

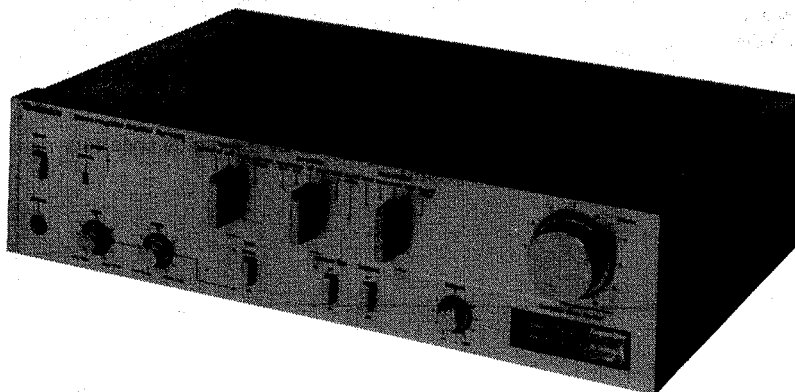
Service Manual

Stereo Integrated Amplifier

SU-V303

[E],[EK],[EF],[EB],[EH],[Ei],
[XA],[XL],[PA],[PE],[PC]

SU-V303(K)

[E],[EK],[EB],[EH],[Ei],[XA],
[PC]

Areas

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

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

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 × 45W (4Ω) 2 × 40W (8Ω)
40 Hz~16 kHz continuous power output both channels driven	2 × 45W (4Ω) 2 × 40W (8Ω)
1 kHz continuous power output both channels driven	2 × 45W (4Ω) 2 × 45W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.03% (4Ω) 0.005% (8Ω)
rated power at 40 Hz~16 kHz	0.03% (4Ω) 0.005% (8Ω)
rated power at 1 kHz	0.007% (4Ω) 0.003% (8Ω)
half power at 20 Hz~20 kHz	0.005% (8Ω)
half power at 1 kHz	0.003% (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	0.03%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.01%

Power bandwidth

both channels driven, -3 dB

5 Hz~40 kHz (4Ω, T.H.D. 0.03%)

5 Hz~50 kHz (8Ω, T.H.D. 0.02%)

Residual hum and noise

0.6 mV

Damping factor

30 (4Ω), 60 (8Ω)

Input sensitivity and impedance

PHONO 2.5 mV/47kΩ

TUNER, AUX/CD/VIDEO 150 mV/22kΩ

TAPE 1 150 mV/22kΩ

TAPE 2 150 mV/22kΩ

PHONO maximum input voltage (1 kHz, RMS) 170 mV

S/N

rated power (4Ω)

PHONO 76 dB (82 dB, IHF, A)

TUNER, AUX/CD/VIDEO, TAPE

91 dB (IHF, A: 102 dB)

-26 dB power (4Ω)

PHONO 69 dB

TUNER, AUX/CD/VIDEO, TAPE 70 dB

50 mW power (4Ω)

PHONO 65 dB

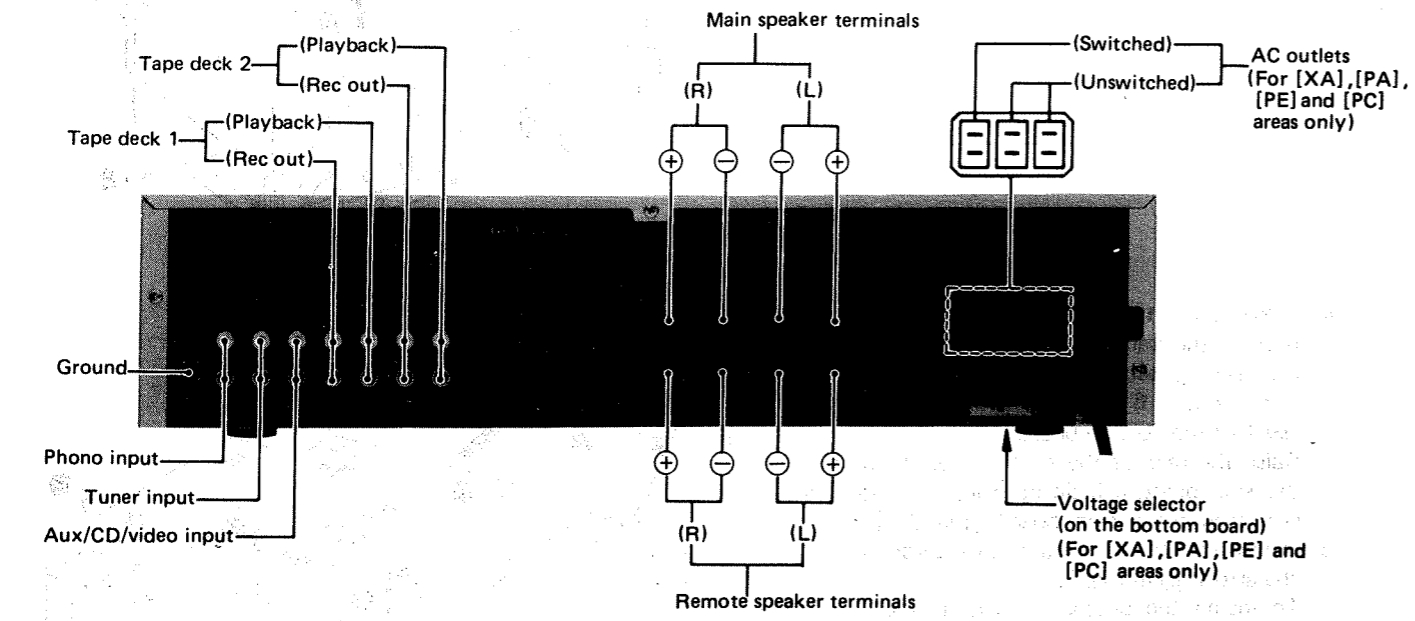
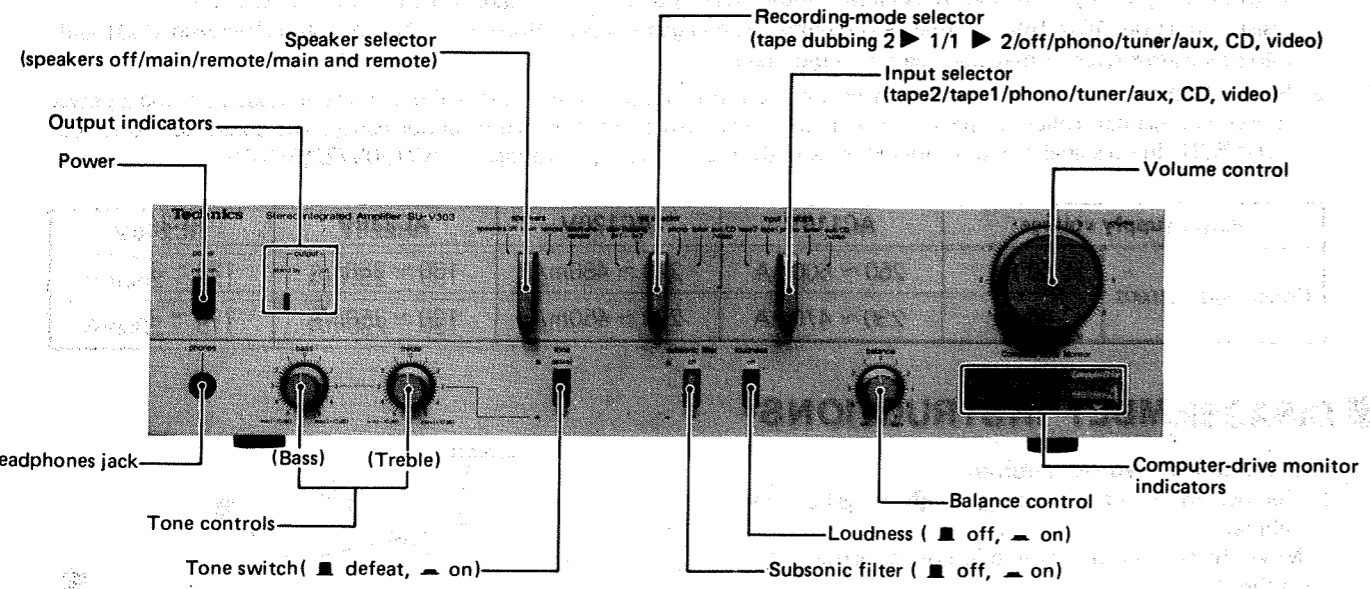
TUNER, AUX/CD/VIDEO, TAPE 65 dB

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, Central Osaka Japan

LOCATION OF CONTROLS



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
- * 220V (50/60Hz) for continental Europe. (Except for United Kingdom)
- * 240V (50/60Hz) for Australia and United Kingdom.
- * 110V/120V/220V/240V (50/60Hz) for other areas. (For other areas are provided with voltage selector)
- * 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 performance.

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

- If this occurs, follow the procedure outlined below:
1. Turn off the power.
 2. Determine the cause of the problem and correct it.
 3. Turn on the power once again

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

Frequency response	RIAA standard curve
PHONO	±0.8 dB (30 Hz~15 kHz)
TUNER, AUX/CD/VIDEO, TAPE	5 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
Output voltage and impedance	
REC OUT	150 mV
Channel balance, AUX/CD/VIDEO	250 Hz~6,300 Hz ±1 dB
Channel separation, AUX/CD/VIDEO	1 kHz 63 dB
Headphones output level and impedance	420 mV/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

GENERAL

Power consumption	340W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 109 × 290 mm
	(16-15/16" × 4-9/32" × 11-13/32")
Weight	6.7 kg
	(14.8 lb.)

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

CONTENTS

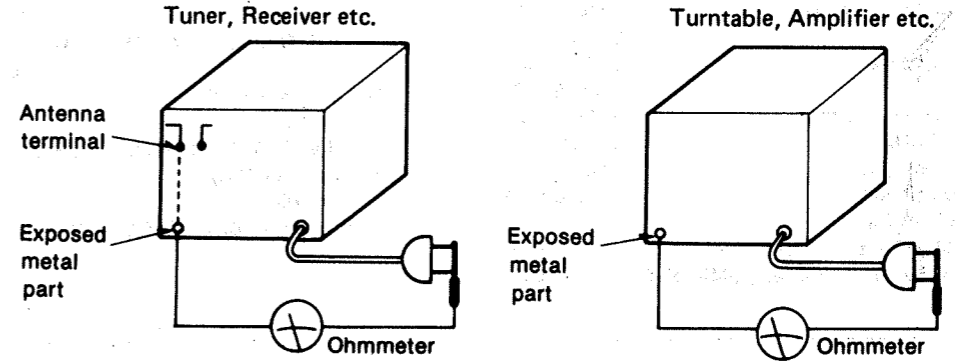
	Page	Page	
SAFETY PRECAUTION	2	PRINTED CIRCUIT BOARDS	15~18
LOCATION OF CONTROLS	3	TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S	17
PROTECTION CIRCUITRY	3	FUNCTION OF TERMINAL (ICQ CONTROLLER IC702)	18
BEFORE REPAIR AND ADJUSTMENT	4	BLOCK DIAGRAM	19, 20
DISASSEMBLY INSTRUCTIONS	4~6	SCHEMATIC DIAGRAM	21~25
MEASUREMENTS AND ADJUSTMENTS	6, 7	RESISTORS & CAPACITORS	27
TECHNICAL INFORMATION	8, 9	REPLACEMENT PARTS LIST	28
OPERATION OF ICQ CONTROLLER	10~12	EXPLODED VIEWS	29, 30
CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)	13, 14		

SAFETY PRECAUTION

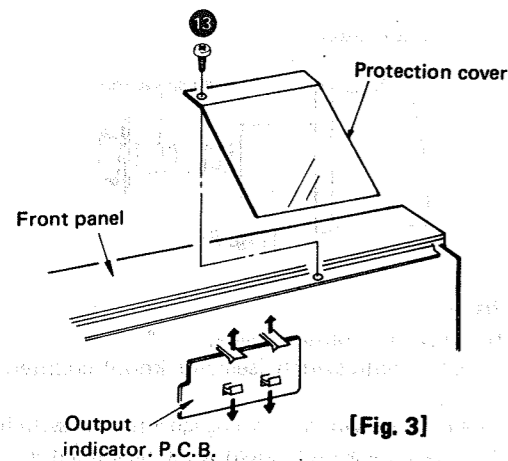
1. Before servicing (such as replacement of components), unplug the power supply cord to prevent an electric shock.
2. Use only manufacturer's recommended components for safety. Check condition of power cord and replace if wear or damage is evident.
3. After servicing, be sure to restore the following to the condition in which they were originally installed.
 - (1) the lead dress and
 - (2) insulation barriers, insulation papers, shields and the like.
4. Before returning a serviced apparatus to a customer, make the following insulation resistance test to prevent a customer from being exposed to a shock hazard.

Insulation resistance test (See figure below.)

