

Service Manual

Stereo DC Power Amplifier

SE-A7(K)

[D],[EW],[EG],[EK],[EF],
[EH],[EB],[Ei],[XA],[XL]



- * The black type model is provided with (K) in the Service Manual. **SE-A7(K)**
* The colors of this model is black type only.

Areas

- * [D] is available in Scandinavia.
- * [EW] is available in Switzerland.
- * [EG] is available in F.R. Germany.
- * [EK] is available in United Kingdom.
- * [EF] is available in France.
- * [EH] is available in Holland.
- * [EB] is available in Belgium.
- * [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.

English

Specifications

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

(DIN 45 500)

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output	
stereo operation	
both channels driven	2 × 60W (4Ω) 2 × 60W (8Ω) 120W (8Ω)
monaural (BTL) operation	120W (8Ω)
40 Hz~16 kHz continuous power output	
stereo operation	
both channels driven	2 × 60W (4Ω) 2 × 60W (8Ω) 120W (8Ω)
monaural (BTL) operation	120W (8Ω)
1 kHz continuous power output	
stereo operation	
both channels driven	2 × 75W (4Ω) 2 × 65W (8Ω) 150W (8Ω)
monaural (BTL) operation	150W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	
stereo operation	0.007% (4Ω) 0.003% (8Ω) 0.007% (8Ω)
monaural (BTL) operation	0.007% (8Ω)
rated power at 40 Hz~16 kHz	
stereo operation	0.007% (4Ω) 0.003% (8Ω) 0.007% (8Ω)
monaural (BTL) operation	0.007% (8Ω)
rated power at 1 kHz	
stereo operation	0.007% (4Ω) 0.003% (8Ω) 0.007% (8Ω)
monaural (BTL) operation	0.007% (8Ω)
half power at 20 Hz~20 kHz	0.0015% (8Ω)
half power at 1 kHz	0.0006% (8Ω)
-26 dB power at 1 kHz	0.03% (4Ω)
50 mW power at 1 kHz	0.03% (4Ω)

Intermodulation distortion

rated power at 250 Hz: 8 kHz=4:1, 4Ω 0.007%

rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0.003%

TIM (Transient Intermodulation Distortion)

unmeasurably small

Power bandwidth

both channels driven, -3 dB 5 Hz~70 kHz (0.02%)

Residual hum and noise

0.2 mV

Damping factor

50 (4Ω), 100 (8Ω)

Input sensitivity and impedance

1 V/47kΩ

S/N

100 dB (110 dB, IHF, A)

Frequency response

20 Hz~20 kHz, +0 dB, -0.1 dB

0.7 Hz~200 kHz, -3 dB

Channel balance, 250 Hz~6,300 Hz

±1 dB

Channel separation, 1 kHz

65 dB

Headphones output level and impedance

520 mV/330Ω

Load impedance

stereo operation

MAIN or REMOTE

4Ω~16Ω

MAIN and REMOTE

8Ω~16Ω

monaural

MAIN or REMOTE

8Ω~16Ω

■ GENERAL

Power consumption

420W

Power supply

AC 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensions (W×H×D)

430 × 53 × 365 mm

(16-15/16" × 2-3/32" × 14-3/8")

Weight

9.8 kg

(21.6 lb.)

Note:

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

Technics

Matsushita Electric Trading Co., Ltd.

PO Box 288, Central Osaka Japan

TECHNISCHE DATEN

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

(DIN 45 500)**■ VERSTÄRKERTEIL****Dauer-Outputleistung bei 20 Hz ~ 20 kHz**

stereo	
beide Kanäle ausgesteuert	2 × 60W (4 Ω) 2 × 60W (8 Ω) 120W (8 Ω)
mono (BTL)	

Dauer-Outputleistung bei 40 Hz ~ 16 kHz

stereo	
beide Kanäle ausgesteuert	2 × 60W (4 Ω) 2 × 60W (8 Ω) 120W (8 Ω)
mono (BTL)	

Dauer-Outputleistung bei 1 kHz

stereo	
beide Kanäle ausgesteuert	2 × 75W (4 Ω) 2 × 65W (8 Ω) 150W (8 Ω)
mono (BTL)	

Gesamtklirrfaktor

Nennleistung bei 20 Hz ~ 20 kHz	
stereo	0,007% (4 Ω) 0,003% (8 Ω)
mono (BTL)	0,007% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	
stereo	0,007% (4 Ω) 0,003% (8 Ω)
mono (BTL)	0,007% (8 Ω)
Nennleistung bei 1 kHz	
stereo	0,007% (4 Ω) 0,003% (8 Ω)
mono (BTL)	0,007% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,0015% (8 Ω)
halbe Nennleistung bei 1 kHz	0,0006% (8 Ω)
-26 dB Leistung bei 1 kHz	0,03% (4 Ω)
50 mW Leistung bei 1 kHz	0,03% (4 Ω)

Intermodulationsfaktor

Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,007%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,003%

TIM (Intermodulationsverzerrung)

unmeßbar

Leistungsbandbreite

beide Kanäle ausgesteuert bei -3 dB	5 Hz ~ 70 kHz (0,02%)
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Restbrumm und Geräusch

0,2 mV

Dämpfungsfaktor

50 (4 Ω), 100 (8 Ω)

Eingangsempfindlichkeit und -impedanz

1 V/47 kΩ

Geräuschabstand

100 dB (110 dB nach IHF, A)

Frequenzgang20 Hz ~ 20 kHz, +0 dB, -0,1 dB
0,7 Hz ~ 200 kHz, -3 dB**Kanalabweichung (250 Hz ~ 6300 Hz)**

±1 dB

Übersprechdämpfung (1 kHz)

65 dB

Kopfhörerpegel und -impedanz

520 mV/330 Ω

Lautsprecherimpedanz

stereo

MAIN oder REMOTE

4 Ω ~ 16 Ω

MAIN und REMOTE

8 Ω ~ 16 Ω

mono

MAIN oder REMOTE

8 Ω ~ 16 Ω

■ ALLGEMEINE DATEN**Leistungsaufnahme**

420 W

Netzspannung

Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V

Abmessungen (B × H × T)

430 × 53 × 365 mm

Gewicht

9,8 kg

Bemerkung:

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

Français

CARACTERISTIQUES

(Sujet à changement sans préavis.)

(DIN 45 500)**■ SECTION AMPLIFICATEUR****Puissance de sortie continue de 20 Hz ~ 20 kHz,**

stereo	
les deux canaux en circuit	2 × 60W (4Ω) 2 × 60W (8Ω) 120W (8Ω)
mono (BTL)	

Puissance de sortie continue de 40 Hz ~ 16 kHz,

stereo	
les deux canaux en circuit	2 × 60W (4Ω) 2 × 60W (8Ω) 120W (8Ω)
mono (BTL)	

Puissance de sortie continue à 1 kHz

stereo	
les deux canaux en circuit	2 × 75W (4Ω) 2 × 65W (8Ω) 150W (8Ω)
mono (BTL)	

Distorsion harmonique totale

à puissance nominale (20 Hz ~ 20 kHz)	
stereo	0,007% (4Ω) 0,003% (8Ω)
mono (BTL)	0,007% (8Ω)
à puissance nominale (40 Hz ~ 16 kHz)	
stereo	0,007% (4Ω) 0,003% (8Ω)
mono (BTL)	0,007% (8Ω)
à puissance nominale (1 kHz)	
stereo	0,007% (4Ω) 0,003% (8Ω)

mono (BTL)	0,007% (8Ω)
à demi-puissance (20 Hz ~ 20 kHz)	0,0015% (8Ω)
à demi-puissance (1 kHz)	0,0006% (8Ω)
puissance de -26 dB à 1 kHz	0,03% (4Ω)
puissance de 50 mW à 1 kHz	0,03% (4Ω)

Distorsion d'intermodulation

à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω	0,007%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,003%

TIM (distorsion d'intermodulation transitoire)

infinitement petite

Réponse de fréquences

les deux canaux en circuit, -3 dB	5 Hz ~ 70 kHz (0,02%)
Bruit et ronflement résiduels	0,2 mV

Coefficient d'amortissement

50 (4Ω), 100 (8Ω)

Sensibilité et impédance d'entrée

1 V/47kΩ

Signal/Bruit

100 dB (110 dB, IHF, A)

Réponse de fréquence20 Hz ~ 20 kHz, + 0 dB, -0,1 dB
0,7 Hz ~ 200 kHz, -3 dB**Equilibrage des canaux, 250 Hz ~ 6,300 Hz**

±1 dB

Séparation des canaux, 1 kHz

65 dB

Niveau de sortie des casques et impédance

520 mV/330Ω

Impédance de charge

stereo

PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)

4Ω ~ 16Ω

PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)

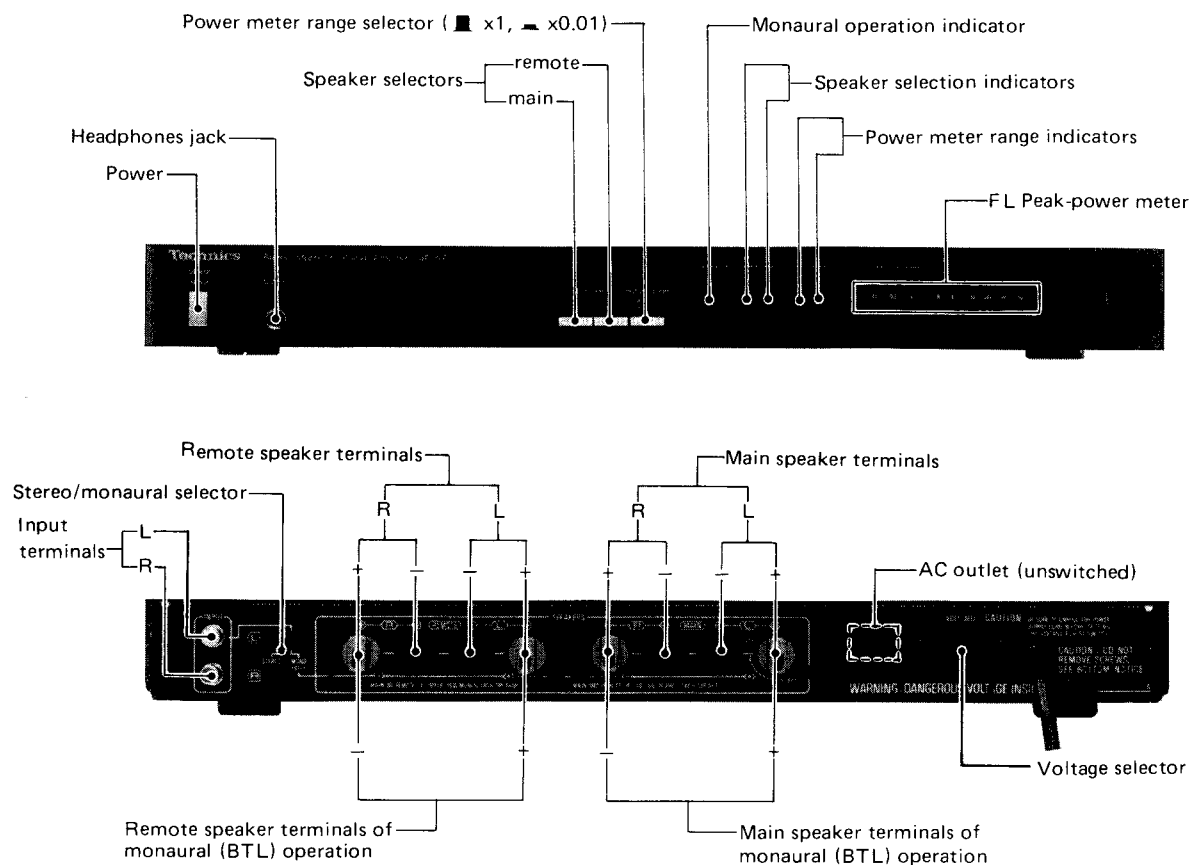
8Ω ~ 16Ω

mono

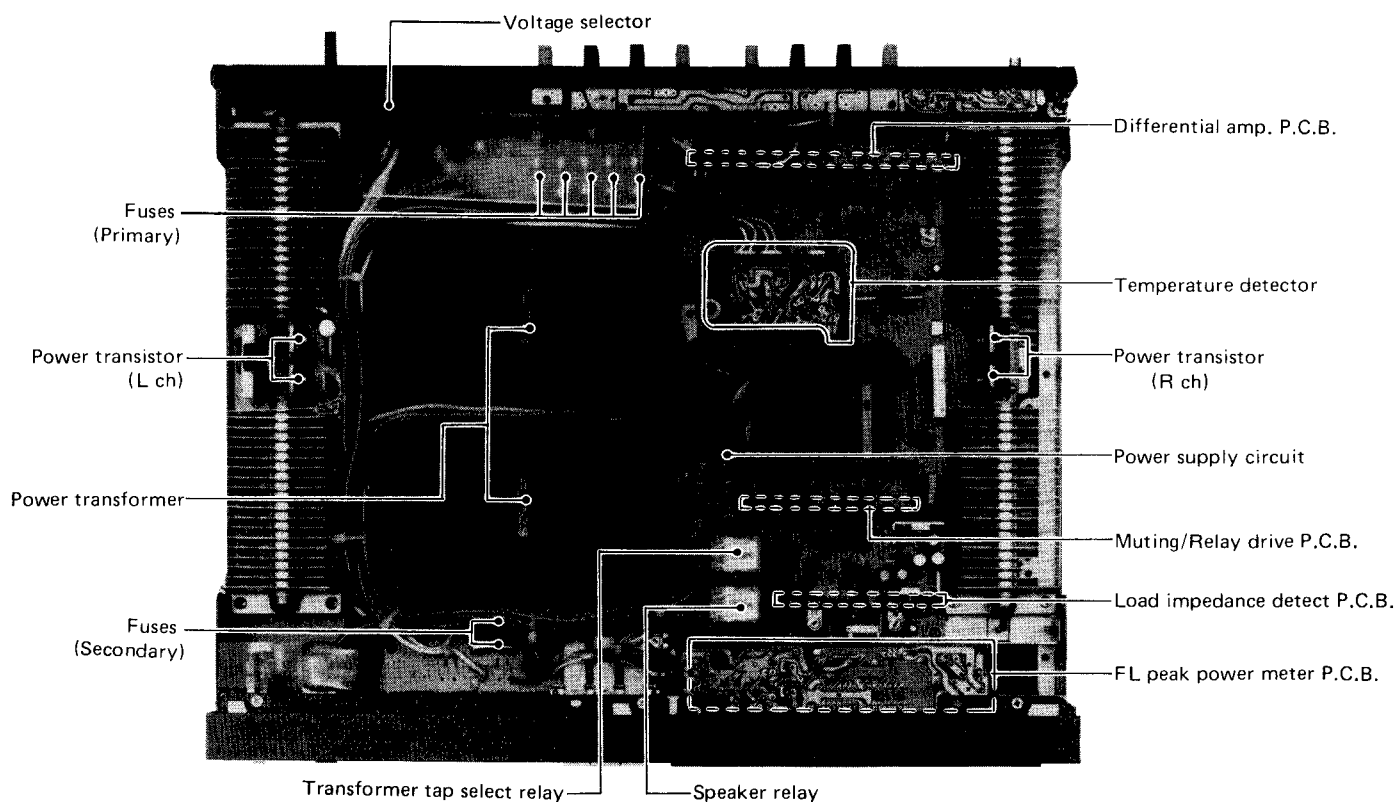
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)

8Ω ~ 16Ω

LOCATION OF CONTROLS



* The product for destination [XA] is equipped with AC outlet.



■ DIVERS

Consommation	420W
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L x H x Pr)	430 x 53 x 365 mm
Poids	9,8 kg

Remarque:

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

Español

ESPECIFICACIONES

(Estas especificaciones están sujetas a cualquier cambio sin previo aviso.)

