

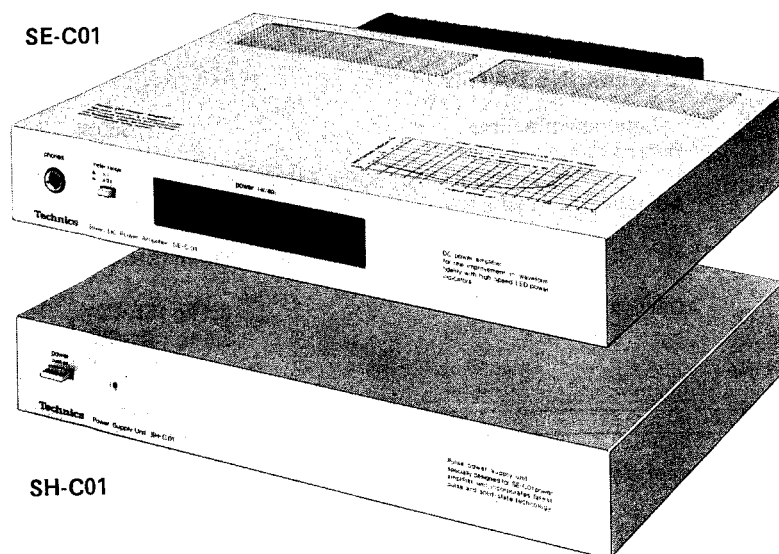
Service Manual

Stereo DC Power Amplifier

SE-C01

Power Supply Unit

SH-C01

(D), (DG), (X), (XA), (XAL),
(XSW), (XGH), (XGF), (XE), (EB)

- * The models SE-C01 (D, DG) and SH-C01 (D, DG) are available in Scandinavia and European only.
- * The models SE-C01 (X, XA) and SH-C01 (X, XA) are available in Asia, Latin America, Middle East and Africa only.
- * The models SE-C01 (XAL) and SH-C01 (XAL) are available in Australia only.
- * The models SE-C01 (XSW) and SH-C01 (XSW) are available in Switzerland only.
- * The models SE-C01 (XGH) and SH-C01 (XGH) are available in Holland only.
- * The models SE-C01 (XGF) and SH-C01 (XGF) are available in France only.
- * The models SE-C01 (XE) and SH-C01 (XE) are available in United Kingdom only.
- * The models SE-C01 (EB) and SH-C01 (EB) are available in Belgium only.

TECHNICAL 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 × 50W (8Ω)
40 Hz~16 kHz continuous power output both channels driven	2 × 50W (8Ω)
1 kHz continuous power output both channels driven	2 × 52W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.03% (8Ω)
rated power at 40 Hz~16 kHz	0.03% (8Ω)
rated power at 1 kHz	0.03% (8Ω)
half power at 20 Hz~20 kHz	0.015% (8Ω)
half power at 1 kHz	0.005% (8Ω)
-26 dB power at 1 kHz	0.03% (8Ω)
50 mW power at 1 kHz	0.05% (8Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.03%
Power bandwidth	
both channels driven, -3 dB	5 Hz~30 kHz (8Ω)
Residual hum and noise	0.1 mV (0.03 mV, IHF, A)
Damping factor	50 (8Ω)

Input sensitivity and impedance	1 V/47kΩ
S/N	105 dB (115 dB, IHF, A)
Frequency response	0~100 kHz, -1 dB
	20 Hz~20 kHz, +0 dB, -0.1 dB
Channel balance, 250 Hz~6,300 Hz	±0.1 dB
Channel separation, 1 kHz	68 dB
Headphones output level and impedance	470 mV/330Ω
Load impedance	8Ω~16Ω

GENERAL

Power consumption	360W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W × H × D)	297 × 49 × 262 mm (SE-C01)
	(11 ¹¹ / ₁₆ × 1 ¹⁵ / ₁₆ × 10 ⁵ / ₁₆) inch
	297 × 49 × 220 mm (SH-C01)
	(11 ¹¹ / ₁₆ × 1 ¹⁵ / ₁₆ × 8 ⁷ / ₁₆) inch
Weight	3.1 kg (6.8 lb.) (SE-C01)
	3.6 kg (7.9 lb.) (SH-C01)

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

Dauertonleistung bei 20 Hz~20 kHz	
beide Kanäle zusammen angesteuert	2 × 50W (8Ω)
Dauertonleistung bei 40 Hz~16 kHz	
beide Kanäle zusammen angesteuert	2 × 50W (8Ω)
Dauertonleistung bei 1 kHz	
beide Kanäle zusammen angesteuert	2 × 52W (8Ω)
Klirrfaktor	
Nennleistung bei 20 Hz~20 kHz	0,03% (8Ω)
Nennleistung bei 40 Hz~16 kHz	0,03% (8Ω)
Nennleistung bei 1 kHz	0,03% (8Ω)
halbe Nennleistung bei 20 Hz~20 kHz	0,015% (8Ω)
halbe Nennleistung bei 1 kHz	0,005% (8Ω)
-26 dB Leistung bei 1 kHz	0,03% (8Ω)
50 mW Leistung bei 1 kHz	0,05% (8Ω)
Intermodulationsverzerrung	
Nennleistung bei 60 Hz: 7 kHz=4:1, SMPTE 8Ω	0,03%
Leistungsbandbreite	
(beide Kanäle zusammen angesteuert bei -3 dB	
5 Hz~30 kHz (8Ω)	
Brummen & Rauschen	0,1 mV (0,03 mV, IHF, A)
Dämpfungsfaktor	50 (8Ω)

Eingangsempfindlichkeit & Impedanz	1 V/47kΩ
S/N	105 dB (115 dB, IHF, A)
Frequenzgang	0~100 kHz, -1 dB
	20 Hz~20 kHz, +0 dB, -0,1 dB
Kanalabweichung, 250 Hz~6 300 Hz	±0,1 dB
Kanaltrennung, 1 kHz	68 dB
Kopfhörerpegel und Ausgangsimpedanz	470 mV/330Ω
Lautsprecher-Ausgangsimpedanz	8Ω~16Ω

ALLGEMEINE DATEN

Leistungsaufnahme	360W
Netzspannung	
Wechselstrom 50 Hz/60 Hz, 110 V/120 V/220 V/240 V	
Abmessungen (B × H × T)	297 × 49 × 262 mm (SE-C01)
	297 × 49 × 220 mm (SH-C01)
Gewicht	3,1 kg (SE-C01)
	3,6 kg (SH-C01)

CARACTERISTIQUES TECHIQUES

Sujet à changement sans préavis.

[DIN 45 500]

PARTIE AMPLIFICATEUR

Puissance de sortie continue de 20 Hz~20 kHz	
les deux canaux en circuit avec distorsion	2 × 50W (8Ω)
Puissance de sortie continue de 40 Hz~16 kHz	
les deux canaux en circuit avec distorsion	2 × 50W (8Ω)
Puissance de sortie continue à 1 kHz	
les deux canaux en circuit avec distorsion	2 × 52W (8Ω)
Distorsion harmonique totale	
à puissance nominale (20 Hz~20 kHz)	0,03% (8Ω)
à puissance nominale (40 Hz~16 kHz)	0,03% (8Ω)
à puissance nominale (1 kHz)	0,03% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,015% (8Ω)
à demi-puissance (1 kHz)	0,005% (8Ω)
puissance de -26 dB (à 1 kHz)	0,03% (8Ω)
puissance de 50 mW (à 1 kHz)	0,05% (8Ω)
Distorsion d'intermodulation	
à puissance nominale 60 Hz: 7 kHz=4:1, 8Ω	0,03%
Largeur de bande de puissance	
les deux canaux en circuit avec distorsion, -3 dB	
5 Hz~30 kHz (8Ω)	

Bruit et ronflement résiduels	0,1 mV (0,03 mV, IHF, A)
Coefficient d'amortissement	50 (8Ω)
Sensibilité et impédance d'entrée	1 V/47kΩ
Signal/Bruit	105 dB (115 dB, IHF, A)
Réponse de fréquence	0~100 kHz, -1 dB
	20 Hz~20 kHz, +0 dB, -0,1 dB
Equilibrage de canaux, 250 Hz~6 300 Hz	±0,1 dB
Séparation des canaux, 1 kHz	68 dB
Niveau de sortie des casques et impédance	470 mV/330Ω
Impédance de charge	8Ω~16Ω

GENERALITES

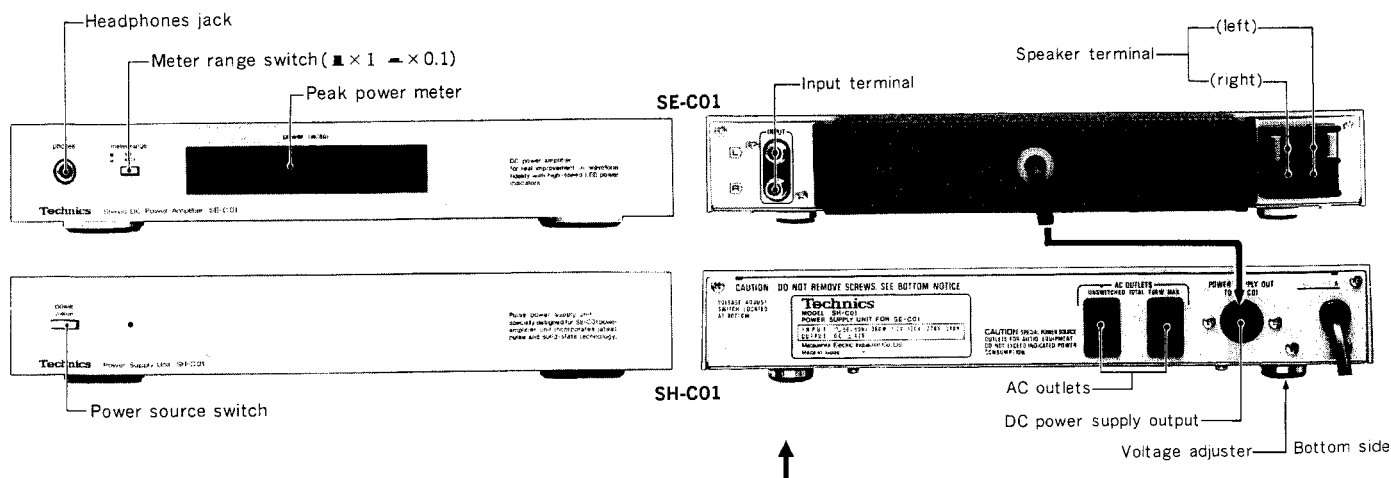
Consommation	360W
Alimentation	CA 50 Hz/60 Hz, 110 V/120 V/220 V/240 V
Dimensions (L × H × Pr)	297 × 49 × 262 mm (SE-C01)
	297 × 49 × 220 mm (SH-C01)
Poids	3,1 kg (SE-C01)
	3,6 kg (SH-C01)

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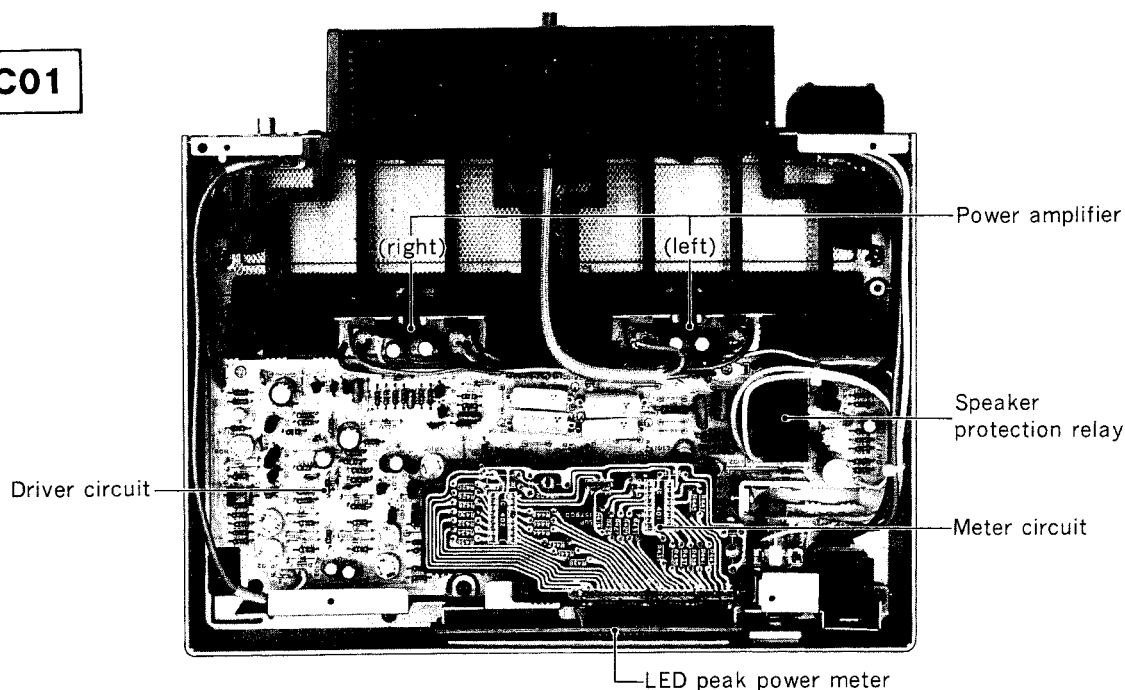
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LOCATION OF CONTROLS



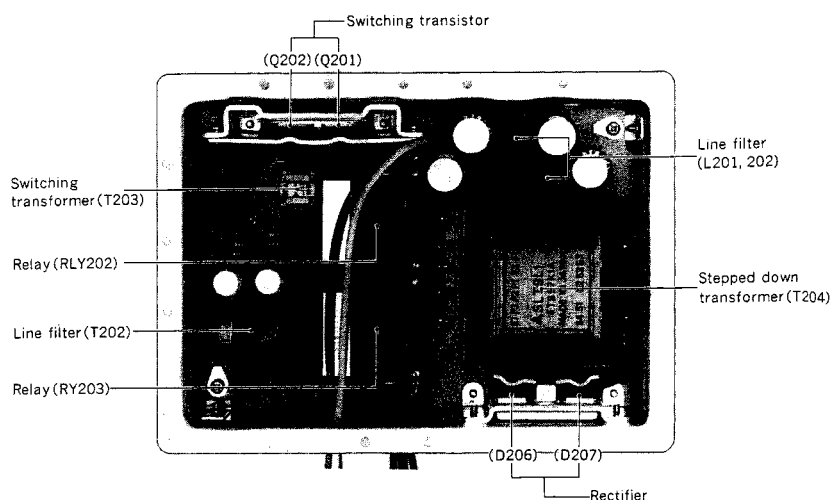
- * This photo shows only the products for (X) and (XA).
- * The products for other destinations except (X) and (XA) are not equipped with AC outlets.