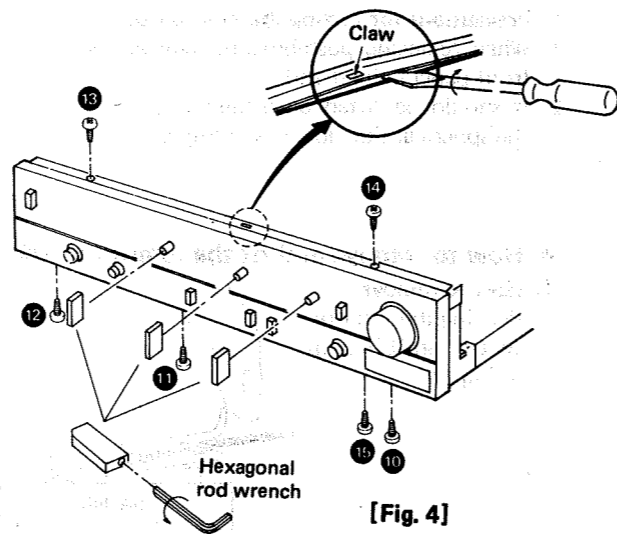
1. Unplug the power supply cord and connect a jumper wire between the two prongs on the plug.
 2. Turn on the power switch of the apparatus.
 3. Measure the resistance value (with an ohmmeter) between the jumpered AC plug and each exposed metallic cabinet part on the apparatus, such as screwheads, antenna, control shafts, handle brackets, etc.
- The reading should be as shown in figure below. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the apparatus should be repaired and rechecked before it is returned to a customer.



where, R: resistance value



[Fig. 3]



[Fig. 4]

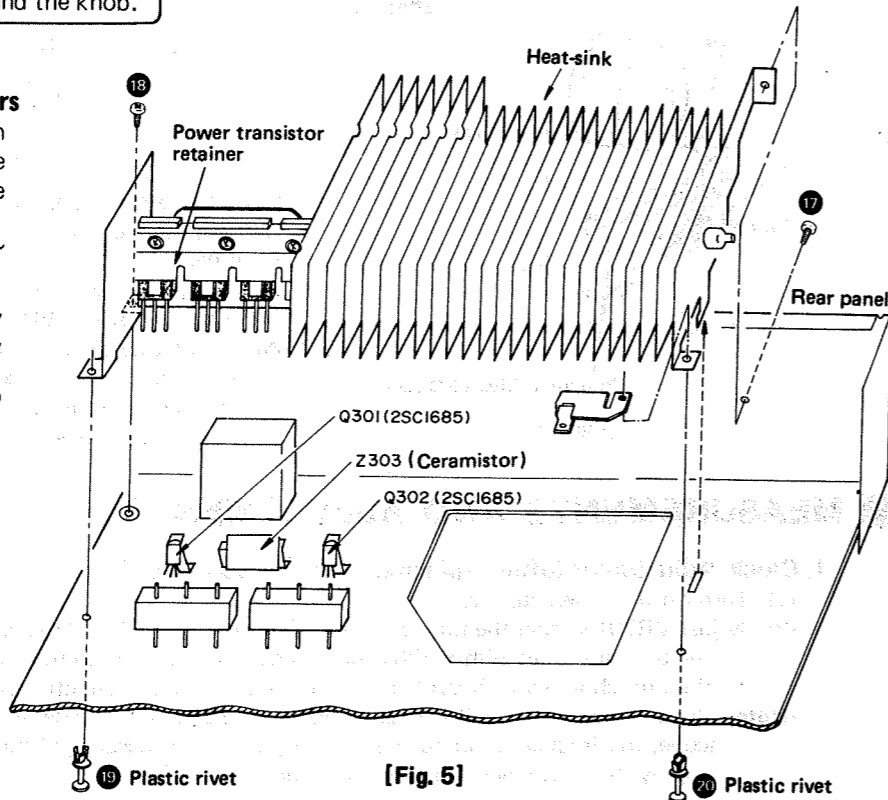
NOTE:
When fitting the selector knob, provide a clearance of about 0.7mm between the front panel and the knob.

How to remove the power transistors

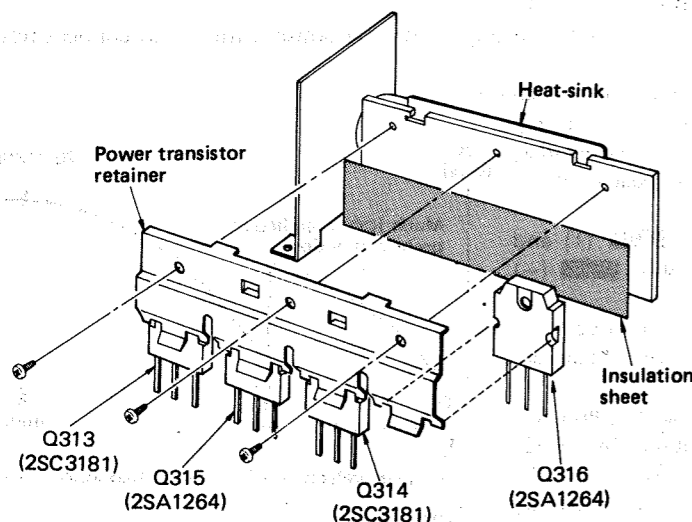
1. Remove the cabinet and the bottom board (Refer to "How to remove the cabinet" and "How to remove the bottom board").
2. Unsolder the power transistors Q313~Q316.
3. Remove the 2 setscrews [Fig. 5: 17, 18] and 2 plastic rivets [Fig. 5: 19, 20] which secure the heat-sink.
4. Remove the power transistor retainer to remove the power transistors. (See Fig. 6)

*** Precautions for Fitting the Power Transistors**

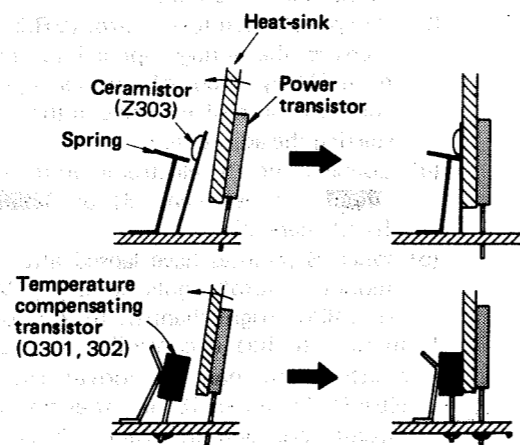
1. Do not apply a heat diffuser or the like to the insulation sheet. [Fig. 6]
 2. Make sure that the ceramistor and temperature compensating transistors are in tight contact with the heat-sink. [Fig. 7]
- * Ceramistor: Element whose change in temperature and resistance is positive (proportional).



[Fig. 5]



[Fig. 6]



[Fig. 7]

BEFORE REPAIR AND ADJUSTMENT

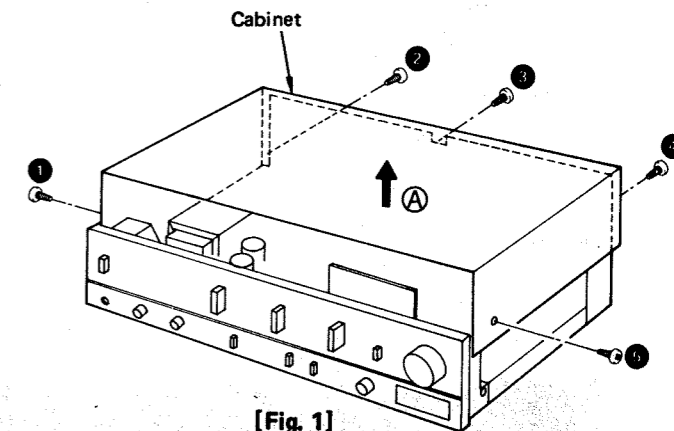
1. Turn off the power supply and short-circuit both ends of power supply capacitors (C401, C402, 6800μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Both ends of do not short between C401 and C402 by screwdriver. It may damage the component.
2. Before turning on the power 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/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Consumed current	50 Hz	250 ~ 500mA	240 ~ 480mA	130 ~ 260mA	120 ~ 250mA
	60 Hz	230 ~ 470mA	220 ~ 450mA	120 ~ 250mA	115 ~ 235mA

DISASSEMBLY INSTRUCTIONS

How to remove the cabinet

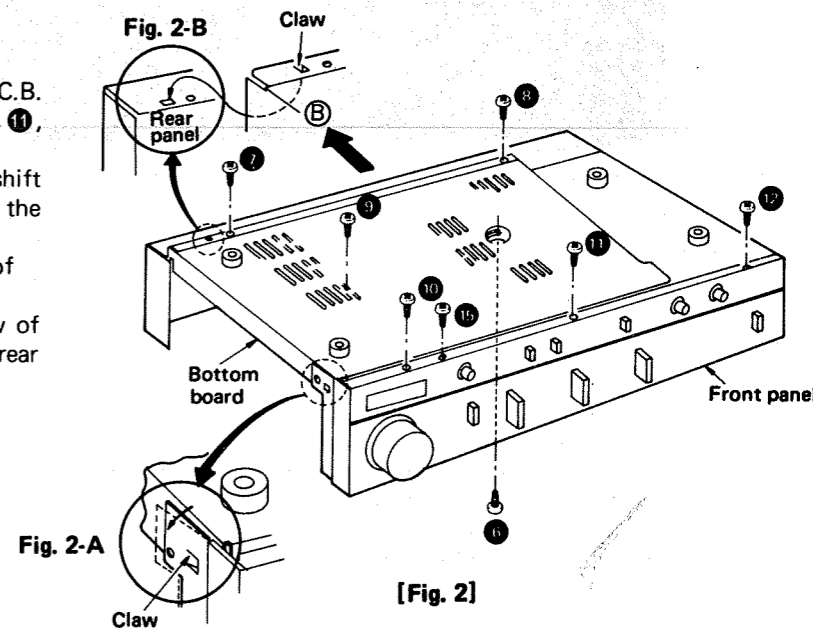
1. Remove the 5 setscrews (Fig. 1: 1 ~ 5) of the cabinet.
2. Move the cabinet in the direction of the arrow A in Fig. 1.



[Fig. 1]

How to remove the bottom board

1. Remove the cabinet.
2. Remove the setscrew [Fig. 2: 6] of the P.C.B.
3. Remove the 6 setscrews [Fig. 2: 7 ~ 11, 15] of the bottom board.
4. Raise the rear of the bottom board, and shift the side board a little outward to release the claw from the bottom board. [Fig. 2-A]
5. Remove the bottom board in the direction of the arrow B in Fig. 2.
6. To install the bottom board, fit the claw of the bottom board into the hole in the rear panel. [Fig. 2-B]



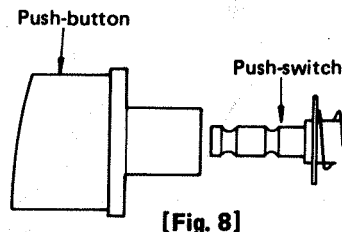
[Fig. 2]

How to remove the front panel

1. Remove the cabinet.
2. Remove the setscrew [Fig. 3: 13] on the left-hand side of the front panel, and then remove the protection cover. (Protection cover is not used in sets for [XA], [PA], [PE] and [PC].)
3. Push up the upper 2 claws which fasten the output indicator P.C.B., then remove the top of the P.C.B. Next, release the lower 2 claws and remove the P.C.B. (See Fig. 3).
4. Loosen the selector knob screw by hexagonal rod wrench (M3), and pull out the knob.
5. Remove the 5 setscrews [Fig. 4: 10 ~ 12, 14, 15] of the front panel.
6. Insert a flat-head screwdriver between the chassis and front panel as in Fig. 4, and then pry open to release the claw from the panel top.
7. Remove the front panel from the chassis.

*** Precautions for Fitting the Push-buttons**

1. When replacing push-button, remove the front panel beforehand.
2. It should be fitted onto the switch with the spherical side down as in Fig. 8.

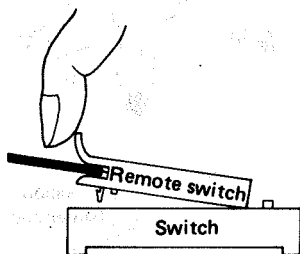


[Fig. 8]

● How to remove and fit the remote switch

1. How to remove –

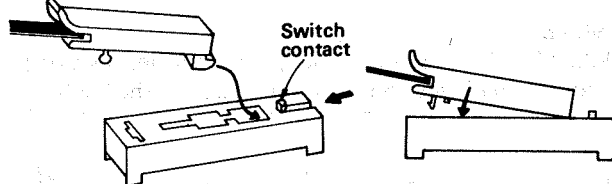
Pushing the remote switch, shift it up as in Fig. 9.



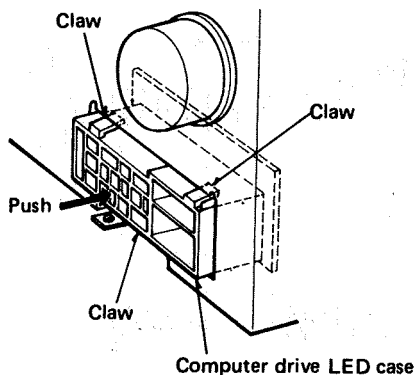
[Fig. 9]

2. How to fit –

- (1) Shift the switch contact inside.
- (2) Turn the remote switch (selector knob) counterclockwise.
- (3) Let the remote switch claw engage with the switch, and shift the remote switch down while pushing it in.



[Fig. 10]



[Fig. 11]

*** How to remove the computer drive LED case**

1. Remove the cabinet and front panel. (Refer to "How to remove the front panel.")
2. Release the 3 claws of computer drive LED case (Fig. 11) to remove the computer drive LED case.
3. When replacing the computer drive LED indicators, unsolder the LED's of D712 ~ 718 and remove them from the printed circuit board along with the computer drive LED case because the case and LED's are set up into an assembly.

MEASUREMENTS AND ADJUSTMENTS

1. Clock Adjustment (after replacing the microcomputer)

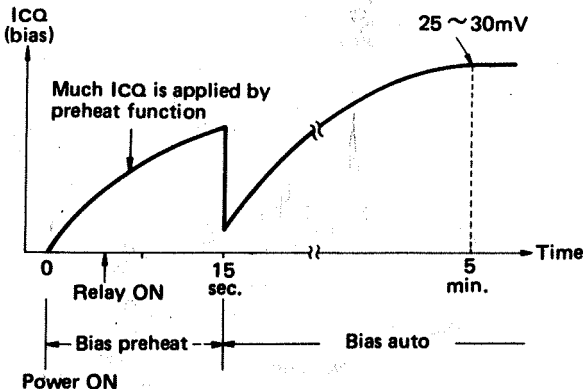
- (1) Turn off the power supply.
- (2) Adjust VR701 so that the time until the relay turns ON is 5 ~ 7 sec. after power ON.
 - * The time elongates with VR701 turned counterclockwise (in the direction of A). (Frequency decreases.)
 - * The time shortens with VR701 turned clockwise (in the direction of B). (Frequency increases.)