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 20 Hz~20 kHz

stereo

en ambos canales

2 x 60W (4Ω)

2 x 60W (8Ω)

mono (BTL)

120W (8Ω)

Potencia continua de 40 Hz~16 kHz

stereo

en ambos canales

2 x 60W (4Ω)

2 x 60W (8Ω)

mono (BTL)

120W (8Ω)

Potencia continua de 1 kHz

stereo

en ambos canales

2 x 75W (4Ω)

2 x 65W (8Ω)

mono (BTL)

150W (8Ω)

Distorsión armónica total

potencia de régimen a 20 Hz~20 kHz

stereo

0,007% (4Ω)

0,003% (8Ω)

mono (BTL)

0,007% (8Ω)

potencia de régimen a 40 Hz~16 kHz

stereo

0,007% (4Ω)

0,003% (8Ω)

mono (BTL)

0,007% (8Ω)

potencia de régimen a 1 kHz

stereo

0,007% (4Ω)

0,003% (8Ω)

mono (BTL)

0,007% (8Ω)

mitad de potencia a 20 Hz~20 kHz

0,0015% (8Ω)

mitad de potencia a 1 kHz

0,0006% (8Ω)

-26 dB de potencia a 1 kHz

0,03% (4Ω)

50 mW de potencia a 1 kHz

0,03% (4Ω)

Distorsión por intermodulación

potencia de régimen a 250 Hz: 8 kHz=4:1, 4Ω 0,007%

potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0,003%

TIM (distorsión intermodular transitoria)

insignificante

Ancho de banda de potencia

con ambos canales, -3 dB 5 Hz~70 kHz (0,02%)

Zumbido residual y ruido

0,2 mV

Factor de amortiguamiento

50 (4Ω), 100 (8Ω)

Sensibilidad e impedancia de entrada

1V/47kΩ

Relación de señal a ruido

100 dB (110 dB, IHF, A)

Respuesta de frecuencia

20 Hz~20 kHz, +0 dB, -0,1 dB

0,7 Hz~200 kHz, -3 dB

Equilibrio de canales, 250 Hz a 6,300 Hz

±1 dB

Separación de canales, 1 kHz

65 dB

Impedancia y nivel de salida de los auriculares

520 mV/330Ω

Impedancia de carga

stereo

MAIN o REMOTE

4Ω~16Ω

MAIN y REMOTE

8Ω~16Ω

mono

MAIN o REMOTE

8Ω~16Ω

■ GENERAL

Consumo de energia

420W

Alimentación de energia

CA 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensiones (An x Al x Prof.)

430 x 53 x 365 mm

Peso

9,8 kg

Nota:

La distorsión armónica total se mide con el analizador de espectro digital (sistema H.P. 3045).

■ PROTECTION CIRCUITRY

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

- No sound is heard when the power is turned on.
- Sound stops during a 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 this unit 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:

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

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TECHNICAL GUIDES

1. SPEAKER IMPEDANCE DETECTION CIRCUIT

This circuit detects the impedance of the speaker connected to the speaker terminal and serves to keep the operation of the unit in best conditions, controlling the constant voltage power supply circuit. It consists of a "voltage comparing circuit", "reset circuit", "detection signal generating circuit" and "relay drive circuit".

① Basic principles

The built-in reset switch is short-circuited only for a moment when speaker selector is operated.

(Fig. 1-A) Simultaneously, the reset circuit operates (Fig. 1-B) to turn both RLY 301 and RLY 302 OFF.

Subsequently, the reset switch opens at the end of operating the speaker selector. Then, the detection signal generating circuit keeps RLY 301 OFF for 0.5 second more. (Fig. 1-C) Since RLY 301 is OFF, the speaker connected to speaker terminal contacts with the voltage comparing circuit. The difference from the reference voltage, that is, the type of speaker connected, is detected; and the secondary side tap voltage of the power transformer is switched by RLY 301 so that the voltage matches the connected speaker.

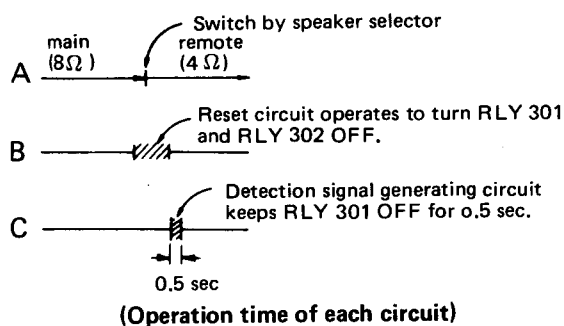


Fig. 1

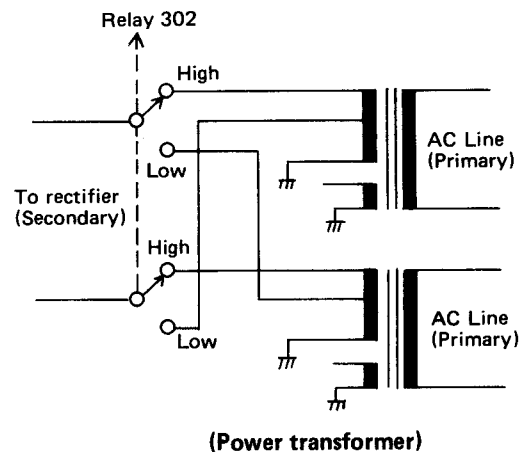


Fig. 2

② Reset circuit and detection signal generating circuit

As already explained, when the reset switch is short-circuited, Q302 in the reset circuit turns ON. Positive voltage is generated at the collector of Q302 as shown in Fig. 3-A, causing Q306 in the relay drive circuit [I] to turn ON. (But, the base of Q306 is usually at 0 volt and OFF.)

When Q306 turns ON, the base of Q307 is grounded and turns OFF, causing RLY 301 to turn OFF. Also, the collector voltage of Q307 becomes positive, causing Q301 as well as RLY 302 to turn OFF. (Q307 emitter is connected to pin ⑥ of IC201 and the voltage of this pin is usually zero or a little positive.) In other words, RLY 301 and RLY 302 are OFF while the reset switch is short-circuited.

Also, at the moment when the reset switch opens, the voltage as in Fig. 3-B is applied to the base of Q305 in the detection signal generating circuit which uses a multi-vibrator due to the charge and discharge of C306, thus causing this transistor to turn ON.

And voltage as in Fig. 3-C is generated at the collector. The voltage in Fig. 3-C turns Q306 ON, and Q307 OFF, therefore both RLY 301 and RLY 302 turn OFF. RLY 301 and RLY 302 are OFF for 0.5 second. That is, RLY 301 and RLY 302 are turned OFF during shortcircuit of the reset switch and for 0.5 sec. more after opening of the switch.

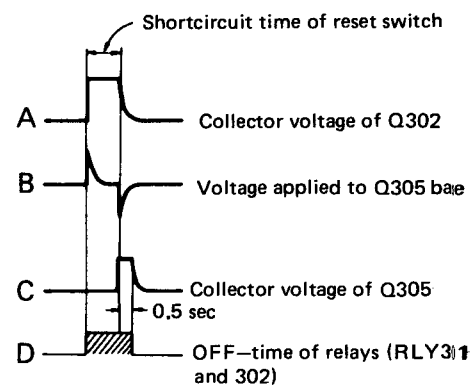
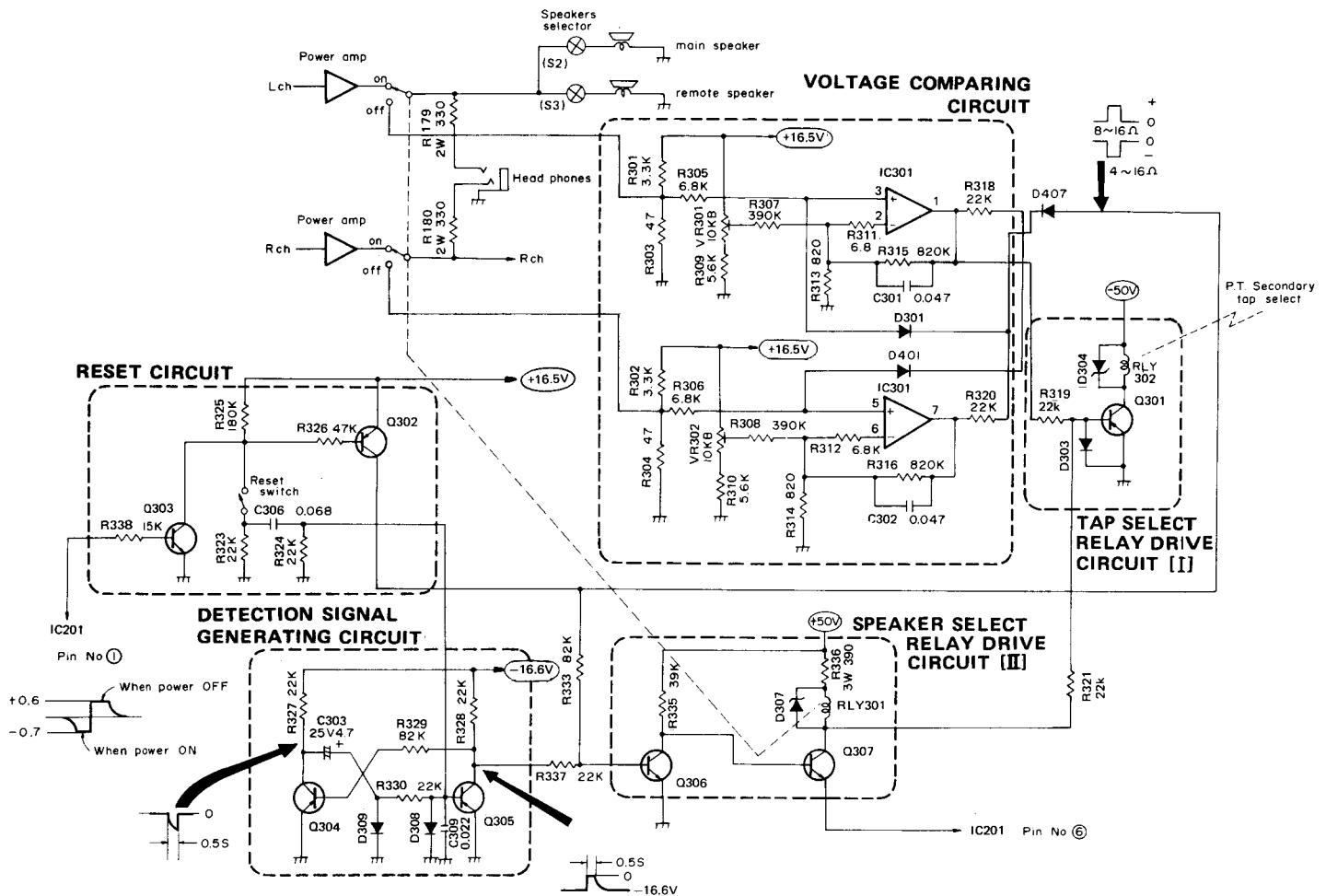


Fig. 3



(Speaker impedance detection circuit)

Fig. 4

③ Voltage comparing circuit

While the relay (RLY302) is OFF, the speaker is in contact with the voltage comparing circuit. (Fig. 5)

The reference voltage is applied to the negative input terminal of operation amplifier (IC301), and the voltage of positive input terminal varies depending on the speaker impedance as shown in Fig. 5. The alteration of voltage is directly related with the output of operation amplifier. Usually the unit is adjusted so that the output voltage is zero with 6Ω speaker connected, and the output voltage of operation amplifier becomes negative with 4Ω speaker connected, and the output voltage becomes positive with 8Ω speaker connected. Only when the voltage is negative, Q301 and RLY 302 turn ON, switching the secondary side tap voltage of power transformer to $32.0V$.

Incidentally, when 8Ω speaker is connected to Rch and 4Ω to Lch, negative voltage is generated.

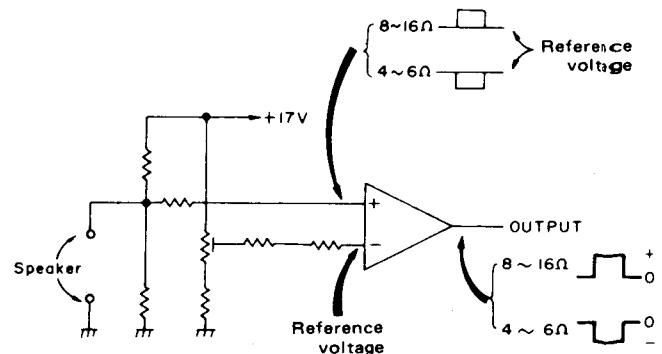


Fig. 5

④ Voltage comparing circuit and reset circuit

The operation amplifier of "voltage comparing circuit" holds the detected impedance 8Ω or 4Ω . Therefore, if a speaker of different impedance is connected, it is necessary to turn off the power supply or switch the speaker selector and to operate the reset circuit. That is, the relays (RLY301 and 302) must be turned OFF. The base of Q303 in the reset circuit is connected to pin ① of IC 201. Positive voltage is generated at this pin for a moment when power supply is turned off, causing Q303 to turn ON.

As Q303 turns ON, the reset circuit momentarily operates to reset RLY 301 and RLY 302.

2. TEMPERATURE DETECTOR/POWER SAVE CIRCUIT

Heat sensing thyristor D605 detects the ambient temperatures of electrolytic condensers C401 and C402; when the temperature is $90 \pm 5^\circ\text{C}$, it turns ON to lower the gate voltage of FET Q601 and Q603 (in case of Lch), thus turning FET off. Accordingly, the input signal flows from R601, R101 to R603, and serves to lower the signal level by 3 dB.

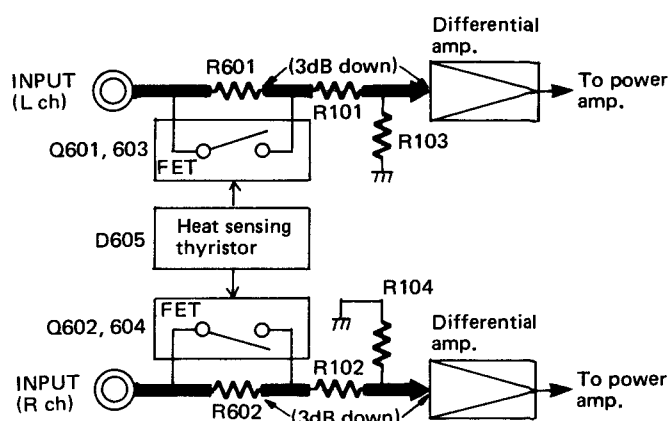


Fig. 6

3. BLOCK DIAGRAM OF BTL OPERATION (MONO)

- ① Connect the \oplus side of speaker cord to the " \oplus side LEFT CHANNEL" main speaker terminal, and the \ominus side of speaker cord to the " \oplus side RIGHT CHANNEL" main speaker terminal of the set, respectively.
- ② When a remote speaker terminal is used, connect the \oplus side of speaker cord to " \oplus side LEFT CHANNEL" remote speaker terminal, and the \ominus side of speaker cord to " \oplus side RIGHT CHANNEL" remote speaker terminal.
- ③ Shift the stereo/MONO (BTL) selector switch on the rear panel to "MONO (BTL)".

- ④ Operation is virtually certain to be satisfactory when ordinary speakers are used for stereo reproduction because the output of $60\text{W} + 60\text{W}$, 8Ω ($20\text{Hz} \sim 20\text{kHz}$) is quite sufficient to drive the speakers. In order, however, to obtain sufficient dynamic range to drive speakers of low efficiency, or for other professional use of this unit for which an even greater output may be desired, the built-in BTL (Balanced-Transformerless) circuitry functions to permit the unit to operate as a high-output monaural power amplifier by effectively utilizing its two power amplifiers.

When the unit is used for Balanced-Transformerless Operation, the output becomes 120W , 8Ω ($20\text{Hz} \sim 20\text{kHz}$), with a total harmonic distortion rating of 0.007%.

Cautions:

The \oplus terminal of Rch is connected as \ominus terminal during BTL. Since it is not grounded, the power amplifier circuit will break down if the line is shortcircuited.