SE-C01

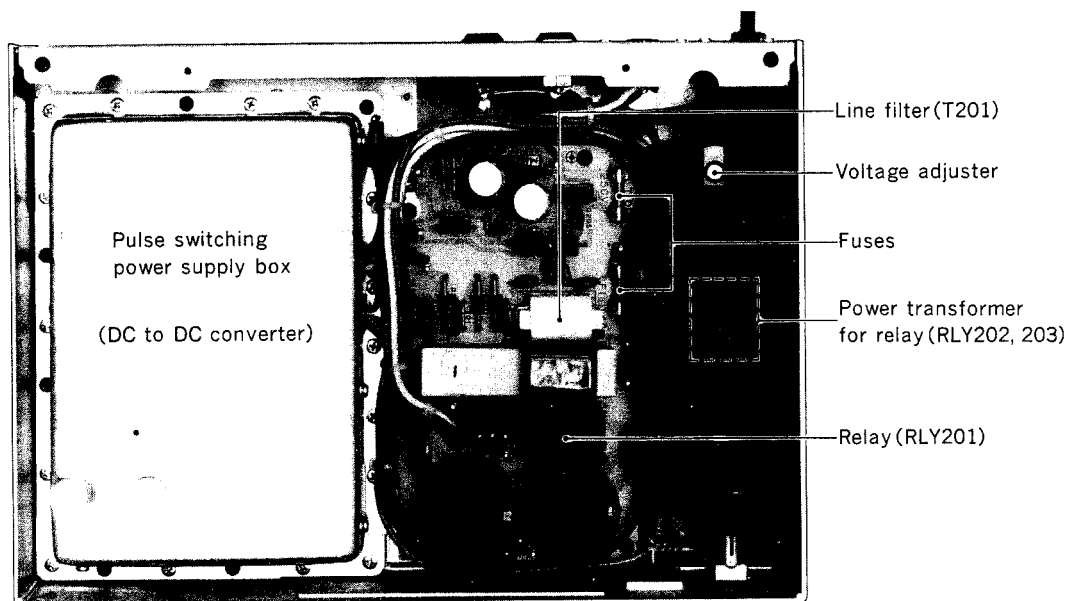


Inside of pulse switching power supply box (SH-C01).

- The inside voltage is very high. Never touch the inside parts without disconnecting the power supply cord from the outlet.
- Do not short-circuit the cables coming out of the box, or otherwise the circuit may be ruined.



SH-C01



■ HOW TO REMOVE CHASSIS(SE-C01)

1. Turn the set upside down and remove 5 setscrews (① ~ ⑥ in Fig. 1) on the bottom board.
2. Remove the bottom board.
3. Remove 4 setscrews (⑦ ~ ⑩ in Fig. 2) which secure heat sink-cover on the rear panel.
4. Remove 4 setscrews (⑪ ~ ⑭ in Fig. 3) which secure chassis and heat sink.
5. Remove 9 setscrews (⑮ ~ ⑳, in Fig. 4) which secure printed circuit board, chassis and heat sink.
6. Hold the heat sink and pull it backward. Then, the cabinet can be removed from the printed circuit board along with the heat sink. (Refer to Fig. 5)
7. When installing, refer to Fig. 4 and pay attention to installing positions.

Also, note that washers are required for some setscrews.

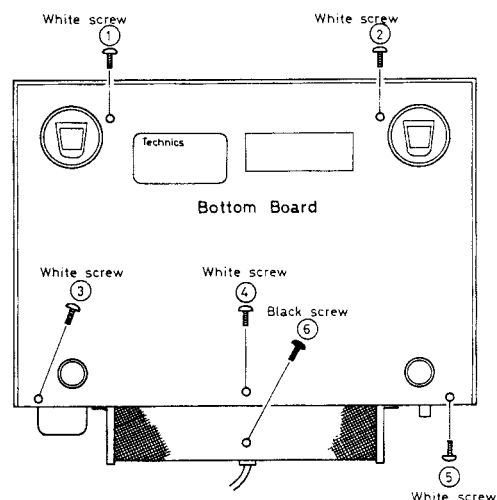


Fig. 1

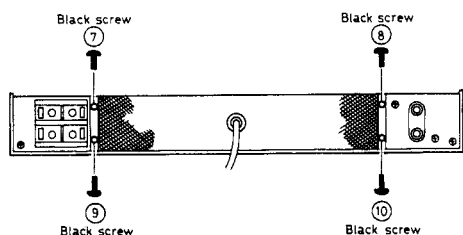


Fig. 2

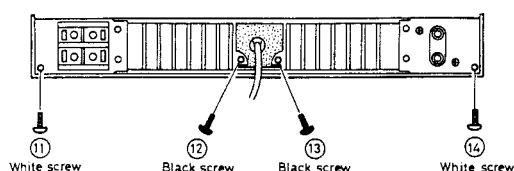


Fig. 3

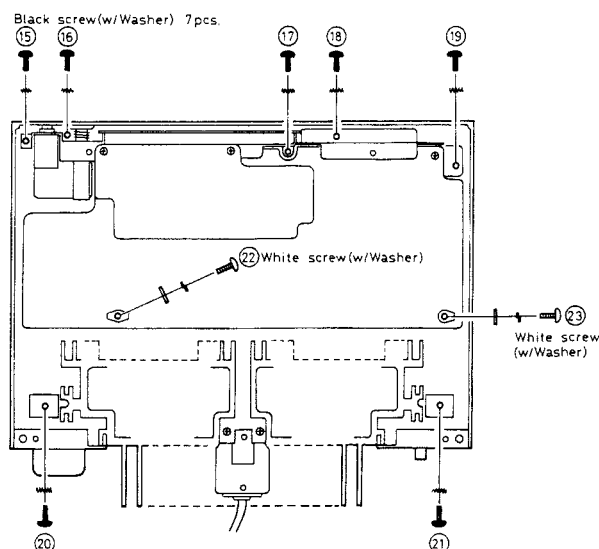


Fig. 4

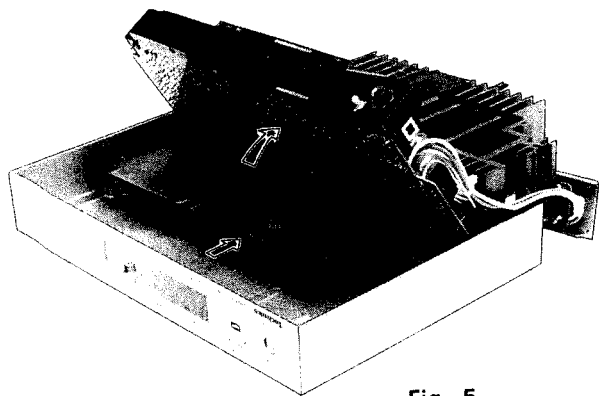


Fig. 5

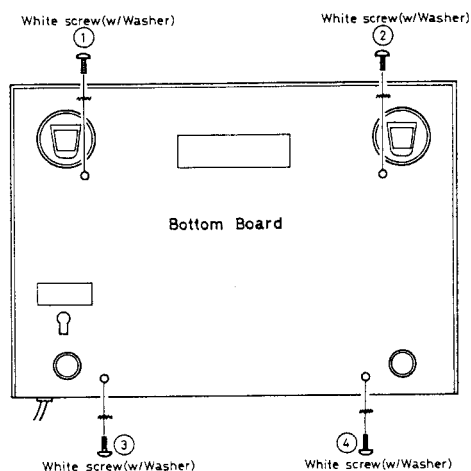


Fig. 6

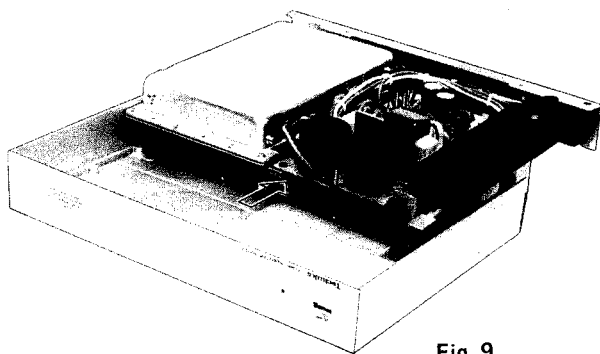


Fig. 9

■ HOW TO REMOVE CHASSIS (SH-C01)

1. Turn the set upside down and remove 4 setscrews (① ~ ④) in Fig. 6) on the bottom board.
2. Remove the bottom board.
3. Remove 2 setscrews (⑤ ~ ⑥ in Fig. 8) on the rear panel.
4. Remove 12 setscrews (⑦ ~ ⑱, in Fig. 7) which secure printed circuit board, chassis and power supply box.
5. Hold the chassis and pull it backward. Then, the cabinet can be removed from the printed circuit board and power supply box. (Refer to Fig. 9)
6. When installing, refer to Fig. 8 and pay attention to installing positions and screw sizes.

Also, note that washers are required for some setscrews.

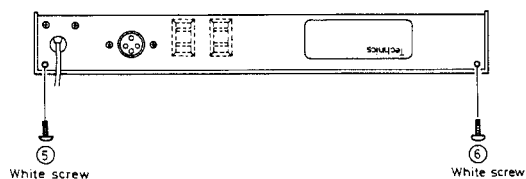


Fig. 7

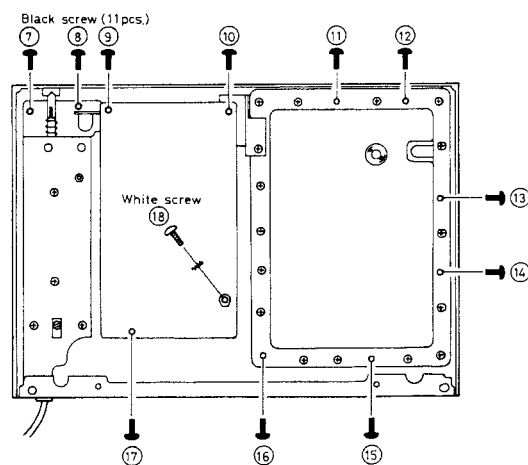


Fig. 8

■ HOW TO REMOVE POWER SUPPLY BOX (SH-C01)

1. Remove 6 setscrews (⑪ ~ ⑯) shown in Fig. 8.
2. Remove power supply box from chassis.
3. Remove 16 setscrews used to secure the cover of power supply box, and then remove cover.
4. Remove 6 setscrews (① ~ ⑥ in Fig. 10) which secure the printed circuit board.
5. Take out printed circuit board.

• Precautions for removal of power supply box

1. Make sure the power supply cord is disconnected from AC outlet.
2. Replace defective gasket with new one.
3. When installing the box, make sure all setscrews are completely tightened. Otherwise, noise may be created.

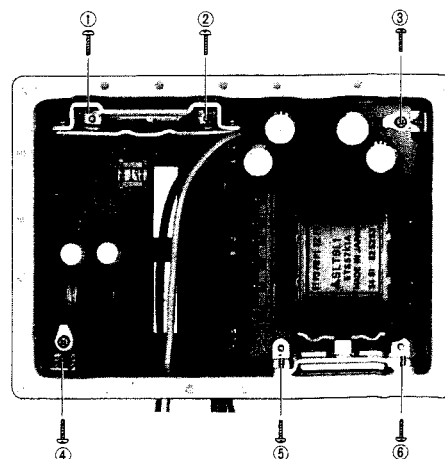


Fig. 10

The diagram illustrates a stereo amplifier system with two channels, Left (L) and Right (R). Each channel consists of an input stage, a differential amplifier, a pre-driver, a driver amplifier, and a power amplifier. The L channel includes a muting section and a speaker protection relay. A central meter range section includes a voltage stabilizer, a log amplifier, and comparators for level indication. The R channel includes a current limiter.

The diagram illustrates the power supply system for the SE-C01. It starts with an AC LINE (110/120/220/240V) entering a switch. The power then flows through a RUSH CURRENT PROTECTION (R201) and a LINE FILTER (T201). A voltage selector switch allows for 110V, 120V, 220V, or 240V input. The power then goes through a PRIMARY RECTIFIER (D201-204) and another LINE FILTER (T202). A 25kHz OSCILLATOR (Q201, 202/T203) and a STARTER (Q203) are connected to the line filter output. The power then flows through a RELAY CIRCUIT POWER SUPPLY and a REGULATOR. The REGULATOR has a voltage selector switch for 110V, 120V, 220V, or 240V. The output of the REGULATOR goes through a RELAY SWITCH (RLY203) and another RELAY SWITCH (RLY202). The power then flows through a STEP-DOWN TRANSFORMER (T204) and a LOW PASS FILTER (L201, 202). The output is DC +42V and DC -42V (To SE-C01).

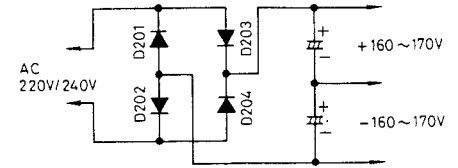
■ TECHNICAL GUIDE

The power supply voltage AC 110V/120V/ 220V or 240V is applied to line filter T201 through resistor R201 for the rush current protection. The line filter serves to prevent switching power supply noise from leaking into AC line. The AC power supply voltage 110V or 120V passed through the line filter and is voltage doubler rectified as shown in Fig. 1, whereas 220V or 240V is bridge-rectified, as shown in Fig. 2, to obtain DC ± 160 to 170V. The DC voltage is applied to the switching circuit through line filter T202 that prevents switching power supply noise. Then the voltage is converted to about 25kHz pulse, and further changed to about ± 42 V pulse by transformer T204, and to direct current by high speed resetting rectifiers D206 and D207, and supplied to power amplifier SE-C01.

