

# Service Manual

Stereo Integrated Amplifier

## SU-V505

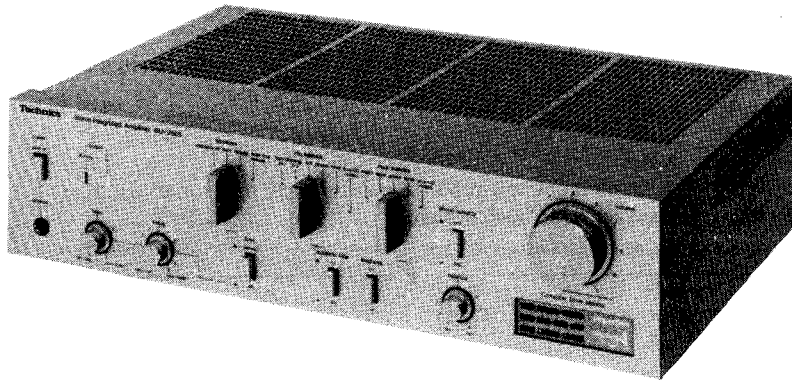
[E],[EK],[EF],[EB],[EH],[Ei],  
[XA],[XL],[PA],[PE],[PC]

## SU-V505(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 × 60W (4Ω) 2 × 60W (8Ω)
40 Hz~16 kHz continuous power output both channels driven	2 × 60W (4Ω) 2 × 60W (8Ω)
1 kHz continuous power output both channels driven	2 × 60W (4Ω) 2 × 60W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.03% (4Ω) 0.004% (8Ω)
rated power at 40 Hz~16 kHz	0.03% (4Ω) 0.004% (8Ω)
rated power at 1 kHz	0.007% (4Ω) 0.003% (8Ω)
half power at 20 Hz~20 kHz	0.004% (8Ω)
half power at 1 kHz	0.002% (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~50 kHz (4Ω, T.H.D. 0.03%)

5 Hz~60 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 MM

2.5 mV/47kΩ

## MC

200 μV/220Ω

## TUNER, AUX/CD/VIDEO

150 mV/22kΩ

## TAPE 1

150 mV/22kΩ

## TAPE 2

150 mV/22kΩ

## PHONO maximum input voltage (1 kHz, RMS)

## MM

170 mV

## MC

15 mV

## S/N

## rated power (4Ω)

## PHONO MM

76 dB (83 dB, IHF, A)

## MC (250 μV)

64 dB (65 dB, IHF, A)

## TUNER, AUX/CD/VIDEO, TAPE

91 dB (IHF, A: 102 dB)

## -26 dB power (4Ω)

## PHONO MM

71 dB

## MC

63 dB

## TUNER, AUX/CD/VIDEO, TAPE

72 dB

## 50 mW power (4Ω)

## PHONO MM

68 dB

## MC

62 dB

## TUNER, AUX/CD/VIDEO, TAPE

68 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

<b>Frequency response</b>		<b>GENERAL</b>	
<b>PHONO</b>	RIAA standard curve	<b>Power consumption</b>	370W
	±0.8 dB (30 Hz~15 kHz)	<b>Power supply</b>	
<b>TUNER, AUX/CD/VIDEO, TAPE</b>	5 Hz~140 kHz (-3 dB)	<b>For continental Europe</b> (Except for United Kingdom)	AC 50 Hz/60 Hz, 220V
	+0 dB, -0.2 dB (20 Hz~20 kHz)	<b>For Australia</b>	AC 50 Hz/60 Hz, 240V
<b>Tone controls</b>		<b>For others</b>	AC 50 Hz/60 Hz, 110V/120V/220V/240V
<b>BASS</b>	50 Hz, +10 dB~ -10 dB	<b>Dimensions (W×H×D)</b>	430 × 109 × 290 mm
<b>TREBLE</b>	20 kHz, +10 dB~ -10 dB		(16-15/16" × 4-9/32" × 11-13/32")
<b>Subsonic filter</b>	30 Hz, -6 dB/oct.	<b>Weight</b>	7.6 kg
<b>Loudness control (volume at -30 dB)</b>	50 Hz, +9 dB		(16.8 lb.)
<b>Output voltage and impedance</b>			
<b>REC OUT</b>	150 mV		
<b>Channel balance, AUX/CD/VIDEO 250 Hz~6,300 Hz</b>	±1 dB		
<b>Channel separation, AUX/CD/VIDEO 1 kHz</b>	63 dB		
<b>Headphones output level and impedance</b>	520 mV/330Ω		
<b>Load impedance</b>			
<b>MAIN or REMOTE</b>	4Ω~16Ω	<b>Note:</b>	Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).
<b>MAIN and REMOTE</b>	8Ω~16Ω		

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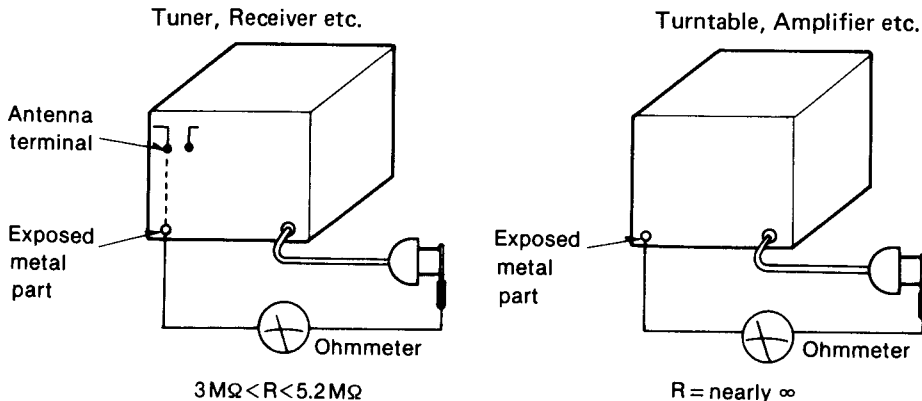
## SAFETY PRECAUTION

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.)

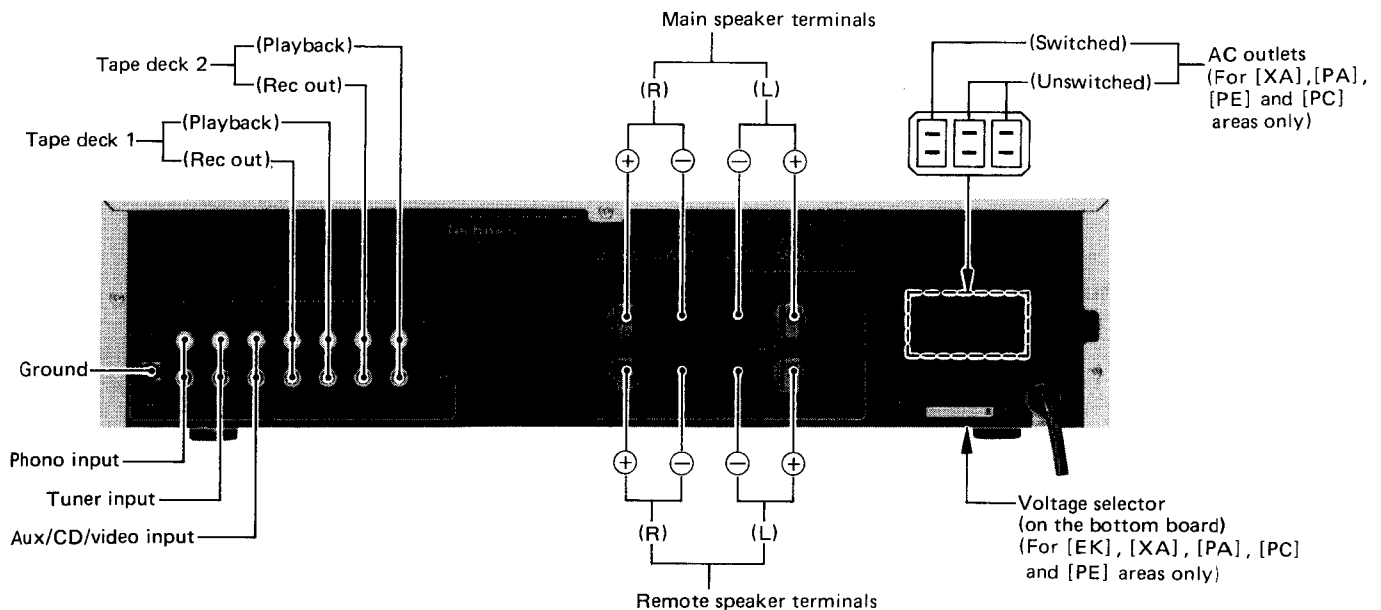
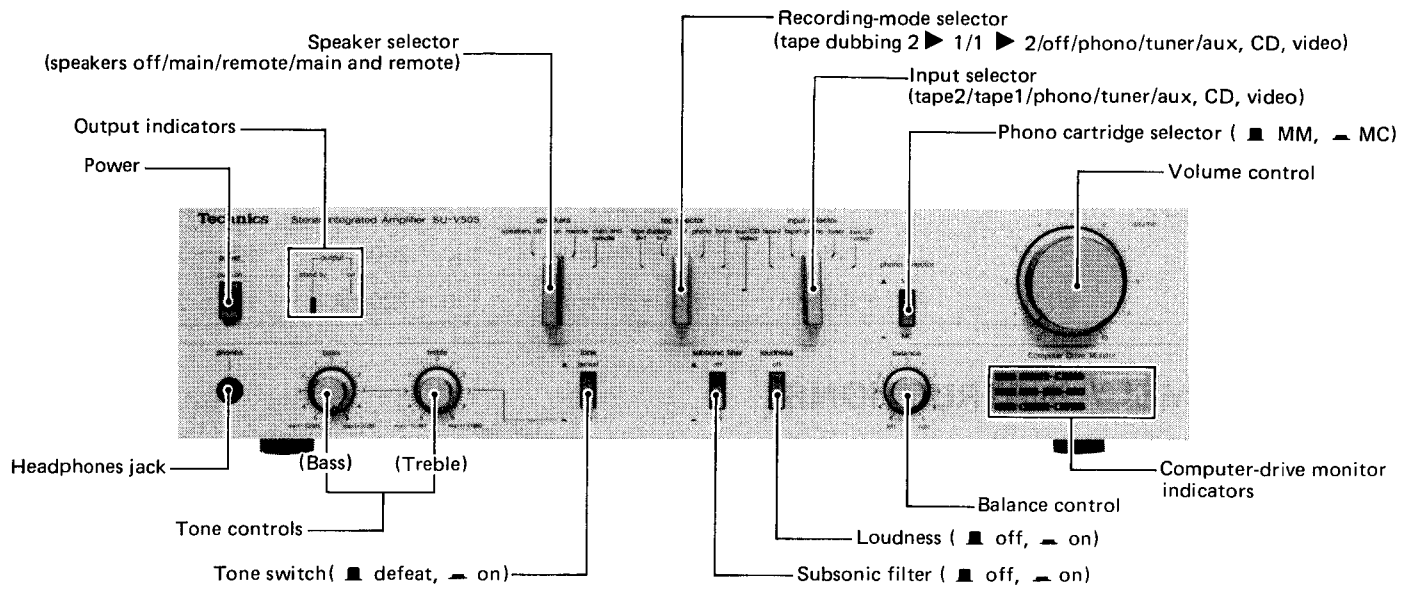
1. Unplug the power supply cord and connect a jumper wire between the two prongs on the plug.
2. Turn on the power switch of the apparatus.
3. Measure the resistance value (with an ohmmeter) between the jumpered AC plug and each exposed metallic cabinet part on the apparatus, such as screwheads, antenna, 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

**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.
- \* 110V/120V/220V/240V (50/60Hz) for other areas. (for other areas is 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.

## BEFORE REPAIR AND ADJUSTMENT

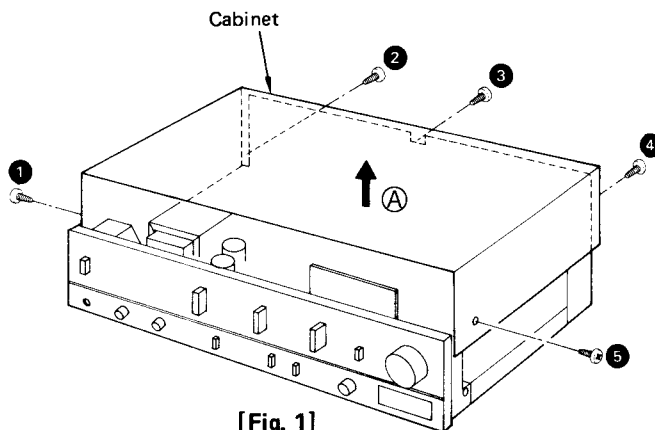
1. Turn off the power supply and short-circuit of power supply capacitors (C401, C402, 8200 $\mu$ F) at resistance (about 10 $\Omega$ , 5W) in order to discharge the charged voltage. Do not short between C401/402 by screwdriver. It may damage the component.
2. Before turning on the power supply after 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	260 ~ 480mA	240 ~ 440mA	130 ~ 240mA	120 ~ 220mA
	60 Hz	240 ~ 440mA	220 ~ 400mA	120 ~ 220mA	110 ~ 200mA

## DISASSEMBLY INSTRUCTIONS

### How to remove the cabinet

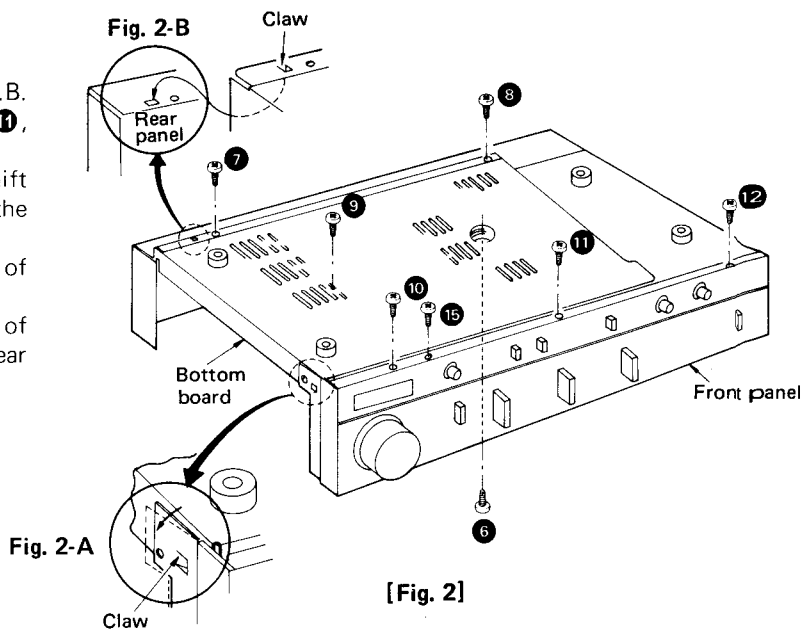
1. Remove the 5 setscrews (Fig. 1: ① ~ ⑤) of the cabinet.
2. Move the cabinet in the direction of the arrow (A) in Fig. 1.