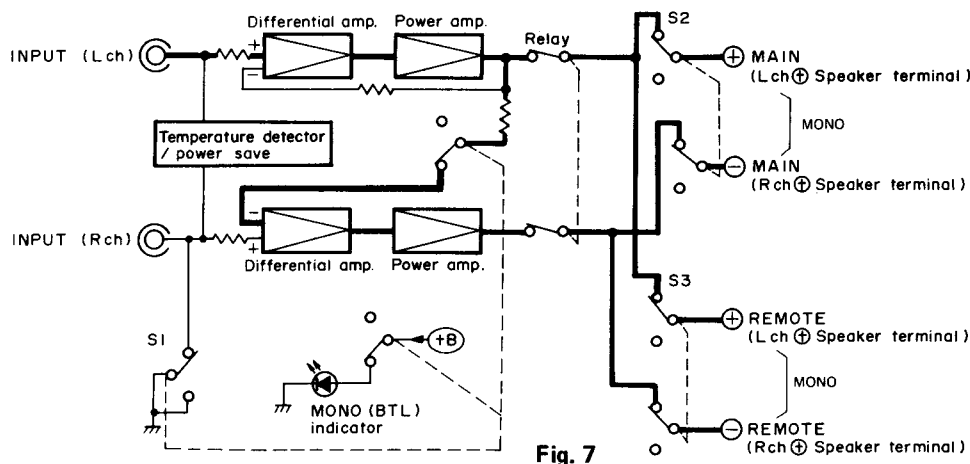


Fig. 7

DISASSEMBLY INSTRUCTIONS

How to remove the cabinet

1. Remove the 4 setscrews (1 ~ 4 in Fig. 8) of the cabinet.

How to remove the front panel

1. Remove the cabinet.
2. Remove the 6 setscrews (5 ~ 10 in Fig. 8 and Fig. 9) of the front panel.
3. Move the front panel in the direction of the arrow A in Fig. 8.

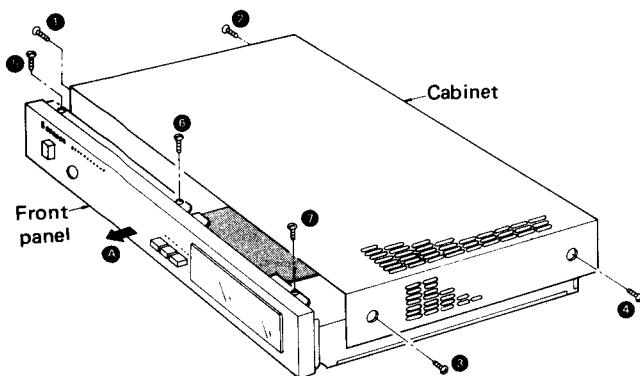


Fig. 8

How to remove the FL peak power meter printed circuit board

1. Remove the cabinet.
2. Remove the front panel.
3. As shown in Fig. 10, 11 lugs (19 ~ 22) to detach the display window plate ass'y from the front chassis.
4. 4 lugs (23 ~ 26 in Fig. 10) to detach the printed circuit boards from the back of the display window plate ass'y.
5. Remove the 2 setscrews (27, 28 in Fig. 11) of the FL peak power meter printed circuit board.
6. Remove the 2 lead connector (29, 30 in Fig. 11) of the printed circuit board.

How to remove the speakers/meter range selector switch printed circuit board

1. Remove the cabinet.
2. Remove the front panel.
3. Remove the FL peak power meter printed circuit board.
4. Remove the 3 setscrews (31 ~ 33 in Fig. 10 and Fig. 11) and cut off the 2 lead clampers.

How to remove the bottom board (Right side)

1. Remove the cabinet and front panel.
2. Remove the 6 setscrews (11, 13 and 15 ~ 18 in Fig. 9) of the bottom board.

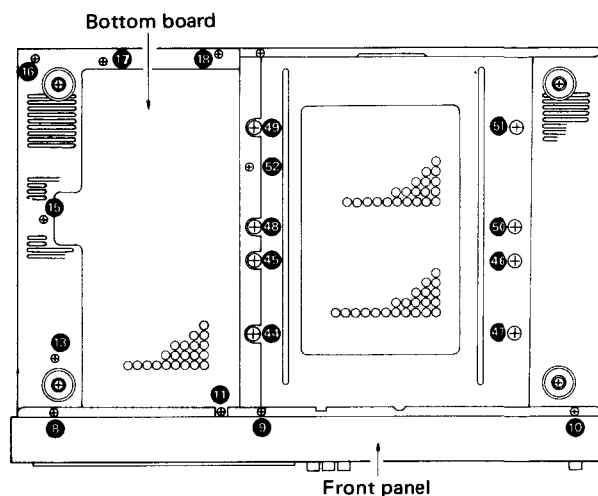


Fig. 9

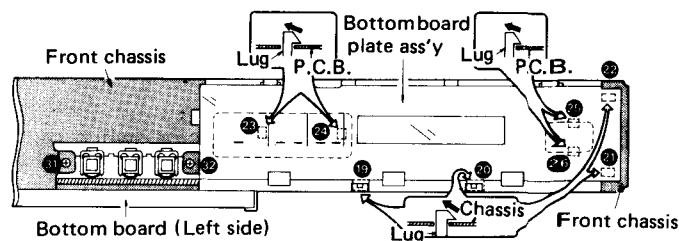


Fig. 10

How to remove the power transistor (Left channel)

1. Remove the cabinet.
2. Remove the 4 setscrews (34 ~ 37 in Fig. 11) of the heat-sink.
3. Remove the 2 setscrews (38, 39 in Fig. 12) of the power transistor.
4. Unsolder the power transistor.

Cautions:

When mounting the power transistor onto the heat-sink, especially keep the following points in mind.

1. Clean the area on the heat-sink side.
2. Be sure to use new insulating sheet (SMX497).
3. Never apply heat diffuser or the like to the insulating sheet (SMX497).
(Otherwise, the insulation will be deteriorated leading to breakdown of power transistor.)

• How to remove the power transistor (Right channel)

1. Remove the cabinet.
2. Remove the bottom board.
3. Remove the 4 setscrews (40 ~ 43 in Fig. 11) of the heat-sink.
4. Remove the 2 setscrews (38 ~ 39 in Fig. 12) of the power transistor.
5. Unsolder the power transistor (Fig. 13) and the metal fitting (Fig. 13) which secures the transistor (Q118).

Cautions:

When mounting the power transistor onto the heat-sink, especially keep the following points in mind.

1. Clean the area on the heat-sink side.
2. Be sure to use new insulating sheet (SMX497).
3. Never apply heat diffuser or the like to the insulating sheet (SMX497).
(Otherwise, the insulation will be deteriorated leading to breakdown of power transistor.)

Cautions:

When soldering the metal fitting, completely set the transistor (Q118) onto the heat sink. See Fig. 13.

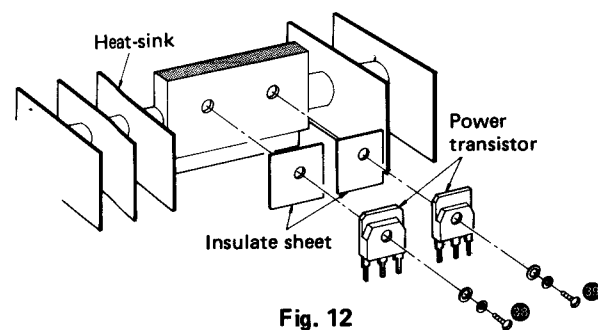


Fig. 12

• How to remove the power transformer

1. Remove the cabinet.
2. Remove the 4 setscrews (34 ~ 37 in Fig. 11) of the heat-sink.
3. Remove the 4 setscrews (44 ~ 47 or 48 ~ 51 in Fig. 9) of the power transformer and cut off the 3 lead clampers.

Cautions:

When replacing the power transistor or power transformer, stop it with lead clamber so that each lead wire does not touch the heat-sink.

• How to remove the main printed circuit board

1. Remove the cabinet.
2. Remove the front panel.
3. Remove the FL peak power meter printed circuit board.
4. Remove the 1 setscrew (52 in Fig. 9) of the temperature detector printed circuit board bracket.
5. Remove the 1 setscrew (15 in Fig. 9) of the Heat-sink bracket.
6. Remove the 4 setscrews (40 ~ 43 in Fig. 11) of the Heat-sink.
7. Remove the 5 setscrews (53 ~ 57 in Fig. 11) of the main printed circuit board.

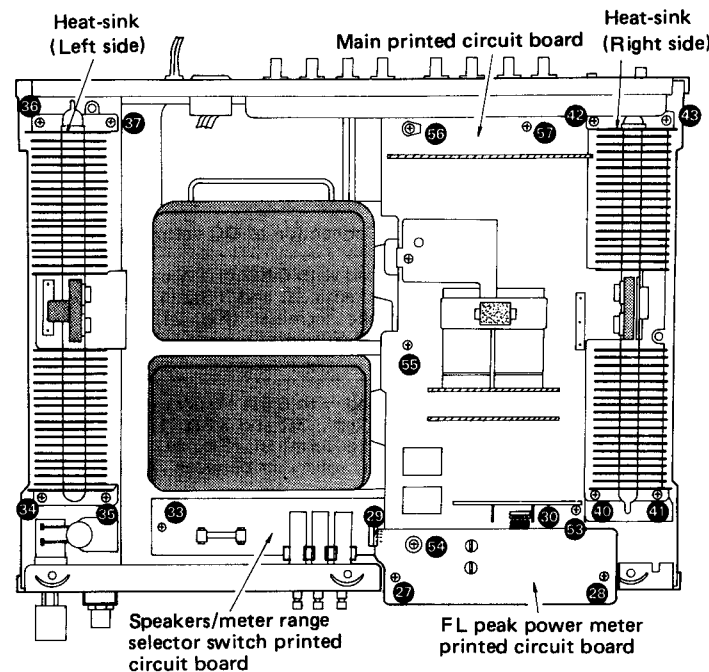


Fig. 11

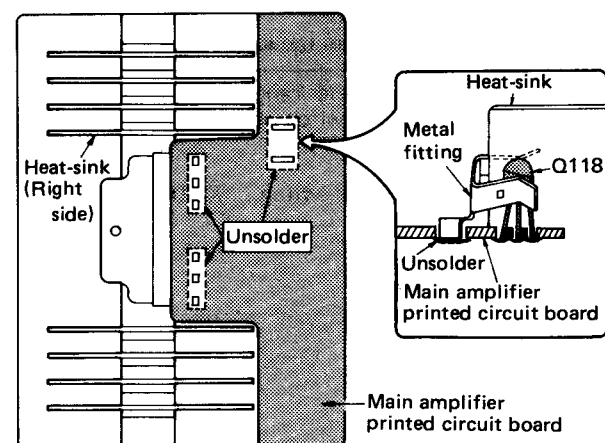


Fig. 13

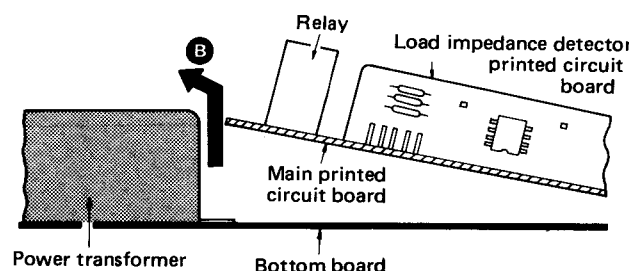


Fig. 14

8. Lift the main printed circuit board on the power transformer side in the direction of the arrow (B) (Fig. 14) to remove it.
In this case, it is often advisable to cut off the lead clamber beforehand.

Note:

After repair, stop the leads with a new lead clamber.

The heat sensing thyristor detects the ambient temperatures of the electrolytic condensers. Therefore, make sure after repair that the thyristor is positioned between electrolytic condensers C401 and C402.

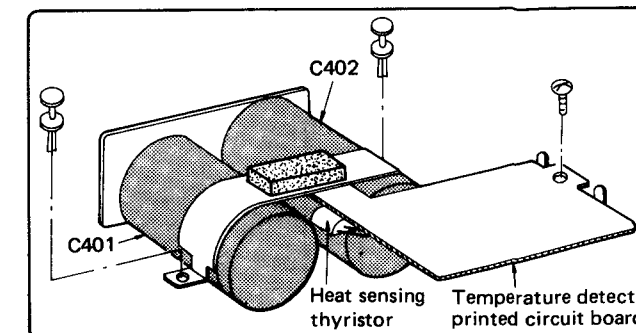


Fig. 15

• Lead connector

1. To disconnect the lead wires from the lead connector, open the "lead holder" of the connector as shown in Fig. 16, and pull out the lead wires.
2. The lead wires are provided with identification colors or patterns as in Fig. 16. So, insert them into the connector in correct positions.
3. It is advisable to put pencil marks on both the leads and the connector beforehand for the convenience of insertion.

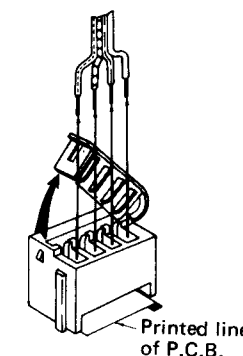


Fig. 16

Note: Setscrews 58 ~ 67 are screws with detents (Part No.: XTBS3+8BFZ1) as shown in Fig. 18 in order to make the contact of electric circuit perfect.
Take care not to mix up these screws with other screws.

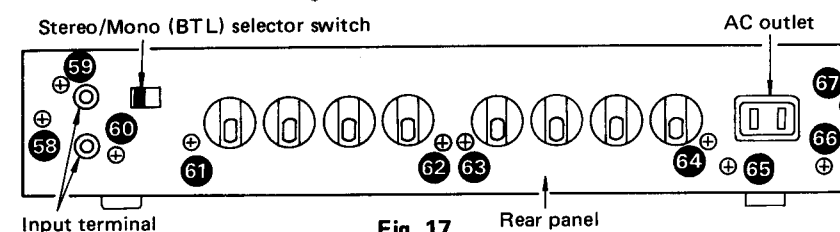


Fig. 17

Caution:

Do not remove the screw (A) of the Fig. 19 during repair of the power amplifier because it is used for grounding. If it is removed, tighten it with spring washer and washer as shown in Fig. 19.

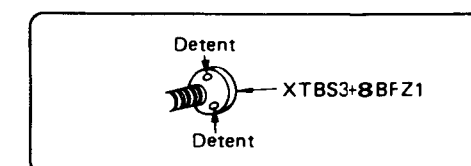


Fig. 18

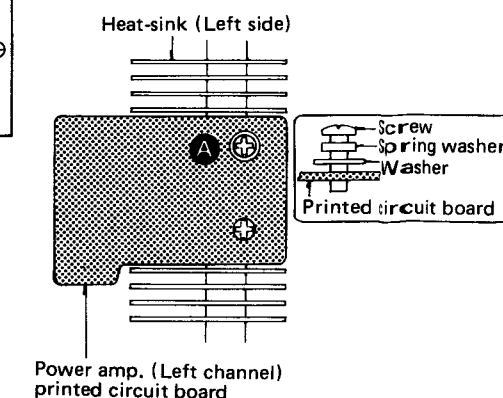


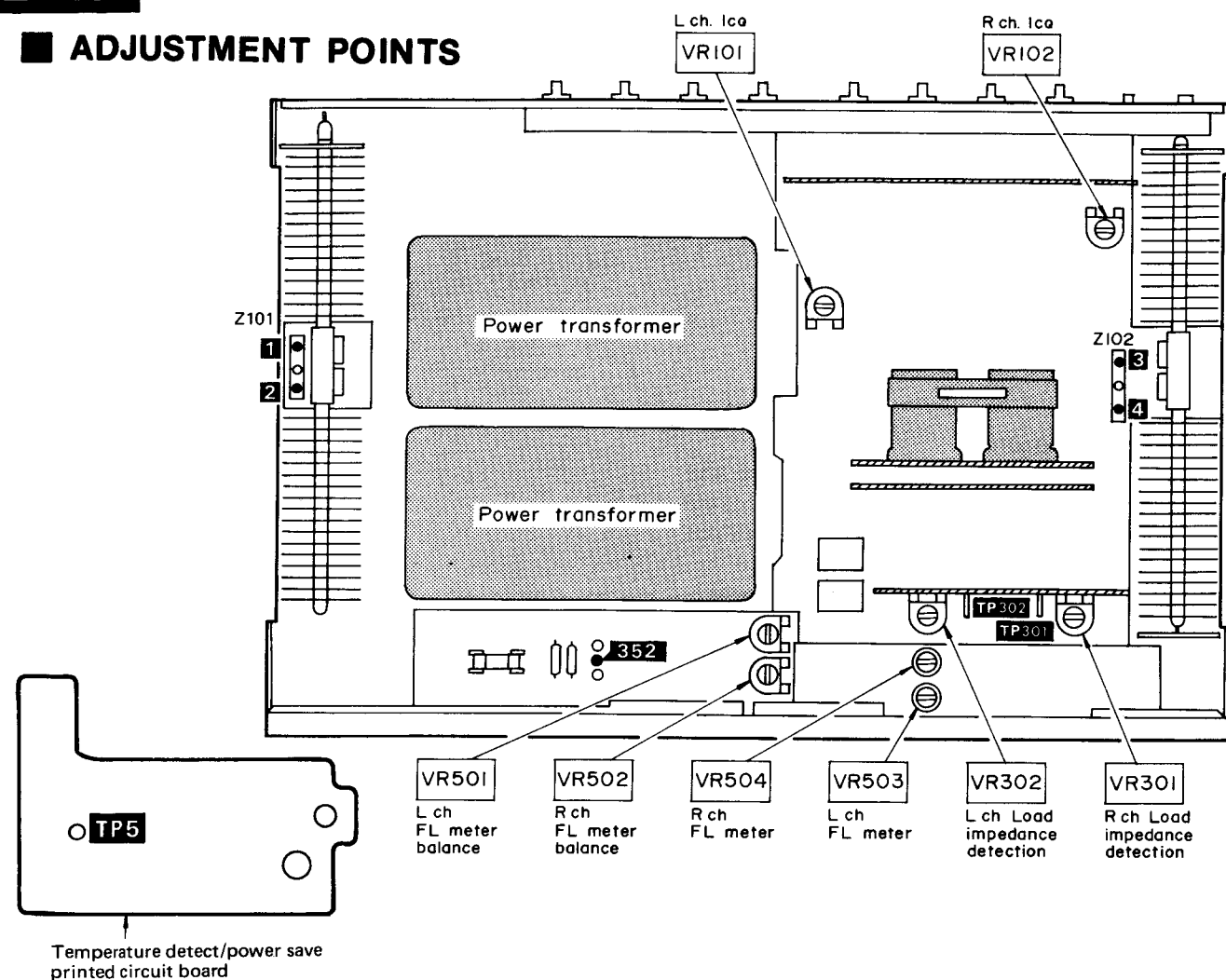
Fig. 19

BEFORE REPAIR AND ADJUSTMENT

Turn off the power supply and short-circuit both ends of power supply condensers (C401, C402, 10,000μF) a 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 110V/120V/220V/240V.

