

Service Manual

Stereo Integrated DC Amplifier

SU-V707 / SU-V707(K)

[EGA]

- * The colors of this model include silver and black.
- * The black type model is provided with (K) in the Se

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

Please use this manual together with the service manual for Model No. SU-V707/(K), Order No. SD83032414C9.

CHANGES

REPLACEMENT PARTS LIST

- Notes:** (1) Mentioned in this parts list are only those changed in Model No. SU-V707/(K) for destination [E] area.
 (2) Important safety notice: Components identified by \triangle mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
 (3) The " $\text{\textcircled{S}}$ " mark is service standard parts and may differ from production parts.

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	SU-V707/(K) [E]	SU-V707/(K) [EGA]			
COILS					
L1, 2	Addition	ELQ050D15	Choke	2	
L351~354	Addition	SLQY07G-30	Choke	4	
TRANSFORMER					
T1	SLT5P229	SLT5P231	Power Source	1	\triangle
COMPONENT COMBINATION					
Z151, 152	Addition	SLM1Z33	L.P.F.	2	
LAMPS					
PL1~3	XAMR74S10	XAMR74S17	New Class A, 12V, 0.055A	3	
FUSES					
F1	XBA2C50TRO	XBA2C25TRO	250V, T2.5A	1	\triangle
F2	XBA2C25TRO	Abolition	-----	0	
SWITCH					
S11	ESE37219	Abolition	-----	0	
RESISTORS					
R251~258	Addition	ERD25FJ272	Carbon, 2.7k Ω , 1/4W	8	$\text{\textcircled{S}}$
R151~154	Addition	ERD25FJ122	Carbon, 1.2k Ω , 1/4W	4	$\text{\textcircled{S}}$
CAPACITORS					
C131~134	Addition	ECCD1H101K	Ceramic, 100pF, 50V	4	$\text{\textcircled{S}}$
C251, 252	Addition	ECCD1H121K	Ceramic, 120pF, 50V	2	$\text{\textcircled{S}}$
C351~354	Addition	ECKD1H471KB	Ceramic, 470pF, 50V	4	$\text{\textcircled{S}}$
C355~358	Addition	ECKD1H102MD	Ceramic, 0.001 μ F, 50V	4	$\text{\textcircled{S}}$
C359	Addition	ECKD1H333ZF	Ceramic, 0.033 μ F, 50V	1	$\text{\textcircled{S}}$
CABINET and CHASSIS PARTS					
26	SJA97	SJA138-3	AC Cord	1	$\text{\textcircled{S}}$ \triangle
27	SGPUV707B	SGPUV707G	Rear Panel	1	
ACCESSORY					
A4	SQF11703	SQF11705	Instruction Book	1	

Technics

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

SU-V707

SCHEMATIC DIAGRAM

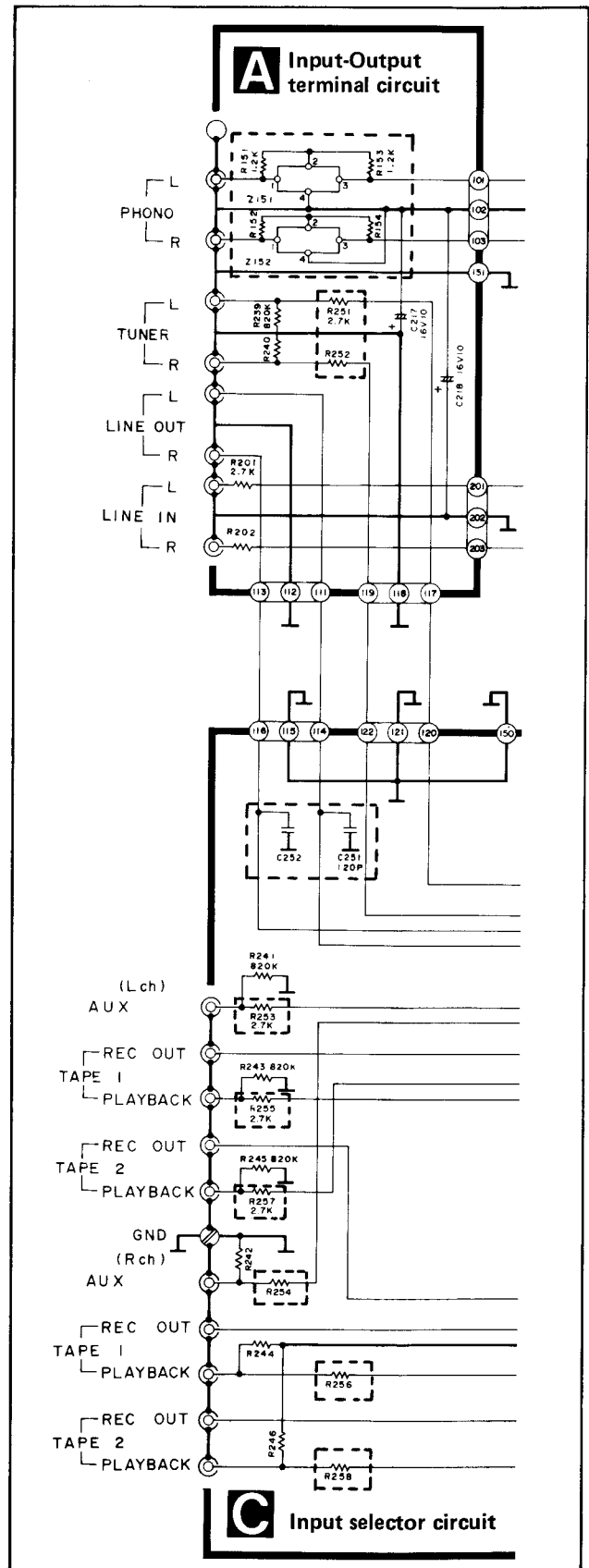
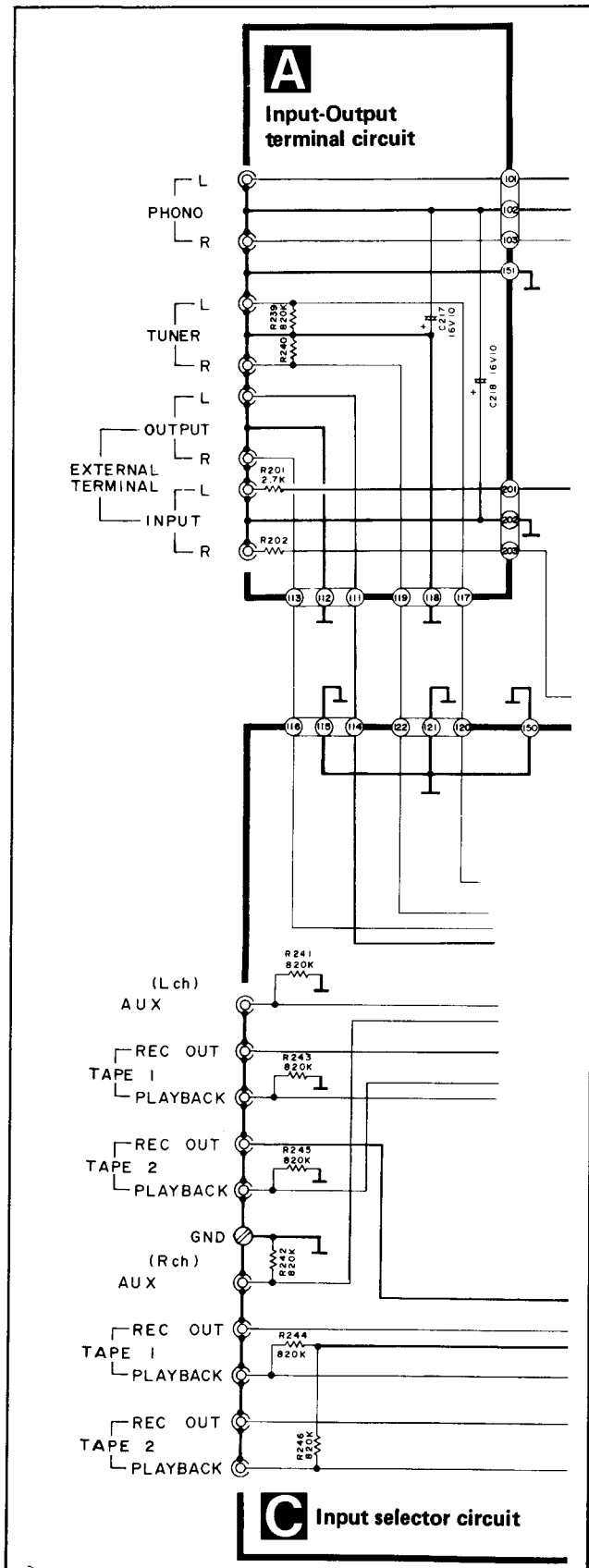
SU-V707/(K)-[E]

change

SU-V707/(K)-[EGA]

• Input-Output terminal circuit

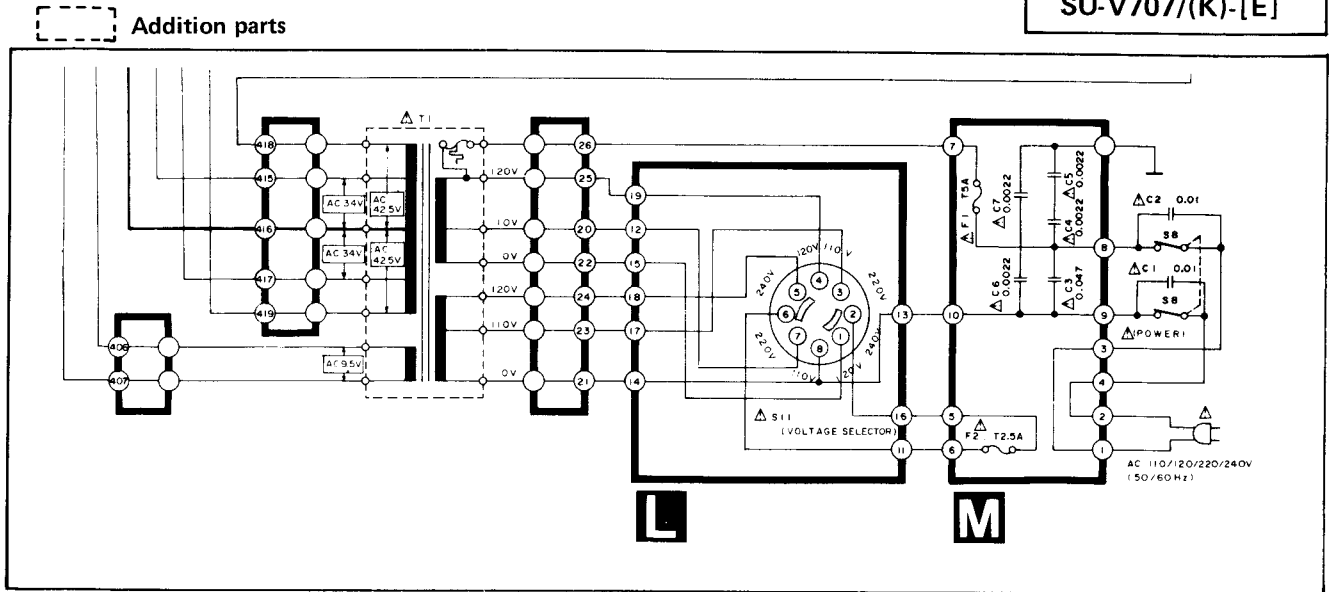
⌋ Addition parts



SU-V707

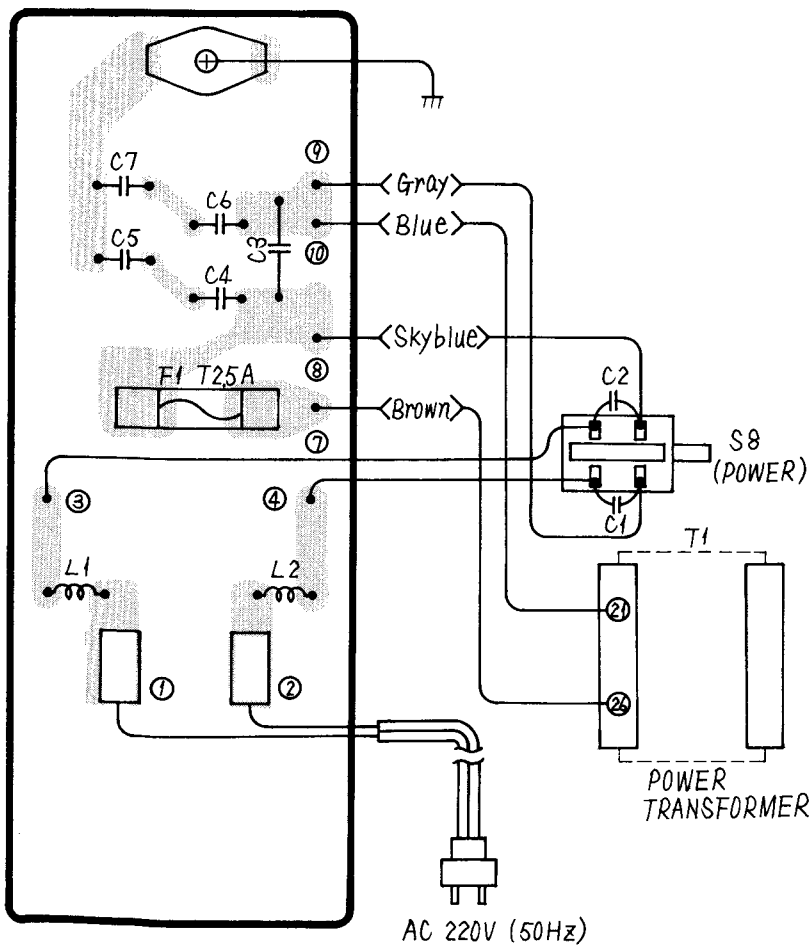
SCHEMATIC DIAGRAM

Power source circuit

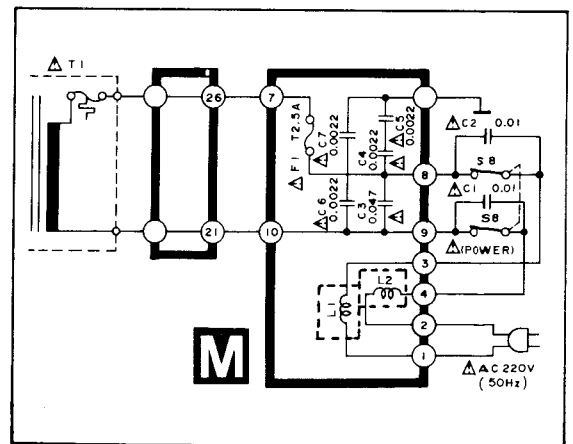


ADDITION PARTS OF PRINTED CIRCUIT BOARD

change



SU-V707/(K)-[EGA]



Service Manual

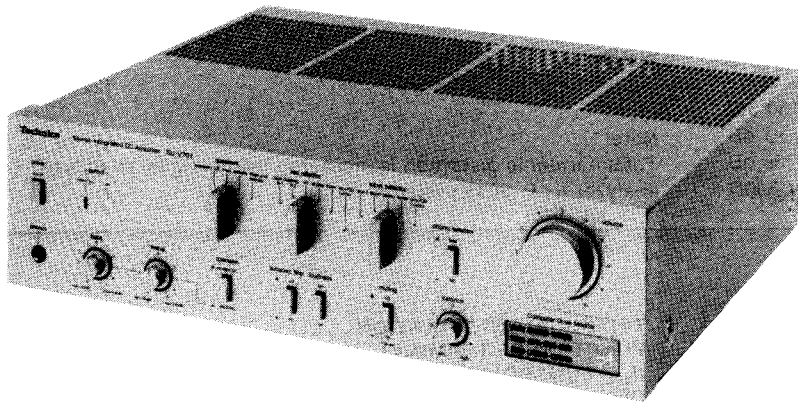
Stereo Integrated DC Amplifier

SU-V707

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

SU-V707(K)

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



- * The colors of this model include silver and black.
- * The black type model is provided with (K) in the Service Manual.

Areas

- *[D] is available in Scandinavia.
- *[EW] is available in Switzerland.
- *[EK] is available in United Kingdom.
- *[XL] is available in Australia.
- *[XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- *[PA] is available in Far East PX.
- *[PE] is available in European Military.
- *[EF] is available in France.
- *[EH] is available in Holland.
- *[EB] is available in Belgium.
- *[Ei] is available in Italy.

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 × 80W (4Ω) 2 × 90W (8Ω)
40 Hz~16 kHz continuous power output both channels driven	2 × 80W (4Ω) 2 × 90W (8Ω)
1 kHz continuous power output both channels driven	2 × 80W (4Ω) 2 × 90W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.007% (4Ω) 0.003% (8Ω)
rated power at 40 Hz~16 kHz	0.007% (4Ω) 0.003% (8Ω)
rated power at 1 kHz	0.0015% (4Ω) 0.001% (8Ω)
half power at 20 Hz~20 kHz	0.002% (8Ω)
half power at 1 kHz	0.001% (8Ω)
-26 dB power at 1 kHz	0.01% (4Ω)
50 mW power at 1 kHz	0.01% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.01%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.007%
Power bandwidth	
both channels driven, -3 dB	5 Hz~70 kHz (4Ω, 0.03%) 5 Hz~70 kHz (8Ω, 0.02%)
Residual hum and noise	0.5 mV

Damping factor	30 (4Ω), 60 (8Ω)
Input sensitivity and impedance	
PHONO MM	2.5 mV/47kΩ
MC	170 μV/220Ω
TUNER	150 mV/18kΩ
AUX/CD/VIDEO	150 mV/18kΩ
TAPE 1	150 mV/18kΩ
TAPE 2	150 mV/18kΩ
PHONO maximum input voltage (1 kHz, RMS)	
MM	2 10 mV
MC	15 mV
S/N	
rated power (4Ω)	
PHONO MM	78 dB (88 dB, IHF, A, 2.5 mV input)
MC	72 dB (72 dB, IHF, A, 250 μV input)
TUNER	93 dB (IHF, A: 104 dB)
AUX/CD/VIDEO, TAPE	93 dB (IHF, A: 104 dB)
-26 dB power (4Ω)	
PHONO MM	72 dB
MC	68 dB
TUNER	74 dB
AUX/CD/VIDEO, TAPE	74 dB
50 mW power (4Ω)	
PHONO MM	68 dB
MC	67 dB
TUNER	69 dB
AUX/CD/VIDEO, TAPE	69 dB

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shiba-koen, Minato-ku, Tokyo 105 Japan

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

Frequency response	
PHONO	RIAA standard curve ±0.5 dB (30 Hz~15 kHz)
TUNER	0.7 Hz~140 kHz (-3 dB) +0 dB, -0.2 dB (20 Hz~20 kHz)
AUX/CD/VIDEO, TAPE	0.7 Hz~140 kHz (-3 dB) +0 dB -0.2 dB (20 Hz~20 kHz)
Tone controls	
BASS	50 Hz, +10 dB~-10 dB
TREBLE	20 kHz, +10 dB~-10 dB
Subsonic filter	30 Hz, -6 dB/oct.
Loudness control (volume at -30 dB)	50 Hz, +9 dB
Muting	-20 dB
Output voltage	
REC OUT	150 mV
Channel balance, AUX/CD/VIDEO 250 Hz~6,300 Hz	±1 dB
Channel separation, AUX/CD/VIDEO, 1 kHz	55 dB
Headphones output level and impedance	630 mV/330Ω

Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

■ GENERAL

Power consumption	510W
Power supply	
	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 120 × 362 mm (16-15/16" × 4-23/32" × 14-1/4")
Weight	10 kg (22 lb.)

Note:

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

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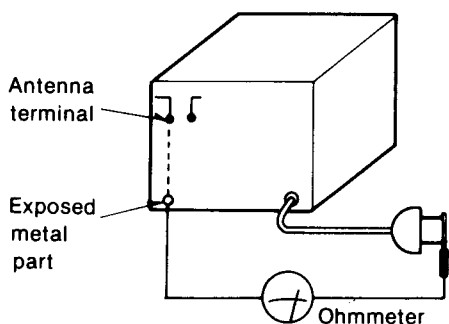
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

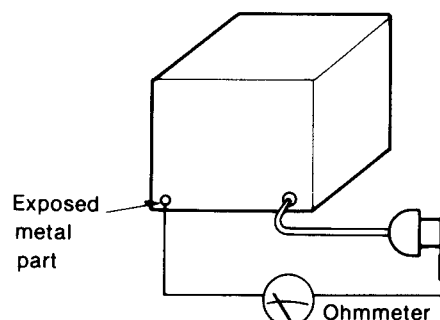
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

Stereo Integrated

DC Amplifier

SU-V707/SU-V707(K)

- This booklet contains the specifications and adjusting procedures for SU-V707, written Germany, French and Spanish.
- File this manual together with the SU-V707 service manual (Order No. SD83032414C9).
- Diese Broschüre enthält die technischen Daten und die Beschreibungen der Justiermethoden für SU-V707 in deutscher, französischer und spanischer Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für SU-V707 (Bestell-Nr. SD83032414C9) auf.
- Cette brochure contient les spécifications et les procédures de réglage pour le SU-V707, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du SU-V707 (N° d'ordre : SD83032414C9).
- Este librito contiene las especificaciones y procedimientos de ajuste para SU-V707, escritas en alemán, francés y español.
- Guardar este manual juntamente con el manual de servicio de SU-V707 (Pedido N°. SD83032414C9).

DEUTSCH**TECHNISCHE DATEN** (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)**(DIN 45 500)****■ VERSTÄRKERTEIL**

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz	
beide Kanäle angesteuert	2 × 80W (4 Ω) 2 × 90W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle angesteuert	2 × 80W (4 Ω) 2 × 90W (8 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle angesteuert	2 × 80W (4 Ω) 2 × 90W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 20 Hz ~ 20 kHz	0,007% (4 Ω) 0,003% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,007% (4 Ω) 0,003% (8 Ω)
Nennleistung bei 1 kHz	0,0015% (4 Ω) 0,001% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,002% (8 Ω)
halbe Nennleistung bei 1 kHz	0,001% (8 Ω)
-26 dB Leistung bei 1 kHz	0,01% (4 Ω)
50 mW Leistung bei 1 kHz	0,01% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,01%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,007%
Leistungsbandbreite	
beide Kanäle angesteuert bei -3 dB	5 Hz ~ 70 kHz (4 Ω, 0,03%) 5 Hz ~ 70 kHz (8 Ω, 0,02%)
Restbrumm und Geräusch	0,5 mV
Dämpfungsfaktor	30 (4 Ω), 60 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono - magnetisch (PHONO MM)	2,5 mV/47 kΩ
Phono - dynamisch (PHONO MC)	170 μV/220 Ω
Tuner	150 mV/18 kΩ
AUX/CD/VIDEO	150 mV/18 kΩ
Tape 1 (TAPE 1)	150 mV/18 kΩ
Tape 2 (TAPE 2)	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	
magnetisch (MM)	210 mV
dynamisch (MC)	15 mV
Geräuschabstand	
Nennleistung (4 Ω)	
Phono - magnetisch (PHONO MM)	78 dB (88 dB nach IHF, A, 2,5 mV Eingang)
Phono - dynamisch (PHONO MC)	72 dB (72 dB nach IHF, A, 250 μV Eingang)

Tuner	93 dB (nach IHF, A: 104 dB)
AUX/CD/VIDEO, TAPE	93 dB (IHF, A: 104 dB)
-26 dB Leistung (4 Ω)	
Phono - magnetisch (PHONO MM)	72 dB
Phono - dynamisch (PHONO MC)	68 dB
Tuner	74 dB
AUX/CD/VIDEO, TAPE	74 dB
50 mW Leistung (4 Ω)	
Phono - magnetisch (PHONO MM)	68 dB
Phono - dynamisch (PHONO MC)	67 dB
Tuner	69 dB
AUX/CD/VIDEO, TAPE	69 dB

Frequenzgang	
Phono	RIAA-Standardkurve ±0,5 dB (30 Hz ~ 15 kHz)
Tuner	0,7 Hz ~ 140 kHz (-3 dB) +0 dB, -0,2 dB (20 Hz ~ 20 kHz)
AUX/CD/VIDEO, TAPE	0,7 Hz ~ 140 kHz (-3 dB) +0 dB, -0,2 dB (20 Hz ~ 20 kHz)

Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ -10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ -10 dB
Tiefenfilter	30 Hz, -6 dB/Okt.

Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei -30 dB Ausgangsleistung)	50 Hz, +9 dB
Tondämpfung	-20 dB

Ausgangsspannung	
Aufnahmeausgang (REC OUT)	150 mV

Kanalabweichung (AUX/CD/VIDEO, 250 Hz ~ 6300 Hz)	±1 dB
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Übersprechdämpfung (AUX/CD/VIDEO, 1 kHz)	55 dB
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Kopfhörerpegel und -impedanz	630 mV/330 Ω
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Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ ALLGEMEINE DATEN

Leistungsaufnahme	510 W
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Netzspannung	
Für Deutschland	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V

Abmessungen (B×H×T)	430 × 120 × 362 mm
Gewicht	10 kg

Bemerkung:

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

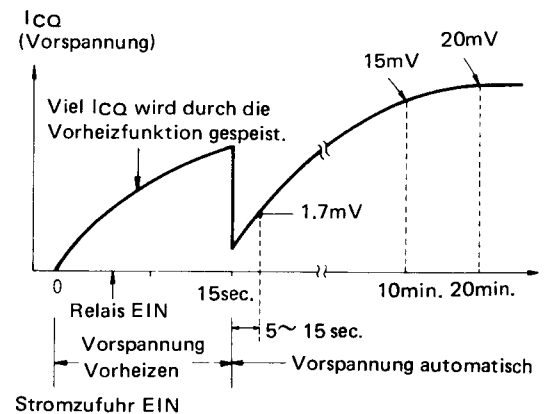
■ MESSUNGEN UND JUSTIERUNGEN

1. Justierung des Taktgebers (nach dem Auswechseln des Mikrocomputers)

- (1) Die Stromzufuhr abschalten.
 - (2) VR501 so abgleichen, daß die Zeit bis zum Einschalten des Relais 5~7 Sekunden vom Einschalten der Stromzufuhr beträgt.
 - * Wenn VR501 entgegen dem Uhrzeigersinn (in Richtung A) gedreht wird, verlängert sich die Zeit (Frequenz verringert sich).
 - * Wenn VR501 im Uhrzeigersinn (Richtung B) gedreht wird verkürzt sich die Zeit (Frequenz erhöht sich).
- (Anmerkung) Die Taktgeberfrequenz von 400kHz wird an TP501 erhalten. Im Falle eines gewöhnlichen Frequenzzählers und Oszilloskops kann die Frequenz aufgrund der Probenkapazität nicht korrekt gemessen werden. Es ist daher empfehlenswert, für die Servicearbeiten die obige Methode anzuwenden.

2. Justierung des Leerlaufs (I_Q) (nach Reparatur des Hauptverstärkers)

- (1) Nach der Reparatur ist die Lautstärke auf Minimum einzustellen, bevor der Netzschalter eingeschaltet wird, und es sollte nichts an die Lautsprecheranschlüsse angeschlossen werden.
- (2) Den I_Q-Regler (VR301, 302) vollständig entgegen dem Uhrzeigersinn drehen.
- (3) Die an den Verstärker angelegte Spannung allmählich mit dem Spannungsregler erhöhen und vor Beginn der Justierung ist der Wert in der nachstehenden Tabelle zu überprüfen.
- (4) Das elektronische Gleichstrom-Voltmeter an TP302 (+) und TP301 (-) (linker Kanal) oder TP304 (+) und TP303 (-) (rechter Kanal) anschließen.
- (5) Nach Ablauf von 5 oder 15 Sekunden nach Aufleuchten von Computer Drive Monitor "auto", VR301 (linker Kanal) oder VR302 (rechter Kanal) auf 2mV abgleichen.
 - * In diesem Gerät wird I_Q durch den Mikrocomputer gesteuert, und I_Q von ein wenig mehr als dem normalen Pegel wird durch "PREHEAT" während 15 Sekunden nach Einschalten der Stromzufuhr gespeist. Nachher werden der Ausgangspegel und die Transistortemperatur durch "AUTO" erfaßt, und dadurch wird I_Q automatisch gesteuert.



3. Justierung der Lastimpedanz-Detektionsschaltung (nach Reparatur der Lautsprecherimpedanz-Detektionsschaltung)

- (1) Eine Last von 6,5Ω (1/2W, Kohlewiderstand) oder 3,3Ω und 3,3Ω (1/2W, ±5%) in Serieschaltung an die "main"-Lautsprecheranschlüsse anschließen.
- (2) Den Lautsprecher-Wahlschalter in die "main"-Position stellen.
- (3) TP601 mit dem Chassis verbinden.
- (4) Ein Gleichstrom-Voltmeter zwischen TP701 und dem Chassis (L. Kanal) oder TP702 und Chassis (R. Kanal) anschließen.
- (5) VR701 (L.Kanal) so justieren, daß die Spannung von TP701 -200mV beträgt.
- (6) VR702 (R.Kanal) so justieren, daß die Spannung von TP702 -200mV beträgt.

ANMERKUNG

Unbedingt zuerst VR702 (L. Kanal) vor VR701 (R. Kanal) justieren.

* Prüfungen der Schutzschaltung nach Reparatur und Justierung

● Prüfung der Stummschaltung beim Ein- und Ausschalten des Netzschalters

- (1) Wechselstrom-Voltmeter und 8Ω-Last (Widerstand oder Lautsprecher) an die Haupt-Lautsprecheranschlüsse anschließen.
- (2) Die Lautstärke auf einen normalen Pegel einstellen.
- (3) Signal von 1kHz, 100mV an den AUX-Eingangsanschluß anlegen.
- (4) Überprüfen, daß die Ausgangsleistung 4~6 Sek. nach Einschalten des Netzschalters erreicht wird, und daß die Ausgangsleistung sofort beim Ausschalten der Stromzufuhr Null wird.

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SU-V707 / SU-V707(K)

[EGA]

Area

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L351~354	Addition	SLQY07G-30	Choke	4	
TRANSFORMER					
T1	SLT5P229	SLT5P231	Power Source	1	\triangle
COMPONENT COMBINATION					
Z151, 152	Addition	SLM1Z33	L.P.F.	2	
LAMPS					
PL1~3	XAMR74S10	XAMR74S17	New Class A, 12V, 0.055A	3	
FUSES					
F1	XBA2C50TRO	XBA2C25TRO	250V, T2.5A	1	\triangle
F2	XBA2C25TRO	Abolition	-----	0	
SWITCH					
S11	ESE37219	Abolition	-----	0	
RESISTORS					
R251~258	Addition	ERD25FJ272	Carbon, 2.7k Ω , 1/4W	8	$\text{\textcircled{S}}$
R151~154	Addition	ERD25FJ122	Carbon, 1.2k Ω , 1/4W	4	$\text{\textcircled{S}}$
CAPACITORS					
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C251, 252	Addition	ECCD1H121K	Ceramic, 120pF, 50V	2	$\text{\textcircled{S}}$
C351~354	Addition	ECKD1H471KB	Ceramic, 470pF, 50V	4	$\text{\textcircled{S}}$
C355~358	Addition	ECKD1H102MD	Ceramic, 0.001 μ F, 50V	4	$\text{\textcircled{S}}$
C359	Addition	ECKD1H333ZF	Ceramic, 0.033 μ F, 50V	1	$\text{\textcircled{S}}$
CABINET and CHASSIS PARTS					
26	SJA97	SJA138-3	AC Cord	1	$\text{\textcircled{S}}$ \triangle
27	SGPUV707B	SGPUV707G	Rear Panel	1	
ACCESSORY					
A4	SQF11703	SQF11705	Instruction Book	1	

Technics

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SU-V707

SCHEMATIC DIAGRAM

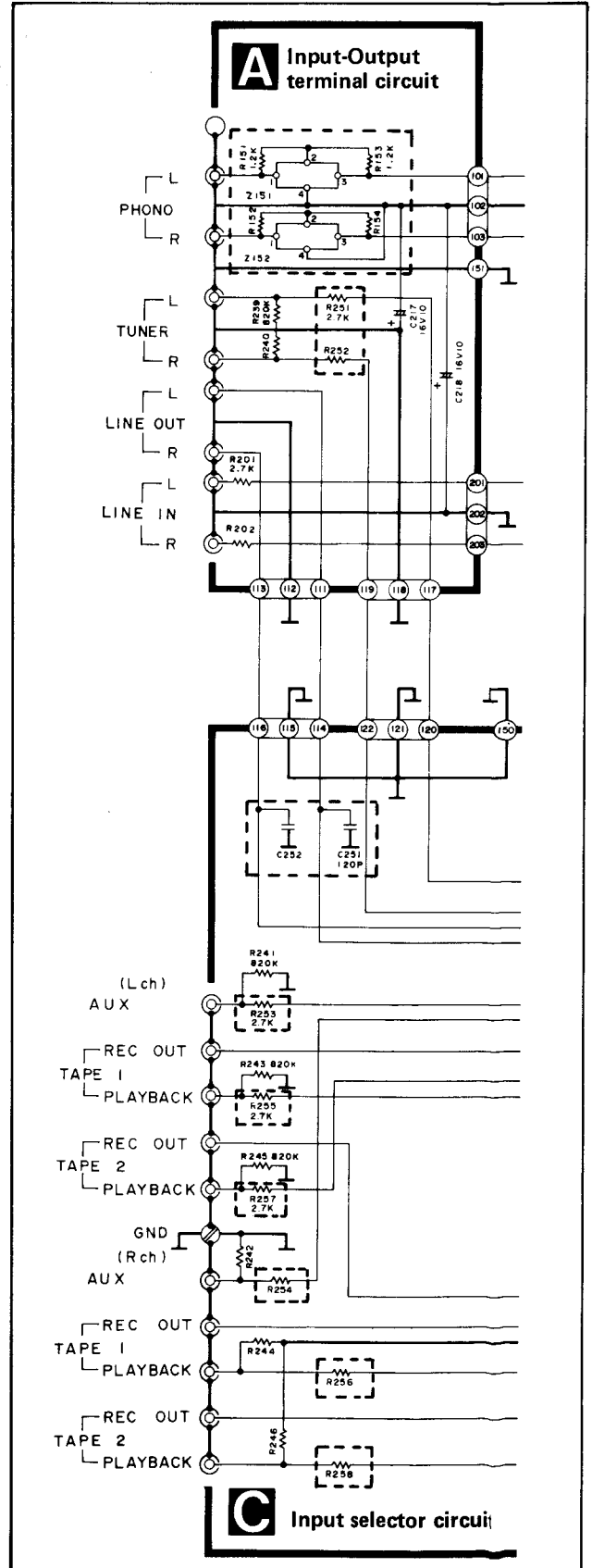
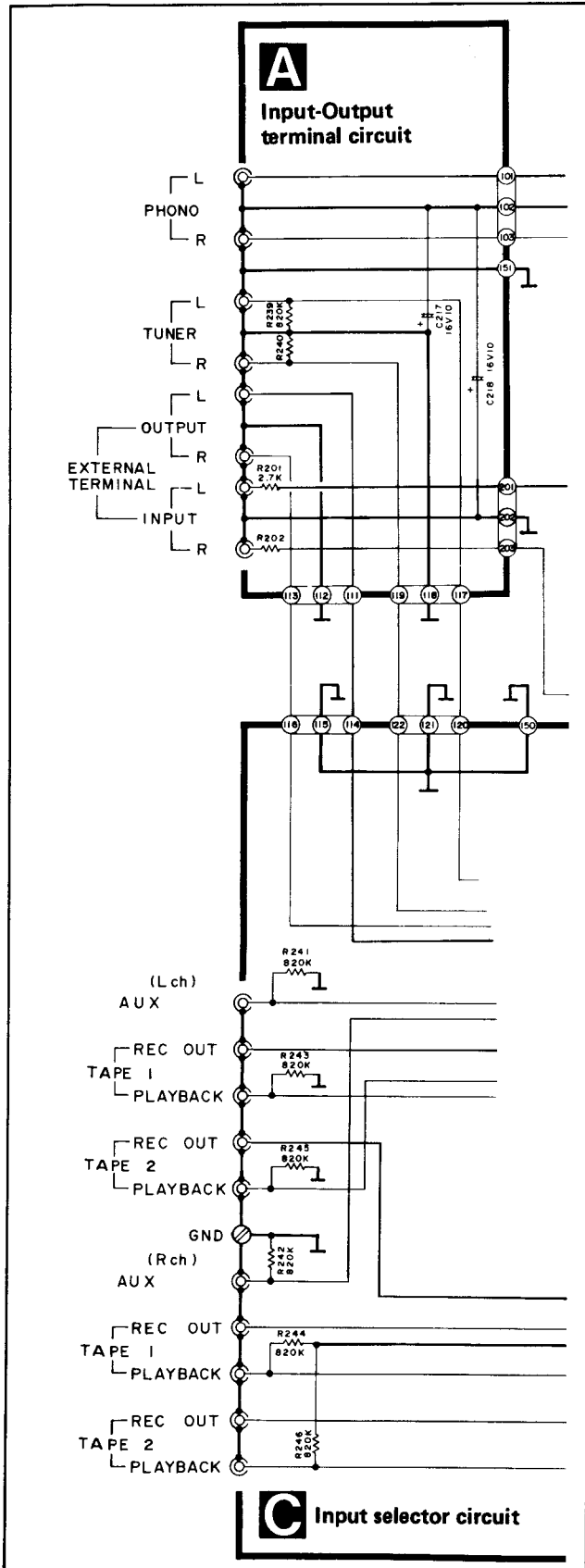
SU-V707/(K)-[E]

change

SU-V707/(K)-[EGA]

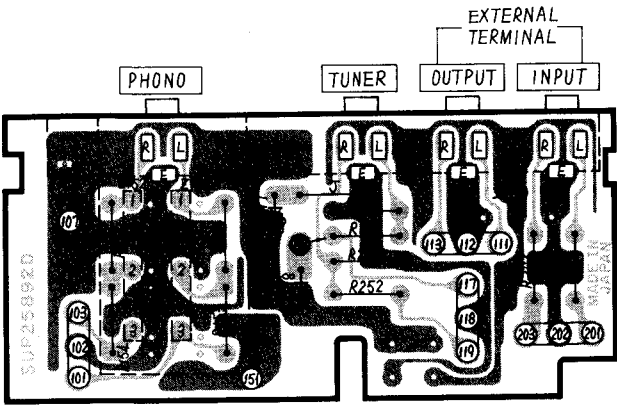
● Input-Output terminal circuit

⊞ Addition parts

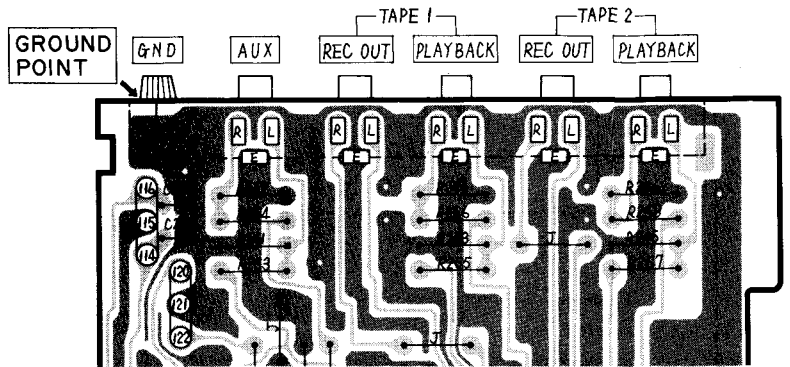


ADDITIONAL PARTS OF PRINTED CIRCUIT BOARD

A Input-Output circuit



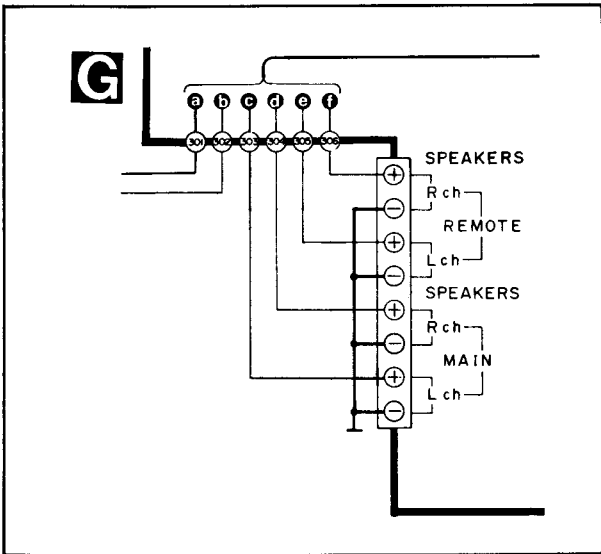
C Input selector circuit



• Speaker terminal

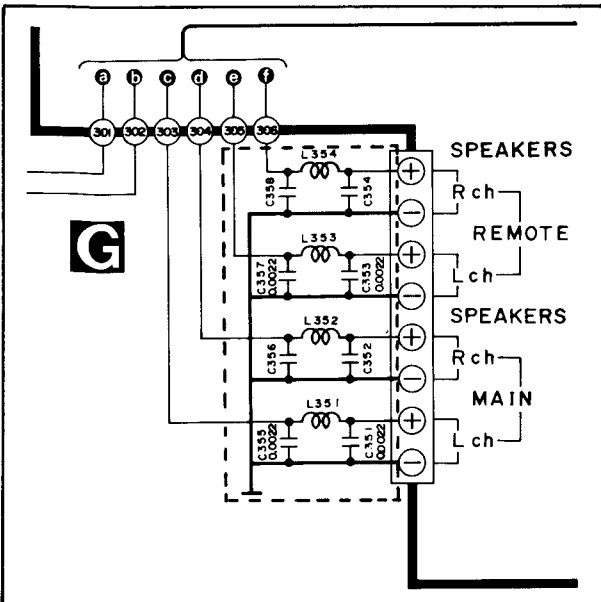
SU-V707/(K)-[E]

[] Addition parts



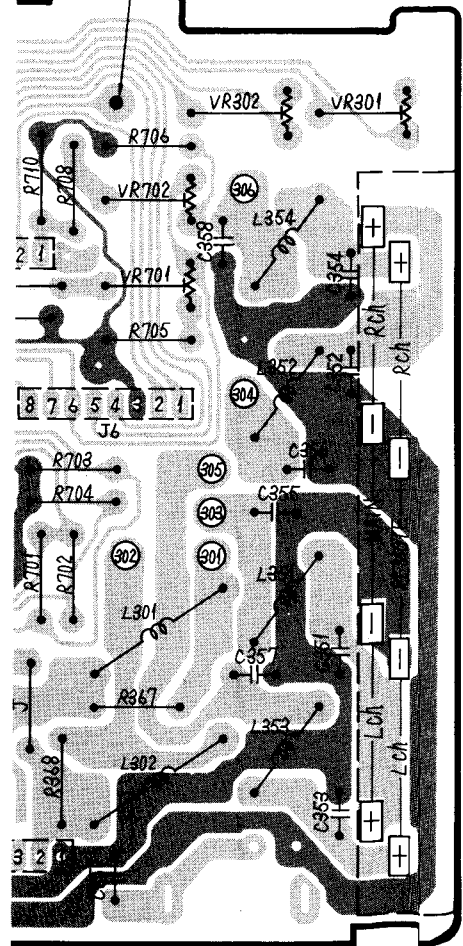
change ↓

SU-V707/(K)-[EGA]



G

TP702 Load impedance detection (-200mV)



SPEAKERS

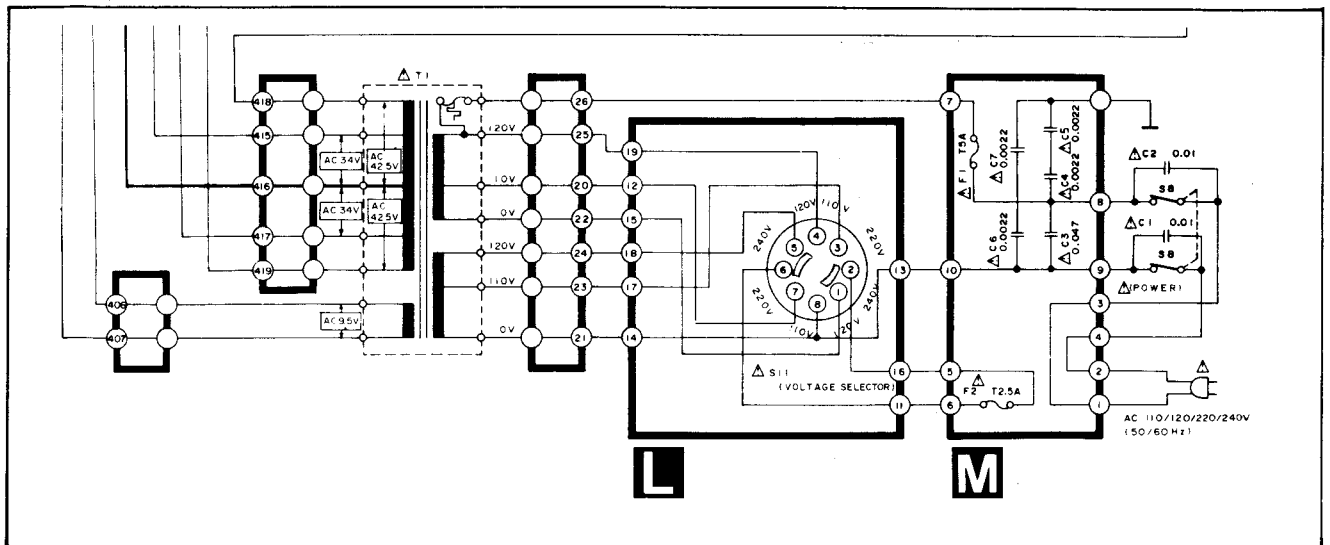
SU-V707

SCHEMATIC DIAGRAM

Power source circuit

 Addition parts

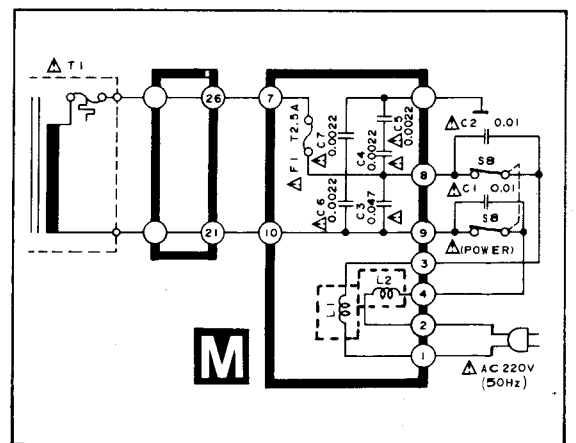
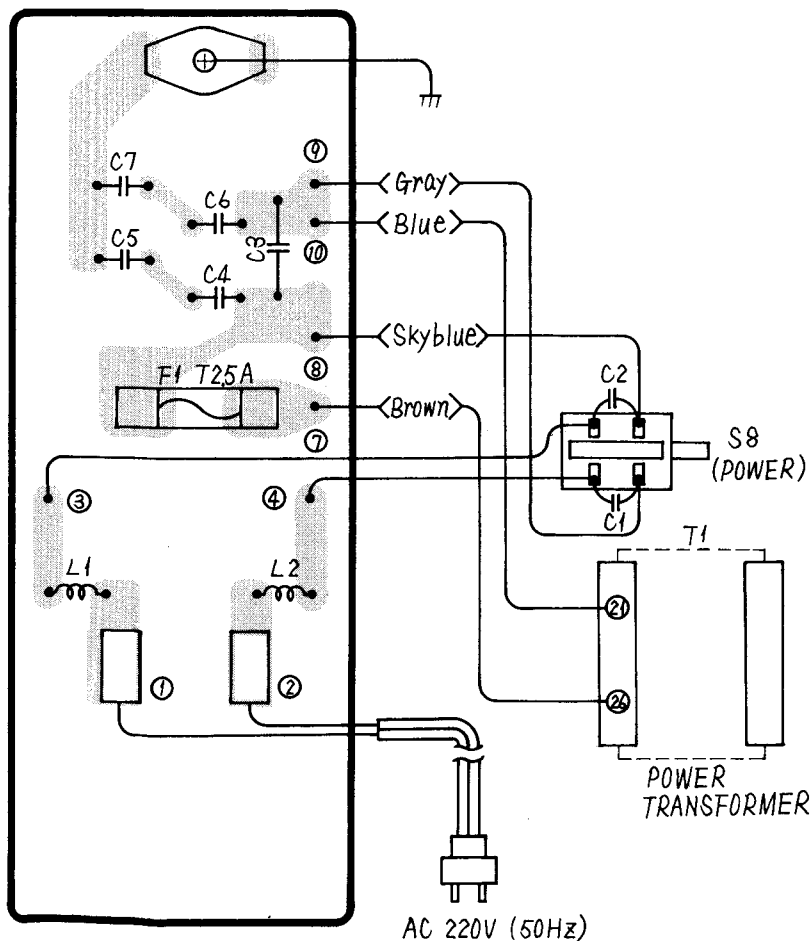
SU-V707/(K)-[E]



ADDITION PARTS OF PRINTED CIRCUIT BOARD

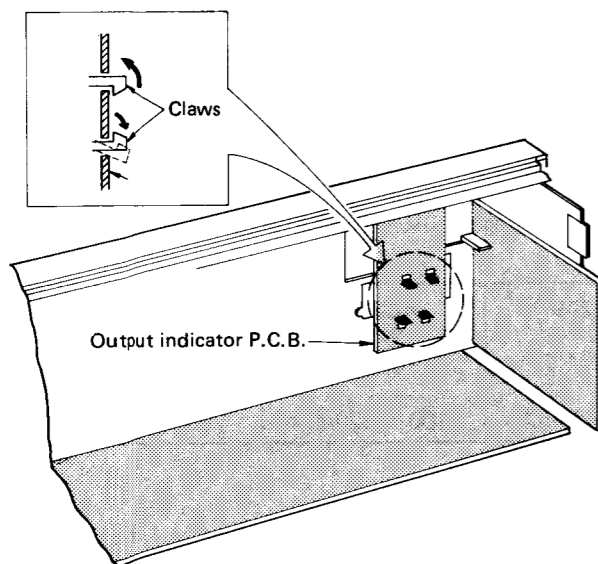
change

SU-V707/(K)-[EGA]



How to remove the front panel

1. Remove the cabinet.
2. Loosen the 3 selector knob screws by hexagonal rod wrench (M3), and pull out the knobs.
3. Remove the 5 setscrews (Fig. 1: ⑩ ~ ⑭) of the front panel.
4. Release the 4 claws which fasten the output indicator P.C.B. and remove the P.C.B. (See Fig. 3.)
5. Insert a screwdriver between the front panel and front chassis while lightly pressing the claw and raise the screwdriver upward to remove the front panel. (See Fig. 1)
6. Remove the front panel from the chassis with care not to damage the knobs.