[Fig. 1]

### How to remove the bottom board

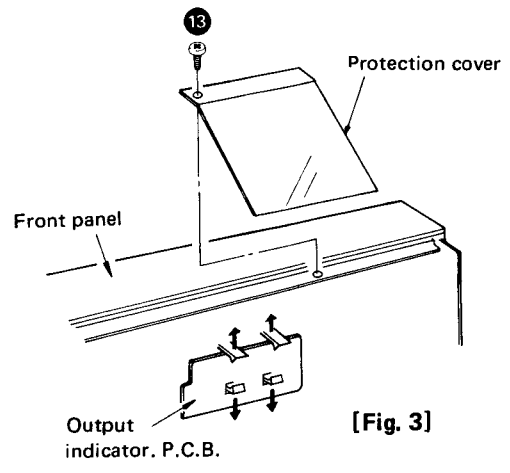
1. Remove the cabinet.
2. Remove the setscrew [Fig. 2: ⑥] of the P.C.B.
3. Remove the 6 setscrews [Fig. 2: ⑦ ~ ⑪, ⑮] of the bottom board.
4. Raise the rear of the bottom board, and shift the side board a little outward to release the claw from the bottom board. [Fig. 2-A]
5. Remove the bottom board from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



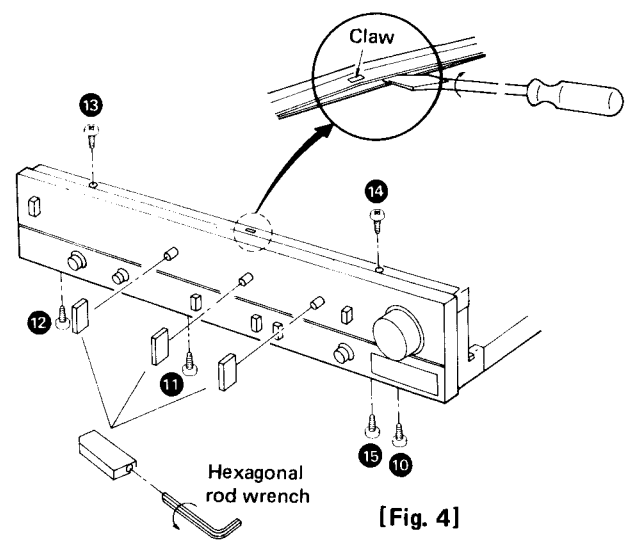
[Fig. 2]

### 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].)
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.



[Fig. 3]



[Fig. 4]

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

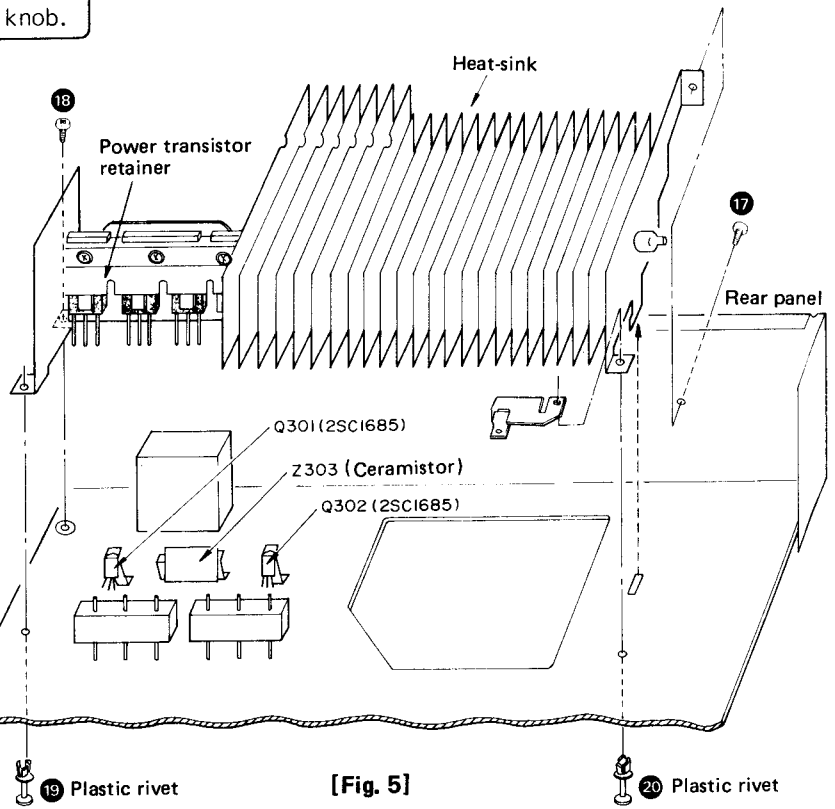
● **How to remove the power transistors**

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)

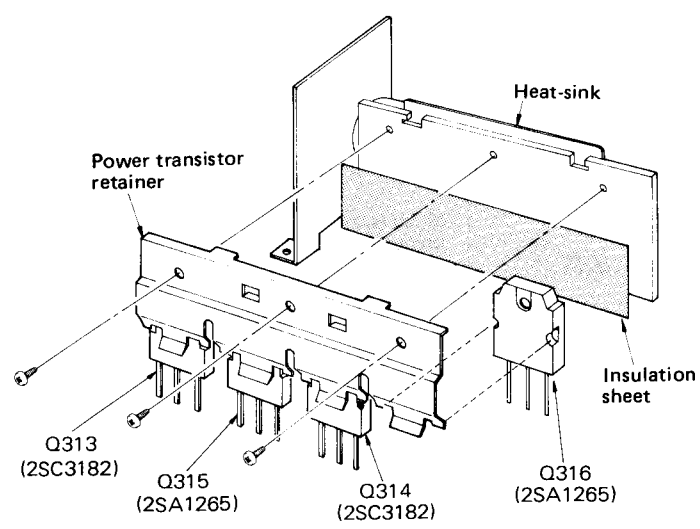
\* **Precautions for Fitting the Power Transistors**

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]

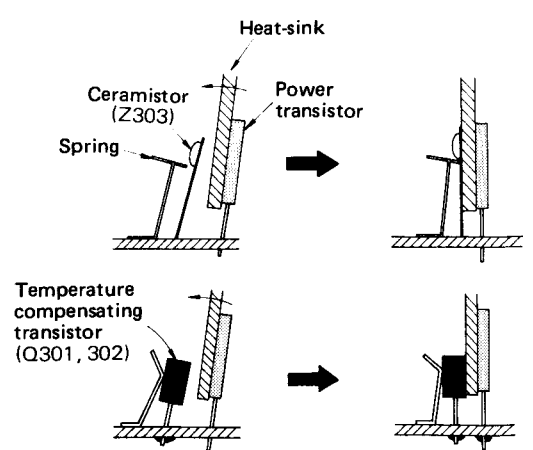
\* Ceramistor: Element whose change in temperature and resistance is positive (proportional).



[Fig. 5]



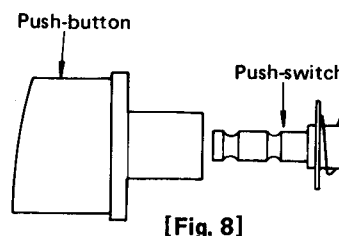
[Fig. 6]



[Fig.7]

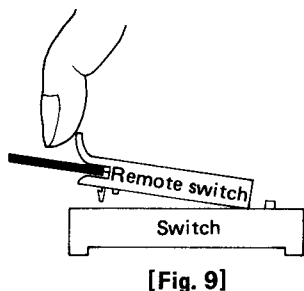
## \* Precautions for Fitting the Push-buttons

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.



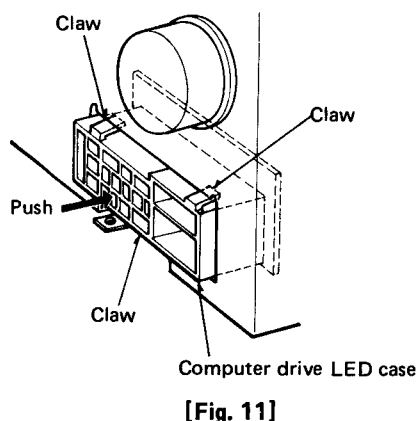
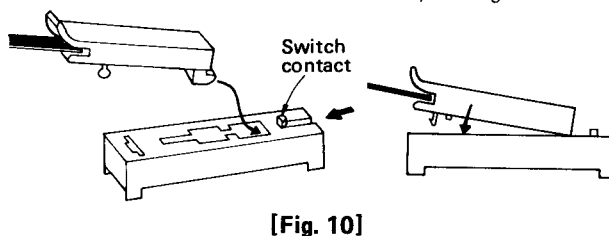
## ● How to remove and fit the remote switch

1. How to remove – Pushing the remote switch, shift it up as in 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.



## \* 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)

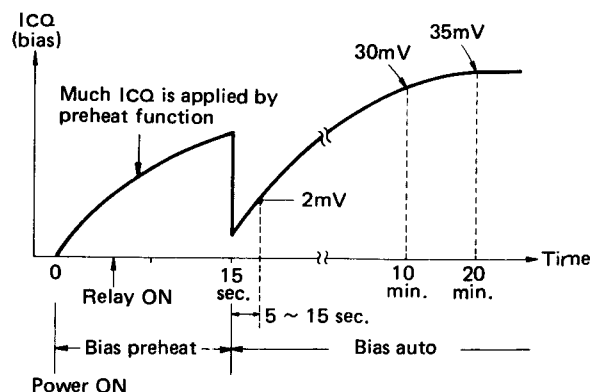
- (1) Turn off the power supply.
- (2) Adjust VR701 so that the time until the relay turns ON is 5 ~ 7 sec. after power ON.
  - \* The time elongates with VR701 turned counterclockwise (in the direction of A). (Frequency decreases.)
  - \* The time shortens with VR701 turned clockwise (in the direction 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 TP305 (-) [left channel] or TP304 (+) and TP306 (-) [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.



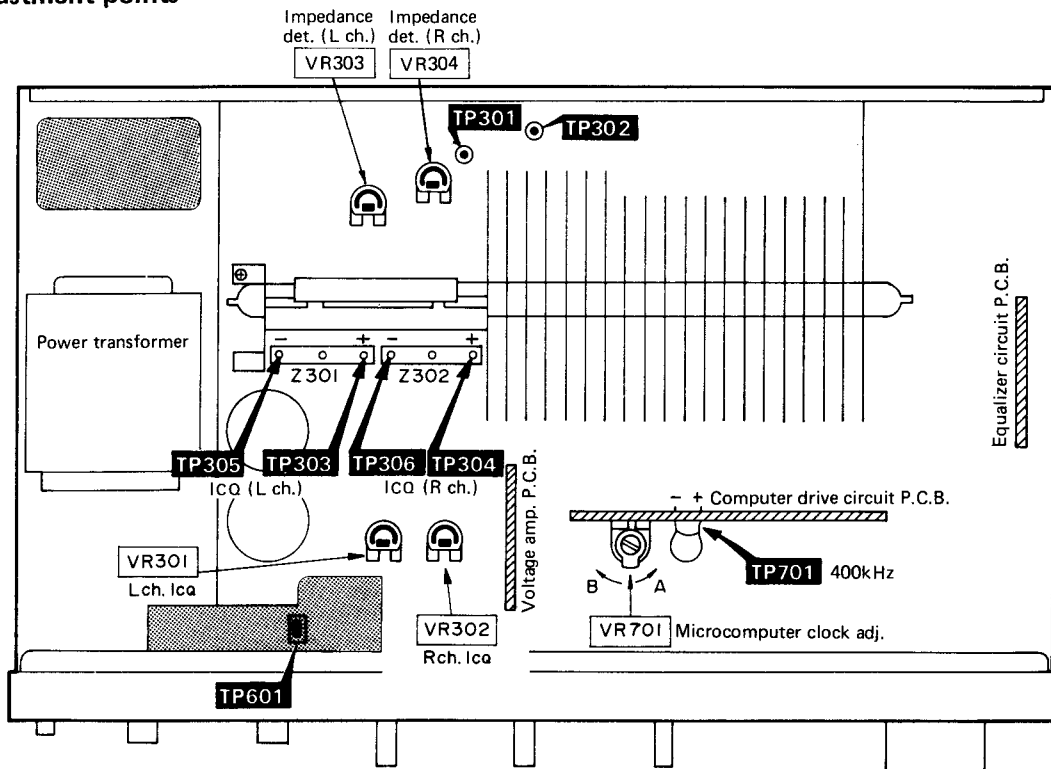
**3. Adjustment of Load Impedance Detection Circuit (after repairing the speaker impedance detection circuit).**

- (1) Connect a load with  $6.5\Omega$  (1/2W, carbon, resistor) or series – connected  $3.3\Omega$  and  $3.3\Omega$  (1/2W,  $\pm 5\%$ ) 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 TP301 and chassis (Lch.) or TP302 and chassis (Rch.)
- (5) Adjust VR303 (Lch.) so that the voltage of TP301 is  $-200\text{mV}$ .
- (6) Adjust VR304 (Rch.) so that the voltage of TP302 is  $-200\text{mV}$ .

**NOTE:**

Be sure to adjust VR304 (Rch.) after adjusting VR303 (Lch.).

● **Adjustment points**



**\* Checks of Protection Circuit After Repair and Adjustment**

● **Check of Muting with Power On/Off.**

- (1) Connect AC voltmeter and  $8\Omega$  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**

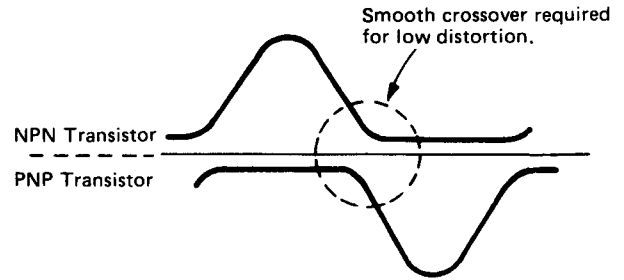
**1. Description of Computer drive system**

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.

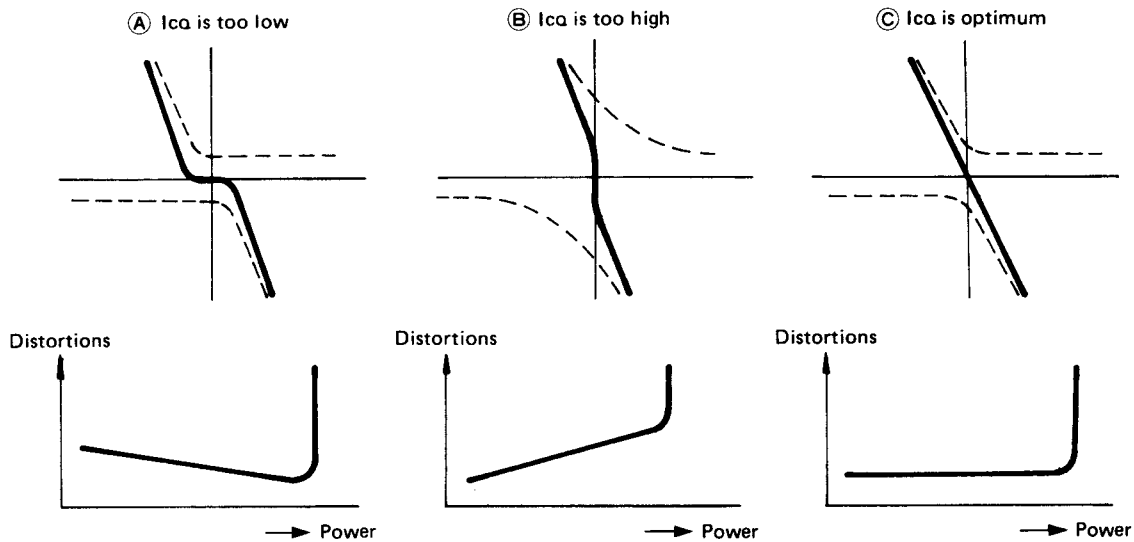
**• Power transistor idling current (I<sub>ca</sub>)**

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<sub>ca</sub> is not adjusted properly, distortion will result as in Fig. 13.