6

These are switched by voltage adjuster switch S2-1 which is interlocked with the AC power supply voltage switch S2-2. Incidentally, T207, D208, D209, Q204 and Q205 are forming a power supply circuit for relay to operate relays RLY202 and RLY203.

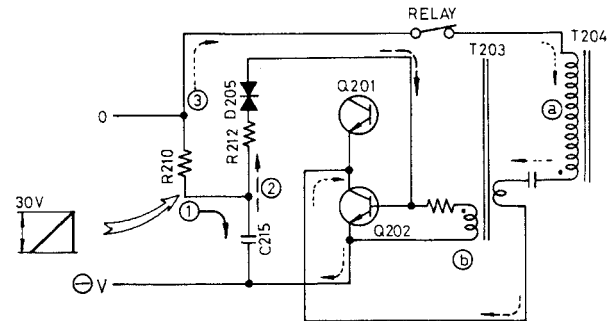
The operation principle of the switching circuit for pulse switching power supply is briefly explained in the following.



(Bridge rectification)

Fig. 2

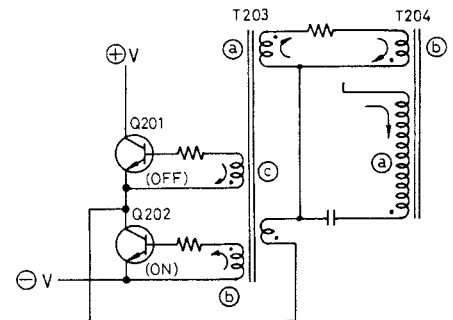
When the power switch is turned on, current flows in the direction of arrow → (① in Fig. 3), starting to charge C215. When the voltage reaches about 30V, trigger diode D205 turns ON, and current flows in the direction of arrow ----- (② in Fig. 3), causing Q202 to turn ON, discharging C215. The current then starts to flow in the direction of arrow ----- (③ in Fig. 3).



(Current generated just after turning the power ON)

Fig. 3

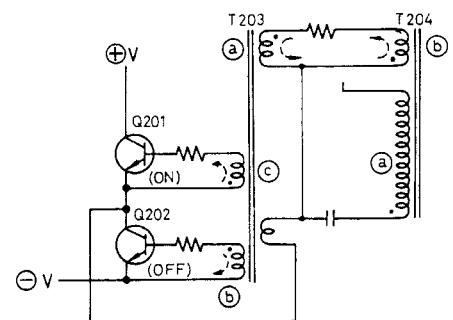
In fig. 4 the pulse current flowing into coil ③ of T204, induces current flow into coil ⑥ in the direction of the arrow, therefore current also flows into coil ③ of T203. Consequently, the current flows into coil ⑥ of T203, causing Q202 to stay turned ON. Because the winding direction of coil ③ of T203 is opposite to that of the other coils, the current in coil ③ flows in the opposite direction, causing Q201 to be OFF.



(Current generated with Q202 turned ON)

Fig. 4

Since the current flowing into coil ③ of T204 is in the same direction, the induced electromotive force will soon reach saturation, and the induced voltage at T203 will rapidly drop, turning Q202 OFF. This sudden drop in voltage causes a reverse electromotive force to be generated at coil ③ of T203. The current then flows as shown in fig. 5 in opposite direction to that shown in fig. 4. As a result, Q202 is reversed biased and turned OFF, while forward bias is applied to Q201 turning it ON.



(Current generated due to counter electromotive force)

Fig. 5

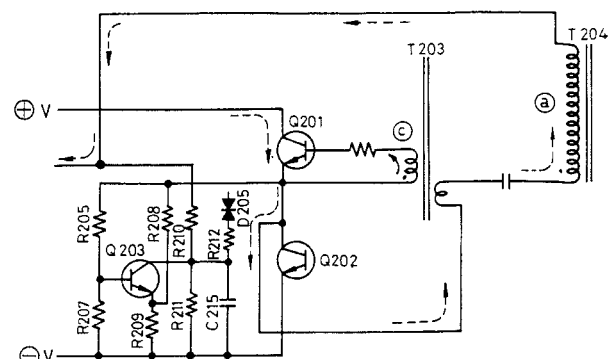
When Q201 is ON, the current flows as shown in fig. 7. Then, as explained above, the voltage soon reaches saturation and the reduced current results in generation of a counter electromotive force, causing Q202 to turn ON. Oscillation occurs due to the repetition of this switching operation. As Q201 is turned ON, bias current flows to Q203, causing it to turn on for the first time. With Q203 turned ON, the charge current to C215 stops flowing keeping D205 turned OFF.

Consequently, bias from D205 is no longer applied to Q202. After Q202 is turned ON initially by D205, its ON-OFF operation continues automatically by the function of Q201 and the coil (self generation). Therefore, it becomes unnecessary to supply any more bias to Q202 with the charge voltage of C215. Transistor Q203 absorbs the charge voltage of C215 thereby protecting trigger diode D205 whose function is no longer required from damage. The collector voltage waveform of Q203 is shown in fig. 6.



(Collector voltage of Q203)

Fig. 6



(Current generated with Q201 turned ON)

Fig. 7

Thus, high frequency pulse oscillation is achieved by regulating the winding direction of the coils in T203 and the frequency of about 25 kHz is determined by the number of turns of the coil. This permits the transformer to be used efficiently and the number of turns of the coil to be reduced. Therefore, the power supply circuit is capable to produce a considerable amount of current for its compact and light weight size.

2. Power ON-OFF muting and DC detector protection circuit SE-C01

This circuit serves to eliminate impact noise generated when the power is turned ON or OFF. When the power switch is turned ON, the power supply voltage will immediately reach operating level. Current flows to D301, causing Q301 to be biased and turned ON. Q302 is OFF at that time.

At the same time the power supply voltage also starts to charge C302. When the voltage at C302 reaches the point (about 1.2 V) at which Q305 starts to operate, Q305 turns ON and subsequently Q306 turns ON causing the relay to be energized. Only then is the output of the power amplifier connected to the speaker terminals.

The time delay for Q305 to turn ON is determined by the time constant of C302 and R308.

When the power switch is turned OFF, the power supply voltage collapses and D301 loses its zener effect (about 16V). Current stops flowing and Q301 turns OFF. With the zener effect lost, Q302 is biased to turn ON. Capacitor C302 discharges, turning OFF both Q305 and Q306, causing the relay to be de-energized.

The DC detector protection circuit. Should direct current appear at the power amplifier output, Q303 or Q304 are turned ON depending on the polarity of the voltage generated at C301. C302 is discharged thus de-energizing the relay. This circuit is intended to protect the speakers from being damaged by direct current at the voice coils. Positive voltage will bias Q304 to turn ON while negative voltage will bias Q303 to be turned ON.

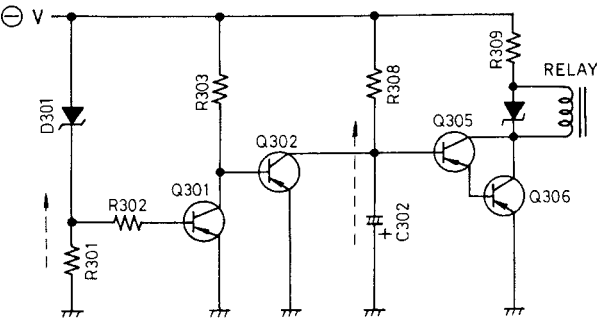


Fig. 8 (Muting circuit)

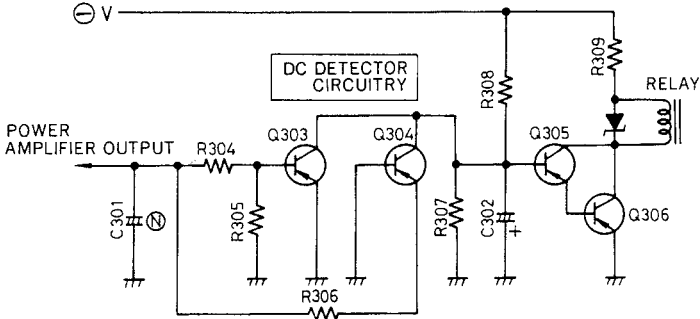


Fig. 9 (DC detector protection circuit)

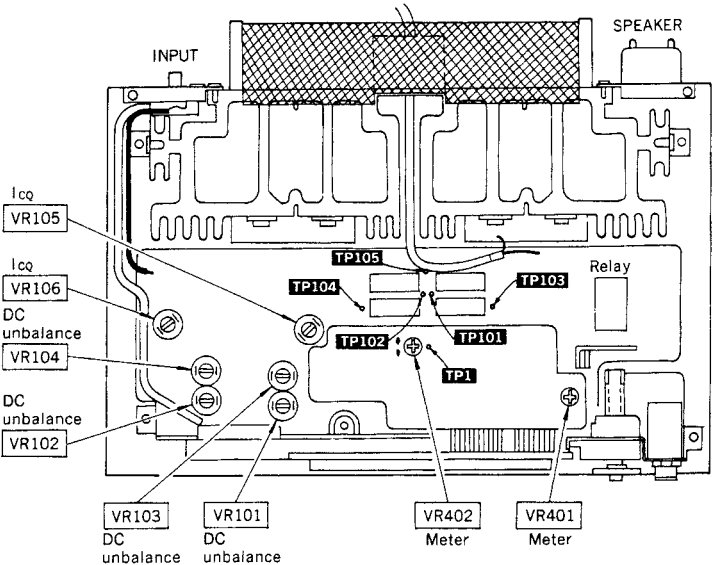
■ ALIGNMENT INSTRUCTIONS ■ ENGLISH ■

SE-C01

[Cautions]

- Precautions for adjustment and repair
- 1. DC power cord of this unit connections to DC output socket of power supply unit SH-C01.
- 2. Main line voltage at rated voltage (SH-C01).
- 3. Do not remove power supply box form chassis except when necessary (SH-C01).
- 4. When carrying out repair after disconnecting the AC cord, short-circuit the ends of condensers (C205, 206, 221, 222) by using resistance of about 5 kilohms (5W) to eliminate charge voltage (SH-C01).
- 5. Input jack of SE-C01 is shorted type: When plug is not inserted, jack is kept in shorted condition.

• Alignment Points



• Setting

Meter range selection switch to "X1" position.

ADJUSTING ITEMS	DC VOLTMETER CONNECTION	ADJUSTING PARTS	ADJUSTING PROCEDURE
DC unbalanced voltage adjustment	Connect it to speaker terminals of L and R channels.	VR103 (L ch.) VR104 (R ch.)	1. Make input terminal short-circuited 2. Adjust it to zero (0) with as small measuring range as possible.
DC unbalanced voltage adjustment	Connect it to speaker terminals of L and R channels.	VR101 (L ch.) VR102 (R ch.)	1. Make input terminal open-circuited. 2. Adjust it to zero (0) with as small measuring range as possible.
ICQ (Idle current of power transistor) adjustment	L ch. { ⊕ side → TP101 ⊖ side → TP103 R ch. { ⊕ side → TP102 ⊖ side → TP104	VR105 (L ch.) VR106 (R ch.)	A few minutes after turning on the power source make the adjustment so that the meter indicates 10mV.

• Adjustment of peak power meter

1. Connect low frequency oscillator to input terminals for both channels, while AC electrovoltmeter to speaker terminal.
 2. Add 1 kHz signal from the low frequency oscillator, and then change the input level so that the AC electrovoltmeter indicates 18V.
 3. Adjust **VR401** (Lch) while observing the power level indicator so that the 40W LED (red) is about to light up.
 4. Next, adjust **VR402** (Rch) in the same way.
- At that time, if the indication for Lch somewhat changes, correct VR401.

■ ABGLEICHANWEISUNGEN DEUTSCH

• Stellungszustand

Meßbereichschalter X1

Abgleich	Anschluß des Gleichstrom-Voltmessers	Abgleichspunkte	Abgleichsverfahren
Unausgeglichene Gleichspannung	An die Lautsprecherklemmen für L- und R-Kanal parallel mit Widerstand den Messer anschließen.	VR103 (L) VR104 (R)	(1) Eingangsklemme kurzschließen. (2) Mit möglichst kleinem Meßbereich den Messer auf Null (0) abgleichen.
Unausgeglichene Gleichspannung	An die Lautsprecherklemmen für L- und R-Kanal parallel mit Widerstand den Messer anschließen.	VR101 (L) VR102 (R)	(1) Eingangsklemme öffnen. (2) Mit möglichst kleinem Meßbereich den Messer auf Null (0) abgleichen.
ICQ (Leerlauf der Leistung TR)	(+) Seite TP101 } L-Kanal (-) Seite TP103 } (+) Seite TP102 } R-Kanal (-) Seite TP104 }	VR105 (L) VR106 (R)	Ein paar Minuten nach Einschalten der Netzschaltung auf ca 10 mV abgleichen.

• Einstellung des Spitzenleistungsmeters

- 1) NF-Oszillator an Eingangsklemmen für beide Kanäle, und Wechselstrom-Elektronenvoltmeter an Lautsprecherklemme anschließen.
- 2) 1 kHz Signal aus dem NF-Oszillator geben, dann Eingangspegel so einstellen, daß Wechselstrom-Elektronenvoltmeter 18 V anzeigt.
- 3) Unter Beobachten auf Leistungspegelanzeiger **VR401** (L-Kanal) so einstellen, daß 40W LED (rot) fast aufzuleuchten beginnt.
- 4) Anschließend **VR402** (R-Kanal) in gleicher Weise einstellen. Dabei VR401 korrigieren, wenn sich die Anzeige für L-Kanal etwas ändert.