[Fig. 3]

How to remove the speaker selector/tap selector P.C.B. or muting/tone control/DC servo P.C.B.

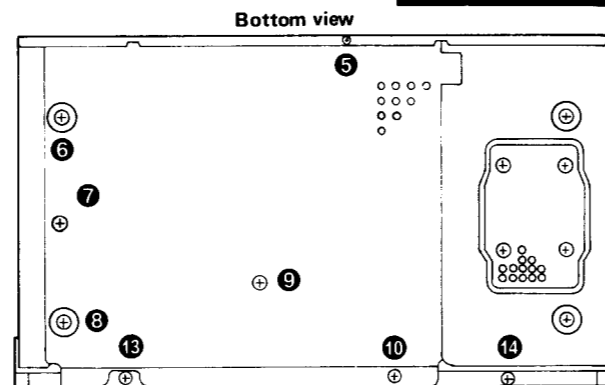
[Speaker selector and tap selector P.C.B.]

1. Remove the cabinet and bottom board.
2. Remove the 1 setscrew (Fig. 4: ⑮) from the P.C.B. and 1 Nut (Fig. 4: ⑯)
3. Move the P.C.B. in the direction of the arrow ③ in Fig. 5 [Muting/tone control/DC servo P.C.B.]

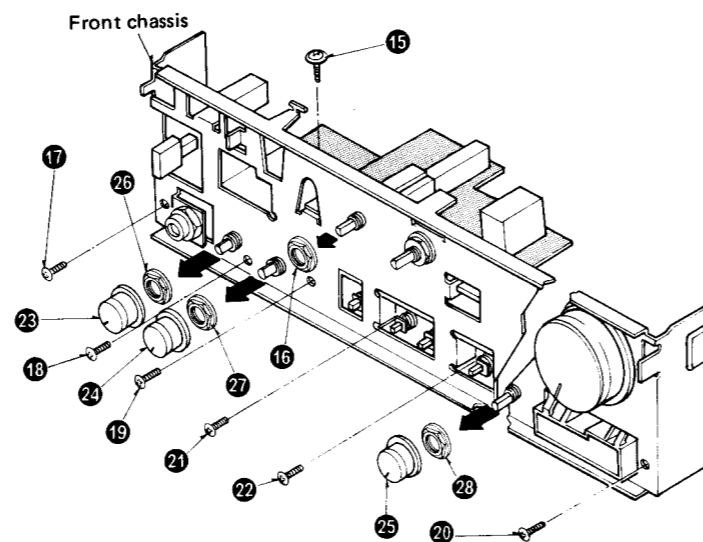
1. Remove the cabinet and bottom board.
2. Remove the 4 setscrews (Fig. 4: ⑰ ~ ⑳) of the front chassis.
3. Remove the 2 setscrews (Fig. 4: ㉑, ㉒) of the P.C.B.
4. Remove the 3 knobs (Fig. 4: ㉓ ~ ㉕) and 3 Nuts (Fig. 4: ㉖ ~ ㉘) of the P.C.B.
5. Move the P.C.B. in the direction of the arrow ④ in Fig. 5

NOTE:

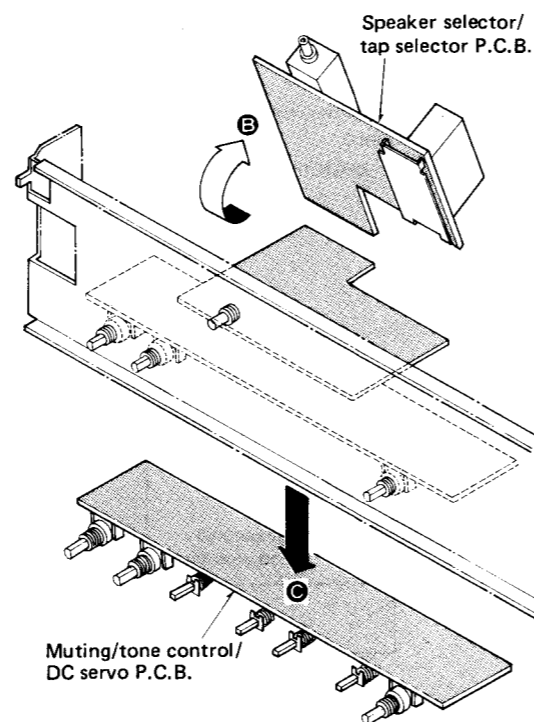
When fitting the selector knob, provide a clearance of about 0.7mm between the front panel and the knob.



[Fig. 2]



[Fig. 4]



[Fig. 5]

How to remove the power transistors

1. Remove the cabinet and bottom board.
2. Unsolder the power transistors Q325 ~ Q328. (See Fig. 6)
3. Remove the 4 setscrews (Fig. 6: ㉑, ㉓ and Fig. 7: ㉔, ㉕) which secure the heat-sink.
4. Remove the power transistor retainer to remove the power transistors. (See Fig. 8)

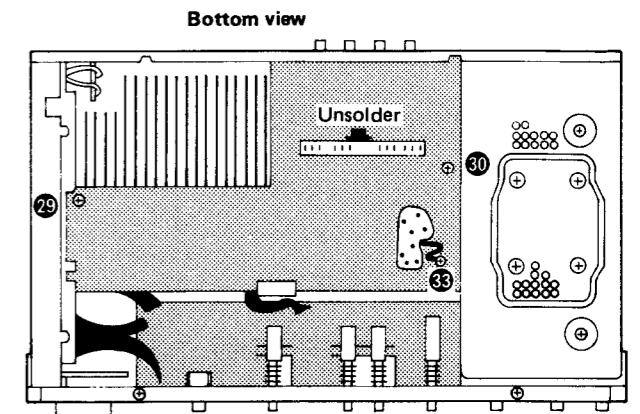
Cautions:

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

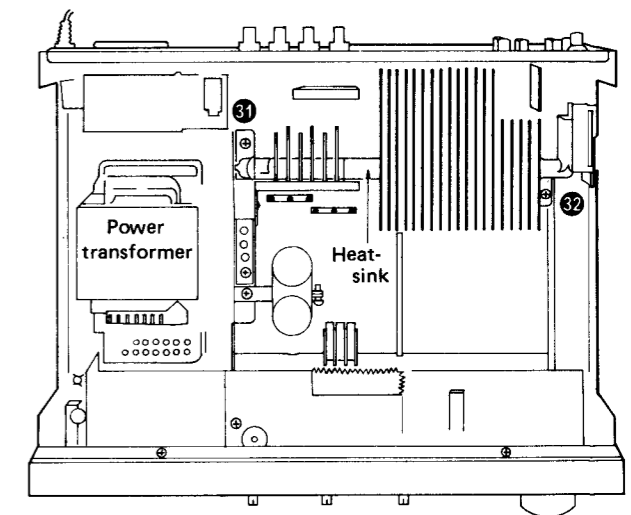
- 1-1 Clean the area on the heat-sink side.
- 1-2 Be sure to use new insulating paper (SMX767).
- 1-3 Never apply heat diffuser or the like to the insulating paper (SMX767).
(Otherwise, the insulation will be deteriorated leading to breakdown of power transistor.)

- 2-1 Do not apply a heat diffuser or the like to the insulation sheet. [Fig. 8]
- 2-2 Make sure that the ceramistor and temperature compensating transistors are in tight contact with the heat-sink. [Fig. 9]

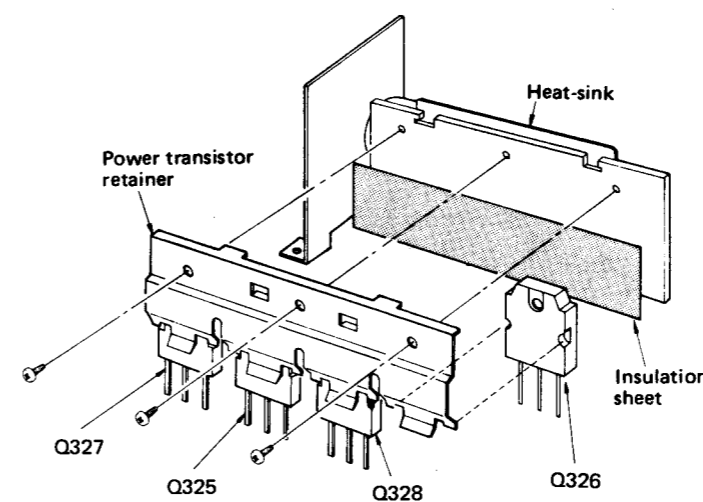
* Ceramistor: Element whose change in temperature and resistance is positive (proportional).



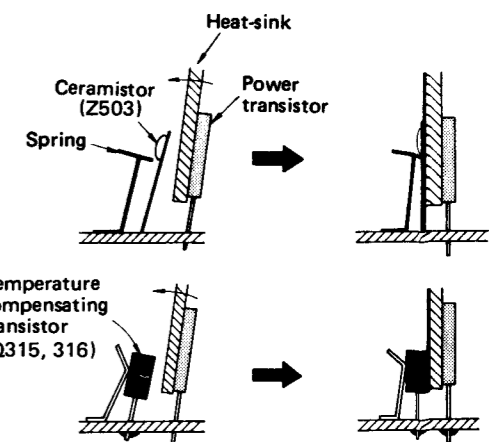
[Fig. 6]



[Fig. 7]

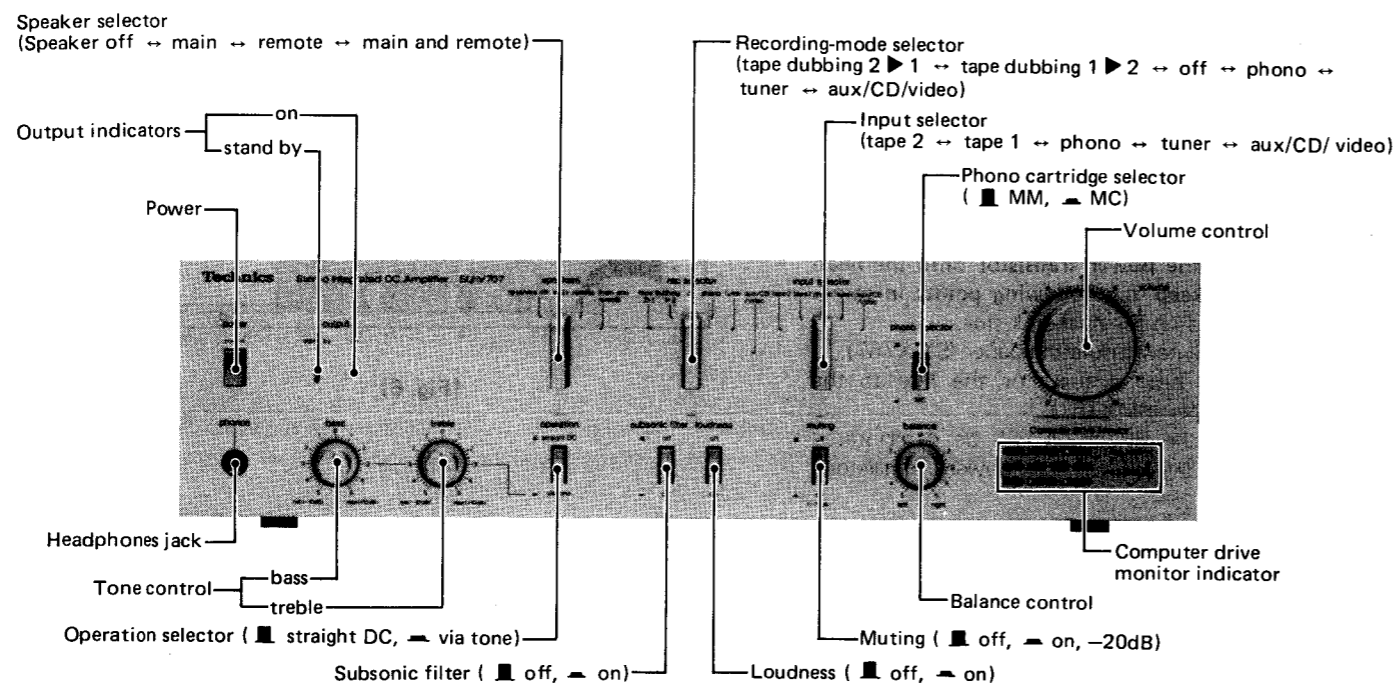


[Fig. 8]



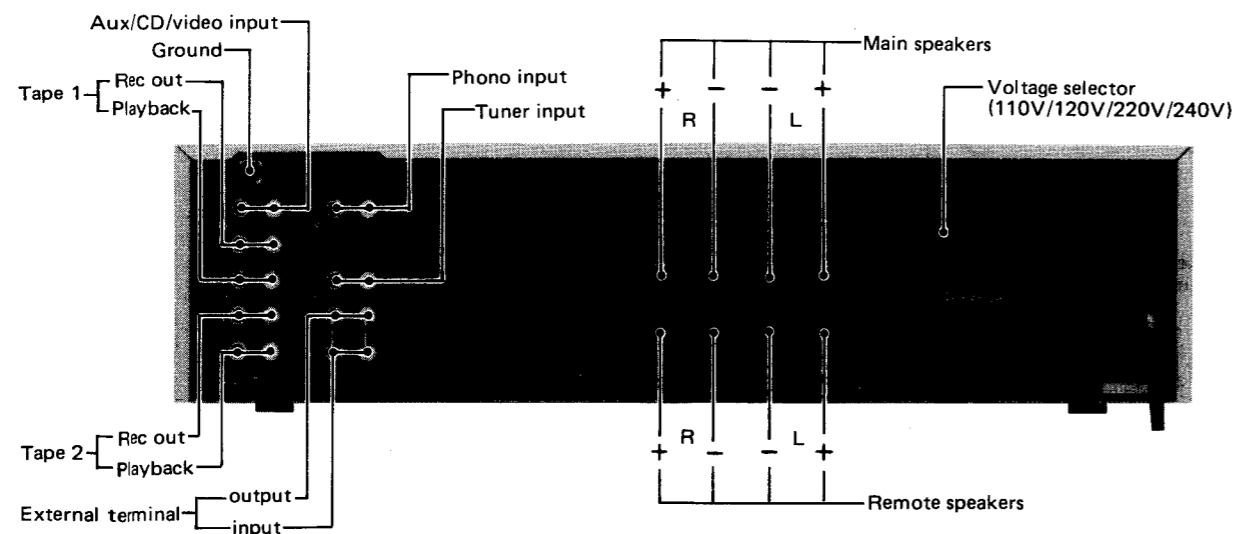
[Fig. 9]

LOCATION OF CONTROLS



Output indicators (output)

These indicators show the condition of the signal sent to speakers or headphones. When the power switch is switched on, the "stand by" indicator flashes, and when the unit is operating normally, the "on" indicator will illuminate. Note that the "stand by" indicator will flash if the positive and negative speaker terminals or speaker connection cords are short-circuited, or if some other circuit abnormality which causes the protection circuit to function is detected. If this occurs, switch the power switch off, and then on again after first determining the cause of the problem and correcting it.



* Phono input capacitance is about 150pF.

PROTECTION CIRCUITRY

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

- No sound is heard when the power is turned on.
- Sound stops during 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 outlines below:
1. Turn off the power.
 2. Determine the cause of the problem and correct it.
 3. Turn on the power once again after one minute.

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

BEFORE REPAIR AND ADJUSTMENT

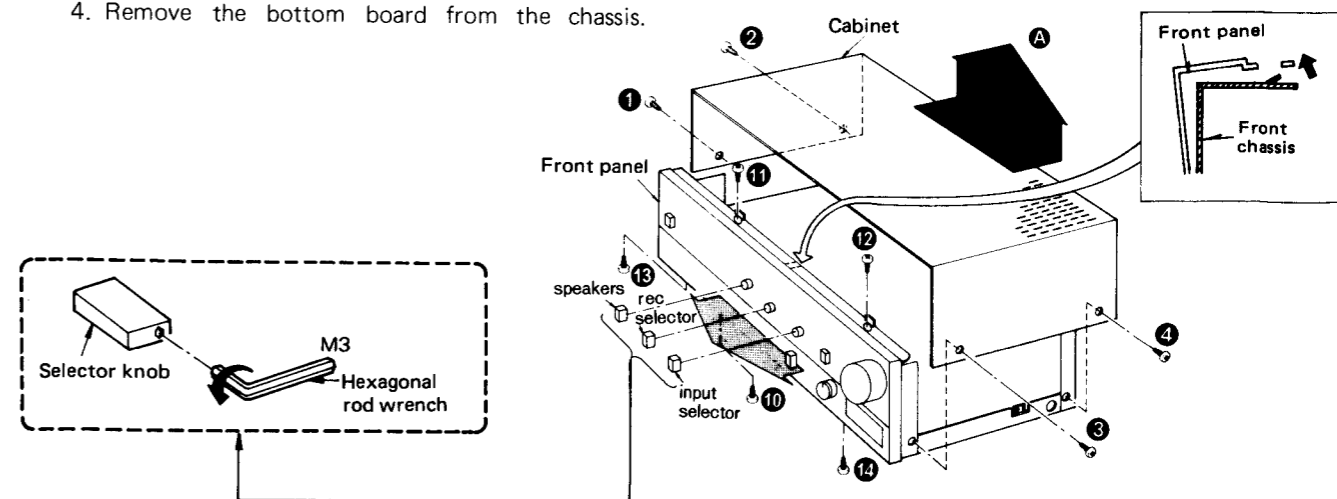
1. Turn off the power supply and short-circuit of power supply capacitors (C403, C404, 15000 μ F and C405, 2200 μ F) at resistance (about 10 Ω , 5W) in order to discharge the charged voltage. Do not short between C403, C404 and C405 by screwdriver. It may damage the componet.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Cousumed current	50 Hz	210 ~ 630mA	230 ~ 700mA	120 ~ 380mA	110 ~ 330mA
	60 Hz	180 ~ 570mA	170 ~ 550mA	100 ~ 320mA	90 ~ 300mA

DISASSEMBLY INSTRUCTIONS

How to remove the cabinet and the bottom board

1. Remove the 4 setscrews (Fig. 1: ① ~ ④) of the cabinet.
2. Move the cabinet in the direction of the arrow A in Fig. 1
3. Remove the 6 setscrews (Fig. 2: ⑤ ~ ⑩) of the bottom board.
4. Remove the bottom board from the chassis.



[Fig. 1]

● Vérification d'une détection de surcharge et du circuit de protection

- Appliquer un signal de sortie d'à peu près 1,5V à 1 kHz à la borne d'entrée AUX.
- Avec les bornes du haut-parleur principal (canal de gauche) court-circuitées par un fil d'amenée (aussi épais et court que possible):

S'assurer que

- le relais est hors circuit.
- l'indicateur de sortie "on" (marche) s'éteigne.
- l'indicateur de sortie "stand by" (attente) clignote.

- S'assurer que la condition de (2) soit obtenue avec le circuit de sortie ouvert. De même, vérifier aussi le canal de droite.

* Lorsque le relais est hors circuit, tourner l'énergie de l'appareil sur "off" pendant un certain temps avant de remettre en marche ("on").

Sans quoi, les conditions originales ne seront pas rétablies même lorsque le circuit et la charge sont normaux.

ESPAÑOL

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

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 20 Hz~20 kHz en ambos canales 2 × 80W (4Ω)
2 × 90W (8Ω)

Potencia continua de 40 Hz~16 kHz en ambos canales 2 × 80W (4Ω)
2 × 90W (8Ω)

Potencia continua de 1 kHz en ambos canales 2 × 80W (4Ω)
2 × 90W (8Ω)

Distorsión armónica total potencia de régimen a 20 Hz~20 kHz 0,007% (4Ω)
0,003% (8Ω)

potencia de régimen a 40 Hz~16 kHz 0,007% (4Ω)
0,003% (8Ω)

potencia de régimen a 1 kHz 0,0015% (4Ω)
0,001% (8Ω)

mitad de potencia a 20 Hz~20 kHz 0,002% (8Ω)
mitad de potencia a 1 kHz 0,001% (8Ω)

-26 dB de potencia a 1 kHz 0,01% (4Ω)
50 mW de potencia a 1 kHz 0,01% (4Ω)

Distorsión por intermodulación potencia de régimen a 250 Hz: 8 kHz=4:1, 4Ω 0,01%
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0,007%

Ancho de banda de potencia con ambos canales, -3 dB 5 Hz~70 kHz (4Ω, 0,03%)
5 Hz~70 kHz (8Ω, 0,02%)

Zumbido residual y ruido 0,5 mV

Factor de amortiguamiento 30 (4Ω), 60 (8Ω)

Sensibilidad e impedancia de entrada

TOCADISC. I. M. (PHONO MM) 2,5 mV/47kΩ

TOCADISC. B. M. (PHONO MC) 170 μV/220Ω

SINTON. (TUNER) 150 mV/18kΩ

AUX./CD/VIDEO (AUX/CD/VIDEO) 150 mV/18kΩ

GRAB. 1 (TAPE 1) 150 mV/18kΩ

GRAB. 2 (TAPE 2) 150 mV/18kΩ

Voltaje máximo de entrada de PHONO (1 kHz, RMS)

I. M. (MM) 210 mV

B. M. (MC) 15 mV

Relación de señal a ruido

potencia de régimen (4Ω)

TOCADISC. I. M. (PHONO MM) 78 dB (88 dB, IHF, A, entrada de 2,5 mV)

TOCADISC. B. M. (PHONO MC) 72 dB (72 dB, IHF, A, entrada de 250 μV)

SINTON. (TUNER) 93 dB (IHF, A: 104 dB)

AUX./CD/VIDEO, GRAB. (AUX/CD/VIDEO, TAPE)

93 dB (IHF, A: 104 dB)

-26 dB de potencia (4Ω)

TOCADISC. I. M. (PHONO MM) 72 dB

TOCADISC. B. M. (PHONO MC) 68 dB

SINTON. (TUNER) 74 dB

AUX./CD/VIDEO, GRAB. (AUX/CD/VIDEO, TAPE) 74 dB

50 mW de potencia (4Ω)

TOCADISC. I. M. (PHONO MM) 68 dB

TOCADISC. B. M. (PHONO MC) 67 dB

SINTON. (TUNER) 69 dB

AUX./CD/VIDEO, GRAB. (AUX/CD/VIDEO, TAPE) 69 dB

Respuesta de frecuencia

TOCADISC. (PHONO) curva RIAA estándar

±0,5 dB (30 Hz~15 kHz)

0,7 Hz~140 kHz (-3 dB)

SINTON. (TUNER) +0 dB -0,2 dB (20 Hz~20 kHz)

AUX./CD/VIDEO, GRAB. (AUX/CD/VIDEO, TAPE)

0,7 Hz~140 kHz (-3 dB)

+0 dB, -0,2 dB (20 Hz~20 kHz)

Controles de tono

BAJOS (BASS) 50 Hz, +10 dB~ -10 dB

AGUDOS (TREBLE) 20 kHz, +10 dB~ -10 dB

Filtro subsónico 30 Hz, -6 dB/oct.