[Fig. 12]

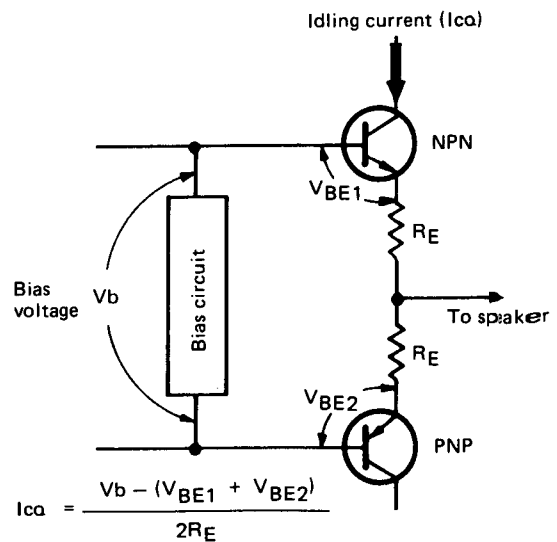


Relationship between idling current level and cross-over distortion.

[Fig. 13]

**• Idling current and bias current**

Idling current is determined by the bias voltage (V<sub>b</sub>) of the bias circuit and the V<sub>BE</sub> of each power transistor (Fig. 14). The V<sub>BE</sub> 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.



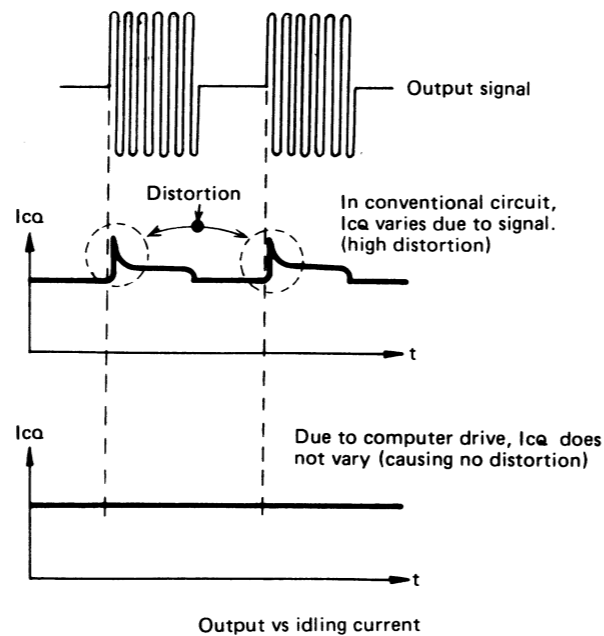
[Fig. 14]



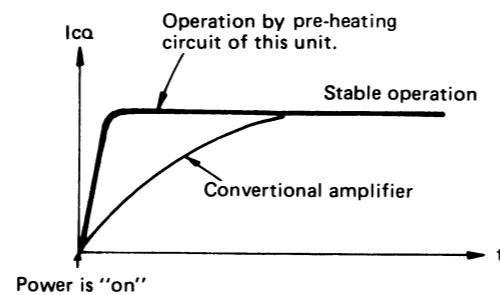
• Computer drive system

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.

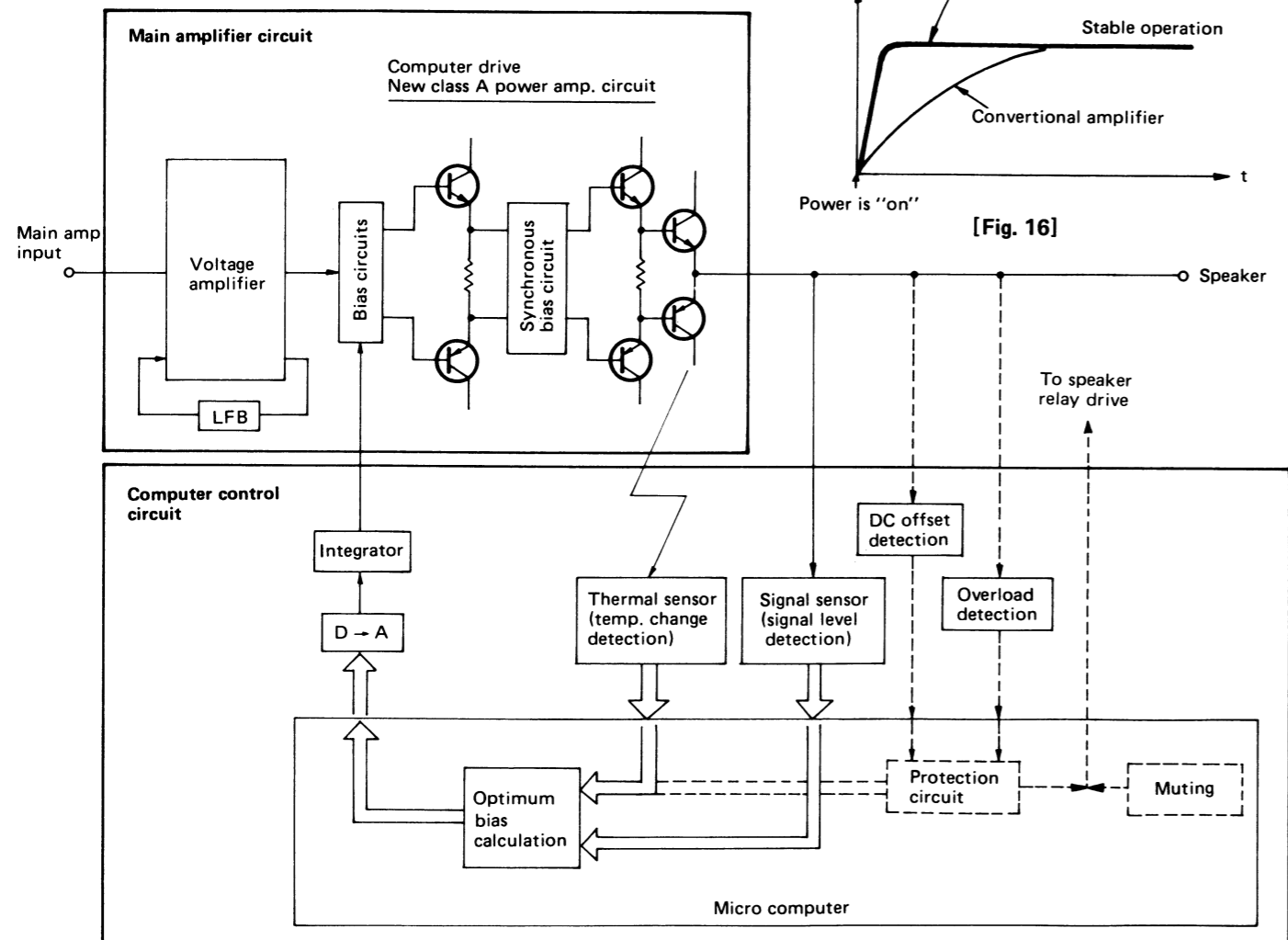
Generally, it takes several minutes for the power transistors to reach the temperature of stable operation after the power is turned on. To ensure stable and optimum performance quickly, the microcomputer forces a large amount of idling current through the power transistors for a short time. This rapidly "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]



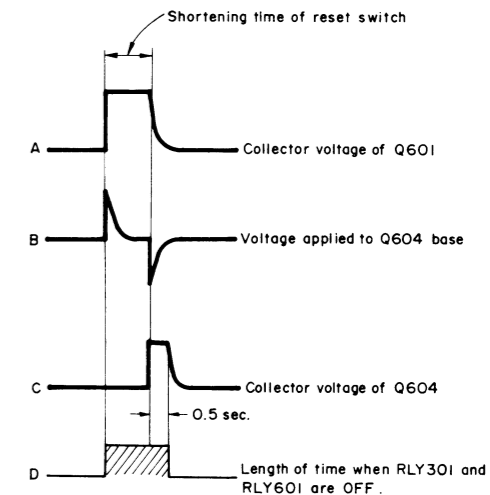
[Fig. 17]

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

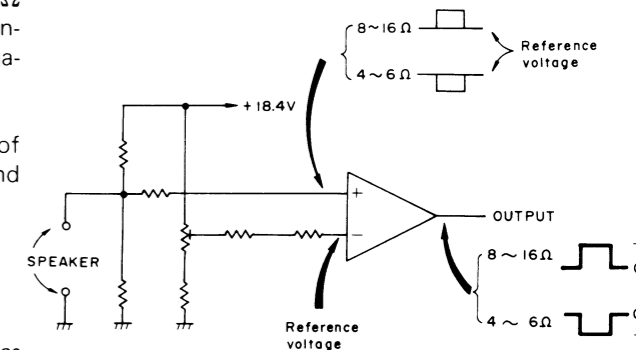
The reset switch of speaker select switch is short-circuited only when the switch is shifted. With the speaker select switch shifted, the reset switch is short-circuited, then Q601 of reset circuit turns ON. When Q601 turns ON, positive voltage as in Fig. 18-A is generated at the collector of Q601, causing Q602 to turn ON. When Q602 turns ON, Q321 turns OFF, and so does RLY301. Also, when Q321 turns OFF, the collector potential of Q321 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, RLY301 turns OFF and so does RLY601 (high volt tap). That is, both RLY301 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 RLY301 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]

2) Voltage comparing circuit

IC301 is a voltage comparing circuit. With RLY301 turned OFF, the speaker is connected to the voltage comparing circuit. (Fig. 19) The reference voltage is applied to minus terminals (2, 6) of IC301. Also, plus terminals (3, 5) are subject to change according to the impedance of the speaker connected to the set. The adjustment has been made with VR303 and VR304 so that the output voltage of IC301 is 0V with 6.5Ω speaker connected. If the impedance of the speaker connected is 4Ω, the output voltage of IC301 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 IC301 becomes positive, then Q605 turns OFF and RLY601 also turns OFF (high volt tap).



[Fig. 19]

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.

**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, Q321 turns OFF, and so does RLY301.

Also, when Q321 turns OFF, the collector potential of Q321 becomes positive, causing Q605 to turn OFF.

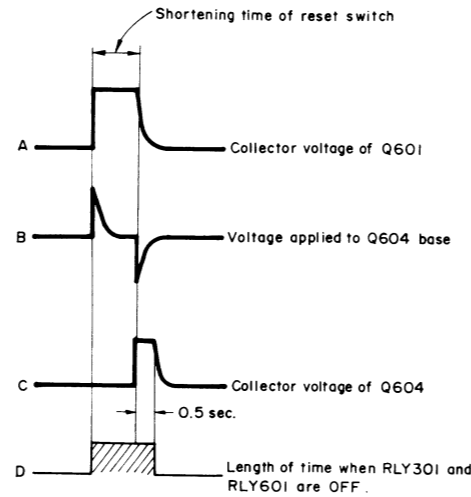
Then RLY601 also turns OFF (high volt tap).

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.

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

With Q602 turns ON, RLY301 turns OFF and so does RLY601 (high volt tap). That is, both RLY301 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 RLY301 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]

**2) Voltage comparing circuit**

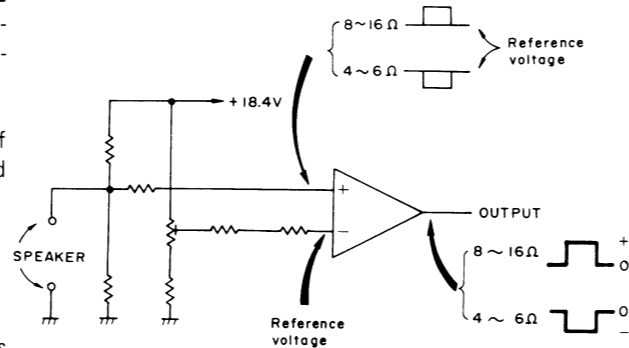
IC301 is a voltage comparing circuit. With RLY301 turned OFF, the speaker is connected to the voltage comparing circuit. (Fig. 19) The reference voltage is applied to minus terminals (2, 6) of IC301.

Also, plus terminals (3, 5) of IC301 are subject to change according to the impedance of the speaker connected to the set.

The adjustment has been made with VR303 and VR304 so that the output voltage of IC301 is 0V with 6.5Ω speaker connected. If the impedance of the speaker connected is 4Ω, the output voltage of IC301 becomes negative, causing Q605 to turn ON.

Then RLY601 also turns ON (low volt tap).

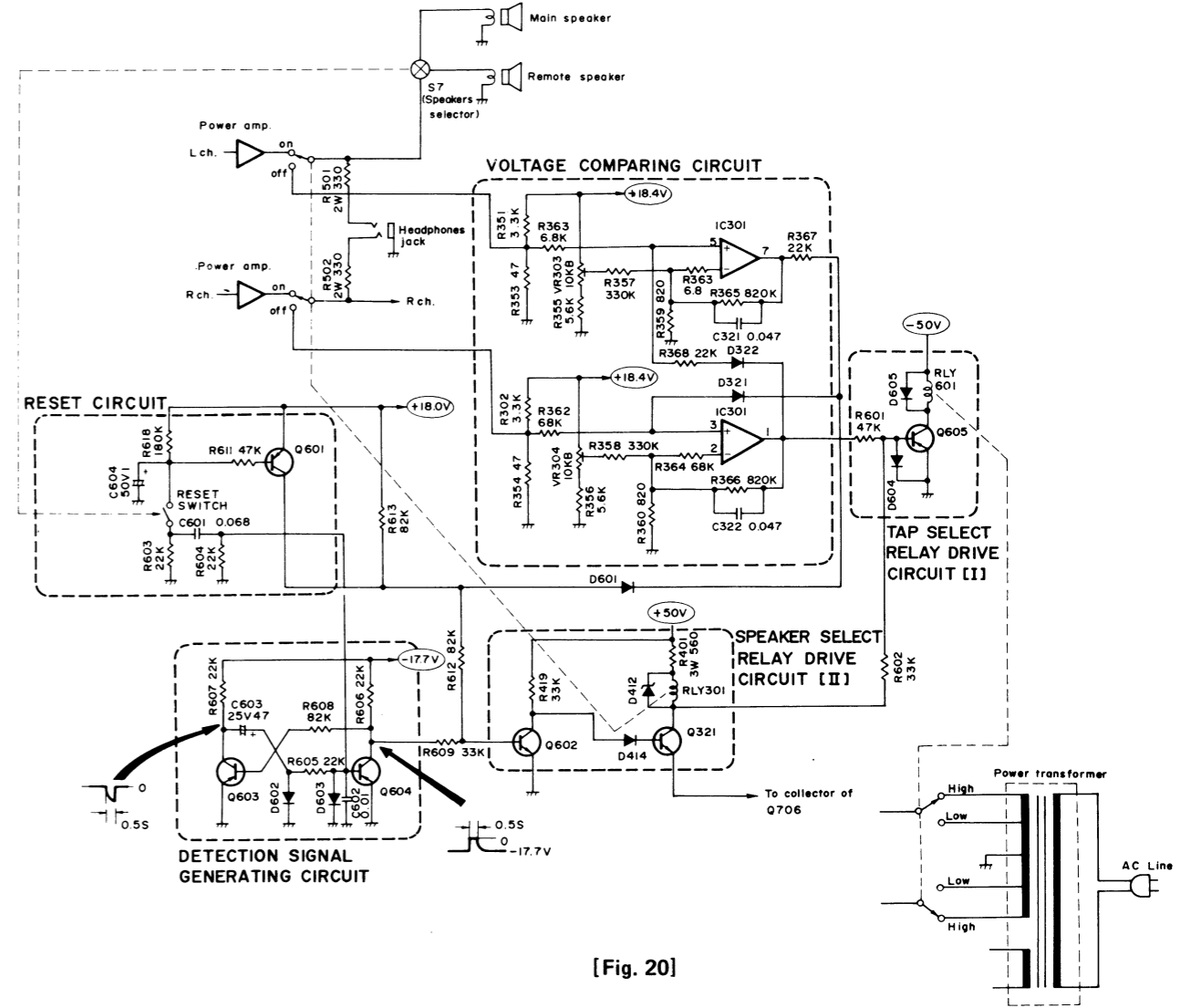
If the speaker impedance is 8Ω, the output voltage of IC301 becomes positive, then Q605 turns OFF and RLY601 also turns OFF (high volt tap).