Power supply voltage		AC 110V	AC 120V	AC 220V	AC 240V
Current consumed	50/60 Hz	150 ~ 550mA	110 ~ 510mA	90 ~ 270mA	80 ~ 260mA

ADJUSTMENT POINTS



• How to give induction hum.

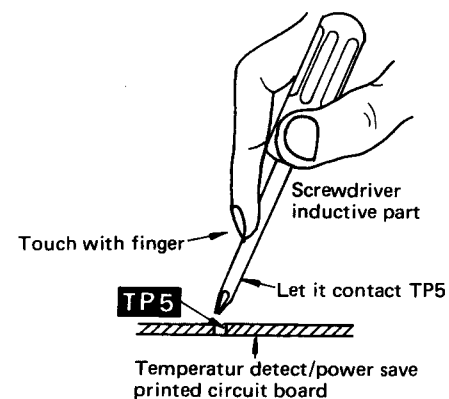


Fig. 20

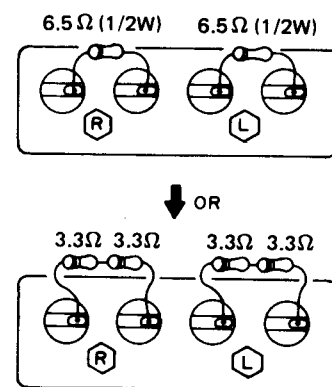
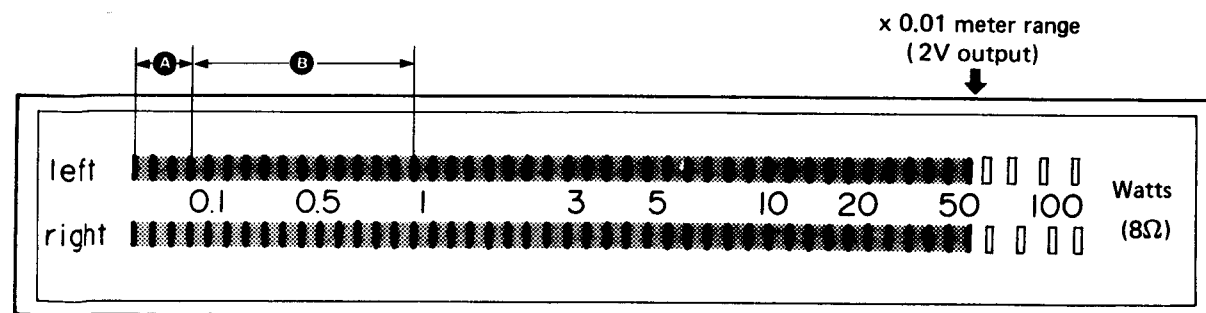


Fig. 21



FL peak power meter

Fig. 22

MEASUREMENTS AND ADJUSTMENTS—English

1. Load impedance detection and idling current of power transistor (ICQ)

• Setting and instruments used

1. Speaker selector main
2. DC voltmeter

3. Instruments for circuit operation check

(AC voltmeter, 1kHz oscillator, 8Ω load, 5W 0.33Ω resistor, 1/2W 6.5Ω or 3.3Ω & 3.3Ω)

Item	Connection of DC voltmeter	VR adjusted	Adjustment
Adjustment of load impedance detection circuit	*Connect a load with 6.5Ω (1/2W carbon resistor) or series-connected 3.3Ω and 3.3Ω (1/2W, ±5%) to the "main" speaker terminal. (Fig. 21) *Connect a DC voltmeter between TP301 and chassis.	VR301	*Connect 352 and chassis. *Completely turn VR301 and VR302 anticlockwise beforehand. *Adjust VR301 so that the voltage of TP301 is -0.1V. *Adjust VR302 so that the voltage of TP302 is 0V in 100mV range.
	*Connect a load with 6.5Ω (1/2W carbon resistor) or series-connected 3.3Ω and 3.3Ω (1/2W, ±5%) to the "main" speaker terminal. (Fig. 21) *Connect a DC voltmeter between TP302 and chassis.	VR302	
Adjustment of ICQ	L channel Connect voltmeter to 1 (+) and 2 (-)	VR101	① Completely turn VR101 and VR102 anticlockwise beforehand ② Adjust VR101 (L channel) and VR102 (R channel) so that the voltage is 1.5mV, about 1 min. after power supply ON.
	R channel Connect voltmeter to 3 (-) and 4 (+)	VR102	

2. Fluorescent peak power meter

Setting

- Connect a low frequency oscillator to the input terminal (Lch and Rch) and AC electronic voltmeter to the speaker terminal.
- Add 1kHz signal from the low frequency oscillator to the set.

Item	Meter range select switch position	VR adjusted	Adjustment
FL Peak-power meter	Range switch ... X0.01	VR503 (L ch) VR504 (R ch)	1. Adjust the input level so that the AC voltmeter indicates 2 volts. 2. Adjust the semi-fixed variable resistors VR503 (L ch.) and VR504 (R ch.) so that the 50W segment of FL meter lights up dimly. (Fig. 22)
Balance	Range switch ... X0.01	VR501 (Lch) VR502 (Rch)	1. With the input gradually decreased, if Lch and Rch are unbalanced when the 1st segments (Fig. 22: A) light up, then adjust the level by VR501 to lower the lighting level of Lch; VR502 to lower the lighting level of Rch. Note: • The 1st segments (Fig. 22: A) to Lch and Rch should go out at the same time. • After the adjustment, the lighting range should be within B (Fig. 22) with the range switch set to x1.

3. Check points

• DC balance

- ① Connect DC voltmeter and 8Ω load to speaker terminal.
- ② Make sure that output voltage is within ±30mV.

• Overload detection circuit

- ① Connect 8Ω load to "main" speaker terminal and 5W 0.33Ω resistance to "remote" speaker terminal.
- ② Apply 1kHz 30mV signal to "main" speaker terminal.
- ③ With speaker selector set at main and remote, make sure that relay in the set is OFF and no output is delivered.

* If protection relay turns OFF due to overload, the circuit and load will not restore their normal conditions unless power supply is once turned OFF and again turned ON.

• MONO (BTL) circuit

- ① Connect the speaker cord to MONO (BTL).
- ② Shift the stereo/MONO (BTL) selector switch to MONO (BTL) Then make sure that the tap change relay turns on.
- ③ Connect DC voltmeter and 8Ω load to "main" speaker terminal.
- ④ Apply 1 kHz sine-wave 0.5V output to Lch INPUT terminal.

Stereo – MONO (BTL)	Output conditions	Voltage values
Stereo	8Ω Load Lch output	8.5 ~ 13.5V
MONO	8Ω Load BTL output	19 ~ 24V

*Lch and Rch of FL peak power meter should be at the same level.

• Power saving circuit

- ① Connect DC voltage and 8Ω load to "main" speaker terminal.
- ② Apply 1 kHz 0.5V output to both Lch and Rch INPUT terminals.
- ③ Give induction hum (Fig. 20) to TP5, and then check the output voltage.

Power saving circuit OFF	➡	Power saving circuit ON
8.5 ~ 13.5V		6 ~ 9.5V

This circuit, once turned on, will not become reset. So, turn off power supply, and again turn it on over 20 seconds later.

MESSUNGEN UND JUSTIERUNGEN ————— Deutsch

1. Belastungsimpedanz-Detektor und ICQ

• Einstellungen und verwendete Instrumente

- 1. Lautsprecher-Wahlschalter "main"
- 2. Gleichstrom-Voltmeter
- 3. Instrumente für die Schaltungsbetrieb-Prüfung (Wechselstrom-Voltmeter, 1kHz-Oszillator, 8Ω-Belastung, 5W 0,33Ω-Widerstand, 1/2W 6,5Ω oder 3,3Ω & 3,3Ω ± 5%)

Gegenstand	Anschluß des Voltmeters	Zu justie- render Dreh- widerstand	Justierung
Justierung der Belastungs- impedanz- Detektor- schaltung	*Eine Last mit 6,5Ω (1/2W Kohlewiderstand) oder in Serie geschalteten 3,3Ω und 3,3Ω (1/2W, ±5%) an den "main" Lautsprecheranschluß anschließen. (Abb. 21) *Ein Gleichstrom-Voltmeter zwischen TP301 und dem Chassis, anshließen.	VR301	* Anschluß 352 und das Chassis verbinden. *VR301 and VR302 vorher bis zum Anschlag entgegen dem Uhrzeigersinn drehen. *VR302 so justieren, daß die Spannung an TP301 -0,1V beträgt. *VR301 so justieren, daß die Spannung an TP302 0V beträgt.
	*Eine Last mit 6,5Ω (1/2W Kohlewiderstand) oder in Serie geschalteten 3,3Ω und 3,3Ω (1/2W, ±5%) an den "main" Lautsprecheranschluß anschließen. (Abb. 21) *Ein Gleichstrom-Voltmeter zwischen TP302 und dem Chassis, anshließen.	VR302	
Justierung von ICQ	Linker Kanal Voltmeter an 1 (+) und 2 (-) anschließen.	VR101	① VR101 und VR102 vorher bis zum Anschlag entgegen dem Uhrzeigersinn drehen. ② VR101 (linker Kanal) und VR102 (rechter Kanal) so justieren, daß die Spannung, ca. 10 Minuten nach dem Einschalten der Stromzufuhr, 20mV beträgt.
	Rechter Kanal Voltmeter an 3 (-) und 4 (+) anschließen.	VR102	

2. Spitzenwertanzeigen

Einstellung:

- Einen Niederfrequenzoszillator an die Eingangsklemme des Tuners schließen und parallel zu 8-ohm Belastungswiderstand den elektronischen Wechselstrom-Voltmeter an die Lautsprecherklemme schließen.
- 1 kHz Signal aus dem Niederfrequenzoszillator in das Gerät speisen.

Gegenstand	Stellung des Meterbereichswählers	Zu justierender widerstand	Justierung
FL Spitzenwert- anzeigen	Bereichswähler auf X0.01	VR503 (Linker Kanal) VR504 (Rechter K.)	1. Den Eingangspegel so justieren, daß der Wechselstrom-Voltmeter 2,0V anzeigt. 2. Die halbfixt eingestellten Widerstände VR503 (linker Kanal) und VR504 (rechter Kanal) so einstellen, daß das 50W-Segment des Fluoreszenz-Aussteuerungsinstru-mentes schwach aufleuchtet. (Abb. 22)
Balance	Bereichswähler auf X0.01	VR501 (Linker Kanal) VR502 (Rechter K.)	1. Wenn beim allmählichen Verringern der Eingangsleistung das erste Segment des linken und des rechten Kanals (Abb. 22: A) nicht gleichzeitig aufleuchten, ist der Pegel folgendermassen zu justieren: VR501 zum Senken des Aufleuchtpegels des linken Kanals; VR 502 zum Senken des Aufleuchtpegels des rechten Kanals. Anmerkung: <ul style="list-style-type: none">• Das erste Segment (Abb. 22: A) des linken und rechten Kanals sollten gleichzeitig erlöschen.• Nach der Justierung sollte der Aufleuchtbereich innerhalb von E in Abb. 22 liegen, wenn der Bereichschalter auf "x1" eingestellt ist.

3. Prüfpunkte

• Gleichstrom-Balance

- ① Das Gleichstrom-Voltmeter und eine 8Ω-Last an den Lautsprecheranschluß anschließen.
- ② Überprüfen, daß die Ausgangsspannung innerhalb ±30mV liegt.

• Überbelastungs-Detektorschaltung

- ① Eine 8Ω-Last an den "main"-Lautsprecheranschluß und einen 5W, 0,33Ω-Widerstand an den "remote"-Lautsprecher-anschluß anschließen.
- ② Dem "main" -Lautsprecheranschluß ein Signal von 1kHz, 30mV zuleiten.
- ③ Den Lautstärkeregler ganz aufdrehen.
- ④ Mit auf "main and remote" eingestelltem Lautsprecher-Wahlschalter überprüfen, daß das Relais ausgeschaltet ist, und keine Ausgangsleistung ausgegeben wird.

* Nachdem das Schutzrelais aufgrund von Überbelastung ausgeschaltet wurde, muß der Netzschalter einmal aus- und wieder eingeschaltet werden, damit die Schaltung und die Last wieder in wieder in ihren normalen Zustand versetzt werden.

• MONO-Schaltung (BTL)

- ① Das Lautsprecherkabel an MONO (BTL) anschließen.
- ② Den Stereo/MONO (BTL)-Wahlschalter auf MONO (BTL) stellen. Anschließend überprüfen, daß das Anzapfumschalt-Relais betätigt wird.
- ③ Das Gleichstrom-Voltmeter und 8Ω-Last an den "Main"-Lautsprecheranschluß anschließen.
- ④ 1 kHz-Sinuswellensignal von 0,5V Ausgangsleistung an den Eingangsanschluß des Linken Kanals anlegen.

Stereo / MONO (BTL)	Ausgangsbedingungen	Spannungswerte
Stereo	8Ω-Last, Ausgangsleistung linker Kanal	8,5 ~ 13,5 V
MONO	8Ω-Last, BTL-Ausgangsleistung	19 ~ 24 V

*Der FL-Pegelmesser sollte für den linken und rechten Kanal den gleichen Pegel anzeigen.

• Stromsparschaltung

- ① Gleichspannung und 8Ω-Last an den "Main"-Lautsprecheranschluß anschließen.
- ② Ausgangsleistung von 1 kHz, 0,5 V an den Eingangsanschluß des linken und des rechten Kanals anlegen.
- ③ Induktionsbrummen (Abb. 20) an TP5 anlegen und dann die Ausgangsspannung überprüfen.

Stromsparschaltung AUS	➡	Stromsparschaltung EIN
8,5 ~ 13,5 V		6 ~ 9,5 V

Einmal eingeschaltet, kann diese Schaltung nicht zurückgestellt werden. Daher die Stromversorgung ausschalten und nach mehr als 20 Sekunden wieder einschalten.