Control de sonoridad (volumen a -30 dB) 50 Hz, +9 dB

Silenciamiento -20 dB

Voltaje de salida

SAL. GRAB. (REC OUT) 150 mV

Equilibrio de canales, AUX/CD/VIDEO 250 Hz~6 300 Hz

±1 dB

Separación de canales, AUX/CD/VIDEO, 1 kHz 55 dB

Impedancia y nivel de salida de los auriculares 630 mV/330Ω

Impedancia de carga

MAIN o REMOTE 4Ω~16Ω

MAIN y REMOTE 8Ω~16Ω

■ GENERAL

Consumo de energía 510W

Alimentación de energía

Para Germany CA 50 Hz/60 Hz, 220V

Para otros países CA 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensiones (An.×Al.×Prof.) 430 × 120 × 362 mm

Peso 10 kg

Nota:

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

■ MEDICIONES Y AJUSTE

1. Ajuste de Reloj (después de reemplazar el microcomputador)

- Desconecte la fuente de alimentación.
- Ajuste VR501 de manera que el tiempo, hasta que el relé se conecte, sea 5~7-seg. después de conectarse la corriente.

* El tiempo se prolonga con VR501 girado a la izquierda (en la dirección de A). (La frecuencia disminuye.)

* El tiempo se acorta con VR501 girado a la derecha (en la dirección de B). (La frecuencia aumenta.)

(Nota) La frecuencia de reloj de 400 kHz se obtiene en TP501. En el caso de un contador de frecuencia y osciloscopio ordinarios, la frecuencia no se puede medir correctamente debido a la capacidad de prueba. Por lo tanto, se recomienda emplear el método antes mencionado durante la prestación de servicio.

2. Ajuste de Marcha en Vacío (IcQ) (después de reparar el amp. principal)

- Después de la reparación, ajuste el volumen de sonido al mínimo antes de conectar el interruptor de alimentación, y no conecte nada a los terminales de altavoz.

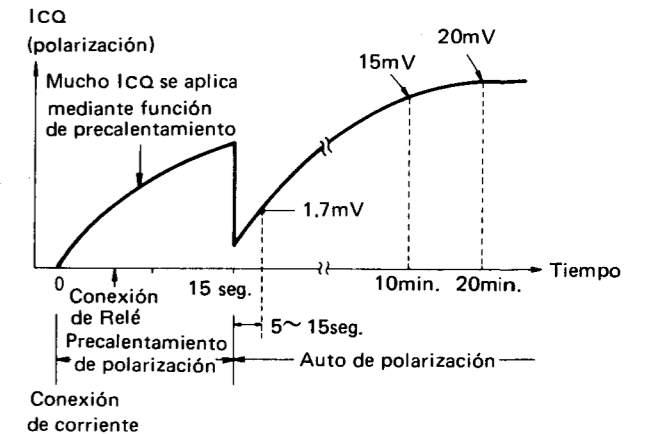
- Gire completamente el control IcQ (VR301, 302) a la izquierda.

- Aumente el voltaje aplicado al amplificador gradualmente desde 0V mediante un regulador de voltaje, y asegúrese del valor en la tabla de abajo antes de comenzar el ajuste.

- Conecte el voltímetro electrónico de CC a TP302 (+) y TP301 (-) (canal izquierdo) o TP304 (+) y TP303 (-) (canal derecho).

- Cuando 5 ó 15 segundos han pasado después que el "auto" de monitor de impulsión de computador se enciende, ajuste VR301 (canal izquierdo) o VR302 (canal derecho) a 2mV.

* En este aparato, IcQ es regulado mediante computador, y IcQ un poco más del nivel normal se aplica mediante "PRECALENTAMIENTO" por unos 15 seg. después de conectarse la corriente. Después de eso, el nivel de salida y la temperatura de transistor se detectan mediante "AUTO", regulando así automáticamente IcQ.



3. Ajuste de Circuito de Detección de Impedancia de Carga (después de reparar el circuito de detección de impedancia de altavoz)

- Conecte una carga con 6,5Ω (resistencia de carbón de 1/2W) o 3,3Ω conectados en serie y 3,3Ω (1/2W, ±5%) a los terminales de altavoz "principal".

- Ponga el selector de altavoz en la posición "principal".

- Conecte TP601 y chasis.

- Conecte un voltímetro de CC entre TP701 y chasis (canal I.) o TP702 y chasis (canal D.).

- Ajuste VR701 (canal I.) de manera que el voltaje de TP701 sea -200mV.

- Ajuste VR702 (canal D.) de manera que el voltaje de TP702 sea -200mV.

NOTA

Asegúrese de ajustar VR702 (canal D.) después de ajustar VR701 (canal I.)

* Chequeos de Circuito de Protección Después de Reparación y Ajuste

● Chequeo de Silenciamiento con Conexión/Desconexión de Corriente.

- Conecte voltímetro de CA y carga de 8Ω (resistor o altavoz) a terminales de altavoz principal.

- Ajuste el volumen de sonido a un nivel apropiado.

- Aplique señal de 1 kHz 100 mV a terminal de entrada AUX.

- Asegúrese de que salida ha ganado 4 ~ 6 seg. después de la conexión de interruptor de alimentación, y que la salida desaparece inmediatamente después de la desconexión del interruptor de alimentación.

● Chequeo de Detección de Sobrecarga y Circuito de Protección

- Aplique señal de salida de aprox. 1,5V a 1kHz a terminal de entrada AUX.

- Con terminales de altavoz principal (canal izquierdo) cortocircuitados mediante alambre de plomo (lo más grueso y corto posible):

Asegúrese de que

- relé está desconectado.
- indicador de salida "encendido" se apaga.
- indicador de salida "de reserva" parpadea.

- Asegúrese de que el estado de (2) ha ganado con circuito de salida abierto. Similarmente, chequee el canal derecho también.

* Cuando el relé está desconectado, desconecte la corriente y unidad por un tiempo antes de conectarla.

De lo contrario, las condiciones originales no se restauran aun cuando el circuito y la carga sean normales.

● Überprüfung der Überlastungs-Detektions- und -Schutzschaltung

- (1) Ausgangssignal von 1,5V bei 1kHz an den AUX-Eingangsanschluß anlegen.
 - (2) Die Hauptlautsprecheranschlüsse (linder Kanal) mit (möglichst kurzem und dickem) Draht kurzschließen; dann überprüfen, daß:
 - das Relais ausgeschaltet ist.
 - die Ausgangsanzeige "on" erlischt.
 - die Ausgangsanzeige "stand by" blinkt.
 - (3) Sicherstellen, daß der Zustand (2) bei geöffneter Ausgangsschaltung erreicht wird. Auf entsprechende Weise ist auch der rechte Kanal zu prüfen.
- * Wenn das Relais ausgeschaltet ist, die Stromzufuhr ausschalten und einige Zeit ausgeschaltet lassen, bevor sie wieder eingeschaltet wird. Andernfalls werden die ursprünglichen Zustände nicht wiederhergestellt, auch dann nicht, wenn die Schaltung und die Last normal sind.

FRANÇAIS

■ CARACTERISTIQUES

(Sujet à changement sans preavis.)

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue de 20 Hz~20 kHz, les deux canaux en circuit	2 × 80W (4Ω) 2 × 90W (8Ω)
Puissance de sortie continue de 40 Hz~16 kHz, les deux canaux en circuit	2 × 80W (4Ω) 2 × 90W (8Ω)
Puissance de sortie continue à 1 kHz les deux canaux en circuit	2 × 80W (4Ω) 2 × 90W (8Ω)
Distorsion harmonique totale	
à puissance nominale (20 Hz~20 kHz)	0,007% (4Ω) 0,003% (8Ω)
à puissance nominale (40 Hz~16 kHz)	0,007% (4Ω) 0,003% (8Ω)
à puissance nominale (1 kHz)	0,0015% (4Ω) 0,001% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,002% (8Ω)
à demi-puissance (1 kHz)	0,001% (8Ω)
puissance de -26 dB à 1 kHz	0,01% (4Ω)
puissance de 50 mW à 1 kHz	0,01% (4Ω)
Distorsion d'intermodulation	
à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω	0,01%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,007%
Réponse de fréquences	
les deux canaux en circuit, -3 dB	5 Hz~70 kHz (4Ω, 0,03%) 5 Hz~70 kHz (8Ω, 0,02%)
Bruit et ronflement résiduels	0,5 mV
Coefficient d'amortissement	30 (4Ω), 60 (8Ω)
Sensibilité et impédance d'entrée	
PHONO, AIMANT MOBILE (PHONO MM)	2,5 mV/47kΩ
PHONO, BOBINE MOBILE (PHONO MC)	170 μV/220Ω
SYNTONISATEUR (TUNER)	150 mV/18kΩ
AUX/CD/VIDEO	150 mV/18kΩ
BANDE 1 (TAPE 1)	150 mV/18kΩ
BANDE 2 (TAPE 2)	150 mV/18kΩ
Réponse de fréquence	
PHONO	Courbe nominale RIAA ±0,5 dB (30 Hz~15 kHz)
SYNTONISATEUR (TUNER)	0,7 Hz~140 kHz (-3 dB) +0 dB, -0,2 dB (20 Hz~20 kHz)
AUX/CD/VIDEO, BANDE (AUX/CD/VIDEO, TAPE)	0,7 Hz~140 kHz (-3 dB) +0 dB, -0,2 dB (20 Hz~20 kHz)
PHONO (tension d'entrée maximum, 1 kHz RMS)	210 mV
AIMANT MOBILE (MM)	15 mV
BOBINE MOBILE (MC)	15 mV

Signal/Bruit

à puissance nominale (4Ω)

PHONO, AIMANT MOBILE (PHONO MM)	78 dB (88 dB, IHF, A, 2,5 mV entrée)
PHONO, BOBINE MOBILE (PHONO MC)	72 dB (72 dB, IHF, A, 250 μV entrée)
SYNTONISATEUR (TUNER)	93 dB (IHF, A: 104 dB)
AUX/CD/VIDEO, BANDE (AUX/CD/VIDEO, TAPE)	93 dB (IHF, A: 104 dB)

puissance de -26 dB (4Ω)

PHONO, AIMANT MOBILE (PHONO MM)	72 dB
PHONO, BOBINE MOBILE (PHONO MC)	68 dB
SYNTONISATEUR (TUNER)	74 dB
AUX/CD/VIDEO, BANDE (AUX/CD/VIDEO, TAPE)	74 dB
puissance de 50 mW (4Ω)	
PHONO, AIMANT MOBILE (PHONO MM)	68 dB
PHONO, BOBINE MOBILE (PHONO MC)	67 dB
SYNTONISATEUR (TUNER)	69 dB
AUX/CD/VIDEO, BANDE (AUX/CD/VIDEO, TAPE)	69 dB

Réglage de la tonalité

BASSES (BASS)	50 Hz, +10 dB~ -10 dB
AIGUS (TREBLE)	20 kHz, +10 dB~ -10 dB
Filter subsonique	30 Hz, -6 dB/oct.
Compensateur physiologique (volume à -30 dB)	50 Hz, +9 dB
Réglage silencieux	-20 dB

Tension de sortie

SORTIE ENREGISTREMENT (REC OUT)	150 mV
Equilibrage des canaux, AUX/CD/VIDEO 250 Hz~6 300 Hz	±1 dB
Séparation des canaux, AUX/CD/VIDEO, 1 kHz	55 dB
Niveau de sortie des casques et impédance	630 mV/330Ω
Impédance de charge	
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)	4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)	8Ω~16Ω

■ DIVERS

Consommation	510W
Alimentation	
Pour Germany	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 120 × 362 mm
Poids	10 kg

Remarques:

1. On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).
2. La Société NATIONAL-PANASONIC-FRANCE, importateur du matériel MATSUSHITA-ELECTRIC déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. (arrêté 14 Janvier 1980).

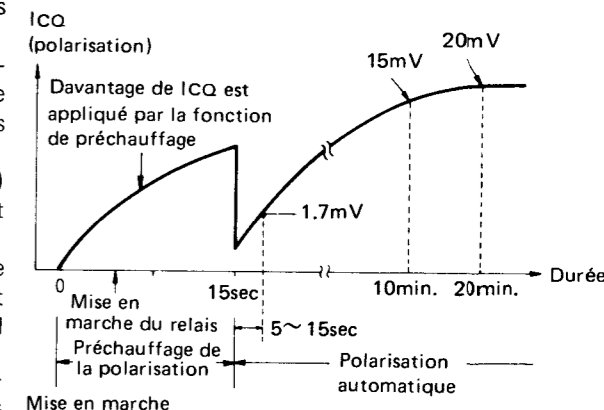
■ MESURAGES ET RÉGLAGES

1. Ajustement des impulsions de rythme (après la remise en place du micro-ordinateur)

- (1) Mettre hors circuit l'alimentation.
 - (2) Ajuster VR501 de telle sorte que la durée jusqu'à ce que le relais se mette en circuit soit de 5~7-sec. après la mise en marche.
 - * La durée s'allonge avec VR501 tourné dans le sens inverse des aiguilles d'une montre (dans la direction de A). (La fréquence diminue.)
 - * La durée raccourcit avec VR501 tourné dans le sens des aiguilles d'une montre (dans la direction de B). (La fréquence augmente.)
- (Nota) Une fréquence d'impulsions de rythme de 400 kHz est obtenue à TP501. Dans le cas d'un oscilloscope et d'un compteur à fréquence normale, la fréquence ne peut être mesurée correctement à cause de la capacité de la sonde. Aussi, il est conseillé d'utiliser la méthode mentionnée cidessus pendant le dépannage.

2. Ajustement de la marche à vide (ICQ) (après réparation de l'amplificateur principal)

- (1) Après la réparation, régler le volume sonore au minimum avant la mise en circuit de l'interrupteur d'alimentation, et ne rien raccorder aux bornes des haut-parleurs.
 - (2) Tourner entièrement dans le sens inverse des aiguilles d'une montre la commande ICQ (VR301 et 302).
 - (3) Augmenter graduellement la tension appliquée à l'amplificateur à partir de 0V au moyen du régulateur de tension, et vérifier la valeur d'après le tableau ci-dessous avant de commencer l'ajustement.
 - (4) Brancher un voltmètre électronique à C.C. à TP302 (+) et à TP301 (-) (canal de gauche) ou à TP304 (+) et TP303 (-) (canal de droite).
 - (5) Lorsque 5 ou 15 secondes se sont écoulées après que le contrôleur d'entraînement "auto" de l'ordinateur se soit éclairé, ajuster VR301 (canal de gauche) ou VR302 (canal de droite) sur 2 mV.
- * Dans cet appareil, ICQ est contrôlé par le micro-ordinateur et ICQ, un peu plus que le niveau normal, est appliqué par le "PRECHAUFFAGE" ("Preheat") pendant à peu près 15 secondes après la mise en marche. Après cela, le niveau de sortie et la température du transistor sont détectés par "AUTO", contrôlant automatiquement ainsi ICQ.



3. Ajustement du circuit de détection d'impédance de charge (après réparation du circuit de détection d'impédance des haut-parleurs)

- (1) Raccorder une charge de 6,5Ω (1/2W, résistance à couche de carbone) ou 3,3Ω monté en série et 3,3Ω (1/2W, ±5%) aux bornes du haut-parleur principal ("main").
- (2) Régler le sélecteur des haut-parleurs sur la position "main" (principale).
- (3) Connecter TP601 et el châssis.
- (4) Brancher un voltmètre à C.C. entre TP701 et le châssis (canal de gauche) ou TP702 et le châssis (canal de droite).
- (5) Ajuster VR701 (canal de gauche) de telle sorte que la tension de TP701 soit de -200mV.
- (6) Ajuster VR702 (canal de droite) de telle sorte que la tension de TP702 soit de -200mV.

NOTA

S'assurer d'ajuster VR702 (canal de droite) après l'ajustement de VR701 (canal de gauche).

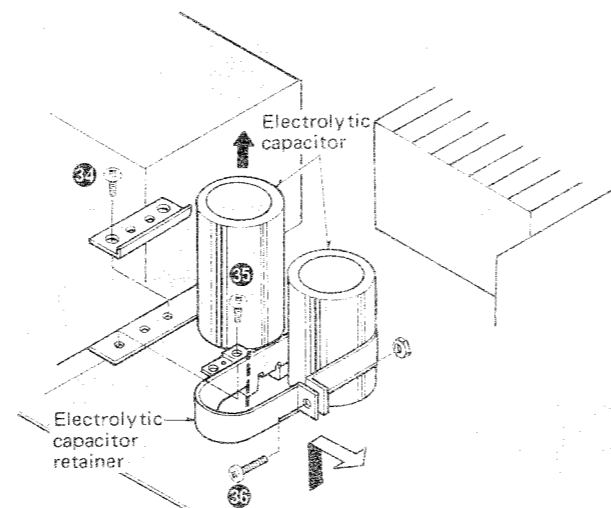
* Vérifications du circuit de protection après la réparation et l'ajustement

● Vérification de l'accord silencieux avec l'énergie sur Marche/Arrêt.

- (1) Brancher un voltmètre à C.A. et une charge de 8Ω (résistance ou haut-parleur) aux bornes du haut-parleur principal.
- (2) Régler le volume sonore sur un niveau approprié.
- (3) Appliquer un signal de 1 kHz 100 mV à la borne d'entrée AUX.
- (4) S'assurer que la puissance de sortie est augmentée 4~6 -sec. après la mise en circuit ("on") de l'interrupteur d'alimentation, et que la sortie s'achève immédiatement après avoir mis l'interrupteur d'alimentation hors circuit ("off").

• How to remove the electrolytic capacitor (C403 and C404)

1. Remove the cabinet and Bottom board.
2. Remove the 3 setscrews (Fig. 6: ④ and Fig. 10: ④, ⑤) which secure the electrolytic capacitor.
3. Unsolder the electrolytic capacitor C403 and C404.
4. Remove the 1 setscrew (Fig. 10: ⑥) of the retainer.



[Fig. 10]

■ MEASUREMENTS AND ADJUSTMENTS

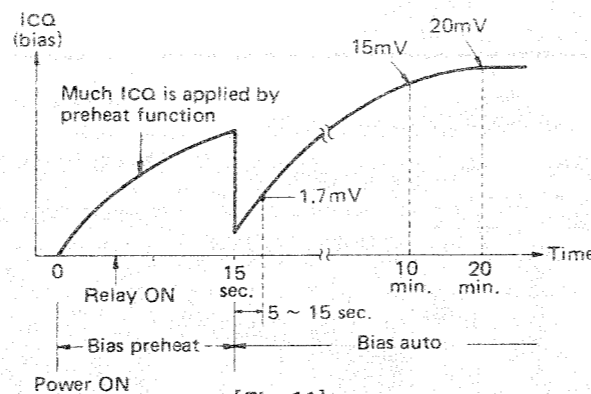
1. Clock Adjustment (after replacing the microcomputer)

- (1) Turn off the power supply.
 - (2) Adjust VR501 so that the time until the relay turns ON is 5 ~ 7 sec. after power ON.
 - * The time elongates with VR501 turned counterclockwise (in the direction of A). (Frequency decreases.)
 - * The time shortens with VR501 turned clockwise (in the direction of B). (Frequency increases.)
- (Note) Clock frequency of 400 kHz is obtained at TP501. In the case of an ordinary frequency counter and oscilloscope, the frequency cannot be correctly measured because of the probe capacity. So, it is recommended to employ the above-mentioned method during servicing.

2. Idling (ICQ) Adjustment (after repairing the main amp.)

- (1) After the repair, set the sound volume to minimum before turning on the power switch, and connect nothing to the speaker terminals.
- (2) Completely turn ICQ control (VR301, 302) counter-clockwise.
- (3) Increase the voltage applied to the amplifier gradually from 0V by means of a power supply voltage controller, and make sure of the value in the Figure on page 4 before starting the adjustment.
- (4) Connect the DC electronic voltmeter to TP302 (+) and TP301 (-) [left channel] or TP304 (+) and TP303 (-) [right channel].
- (5) When 5 or 15 seconds have lapsed after computer drive monitor "auto" lights up, adjust VR301 [left channel] or VR302 [right channel] to 2mV.

* In this set, ICQ is controlled by microcomputer, and ICQ a little more than the normal level is applied by "PRE-HEAT" for about 15 sec. after power ON. After that, the output level and transistor temperature are detected by "AUTO", thereby automatically controlling ICQ.



[Fig. 11]

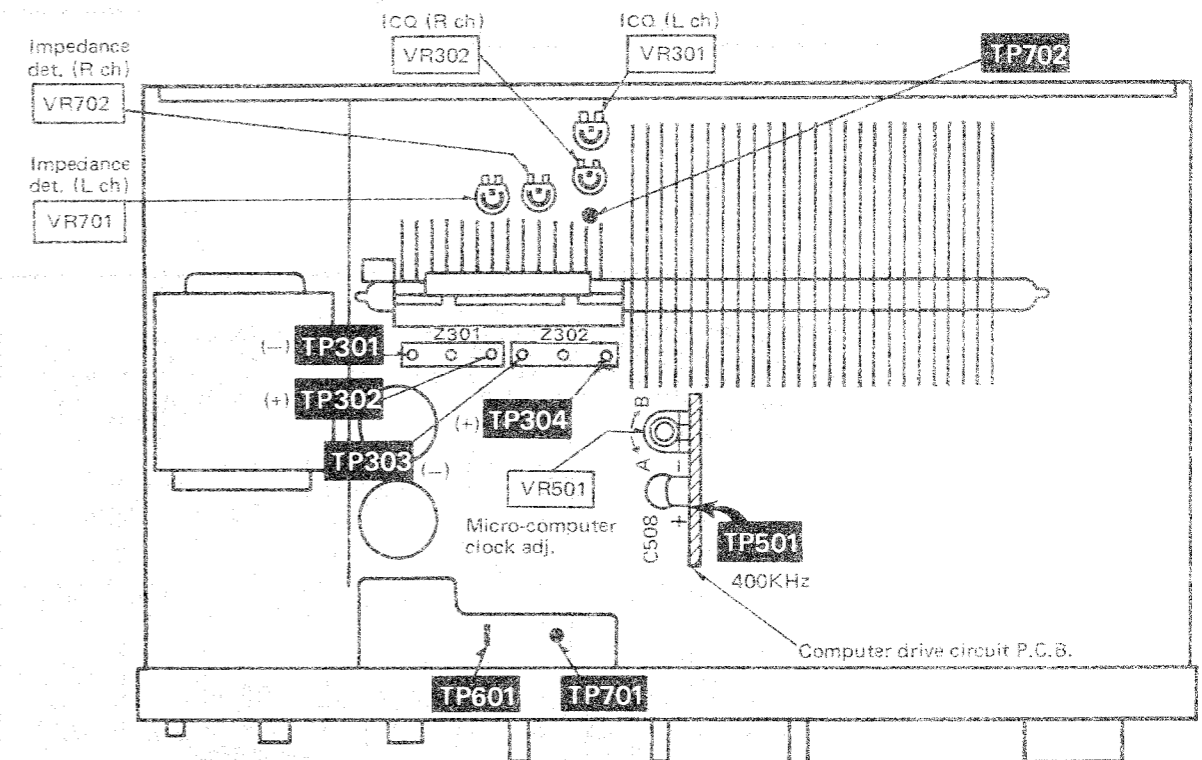
3. Adjustment of Load Impedance Detection Circuit (after repairing the speaker impedance detection circuit).

- (1) 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 terminals.
- (2) Set the speaker selector to the "main" position.
- (3) Connect TP601 and chassis.
- (4) Connect a DC voltmeter between TP701 and chassis (Lch.) or TP702 and chassis (Rch.)
- (5) Adjust VR701 (Lch.) so that the voltage of TP701 is -200mV.
- (6) Adjust VR702 (Rch.) so that the voltage of TP702 is -200mV.

NOTE:

Be sure to adjust VR702 (Rch.) after adjusting VR701 (Lch.).

• Adjustment points



* Checks of Protection Circuit After Repair and Adjustment

• Check of Muting with Power On/Off.

- (1) Connect AC voltmeter and 8Ω load (resistor or speaker) to main speaker terminals.
- (2) Set the sound volume to a proper level.
- (3) Apply 1 kHz 100 mV signal to AUX. input terminal.
- (4) Make sure that output is gained 4 ~ 6 sec. after power switch "on", and that the output goes out immediately after power switch "off".