(Note) Clock frequency of 400 kHz is obtained at TP701. 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.

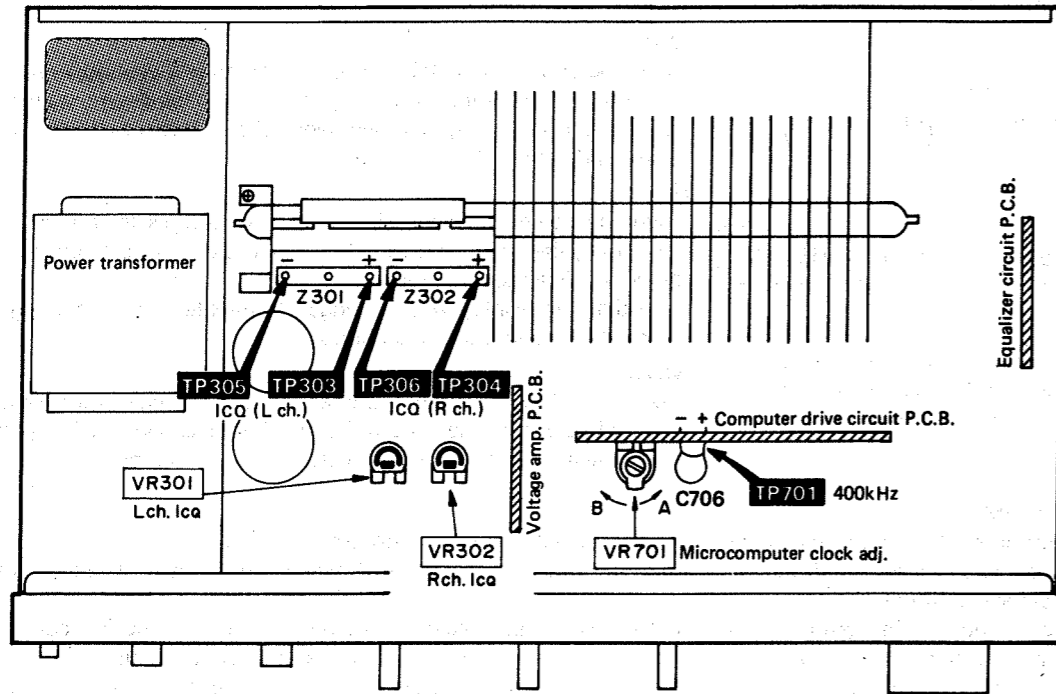
2. Idling (ICQ) Adjustment (after repairing the main amp.)

- (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 TP303 (+) and TP304 (-) [left channel] or TP303 (+) and TP306 (-) [right channel].
- (5) When 5 minutes have lapsed after computer drive monitor "auto" lights up, adjust VR301 [left channel] or VR302 [right channel] to 25~30mV.

* 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.



● 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 ~ 7 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):
 Make sure [
 - relay is off.
 - output indicator "on" goes out.
 - output indicator "stand by" blinks.
 - (3) 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.

■ TECHNICAL INFORMATION

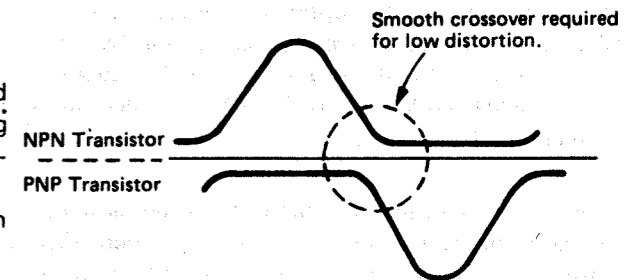
1. Description of Computer drive system

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.

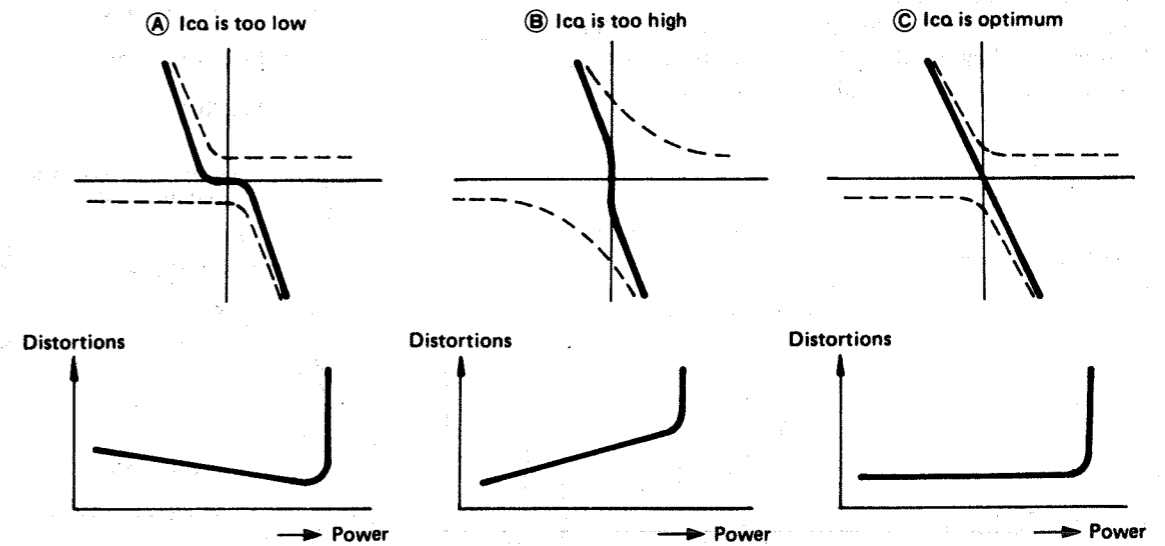
● Power transistor idling current (I_{ca})

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 I_{ca} is not adjusted properly, distortion will result as in Fig. 13.



[Fig. 12]

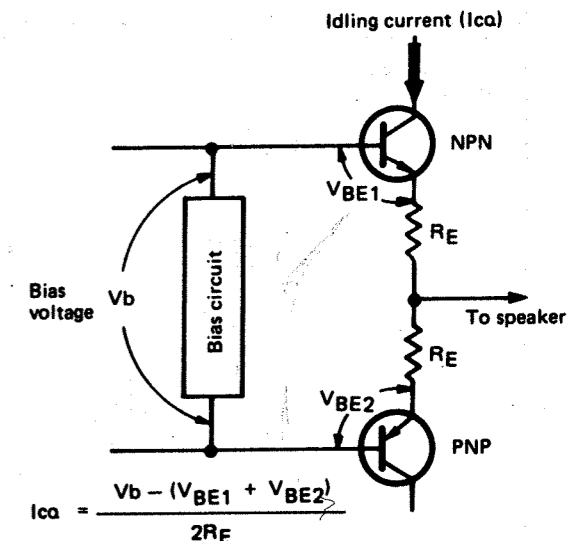


Relationship between idling current level and cross-over distortion.

[Fig. 13]

● Idling current and bias current

Idling current is determined by the bias voltage (V_b) of the bias circuit and the V_{BE} of each power transistor (Fig. 14). The V_{BE} 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.



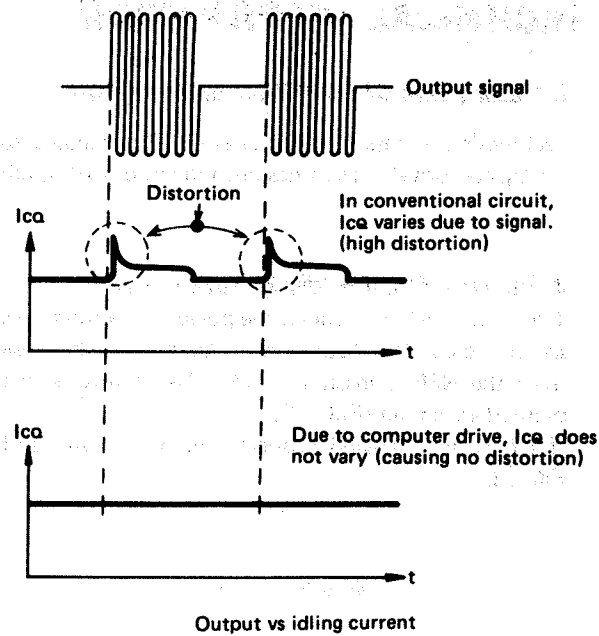
$$I_{ca} = \frac{V_b - (V_{BE1} + V_{BE2})}{2R_E}$$

[Fig. 14]

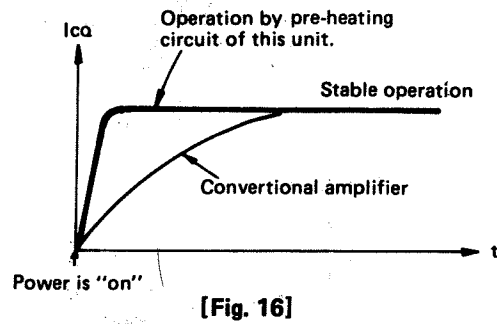
● Computer drive system

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.

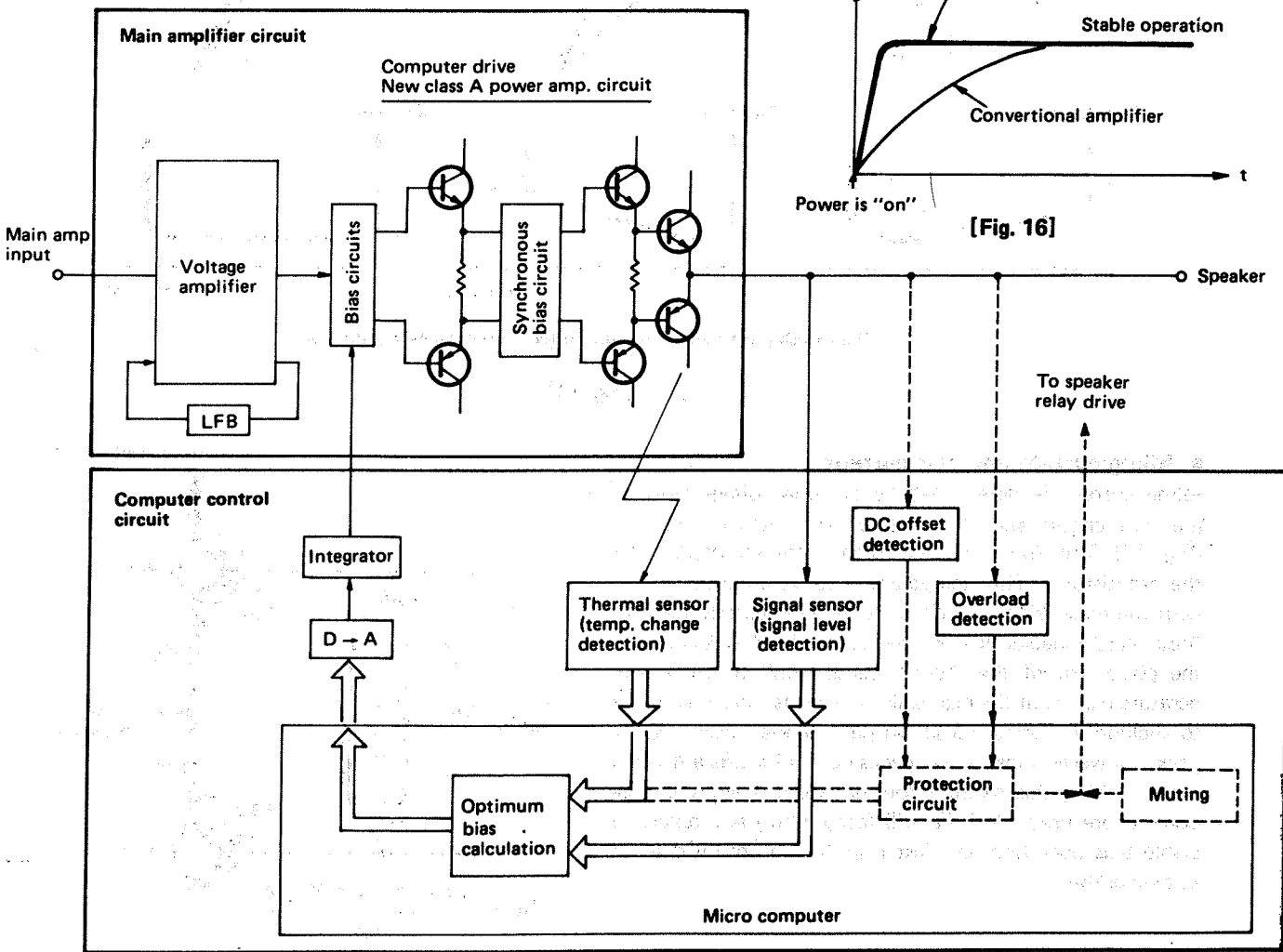
Generally, it takes several minutes for the power transistors to reach the temperature of stable operation after the power is turned on. To ensure stable and optimum performance quickly, the microcomputer forces a large amount of idling current through the power transistors for a short time. This rapidly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



[Fig. 15]



[Fig. 16]

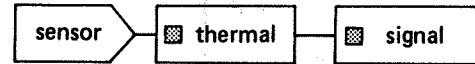


[Fig. 17]

■ 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.