■ INSTRUCTIONS D'ALIGNEMENT FRANÇAIS

• Conditions de l'appareil

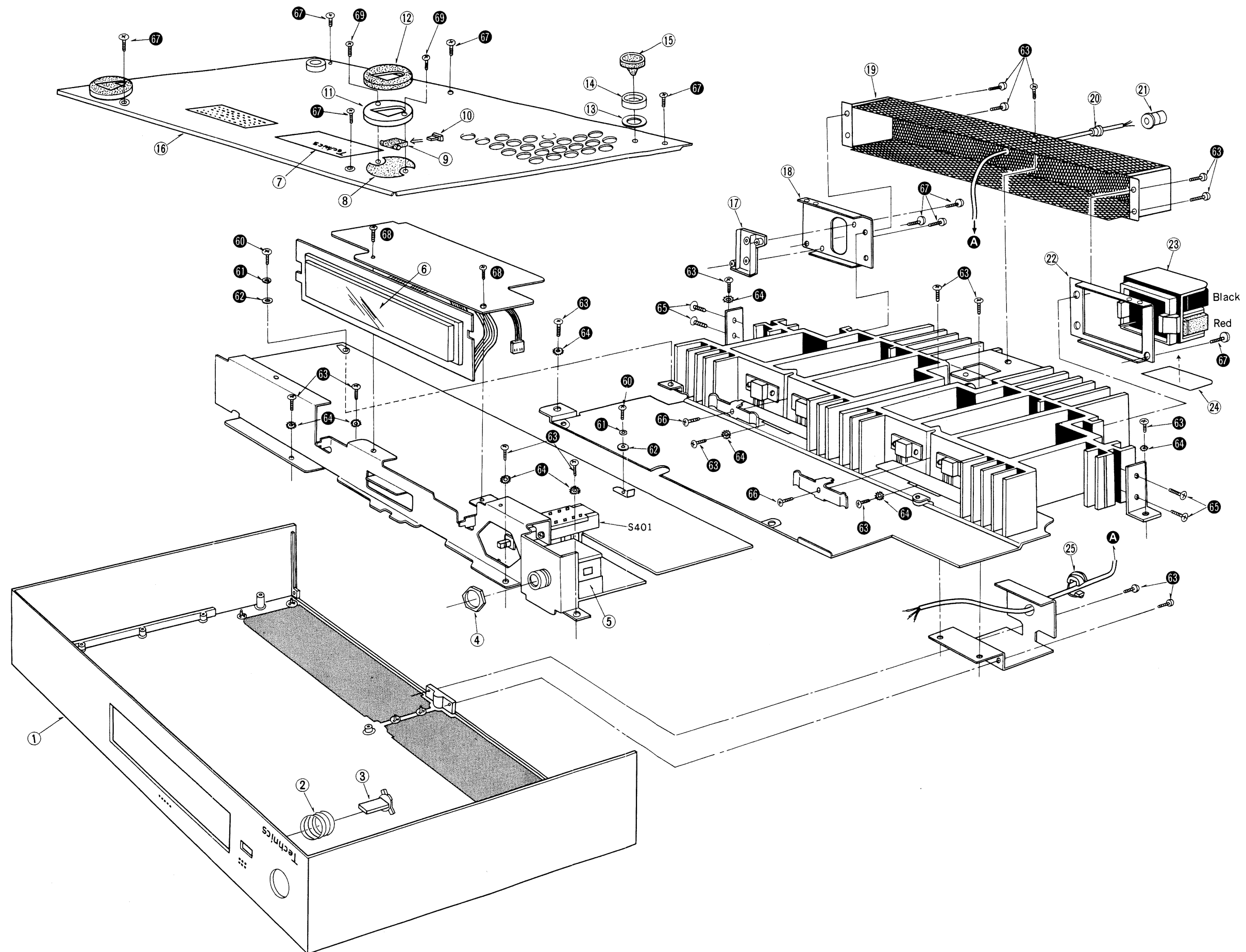
Commutateur de la gamme du compteur X1

Réglages	Branchements du voltmètre CC	Sections à régler	Procédé de réglage
Tension CC déséquilibrée	Brancher le compteur aux bornes des canaux D et G du haut-parleur en parallèle avec la résistance.	VR103 (Canal G) VR104 (Canal D)	(1) Court-circuiter la borne d'entrée. (2) Régler le compteur sur "0" avec une gamme de mesure aussi petite que possible.
Tension CC déséquilibrée	Brancher le compteur aux bornes des canaux G et D du haut-parleur, en parallèle avec la résistance.	VR101 (Canal G) VR102 (Canal D)	(1) Ouvrir le circuit la borne d'entrée. (2) Régler le compteur sur "0" avec une gamme de mesure aussi petite que possible.
ICQ (Courant de temps mort du transformateur d'alimentation)	Côté (+) TP101 } Canal G Côté (-) TP103 } Côté (+) TP102 } Canal D Côté (-) TP104 }	VR105 (Canal G) VR106 (Canal D)	Le régler à environ 10mV quelques minutes après avoir branché l'alimentation.

• Réglage du compteur de puissance de drête

- 1) Brancher un oscillateur de basse fréquence aux bornes d'entrée des deux canaux, le voltmètre électronique CA étant branché à la borne des enceintes.
 - 2) Appliquer un signal de 1 kHz par l'oscillateur de basse fréquence, puis modifier le niveau d'entrée de telle sorte que le voltmètre électronique indique 18V.
 - 3) Régler le **VR401** (Canal Gauche) tout en observant le témoin de niveau de puissance, de telle sorte que la LED (diode à lueurs) rouge de 40W, soit sur le point de s'allumer.
 - 4) Végler le **VR402** (Canal Droit) de la même façon.
- A cette étape, si l'indication du canal gauche est quelque peu modifiée, la corriger par le VR401.

■ EXPLODED VIEW (SE-C01)



■ REPLACEMENT PARTS LIST Cabinet and Chassis Parts

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

(SE-C01)

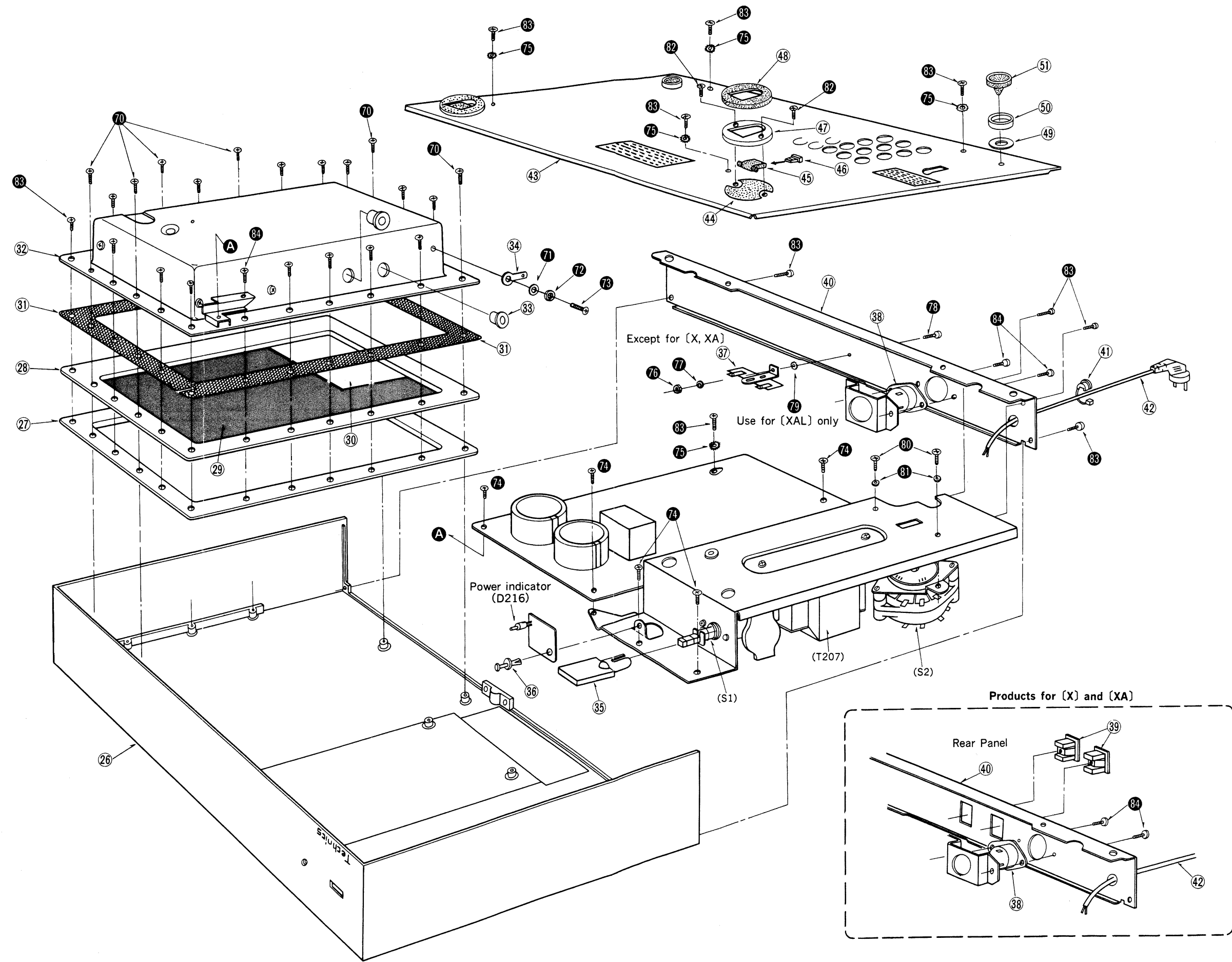
Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
1	SGWEC01D	Cabinet, with Front Panel Ass'y
2	SUS123-2	Spring, Meter Range Switch Button
3	SBC205-1	Button, Meter Range Push Switch
4	XNSS12	Nut, Headphones Jack M'tg
5	XCJ6P21E-A	Jack, Headphones
6	SWV3-2	Meter, LED Peak Power
7 [D, XSW] only	SGT19190	Name Plate, Product for [D] and [XSW]
7	SGT19530	Name Plate, The other products
8	SHS2411	Fiber, Front Side Feet
9	SKX259	Stand Foot, Front Side
10	SHG1493	Rubber Cushion, Stand Feet
11	SKL217	Foot, Front Side
12	SHG1485	Rubber Cushion, Front Feet
13	SHR5013	Washer, Rear Side Feet
14	SGX803	Ring, Rear Side Feet
15	SHG1487	Foot, Rear Side
16	SKUEC01D	Bottom Board
17	SJF3225SA	Terminal, Input
18	SGP1450-1A	Rear Panel, Input Terminal M'tg
19	SGM69	Cover, Heat Sink
20	SHR129	Bushing, DC Power Supply Input Cord
21	SJP6305-1	Plug, DC Power Supply Input
22	SGP1470-1A	Rear Panel, Speaker Terminal M'tg
23	SJFA5403	Terminal, Speaker
24	SGK1285	Label, Speaker Terminal
25	RHR110-1	Bushing, DC Power Supply Cord
SCREWS and WASHERS		
⑩	XSN3+8BNS	Screw, P.C.B. M'tg
⑪	XWA38FN	Washer, Spring
⑫	XWG3FN	Washer
⑬	XTB3+8BFZ	Screw, Chassis M'tg (Black)
⑭	XWC3	Washer
⑮	XTB4+8BFZ	Screw, Heat Sink M'tg (Black)
⑯	XTB3+16BFZ	Screw, Power Transistor M'tg (Black)
⑰	XTB3+8BFN	Screw, Rear Panel & Bottom Board M'tg
⑱	XTB3+8B	Screw, P.C.B. M'tg
⑲	XSS3+6S	Screw, Front Side Feet M'tg

- * (D, DG) are available in Scandinavia and European only.
- * (X, XA) are available in Asia, Latin America, Middle East and Africa only.
- * (EB) is available in Belgium only.
- * (XSW) is available in Switzerland only.
- * (XGF) is available in France only.
- * (XGF) is available in Holland only.
- * (XE) is available in United Kingdom only.
- * (XAL) is available in Australia only.