• Check of Overload Detection and Protection Circuit

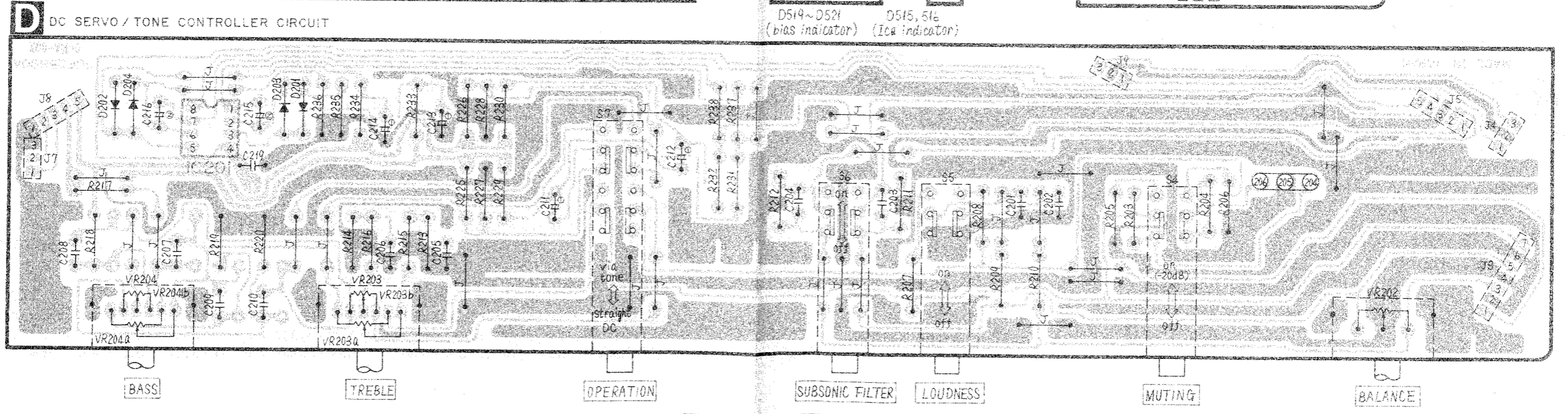
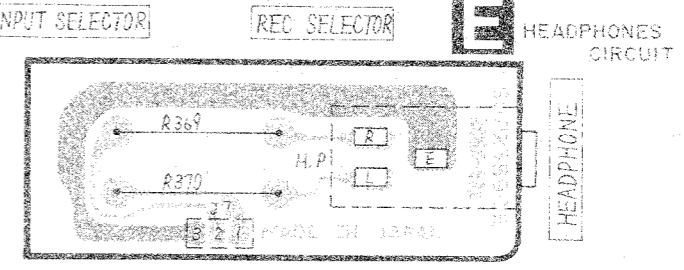
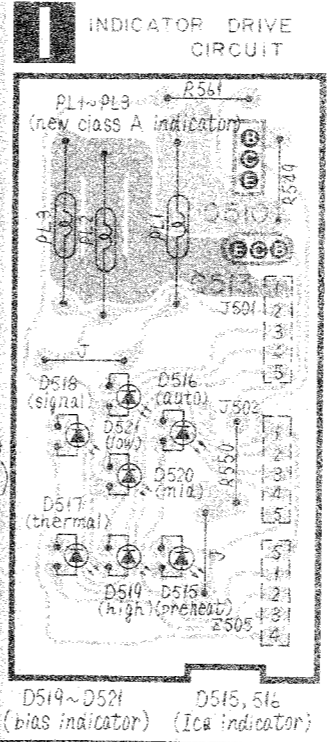
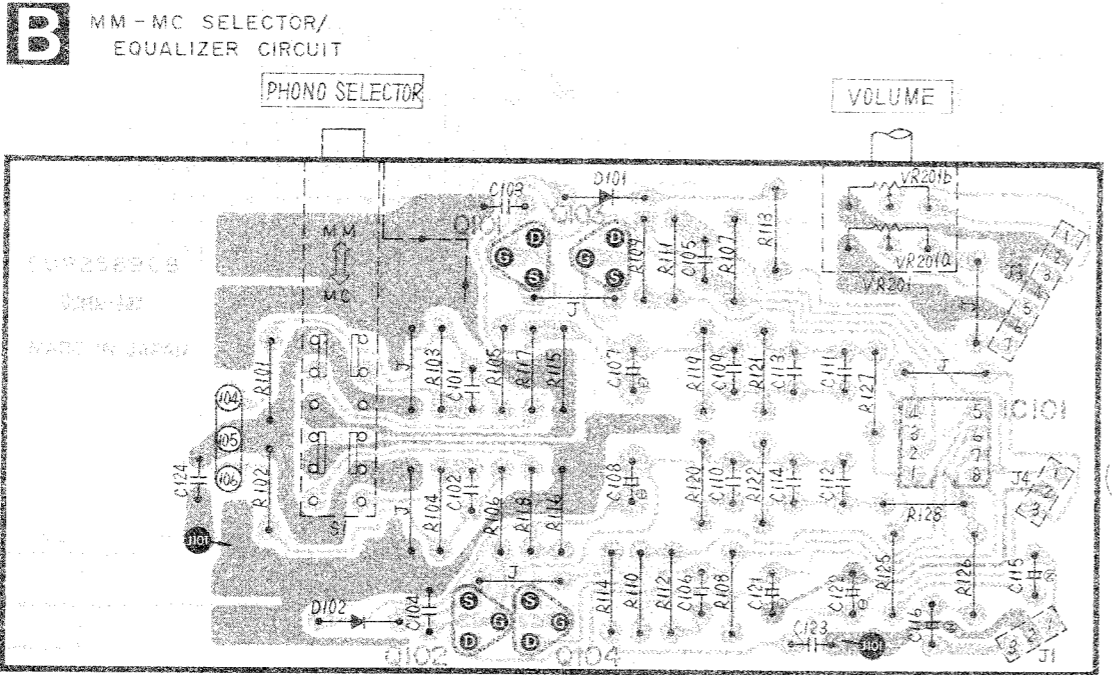
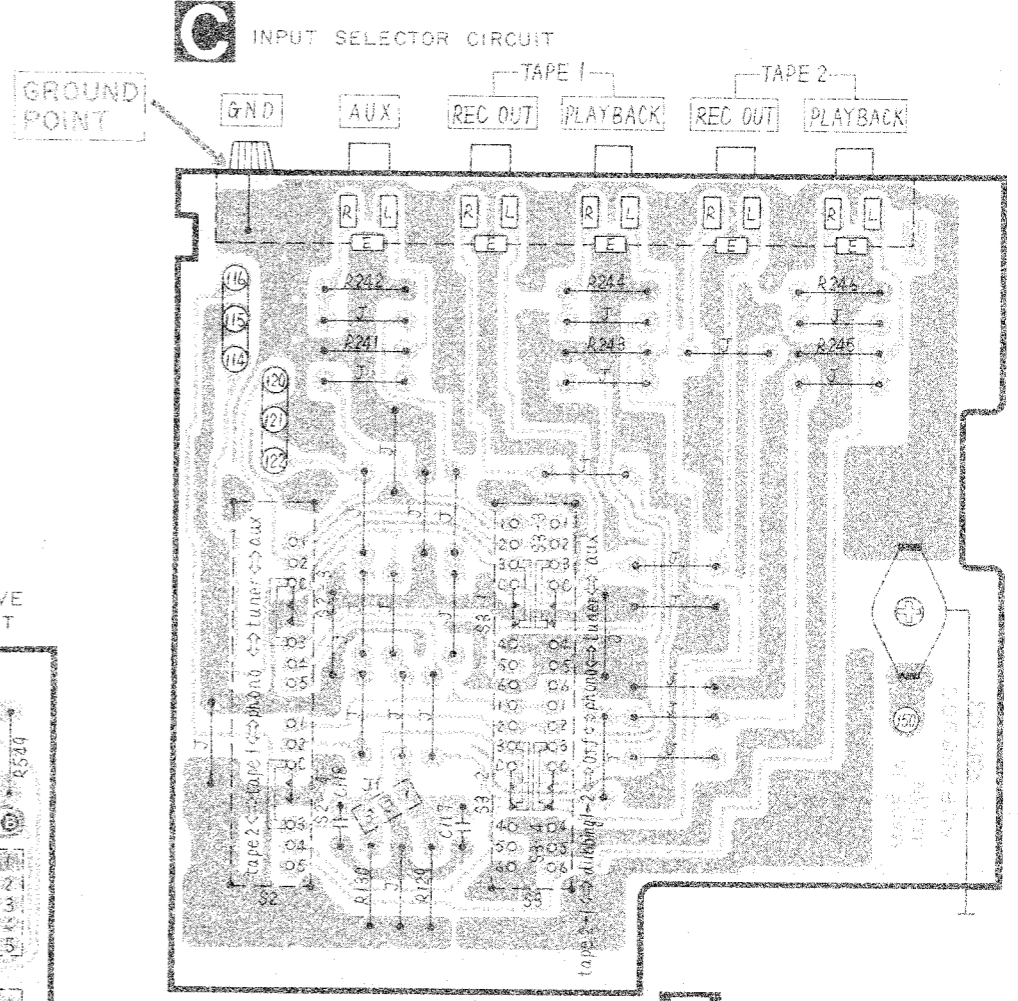
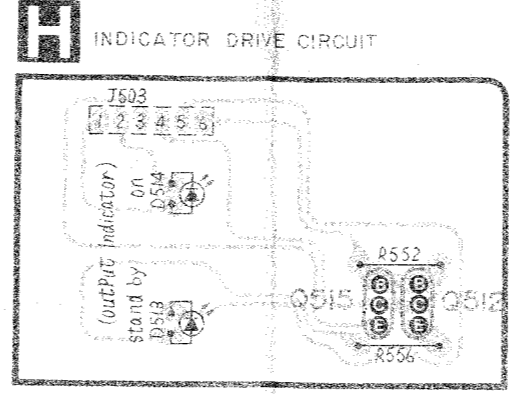
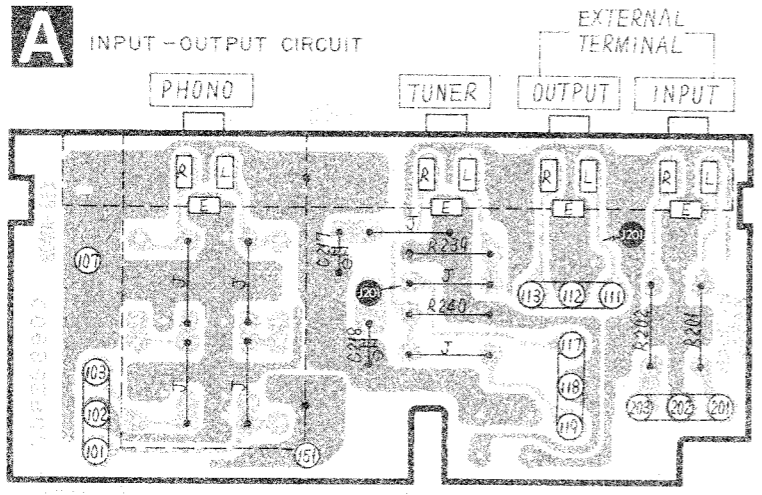
- (1) Apply output signal of about 1.5V at 1kHz to AUX. input terminal.
- (2) With main speaker terminals (left channel) short-circuited by lead wire (as thick and short as possible):
 - relay is off.
 - output indicator "on" goes out.
 - output indicator "stand by" blinks.

Make sure the state of (2) is gained with output circuit opened. Similarly, check the right channel as well.

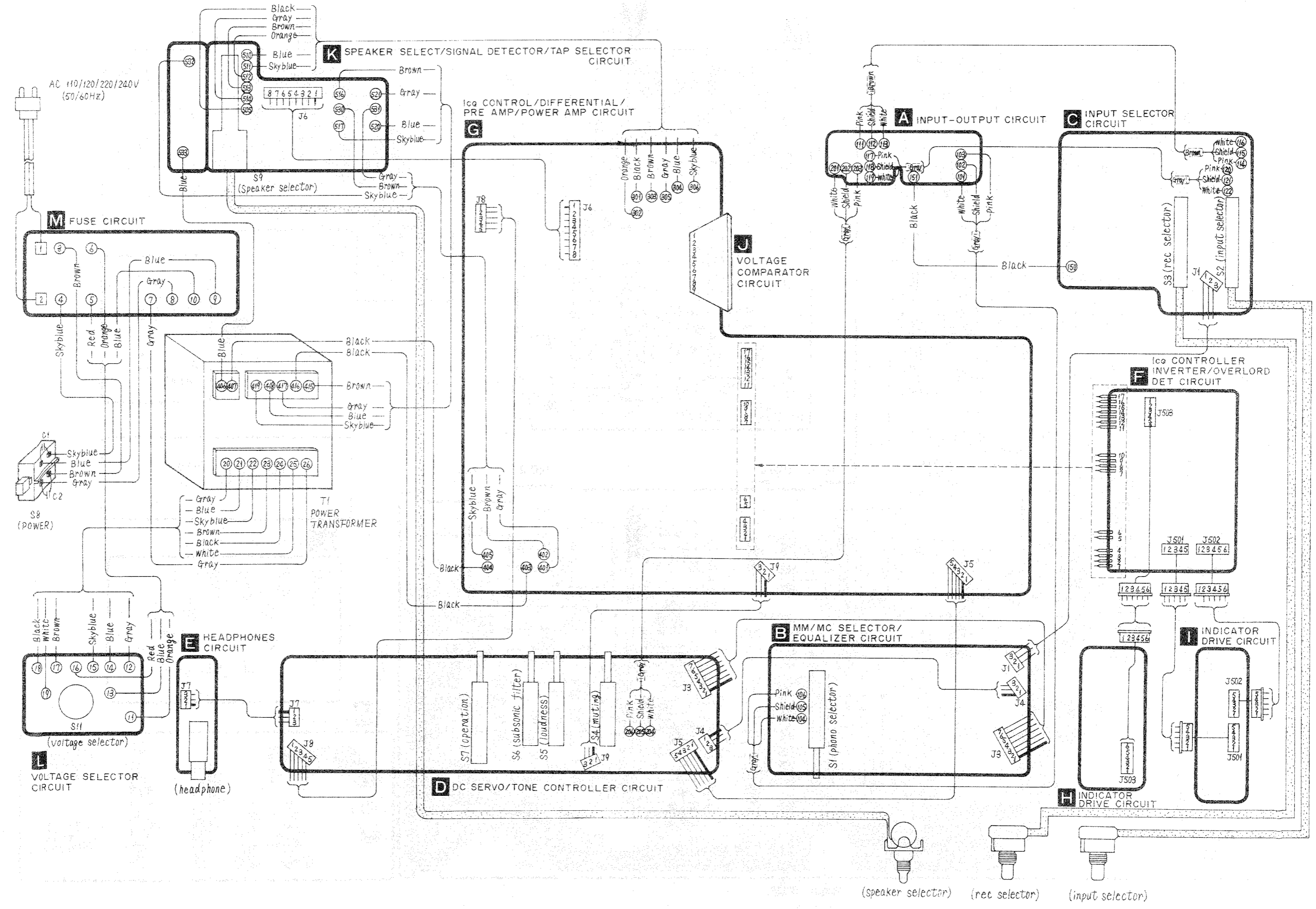
* When relay is off, turn power "off" and unit for a while before turning it "on". Otherwise, the original conditions are not restored even when the circuit and load are normal.

PRINTED CIRCUIT BOARDS

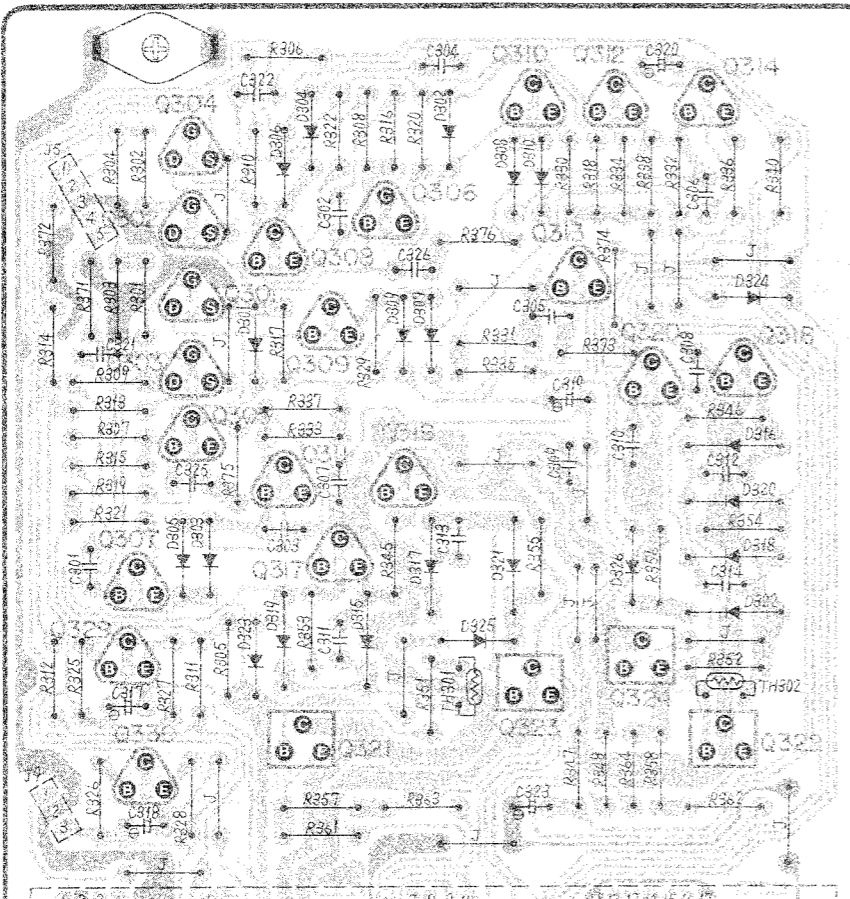
Ground (Earth) lines



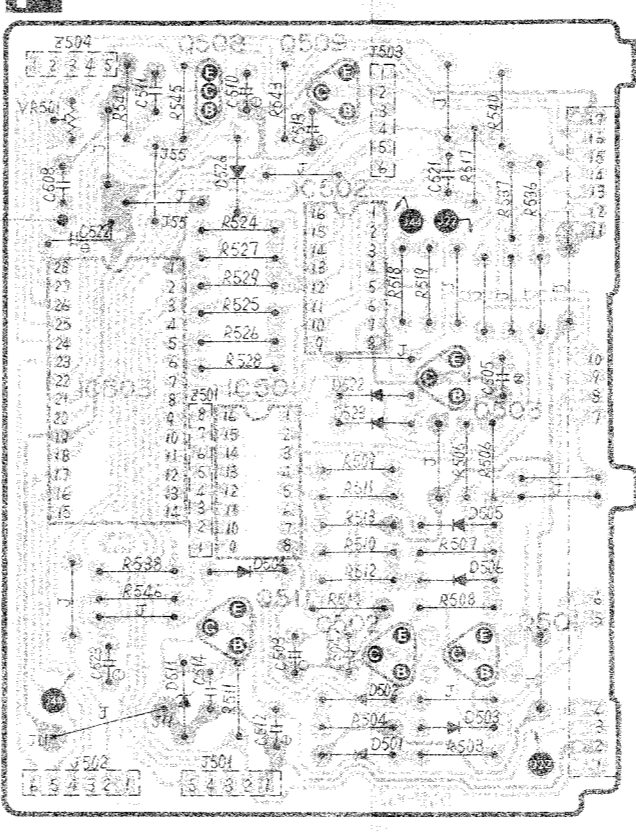
CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)



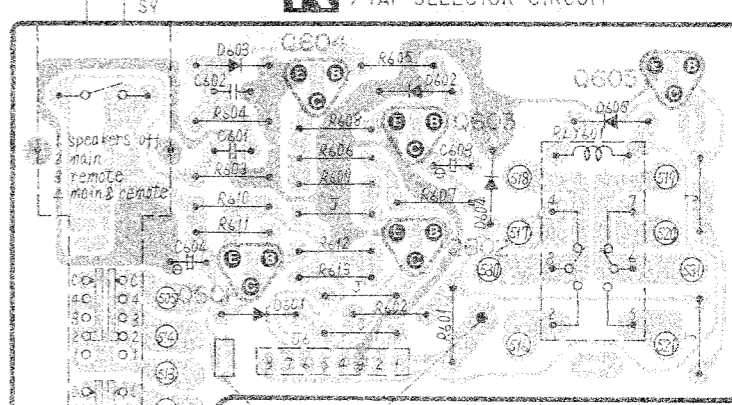
G ICQ CONTROL / DIFFERENTIAL / PRE AMP / POWER AMP CIRCUIT



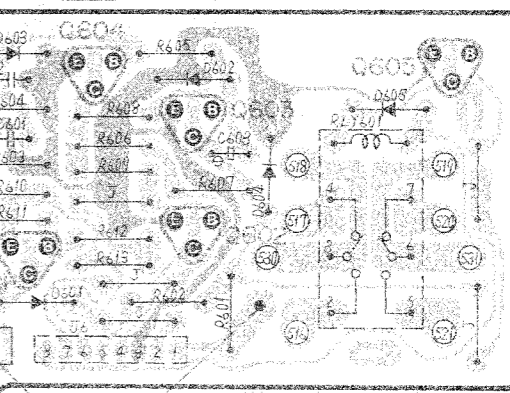
F ICQ CONTROLLER / INVERTER / OVERLOAD DET CIRCUIT



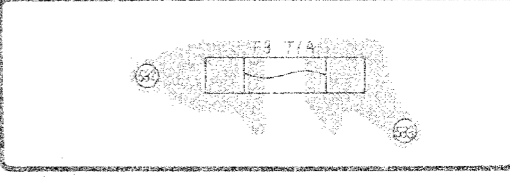
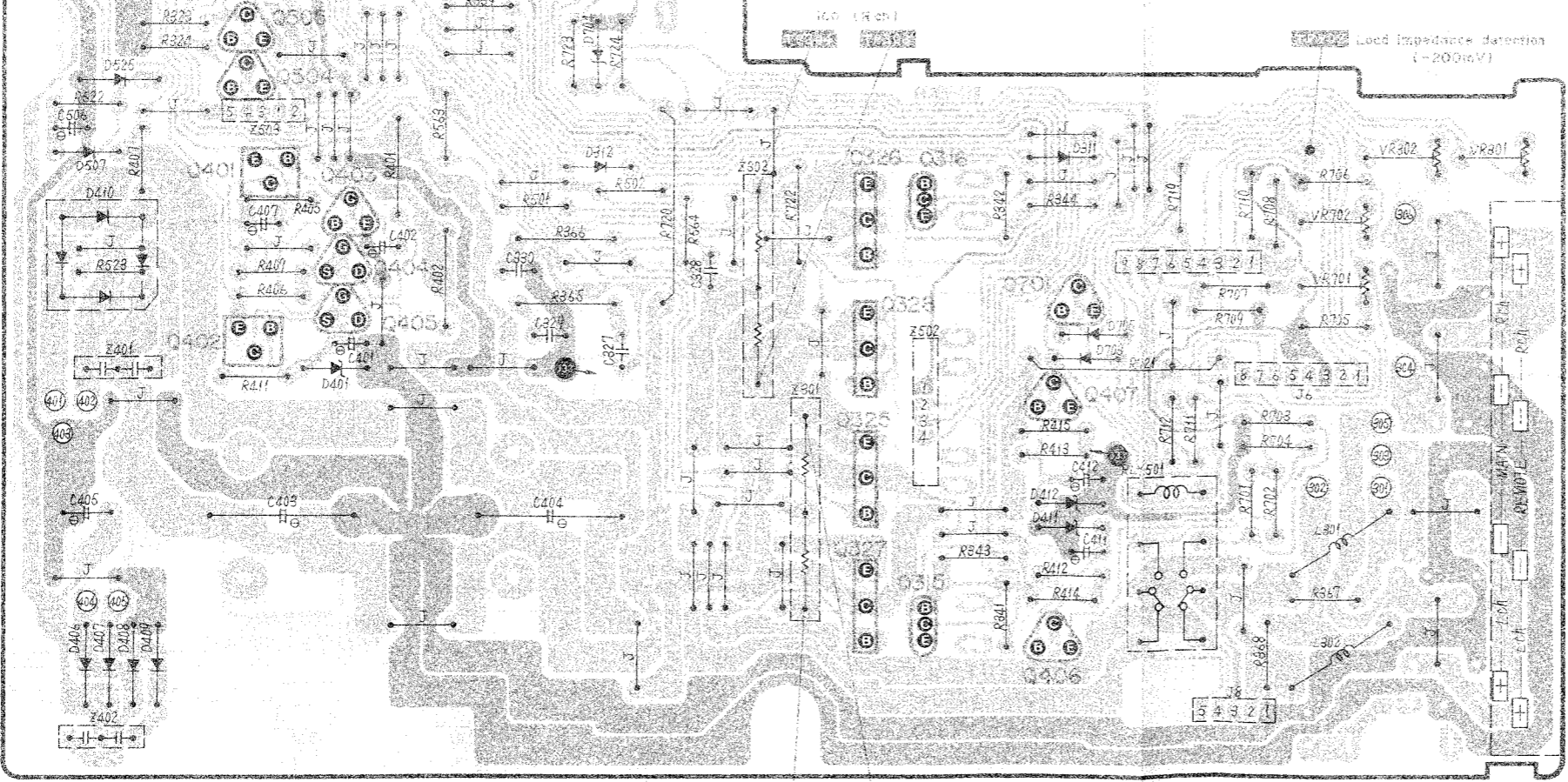
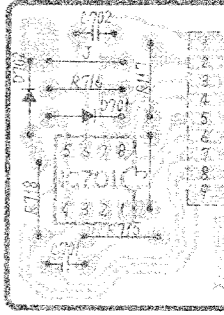
SPEAKERS SELECTOR



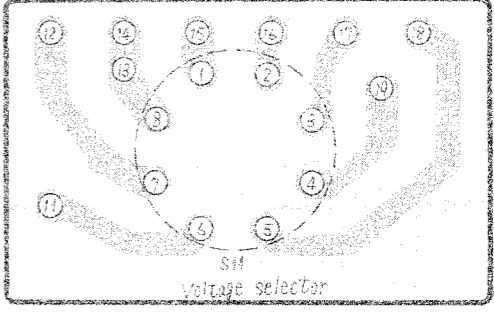
K SPEAKER SELECT / SIGNAL DETECTOR / TAP SELECTOR CIRCUIT



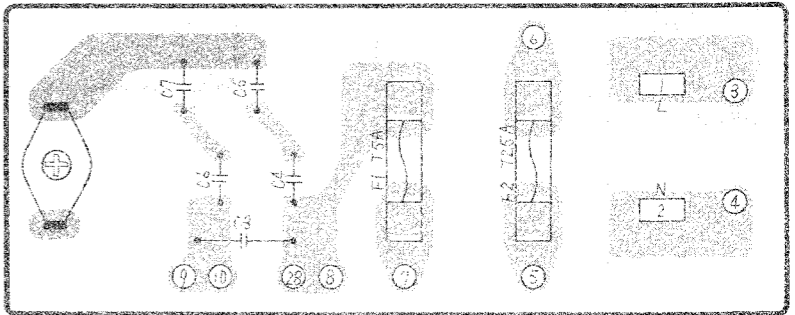
J VOLTAGE COMPARATOR CIRCUIT



L VOLTAGE SELECTOR CIRCUIT



M FUSE CIRCUIT



ICQ (LCA)

2. Description of Speaker Impedance Detection Circuit

This circuit serves to detect the impedance of speaker connected to the speaker terminals and to change the secondary tap voltage of power transformer according to the speaker impedance. It consists of a voltage comparing circuit, reset circuit, detection signal generating circuit, and speaker select relay drive circuit.