■ MESURAGES ET RÉGLAGES — Français

1. Détection d'impédance de charge et ICQ

● Réglages et appareils utilisés

1. Sélecteur de haut-parleurs principal (main)
2. Voltmètre à C.C.

3. Appareils pour la vérification du fonctionnement du circuit.
(Voltmètre à C.A., oscillateur de 1 kHz, charge de 8Ω , résistance de $5W$ $0,33\Omega$, $1/2W$ $6,5\Omega$ ou $3,3\Omega$ et $3,3\Omega \pm 5\%$)

Article	Branchement du voltmètre à C.C.	VR à régler	Réglage
Réglage du circuit de détection d'impédance de charge.	*Mettre en circuit une charge avec $6,5\Omega$ (résistance à couche de carbone de $1/2W$) ou un montage en série de $3,3\Omega$ et $3,3\Omega$ ($1/2W$, $\pm 5\%$) à la prise du haut-parleur "principal". (Fig. 21) *Brancher un voltmètre à C.C. entre TP301 et le châssis.	VR301	*Reccorder la borne 352 et le châssis. *Tourner préalablement complètement dans le sens inverse des aiguilles d'une montre VR301 et VR302. *Régler VR302 de façon à ce que la tension de TP301 soit de $-0,1V$. *Régler VR301 de façon à ce que la tension de TP302 soit de $0V$.
	*Mettre en circuit une charge avec $6,5\Omega$ (résistance à couche de carbone de $1/2W$) ou un montage en série de $3,3\Omega$ et $3,3\Omega$ ($1/2W$, $\pm 5\%$) à la prise du haut-parleur "principal". (Fig. 21) *Brancher un voltmètre à C.C. entre TP302 et le châssis.	VR302	
Réglage de ICQ	Canal de gauche Brancher le voltmètre à 1 (+) et 2 (-).	VR101	① Tourner préalablement complètement dans le sens inverse des aiguilles d'une montre VR101 et VR102. ② Régler VR101 (canal de gauche) et VR102 (canal de droite) de façon à ce que la tension soit de $20mV$, environ 10 minutes après la mise en marche de la tension d'alimentation.
	Canal de droite Brancher le voltmètre à 3 (-) et 4 (+).	VR102	

2. Indicateurs de puissance de crête fluorescents

Réglage:

- Brancher un oscillateur à basse fréquence à la borne de sortie du tuner et une résistance de charge de 8 ohms et un voltmètre électronique à la borne de l'enceinte.
- Par l'oscillateur à basse fréquence, appliquer un signal de 1 kHz à l'appareil.

Article	Position du commutateur de sélection de la gamme du compteur	VR à régler	Réglage
FL Indicateurs de puissance de crête fluorescents	Commutateur de gamme X0,01	VR503 (CG) VR504 (CD)	1. Régler le niveau de sortie de telle sorte que la voltmètre CA indique $2,0V$. 2. Régler les résistances variables semi-fixes VR503 (canal de gauche) et VR504 (canal de droite), de façon à ce que le segment de $50W$ de l'appareil de mesure FL s'éclaire faiblement. (Fig. 22)
Equilibre	Commutateur de gamme X0,01	VR501 (CG) VR502 (CD)	1. Avec l'entrée graduellement diminuée, si la gauche et la droite sont en dissymétrie lorsque les premiers segments (Fig. 22: A) s'éclairent, ajuster alors le niveau de la manière suivante: VR501 Diminuer le niveau d'éclairement de gauche VR502 Diminuer le niveau d'éclairement de droite Nota: • Les premiers segments (Fig. 22: A) de gauche et de droite devront s'éteindre au même moment. • Après la mise au point, la plage d'éclairement devra être en deçà de E (Fig. 22) avec le commutateur de plage placé sur x1.

3. Points de vérification

● Compensation du C.C.

- ① Brancher le voltmètre à C.C. et une charge de 8Ω à la prise de haut-parleurs.
- ② S'assurer que la tension de sortie est en deçà de $\pm 30mV$.

● Circuit de détection d'une surcharge

- ① Connecter une charge de 8Ω à la prise de haut-parleurs "principale" ("main") et une résistance de $5W$ $0,33\Omega$ à la prise de haut-parleurs "auxiliaire" ("remote").
- ② Appliquer un signal de 1kHz $30mV$ à la borne du haut-parleur "principal" ("main").
- ③ Augmenter le volume sonore au maximum.
- ④ Avec le sélecteur de haut-parleurs réglé sur "main" (principal) et sur "remote" (auxiliaire), s'assurer que le relais dans l'appareil soit mis hors circuit et qu'aucune sortie ne soit livrée.

* Si le relais de protection est mis hors circuit à cause d'une surcharge, le circuit et la charge ne récupéreront pas leurs conditions normales à moins que l'alimentation secteur soit une fois mise hors circuit et remise à nouveau en marche.

● Circuit monophonique BTL (Montage sans transformateur)

- ① Raccorder le câble du haut-parleur au circuit monophonique (BTL).
- ② Glisser le commutateur-sélecteur stéréo/mono (BTL) sur "mono" (BTL). Puis, s'assurer que le relais à changement de raccordement est mis en marche.
- ③ Brancher un voltmètre C.C. et une charge de 8Ω sur la borne du haut-parleur principal ("main").
- ④ Appliquer une puissance de sortie de $0,5V$ sinusoïdale de 1 kHz à la borne d'ENTREE de gauche.

Stéréo / MONO (BTL)	Conditions de sortie	Valeurs de tension
Stéréophonique	Charge de 8Ω Sortie de gauche	$8,5 \sim 13,5 V$
Monophonique	Charge de 8Ω Sortie BTL	$19 \sim 24 V$

* La gauche et la droite du compteur à puissance de crête fluorescent devront être du même niveau.

● Circuit économisant de l'énergie

- ① Brancher une tension de C.C. et une charge de 8Ω à la borne du haut-parleur principal ("main").
- ② Appliquer une sortie de $0,5V$ 1 kHz à la fois aux bornes d'ENTREE de gauche et de droite.
- ③ Procurer un ronflement d'induction (Fig. 20) à TP5, puis vérifier la tension de sortie.

ARRET du circuit économisant de l'énergie	MARCHE du circuit économisant de l'énergie
$8,5 \sim 13,5 V$	$6 \sim 9,5 V$

Ce circuit, une fois mis en marche, ne se remettra pas en position initiale. Aussi, couper l'alimentation et remettre à nouveau en marche après 20 secondes.

■ MEDICIONES Y AJUSTES — Español

1. Detección de impedancia de carga y corriente de reposo de transistor de potencias (ICQ)

● Puesta e instrumentos usados

1. Selector de altavoz principal
2. Voltímetro de CC
3. Instrumentos para verificación de operación de circuito
(Voltímetro de CA, oscilador 1kHz, carga 8Ω , resistor $5W$ $0,33\Omega$, $1/2W$ $6,5\Omega$ ó $3,3\Omega$ y $3,3\Omega$)

Item	Conexión de voltmetro de CC	RV ajustado	Procedimiento de ajuste
Ajuste del circuito de detección de impedancia de carga	*Conectar una carga con $6,5\Omega$ (resistor de carbón de $1/2W$) ó $3,3\Omega$ y $3,3\Omega$ ($1/2W$, $\pm 5\%$), conectados en serie, al terminal del altavoz "principal". (Fig. 21) *Conectar un voltmetro de CC entre TP301 y chasis.	VR301	*Conectar terminal 352 y chasis. *Girar completamente VR302 y VR301 a la izquierda de antemano. *Ajustar VR302 de manera que el voltaje de TP301 sea $-0,1V$.
	*Conectar una carga con $6,5\Omega$ (resistor de carbón de $1/2W$) ó $3,3\Omega$ y $3,3\Omega$ ($1/2W$, $\pm 5\%$), conectados en serie, al terminal del altavoz "principal". (Fig. 21) *Conectar un voltmetro de CC entre TP302 y chasis.	VR302	*Ajustar VR301 de manera que el voltaje de TP302 sea $0V$.
Ajuste de ICQ	Canal I Conectar voltmetro a 1 (+) y 2 (-)	VR101	① Girar completamente VR101 y VR102 a la izquierda de antemano ② Ajustar VR101 (canal I) y VR102 (canal D) de manera que el voltaje sea $20mV$, unos 10 min. después de conectar el suministro de energía.
	Canal D Conectar voltmetro a 3 (-) y 4 (+)	VR102	

2. Medidor fluorescente de potencia de cresta

Puesta

- Conectar un oscilador de baja frecuencia al terminal de entrada de sintonizador, y el resistor de carga 8Ω al terminal del altavoz.
- Añadir señal 1kHz del oscilador de baja frecuencia al aparato.

Item	Posición de interruptor selector de gama de medidor	RV ajustado	Procedimiento de ajuste
FL Indicadores de potencia-cresta	Interruptor de gama ... X0.01	VR503 (Canal I) VR504 (Canal D)	1. Ajustar el nivel de entrada de manera que el voltímetro de CA indique 2 voltios. 2. Ajustar los resistores variables semifijos VR503 (C.I.) y VR504 (C.D.) de manera que el segmento de 50W del medidor FI se ilumine débilmente (Fig. 22)
Equilibrio	Interruptor de gama ... X0.01	VR501 (Canal I) VR502 (Canal D)	1. Si, al ir disminuyendo poco a poco la entrada, el canal de izquierda (Lch) y el de derecha (Rch) quedaran desequilibrados cuando se iluminan los primeros segmentos (Fig. 22: A), entonces regular el nivel usando VR501 para hacer disminuir el nivel de iluminación del canal izquierdo. VR502 para hacer disminuir el nivel de iluminación del canal derecho. Notas: <ul style="list-style-type: none">Los primeros segmentos (Fig. 22: A) del canal de izquierda (Lch) y del de derecha (Rch) deberán producirse al mismo tiempo.Una vez hecho el reglaje, el alcance de iluminación deberá mantener dentro del ámbito B (Fig. 22) con el interruptor de alcance puesto en x1.

3. Puntos de verificación

• Equilibrio de CC

- Conectar el voltímetro de CC y carga de 8Ω al terminal del altavoz.
- Asegurarse de que el voltaje de salida esté dentro de $\pm 30\text{mV}$.

• Circuito de detección de sobrecarga

- Conectar la carga de 8Ω al terminal del altavoz "principal" (main) y la resistencia de $5\text{W } 0,33\Omega$ al terminal del altavoz "remoto" (remote).
- Aplicar señal de $1\text{kHz } 30\text{mV}$ a terminal de altavoz "principal"
- Hacer el volumen de sonido máximo.
- Con el selector del altavoz puesto en principal y remoto, asegurarse de que el relé del aparato esté en OFF (desconectado) y no se transmita potencia de salida.

* Si el relé de protección se desconecta debido a sobrecarga, el circuito y la carga no se repondrán a sus condiciones normales, a no ser que el suministro de energía se desconecte una vez y se conecte de nuevo.

• Circuito MONO (BTL)

- Conectar el cable del altavoz a MONO (BTL).
- Correr el selector de estéreo/MONO (BTL) a la posición marcada MONO (BTL). A continuación, cerciorarse de que se encienda el relé de cambio de toma.
- Conectar el voltímetro de C.C. y la carga de 8Ω al terminal de los altavoces marcado "main".
- Aplicar una potencia de salida de $0,5\text{V}$ de una onda sinusoidal de 1kHz al terminal marcado INPUT del canal de izquierda (Lch).

Estéreo — MONO (BTL)	Condiciones de salida	Valores de tensión
Estéreo	Salida del canal Lch con carga de 8Ω	$8,5 \sim 13,5\text{V}$
MONO	Salida BTL con carga de 8Ω	$19 \sim 24\text{V}$

*El canal Lch y el Rch del medidor de potencia de cresta fluorescente (FL) deberán encontrarse al mismo nivel.

• Circuito ahorrador de corriente

- Conectar la tensión de C.C. y la carga de 8Ω al terminal de los altavoces marcado "main".
- Aplicar una salida de $0,5\text{V}$ de 1kHz a los terminales marcados INPUT tanto del canal de izquierda (Lch) como del de derecha (Rch).
- Suministrar un zumbido de inducción (Fig. 20) a **TP5**, y, a continuación, comprobar la tensión de salida.

Circuito ahorrador de corriente en OFF	Circuito ahorrador de corriente en ON
$8,5 \sim 13,5\text{V}$	$6 \sim 9,5\text{V}$

Este circuito, una vez encendido, no se apagará. Por lo tanto, apagar una vez la corriente y volver a encenderla transcurridos unos 20 segundos.

REPLACEMENT PARTS LIST Electrical Parts

Notes: 1. Part numbers are indicated on most mechanical parts.

Please use this part number for parts orders.

2. Important safety notice:

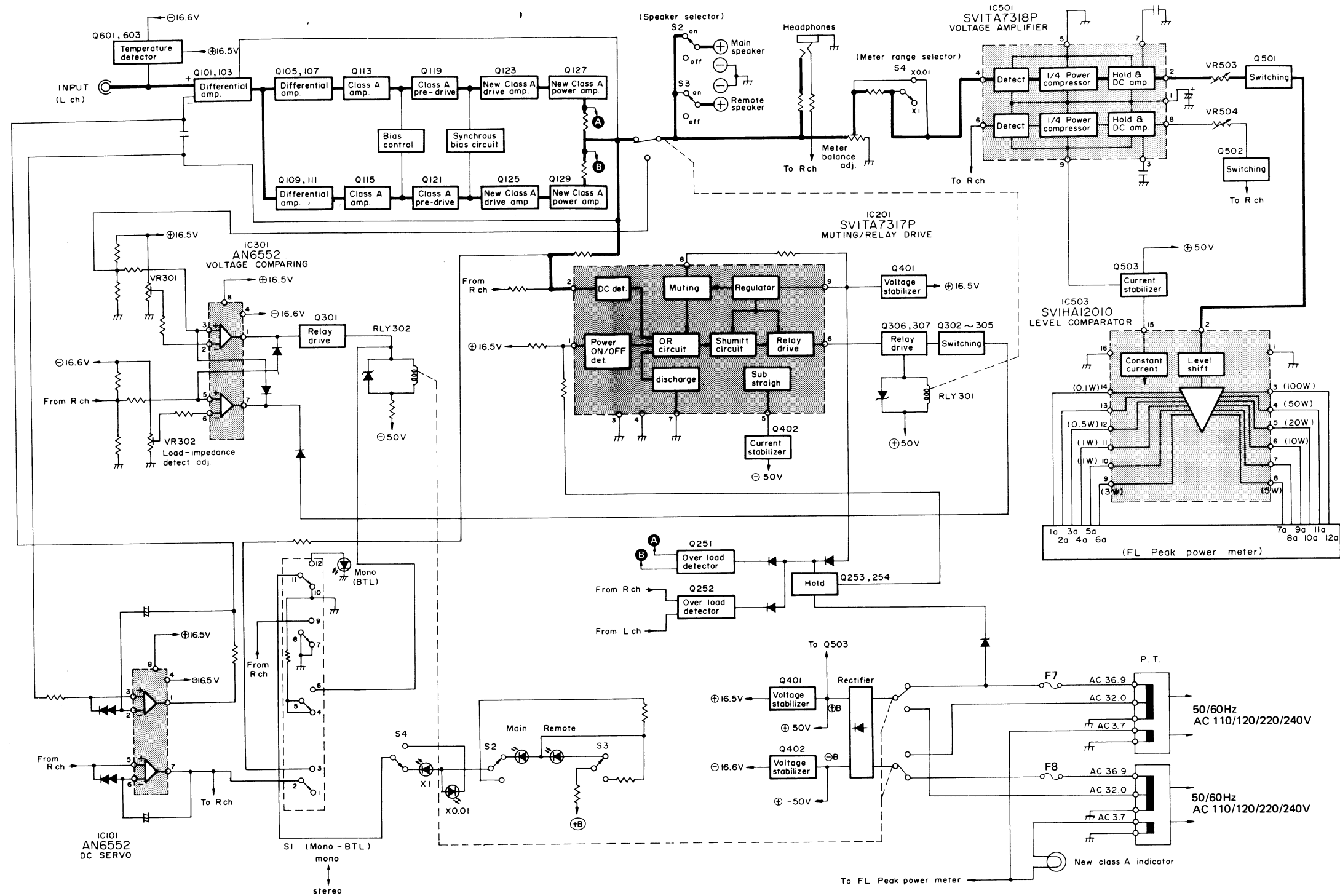
Components identified by **A** mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC101 IC201 IC301 IC501 IC502, 503	AN6552F SVITA7317P AN6552F SVITA7318P SVIHA12010	IC, DC Servo IC, Muting/Relay Drive IC, Voltage Comparing IC, Voltage Amplifier IC, Level Comparator
TRANSISTORS		
Q101~104	2SK170-GR	Transistor, Differential Amplifier (Use in ranks BG, BL or GR)
Q105~108	2SC1980-T	Transistor, Differential Amplifier (Use in ranks Q, R or S)
Q109~112	2SA921-T	Transistor, Differential Amplifier (Use in ranks Q, R or S)
Q113, 114 Q115, 116	2SA1123-R 2SC2631-R	Transistor, Pre-Driver Transistor, Pre-Driver (Use in pair ranks Q113, 114, Q115 & 116)
Q117, 118	2SC1815-Y	Transistor, ICQ & Synchronize Bias (Use in ranks Y or O)
Q119, 120 Q121, 122	2SC2632-R 2SA1124-R	Transistor, Pre-Driver (Use in ranks Q, R, or S) Transistor, Pre-Driver (Use in ranks Q, R, or S) (Use in pair ranks Q119, 120, Q121 & 122)
Q123, 124	2SC2592-R	Transistor, New Class A Drive Amplifier (Use in ranks Q, R or S)
Q125, 126	2SA1112-R	Transistor, New Class A Drive Amplifier (Use in ranks Q, R or S)
Q127, 128 Q129, 130	2SC2581S-Y 2SA1106S-Y	Transistor, New Class A Power Amplifier (Use in pair ranks Q127, 128, Q129 & 130)
Q251, 252	2SC1980-T	Transistor, Over Load Detector (Use in ranks Q, R or S)
Q253 Q254 Q301	2SC1815-Y 2SA1015-Y 2SA777-R	Transistor, Hold (Use in ranks Y or O) Transistor, Hold (Use in ranks Y or O) Transistor, Relay Driver I (Use in ranks Q, R or S)
Q302, 304, 305 Q303, 501, 502 Q306 Q307	2SA1015-Y 2SA1815-Y 2SC1815-Y 2SC1509FR	Transistor, Switching (Use in ranks Y or O) Transistor, Switching (Use in ranks Y or O) Transistor, Relay-Driver (Use in ranks Y or O) Transistor, Relay-Driver (Use in ranks Q, R or S)
Q401	2SD836-Q	Transistor, Current Stabilizer (Use in ranks Q, R or S)
Q402 Q503	2SB750-Q 2SD762-O	Transistor, Current Stabilizer Transistor, Current Stabilizer (Use in ranks O, P or Q)
Q601~604	2SK301-S	Transistor
DIODES		
D101~104 D105~108, 125, 126 D109~112 D113~120 D121~124 131, 132 D201, 202, 251 252, 301, 302 305, 502	MA162A MA27A1 MA162A 2-0A99 MA27A2 MA162A	Diode, Switching Diode Diode, Switching Diode, Synchro Bias Diode Diode, Bias Supply, Protection Circuit
D303, 306, 308 309 D304, 307 D401~404 D405, 406 D407 D411~415 D501 D601, 602 D603, 604	MA162A SVDMZ422B SVDS3V40 SVDMZ318 SVDSR1K2 LN217RP SVDMZ320 MA162A SVDMZ304	Diode Diode, 22V, Zener Diode, Rectifier Diode, 18V, Zener Diode, Rectifier Diode, Rectifier Diode, Function Indicator Diode, 20V, Zener Diode Diode, 4V, Zener
D605 D606	SVTTT201-90 RVDEQA0106S	Diode, Thyristor Diode, 6V, Zener
COILS and TRANSFORMERS		
L101, 102 T401, 402	SLQY15G-30 SLT5Z3	Coil, Choke Transformer, Power Source