(SH-C01)

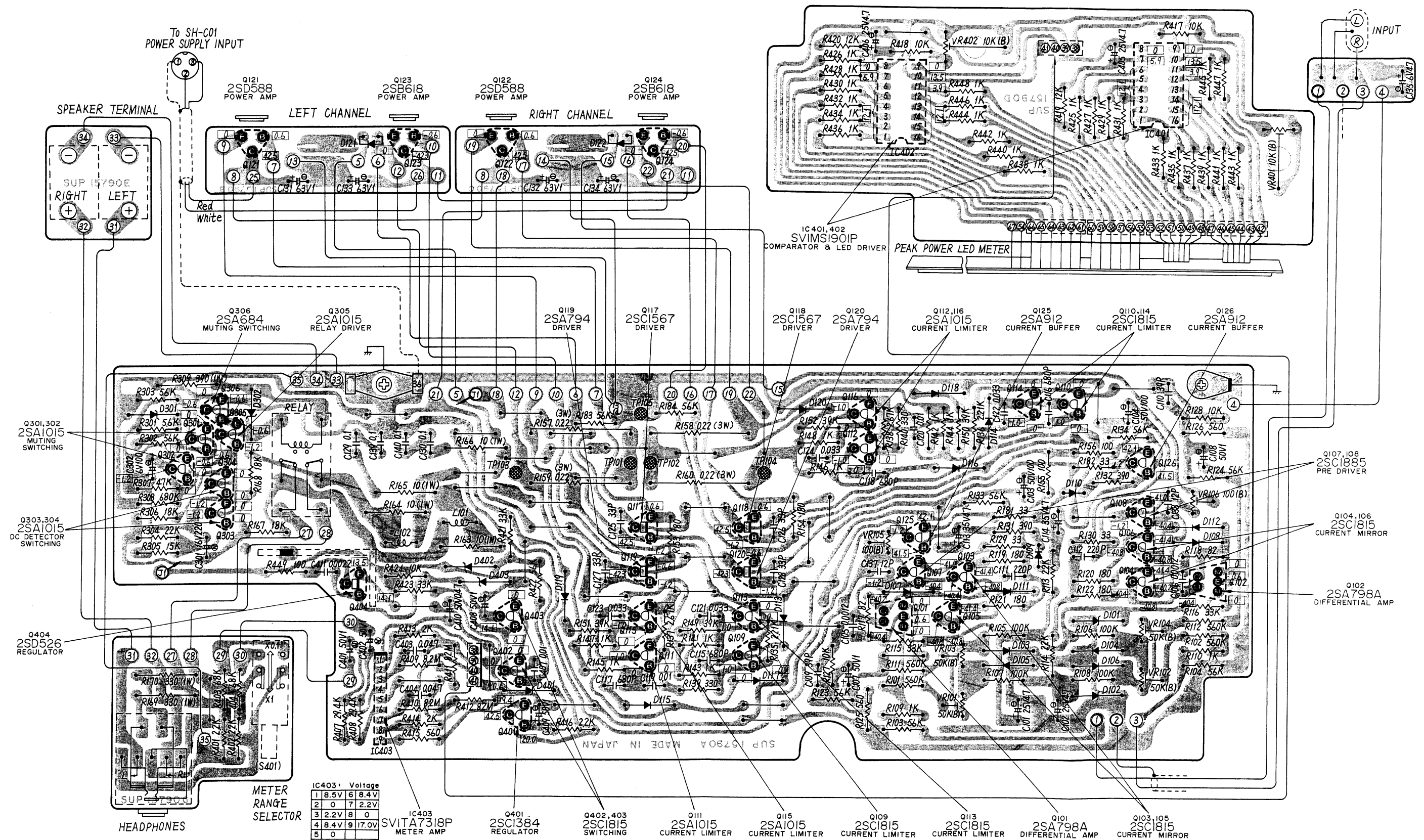
Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
26	SGWHC01D	Cabinet, with Front Panel Ass'y
27	SMC651	Cover, Power Supply Box
28	SMC649	Cover, Power Supply Box
29	SMX261	Sheet, Shield
30	SMX259	Sheet, Shield
31	SMC653	Gasket
32	SMC647	Case, Power Supply Box
33	RHR110	Bushing, Lead Wire
34	RJT202B	Lug Terminal, Ground
35	SBC207-1	Button, Power Siwtch
36	SHR401-1	Latch, LED Indicator P.C.B. M'tg
37 Except [X, XA]	SJR205	Terminal Strip, 2 pin (Except products for [X, XA])
38	SJS5309	Socket, DC Output
39 [X, XA] only Δ	SJSA66-1	Socket, AC Outlet (Use only for [X, XA])
40 [D, XSW]	SGP1770A	Rear Panel
40 [X, XA]	SGP1770-1A	Rear Panel
40 [XE, XGF, EB, XGH, DG]	SGPHC01E	Rear Panel, SGP1770A with Name Plate (SGT19670)
40 [XAL]	SGPHC01L	Rear Panel, SGP1770-2A with Name Plate (SGT19690)
41	SHR127	Bushing, AC Cord (Except for [XE, XAL])
41 [XE] only	SHR129	Bushing, AC Cord
41 [XAL] only	SHR131	Bushing, AC Cord
42	SJA97	AC Cord (Except for [XSW, XE, XAL])
42 [XSW] only Δ	SJA111	AC Cord, with Plug
42 [XE] only Δ	RJA452C	AC Cord
42 [XAL] only Δ	QFC1207M	AC Cord, with Plug
43	SKUHC01D	Bottom Board
44	SHS2411	Fiber, Front Side Feet
45	SKX259	Stand Foot, Front Side
46	SHG1493	Rubber Cushion, Stand Feet
47	SKL217	Foot, Front Side
48	SHG1485	Rubber Cushion, Front Feet
49	SHR5013	Washer, Rear Side Feet
50	SGX803	Ring, Rear Side Feet
51	SHG1487	Foot, Rear Side
SCREWS and WASHERS		
⑩	XTB3+10BFZ	Screw, Power Supply Box M'tg (Black)
⑪	XWG3FN	Washer
⑫	XWA38FN	Washer, Spring
⑬	XSN3+8BNS	Screw, Lug Terminal M'tg
⑭	XTB3+6BFZ	Screw, P.C.B. M'tg (Black)
⑮	XWC3B	Washer
⑯	XNG3BS	Nut, 2P Terminal Strip M'tg
⑰ Except for [XAL]	XWA3B	Washer, Spring
⑱ [XAL] only	XSB3+8BNS	Screw, 2P Terminal Strip M'tg
	XWC3B	Washer
⑲	XSN3+6FZS	Screw, Voltage Adjuster Switch M'tg (Black)
⑳	XWA38FZ	Washer, Spring
㉑	XSS3+6S	Screw, Front Side Feet M'tg
㉒	XTB3+8BFN	Screw, Power Supply Box & Chassis M'tg
㉓	XTB3+10BFN	Screw, Power Supply Box & P.C.B. M'tg

■ EXPLODED VIEW (SH-C01)



■ PRINTED CIRCUIT BOARD WIRING VIEW (SE-C01)

Earth (Ground) Lines



REPLACEMENT PARTS LIST Electric Part

- Notes: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts order.
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(SE-C01)

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC401, 402 IC403	SVIMS1901P SVITA7318P	IC, Voltage Comparator IC, Logarithm Meter Amplifier
TRANSISTORS		
Q101, 102	2SA798A-G2	Transistor, Differential Amplifier (Use in ranks H2 or G2)
Q103, 104, 105, 106, 109, 110, 113, 114	2SC1315-O	Transistor, Current Mirror & Current Limiter (Use in ranks Y or O)
Q107, 108	2SC1885-R	Transistor, Pre Drive Amplifier (Use in ranks Q or R)
Q111, 112, 115, 116	2SA1015-O	Transistor, Current Limiter (Use in ranks Y or O)
Q117, 118	2SC1567-Q	Transistor, Drive Amplifier (Use in ranks Q or R)
Q119, 120	2SA794-Q	Transistor, Drive Amplifier (Use in ranks Q or R)
Q121, 122	2SD588-R2	Transistor, Power Amplifier (Use in ranks R2 or S2)
Q123, 124	2SB618-R2	Transistor, Power Amplifier (Use in ranks R2 or S2)
Q125, 126	2SA912-R	Transistor, Current Buffer (Use in ranks Q or R)
Q301, 302, 303, 304, 305	2SA1015-O	Transistor, Power Muting & DC Detector - Switching (Use in ranks Y or O)
Q306	2SA684NC-R	Transistor, Relay Driver (Use in ranks Q or R)
Q401 Q402, 403	2SC1384A-R 2SC1815-O	Transistor, Regulator (Use in ranks Q or R) Transistor, LED Muting Switching (Use in ranks Y or O)
Q404	2SD588-R	Transistor, Regulator (Production Part No. is 2SD526)
DIODES		
D101, 102, 401 D103 ~ 108, 111 ~ 116	MA1220 MA150	Diode, Zener 22V Diode, Bias Supply
D109, 110 D117 ~ 120	SVDMA26-1 MA162	Diode, Bias Supply Diode, Protection
D121, 122	SVDSTV4HG	Diode, Thermal Compensation
D301	SVDMZ316B	Diode, Zener 16V
D302	SVDMZ424B	Diode, Zener 24V
D402	SVDMZ318B	Diode, Zener 18V
D403	SVDMZ314B	Diode, Zener 14V
COILS		
L101, 102	SLQY15G-1U	Coil, Power Output
VARIABLE RESISTORS		
VR101 ~ 104 VR105, 106 VR401, 402	EVTR4AA00B54 EVT12AA00B12 EVLS3AA00B14	DC Unbalance Adjustment, 50kΩ (B) ICQ Adjustment, 100Ω (B) Power Level Indicator Adjustment, 10kΩ (B)
RELAY		
RELAY	SSY69	Relay, Speakers Protection & Muting
SWITCH		
S401	SSH83	Switch, Meter Range Selector

(SH-C01)

Ref. No.	Part No.	Part Name & Description
TRANSISTORS		
Q201, 202	2SC2335-K	Transistor, Pulse Switching (Use in ranks L or K)
Q203	2SC1815-O	Transistor, Pulse Switching (Use in ranks Y or O)
Q204 Q205	2SA912-R 2SA794-Q	Transistor, Regulator (Use in ranks Q or R) Transistor, Regulator (Use in ranks Q or R)
DIODES		
D201, 202, 203 204	Δ SVDS3V60	Rectifier
D205	Δ SVDN413	Diode, Trigger
D206	Δ SVDCTU22R	Rectifier, High Sped Resetting, (—)
D207	Δ SVDCTU22S	Rectifier, High Sped Resetting, (+)
D208	Δ SVDM1152R	Rectifier, (—)
D209	Δ SVDM1152	Rectifier, (+)
D210	SVDMZ436A	Diode, Zener 36V
D211	MA150	Diode, Zener 36V
D212	SVDMZ424B	Diode, Zener 24V
D213, 214, 215	SM112	Diode, Relay Pulse Killer
D216	SVDGD4203SRD	Light Emitting Diode
COILS and TRANSFORMERS		
L201, 202	SLQW101-5	Coil, Low Pass Filter (10μH)
T201	Δ ELF18D112	Transformer, Line Filter
T202	Δ SLL18D1	Transformer, Line Filter
T203	Δ SLT9C1	Transformer, Oscillator
T204	Δ SLT9L1	Transformer, Output
T207	Δ SLT5J81	Transformer, Relay Power Supply
T207 [XE, XAL] only	Δ SLT5J89	Transformer, Relay Power Supply
COMPONENT COMBINATIONS		
Z201 ~ 204	RXAF103P22HD	Component Combination, 0.01μF (X2)
FUSES		
F1 F1 [XE] only F2 F201	Δ XBA2C40TRO Δ XBAS2C40T1A Δ XBA2C01TRO EYP2AS109	Fuse, T4A (250V) Fuse, T4A (250V) Fuse, T100mA (250V) Thermal Fuse, 125V 109°C
RELAYS		
RLY201 ~ 203	SSY67	Relay, Power & Transformer Coil Tap Selection
SWITCHES		
S1 S2	Δ SSH119 Δ SSR53S	Switch, Power Source Switch, Voltage Adjuster

 Earth (Ground) Lines

■ REPLACEMENT PARTS LIST Electric Parts

(SE-C01)