1) Reset circuit and detection signal generating circuit

The reset switch of speaker select switch is short-circuited only when the switch is shifted, With the speaker select switch shifted, the reset switch is short-circuited, then Q601 of reset circuit turns ON. When Q601 turns ON, positive voltage as in Fig. 18-A is generated at the collector of Q601, causing Q602 to turn ON.

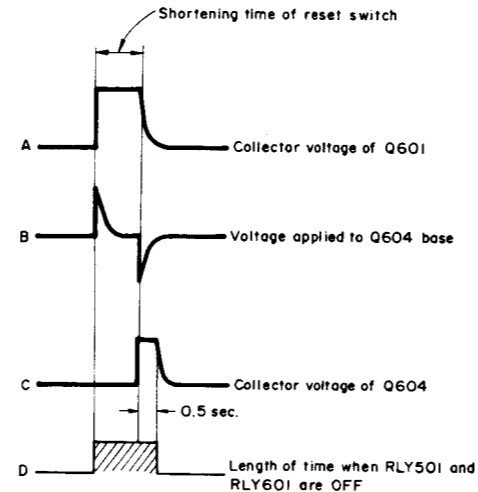
When Q602 turns ON, Q701 turns OFF, and so does RLY501. Also, when Q701 turns OFF, the collector potential of Q701 becomes positive, causing Q605 to turn OFF. Then RLY601 also turns OFF (high volt tap).

When the reset switch is open, a voltage as in Fig. 18-B is applied to the base of Q604 due to the charge and discharge of C601.

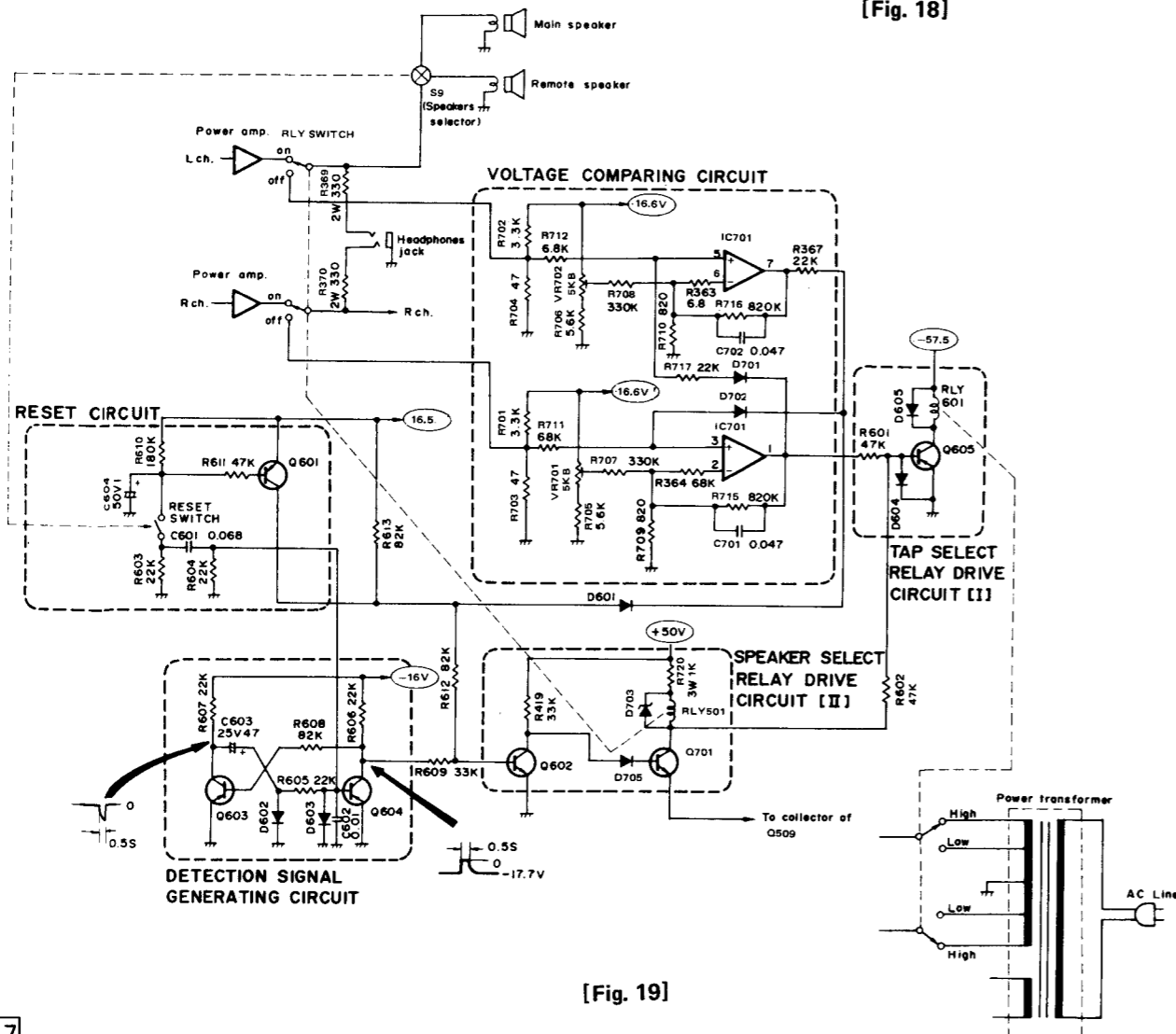
With Q604 turned ON, a voltage as in Fig. 18-C is generated at the collector of Q604. The voltage causes Q602 to turn ON.

When Q602 turns ON, RLY501 turns OFF and so does RLY601 (high volt tap). That is, both RLY501 and RLY601 are OFF during short-circuit of reset switch and for 0.5sec. more after opening the switch.

Also, when power switch is turned ON, C604 is charged with voltage, then the base voltage of Q601 becomes 0V and Q601 turns ON. Then both RLY501 and RLY601 turn OFF, and the speaker impedance detecting circuit operate. About 0.5sec. after power switch ON, C604 is discharged and Q601 turns OFF.



[Fig. 18]



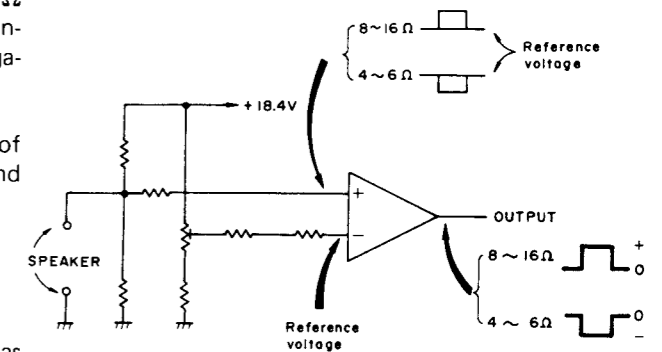
[Fig. 19]

2) Voltage comparing circuit

IC701 is a voltage comparing circuit. With RLY501 turned OFF, the speaker is connected to the voltage comparing circuit. (Fig. 20) The reference voltage is applied to minus terminals (2, 6) of IC701. Also, plus terminals (3, 5) of IC701 are subject to change according to the impedance of the speaker connected to the set.

The adjustment has been made with VR701 and VR702 so that the output voltage of IC701 is 0V with 6.5Ω speaker connected. If the impedance of the speaker connected is 4Ω, the output voltage of IC701 becomes negative, causing Q605 to turn ON.

Then RLY601 also turns ON (low volt tap). If the speaker impedance is 8Ω, the output voltage of IC701 becomes positive, then Q605 turns OFF and RLY601 also turns OFF (high volt tap).



[Fig. 20]

3) Voltage comparing circuit and reset circuit

The operation amplifier of voltage comparing circuit has a nature to hold the impedance 8Ω, or 4Ω once detected. So, if a speaker with different impedance is connected, it is necessary to turn OFF the power supply or shift the speaker select switch before operating the reset circuit.

FUNCTION OF TERMINAL (ICQ CONTROLLER IC503)

Pin No.	Mark	Name of block	Description of terminal
1	V _{SS}	Power supply input terminal	Grounded (0V)
2	CO ₉	Output port C	It delivers ICQ control signal through input port A (thermal sensor) and input port B (signal sensor). [Output "L"]
3	CO ₈		
4	CO ₇		
5	CO ₆		
6	CO ₅		
7	AI ₃	Input port A	When DC detection circuit of power amplifier operates, the input level becomes "H".
8	AI ₂		When 125°C (257°F) sensor of power amplifier operates, the input level becomes "H".
9	AI ₁		When 100°C (212°F) sensor of power amplifier operates, the input level becomes "L".
10	AI ₀	When 60°C (140°F) sensor of power amplifier operates, the input level becomes "L".	
11	BI ₃	Input port B	Input level changes to "L" as effective output 2V signal sensor of power amplifier operates. (L ch.)
12	BI ₂		Input level changes to "L" as effective output 5V signal sensor of power amplifier operates. (L ch.)
13	BI ₁		Input level changes to "L" as effective output 2V signal sensor of power amplifier operates. (R ch.)
14	BI ₀		Input level changes to "L" as effective output 5V signal sensor of power amplifier operates. (R ch.)
15	EO ₀	Output port E	Indicator "thermal" lights up at "L" output.
16	EO ₁		Indicator "signal" lights up at "L" output.
17	EO ₂		Indicator "auto" lights up at "L" output.
18	EO ₃		Indicator "stand by" lights up at "L" output.
19	TST	Test input terminal	Terminal for testing LSI (Grounded)
20	RST	Reset input terminal	All outputs are cleared or reset with input at "L" (It is connected to power supply circuit)
21	SNS ₀	Sensor input terminal	Conditional transfer (branch) is performed according to the input level.
22	SNS ₁		Input level changes to "H" as power amplifier output short-circuit operates.
23	DO ₀	Output port D	Output terminal for indicator "preheat" and preheating circuit-operation. [Output "L"]
24	DO ₁		Not used in this unit.
25	DO ₂		
26	DO ₃		Output relay turns ON with output at "H"
27	VDD	Power supply input terminal	Apply 5V.
28	OSC	OSC input terminal	Clock signal (about 400 kHz) can be obtained by internal oscillation circuit.

TECHNICAL INFORMATION

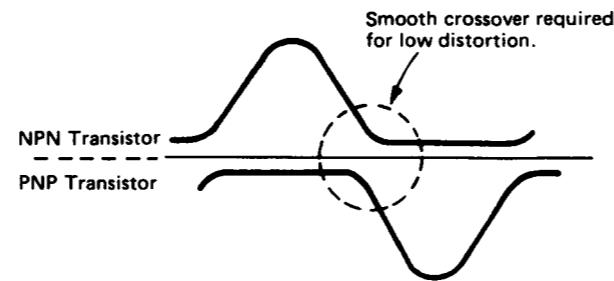
1. Description of Computer drive system

Technics New Class A amplifier circuitry eliminates switching and crossover distortion. To further improve fidelity a "computer drive" circuit has been incorporated to eliminate transient distortion in music signal reproduction.

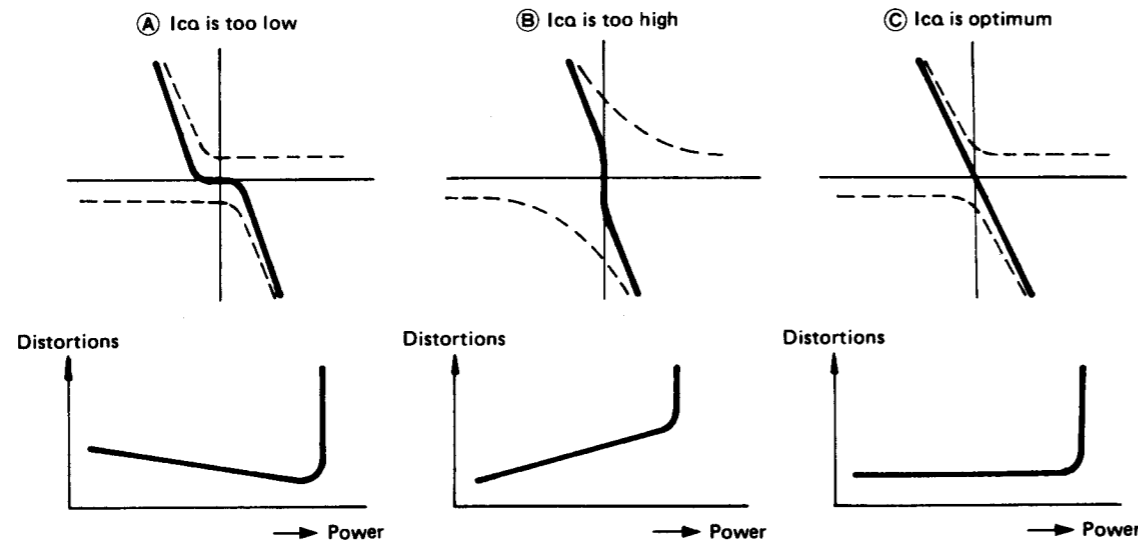
Power transistor idling current (Ica)

The idling current through the power transistors is adjusted so that crossover distortion is minimized when switching from the NPN transistor to the PNP transistor in a complimentary design (Fig. 12).

If Ica is not adjusted properly, distortion will result as in Fig. 13.



[Fig. 12]

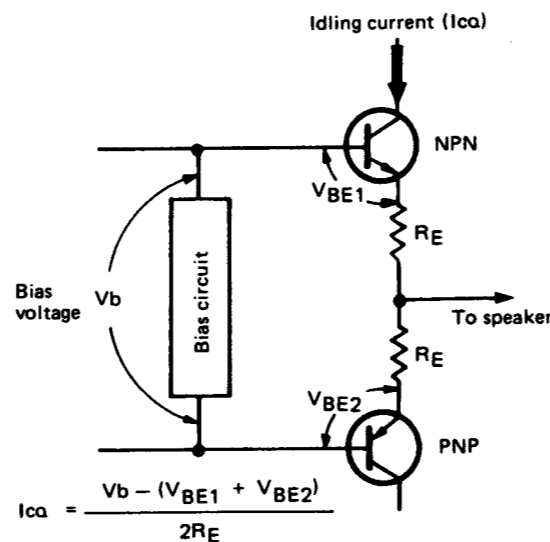


Relationship between idling current level and cross-over distortion.

[Fig. 13]

Idling current and bias current

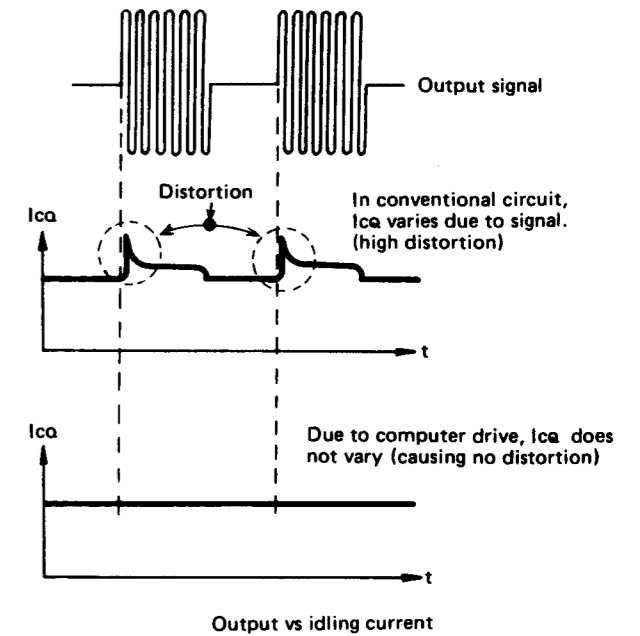
Idling current is determined by the bias voltage (Vb) of the bias circuit and the VBE of each power transistor (Fig. 14). The VBE varies according to the temperature of the transistor. This temperature varies instantaneously with the music signal. Unfortunately, with current designs, these instantaneous fluctuations cannot be detected due to the placement of the thermal sensor and the slow temperature change of the heat sink. Attempts have been made to include a thermal sensor as part of the output power pack. However, most power packs do not include a thermal sensor. Also, this method does not work if discrete components are used. We are still faced with the problem of stable bias operation and fast response to abrupt changes in temperature.



[Fig. 14]

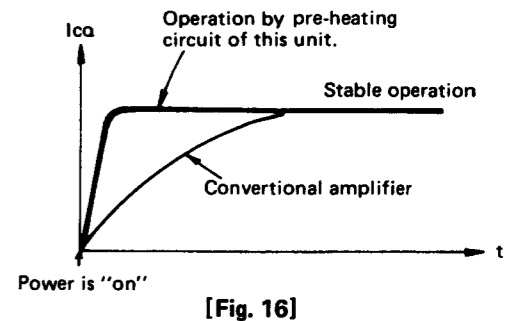
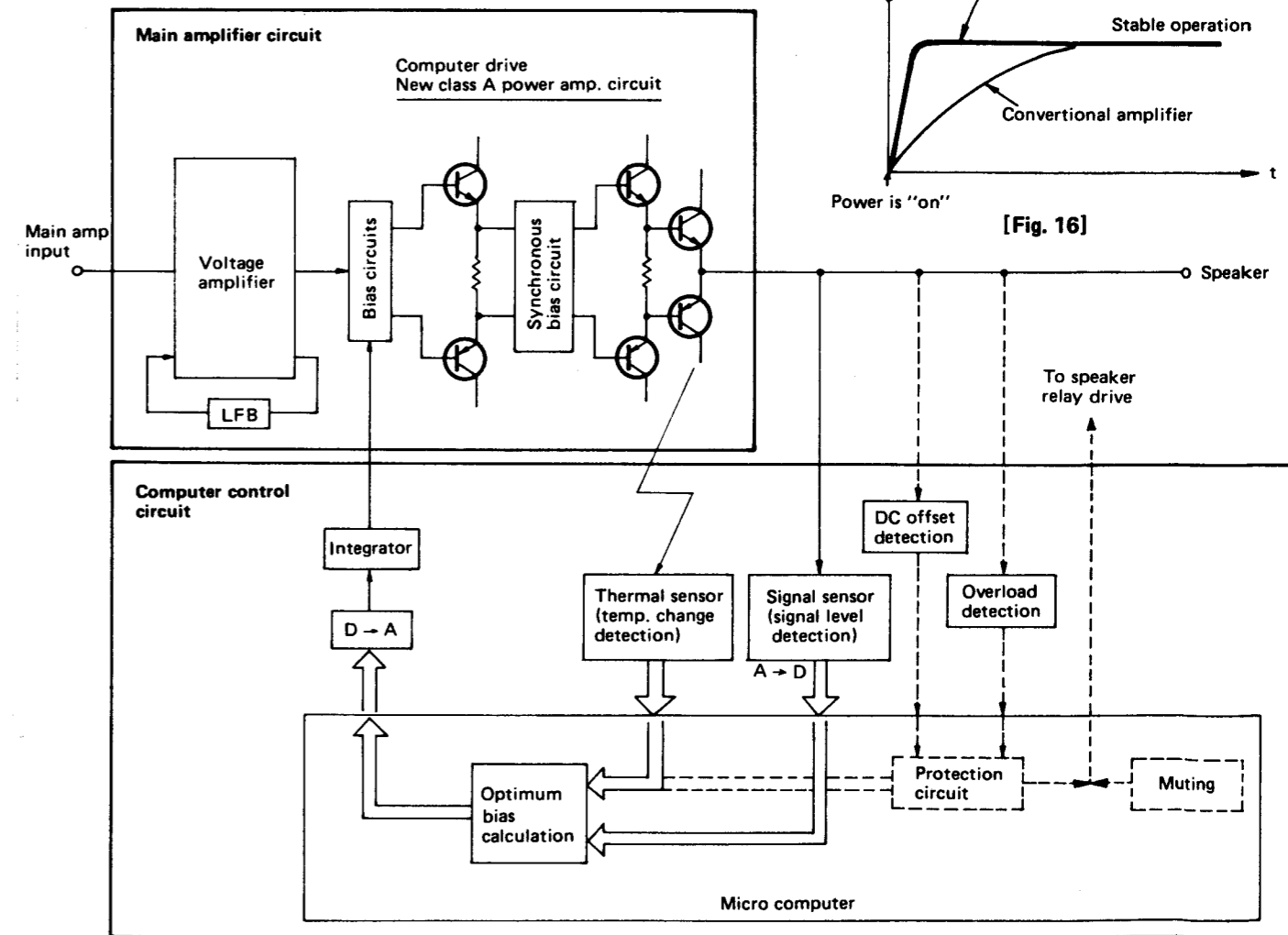
Computer drive system

Knowing the thermal and signal characteristics of the power transistors, a system can be designed to calculate the instantaneous temperature changes and adjust for the optimum idling current. Information regarding the transistor ambient temperature and the input music signal is obtained through sensors and fed to a computer. The computer calculates the optimum idle current and maintains it at a constant level by varying the bias voltage. Figure 15 illustrates the relationship of the output signal and the idling current. Figure 17 is a block diagram of the "computer drive" system.



[Fig. 15]

Generally, it takes several minutes for the power transistors to reach the temperature of stable operation after the power is turned on. To ensure stable and optimum performance quickly, the microcomputer forces a large amount of idling current through the power transistors and the heat sink. Figure 16 illustrates the stable operation level for the conventional and new computer drive system.



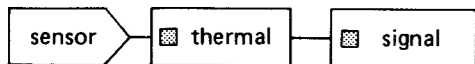
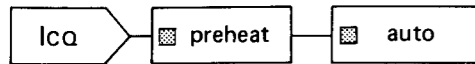
[Fig. 16]

[Fig. 17]

OPERATION OF ICQ CONTROLLER

Computer drive monitor indicators

These indicators are used to check that stable idling current flows from the bias circuit in order to prevent transient crossover distortion.



ICQ:

When the power is switched on, the radiator is preheated so that the bias circuit can immediately operate. The "preheat" indicator will illuminate at this time, and then, when the circuit is fully stabilized, the "auto" indicator will illuminate.

bias:

When the power is switched on, the bias changes from high, mid and low during the time until the idling current becomes stabilized, and the respective indicators illuminate.

Note that the display will no longer illuminate when the idling current has reached a condition of stability.

sensor:

The "thermal" sensor detects the temperature of the output transistor(s) and radiator, and the "signal" sensor detects the music signal level. Both indicators will illuminate when the sound can be heard.

Output indicators

These indicators show the condition of the signal sent to speakers or headphones.

When the power switch is switched on, the "stand by" indicator flashes, and, when the unit is operating normally, the "on" indicator will illuminate.

Note that the "stand by" indicator will flash if the positive and negative speaker terminals or speaker connection cords are short-circuited, or if some other circuit abnormality which causes the protection circuit to function is detected. If this occurs, switch the power switch off, and then on again after first determining the cause of the problem and correcting it.