[Fig. 19]

**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.



[Fig. 20]

Output signal

Operational circuit, (due to signal distortion)

Speaker drive, (due to no distortion)

Pre-heating unit.

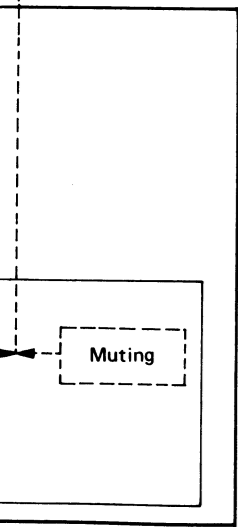
Stable operation

Power amplifier

t

Speaker

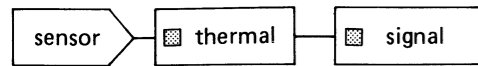
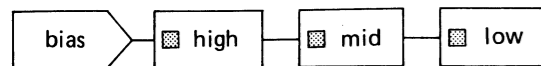
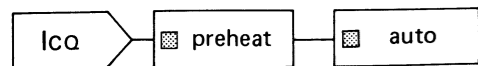
Speaker drive



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 <sub>7</sub>	(3) pin CO <sub>8</sub>	(2) pin CO <sub>9</sub>	(15) pin EO <sub>6</sub>	(16) pin EO <sub>1</sub>	(17) pin EO <sub>2</sub>	(18) pin EO <sub>3</sub>	(26) pin DO <sub>3</sub>	(23) pin DO <sub>6</sub>
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.							L		
0.4 sec.							H		
0.4 sec.	L	H					L		
0.4 sec.							H		
0.4 sec.							L		
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. 21]

1) Preheat

When power supply is turned ON, the level of IC702 pin 23 becomes low. At the same time, preheat LED (D717) lights up, Q707 turns OFF and so does the computer drive lamp. Also, Q709 turns ON, then voltage is applied to LED's (D712), (D713), (D714). Each of D712, D713 and D714 is controlled by IC702 terminals 2, 3 and 4 respectively. The output voltages are shown in Fig. 21. The "high" LED lights up first, followed by "mid" LED, and then "low" LED. IC702 Pin 17 turns power supply ON as in Fig. 21. It becomes "H" 0.4 sec. later, then IC701 pin 1 also becomes "H". IC701 pin 16 changes to "L" and it is applied to Q712 and Q713 through D708 and D709, causing Q712 and Q713 to turn ON. IC701 pin 16 delivers a large ICQ for 6 sec. after power ON (while pin 16 is "L"), and after that, pin 16 become "H". ICQ is controlled by the output of IC702 pin 2, 3, 4.

2) Signal sensor and thermal sensor

The musical signal from power amplifier is applied to IC702 pin 11 (pin 13) through D705 (D706) and IC701. When the signal, changed to DC by D705 (D706) and C703 (C704), becomes higher than about 2V, then "L" input is applied to IC702 pin 11 (pin 13), and the output is delivered to IC702 pin 2, 3, 4. Also, when the temperature of heat-sink becomes higher than 130°C the resistance of the thermistor (Z303) increases and IC701 pin 5 becomes "H". IC701 pin 12 changes to "L", then "L" input is applied to IC702 pin 10. The output is delivered to IC702 pin 11, 13 (signal sensor input) and IC702 pin 10 (thermal sensor input), thereby controlling ICQ through R715, 716, 717 and Q712, 713.

3) Power on/off muting

When power supply is turned ON, the output of IC702 pin 26 is "L" for about 6 sec. as in Fig. 21, then relay RLY301 turns OFF, and D710 output "on" LED also turns OFF. The voltage of IC702 pin 18 alternately becomes "L" and "H" for 6 sec. after power ON as in Fig. 21, causing D719 "stand by" LED to blink. IC702 pin 26 output becomes "H" 6 sec. after power ON, then relay RLY301 turns ON and D710 output "on" LED lights up. When power supply is turned OFF, "H" is applied to IC701 pin 2 and IC701 pin 15 output changes to "L" because the time constant of C410 (3.3μF) and R414 (15kΩ) is smaller than that of C401 (8200μF) and R411 (100kΩ). The signal is put into IC702 pin 20 while "L" output is delivered to IC702 pin 26. When pin 26 becomes "L", Q706 turns OFF and so does relay RLY301.

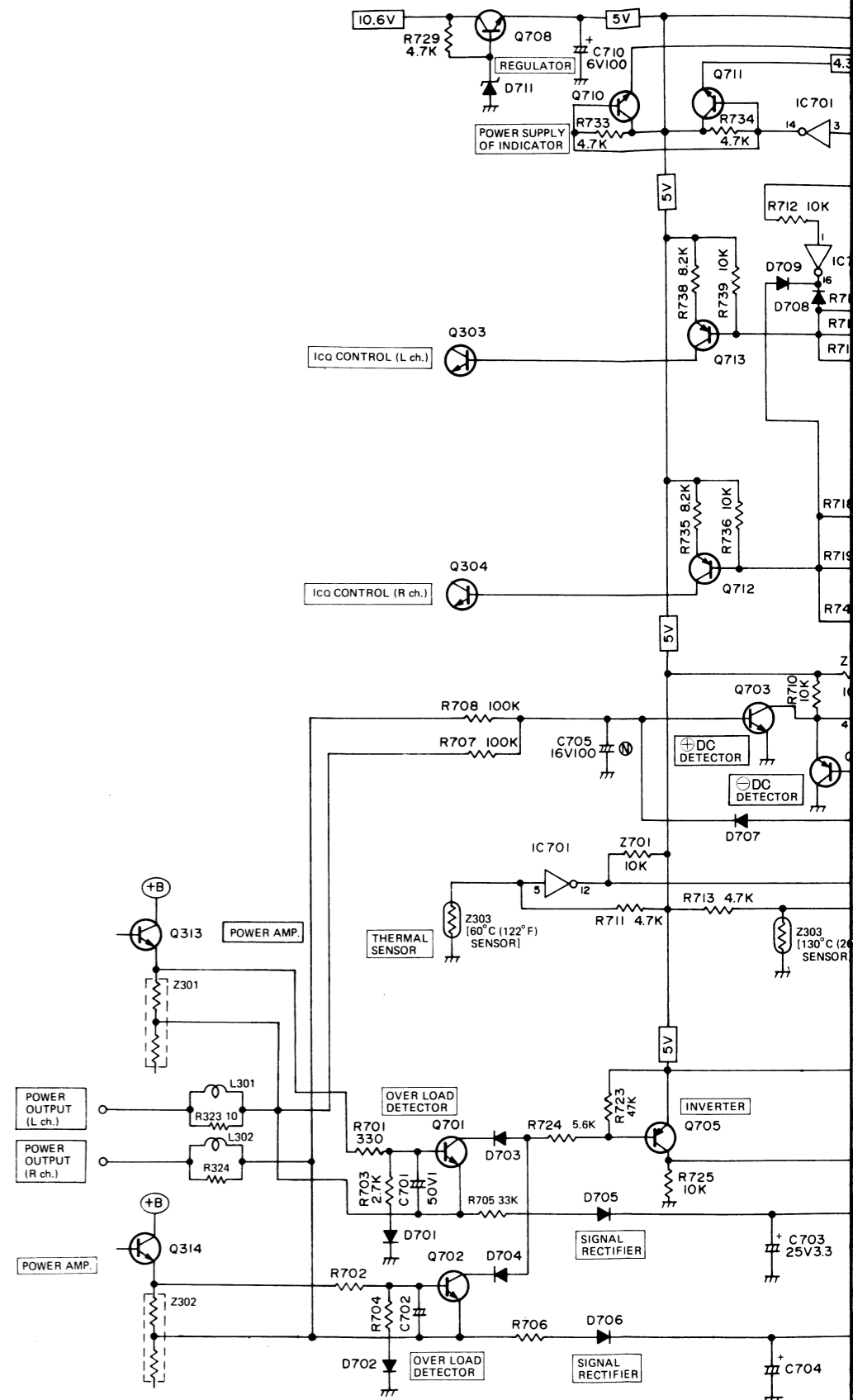
4) DC detection circuit

When the power amplifier voltage is over 2V DC. Q703 (+DC detection) and Q704 (-DC detection) are turned ON, then "H" input is applied to IC702 pin 7, and "L" output is delivered to IC702 pin 26. When pin 26 becomes "L", relay RLY301 turns OFF the same as in power-off muting.

5) Overload detector circuit

When speaker terminals are short-circuited, a large amount of current flows into Z301 (Z302), and the base voltage of Q701 (Q702) increases, causing Q701 (Q702) to turn ON. As Q705 turns ON, "H" input is applied to IC702 pin 22, and "L" output is delivered to IC702 pin 26. When pin 26 becomes "L", relay RLY301 turns OFF the same as in power off muting.

When "H" is applied to IC701 pin 22, the output of IC702 pin 26 is held. Therefore, turn off the power switch and check the set beforehand. Otherwise, relay RLY301 will not turn ON.



1) Preheat

When power supply is turned ON, the level of IC702 pin 23 becomes low. At the same time, preheat LED (D717) lights up, Q707 turns OFF and so does the computer drive lamp. Also, Q709 turns ON, then voltage is applied to LED's (D712), (D713), (D714). Each of D712, D713 and D714 is controlled by IC702 terminals 2, 3 and 4 respectively. The output voltages are shown in Fig. 21. The "high" LED lights up first, followed by "mid" LED, and then "low" LED. IC702 Pin 17 turns power supply ON as in Fig. 21. It becomes "H" 0.4 sec. later, then IC701 pin 1 also becomes "H". IC701 pin 16 changes to "L" and it is applied to Q712 and Q713 through D708 and D709, causing Q712 and Q713 to turn ON. IC701 pin 16 delivers a large ICQ for 6 sec. after power ON (while pin 16 is "L"), and after that, pin 16 become "H". ICQ is controlled by the output of IC702 pin 2, 3, 4.

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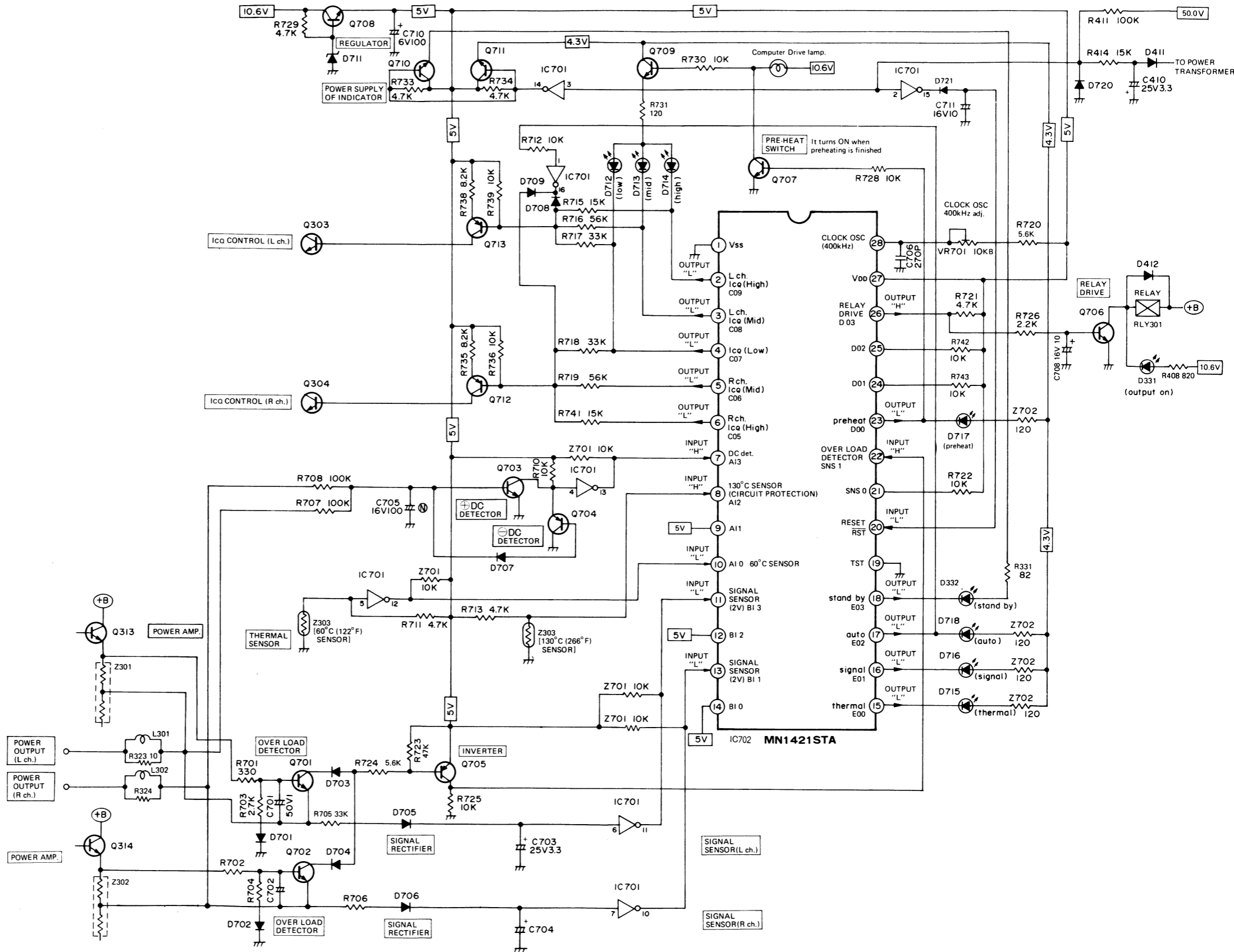
4) DC detection circuit

When the power amplifier voltage is over 2V DC. Q703 (+DC detection) and Q704 (-DC detection) are turned ON, then "H" input is applied to IC702 pin 7, and "L" output is delivered to IC702 pin 26. When pin 26 becomes "L", relay RLY301 turns OFF the same as in power-off muting.