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
RESISTORS					
R101, 102	ERD25TJ564	Carbon, 560kΩ, 1/4W, ± 5%	R415	ERD25FJ561	Carbon, 560Ω, 1/4W, ± 5%
R103, 104	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%	R416	ERD25TJ222	Carbon, 2.2kΩ, 1/4W, ± 5%
R105, 106	ERD25TJ104	Carbon, 100kΩ, 1/4W, ± 5%	R417, 418	ERD25TJ103	Carbon, 10kΩ, 1/4W, ± 5%
R107, 108	ERD25TJ104	Carbon, 100kΩ, 1/4W, ± 5%	R419, 420	ERD25TJ123	Carbon, 12kΩ, 1/4W, ± 5%
R109, 110	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%	R421	ERD25TJ332	Carbon, 3.3kΩ, 1/4W, ± 5%
R111, 112	ERD25TJ564	Carbon, 560kΩ, 1/4W, ± 5%	R422	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%
R113, 114	ERD25TJ222	Carbon, 2.2kΩ, 1/4W, ± 5%	R423	ERD25TJ333	Carbon, 33kΩ, 1/4W, ± 5%
R115, 116	ERD25TJ333	Carbon, 33kΩ, 1/4W, ± 5%	R424	ERD25TJ103	Carbon, 10kΩ, 1/4W, ± 5%
R117, 118	ERD25TJ820	Carbon, 82Ω, 1/4W, ± 5%	R425, 426	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R119, 120	ERD25FJ181	Carbon, 180Ω, 1/4W, ± 5%	R427, 428	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R121, 122	ERD25FJ181	Carbon, 180Ω, 1/4W, ± 5%	R429, 430	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R123, 124	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%	R431, 432	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R125, 126	ERO25CKF5600	Metal film, 560Ω, 1/4W, ± 1%	R433, 434	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R127, 128	ERO25CKF1002	Metal film, 10kΩ, 1/4W, ± 1%	R435, 436	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R129, 130	ERD25FJ330	Carbon, 33Ω, 1/4W, ± 5%	R437, 438	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R131, 132	ERD25FJ391	Carbon, 390Ω, 1/4W, ± 5%	R439, 440	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R133, 134	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%	R441, 442	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R135, 136	ERO25CKF2211	Metal film, 2.21kΩ, 1/4W, ± 1%	R443, 444	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R137, 138	ERO25CKF2671	Metal film, 2.67kΩ, 1/4W, ± 1%	R445, 446	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R139, 140	ERD25TJ331	Carbon, 330Ω, 1/4W, ± 5%	R447, 448	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%
R141, 142	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%	R449	ERD25FJ101	Carbon, 100Ω, 1/4W, ± 5%
R143, 144	ERO25CKF1001	Metal film, 1kΩ, 1/4W, ± 1%	CAPACITORS		
R145, 146	ERO25CKF1001	Metal film, 1kΩ, 1/4W, ± 1%	C101, 102	ECEA1ES470	Electrolytic, 47μF, 25V
R147, 148	ERD25TJ102	Carbon, 1kΩ, 1/4W, ± 5%	C103, 104	ECEA1HS101	Electrolytic, 100μF, 50V
R149, 150	ERD25TJ393	Carbon, 39kΩ, 1/4W, ± 5%	C105, 106	ECQM1H122KZ	Polyester, 0.0012μF, 50V, ±10%
R151, 152	ERD25TJ393	Carbon, 39kΩ, 1/4W, ± 5%	C107, 108	ECEA50M1R	Electrolytic, 1μF, 50V
R153, 154	ERD25FJ181	Carbon, 180Ω, 1/4W, ± 5%	C109, 110	ECCD1H390K	Ceramic, 39pF, 50V, ±10%
R155, 156	ERD25FJ101	Carbon, 100Ω, 1/4W, ± 5%	C111, 112	ECKD1H221KB	Ceramic, 220pF, 50V, ±10%
R157, 158	ERF3AKR22	Non-Flammable, 0.22Ω, 3W, ±10%	C113, 114	ECEA1HS470	Electrolytic, 47μF, 50V
R159, 160	ERF3AKR22	Non-Flammable, 0.22Ω, 3W, ±10%	C115, 116	ECKD1H681KB	Ceramic, 680pF, 50V, ±10%
R163, 164	ERG1ANJ100	Metal oxide, 10Ω, 1W, ± 5%	C117, 118	ECKD1H681KB	Ceramic, 680pF, 50V, ±10%
R165, 166	ERG1ANJ100	Metal oxide, 10Ω, 1W, ± 5%	C119, 120	ECQM1H103KZ	Polyester, 0.01μF, 50V, ±10%
R167, 168	ERD25TJ183	Carbon, 18kΩ, 1/4W, ± 5%	C121, 122	ECQM1H333KZ	Polyester, 0.033μF, 50V, ±10%
R169, 170	ERG1ANJ331	Metal oxide, 330Ω, 1W, ± 5%	C123, 124	ECQM1H333KZ	Polyester, 0.033μF, 50V, ±10%
R181, 182	ERD25FJ330	Carbon, 33Ω, 1/4W, ± 5%	C125, 126	ECCD2H330K	Ceramic, 33pF, 500V, ±10%
R183, 184	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%	C127, 128	ECCD2H330K	Ceramic, 33pF, 500V, ±10%
R301	ERD25TJ562	Carbon, 5.6kΩ, 1/4W, ± 5%	C129, 130	ECQM1H104KZ	Polyester, 0.1μF, 50V, ±10%
R302, 303	ERD25TJ563	Carbon, 56kΩ, 1/4W, ± 5%	C131, 132	ECEA63T1E	Electrolytic, 1μF, 63V
R304	ERD25TJ223	Carbon, 22kΩ, 1/4W, ± 5%	C133, 134	ECEA63T1E	Electrolytic, 1μF, 63V
R305	ERD25TJ153	Carbon, 15kΩ, 1/4W, ± 5%	C135	ECEA1AS470	Electrolytic, 47μF, 10V
R306	ERD25TJ183	Carbon, 18kΩ, 1/4W, ± 5%	C137, 138	ECCD2H120K	Ceramic, 12pF, 500V, ±10%
R307	ERD25TJ473	Carbon, 47kΩ, 1/4W, ± 5%	C139, 140	ECQM1H104KZ	Polyester, 0.1μF, 50V, ±10%
R308	ERD25TJ684	Carbon, 680kΩ, 1/4W, ± 5%	C301	ECEA16N220	Non-Polar Electrolytic, 220μF, 16V
R309	ERG1ANJ391	Metal oxide, 390Ω, 1W, ± 5%	C302	ECEA1AS101	Electrolytic, 100μF, 10V
R401, 402	ERD25TJ222	Carbon, 2.2kΩ, 1/4W, ± 5%	C401, 402	ECEA50N1	Non-Polar Electrolytic, 1μF, 50V
R403, 404	ERD25TJ683	Carbon, 68kΩ, 1/4W, ± 5%	C403, 404	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
R407, 408	ERO25CKF2942	Metal film, 29.4kΩ, 1/4W, ± 1%	C405, 406	ECEA25Z4R7	Electrolytic, 4.7μF, 25V
R409, 410	ERC14GK825	Solid, 8.2MΩ, 1/4W, ±10%	C407	ECQM1H103KZ	Polyester, 0.01μF, 50V, ±10%
R411, 412	ERC14GK825	Solid, 8.2MΩ, 1/4W, ±10%	C408, 409	ECEA50Z1	Electrolytic, 1μF, 50V
R413, 414	ERO25CKF2001	Metal film, 2kΩ, 1/4W, ± 1%	C410	ECEA50ZR47	Electrolytic, 0.47μF, 50V
			C411	ECKD1H222KB	Ceramic, 0.0022μF, 50V, ±10%

(SH-C01)

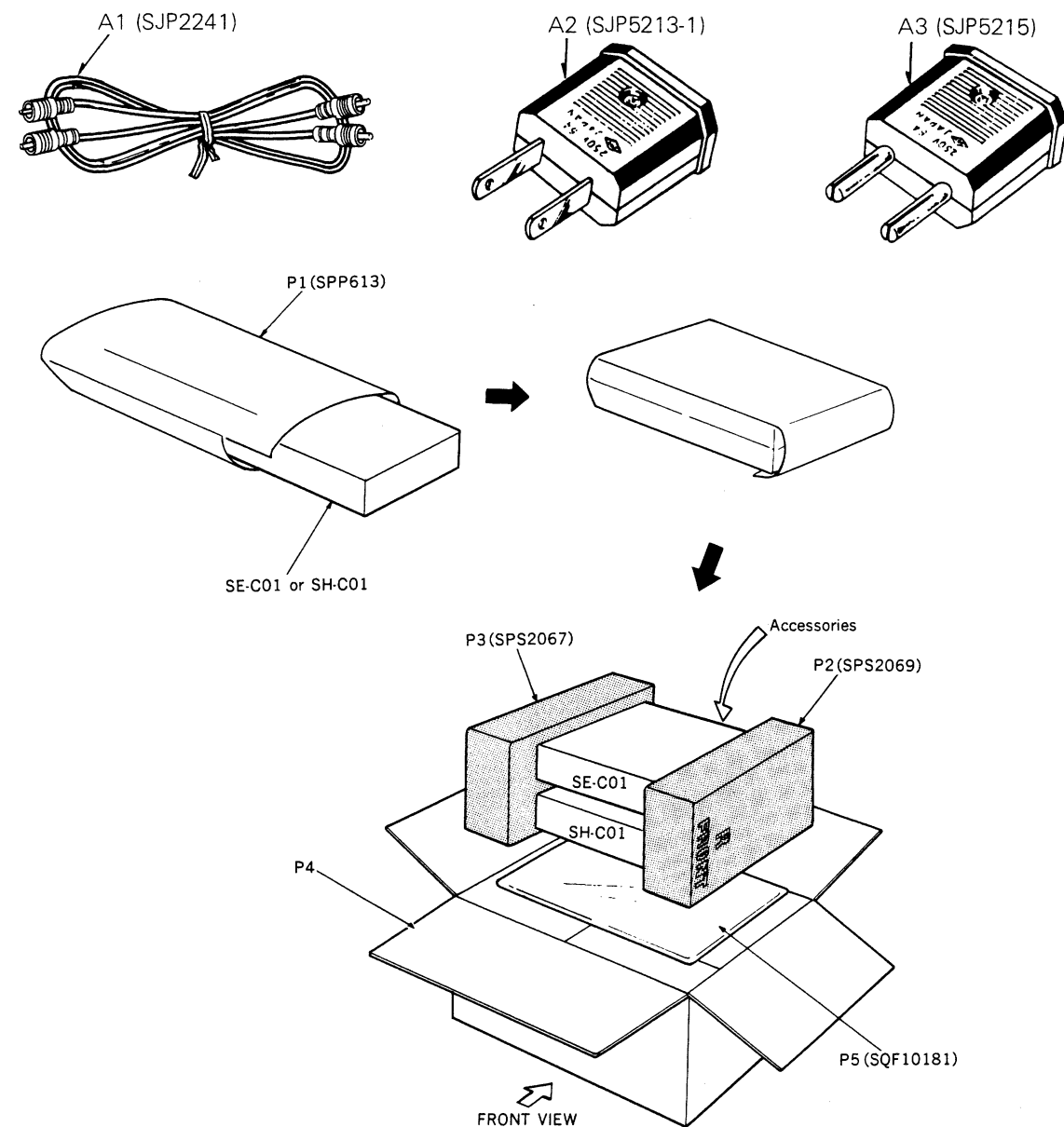
Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
RESISTORS					
R201	ERF30HJ270B	Non-Flammable, 27Ω, 30W, ± 5%	C201, 202	ECKD2H103P	Ceramic, 0.01μF, 500V, ±100%
R201, 203	ERG2ANJ333	Metal oxide, 33kΩ, 2W, ± 5%	C203, 204	ECKD2H103P	Ceramic, 0.01μF, 500V, ±100%
R204, 205, 206	ERD25TJ394	Carbon, 390kΩ, 1/4W, ± 5%	C205, 206	ECET2DR471SL	Electrolytic, 470μF, 160V
R207	ERD25TJ223	Carbon, 22kΩ, 1/4W, ± 5%	C207, 208	ECKDHS102MD	Ceramic, 0.001μF, 400VAC, ±20%
R208	ERD25TJ393	Carbon, 390kΩ, 1/4W, ± 5%	C209, 210	ECKDHS102MD	Ceramic, 0.001μF, 400VAC, ±20%
R209	ERD25TJ223	Carbon, 22kΩ, 1/4W, ± 5%	C211, 212	ECKDHS102MD	Ceramic, 0.001μF, 400VAC, ±20%
R210	ERD25TJ824	Carbon, 820kΩ, 1/4W, ± 5%	C213, 214	ECEA200G10	Electrolytic, 10μF, 200V
R211	ERD25TJ394	Carbon, 390kΩ, 1/4W, ± 5%	C215	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
R212	ERD50FJ100	Carbon, 10Ω, 1/2W, ± 5%	C216, 217	ECKD3D101KB9	Ceramic, 100pF, 2000V, ±10%
R213, 214	ERX12ANJ1R0	Metal film, 1Ω, 1/2W, ± 5%	C218	ECQE10274T24	Polyester, 0.27μF, 1000V
R215	ERX2ANJ2R7	Metal film, 2.7Ω, 2W, ± 5%	C219, 220	ECEA1HF221V	Electrolytic, 220μF, 50V
R216	ERG1ANJ471	Metal oxide, 470Ω, 1W, ± 5%	C221, 222	ECEA1HF221V	Electrolytic, 220μF, 50V
R217	ERG1ANJ152	Metal oxide, 1.5kΩ, 1W, ± 5%	C223, 224	ECEA2AS221	Electrolytic, 220μF, 100V
R218	ERD25TJ562	Carbon, 5.6kΩ, 1/4W, ± 5%	C225	ECKD1H103ZF	Ceramic, 0.01μF, 50V, ±80%
R219	ERD50FJ183	Carbon, 18kΩ, 1/2W, ± 5%	C226, 227	ECKDHS103SE2	Ceramic, 0.01μF, 400VAC
R220	ERG3ANJ681	Metal oxide, 680Ω, 3W, ± 5%	C228, 229	ECKDHS102MD	Ceramic, 0.001μF, 400VAC, ±20%
R221	ERG1ANJ121	Metal oxide, 120Ω, 1W, ± 5%	C230, 231	ECKDHS102MD	Ceramic, 0.001μF, 400VAC, ±20%
R222	ERG1ANJ222	Metal oxide, 2.2kΩ, 1W, ± 5%	C232	ECQE10274T24	Polyester, 0.27μF, 1000V

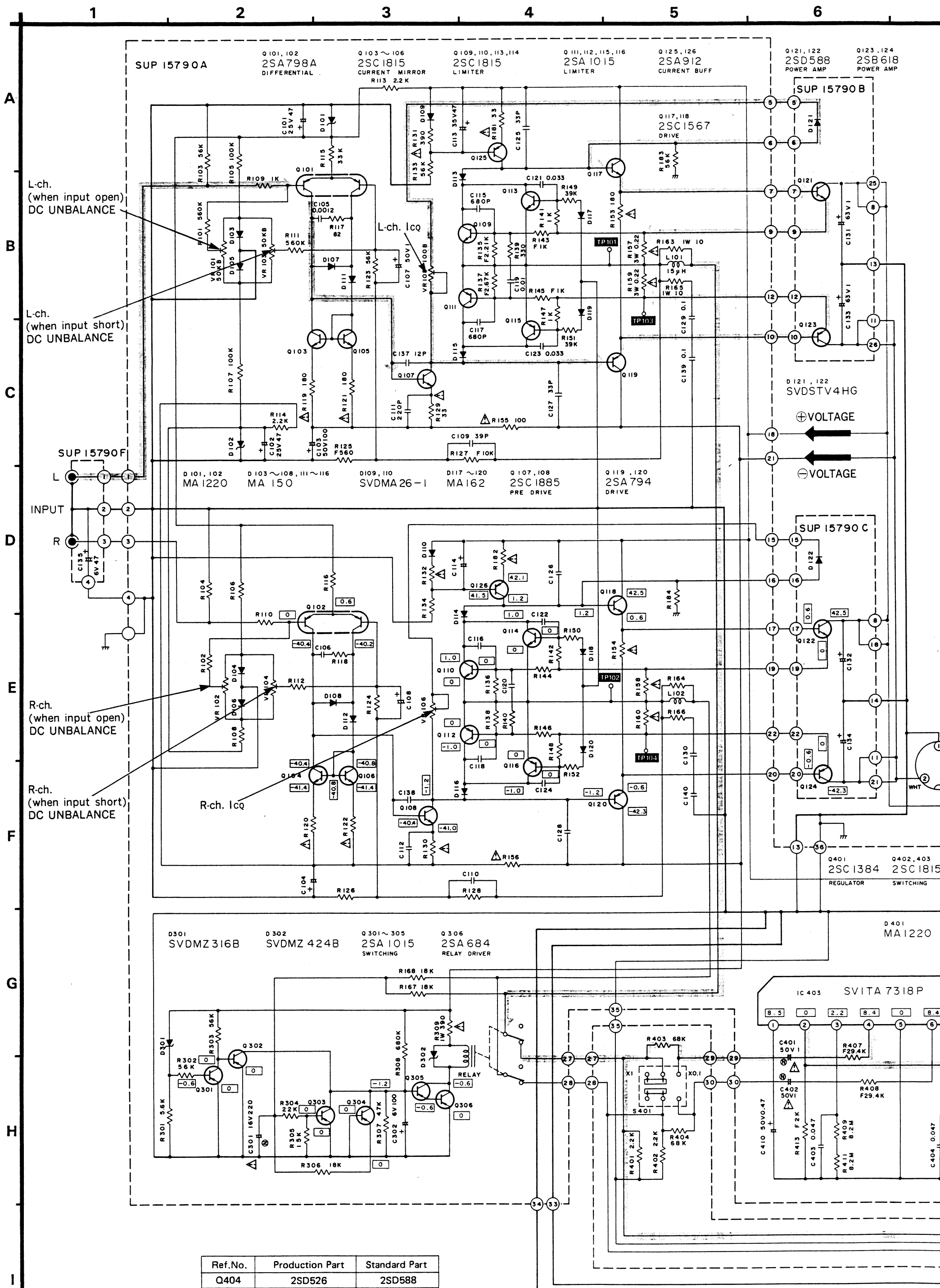
■ REPLACEMENT PARTS LIST Accessories and Packing Parts