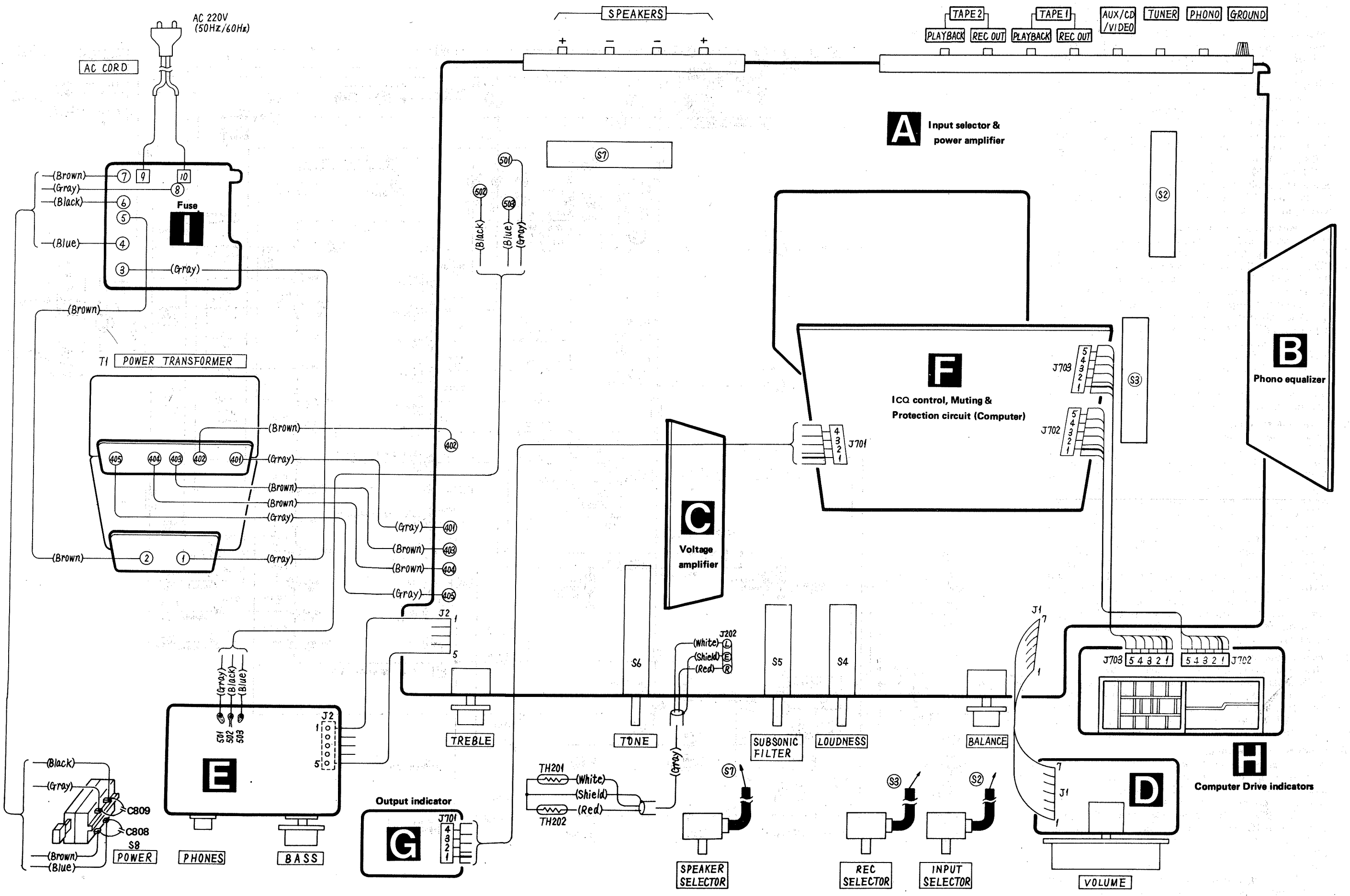
● ON-time of each indicator, and output generated at pin terminal of microcomputer (IC702)

Output port	(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
Ind. sec.	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		
0.4 sec.				H	L		L		
0.4 sec.	L	H			H		H		
0.4 sec.							L		
0.4 sec.							H		
14 sec.	H		L	L	L			Relay ON	
}						L		H	H

* 130°C (266°F) sensor is for protection of circuit. ICQ is not controlled.

[Fig. 18]

CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)

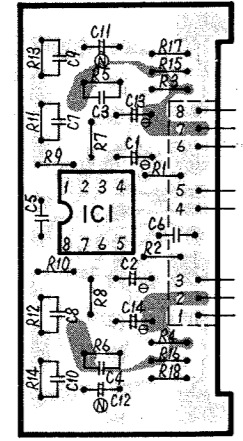
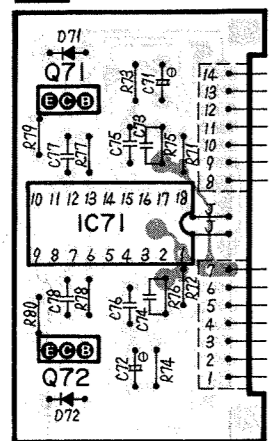


PRINTED CIRCUIT BOARDS

GROUND POINT

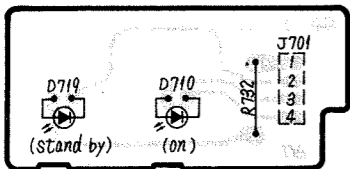
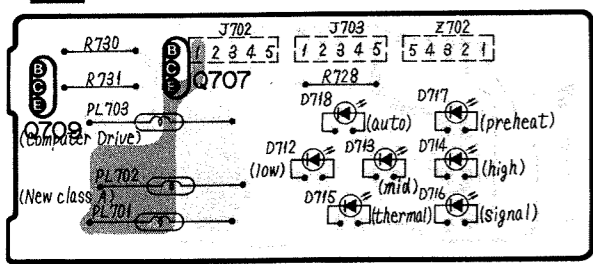
A Input selector & Power amplifier

C Voltage amplifier

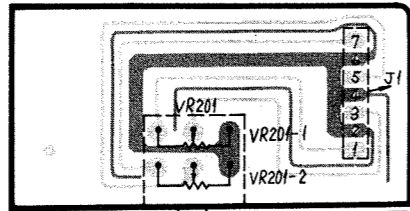
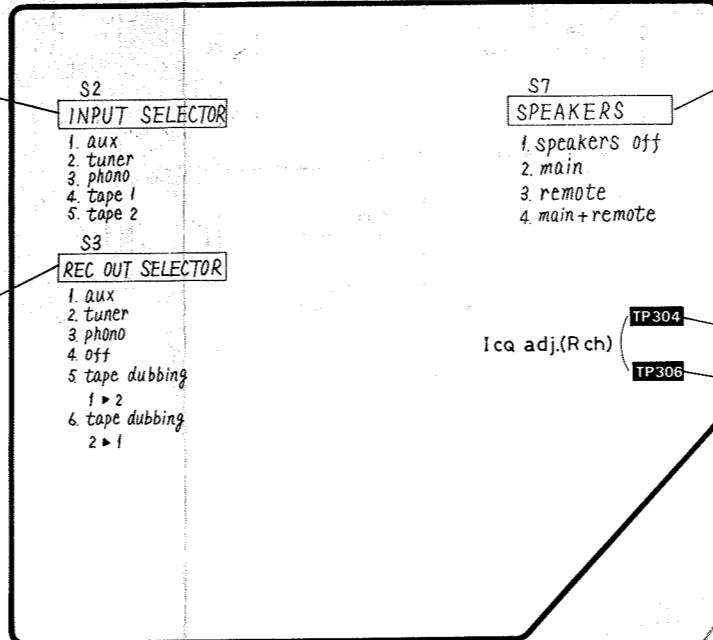
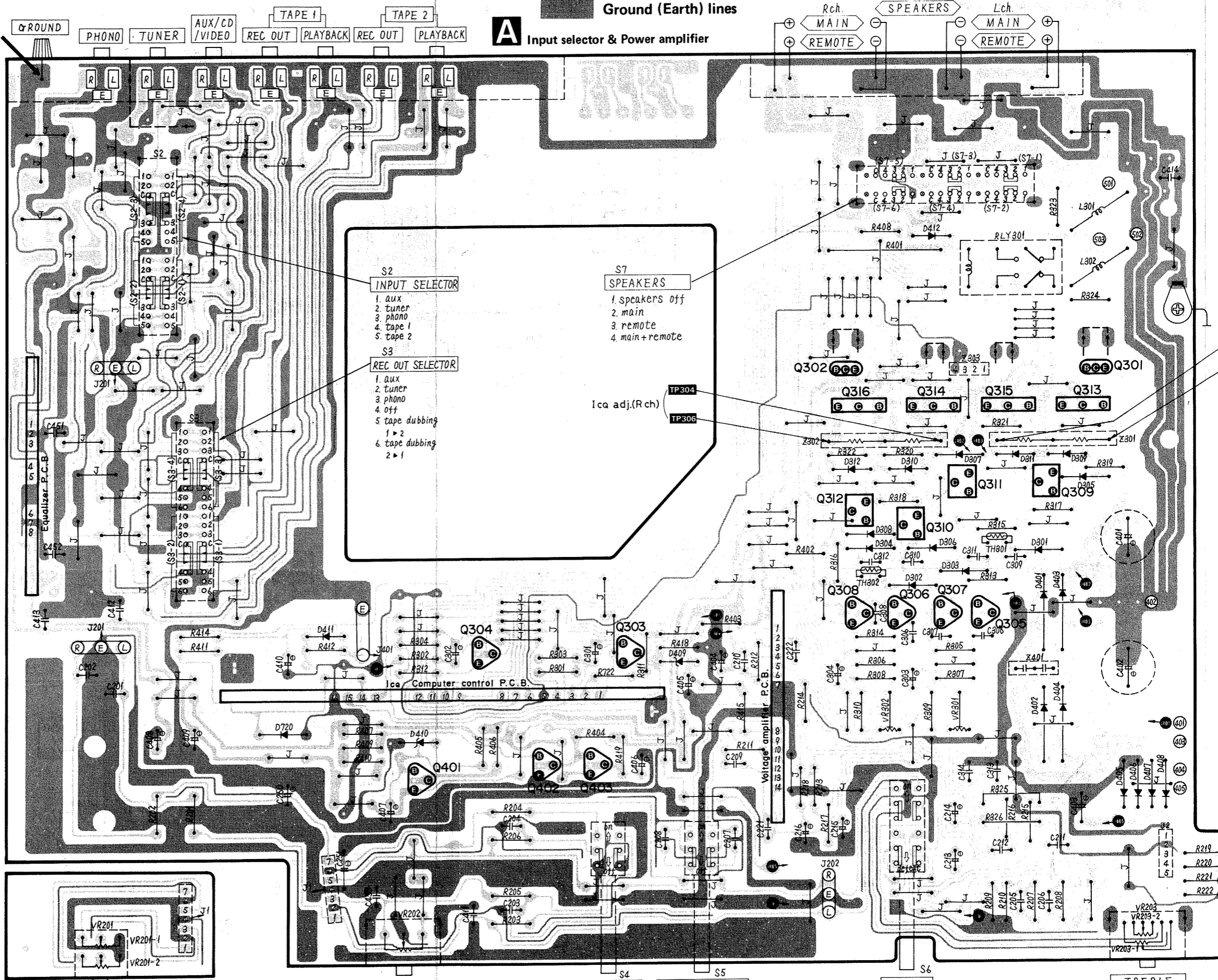