Ref. No.	Part No.	Part Name & Description
SWITCHES		
S1 S2, 3, 4 S5 S6	RSS42A SSH3025-2 ESB90259S ESE37200	Switch, Mono BTL Select Switch, Speaker, Meter Range Select Switch, Power Source Switch, Volt Adjuster
FLUORESCENT DISPLAY TUBE		
FL	SADBG89Z	FL, Peak Power Meter
RELAYS		
RLY301 RLY302	SSY99-1 SSY101-1	Relay, Speaker Protection Relay, Transformer Top Select of Secondary
VARIABLE RESISTORS		
VR101, 102 VR301, 302	EVNM4AA00B52 EVNM0AA00B14	ICQ Adjustment, 500Ω (B) Load Impedance, Detect Adjustment, $10k\Omega$ (B)
VR501, 502 VR503, 504	EVNM4AA00B53 EVNM4AA00B23	FL Meter Balance Adjustment, $5k\Omega$ (B) FL Meter Level Adjustment, $2k\Omega$ (B)
THERMISTORS		
TH101, 102 TH103, 104 251, 252	ERTD2ZHL332S ERTD2ZHL103S	Thermistor, Thermal Compensation, $3,3k\Omega$ Thermistor, Thermal Compensation, $10k\Omega$
LAMP		
PL1	XAMR81S10	Lamp, New Class A, 150mA (8V)
FUSE		
F1, 2, 3, 4, 5, 6 F7, 8	XBA2C10TRO XBA2C63TRO	Fuse, 1A (250V) Fuse, 6.3A (250V)
COMPONENT COMBINATIONS		
Z101, 102 Z103, 104, 105 Z401	ERF3GBKR22N ECQJ0517 SXRFS203ZSM	Component Combination, $3\text{W}, 0,22\Omega$ (x2) Component Combination, $0,047\mu\text{F}, 10\Omega$ Component Combination, $0,01\mu\text{F}$ (x2)
RESISTORS		
R101, 102 R103, 104 R105, 106 R107, 108 R109, 110 R111, 112 R113, 114 R115, 116 R117, 118 R119, 120	ERD25FJ102 ERD25TJ473 ERD25TJ123 ERD25TJ123 ERD25FJ471 ERD25TJ153 ERD25TJ223 ERD25TJ683 ERD25FJ122 ERD25FJ122	Carbon, $1/4\text{W}, 1k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 47k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 12k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 12k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 470\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 15k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 22k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 68k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$
R121, 122 R123, 124 R125, 126 R127, 128 R129, 130 R131, 132 R133, 134 R135, 136 R137, 138 R139, 140	ERD25TJ153 ERD25FJ122 ERD25FJ122 ERD25FJ332 ERD25FJ103 ERD25FJ103 ERD25FJ122 ERD25FJ102 ERD2FCG101 ERD2FCG101	Carbon, $1/4\text{W}, 15k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 3,3k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 10k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 10k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1k\Omega, \pm 5\%$ Carbon, $2\text{W}, 100\Omega, \pm 2\%$ Carbon, $2\text{W}, 100\Omega, \pm 2\%$
R141, 142 R143, 144 R145, 146 R147, 148 R149, 150 R151, 152 R153, 154 R155, 156 R157, 158 R159, 160	ERD25FJ821 ERD25FJ103 ERD25FJ682 ERD25TJ333 ERD25FJ102 ERD25FJ102 ERD25FJ103 ERD25TJ184 ERD25TJ184 ERD2FCG390	Carbon, $1/4\text{W}, 820\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 10k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 6,8k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 33k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 10k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 180k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 180k\Omega, \pm 5\%$ Carbon, $2\text{W}, 39\Omega, \pm 2\%$
R161, 162 R163, 164 R165, 166 R167, 168 R169, 170 R171, 172 R173, 174 R175, 176	ERD2FCG390 ERD25FJ221 ERG1ANJ100 ERD25TJ223 ERD25FJ122 ERD25TJ104 ERD25TJ104 ERD25FJ103	Carbon, $2\text{W}, 39\Omega, \pm 2\%$ Carbon, $1/4\text{W}, 220\Omega, \pm 5\%$ Metal Oxide, $1\text{W}, 10\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 22k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 1,2k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 100k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 100k\Omega, \pm 5\%$ Carbon, $1/4\text{W}, 10k\Omega, \pm 5\%$

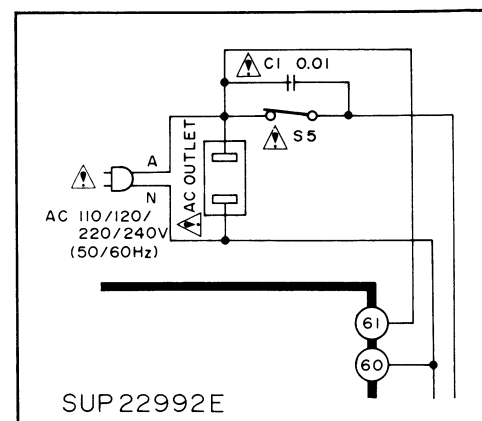
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■ BLOCK DIAGRAM

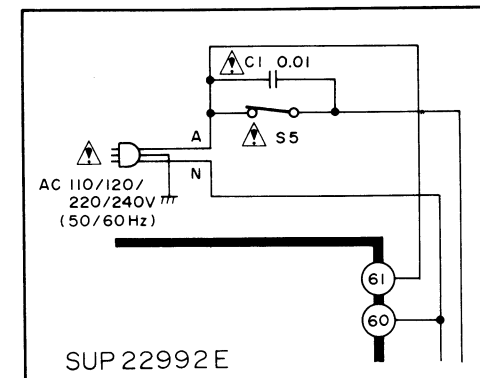


- Power source circuit for [XA], [XL] and [EG] area only.

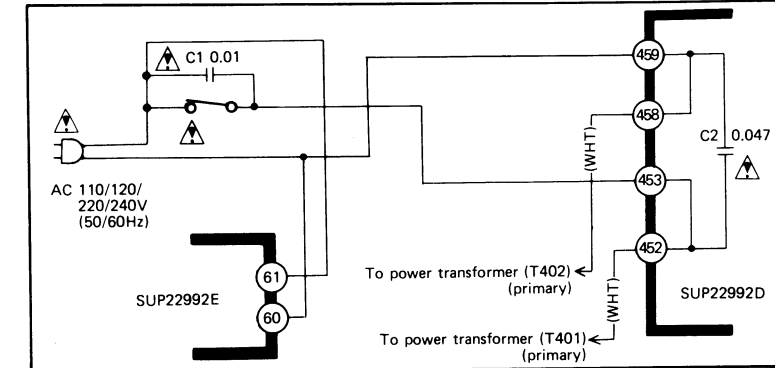
[XA] area
For Southeast Asia, Africa, Middle Near East
and Central South America.

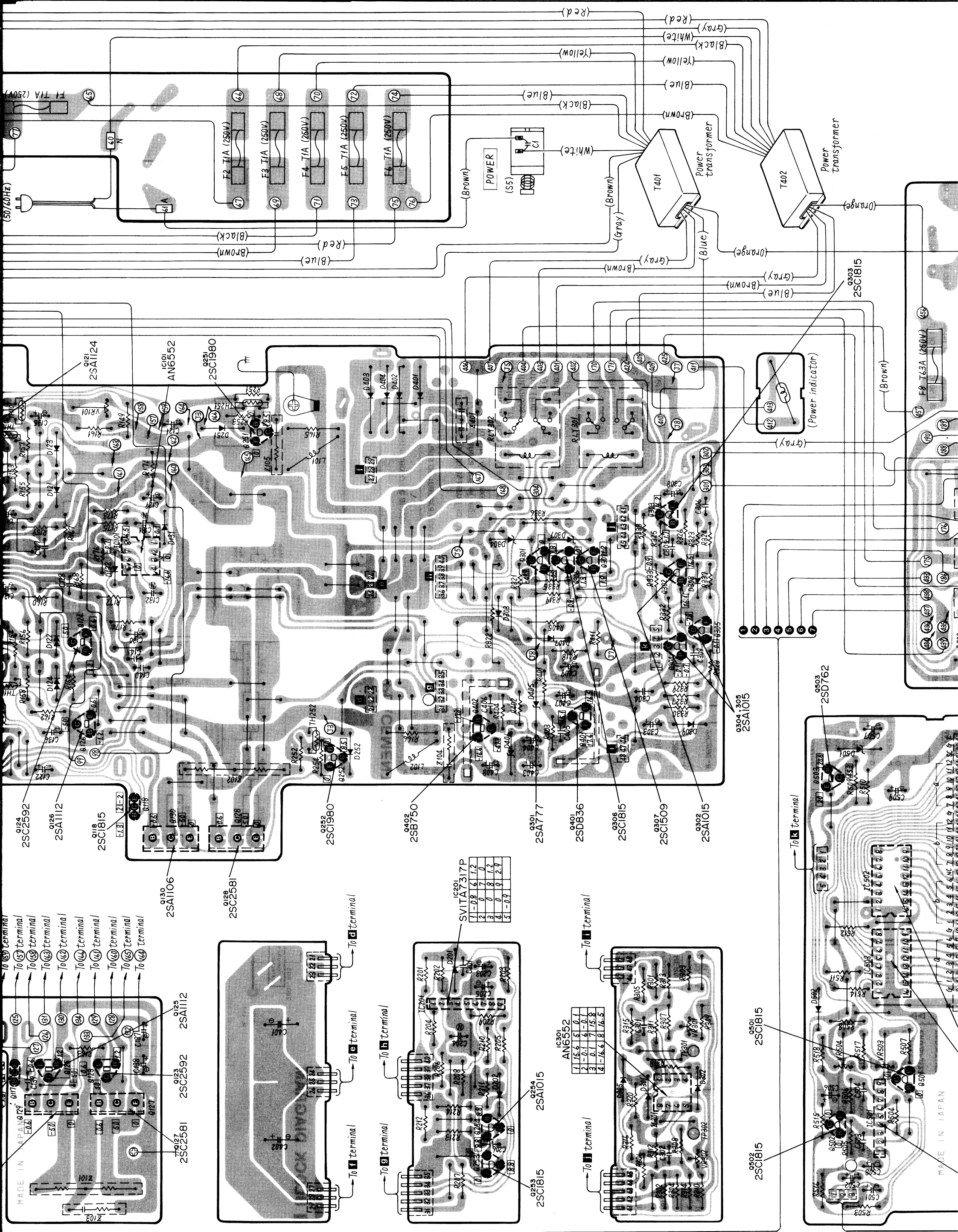


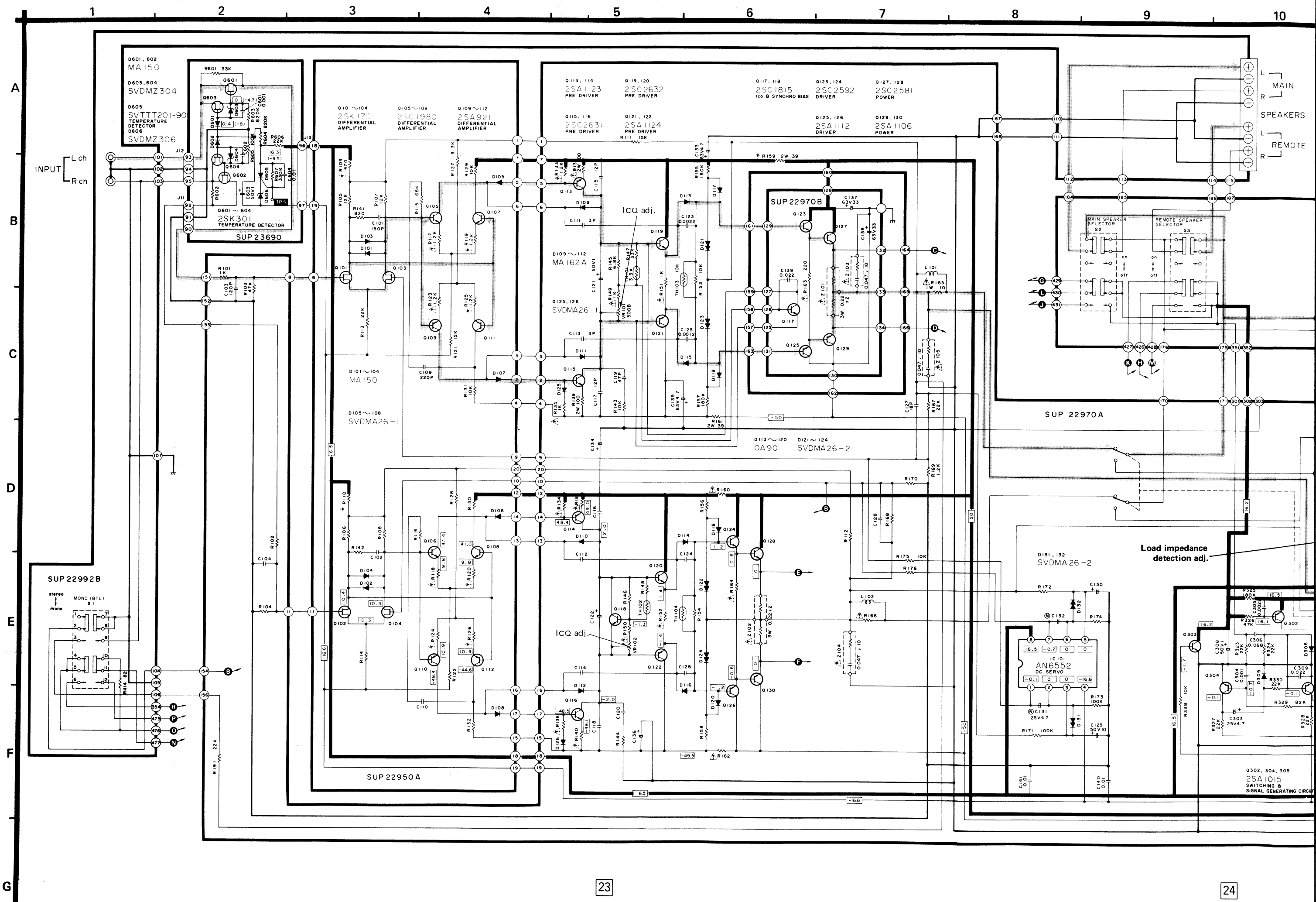
[XL] area
For Australia.