Ref. No.	Part No.	Part Name & Description
ACCESSORIES		
A1	SJP2241	Cord, Connection
A2 [X, XA] only	SJP5213-1	Plug Adapter
A3 [X, XA] only	SJP5215	Plug Adapter
PACKING PARTS		
P1	SPP613	Polyethylene Bag
P2	SPS2069	Pad, Right Side
P3	SPS2067	Pad, Left Side
P4 [D] only	SPG1991	Carton Box
P4 [XGF] only	SPG2055	Carton Box
P4	SPG1993	Carton Box
P5	SQF10181	Instructions Book, Printed Matter

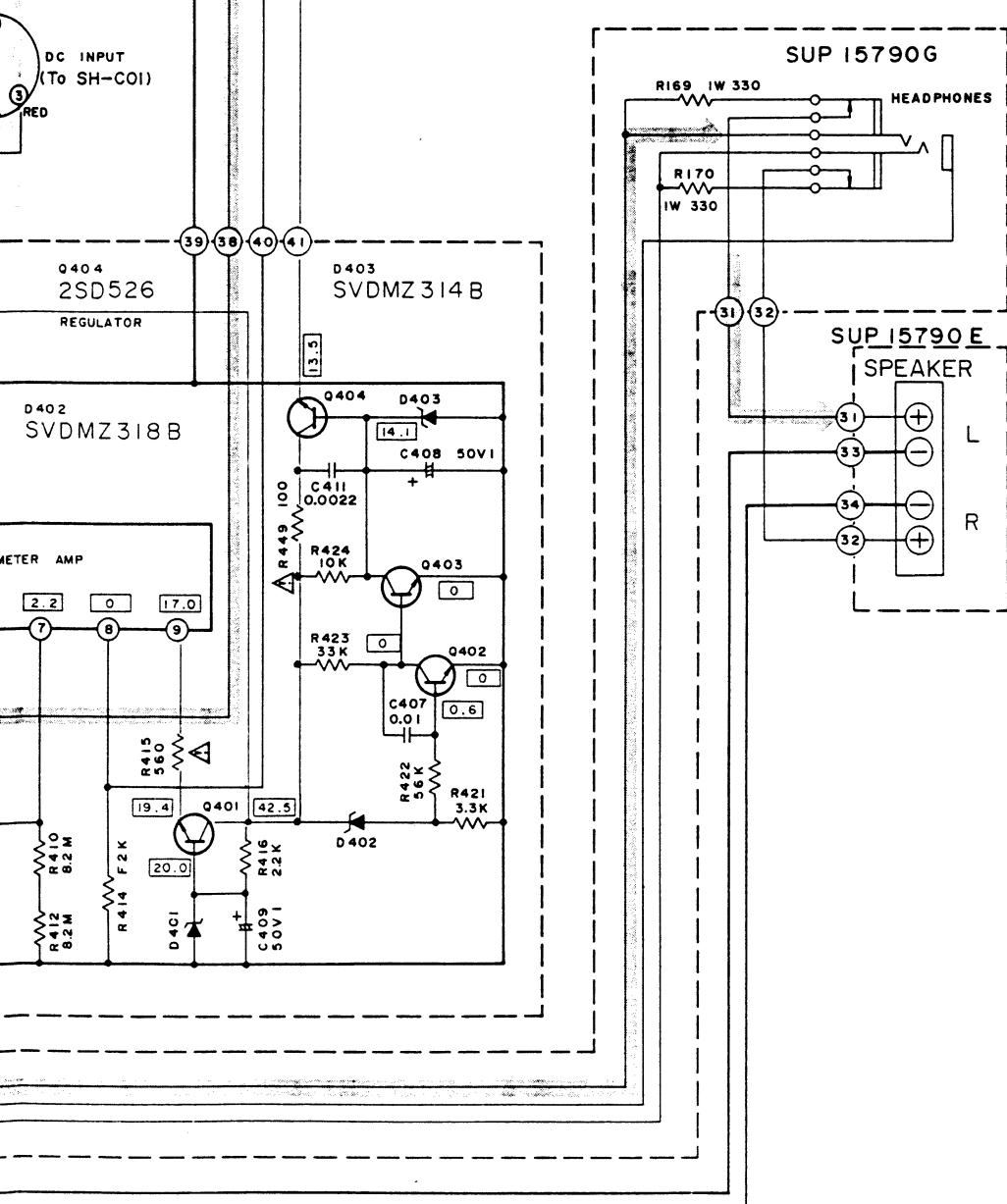
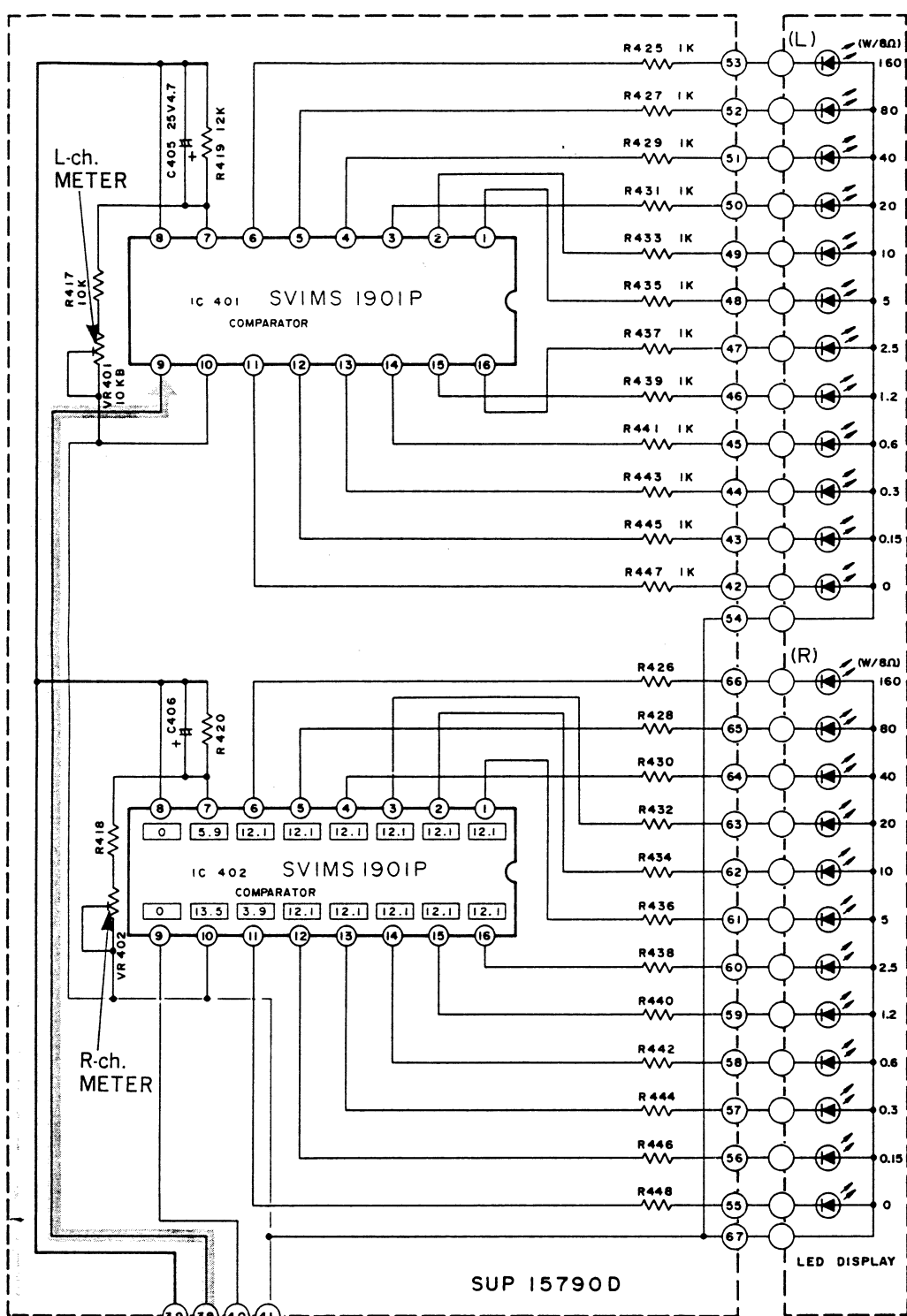
(X) and (XA) are available in Asia, Latin America, Middle East and Africa only.
 (D) is available in Scandinavia and European only.
 (XGF) is available in France only.

■ ACCESSORIES & PACKINGS





Ref.No.	Production Part	Standard Part
Q404	2SD526	2SD588

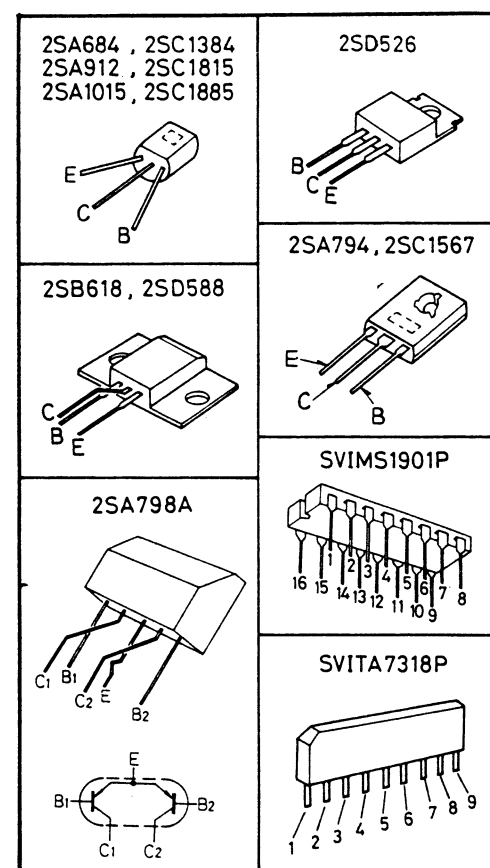


(This schematic diagram may be modified at any time with the development of new technology.)

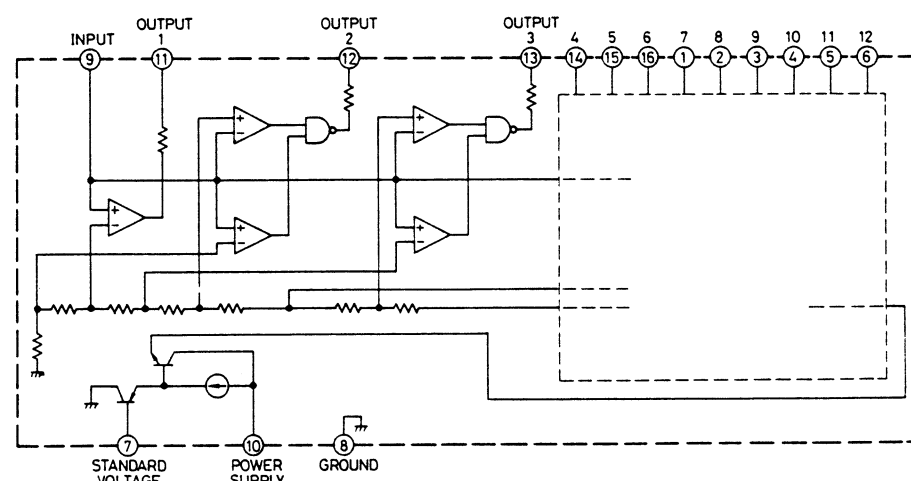
Notes:

1. **S401** : Meter range selector switch in "X1" position.
(X1 $\leftrightarrow$ X0.1)
2. **RELAY** : Muting and speaker protection relay in "ON" position.
3. Amplifier and meter circuit: The left and right channels use the same type of circuit. The resistors, capacitors, etc. used for the right channel (schematic diagram below) are the same as for the left channel.
4. $\square$ Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
5. To represent transistor **Q** is used instead of **TR**.
(Ex. TR101 $\leftrightarrow$ Q101)
6. $\rightarrow$ Signal lines of the left channel.
7. $\triangle$ indicates that only parts specified by the manufacturer be used for safety.
8. Input jack is shorted type: When plug is not inserted, jack is kept in shorted condition.