5) Overload detector circuit

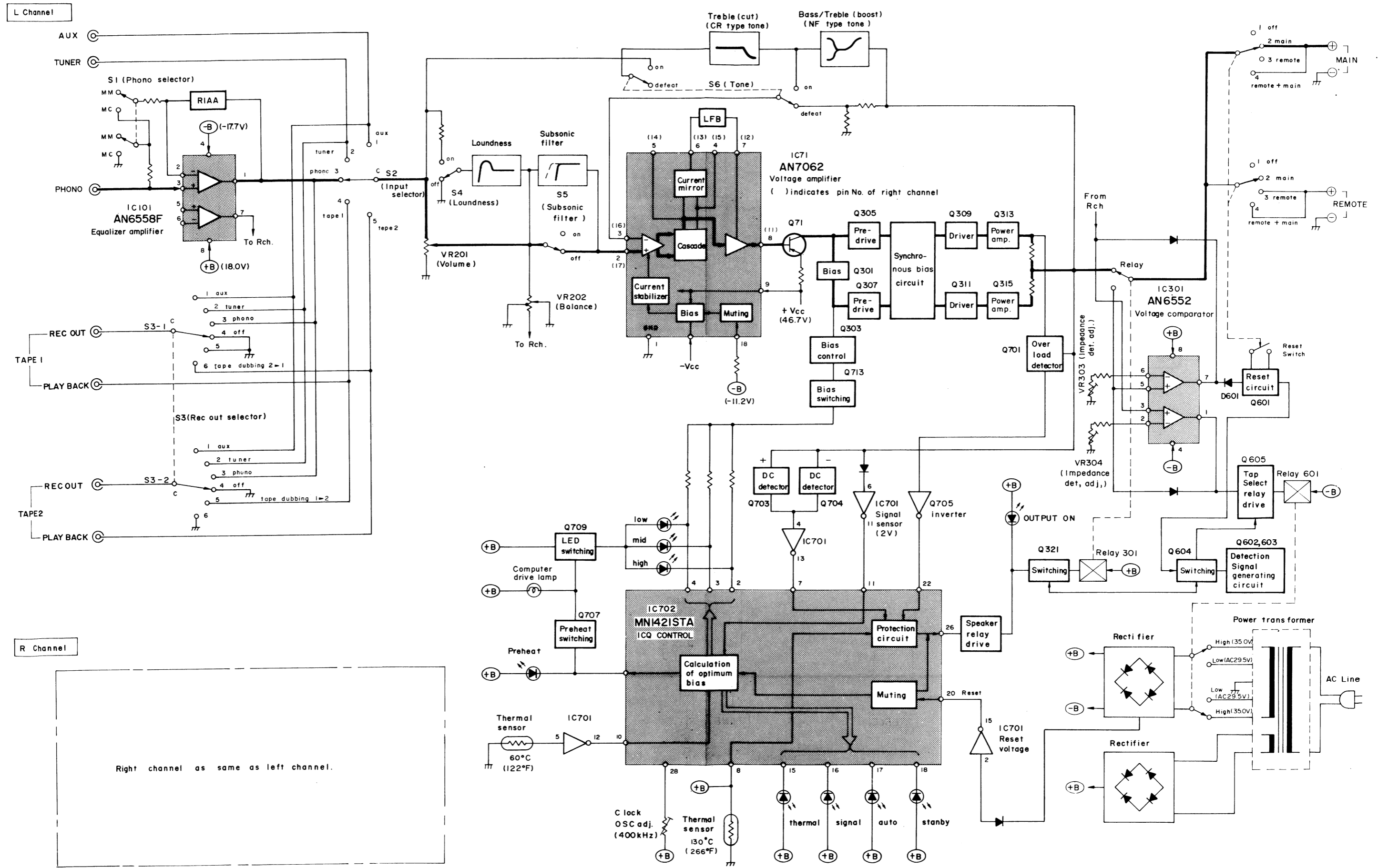
When speaker terminals are short-circuited, a large amount of current flows into Z301 (Z302), and the base voltage of Q701 (Q702) increases, causing Q701 (Q702) and Q705 to turn ON. As Q705 turns ON, "H" input is applied to IC702 pin 22, and "L" output is delivered to IC702 pin 26. When pin 26 becomes "L", relay RLY301 turns OFF the same as in power off muting.

When "H" is applied to IC701 pin 22, the output of IC702 pin 26 is held. Therefore, turn off the power switch and check the set beforehand. Otherwise, relay RLY301 will not turn ON.



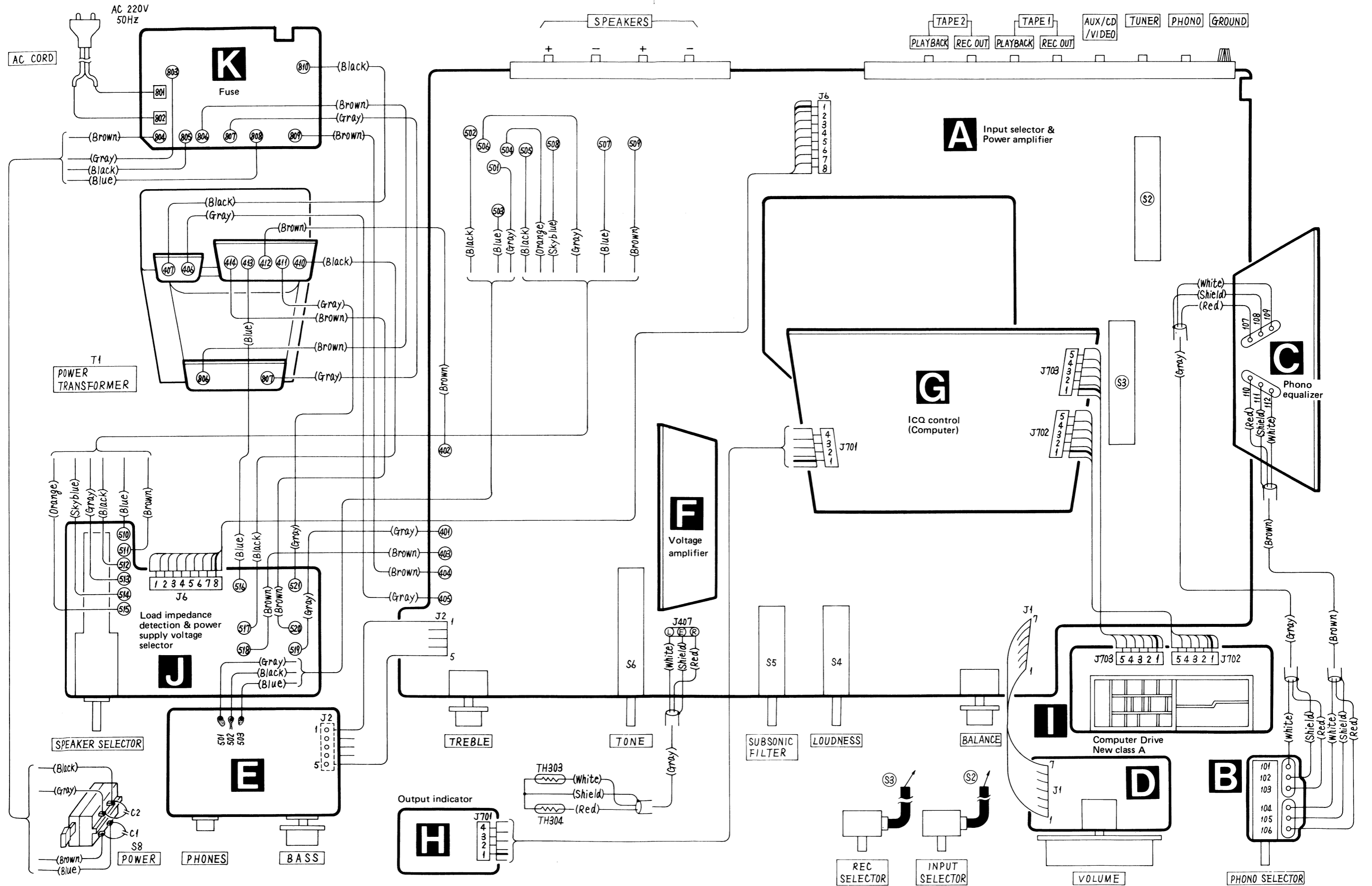
# SU-V505 SU-V505

## BLOCK DIAGRAM



# SU-V505

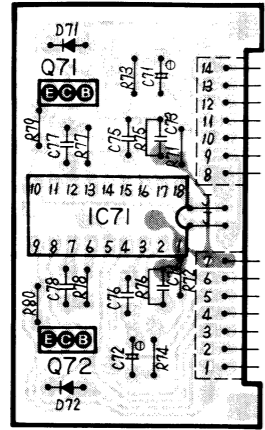
## CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)



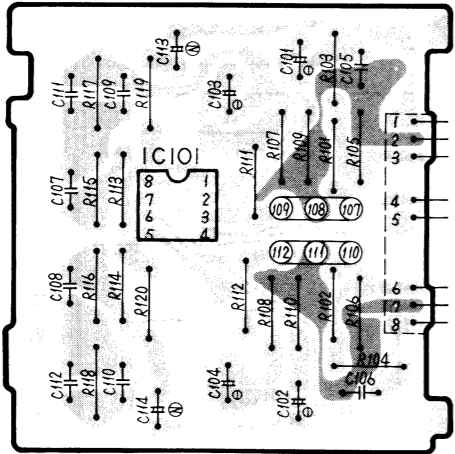
PRINTED CIRCUIT BOARDS

Ground (Earth) lines

**F** Voltage amplifier

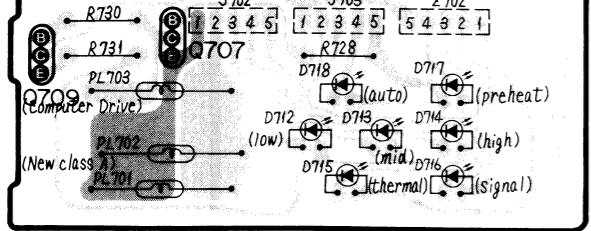


**C** Phono equalizer

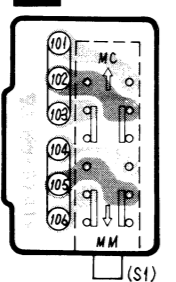


**I** Computer Drive

New class A

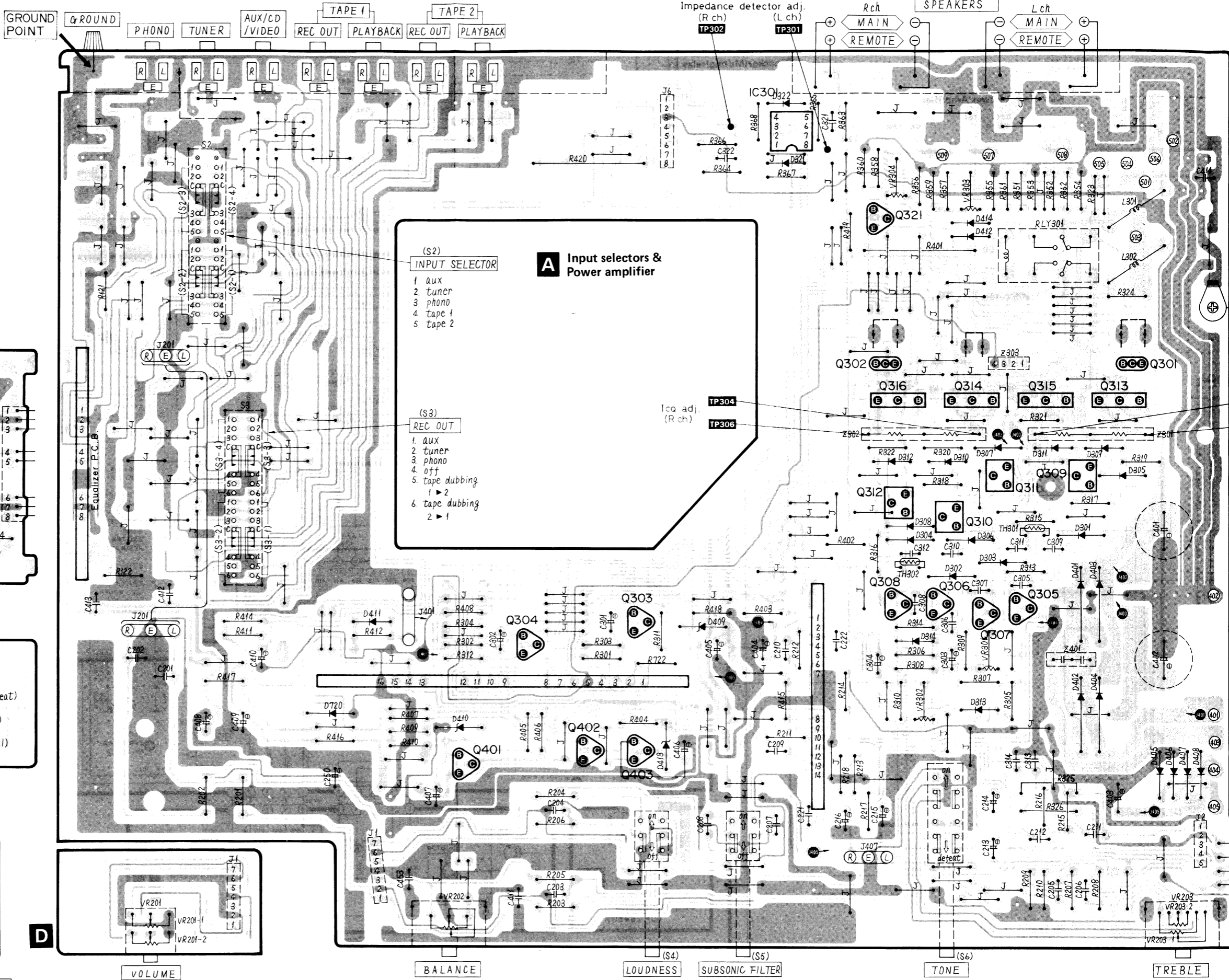
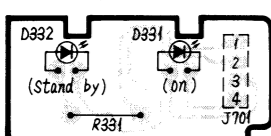