ON-time of each indicator, and output generated at pin terminal of microcomputer (IC503)

Output port	Ind. sec.	(4) pin CO ₁	(3) pin CO ₂	(2) pin CO ₃	(15) pin EO ₀	(16) pin EO ₁	(17) pin EO ₂	(18) pin EO ₃	(26) pin DO ₃	(23) pin DO ₀
		bias low	bias mid	bias high	sensor thermal	sensor signal	ICQ auto	output stand by	output on	ICQ preheat
Power "ON"		L	L	L	L	L	L	L	L	L
0.4 sec.										
0.8 sec.		H	H					H	H	
0.4 sec.								L		
0.4 sec.								H		
0.4 sec.								L		
0.4 sec.			L	H		H		H		
0.4 sec.								L		
0.4 sec.					H	L		L		
0.4 sec.								H		
0.4 sec.		L	H					L		
0.4 sec.								L		
0.4 sec.								H		
14 sec.		H		L	L	L			Relay ON	
								L	H	H

* 125°C (257°F) sensor is for protection of circuit. ICQ is not controlled.

[Fig.21]

1) Preheat

When power supply is turned ON, the level of IC503 pin 23 becomes low. At the same time, preheat LED (D515) lights up, Q513 turns OFF and so does the computer drive lamp. Also, Q510 turns ON, then voltage is applied to LED's (D519), (D520), (D521). Each of D519, D520 and D521 is controlled by IC503 pins 2 ~ 5 and 6 respectively. The output voltages are shown in Fig. 21. The "high" LED lights up first, followed by "mid" LED, and then "low" LED. IC503 pin 17 turns power supply ON as in Fig. 21. It becomes "H" 0.4 sec. later, then IC502 pins 5 and 6 also becomes "H". IC502 pins 12 and 11 changes to "L" and it is applied to Q504 and Q505, causing Q504 and Q505 to turn ON. IC502 pins 12 and 11 delivers a large ICQ for 6 sec. after power ON (while pins 12 and 11 are "L"), and after that, pin 12 and 11 become "H". ICQ is controlled by the output of IC503 pins 2 ~ 5 and 6.

2) Power on/off muting

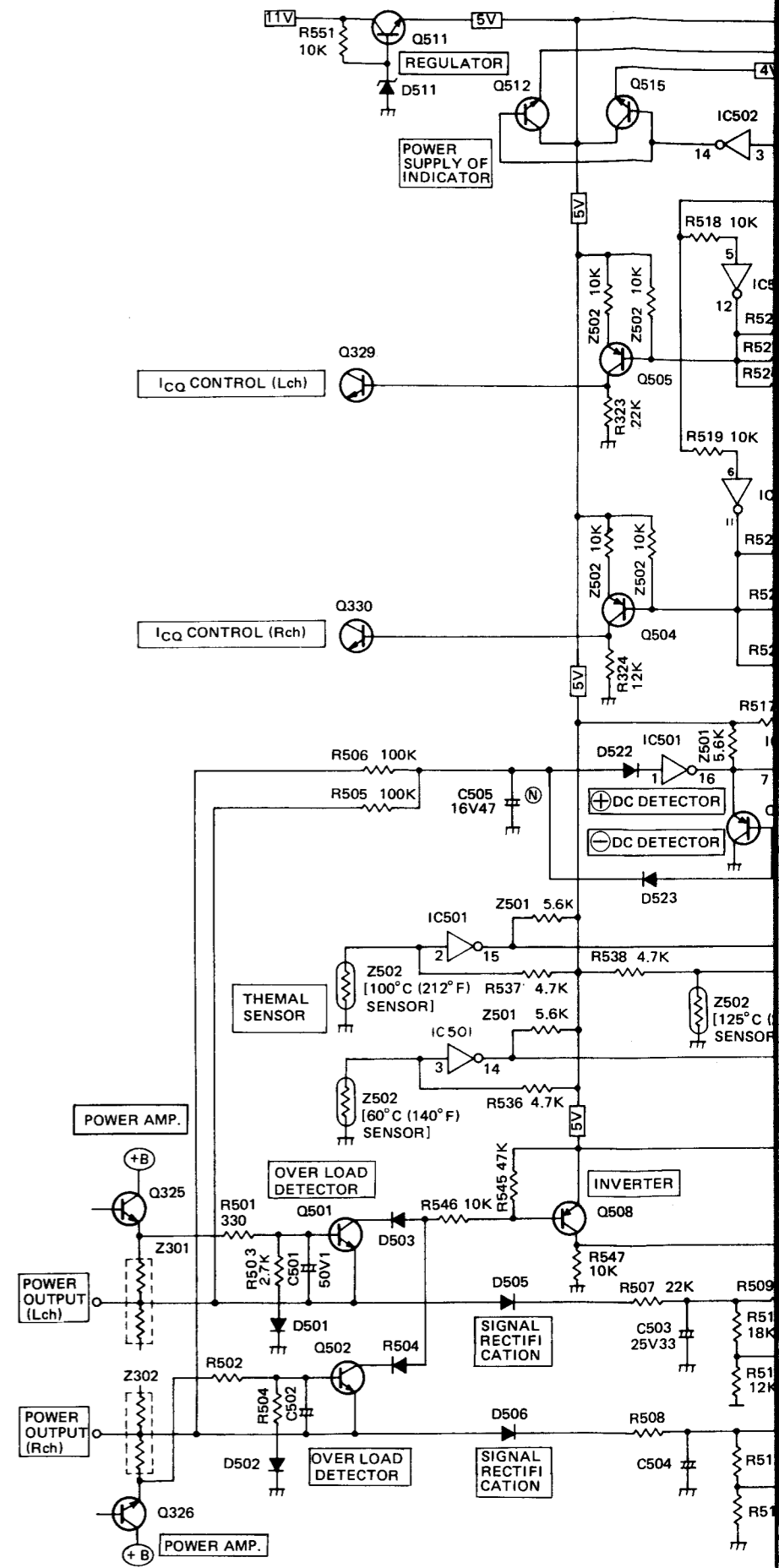
When power supply is turned ON, the output of IC503 pin 26 is "L" for about 6 sec. as in Fig. 21, then relay RLY501 turns OFF, and D514 output "on" LED also turns OFF. The voltage of IC503 pin 18 alternately becomes "L" and "H" for 6 sec. after power ON as in Fig. 21, causing D513 "stand by" LED to blink. IC503 pin 26 output becomes "H" 6 sec. after power ON, then relay RLY501 turns ON and D514 output "on" LED lights up. When power supply is turned OFF, "H" is applied to IC502 pin 4 and IC502 pin 13 output changes to "L" because the time constant of C506 (3.3μF) and R522 (15kΩ) is smaller than that of C403 (15000μF) and R523 (120kΩ). The signal is put into IC503 pin 20 while "L" output is delivered to IC503 pin 26. When pin 26 becomes "L", Q509 turns OFF and so does relay RLY501.

3) DC detection circuit

When the power amplifier voltage is over 2V DC, IC501 pin 1 (+ DC detection) and Q503 (- DC detection) are turned ON, then "H" input is applied to IC503 pin 7, and "L" output is delivered to IC503 pin 26. When pin 26 becomes "L", relay RLY501 turns OFF the same as in power-off muting.

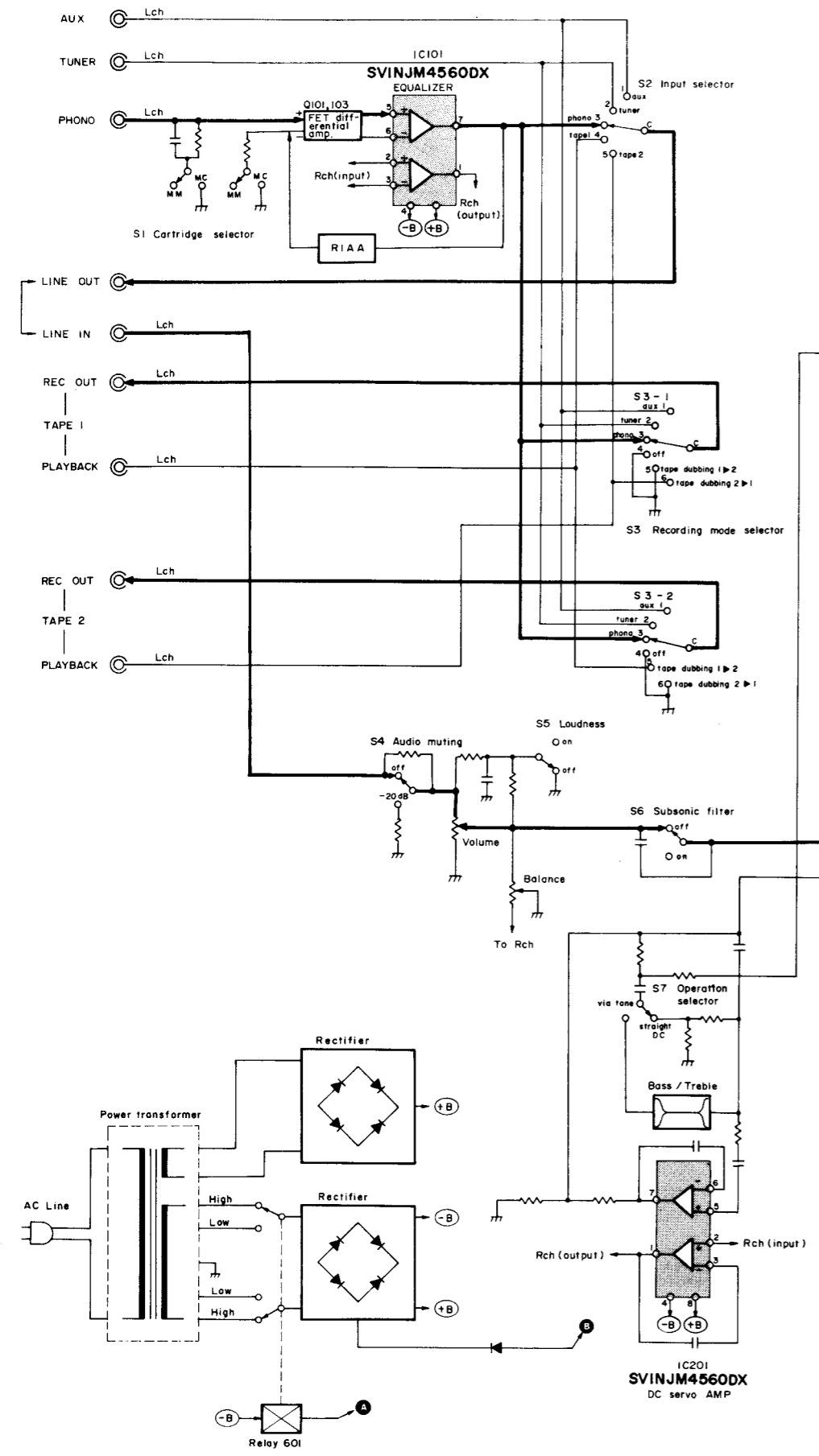
4) Overload detector circuit

When speaker terminals are short-circuited, a large amount of current flows into Z301 (Z302), and the base voltage of Q501 (Q502) increases, causing Q501 (Q502) and Q508 to turn ON. As Q508 turns ON, "H" input is applied to IC503 pin 22, and "L" output is delivered to IC503 pin 26. When pin 26 becomes "L", relay RLY501 turns OFF the same as in power off muting. When "H" is applied to IC503 pin 22, the output of IC503 pin 26 is held. Therefore, turn off the power switch and check the set beforehand. Otherwise, relay RLY501 will not turn ON.

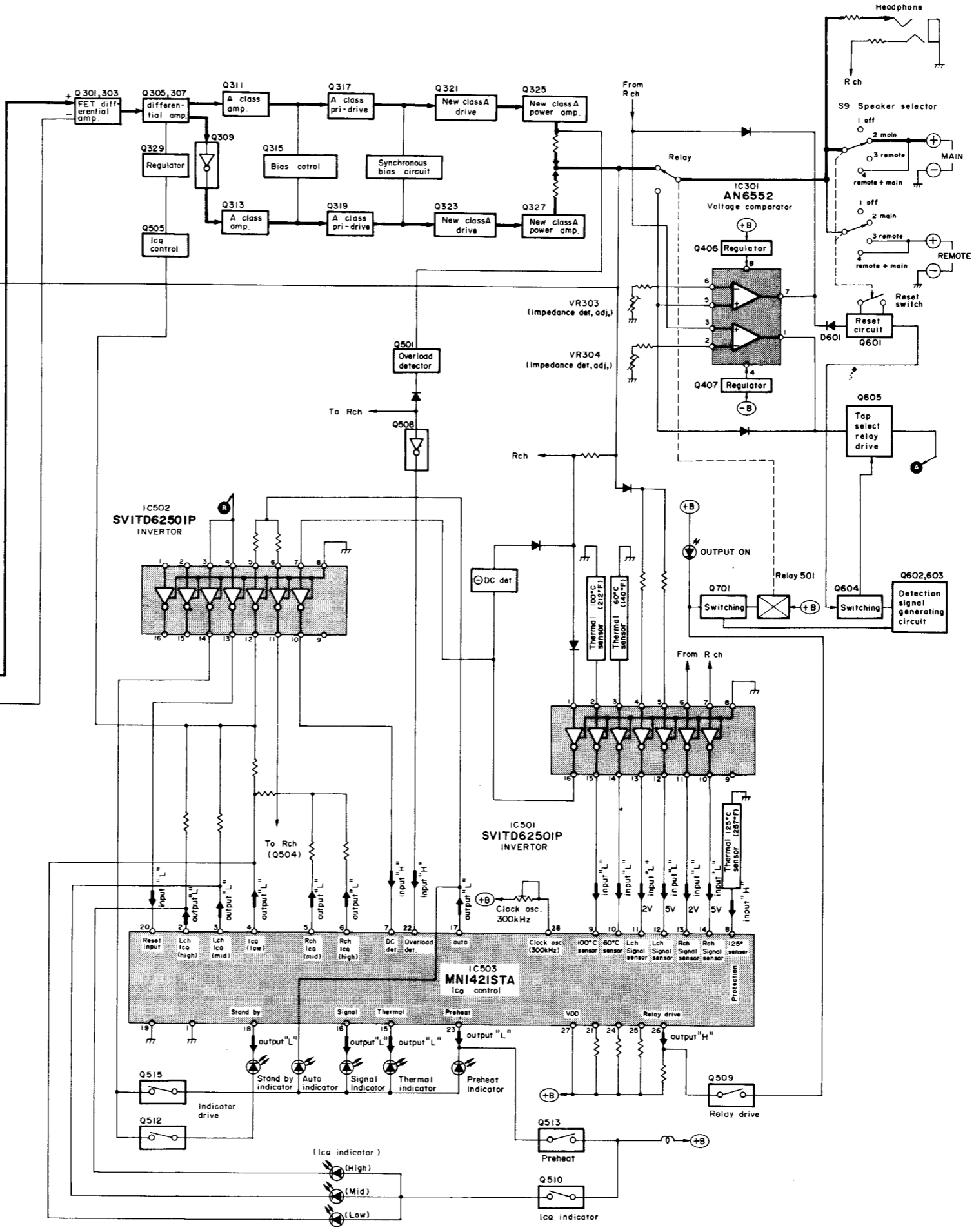


[20]

BLOCK DIAGRAM



SCHEMA



(This schematic diagram shows the development of new...)

The part No. of the component in the schematic diagram with a circled mark, the replacement part No. of the component parts, please refer to the parts list.

Notes:

- 1. S1 : Phono
- 2. S2-1 ~ S2-4 : Input selector
- 3. S3-1 ~ S3-4 : Recording mode selector

Terminal guide

SVITD62501	1
MN1421STA	2
2SK369	

SCHEMATIC DIAGRAM

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

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

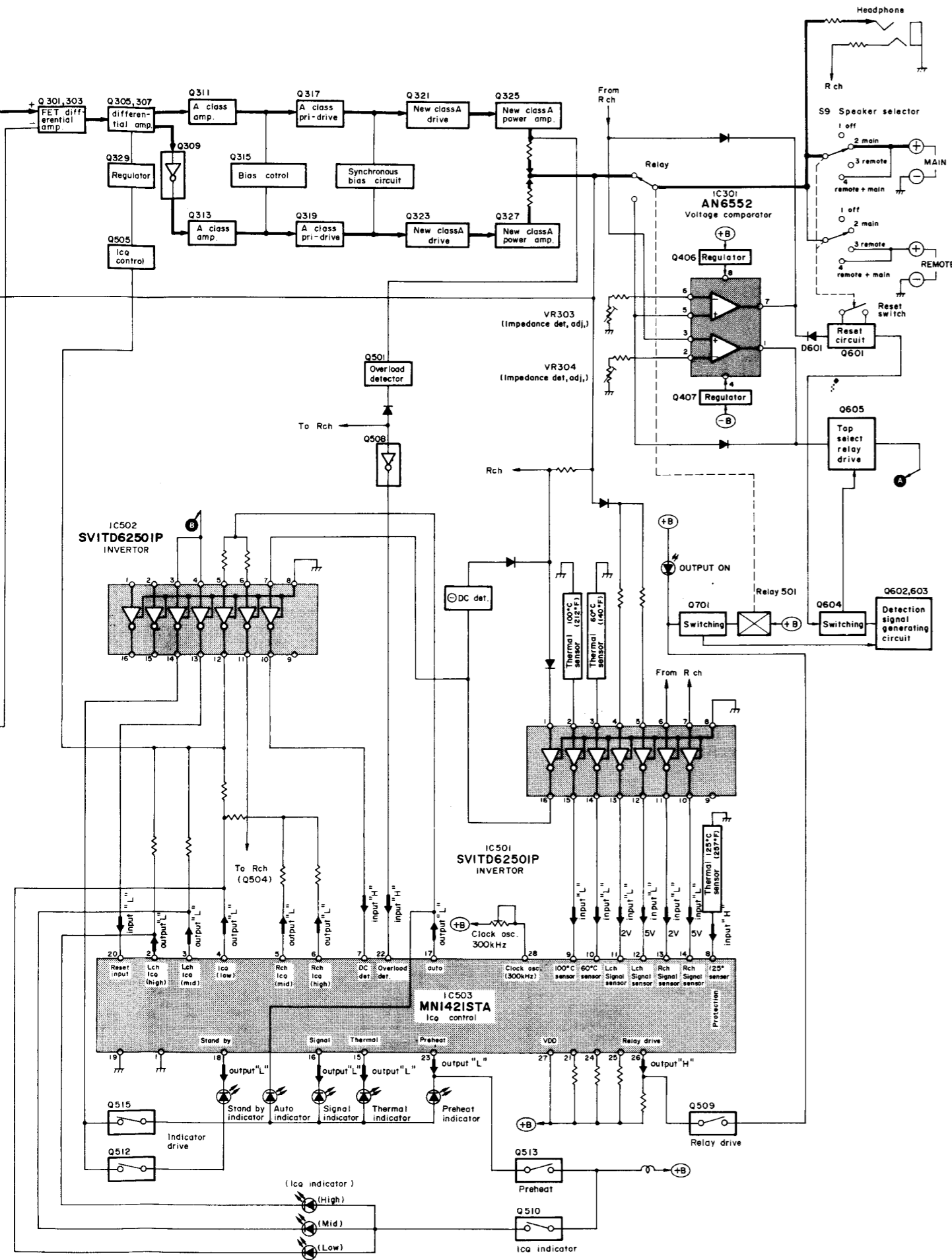
- 4. S4 : Muting switch in "off" position. (\blacksquare off, \blacktriangle on (-20dB))
- 5. S5 : Loudness switch in "off" position. (\blacksquare off, \blacktriangle on)
- 6. S6 : Subsonic filter switch in "off" position. (\blacksquare off, \blacktriangle on)
- 7. S7 : Operation switch in "straight DC" position. (\blacksquare straight DC, \blacktriangle via tone)
- 8. S8 : Power source switch in "on" position.
- 9. S9 : Speaker selector switch in "main" position. (Speakers off \leftrightarrow main \leftrightarrow remote \leftrightarrow main and remote)
- 10. S9 : Voltage selector switch in "240V" position. 120 \leftrightarrow 110V \leftrightarrow 220V \leftrightarrow 240V

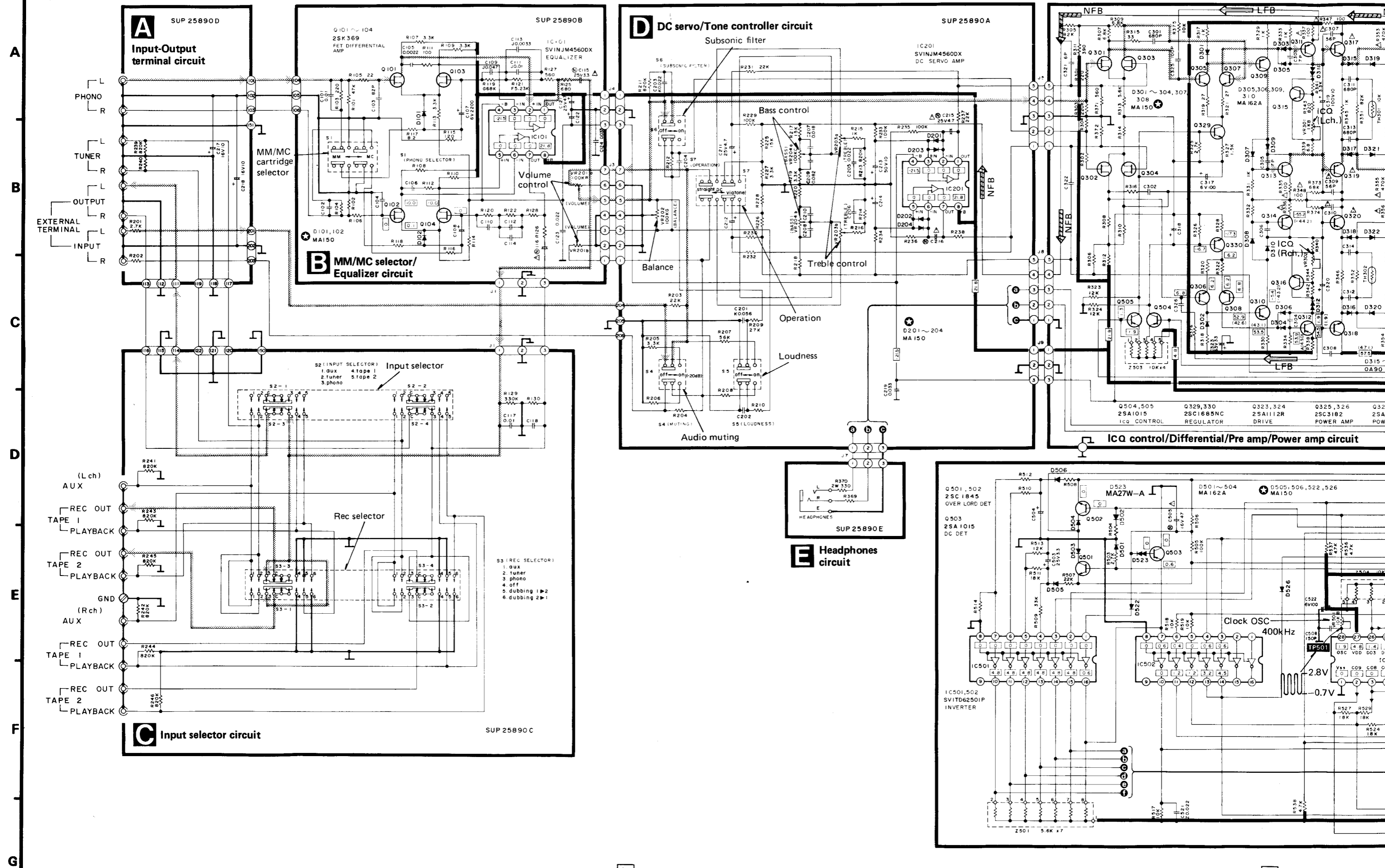
11. Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
12. \square indicated voltage values are the standard values for the DC electronic circuit tester (high impedance)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

- Notes:
- 1. S1 : Phono cartridge selector switch in "MM" position. MM \leftrightarrow MC
 - 2. S2-1 ~ S2-4 : Input selector switch in "phono" position. 1. aux \leftrightarrow 2. tuner \leftrightarrow 3. phono \leftrightarrow 4. tape 1 \leftrightarrow 5. tape 2
 - 3. S3-1 ~ S3-4 : Recording-mode selector switch in "off" position. 1. aux \leftrightarrow 2. tuner \leftrightarrow 3. phono \leftrightarrow 4. off \leftrightarrow 5. tape dubbing 1 \leftrightarrow 6. tape dubbing 2 \leftrightarrow 1

Terminal guide of transistors, diodes and IC's

SVITD62501 16pin MNI421STA 28pin	2SK1845, 2SA1124, 2SC2632, 2SC1685, 2SC2631, 2SA1123, 2SA1015, 2SC3112, 2SD788, 2SA684, 2SC1384, 2SA992	SVDMZ322A, SVDMZ306A, SVDMZ316B, SVDMZ306B, SVDMZ314B	SVDAY5533K, SVDBG5533K	LN420, LN820	
SVINJM4560DX, AN6552	2SK117, 2SK246	2SC2592, 2SA1112	2SC3182, 2SA1265	MA150, 0A90LF	SVDSR1K2
2SK369	MA27W-A	MA162A	2SD661, 2SB745, 2SB941		