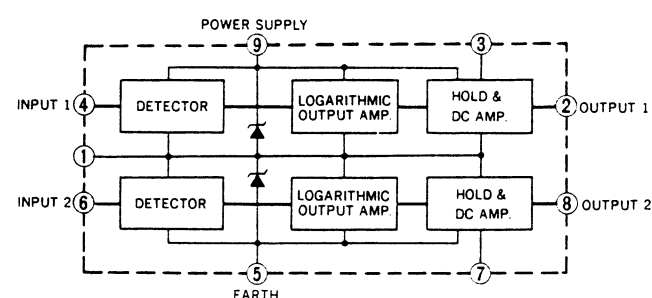
• Terminal Guide of Transistors & IC's



• Block Diagram of IC's

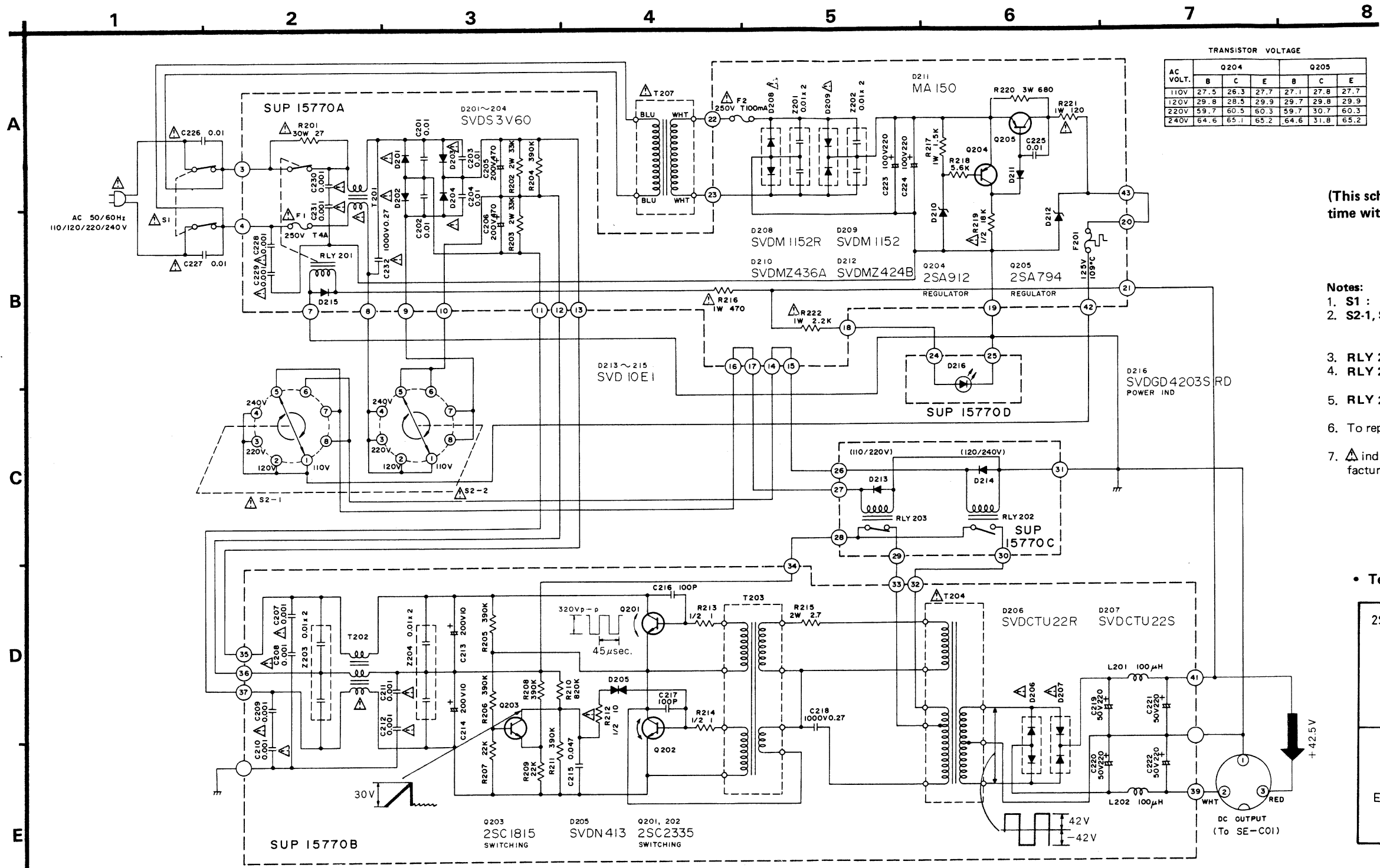


IC401, 402 (SVIMS1901P) Level Comparator



IC403 (SVITA7318P) Meter Amplifier

■ SCHEMATIC DIAGRAM SH-C01



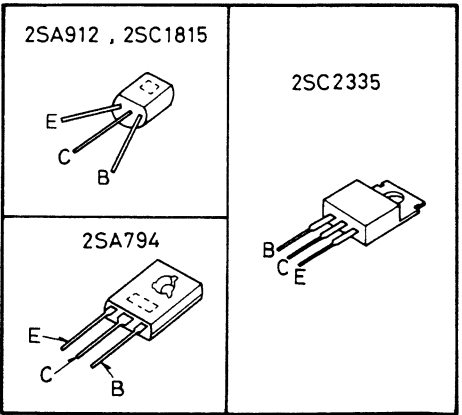
TRANSISTOR VOLTAGE						
AC VOLT.	Q204			Q205		
	B	C	E	B	C	E
110V	27.5	26.3	27.7	27.1	27.8	27.7
120V	29.8	28.5	29.9	29.7	29.8	29.9
220V	59.7	60.5	60.3	59.7	60.3	60.3
240V	64.6	65.1	65.2	64.6	65.1	65.2

Ref. No.	Production Part	Standard Part
D213, 214, 215	SVD10E1	SM112

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

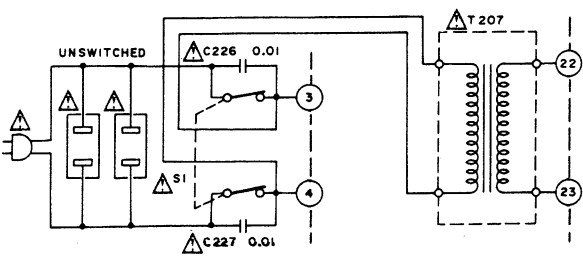
- Notes:
1. S1 : Power source switch in "ON" position.
 2. S2-1, S2-2 : Voltage adjuster switch in "110V" position.
110V ↔ 120V ↔ 220V ↔ 240V
 3. RLY 201 : Power source relay.
 4. RLY 202 : Relay of input AC 120V/240V power source.
 5. RLY 203 : Relay of input AC 110V/220V power source.
 6. To represent transistor Q is used instead of TR.
(EX. TR201 ↔ Q201)
 7. Δ indicates that only parts specified by the manufacturer be used for safety.

• Terminal Guide of Transistors

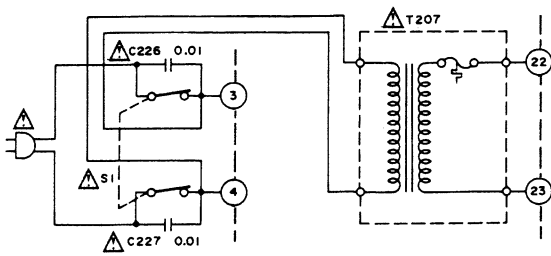


• Power Source Circuit for (X), (XA), (XE) and (XAL)

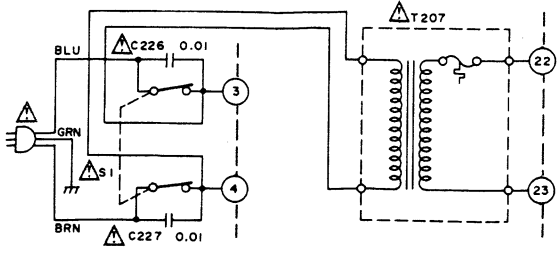
Only products for (X) and (XA)



Only products for United Kingdom (XE)



Only products for Australia (XAL)



■ TROUBLESHOOTING GUIDE

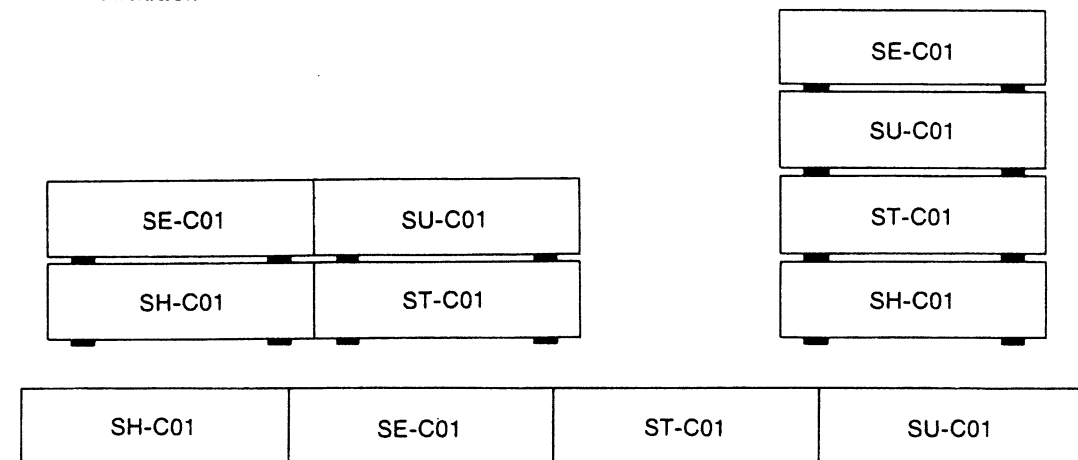
Note:

The information shown in this table is based upon the use of this unit in combination with Technics SU-C01 and ST-C01

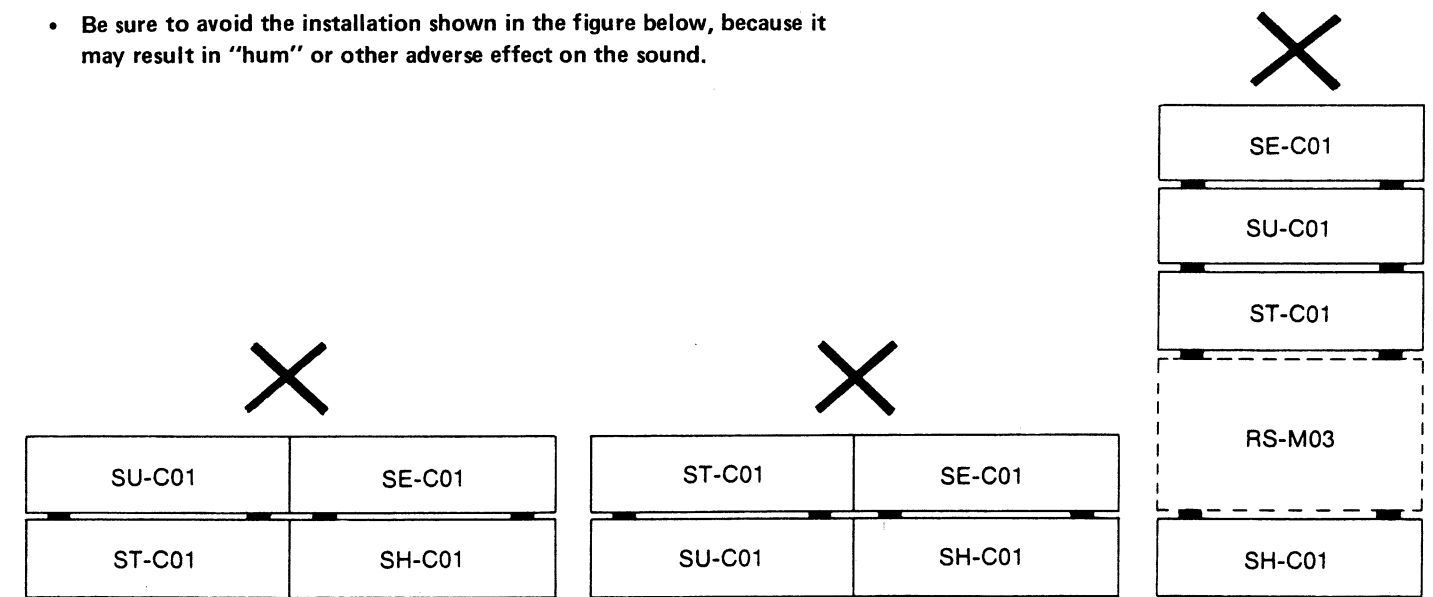
Problem	Probable cause(s)	Suggested remedy
The peak-power meter indicator always illuminates.	The power cord of this unit is connected, incorrectly, to an ordinary household power outlet or to the "UNSWITCHED" power outlet of the amplifier.	• Make the connection to the power outlet marked "SWITCHED."
No sound is heard when the power is turned on.	The power cord plug is not completely inserted.	• Confirm that the power cord plug is connected completely.
	The power supply fuse has failed.	• Request the store where this unit was purchased, or a Service Center, to replace the fuse.
	Connections are incomplete or incorrect to the speaker systems, the tuner, the power amplifier, etc.	• Check to be sure that all connection wires are correctly connected.
	The setting of the input selector of the amplifier is not correct.	• Check to be sure that the selector is set to the correct position.
	Headphones are connected.	• Disconnect the headphones from this unit.
When listening to stereo sound, each sound of the various musical instruments is not heard from its correct position.	The positive (+) and (-) negative connections of the speaker connection wires are reversed.	• Reconnect the speaker connection wires so that the positive and negative connections are correct.
When listening to stereo sound, the left and right sounds are reversed.	The left and right connections of the speaker connection wires are reversed.	• Check the connections of the speaker connection wires and make them correctly.
	The left and right connections of the connection wires connected to other equipment are reversed.	• Check the connections of the connection wires to other equipment and make them correctly.
A low-pitched noise ("hum" or "buzz") is heard.	The power cord or a fluorescent light, etc., is near the connection wires.	• Try separating this unit and the electric appliance as far as possible. • Reverse the connection of the power cord plug.
Sound is not heard from the speaker system on one side.	The speaker connection wires are disconnected.	• Check and correct the connections of the speaker connection wires.
	The balance control of the amplifier is not set to the center position.	• Set the mark on the balance control to the center position.
The volume level for a radio broadcast is different from that for disc play.	The strength of the broadcast signal is not the same as the output from the record player.	• Use the volume control of the amplifier to adjust the volume.
While listening, sound is suddenly no longer heard. (Indication lamps of other equipment are still illuminated.)	A DC component is mixed with the input. (The protection circuitry of the power amplifier has functioned.)	• Check the connections to other equipment (especially the speaker connection terminals, etc.).

■ INSTALLATION EXAMPLE

- Recommended installation



- Be sure to avoid the installation shown in the figure below, because it may result in "hum" or other adverse effect on the sound.



■ NEW INDICATION MARK

The **S** mark has been used for the indication of specified parts for an assurance of safety, but it has been changed to **Δ** mark. When replacing parts, be sure to use parts with correct numbers with reference to the circuit drawing or the repair parts list.

S → **Δ** (new mark)