B Phono equalizer

H Computer Drive indicators



G Output indicator



VOLUME

D

BALANCE

15

LOUDNESS

16

SUBSONIC FILTER

TONE

TREBLE

Ground (Earth) lines

PHONO TUNER AUX/CD /VIDEO REC OUT PLAYBACK REC OUT PLAYBACK

TAPE 1

TAPE 2

SPEAKERS Rch. MAIN REMOTE Lch. MAIN REMOTE

S2 INPUT SELECTOR

- 1. aux
- 2. tuner
- 3. phono
- 4. off
- 5. tape 1
- 5. tape 2

S3 REC OUT SELECTOR

- 1. aux
- 2. tuner
- 3. phono
- 4. off
- 5. tape dubbing
- 1 > 2
- 2 > 1

S7 SPEAKERS

- 1. speakers off
- 2. main
- 3. remote
- 4. main+remote

TP304 TP306

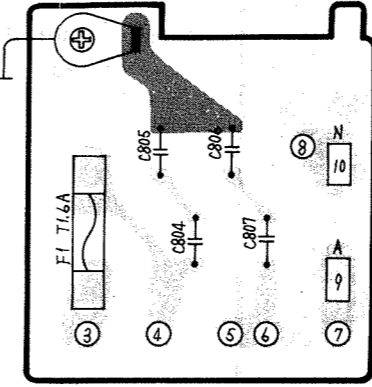
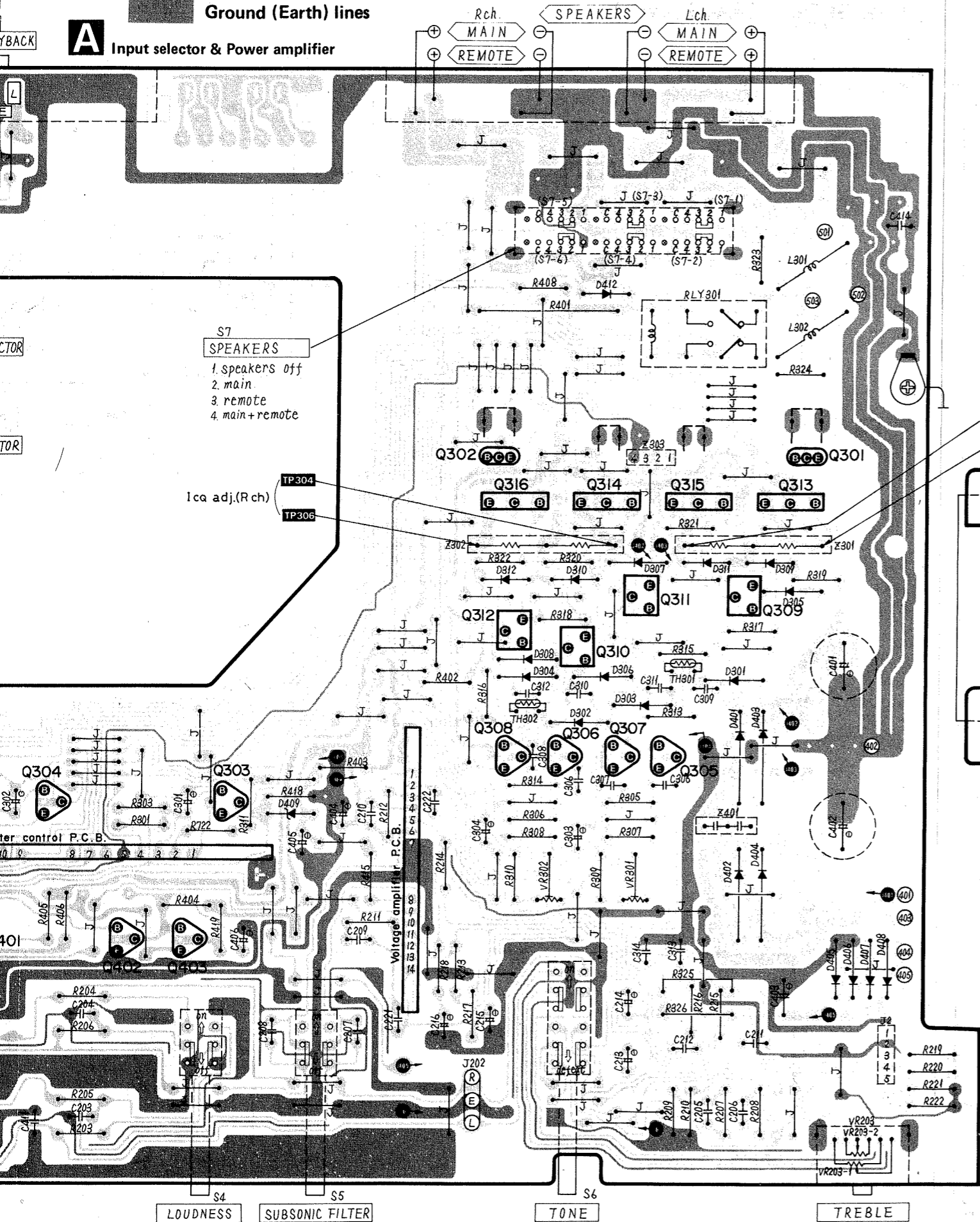
Ica adj.(Rch)

Ica Computer control P.C.B.

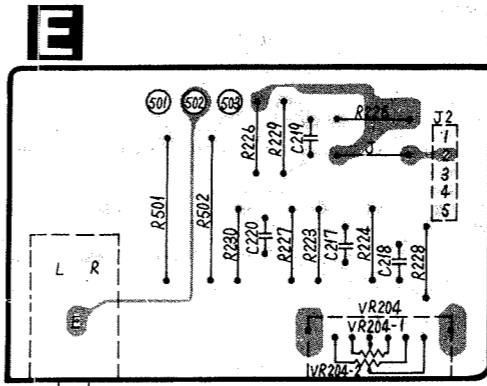
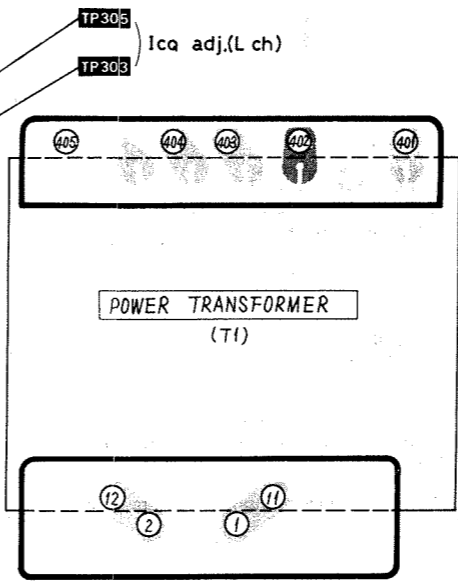
Voltage amplifier P.C.B.

Ground (Earth) lines

A Input selector & Power amplifier



I Fuse



HEADPHONES JACK

BASS

TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

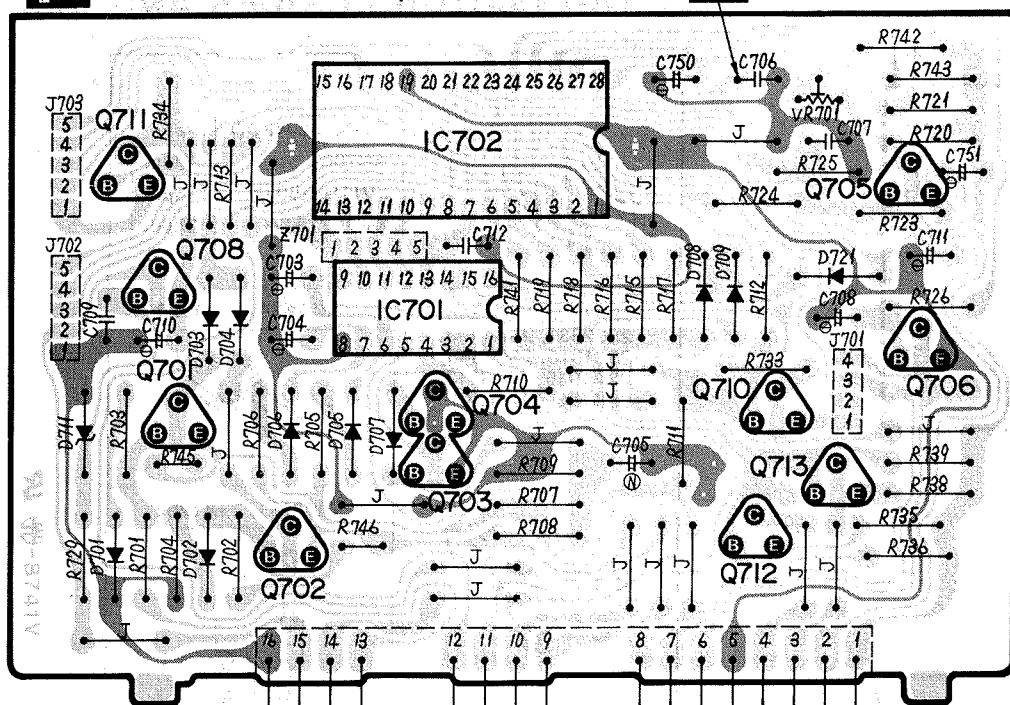
	<table border="1"> <tr><td>SVINJM2043DD</td><td>8pin</td></tr> <tr><td>AN7062</td><td>18pin</td></tr> <tr><td>SVITD62501P</td><td>16pin</td></tr> <tr><td>MN1421STA</td><td>28pin</td></tr> </table>	SVINJM2043DD	8pin	AN7062	18pin	SVITD62501P	16pin	MN1421STA	28pin
SVINJM2043DD	8pin								
AN7062	18pin								
SVITD62501P	16pin								
MN1421STA	28pin								
<p>2SA1123, 2SC1685, 2SC2631, 2SA1123, 2SC1815, 2SC1845, 2SA1015, 2SC3112, 2SD788, 2SA992</p>	<p>2SC2824, 2SA1184</p>								
	<p>2SC3181, 2SA1264</p>								
<p>2SD661</p>	<p>MA162A</p>								
<p>OA90, MA150</p>	<p>Mark</p>								
<p>SVDS3V20, SVDSR1K2</p>	<p>MA27W-A</p>								
<p>LN820WP, LN420WP</p>	<p>Red mark</p>								
<p>LN820WP, LN420WP</p>									
<p>LN820WP, LN420WP</p>	<p>SVDAY5533K1M, SVDBG5533K-1</p>								

F

ICQ control, Muting & Protection circuit (Computer)

Micro computer VCO adj.

TP701



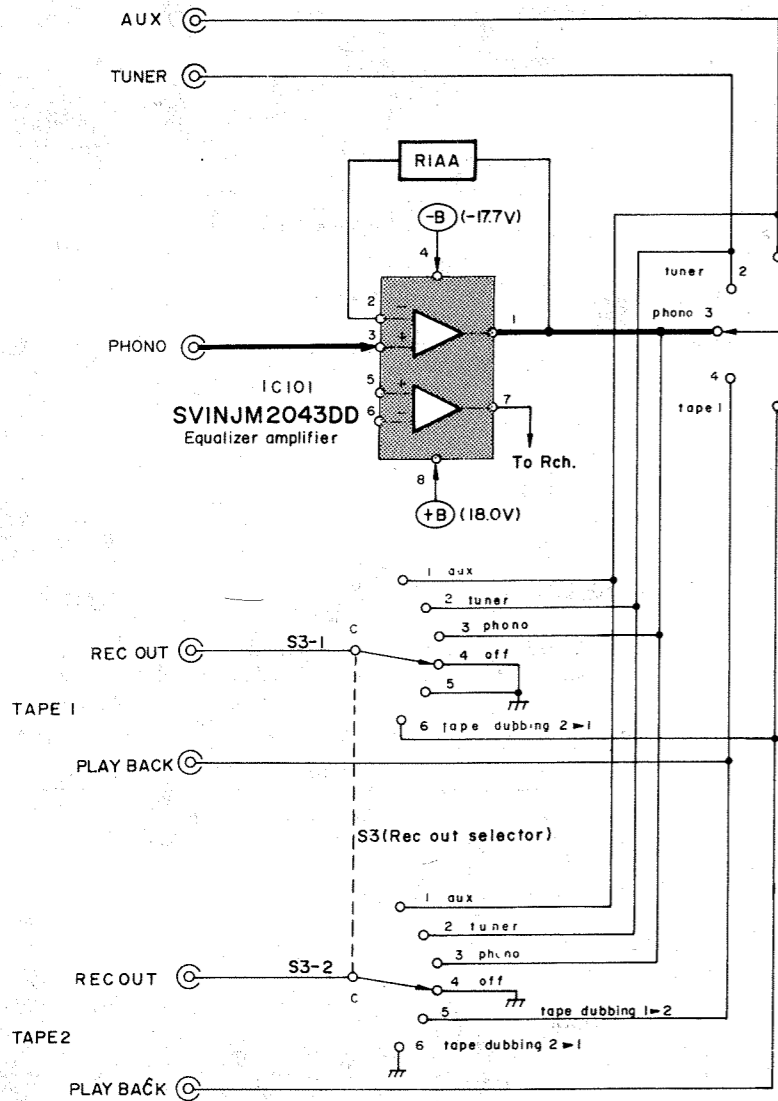
Ground (Earth) lines

FUNCTION OF TERMINAL (ICQ CONTROLLER IC702)

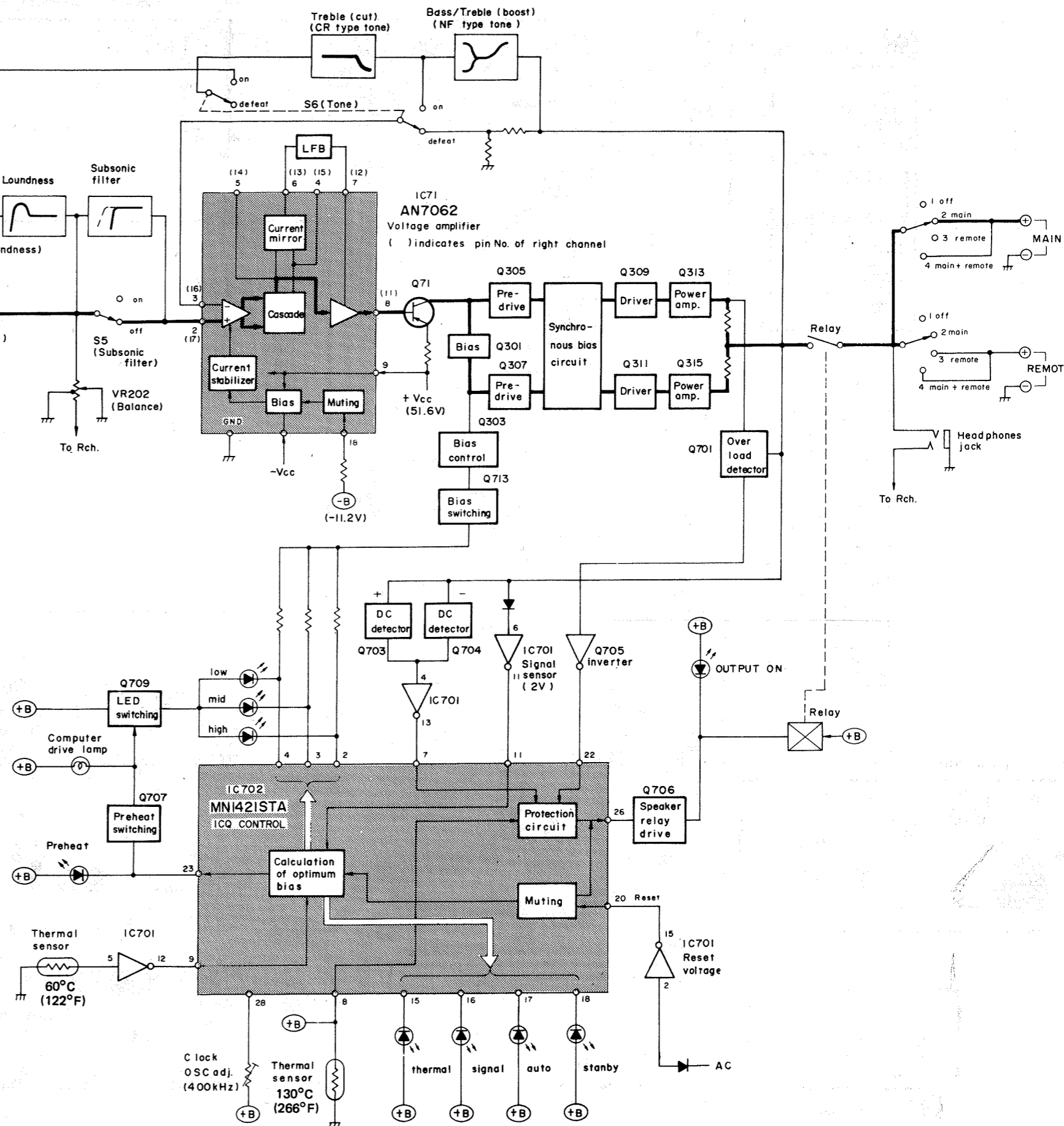
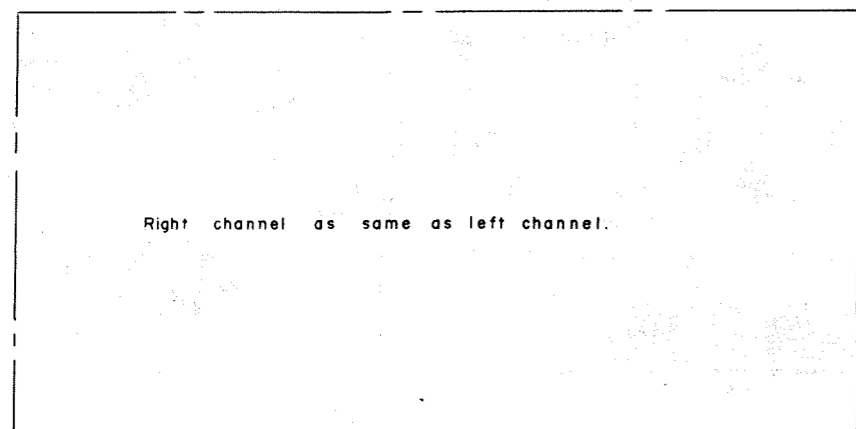
Pin No.	Mark	Name of block	Description of terminal
1	Vss	Power supply input terminal	Grounded (0V)
2	CO ₉	Output port C	It delivers Icq control signal through input port A (thermal sensor) and input port B (signal sensor). [Output "L"]
3	CO ₈		
4	CO ₇		
5	CO ₆		
6	CO ₅		
7	AI ₃	Input port A	When DC detection circuit of power amplifier operates, the input level becomes "H".
8	AI ₂		When 130°C (266°F) sensor of power amplifier operates, the input level becomes "H".
9	AI ₁		Not used in this unit
10	AI ₀	Input port B	When 60°C (122°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		Not used in this unit
13	BI ₁		Input level changes to "L" as effective output 2V signal sensor of power amplifier operates (R ch.)
14	BI ₀		Not used in this unit.
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		Not used in this unit.
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.