A SUP 25890D
Input-Output terminal circuit

SUP 25890B
B MM/MC selector/
 Equalizer circuit

SUP 25890C
C Input selector circuit

SUP 25890A
D DC servo/Tone controller circuit

SUP 25890E
E Headphones circuit

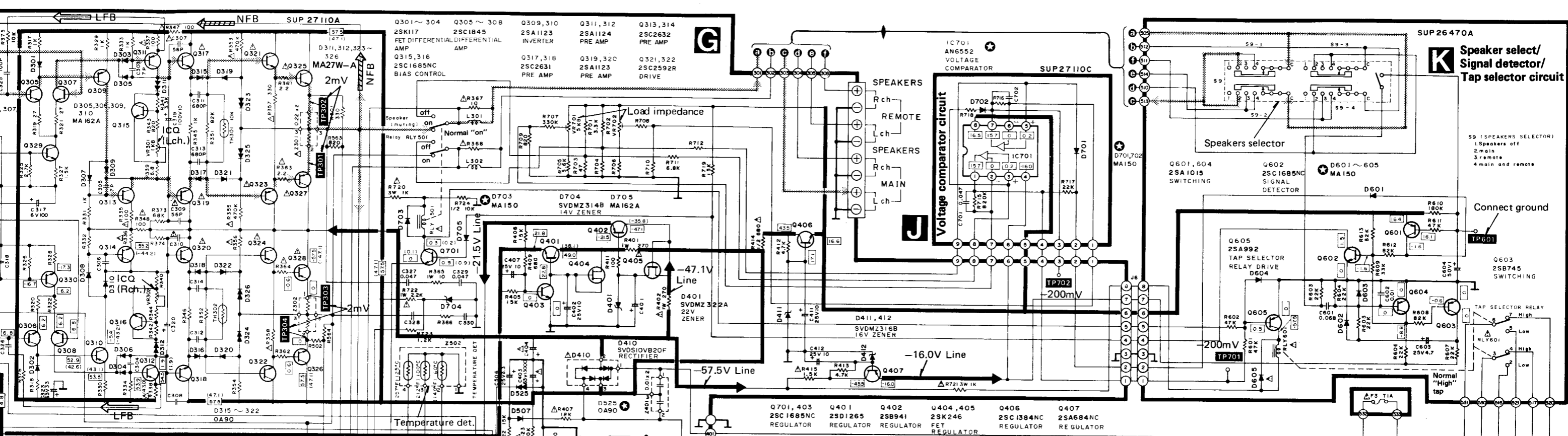
F IC control/Differential/Pre amp/Power amp circuit

C Input selector circuit

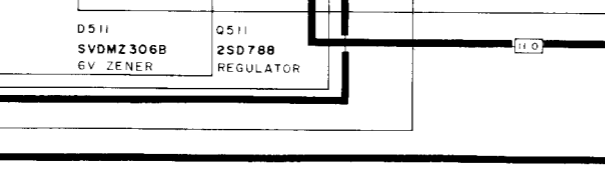
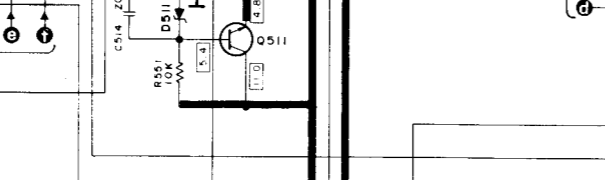
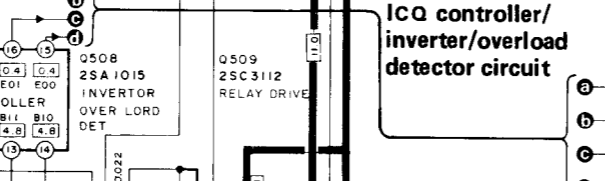
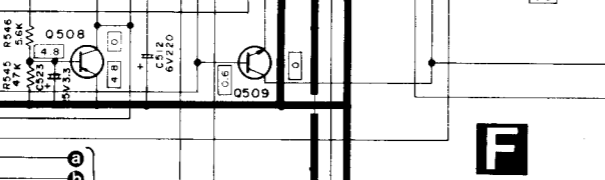
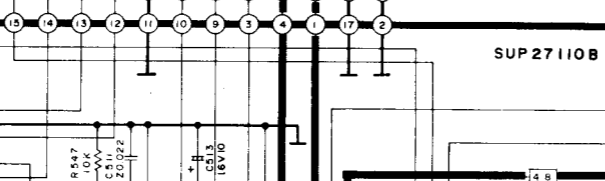
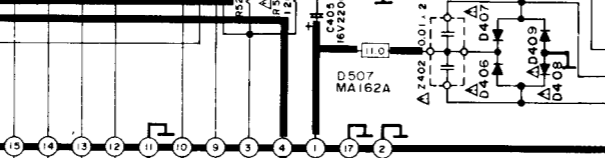
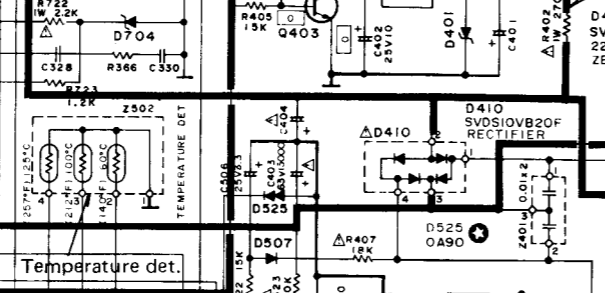
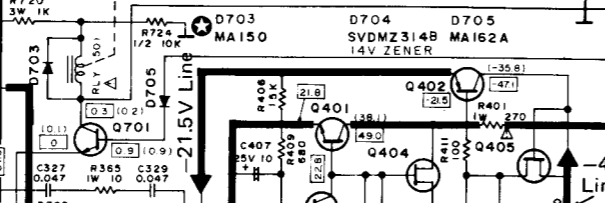
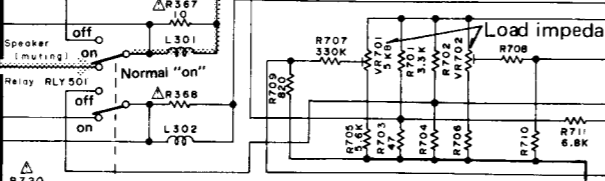
SUP 25890C

E Headphones circuit

Clock OSC 400KHz



Q301 ~ 304	Q305 ~ 308	Q309, 310	Q311, 312	Q313, 314
2SK117	2SC1845	2SA1123	2SA1124	2SC2632
FET DIFFERENTIAL	DIFFERENTIAL	INVERTER	PRE AMP	PRE AMP
AMP	AMP			
Q315, 316	Q317, 318	Q319, 320	Q321, 322	Q323, 324
2SC1685NC	2SC2631	2SA1123	2SC2592R	2SC1685NC
BIAS CONTROL	PRE AMP	PRE AMP	DRIVE	



RESISTORS & CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - Important safety notice: Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
 - The "S" mark is service standard parts and may differ from production parts.
 - The unit of resistance is Ω (ohm), K = 1000 Ω , M = 1000k Ω .
 - The unit of capacitance is μ F (microfarad), P = 10⁻⁶ μ F
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance	Capacitor Type	Voltage		Tolerance
				ECEA Type	Other	
ERD : Carbon	25 : 1/4W	J : \pm 5%	ECEA : Electrolytic	OJ : 6.3V	1H : 50V	C : \pm 0.25 μ F
ERG : Metal Oxide	1 : 1W	G : \pm 2%	ECCD : Ceramic	1A : 10V	KC : 400V AC	D : \pm 0.5 μ F
ERO : Metal Film	2 : 2W		ECKD : Ceramic	1C : 16V	2H : 500V DC	M : \pm 20%
	3 : 3W		EQCM : Polyester	1E : 25V	2A : 250V AC	J : \pm 5%
	S1 : 1/2W		ECET : Electrolytic	1H : 50V		K : \pm 10%
			ECEA.....N : Non Polar Electrolytic	1J : 63V		Z : +80%, -20%
				50 : 50V		P : +100%, -0%
				25 : 25V		
				2A : 100V		

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
RESISTORS											
R101, 102	ERD25TJ473	47K	R331, 332	ERD25FJ102	1K	R549, 550	ERD25FJ103	10K	C209, 210	ECQM1H823JZ	0.082
R103, 104	ERD25FJ221	220	R333, 334	ERD25FJ102	1K	R551	ERD25FJ103	10K	C211, 212	ECEA25Z4R7	4.7
R105, 106	ERD25FJ220	22	R335, 336	ERD25FJ101	100	R552	ERD25FJ472	4.7K	C213, 214	ECEA1HS100	10
R107, 108	ERD25FJ332	3.3K	R337, 338	ERD25FJ101	100	R556	ERD25FJ560	56	C215, 216	ECEA1EN4R7S	4.7
R109, 110	ERD25FJ332	3.3K	R339, 340	ERD25FJ6R8	6.8	R561	ERD25FJ121	120	C217, 218	ECEA1HS100	10
R111, 112	ERD25FJ101	100	R341, 342	ERD25FJ332	3.3K	R563, 564	ERD25FJ821	820	C219	ECKD1H333ZF	0.033
R113, 114	ERD25FJ332	3.3K	R343, 344	ERD25FJ821	820	R601, 602	ERD25TJ473	47K	C301, 302	ECKD1H681KB	680P
R115, 116	ERD25FJ121	120	R345, 346	ERD25FJ102	1K	R603, 604	ERD25TJ223	22K	C303, 304	ECCD2H070D	7P
R117, 118	ERD25FJ8R2	8.2	R347, 348	ERD25FJ101	100	R605, 606	ERD25TJ223	22K	C305, 306	ECCD2H070D	7P
R119, 120	ERO25CKF6802	68K	R351, 352	ERD25TJ823	82K				C307, 308	ECCD2H560K	56P
R121, 122	ERO25CKF5231	5.23K	R353, 354	ERD25TJ474	470K	R607	ERD25TJ223	22K	C309, 310	ECCD2H560K	56P
R125, 126	ERD25FJ681	680	R355, 356	ERD25TJ474	470K	R608	ERD25TJ823	82K	C311, 312	ECKD1H681KB	680P
R127, 128	ERD25FJ561	560	R357, 358	ERD25FJ331	330	R609	ERD25TJ333	33K	C313, 314	ECKD1H681KB	680P
R129, 130	ERD25TJ334	330K	R361, 362	ERD25FJ2R2	2.2	R610	ERD25TJ184	180K	C317, 318	ECEA1AS101	100
R201, 202	ERD25FJ272	2.7K	R363, 364	ERD25FJ2R2	2.2	R611	ERD25TJ473	47K	C319, 320	ECEA2AS100	10
R203, 204	ERD25TJ223	22K	R365, 366	ERD25FJ100	10	R612, 613	ERD25TJ823	82K	C321, 322	ECCD1H060CC	6P
R205, 206	ERD25FJ332	3.3K	R367, 368	ERD25FJ100	10	R701, 702	ERD25FJ332	3.3K	C323	ECEA1JS330	33
R207, 208	ERD25FJ563	56K	R369, 370	ERG2ANJ331	330	R703, 704	ERD25FJ470	47	C325, 326	ECCD1H101K	100P
R209, 210	ERD25TJ273	27K	R371, 372	ERD25FJ561	560	R705, 706	ERD25FJ562	5.6K	C327, 328	ECQM1H473JZ	0.047
R211, 212	ERD25TJ824	820K	R373, 374	ERD25TJ683	68K	R707, 708	ERD25TJ334	330K	C329, 330	ECQM1H473JZ	0.047
R213, 214	ERD25TJ824	820K	R375, 376	ERD25FJ103	10K	R709, 710	ERD25FJ821	820	C401, 402	ECEA1HS100	10
R215, 216	ERD25FJ102	1K	R401	ERDS1FJ271	270	R711, 712	ERD25FJ682	6.8K	C403, 404	ECET1JV153	15000
R217, 218	ERD25TJ153	15K	R402	ERG1ANJ271	270	R715, 716	ERD25TJ824	820K	C405	ECEA1CS222	2200
R219, 220	ERD25FJ332	3.3K	R405, 406	ERD25TJ153	15K	R717, 718	ERD25TJ223	22K	C407	ECEA1HS100	10
R225, 226	ERD25TJ153	15K	R407	ERD25TJ183	18K	R719	ERD25TJ153	15K	C411, 412	ECEA1HS100	10
R227, 228	ERD25FJ332	3.3K	R409	ERD25FJ681	680	R720, 721	ERG3ANJ102	10K	C503, 504	ECEA50Z3R3	3.3
R229, 230	ERD25TJ104	100K	R411	ERD2FCG101	100	R722	ERG1ANJ222	2.2K	C505	ECEA1CN470S	47
R231, 232	ERD25TJ223	22K	R412	ERD25FJ472	4.7K	R723	ERG1ANJ122	1.2K	C506	ECEA50Z3R3	3.3
R233, 234	ERD25TJ104	100K	R414	ERDS1FJ681	680	R724	ERDS1FJ103	10K	C508	ECCD1H151K	150P
R235, 236	ERD25TJ104	100K	R415	ERDS1FJ152	1.5K				C510	ECEA1HS100	10
R237, 238	ERD25TJ223	22K	R501, 502	ERD25FJ331	330				C511	ECKD1H223ZF	0.022
R239, 240	ERD25TJ824	820K	R503, 504	ERD25FJ272	2.7K				C512	ECEA1AS221	220
R241, 242	ERD25TJ824	820K	R505, 506	ERD25TJ104	100K				C513	ECEA1HS100	10
R243, 244	ERD25TJ824	820K	R507, 508	ERD25TJ223	22K				C514	ECKD1H223ZF	0.022
R245, 246	ERD25TJ824	820K	R509, 510	ERD25TJ333	33K				C521	ECKD1H223ZF	0.022
R301, 302	ERD25FJ221	220	R511, 512	ERD25FJ183	18K				C522	ECEA1AS101	100
R303, 304	ERD25TJ224	220K	R513, 514	ERD25FJ123	12K				C523	ECEA50Z3R3	3.3
R305, 306	ERD25TJ823	82K	R515, 518	ERD25FJ103	10K				C601	ECQM1H683JZ	0.068
R307, 308	ERD25FJ682	6.8K	R519	ERD25FJ103	10K				C602	ECKD1H103ZF	0.01
R309, 310	ERD25FJ682	6.8K	R522	ERD25TJ153	15K				C603	ECEA25Z4R7	4.7
R311, 312	ERD25FJ391	390	R523	ERD25TJ124	120K				C604	ECEA50Z1	1
R313, 314	ERD25FJ562	5.6K	R524, 525	ERD25TJ183	18K				C701, 702	ECQM1H473JZ	0.047
R315, 316	ERD25FJ330	33	R526, 527	ERD25TJ183	18K						
R317, 318	ERD25FJ102	1K	R528, 529	ERD25TJ183	18K						
R319, 320	ERD25FJ270	27	R536, 537	ERD25FJ472	4.7K						
R321, 322	ERD25FJ270	27	R538	ERD25FJ472	4.7K						
R323, 324	ERD25TJ123	12K	R540	ERD25FJ472	4.7K						
R325, 326	ERD25FJ272	2.7K	R543	ERD25FJ222	2.2K						
R327, 328	ERD25FJ152	1.5K	R545	ERD25TJ473	47K						
R329, 330	ERD25FJ102	1K	R546	ERD25FJ562	5.6K						
			R547	ERD25FJ103	10K						

REPLACEMENT PARTS LIST

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
 - 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.
 - \otimes -marked parts are used for black only, while \circ -marked parts are for silver type only.
 - Part other than \otimes - and \circ -marked are used for both black and silver type.
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
 - The "S" mark is service standard parts and may differ from production parts.
 - The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101, 201	SVINJM4560DX	Equalizer, DC Servo Amp. Inverter
IC501, 502	SVITD62501P	Inverter
IC503	MN1421STA	ICQ Controller
IC701	AN6552F	Muting.
TRANSISTORS		
Q101, 102, 103, 104	2SK369-GR	FET Differential Amp. Use in pair ranks
Q301, 302, 303, 304	2SK117-GR	FET Differential Amp. Use in pair ranks
Q305-308, 501, 502	2SC1845	Differential Amp., Over Load Det. Inverter
Q309, 310	2SA1123-R	Pre Amp. } Use in pair ranks
Q311, 312	2SA1124-R	Pre Amp. }
Q313, 314	2SC2632-R	Bias Control, Regulator, Relay Drive
Q315, 316, 329, 330, 403, 602, 701	2SC1685-Q	Pre Drive } Use in pair ranks
Q317, 318	2SC2631-R	Pre Drive }
Q319, 320	2SA1123-R	Drive } Use in pair ranks
Q321, 322	2SC2592-R	Power Amp. in Power Amp. pair ranks
Q323, 324	2SA1112-R	Regulator
Q401	2SD1265-P	Regulator
Q402	2SB941-Q	Regulator
Q404, 405	2SK246-Y	Regulator
Q406	S 2SC1384Q	Regulator
Q407	S 2SA684-QNC	Regulator
Q503, 504, 505, 508, 601, 604	2SA1015-Y	DC Det., ICQ Control, Inverter, Relay Drive, Switching, Indicator Drive
Q509, 512, 513, 515	2SC3112	Indicator Drive
Q510	2SD661-S	Regulator
Q511	2SD788-D	Regulator
Q603	2SB745-S	Muting
Q605	2SA992	Relay Drive
DIODES		
D101, 102, 201-204, 301-310, 501-507, 522, 526, 601-605, 701-703, 705, S	MA162A	Switching
D311, 312, 323-326, 523	MA27W-A	Bias
D315-322, 525	20A90	Bias
D401	SVDMZ322A	Zener, 22V
D406-409	SVDSRIK2	Rectifier
D410	SVDS10VB20F	Rectifier
D411, 412	SVDMZ316B	Zener, 16V
D511	SVDMZ306B	Zener, 6V
D513	LN420WP	L. E. D., Output (stand-by)
D514	LN820WP	L. E. D., Output (ON)
D515, 517-521	SVDAY5533K1M	New class A Indicator
D516	SVDBG5533K-1	New class A Indicator(Auto)
D704	SVDMZ314B	Zener, 14V
COILS		
L301, 302	SLQY15G-30	Choke
TRANSFORMERS		
T1	Δ SLT5P229	Power Source

Ref. No.	Part No.	Description
THERMISTERS		
TH301, 302	ERTD2ZHL103S	10k Ω
VARIABLE RESISTORS		
VR201	EWJG2A066B15	Volume, 100k Ω (B)
VR202	EWHF5AF20G15	Balance Control, 100k Ω (G)
VR203	EWCS7A020012	Treble
VR204	EWCS6A020C15	Bass, 100k Ω (C)
VR301, 302	EVNK6AA00B13	ICQ Adj., 1k Ω (B)
VR501	EVNM0AA00B14	Clock Adj., 10k Ω (B)
VR701, 702	EVNK6AA00B53	Impedance Detector, 5k Ω (B)
COMPONENT COMBINATIONS		
Z301, 302	Δ ERF3GBKR22N	0.22 Ω (X2)
Z401, 402	Δ SXRF5203Z5M	0.01 μ F(X2)
Z501	EXBP87562K	5.6k Ω (X7)
Z502	SXRP7H517F03	Temperature Det., (60°C, 100°C, 130°C)
Z503	EXBP84103J	10k Ω (X4)
Z504	EXBP84103M	10k Ω (X4)
Z505	EXBP84121M	120 Ω (X4)
RELAYS		
RLY501	SSY117	Speaker Transformer Tap
RLY601	Δ SSY109-1	Select of Secondary
LAMPS		
PL1-3	XAMR74S10	New class A, 12V, 0.055A
FUSES		
F1	Δ XBA2C50TR0	250V, T5A
F2	Δ XBA2C25TR0	250V, T2.5A
F3	Δ XBA2C10TR0	250V, T1A
SWITCHES		
S1	SSH1079	Phono Selector
S2, 3	ESA2682	Input Selector, Rec Selector
S4	SSH165-1	Muting
S		

EXPLODED VIEW

ty.
r all areas.

SU-V707(K)

Description	Quantity
Holder, L. E. D.	(1)
Cabinet (Silver)	(1)
Cabinet (Black)	(1)
Shield Plate	(1)
Bracket, P. C. B.	(1)
Shield Plate	(1)
Bracket	(1)
Rubber, Power Transformer	(2)
Bracket, Electrolytic Capacitor	(1)
Bracket, Power Transistor	(1)
Spacer, Power Transistor	(1)
Bracket	(1)
Bracket	(1)
Holder, Fuse	(6)
Insulation Plate	(1)
Terminal Board, Speaker	(1)
Socket, AC Outlet	(1)
Bushing, AC Cord	(1)
Bushing, AC Cord	(1)
Bushing, AC Cord	(1)
AC Cord	(1)
AC Cord	(1)
AC Cord	(1)
AC Cord	(1)
AC Cord	(1)
Rear Panel	(1)
Rear Panel	(1)
Rear Panel	(1)
Rear Panel	(1)
Rear Panel	(1)
Terminal Board	(1)
Short Pin	(2)
Terminal Board	(1)
Remote Control, Input Selector	(1)
Remote Control, Rec Selector	(1)
Foot	(4)
Bottom Board	(1)
Reflector Plate	(1)
Case, L. E. D.	(1)
Bracket, P. C. B. (Fuse)	(1)
Terminal	(1)
Tapping with Detent, $\varnothing 3 \times 8$	(3)
Washer Head $\varnothing 3 \times 6$	(8)
Tapping, $\varnothing 3 \times 10$	(1)
Washer Head Tapping with Detent, $\varnothing 3 \times 8$	(1)
Washer Head Tapping with Detent, $\varnothing 3 \times 10$	(1)

Ref. No.	Part No.	Description	Quantity
SCREWS			
N7	XTW3+12JFYR	Washer Head Tapping, $\varnothing 3 \times 12$	(3)
N8	S XTB4+10BFN	Tapping, $\varnothing 3 \times 10$	(4)
N9	SNE2095-2	Tapping (Silver)	(4)
N9	SNE2095-3	Tapping (Black)	(4)
N10	XTBS3+8BFYR1	Tapping with Detent, $\varnothing 3 \times 8$	(4)
N11(XL)only	S XSN3+8S	$\varnothing 3 \times 8$	(1)
WASHERS			
N15	S XWA3B	Spring, $\varnothing 3$	(9)
N16	SNE59-1	Spring	(1)
N17	S XWG3	Plain, $\varnothing 3$	(1)
N18	S XWC4B	External Toothed Look, $\varnothing 4$	(4)
N18	XWC4BFZ	External Toothed Look, $\varnothing 4$	(4)
N19(XL)only	S XWC3B	External Toothed Look, $\varnothing 3$	(2)
NUTS			
N20	SNE4021	Washer Head Nut	(7)
N21	S XNS12	$\varnothing 12$	(1)
ACCESSORIES			
A1(XA)only	Δ SJP5213-1	Plug Adapter	(1)
A2(XA)only	Δ SJP5215	Plug Adapter	(1)
A3(PA, PE) only	Δ SJP9215	Plug Adapter	(1)
A4 Other areas	SQF11703	Instruction Book	(1)
A4(XA)only	SQF11707	Instruction Book	(1)
A4(PA, PE) only	SQF11709	Instruction Book	(1)
PACKING PARTS			
P1	SPP701	Polyethylene Bag	(1)
P1	SPP689	Polyethylene Bag	(1)
P2 Other areas	SPS3023-3	Pad, Left Side	(1)
P2(EK, PA, PE)only	SPS3023-2	Pad, Left Side	(1)
P3 Other areas	SPS3025-3	Pad, Right Side	(1)
P3(EK, PA, PE)only	SPS3025-2	Pad, Right Side	(1)
P4 Other areas	SPS4061	Pad, Corner	(1)
P4(EK, PA, PE)only	SPS3633	Pad, Corner	(1)
P5	SPG4417	Carton Box	(1)
P5	SPG4421	Carton Box	(1)
P5(EF)only	SPG4419	Carton Box	(1)
P5(EK, PA, PE)only	SPG4413	Carton Box	(1)
P6(EF)only	SGK1411	Label	(2)
P6(EK)only	SGK1413	Label	(2)

Areas

- *[D] is available in Scandinavia.
- *[EW] is available in Switzerland.
- *[EK] is available in United Kingdom.
- *[XL] is available in Australia.
- *[XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- *[PA] is available in Far East PX.
- *[PE] is available in European Military.
- *[EF] is available in France.
- *[EH] is available in Holland.
- *[EB] is available in Belgium.
- *[Ei] is available in Italy.