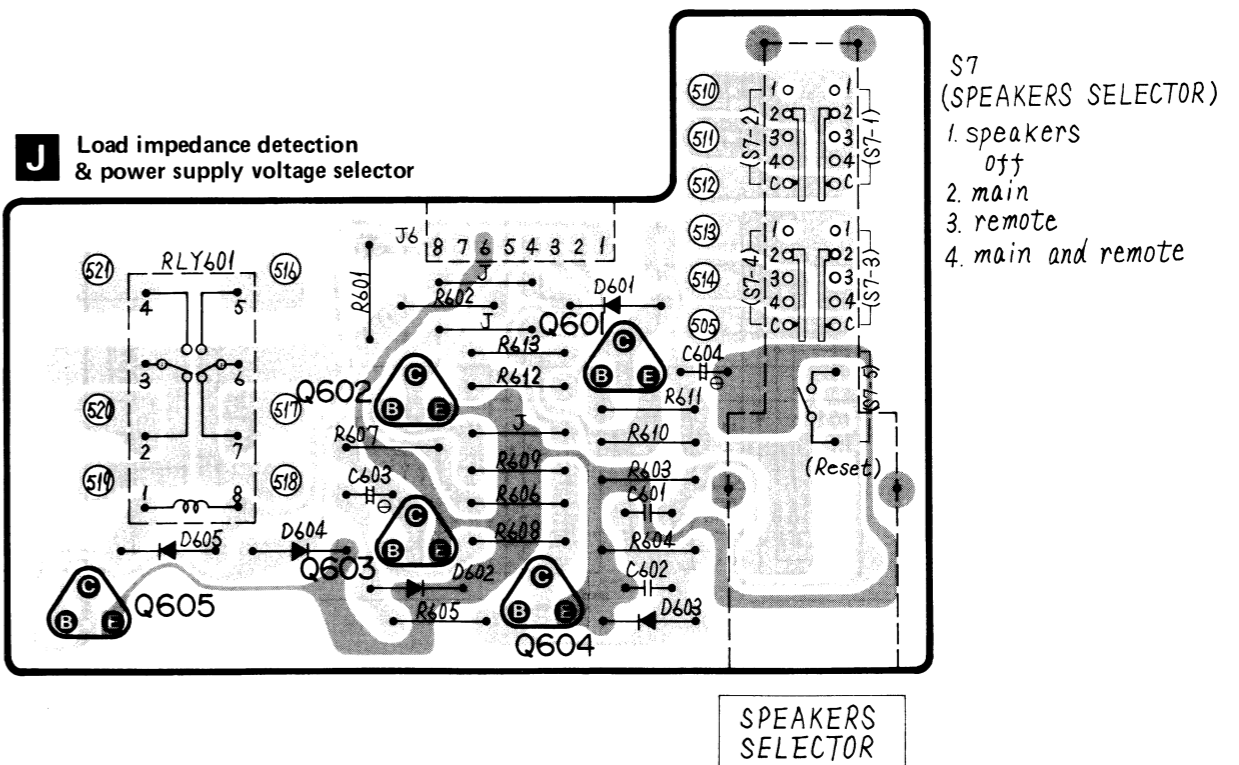
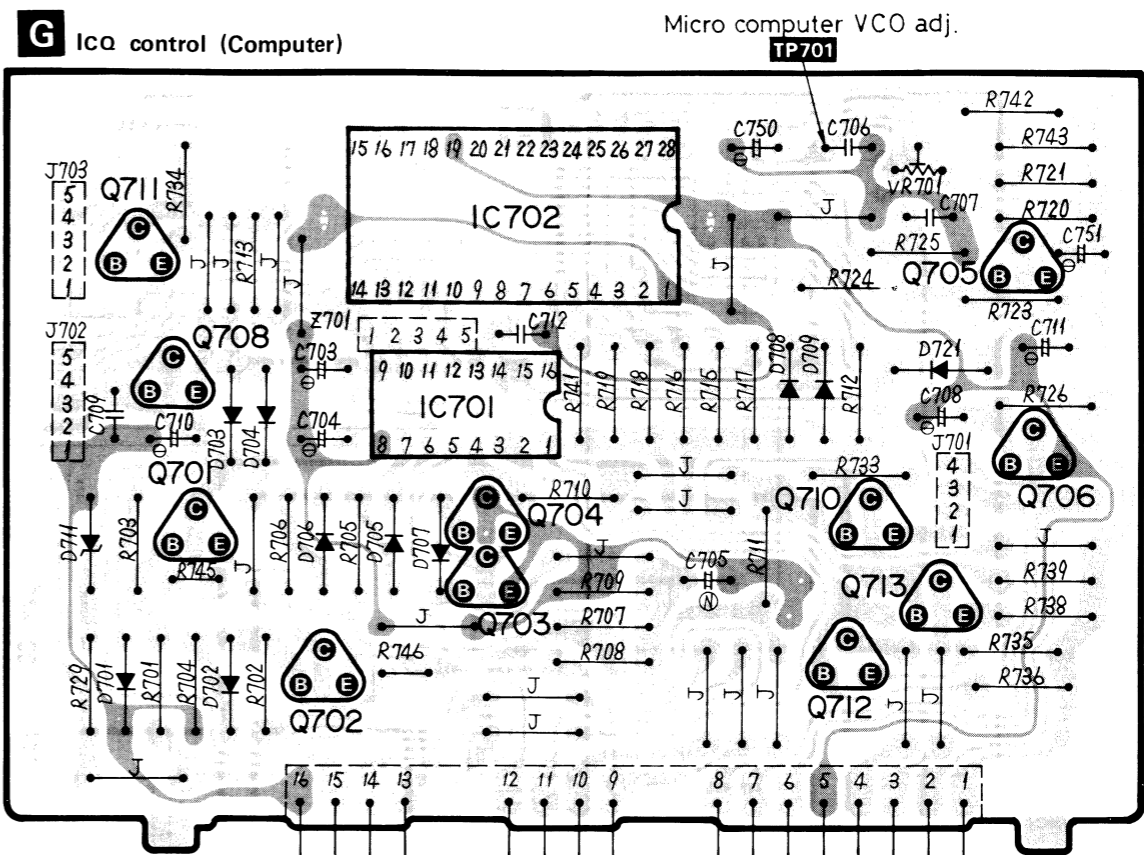
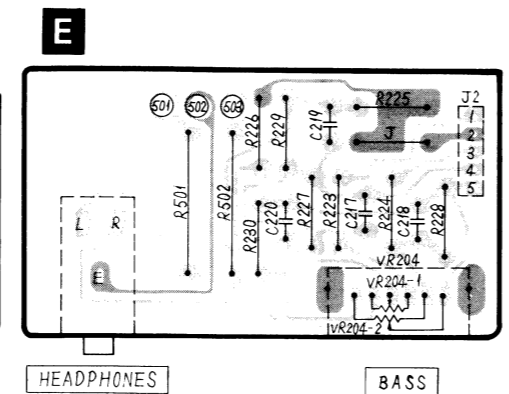
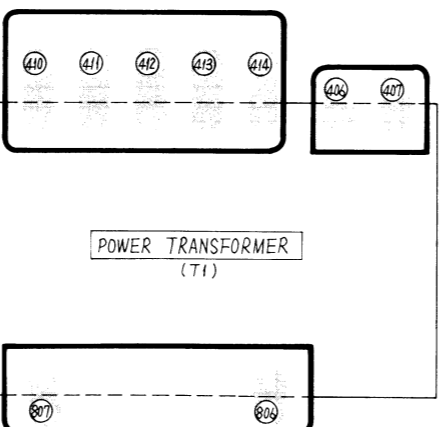
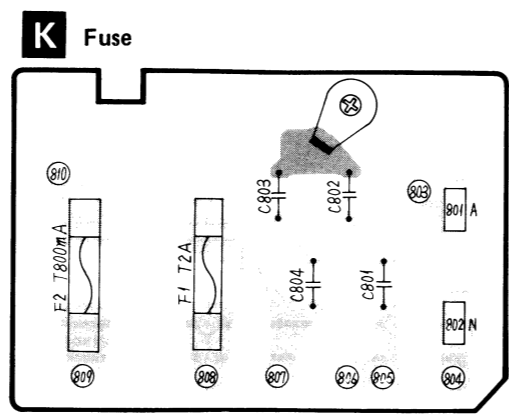
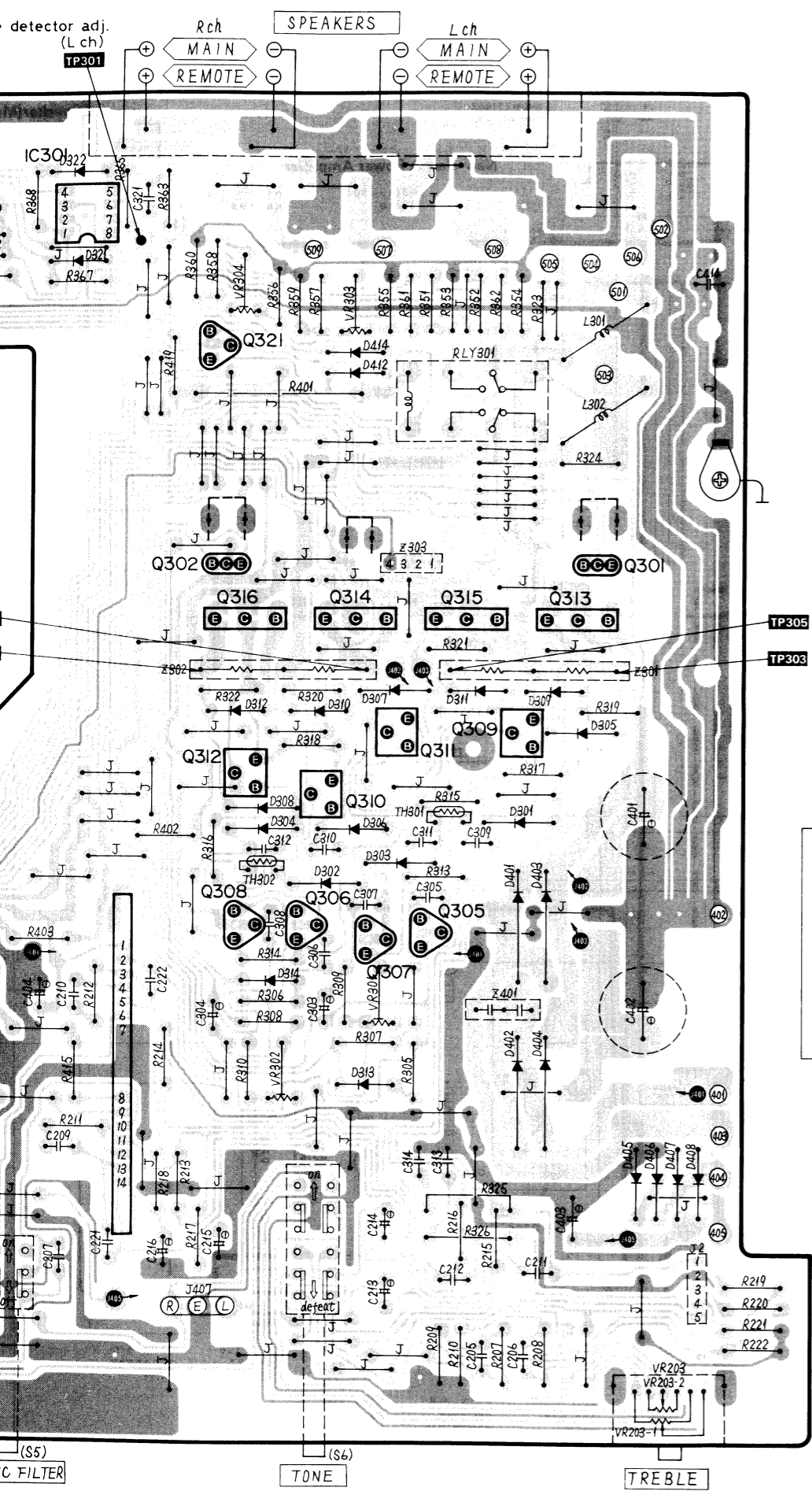
**B**