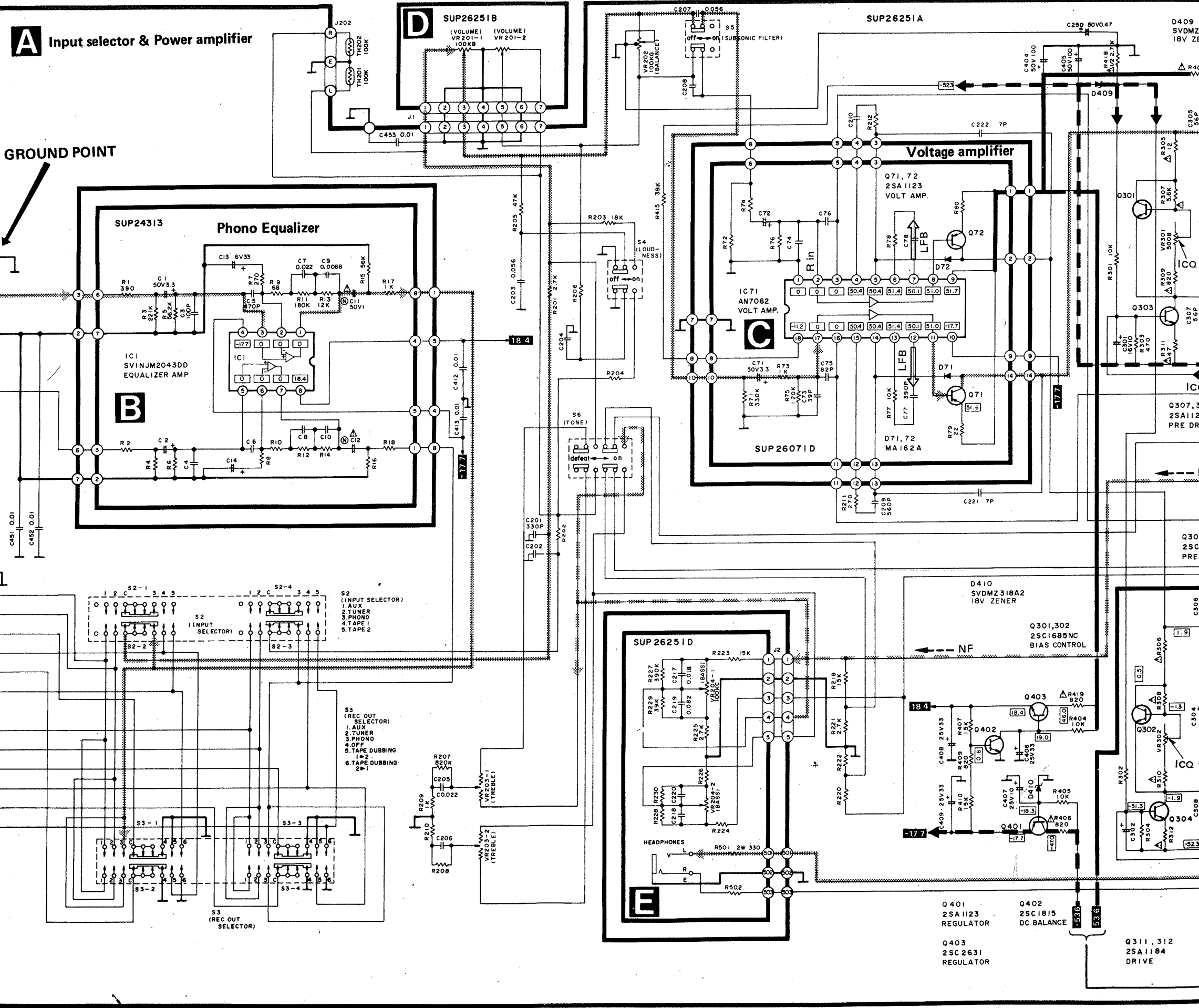
BLOCK DIAGRAM

L Channel



R Channel





A Input selector & Power amplifier

B Phono Equalizer

C Voltage amplifier

D (INPUT SELECTOR)

E HEADPHONES

F REGULATORS

GROUND POINT

(Lch) PHONO
(Rch) PHONO

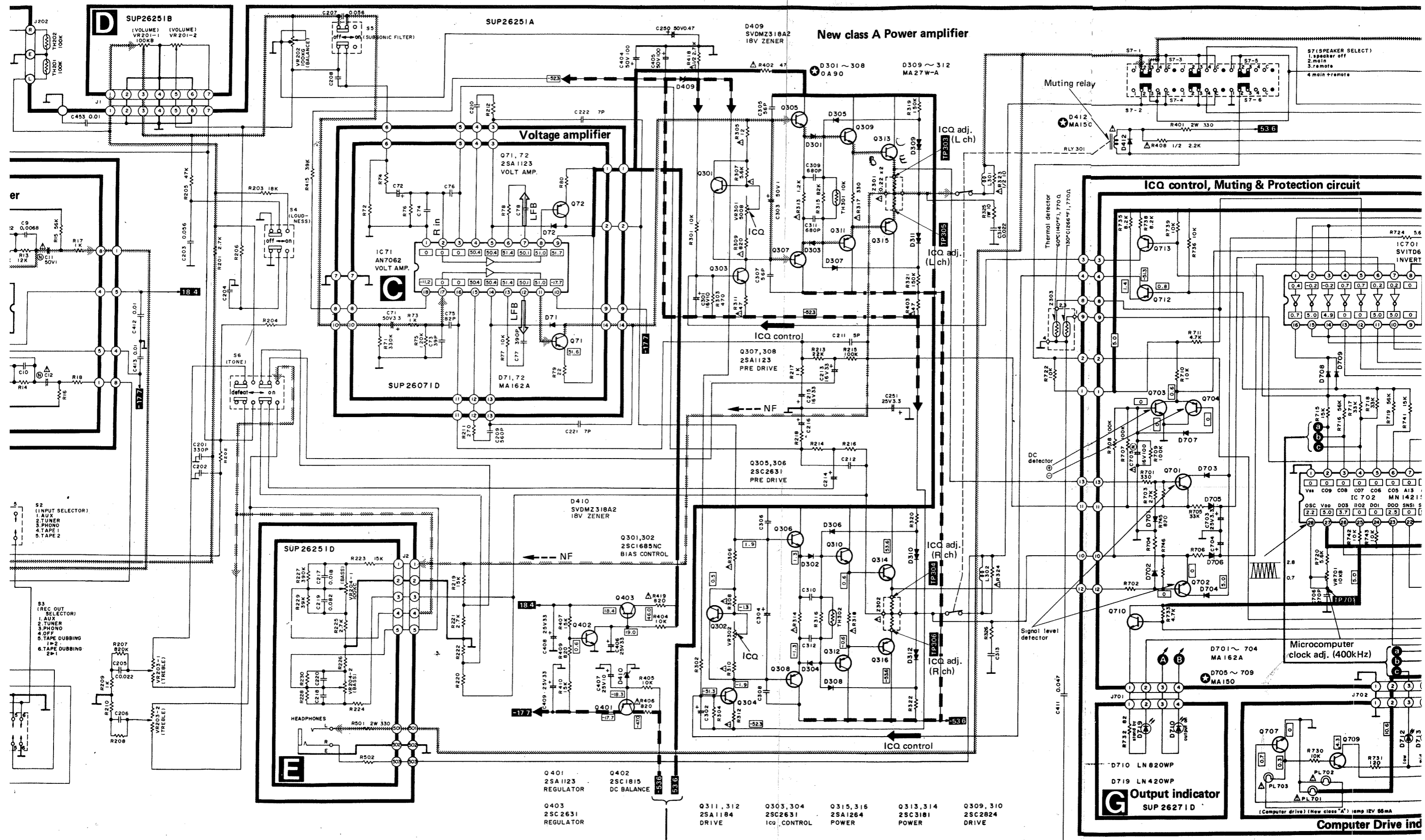
(Lch)
AUX/CD/VIDEO
TUNER
TAPE 1
REC OUT
PLAYBACK
TAPE 2
REC OUT
PLAYBACK

(Rch)
AUX/CD/VIDEO
TUNER
TAPE 1
REC OUT
PLAYBACK
TAPE 2
REC OUT
PLAYBACK

S2 (INPUT SELECTOR)
1. AUX
2. TUNER
3. PHONO
4. OFF
5. TAPE 1
6. TAPE 2

S3 (REC OUT SELECTOR)
1. AUX
2. TUNER
3. PHONO
4. OFF
5. TAPE DUBBING
1=2
6. TAPE DUBBING
2=1

Q401 2SA1123 REGULATOR
Q402 2SC1815 DC BALANCE
Q403 2SC2631 REGULATOR
Q311, 312 2SA1184 DRIVE



New class A Power amplifier

Voltage amplifier

ICQ control, Muting & Protection circuit

Output indicator

Computer Drive ind

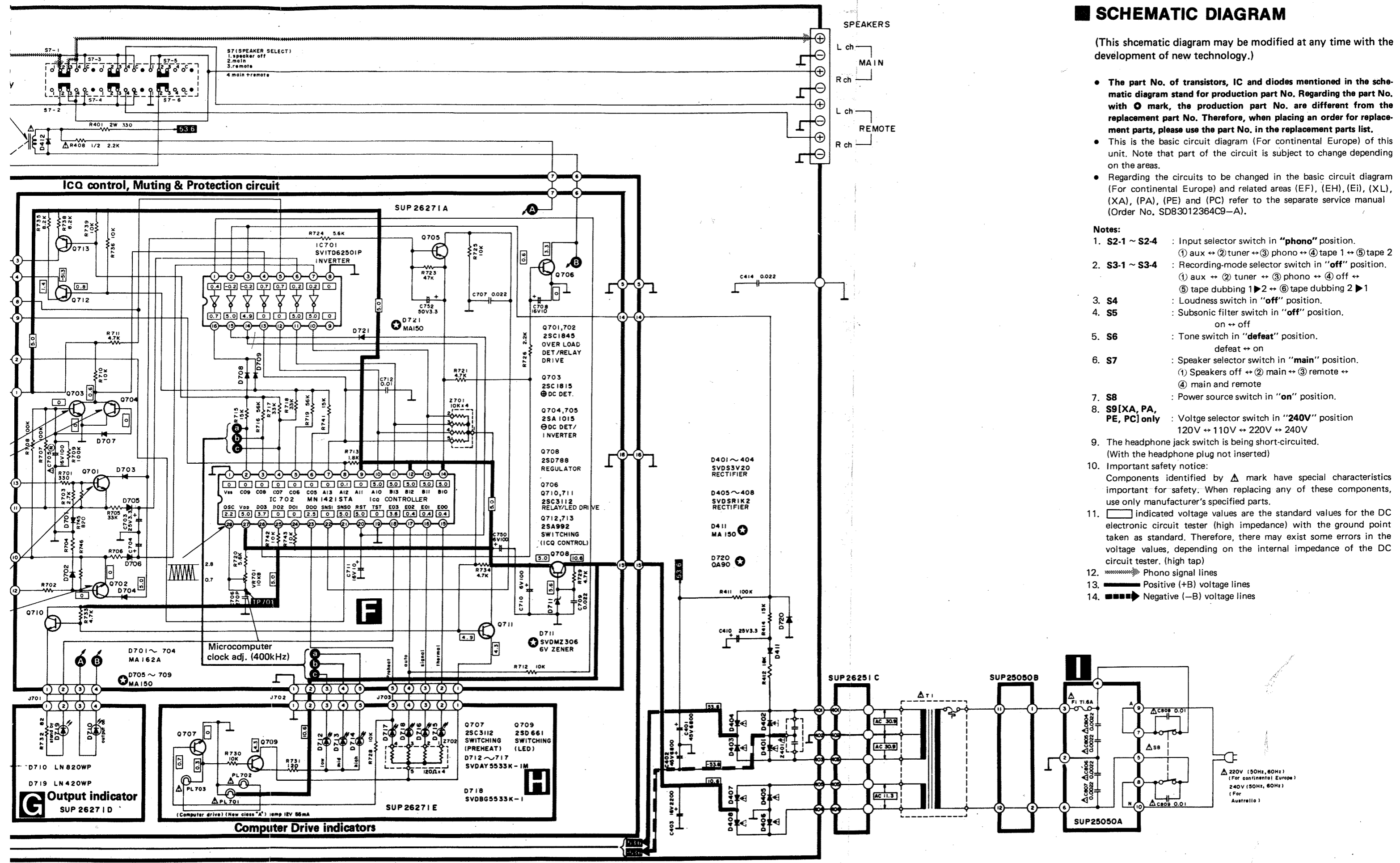
- Q 401 2SA1123 REGULATOR
- Q 402 2SC1815 DC BALANCE
- Q 403 2SC2631 REGULATOR
- Q301,302 2SC1685NC BIAS CONTROL
- Q303,304 2SC2631 ICQ CONTROL
- Q311,312 2SA1184 DRIVE
- Q313,314 2SC3181 POWER
- Q309,310 2SC2824 DRIVE

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 **⊙** 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.
- This is the basic circuit diagram (For continental Europe) of this unit. Note that part of the circuit is subject to change depending on the areas.
- Regarding the circuits to be changed in the basic circuit diagram (For continental Europe) and related areas (EF), (EH), (Ei), (XL), (XA), (PA), (PE) and (PC) refer to the separate service manual (Order No. SD83012364C9-A).