[EG] area
For F.R. Germany.







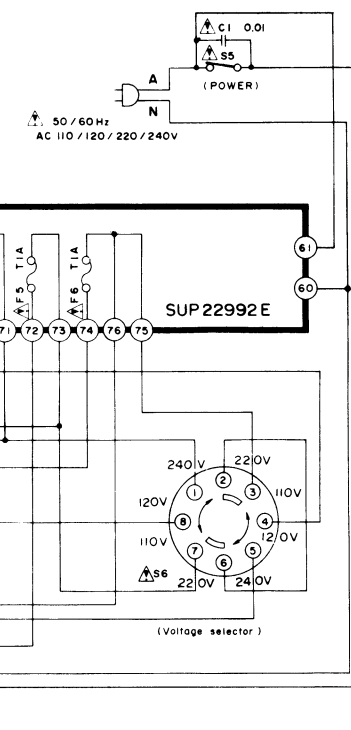
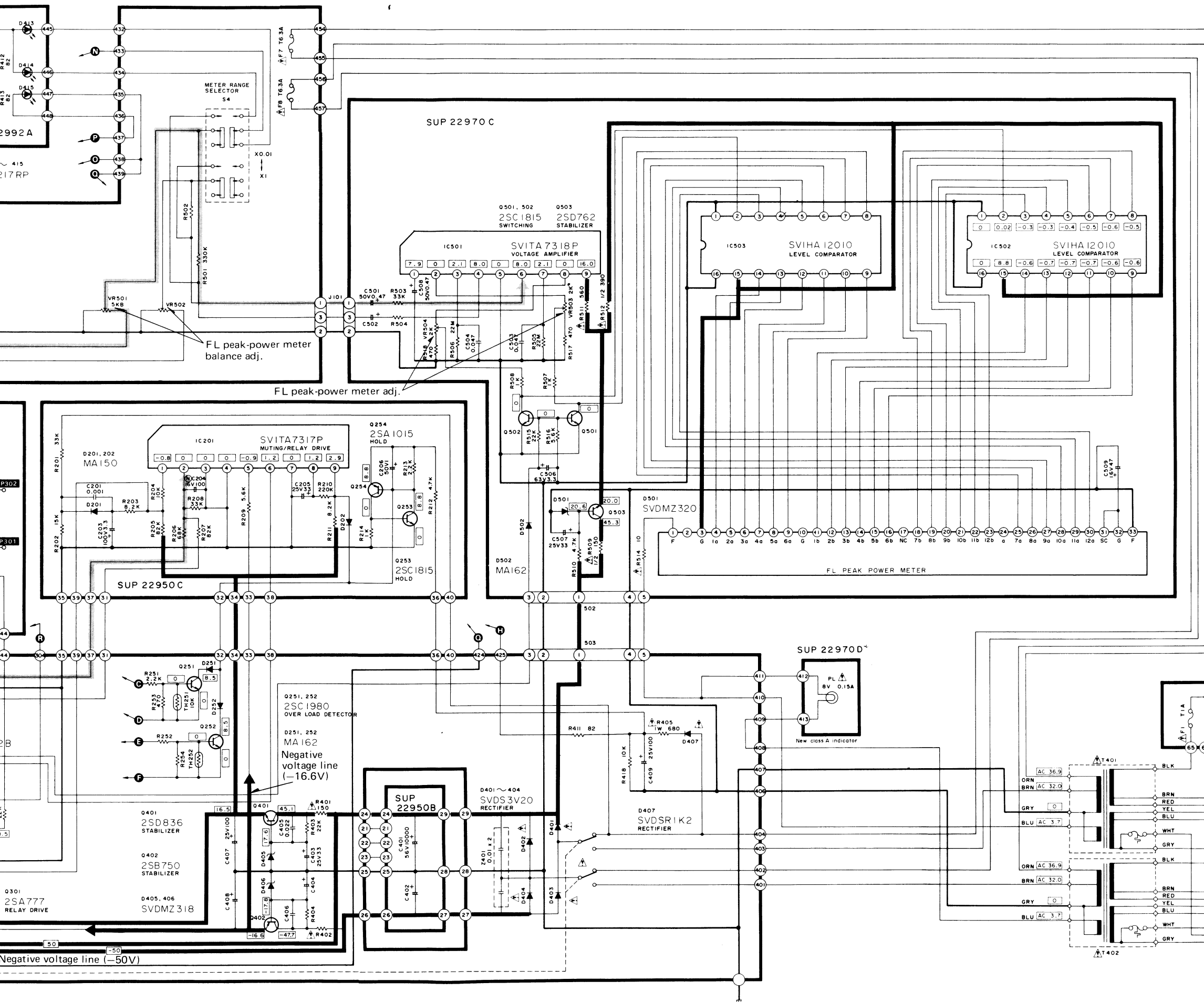
SCHEMATIC DIAGRAM

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

Notes:

1. Mono (BTL) selector switch in "stereo" position.
Stereo ↔ MONO (BTL)
2. Main speaker selector switch in "on" position.
■ on, ■ off
3. Remote speaker selector switch in "on" position.
■ on, ■ off
4. Meter range selector switch in "x1" position.
■ x1, ■ x0.01
5. Power source switch in "on" position.
6. Voltage selector switch in "220V" position.
120V ↔ 110V ↔ 220V ↔ 240V
7. indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
* Figure in stand for DC voltage in no signal and no load impedance.
* Figures in () stand for DC voltage in D605 turned ON.
8. — signal lines of left channel
9. — Positive (+B) voltage lines.
10. Important safety notice:

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

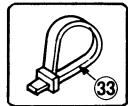
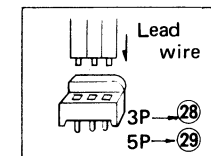


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Ref. No.	Part No.	Part Name & Description
R179, 180 R191	ERG2ANJ331 ERD25TJ223	Metal Oxide, 2W, 330Ω, ±5% Carbon, 1/4W, 22kΩ, ±5%
R201	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%
R202	ERD25TJ153	Carbon, 1/4W, 15kΩ, ±5%
R203	ERD25FJ822	Carbon, 1/4W, 8.2kΩ, ±5%
R204	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%
R205	ERD25TJ823	Carbon, 1/4W, 82kΩ, ±5%
R206	ERD25TJ683	Carbon, 1/4W, 68kΩ, ±5%
R207	ERD25TJ823	Carbon, 1/4W, 82kΩ, ±5%
R208	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%
R209	ERD25FJ562	Carbon, 1/4W, 5.6kΩ, ±5%
R210	ERD25TJ224	Carbon, 1/4W, 220kΩ, ±5%
R211	ERD25FJ822	Carbon, 1/4W, 8.2kΩ, ±5%
R212	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ±5%
R213	ERD25FJ222	Carbon, 1/4W, 2.2kΩ, ±5%
R214	ERD25FJ102	Carbon, 1/4W, 1kΩ, ±5%
R251, 252	ERD25FJ222	Carbon, 1/4W, 2.2kΩ, ±5%
R253, 254	ERD25FJ471	Carbon, 1/4W, 470Ω, ±5%
R301, 302	ERD25FJ332	Carbon, 1/4W, 3.3kΩ, ±5%
R303, 304	ERD25FJ470	Carbon, 1/4W, 47Ω, ±5%
R305, 306	ERD25FJ682	Carbon, 1/4W, 6.8kΩ, ±5%
R307, 308	ERD25TJ394	Carbon, 1/4W, 390kΩ, ±5%
R309, 310	ERD25FJ562	Carbon, 1/4W, 5.6kΩ, ±5%
R311, 312	ERD25FJ682	Carbon, 1/4W, 6.8kΩ, ±5%
R313, 314	ERD25FJ821	Carbon, 1/4W, 820Ω, ±5%
R315, 316	ERD25TJ824	Carbon, 1/4W, 820kΩ, ±5%
R318, 319	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R320, 321	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R322	ERG3ANJ391	Metal Oxide, 3W, 390Ω, ±5%
R323, 324	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R325	ERD25TJ184	Carbon, 1/4W, 180kΩ, ±5%
R326	ERD25TJ473	Carbon, 1/4W, 47kΩ, ±5%
R327, 328	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R329	ERD25TJ823	Carbon, 1/4W, 82kΩ, ±5%
R330	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R332	ERD25TJ563	Carbon, 1/4W, 56kΩ, ±5%
R333	ERD25TJ823	Carbon, 1/4W, 82kΩ, ±5%
R335	ERD25TJ393	Carbon, 1/4W, 39kΩ, ±5%
R336	ERG3ANJ391	Metal Oxide, 3W, 390Ω, ±5%
R337	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R338	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%
R401, 402	ERD2FCG151	Carbon, 1/4W, 150Ω, ±2%
R403, 404	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R405	ERG1ANJ681	Metal Oxide, 1W, 680Ω, ±5%
R411, 412	ERD25FJ820	Carbon, 1/4W, 82Ω, ±5%
R413, 414	ERD25FJ820	Carbon, 1/4W, 82Ω, ±5%
R418	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%
R501, 502	ERD25TJ334	Carbon, 1/4W, 330kΩ, ±5%
R503, 504	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%
R505, 506	ERC14GJ226	Solid, 1/4W, 22MΩ, ±5%
R507, 508	ERD25FJ102	Carbon, 1/4W, 1kΩ, ±5%
R509	ERD50FJ151	Carbon, 1/2W, 150Ω, ±5%
R510	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ±5%
R511	ERD25FJ561	Carbon, 1/4W, 560Ω, ±5%
R512	ERD50FJ391	Carbon, 1/2W, 390Ω, ±5%
R514	ERD25FJ100	Carbon, 1/4W, 10Ω, ±5%
R515	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R516	ERD25FJ562	Carbon, 1/4W, 5.6kΩ, ±5%
R517, 518	ERD25FJ471	Carbon, 1/4W, 470Ω, ±5%
R601, 602	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%
R603, 604	ERD25TJ824	Carbon, 1/4W, 820kΩ, ±5%
R605	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%
R606	ERD25TJ223	Carbon, 1/4W, 22kΩ, ±5%
R607	ERD25TJ334	Carbon, 1/4W, 330kΩ, ±5%
CAPACITORS		
C1	ECKDKC103PF	Ceramic, 400VAC, 0.01μF, ±10%
C2 [EG] only	ECQE2A473M	Polyester, 250VAC, 0.047μF, ±20%
C101, 102	ECCD1H151K	Ceramic, 50V, 150pF, ±10%
C103, 104	ECCD1H121K	Ceramic, 50V, 120pF, ±10%
C109, 110	ECKD1H221KB	Ceramic, 50V, 220pF, ±10%
C111, 112	ECCD1H030CC	Ceramic, 50V, 3pF, ±0.25pF
C113, 114	ECCD1H030CC	Ceramic, 50V, 3pF, ±0.25pF
C115, 116	ECCD2H120K	Ceramic, 500V, 12pF, ±10%
C117, 118	ECCD2H120K	Ceramic, 500V, 12pF, ±10%
C119, 120	ECCD1H470K	Ceramic, 50V, 47pF, ±10%
C121, 122	ECEA50Z1	Electrolytic, 50V, 1μF, ±5%
C123, 124	ECQM1H222JZ	Polyester, 50V, 0.0022μF, ±5%
C125, 126	ECQM1H122JZ	Polyester, 50V, 0.0012μF, ±5%
C127, 128	ECCD1H180KC	Ceramic, 50V, 18pF, ±10%
C129, 130	ECEA1HS100	Electrolytic, 50V, 10μF
C131, 132	ECEA25N4R7	Non-polar Electrolytic, 25V, 4.7μF
C133, 134	ECEA1JS4R7	Electrolytic, 63V, 4.7μF
C135, 136	ECEA1JS4R7	Electrolytic, 63V, 4.7μF

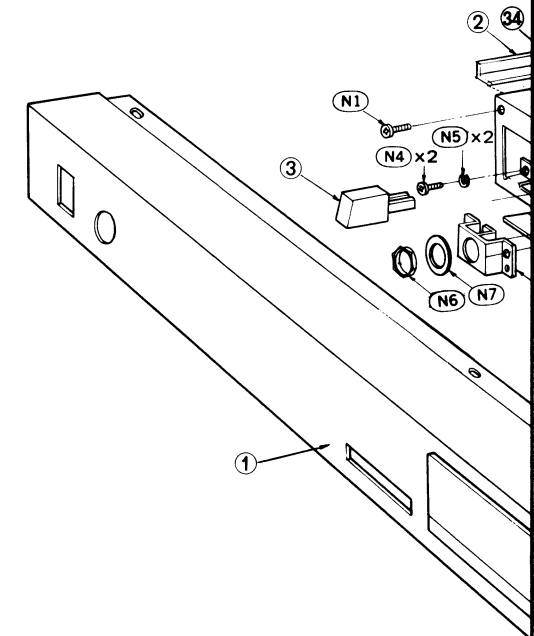
Ref. No.	Part No.	Part Name & Description
C137, 138	ECEA1JS330	Electrolytic, 63V, 33μF
C139	ECKD1H223ZF	Ceramic, 50V, 0.022μF, ±20%
C140, 141	ECKD1H103ZF	Ceramic, 50V, 0.01μF, ±20%
C201	ECKD1H102MD	Ceramic, 50V, 0.001μF, ±20%
C203	ECEA2AG3R3	Electrolytic, 100V, 3.3μF
C204	ECEA1CN101S	Non-Polar Electrolytic, 16V, 100μF
C205	ECEA1EG330S	Electrolytic, 25V, 33μF
C206	ECEA50Z1	Electrolytic, 50V, 1μF
C301, 302	ECQM1H473JZ	Polyester, 50V, 0.047μF, ±5%
C303	ECEA50Z4R7	Electrolytic, 50V, 4.7μF
C304	ECKD1H102MD	Ceramic, 50V, 0.001μF, ±20%
C305	ECKD1H222MD	Ceramic, 50V, 0.0022μF, ±20%
C306	ECQM1H683JZ	Polyester, 50V, 0.068μF, ±5%
C308	ECEA50Z1	Electrolytic, 50V, 1μF
C309	ECKD1H223ZF	Ceramic, 50V, 0.022μF, ±20%
C401, 402	ECETS56V103U	Electrolytic, 56V, 10000μF
C403, 404	ECEA1EG330S	Electrolytic, 25V, 33μF
C405, 406	ECKD1H223ZF	Ceramic, 50V, 0.022μF, ±20%
C407	ECEA1ES101	Electrolytic, 25V, 100μF
C408	ECEA1EG101S	Electrolytic, 25V, 100μF
C409	ECEA1ES101	Electrolytic, 25V, 100μF
C501, 502	ECEA50Z4R7	Electrolytic, 50V, 0.47μF
C503, 504	ECQM1H473JZ	Polyester, 50V, 0.047μF, ±5%
C506	ECEA2AS3R3	Electrolytic, 100V, 3.3μF
C507	ECEA1VS330	Electrolytic, 35V, 33μF
C508	ECEA50Z4R7	Electrolytic, 50V, 0.47μF
C509	ECEA1ES470	Electrolytic, 25V, 47μF
C601, 602	ECKD1H102MD	Ceramic, 50V, 0.001μF, ±20%
C603	ECEA50Z1	Electrolytic, 50V, 1μF
C604	ECKD1H103ZF	Ceramic, 50V, 0.01μF, ±20%