PHONO SELECTOR

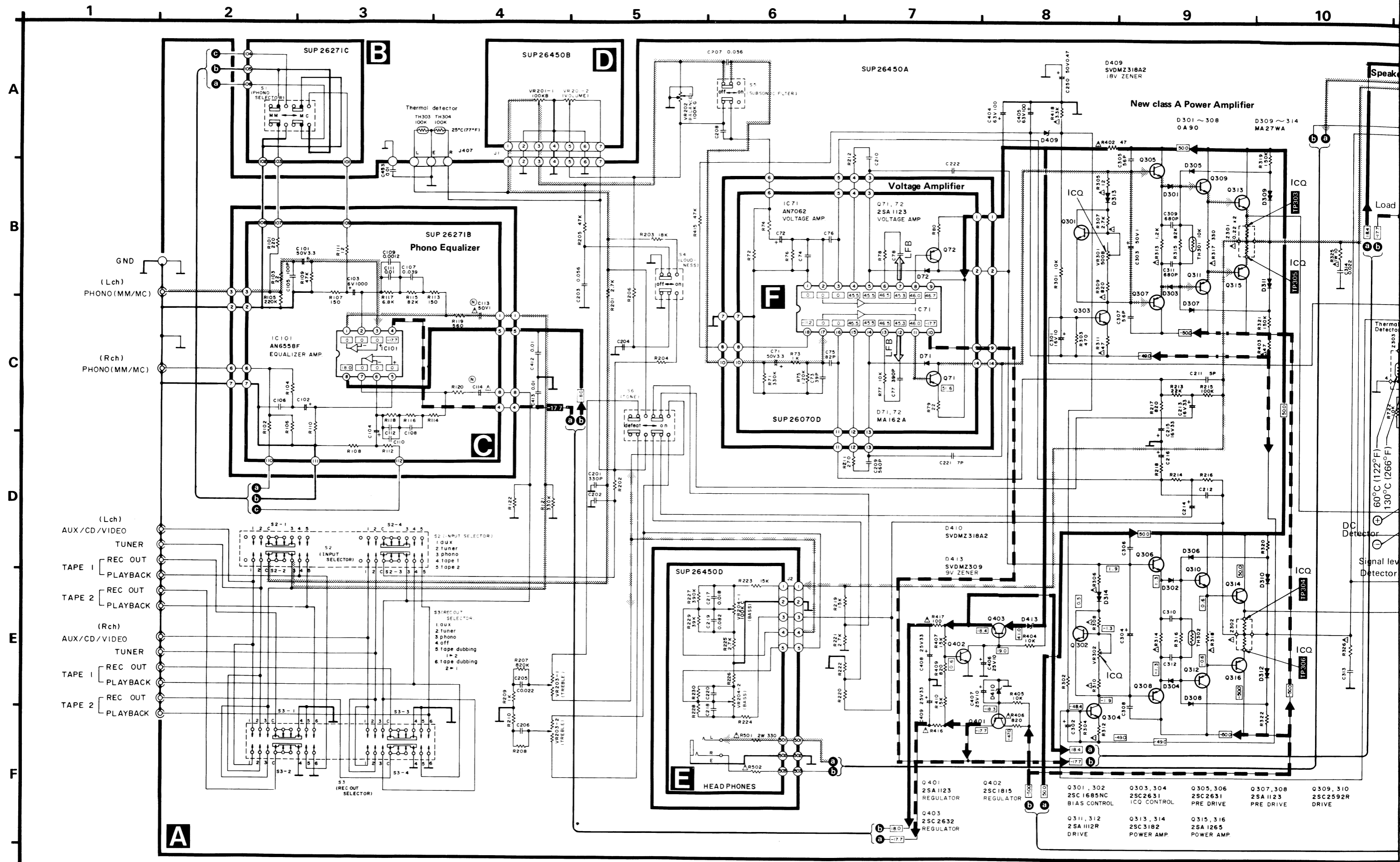
**H** Output indicator

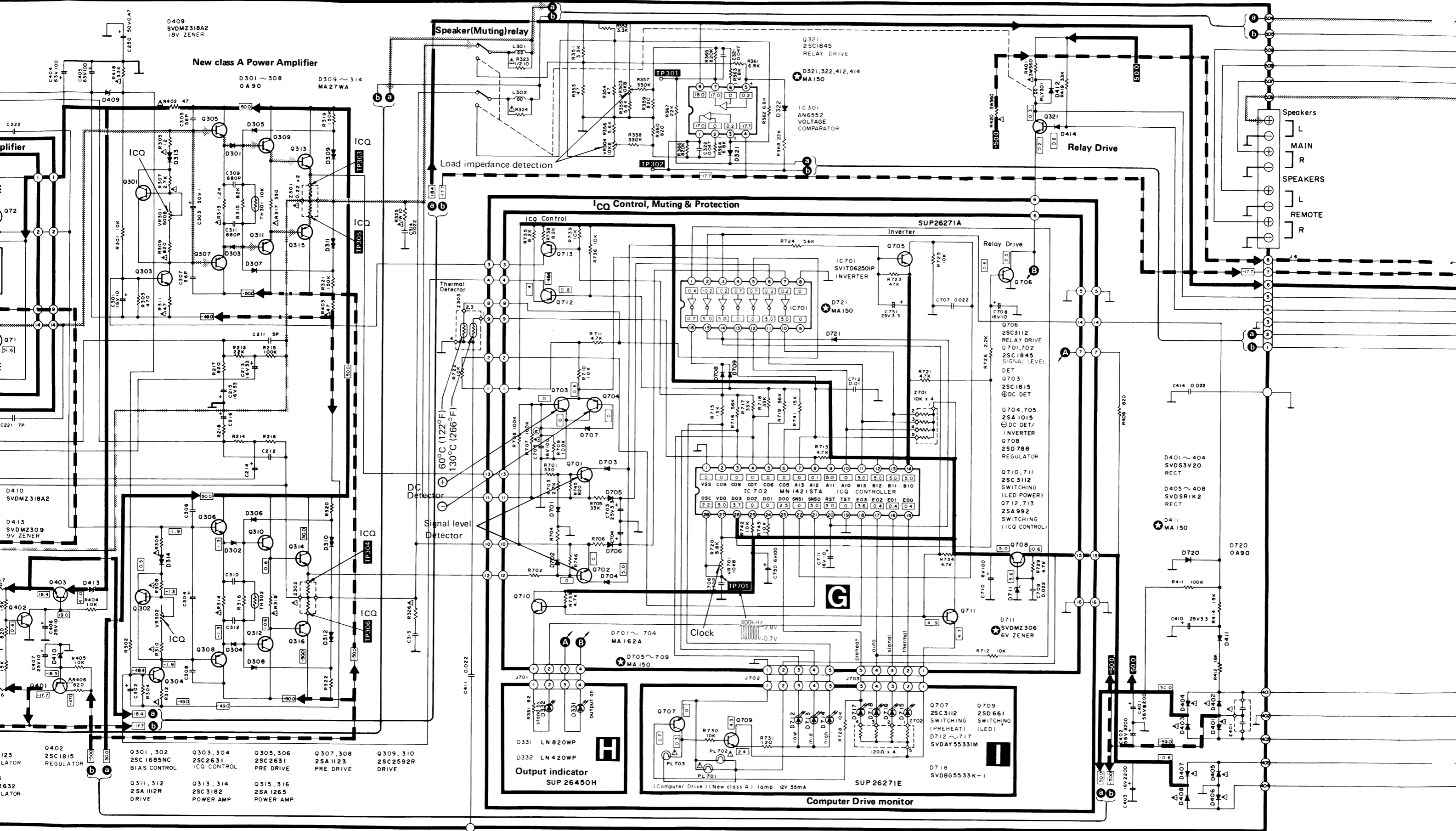






SCHEMATIC DIAGRAM



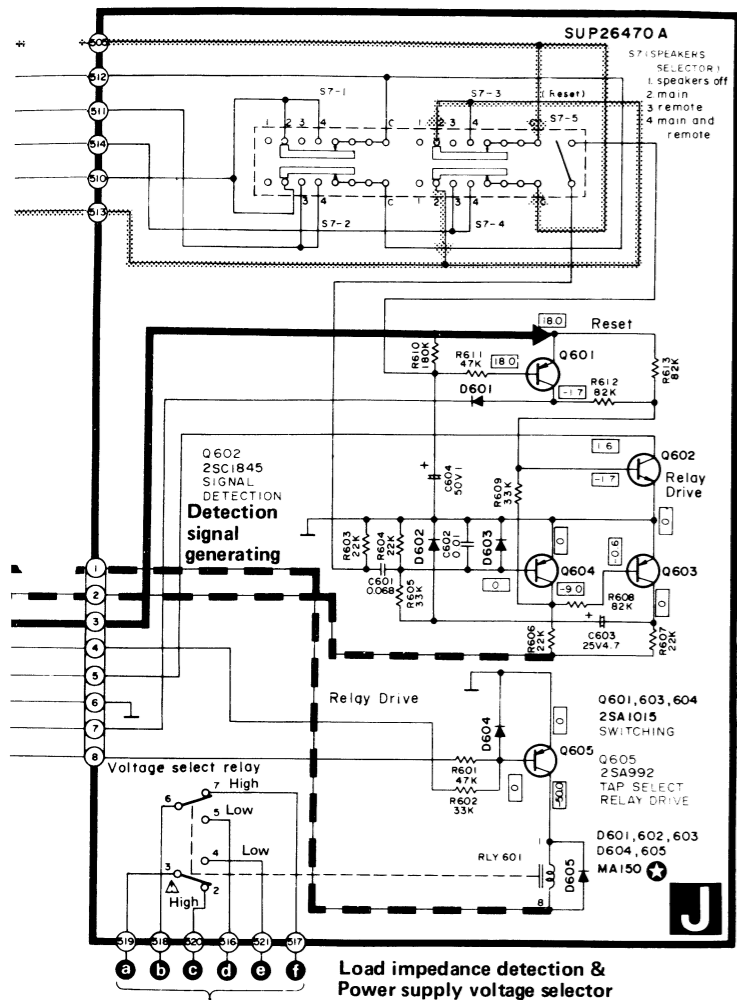


(This schematic diagram may be modified at any time with the development of new technology.)

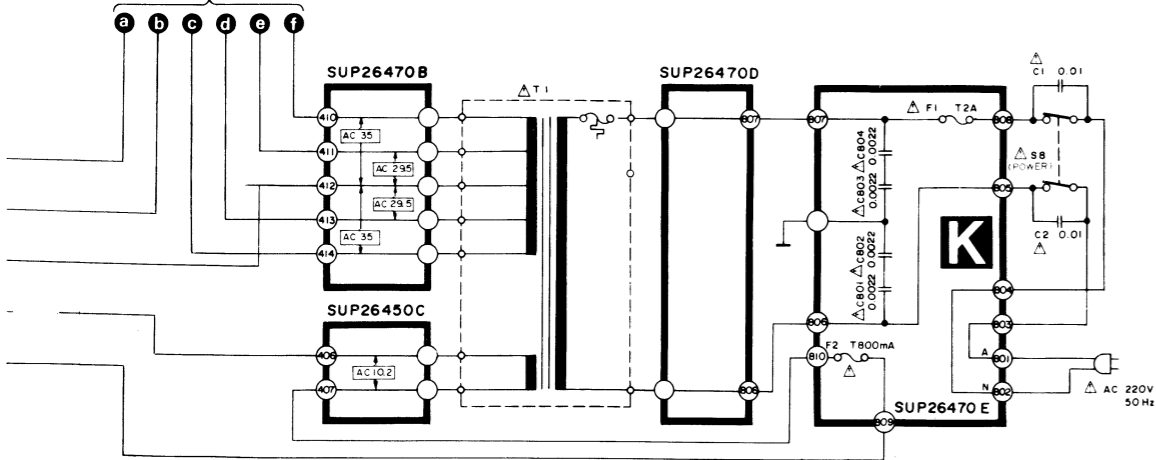
- The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with  $\Delta$  mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. 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), (EB), (Ei), (EK), (XL), (XA), (PA) and (PE) refer to the separate service manual (Order No. SD83012365C9-A)

Notes:

- S1** : Phono cartridge selector switch in "MM" position. MM  $\leftrightarrow$  MC
- 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
- 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
- S4** : Loudness switch in "off" position.
- S5** : Subsonic filter switch in "off" position. on  $\leftrightarrow$  off
- S6** : Tone switch in "defeat" position. defeat  $\leftrightarrow$  on
- S7** : Speaker selector switch in "main" position. Speakers off  $\leftrightarrow$  main  $\leftrightarrow$  remote  $\leftrightarrow$  main and remote
- S8** : Power source switch in "on" position.
- S9[XA, PA, PE, EK] only** : Voltage selector switch in "240V" position. 120V  $\leftrightarrow$  110V  $\leftrightarrow$  220V  $\leftrightarrow$  240V
- The headphone jack switch is being short-circuited. (With the headphone plug not inserted)
- Important safety notice:  
Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- $\square$  indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. (high tap)
- $\text{---}$  Phono signal lines
- $\text{---}$  Positive (+B) voltage lines
- $\text{---}$  Negative (-B) voltage lines



Load impedance detection & Power supply voltage selector



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 <sub>9</sub>	Output port C	It delivers Ico control signal through input port A (thermal sensor) and input port B (signal sensor). [Output "L"]
3	CO <sub>8</sub>		
4	CO <sub>7</sub>		
5	CO <sub>6</sub>		
6	CO <sub>5</sub>		
7	AI <sub>3</sub>	Input port A	When DC detection circuit of power amplifier operates, the input level becomes "H".
8	AI <sub>2</sub>		When 130°C (266°F) sensor of power amplifier operates, the input level becomes "H".
9	AI <sub>1</sub>		Not used in this unit
10	AI <sub>0</sub>	Input port B	When 60°C (122°F) sensor of power amplifier operates, the input level becomes "L".
11	BI <sub>3</sub>		Input level changes to "L" as effective output 2V signal sensor of power amplifier operates. (L ch.)
12	BI <sub>2</sub>		Not used in this unit
13	BI <sub>1</sub>	Output port E	Input level changes to "L" as effective output 2V signal sensor of power amplifier operates (R ch.)
14	BI <sub>0</sub>		Not used in this unit.
15	EO <sub>0</sub>		Indicator "thermal" lights up at "L" output.
16	EO <sub>1</sub>	Indicator "signal" lights up at "L" output.	
17	EO <sub>2</sub>	Indicator "auto" lights up at "L" output.	
18	EO <sub>3</sub>	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 <sub>0</sub>	Sensor input terminal	Conditional transfer (branch) is performed according to the input level.
22	SNS <sub>1</sub>		Input level changes to "H" as power amplifier output short-circuit operates.
23	DO <sub>0</sub>	Output port D	Output terminal for indicator "preheat" and preheating circuit operation. [Output "L"]
24	DO <sub>1</sub>		Not used in this unit.
25	DO <sub>2</sub>		Output relay turns ON with output at "H"
26	DO <sub>3</sub>	Power supply input terminal	Apply 5V.
27	VDD		OSC input terminal

Terminal guide of transistors, diodes and IC's

<p>AN7062 18pin AN6558F 8pin SVITD62501P 16pin MN1421STA 28pin</p>	<p>AN6552</p>	<p>2SA1123, 2SC1685NC 2SC2631, 2SC2632 2SC1845, 2SC1815 2SA1015, 2SC1845 2SA992, 2SC3112 2SD788</p>	<p>SVDS3V20, SVDSR1K2</p>
<p>2SC2592R, 2SA1112R</p>	<p>2SC3182, 2SA1265</p>	<p>2SD661</p>	<p>SVDMZ □□□□</p>
<p>MA162A Mark</p>	<p>OA90, MA150</p>	<p>MA27WA Red mark</p>	<p>LN820WP, LN420WP</p>
<p>SVDA Y5533K1M, SVDBG5533K-1</p>			

Notes: 1. 2.

Resistor	Part No.	Value
ERD	Car	
ERG	Me	

ERD10TLJ

Ref. No.

RESISTORS

R71, 72	S
R73, 74	S
R75, 76	S
R77, 78	S
R79, 80	S
R101, 102	S
R103, 104	S
R105, 106	S
R107, 108	S
R109, 110	S
R111, 112	S
R113, 114	S
R115, 116	S
R117, 118	S
R119, 120	S
R121, 122	S
R203, 204	S
R205, 206	S
R207, 208	S
R209, 210	S
R211, 212	S
R213, 214	S
R215, 216	S
R217, 218	S
R219, 220	S
R221, 222	S
R223, 224	S
R225, 226	S
R227, 228	S
R229, 230	S
R301, 302	S
R303, 304	S
R305, 306	S
R307, 308	S
R309, 310	S
R311, 312	S
R313, 314	S
R315, 316	S
R317, 318	S
R319, 320	S
R321, 322	S
R323, 324	S
R325, 326	S
R331	S
R351, 352	S
R353, 354	S
R355, 356	S
R357, 358	S
R359, 360	S
R361, 362	S
R363, 364	S