- Notes:**
- S2-1 ~ S2-4** : Input selector switch in "phono" position.
 (1) aux ↔ (2) tuner ↔ (3) phono ↔ (4) tape 1 ↔ (5) tape 2
 - S3-1 ~ S3-4** : Recording-mode selector switch in "off" position.
 (1) aux ↔ (2) tuner ↔ (3) phono ↔ (4) off ↔ (5) tape dubbing 1 ▶ 2 ↔ (6) tape dubbing 2 ▶ 1
 - S4** : Loudness switch in "off" position.
 - S5** : Subsonic filter switch in "off" position.
 on ↔ off
 - S6** : Tone switch in "defeat" position.
 defeat ↔ on
 - S7** : Speaker selector switch in "main" position.
 (1) Speakers off ↔ (2) main ↔ (3) remote ↔ (4) main and remote
 - S8** : Power source switch in "on" position.
 - S9 [XA, PA, PE, PC] only** : Voltage selector switch in "240V" position
 120V ↔ 110V ↔ 220V ↔ 240V
 - The headphone jack switch is being short-circuited.
 (With the headphone plug not inserted)
 - Important safety notice:
 Components identified by **⚠** mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
 - indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. (high tap)
 - ⋯** Phono signal lines
 - Positive (+B) voltage lines
 - Negative (-B) voltage lines



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
ERD : Carbon	10 : 1/8W	J : \pm 5%
ERG : Metal Oxide	25 : 1/4W	
	1 : 1W	
	2 : 2W	
	3 : 3W	
	S1 : 1/2W	

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	OJ : 6.3V	1H : 50V	C : \pm 0.25pF
ECCD : Ceramic	1A : 10V	1C : 16V	D : \pm 0.5pF
ECKD : Ceramic	1C : 16V	KC : 400V AC	M : \pm 20%
ECQM : Polyester	1E : 25V	1 : 100V	J : \pm 5%
ECET : Electrolytic	1H : 50V	45 : 45V DC	K : \pm 10%
ECEA..... N: Non Polar Electrolytic	1J : 63V	2H : 500V DC	Z : +80%, -20%
ECQE : Polyester	1V : 35V	2A : 250V AC	N : \pm 30%
	50 : 50V		P : +100%, -0%
	25 : 25V		

ERD10TLJ $\square\square\square$ \rightarrow Chip type carbon
 ERO10MKG $\square\square\square$ \rightarrow Chip type metal film

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
RESISTORS			R407	S ERD25TJ153	15K	CAPACITORS			C703, 704	S ECEA50Z3R3	3.3
R1, 2	ERD10TLJ391U	390	R408	Δ ERDS1FJ222	2.2K	C1, 2	S ECEA50M3R3R	3.3	C705	Δ ECEA1CN101S	100
R3, 4	ERO10MKG2213	221K	R409	S ERD25FJ821	820	C3, 4	S ECCD1H101K	100P	C706	S ECCD1H271K	270P
R5, 6	ERO10MKG5622	56.2K	R411	S ERD25TJ104	100K	C5, 6	S ECKD1H471KB	470P	C707	S ECKD1H223ZF	0.022
R7, 8	ERD10TLJ271U	270	R412	S ERD25TJ183	18K	C7, 8	S ECQM1H223JZ	0.022	C708	S ECEA1HS100	10
R9, 10	ERD10TLJ680U	68	R414	S ERD25TJ153	15K	C9, 10	S ECQM1H682JZ	0.0068	C709	S ECKD1H223ZF	0.022
R11, 12	ERD10TLJ184U	180K				C11, 12	Δ ECEA1HN010S	1	C710	S ECEA1AS101	100
R13, 14	ERD10TLJ123U	12K	R415	S ERD25TJ393	39K	C13, 14	S ECEA1CS330	33	C711	S ECEA1HS100	10
R15, 16	ERD10TLJ563U	56K	R418	Δ ERDS1FJ272	2.7K	C71, 72	S ECEA50Z3R3	3.3	C712	S ECKD1H103ZF	0.01
R17, 18	ERD10TLJ102U	1K	R419	Δ ERD2FCG821	820	C73, 74	S ECCD1H390K	39P	C750	S ECEA1AS101	100
R71, 72	ERD10TLJ334U	330K	R501, 502	S ERG2ANJ331	330	C75, 76	S ECCD1H820K	82P	C752	S ECEA50Z3R3	3.3
			R701, 702	S ERD25FJ331	330				C801, 802	Δ ECKDKC222MF	0.0022
R73, 74	ERD10TLJ102U	1K	R703, 704	S ERD25FJ272	2.7K	C201, 202	S ECKD1H331KB	330P	[XA] only		
R75, 76	ERD10TLJ124U	120K	R705, 706	S ERD25TJ333	33K	C203, 204	S ECQM1H563JZ	0.056	C803	Δ ECKDKC222MF	0.0022
R77, 78	ERD10TLJ103U	10K	R707, 708	S ERD25TJ104	100K	C205, 206	S ECQM1H223JZ	0.022	[XA] only		
R79, 80	ERD10TLJ220U	22	R709	S ERD25TJ104	100K	C207, 208	S ECQM1H563JZ	0.056	C803	Δ ECQE2A473MW	0.047
R203, 204	S ERD25TJ183	18K	R710	S ERD25FJ103	10K				[EF, EH, EI] only		
R205, 206	S ERD25TJ473	47K				C209, 210	S ECKD1H561KB	560P	C804	Δ ECKDKC222MF	0.0022
R207, 208	S ERD25TJ824	820K	R711	S ERD25FJ472	4.7K	C211, 212	S ECCD1H050CC	5P	C805, 806	Δ ECKDKC222MF	0.0022
R209, 210	S ERD25FJ102	1K	R712	S ERD25FJ103	10K	C213, 214	S ECEA1CS330	33	Except for [XA]		
R211, 212	S ERD25FJ271	270	R713	S ERD25FJ472	4.7K	C215, 216	S ECEA1CS330	33	C807 Except for [XA]	ECKDKC222MF	0.0022
R213, 214	S ERD25FJ223	22K	R715	S ERD25TJ153	15K	C217, 218	S ECQM1H183JZ	0.018	C807 Except for [XA]	ECKDKC222MF	0.0022
R215, 216	S ERD25TJ104	100K	R716	S ERD25TJ563	56K	C219, 220	S ECQM1H823JZ	0.082	C808, 809	Δ ECKDKC103PF	0.01
R217, 218	S ERD25FJ102	1K	R717, 718	S ERD25TJ333	33K	C221, 222	S ECCD2H070D	7P			
R219, 220	S ERD25TJ153	15K	R719	S ERD25TJ563	56K	C250	S ECEA50Z4R7	0.47			
R221, 222	S ERD25FJ272	2.7K	R720	S ERD25FJ562	5.6K	C251	S ECEA1ES3R3	3.3			
R223, 224	S ERD25TJ153	15K	R721	S ERD25FJ472	4.7K	C301,302	S ECEA1HS100	10			
R225, 226	S ERD25FJ272	2.7K	R722	S ERD25FJ103	10K						
R227, 228	S ERD25TJ394	390K				C303, 304	S ECEA50Z1	1			
R229, 230	S ERD25TJ393	39K	R723	S ERD25TJ563	56K	C305, 306	S ECCD1H560K	56P			
R301, 302	S ERD25FJ103	10K	R724	S ERD25FJ562	5.6K	C307, 308	S ECCD1H560K	56P			
R303, 304	S ERD25FJ471	470	R725	S ERD25FJ103	10K	C309, 310	S ECKD1H681KB	680P			
R305, 306	Δ S ERD25FJ120	12	R726	S ERD25FJ222	2.2K	C311, 312	S ECKD1H681KB	680P			
			R728	S ERD25FJ103	10K	C313, 314	S ECKD1H223ZF	0.022			
R307, 308	Δ S ERD25FJ562	5.6K	R729	S ERD25FJ472	4.7K	C401, 402	S ECETS45V682U	6800			
R309, 310	Δ S ERD25FJ821	820	R730	S ERD25FJ103	10K						
R311, 312	Δ S ERD25FJ470	47	R731	S ERD25FJ121	120	C403	S ECEA1CS222	2200			
R313, 314	Δ S ERD25FJ122	1.2K	R732	S ERD25FJ820	82	C404, 405	S ECEA1HS101	100			
R315, 316	S ERD25TJ823	82K	R733, 734	S ERD25FJ472	4.7K	C406	S ECEA1VS330	33			
R317, 318	Δ S ERD25FJ331	330				C407	S ECEA1HS100	10			
R319, 320	S ERD25TJ154	150K	R735	S ERD25FJ822	8.2K	C408, 409	S ECEA1VS330	33			
R321, 322	S ERD25TJ154	150K	R736	S ERD25FJ103	10K	C410	S ECEA50Z3R3	3.3			
R323, 324	Δ ERDS1FJ100	10	R738	S ERD25FJ822	8.2K	C411	S ECKD1H473ZF	0.047			
R325, 328	S ERG1ANJ100	10	R739	S ERD25FJ103	10K	C412, 413	S ECKD1H103ZF	0.01			
			R741	S ERD25TJ153	15K	C414	S ECKD1H223ZF	0.022			
R401	S ERG2ANJ331	330	R742, 743	S ERD25FJ103	10K	C451, 452	S ECKD1H103ZF	0.01			
R402, 403	Δ S ERD25FJ470	47	R745, 746	S ERD25FJ821	820						
R404, 405	S ERD25FJ103	10K				C453	S ECKD1H103ZF	0.01			
R406	Δ ERD2FCG821	820				C701, 702	S ECKD1H472ZF	0.0047			

REPLACEMENT PARTS LIST

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

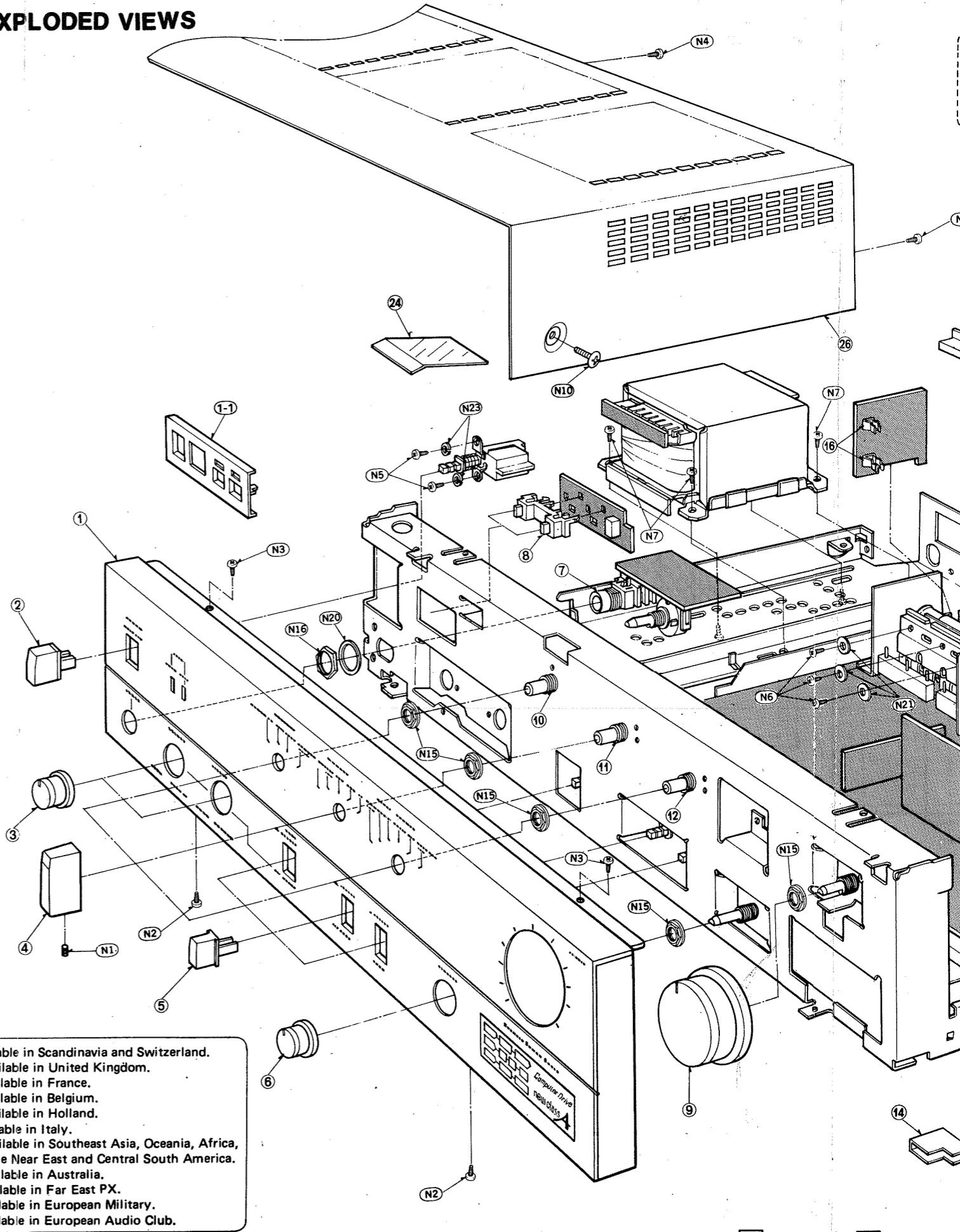
Black type model No. : SU-V303(K)