EXPLODED VIEWS



Terminal guide of transistors, diodes and IC's

AN6552F	SVITA7317P	SVITA7318P
SVIHA12010	2SK170-GR, 2SK301-S	2SC2581, 2SA1106
2SC2592, 2SA1112, 2SD836, 2SB750, 2SD762	2SC1980, 2SA921, 2SA1123, 2SC2631, 2SC1815, 2SC2632, 2SA1124, 2SA1015, 2SA777, 2SC1509	
SVDMZ □ □ □	LN217RP	



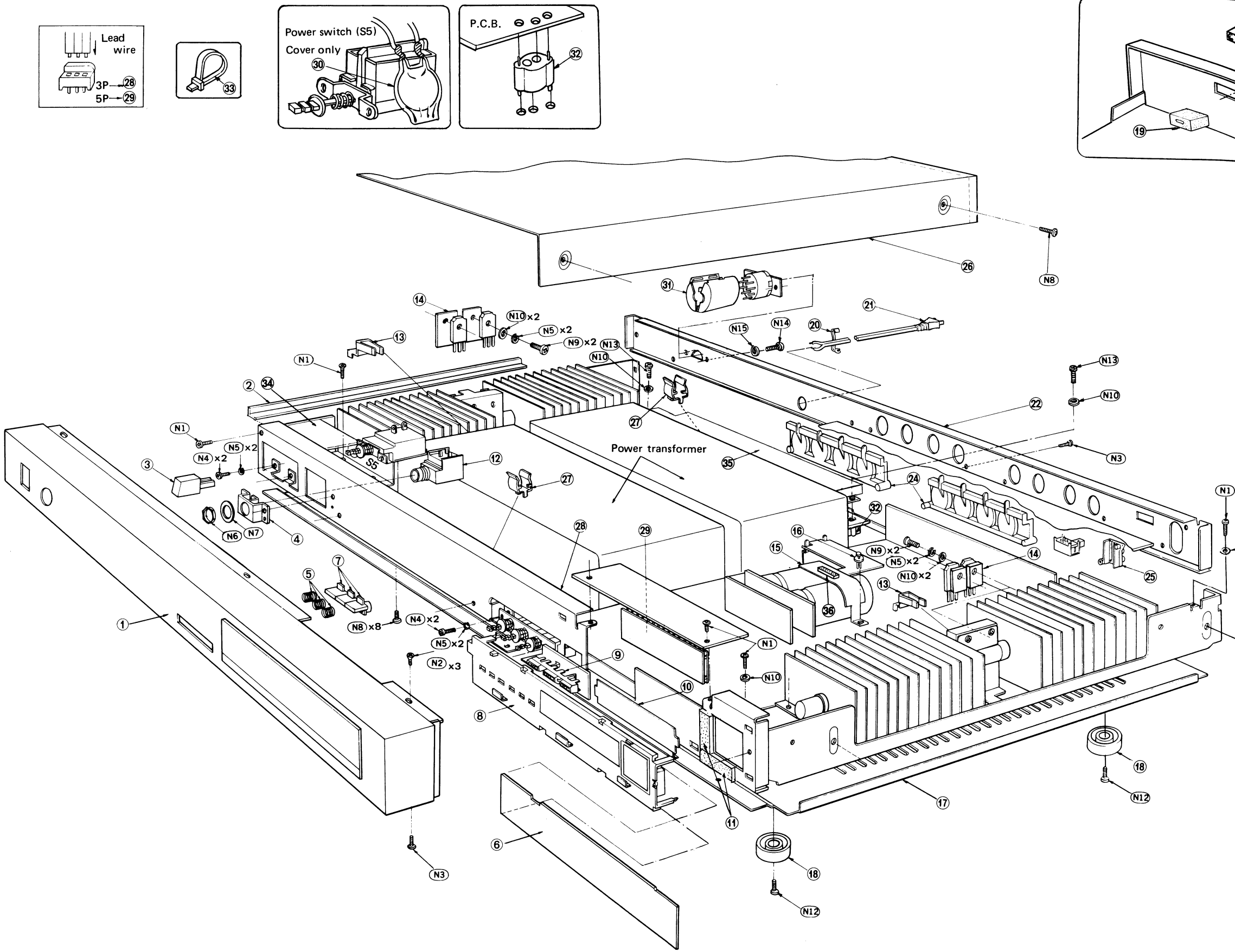
Part No.	Part Name & Description			
EA1JS330	Electrolytic,	63V,	33μF	
KA1H223ZF	Ceramic,	50V,	0.022μF, ±8%	
KA1H103ZF	Ceramic,	50V,	0.01μF, ±8%	
KA1H102MD	Ceramic,	50V,	0.001μF, ±20%	
EA2AG3R3	Electrolytic,	100V,	3.3μF	
EA1CN101S	Non-Polar Electrolytic,	16V,	100μF	
EA1EG330S	Electrolytic,	25V,	33μF	
EA50Z1	Electrolytic,	50V,	1μF	
EA1H473JZ	Polyester,	50V,	0.047μF, ±5%	
EA50Z4R7	Electrolytic,	50V,	4.7μF	
KA1H102MD	Ceramic,	50V,	0.001μF, ±20%	
KA1H222MD	Ceramic,	50V,	0.0022μF, ±20%	
EA1H683JZ	Polyester,	50V,	0.068μF, ±5%	
EA50Z1	Electrolytic,	50V,	1μF	
KA1H223ZF	Ceramic,	50V,	0.022μF, ±8%	
EA1TS56V103U	Electrolytic,	56V,	10000μF	
EA1EG330S	Electrolytic,	25V,	33μF	
KA1H223ZF	Ceramic,	50V,	0.022μF, ±8%	
EA1ES101	Electrolytic,	25V,	100μF	
EA1EG101S	Electrolytic,	25V,	100μF	
EA1ES101	Electrolytic,	25V,	100μF	
EA50Z4R7	Electrolytic,	50V,	0.47μF	
EA1H473JZ	Polyester,	50V,	0.047μF, ±5%	
EA2AS3R3	Electrolytic,	100V,	3.3μF	
EA1VS330	Electrolytic,	35V,	33μF	
EA50Z4R7	Electrolytic,	50V,	0.47μF	
EA1ES470	Electrolytic,	25V,	47μF	
KA1H102MD	Ceramic,	50V,	0.001μF, ±20%	
EA50Z1	Electrolytic,	50V,	1μF	
KA1H103ZF	Ceramic,	50V,	0.01μF, ±8%	

ors, diodes and IC's

SVITA7317P	SVITA7318P
170-GR, 2SK301-S	2SC2581, 2SA1106
 1. Drain 2. Gate 3. Source	
2SC1980, 2SA921, 2SA1123, 2SC2631, 2SC1815, 2SC2632, 2SA1124, 2SA1015, 2SA777, 2SC1509	
 E C B	

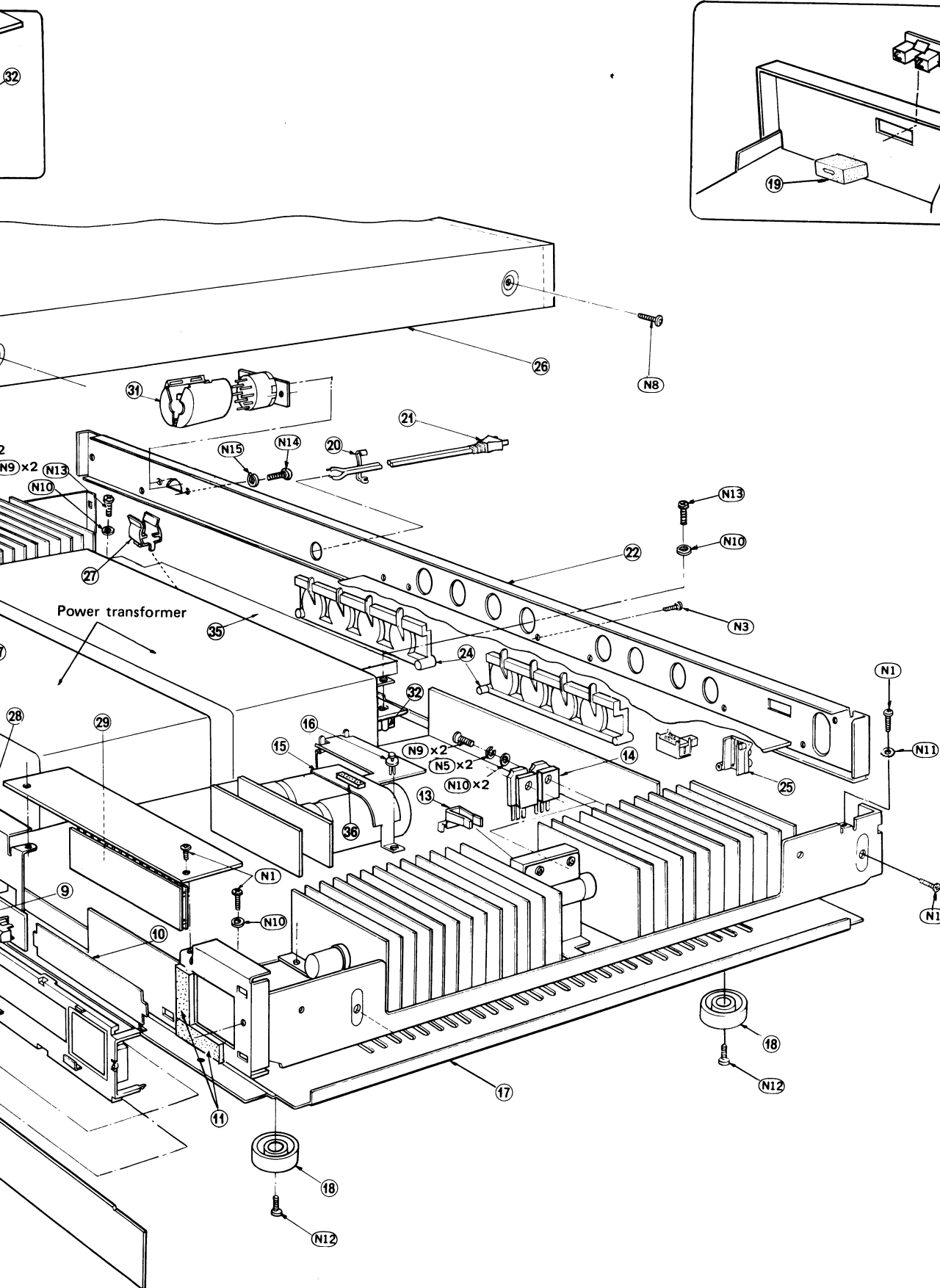
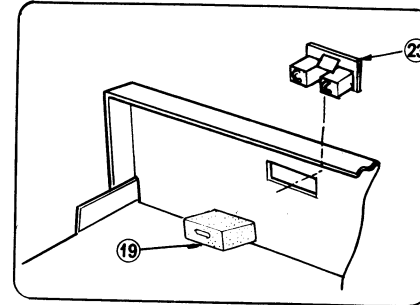
LN217RP
 A K

EXPLODED VIEWS



(Rear Panel and AC Outlet) . . . for [XA]

Available in Southeast Asia, Oceania, Africa,
Middle Near East and Central South America.



REPLACEMENT PARTS LIST

Cabinet & Chassis Parts

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

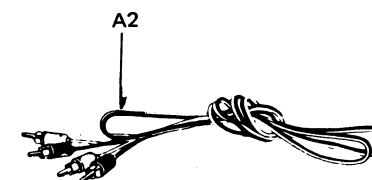
Areas

- * [D] is available in Scandinavia.
- * [EW] is available in United Kingdom.
- * [EG] is available in F.R. Germany.
- * [EK] is available in United Kingdom.
- * [EF] is available in France.
- * [EH] is available in Holland.
- * [EB] is available in Belgium.
- * [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.

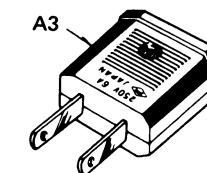
Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
1	SGWEA7KM	Front Panel Ass'y
2	SGX6937-7	Arnamet
3	SBC337	Button, Power Source
4	SMN1793	Bracket, Head Phone
5	SUS257	Spring, Speakers & Meter Range
6	SGU241	Filter, FL
7	SBC413	Button, Speakers & Meter Range
8	SGXEA7KM	Plate, Display Window
9	SMP315	Cover, LED
10	SBU89	Filter, LED
11	SHG6219	Cushion, FL
12	XCJS6P21B-A1	Jack, Head Phone
13	SUS243	Bracket
14	SMX497	Sheet, Heat Sink (Insulating)
15	SUW1819	Bracket
16	SHR401-1	Pin, PCB
17 [D, EW]	SKUEA7KD	Bottom Board
17 [XL]	SKUEA7KXL	Bottom Board
17 Other Areas	SKUEA7KEK	Bottom Board
18	SKL197-1	Foot
19 [XA] only	SMX13-1	Cover, AC Socket
20 [EK]	SHR129	Bushing, AC Cord
20 [XL]	SHR131	Bushing, AC Cord
20 Other Areas	SHR127	Bushing, AC Cord
21 [EW, XA]	Δ SJA111	AC Cord
21 [EK]	Δ RJA45YA	AC Cord
21 [XL]	Δ QFC1207MA	AC Cord
21 Other Areas	Δ SJA97	AC Cord
22 [XA]	SGP2811-1B	Rear Panel
22 [XL]	SGP2811-2B	Rear Panel
22 Other Areas	SGP2811B	Rear Panel
23 [XA] only	Δ SJS9221	Socket, AC Outlet
24	SJF4427-2	Terminal Board, Speaker
25	SJF3225-2N	Terminal Board, Input
26	SKC710B1	Cabinet
27	SJT347	Fuse Crip
28	SJS5327	Socket (3P)

Ref. No.	Part No.	Part Name & Description
29	SJS5519	Socket (5P)
30	SMXA65	Cover, Line Capacitor
31	SUV453	Cover, Voltage Adjuster
32	SHR75	Clamper, PCB
33	SHR301	Clamper, Pointer
34	SMX363	Cover, Power
35	SMX527	Cover, PCB
36	SHG6025	Rubber, Cushion
SCREWS, WASHERS and NUTS		
N1	XTB3+8BFN	Screw, Tapping \oplus 3 x 8
N2	XTS3+8B	Screw, Tapping \oplus 3 x 8
N3	XTBS3+8BFZ1	Screw, Tapping \oplus 3 x 8
N4	XSN3+6S	Screw, \oplus 3 x 6
N5	XWA3B	Washer, Spring ϕ 3
N6	XNS12	Nut, Head Phone
N7	SNE59-1	Washer, Head Phone
N8	XTB4+6BFZ	Screw, Tapping \oplus 4 x 6
N9	XSN3+10S	Screw, ϕ 3
N10	XWG3	Washer, Plain ϕ 3
N11	XWC3B	Washer, External Toothed Lock ϕ 3
N12	XTB3+10BFZ	Screw, Tapping \oplus 3 x 10
N13	XTV3+8BFN	Screw, Tapping \oplus 3 x 8
N14	XSN3+6BVS	Screw, 3x6
N15	XWA3BFZ	Washer, ϕ 3
ACCESSORIES		
A1 [EK, XL]	SQF10951-1	Instructions Book
A1 [XA]	SQF10949-1	Instructions Book
A1 [EG]	SQF11097-1	Instructions Book
A1 [Ei]	SQF11099-1	Instructions Book
A1 Other Areas	SQF10953-1	Instructions Book
A2	SJP2129-5	Plug, Stereo PIN Connection Cord
A3 [XA] only	Δ SJP5213-1	Plug, Adapter, AC Power
A4 [XA] only	Δ SJP5215	Plug, Adapter, AC Power
PACKING PARTS		
P1	SPG3313	Carton Box
P2	SPS3307	Pad, Lower
P3	SPS3309	Pad, Upper Front
P4	SPS3311	Pad, Upper Rear
P5	SPS3313	Pad, Upper Center

Accessories



[XA] area only



[XA] area only