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	SVINJM2043DD	Equalizer Amplifier
IC71	AN7062	Voltage Amplifier
IC701	SVITD62501P	Inverter
IC702	MN1421STA	Micro Computer
TRANSISTORS		
Q71, 72	2SA1123-R	Voltage Amplifier
Q301, 302	2SC1685-Q	ICQ Control
Q303, 304, 403	2SC2631-R	ICQ Control, Regulator
Q305, 306	2SC2631-R	Pre Drive } Use pair ranks
Q307, 308	2SA1123-R	Pre Drive } ranks
Q309, 310	2SC2824-Y	Drive } Use pair ranks
Q311, 312	2SA1184-Y	Drive } ranks
Q313, 314	2SC3181-R	Power } Use pair ranks
Q315, 316	2SA1264-R	Amplifier } pair ranks
Q401	2SA1123-R	Regulator
Q402	2SC1815-Y	Mute Switch
Q701, 702	2SC1845	Over Load Detector, Relay Drive
Q703	2SC1815-Y	DC Detector
Q704, 705	2SA1015-Y	DC Detector
Q706, 707	2SC3112	Inverter Switching
Q710, 711	2SA788-D	Regulator
Q708	2SD661-S	Switching
Q709	2SA992	ICQ Control
Q712, 713	2SA992	ICQ Control
DIODES		
D71, 72	MA162A	Switching
D301~308	20A90	Synchro Bias
720	MA27W-A	Bias
D309~314	SVDS3V40	Rectifier
D401~404	SVDSR1K2	Rectifier
D405~408	SVDMZ318A2	18V, Zener
D409, 410	MA162A	Switching
D411, 412	RVDEQA0106S	6V, Zener
D413	MA162A	Switching
D701~709	MA162A	Switching
721	LN820WP	LED (Orange), Output ON
D710	LN820WP	LED (Orange), Output ON
D711	RVDEQA0106S	6V, Zener
D712~717	SVDAY5533K1M	LED (Yellow), Computer Drive
D718	SVDBG5533K-1	LED (Green), Computer Drive
D719	LN420WP	LED (Amber), Output stand-by
FUSES		
F1 [XA,PA,PE,PC]	XBA2C31TRO	T3.1A, 250V
F1 [other]	XBA2C16TRO	T1.6A, 250V
F2 [XA,PA,PE,PC]	XBA2C16TRO	T1.6A, 250V
COILS		
L301, 302	SLQY15G-30	Choke
TRANSFORMERS		
T1 [EK,XL]	SLT5U31	Power Source
T1 [XA,PC]	SLT5U33	Power Source
T1 [other]	SLT5U29	Power Source
THERMISTORS		
TH201, 202	RRT104	100k Ω
TH301, 302	ERTD2ZHL103S	10k Ω

Ref. No.	Part No.	Description
LAMP		
PL701~703	XAMR74S10	12V, 0.055A
RELAY		
RLY301	SSY105	Speaker Output
VARIABLE RESISTORS		
VR201	EWJG2A066B15	Main, 100k Ω (B)
VR202	EWHFNAF20G15	Balance, 100k Ω (G)
VR203	EWCS7AF20012	Treble
VR204	EWCS6A020C15	Bass, 100k Ω (C)
VR301, 302	EVNKGAA00B52	ICQ Adjustment, 500 Ω (B)
VR701	EVNMOAA00B14	Clock 10k Ω (B)
SWITCHES		
S2, 3	ESA2682	Input, Rec Out, Selector
S4, 5	SSH2049	Subsonic, Loudness
S6	SSH1045	Tone
S7	ESA2718	Speaker
S8	ESB90227S	Power Source
S9 [XA,PA,PE,PC]	ESE37219	Voltage Selector
COMPONENT COMBINATION		
Z301, 302	ERF3GBKR22N	3W, 0.22 Ω (x2)
Z303	SXRPTH517F02	Thermal Detector
Z401	SXRFS203ZSM	0.01 μ F (x2)
Z701	EXBP84103M	10k Ω (x4)
Z702	EXBP84121M	120 Ω (x4)
CABINET and CHASSIS PARTS		
1 [PA,PE]	SYW629	Panel, Front Ass'y (1)
1 [other]	SYW627	Panel, Front Ass'y (1)
1	SYW631	Panel, Front Ass'y (1)
1-1	SGX7435	Holder (1)
2	SBC337-1	Button, Power (1)
3	SBN1153	Knob, Bass, Treble (2)
4	SBN1151	Knob, Speaker, Rec, Input (3)
5	SBC339	Button, Tone, Subsonic, Loudness (3)
6	SBN1153	Knob, Balance (1)
7	SJJ71B	Jack, Headphone (1)
8	SMP303	Holder, Output LED (1)
9	SBN1149	Knob, Volume (1)
10	ESA33273B	Switch, Speaker (1)
11	ESA335012B	Switch, Rec. Selector (1)
12	ESA335013B	Switch, input (1)
13	SMP335-1	Holder, New Class A Indicator (1)
14	SDH545	Reflector Plate (1)
15	SHR401-1	Pin (4)
16	SJT347	Terminal, Fuse (2)
17	SKU9950-4	Bottom Board (1)
18	SKL249	Foot (4)
19	SJF4815-2	Terminal, Speaker (1)
20	SJF3051-3N	Terminal, Input (1)
21 [XA,PC]	SGP3590-2B	Panel, Rear (1)
21 [XL]	SGP3590-3B	Panel, Rear (1)
21 [EK]	SGP3590-1F	Panel, Rear (1)
21 [other]	SGP3590-1D	Panel, Rear (1)
22 [EK]	QFC1205M	Cord, Power Source (1)
22 [XA,PC]	SJA111	Cord, power Source (1)
22 [XL]	QFC1207MA	Cord, Power Source (1)
22 [other]	SJA88	Cord, Power Source (1)

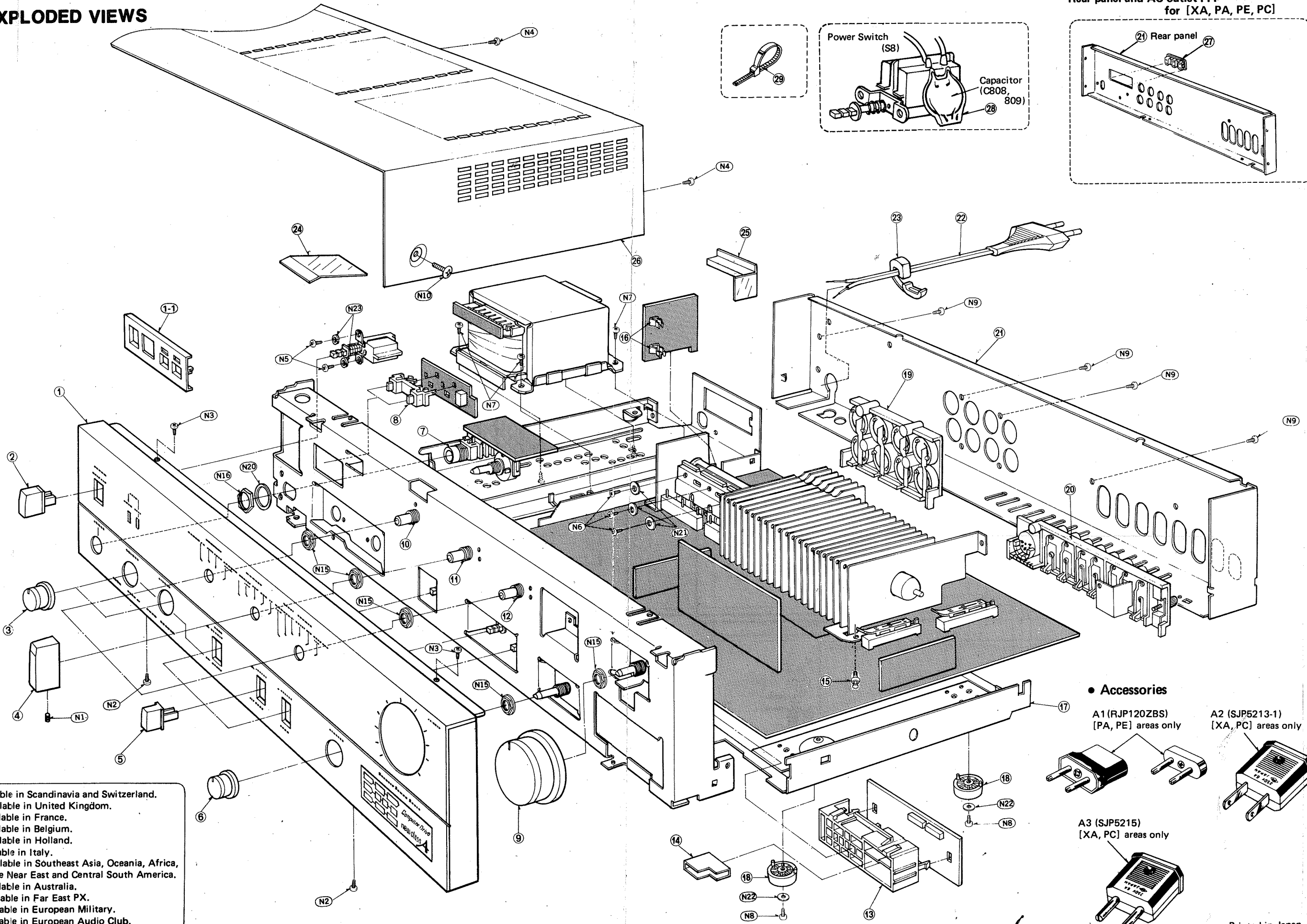
Ref. No.	Parts No.	Description & Pcs
23 [EK]	SHR129	Bushing, AC Cord (1)
23 [XL]	SHR131	Bushing, AC Cord (1)
23 [other]	SHR127	Bushing, AC Cord (1)
24	SMX747	Insulation Sheet (1)
25 [XA, PA, PE,PC]	SMX745	Insulation Sheet (1)
25 [other]	SMX749	Insulation Sheet (1)
26	SKC1310S1	Cabinet (1)
26	SKC1310BB1	Cabinet (1)
27 [XA, PA, PE,PC]	SJS601-2	Socket, AC Outlet (1)
28	SMX685	Cover, (C808, 809) (2)
29	SHR301	Clamper, Lead Wire (2)
SCREWS		
N1	XXE4D5FZS	Speaker, Rec, Input Selector (3)
N2	XTB3+8BFN	Tapping, \oplus 3x8 (2)
N3	XTB3+8BFN	Tapping, \oplus 3x8 (2)
N4	XTB3+8BFN	Tapping, \oplus 3x8 (3)
N5	XSN3+6S	Tapping, \oplus 3x6 (2)
N6	XTB3+12BFN	Tapping, \oplus 3x12 (3)
N7	XTB4+10BFN	Tapping, \oplus 4x10 (4)
N8	XTN3+8BFN	Tapping, \oplus 3x8 (4)
N9	XTB3+8BFN	Tapping, \oplus 3x8 (4)
N10	SNE2095-2	Cabinet Carbinet (2)
N10	SNE2095-3	Cabinet Carbinet (2)
NUTS		
N15	SNE4021	ϕ 12 (5)
N16	XNS12	ϕ 12 (1)
WASHERS		
N20	SNE59-1	Plain, ϕ 3 (1)
N21	XWG3	Plain, ϕ 3 (3)
N22	XWG3	Plain, ϕ 3 (2)
N23	XWA3B	Spring, ϕ 3 (2)
ACCESSORIES		
A1 [PA,PE]	RJP120ZBS	Plug, AC Adaptor (1)
A2 [XA,PC]	SJP5213-1	Plug, AC Adaptor (1)
A3 [XA,PC]	SJP5215	Plug, AC Adaptor (1)
A4 [XA,PC]	SQF11615	Instruction Book (1)
A4 [EK]	SQF11691	Instruction Book (1)
A4 [other]	SQF11613	Instruction Book (1)
PACKING PARTS		
P1 [XL]	SPG4277	Carton Box (1)
P1 [EF]	SPG4275	Carton Box (1)
P1 [other]	SPG4273	Carton Box (1)
P2 [XL]	SPS3915-3	Pad, Left (1)
P2 [other]	SPS3915-2	Pad, Left (1)
P3 [XL]	SPS3921-3	Pad, Right (1)
P3 [other]	SPS3921-2	Pad, Right (1)
P4	SPP699	Polyethylene Bag (1)

EXPLODED VIEWS



EXPLODED VIEWS

Rear panel and AC outlet ...
for [XA, PA, PE, PC]



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

- Accessories**
- A1 (RJP120ZBS) [PA, PE] areas only
 - A2 (SJP5213-1) [XA, PC] areas only
 - A3 (SJP5215) [XA, PC] areas only