REPLACEMENT PARTS LIST

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

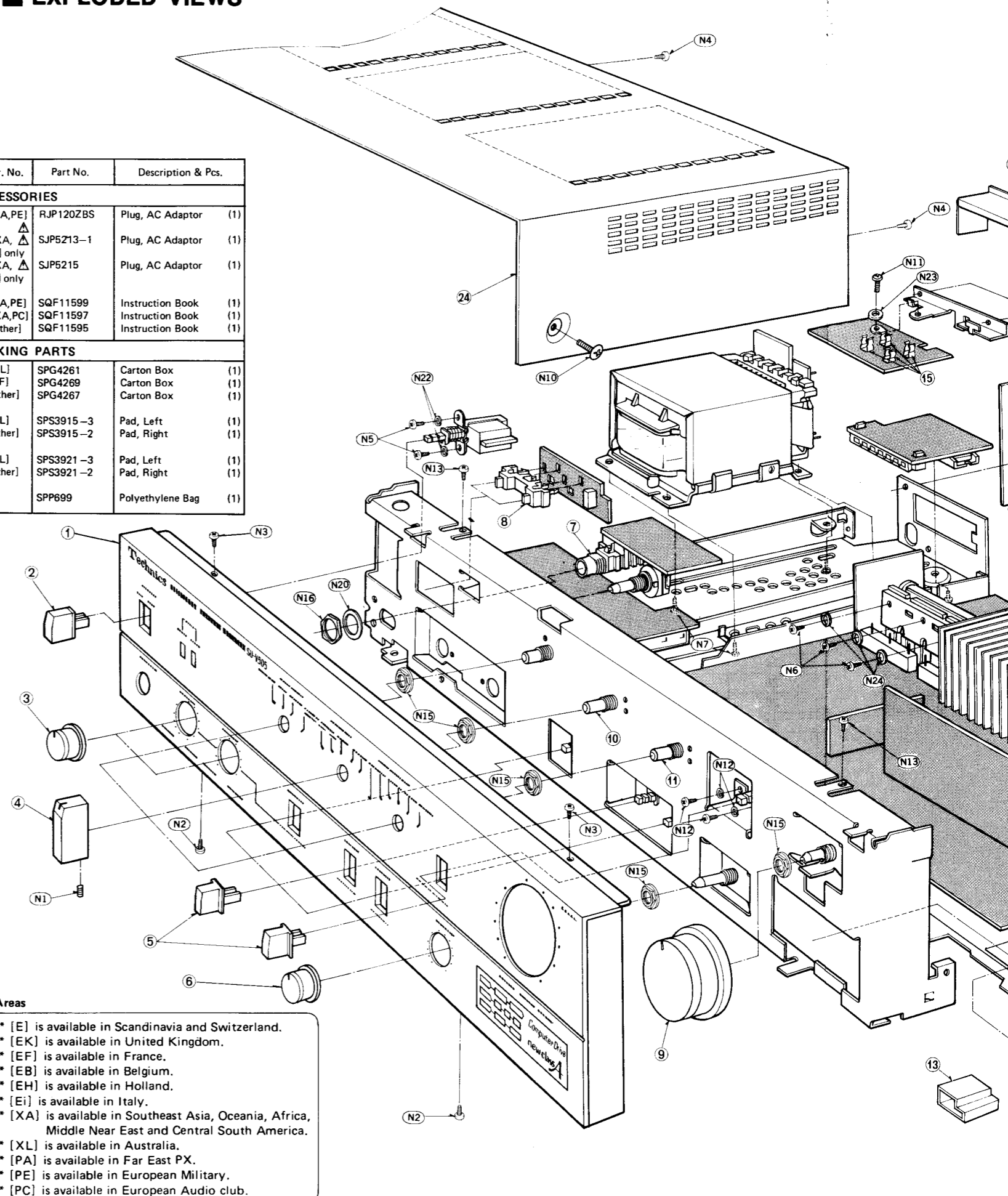
Black type model No. : SU-V505(K)

Ref. No.	Part No.	Description
<b>INTEGRATED CIRCUITS</b>		
IC71 IC101 IC301	AN7062 AN6558F AN6552F	Voltage Amplifier Equalizer Voltage Comparator Inverter Micro Computer (ICQ Control)
IC701 IC702	SVITD62501P MN1421STA	
<b>TRANSISTORS</b>		
Q71, 72 Q301, 302, Q303, 304 Q305, 306 Q307, 308	2SA1123-R 2SC1685-Q 2SC2631-R 2SC2631-R 2SA1123-R	Voltage Amplifier ICQ Control ICQ Control Pre Drive } Use Pre Drive } pair ranks
Q309, 310 Q311, 312 Q313, 314	2SC2592-R 2SA1112-R 2SC3182-R	Drive } Use pair Drive } ranks Power } Use Amplifier } pair ranks
Q315, 316	2SA1265-R	Power Amplifier ranks
Q321	2SC1845	Relay Drive
Q401 Q402 Q403 Q601, 603, 604	2SA1123-R 2SC1815-Y 2SC2632-R 2SA1015-Y	Regulator Regulator Regulator Reset & Detection Signal Generator
Q602 Q605 Q701, 702	2SC1845 2SA992 2SC1845	Relay Drive Relay Drive Signal Level Detector
Q703 Q704, 705	2SC1815-Y 2SA1015-Y	DC Detector DC Detector, Inverter
Q706, 710, 711	2SC3112	Relay Drive, Switching
Q707 Q708 Q709 Q712, 713	2SC3112 2SD788-D 2SD661-S 2SA992	Lamp Drive Regulator L.E.D. Drive ICQ Control
<b>DIODES</b>		
D71, 72 D301~308, 720 D309~314 D321, 322 D331	MA162A 20A90 MA27W-A MA162A LN820WP	Switching Sincro Bias Bias Switching L.E.D. Output ON (Orange)
D332	LN420WP	L.E.D. Stand-by (Amber)
D401~404 D405~408 D409, 410 D411, 412, 414	SVDS3V40 SVDSR1K2 SVDMZ318A2 MA162A	Rectifier Rectifier 18V, Zener Switching
D413 D601~605 D701~709 721 D711 D712~717	SVDMZ309A MA162A MA162A RVDEQA0106S SVDAY5533K1M	9V, Zener Switching Switching 6V, Zener L.E.D. Computer Drive (Yellow)
D718	SVDBG5533K-1	L.E.D. Computer Drive (Green)
<b>FUSES</b>		
F1	XBA2C20TR0	250V, T2A
F2 [EK, XA, PA, PE]	XBA2C40TR0	250V, T4A
F2 [E, EF, EH, EB, Ei, XL]	XBA2C08TR0	250V, T800mA

Ref. No.	Part No.	Description
<b>COILS</b>		
L301, 302	SLQY15G-30	Choke
<b>TRANSFORMERS</b>		
T1 [other] T1 [XL] T1 [EK, XA, PA, PE, PC]	SLT5U27-W SLT5U39-W SLT5N403	Power Source Power Source Power Source
<b>THERMISTORS</b>		
TH301, 302 TH303, 304	ERTD2ZHL103S RRT104	10k $\Omega$ 100k $\Omega$
<b>VARIABLE RESISTORS</b>		
VR201 VR202 VR203 VR204 VR301, 302 VR303, 304 VR701	EWJG2A066B15 EWHFNAF20G15 EWC57AF20012 EWC56A020C15 EVNK6AA00B52 EVNK6AA00B14 EVNM0AA00B14	Main, 100k $\Omega$ (B) Balance, 100k $\Omega$ (G) Treble, ICQ Control, 500 $\Omega$ (B) ICQ Control, 10k $\Omega$ (B) Clock OSC Control, 10k $\Omega$ (B)
<b>LAMPS</b>		
PL701~703	XAMR74S10	12V, 0.055A
<b>SWITCHES</b>		
S1 S2, 3 S4, 5 S6 S7 S8 S9 [EK, XA, PA, PE, PC] only	SSH1079 ESA2682 SSH2049 SSH1045 SSR183 ESB90227S ESE37219	Phono Selector Input & Record- ing Selector Sub Sonic, Loudness Tone Selector Speaker Selector Power Source Voltage Selector
<b>COMPONENT COMBINATIONS</b>		
Z301, 302 Z303 Z401 Z701 Z702	ERF3GBKR22N SXRPTH517F02 SXRFS203ZSM EXBP84103M EXBP84121M	3W, 0.22 $\Omega$ (x2) Thermal Detector 0.01 $\mu$ F (x2) 10k $\Omega$ (x4) 120 $\Omega$ (x4)
<b>RELAY</b>		
RLY301 RLY601	SSY107 SSY109	Muting Voltage Selector
<b>CABINET and CHASSIS PARTS</b>		
1 [other] 1 1 [PA, PE]	SYW617 SYW619 SYW621	Panel, Front Ass'y (1) Panel, Front Ass'y (1) Panel, Front Ass'y (1)
2 3 4 5 6 7 8	SBC337-1 SBN1153 SBN1151 SBC339 SBN1153 SJJ718 SMP303	Button, Power (1) Knob, Bass, Treble (2) Knob, Speaker, Rec, & Input (3) Button, Tone, Subsonic, & Loudness (3) Knob, Balance (1) Jack, Headphone (1) Holder, Output & L.E.D. (1)

Refer. No.	Part No.	Description & Pcs.
9	SBN1149	Knob, Volume & Selector (1)
10	ESA335012B	Switch, Rec. Selector (1)
11	ESA335013B	Switch, Speaker Selector (1)
12	SMP335-1	Holder, New Class A Indicator (1)
13	SDH545	Reflector Plate (1)
14	SHR401-1	Pin (4)
15	SJT347	Terminal, Fuse (2)
16	SKU9950-4	Bottom Board (1)
17	SKL249	Foot (4)
18	SJF4815-2	Terminal, Speaker (1)
19	SJF3051-3N	Terminal, Input (1)
20 [EK] 20 [XA, PA, PE, PC] 20 [XL] 20 [other]	SGP3590-1C SGP3590-2A SGP3590-3A SGP3590-1A	Panel, Rear (1) Panel, Rear (1) Panel, Rear (1) Panel, Rear (1)
21 [PA, PE] 21 [EK] 21 [XA, PC] 21 [other]	RJA52YA QFC1205M SJA111 QFC1207MA SJA88	Cord, Power Source (1) Cord, Power Source (1) Cord, Power Source (1) Cord, Power Source (1)
22 [XL] 22 [EK] 22 [other]	SHR131 SHR129 SHR127	Bushing, AC Cord (1) Bushing, AC Cord (1) Bushing, AC Cord (1)
23	SMX745	Insulation Sheet (1)
24 24	SKC1310S1 SKC1310BB1	Cabinet (1) Cabinet (1)
25 [XA, PA, PE, PC] 26 27	SJS601-2 SMX685 SHR301	Socket, AC Outlet (1) Cover (1) Clamper (2)
<b>SCREWS</b>		
N1 N2 N3 N4 N5 N6 N7 N8 N9	XXE4D5FZS XTB3+8BFN XTB3+8BFN XTB3+8BFN XSN3+6S XTB3+12BFN XTB4+10BFN XTN3+8BFN XTB3+8BFN	Speaker, Rec, Input Selector (3) Tapping, $\oplus$ 3x8 (2) Tapping, $\oplus$ 3x8 (2) Tapping, $\oplus$ 3x8 (3) $\oplus$ 3x6 (2) Tapping, $\oplus$ 3x12 (3) Tapping, $\oplus$ 4x10 (4) Tapping, $\oplus$ 3x8 (4) Tapping, $\oplus$ 3x8 (4)
N10 N10	SNE2095-2 SNE2095-3	Cabinet (2) Cabinet (2)
N11 N12 N13	XTB3+8BFN XSN3+6S XTB3+8BFN	Tapping, $\oplus$ 3x8 (2) $\oplus$ 3x6 (2) Tapping, $\oplus$ 3x8 (2)
<b>NUTS</b>		
N15 N16	SNE4021 XNS12	$\phi$ 12 (5) $\phi$ 12 (1)
<b>WASHERS</b>		
N20 N21 N22 N23 N24 N25	SNE59-1 XWA3B XWA3B XWG3 XWG3 XWG3	Spring, $\phi$ 3 (1) Spring, $\phi$ 3 (3) Spring, $\phi$ 3 (2) Plain, $\phi$ 3 (2) Plain, $\phi$ 3 (2) Plain, $\phi$ 3 (2)

EXPLODED VIEWS



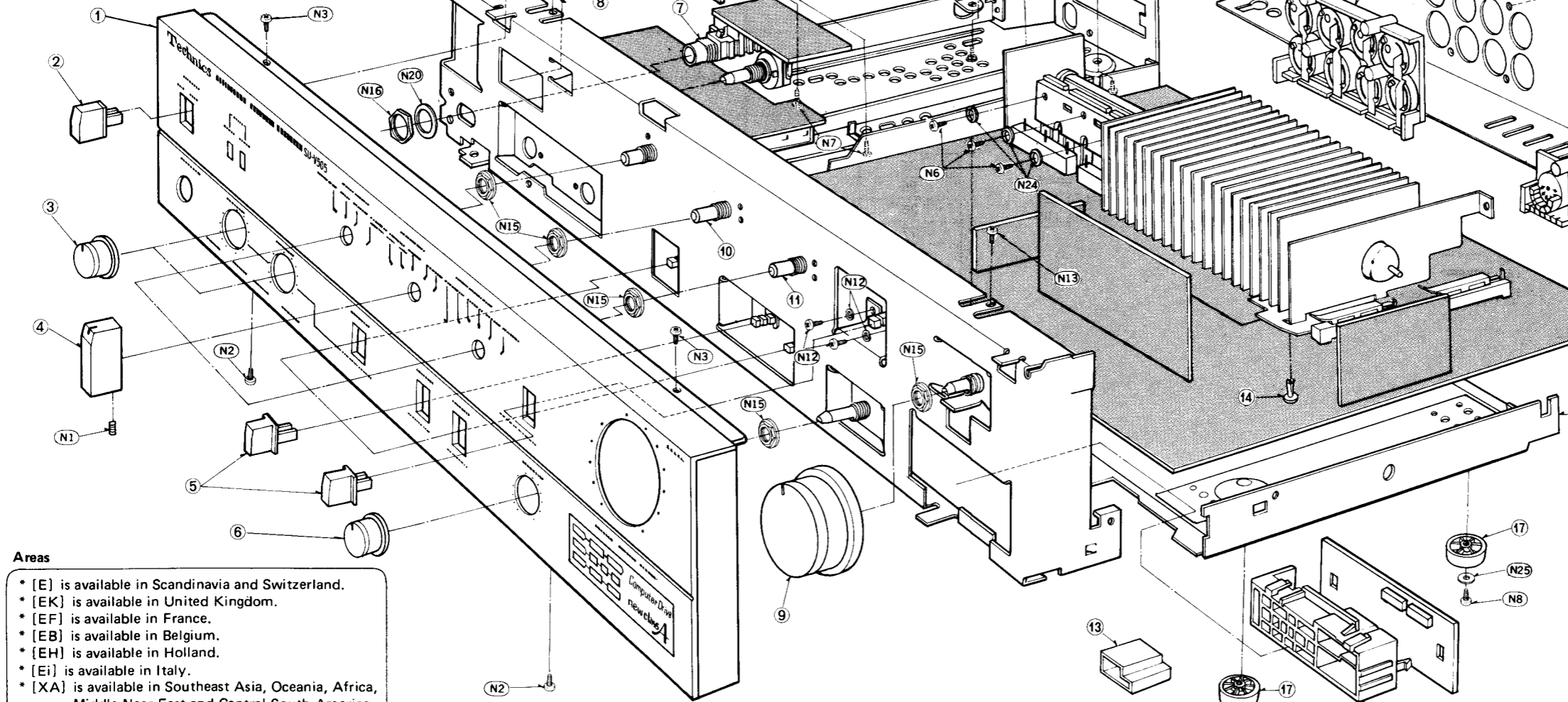
- Areas**
- \* [E] is available in Scandinavia and Switzerland.
  - \* [EK] is available in United Kingdom.
  - \* [EF] is available in France.
  - \* [EB] is available in Belgium.
  - \* [EH] is available in Holland.
  - \* [Ei] is available in Italy.
  - \* [XA] is available in Southeast Asia, Oceania, 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.

EXPLODED VIEWS

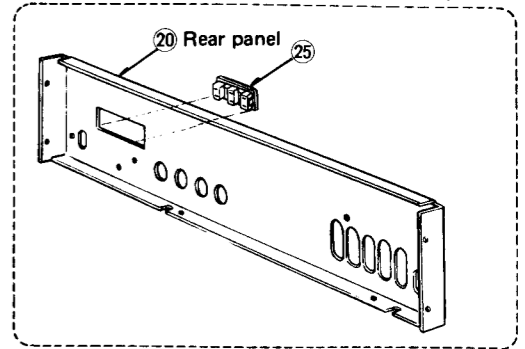
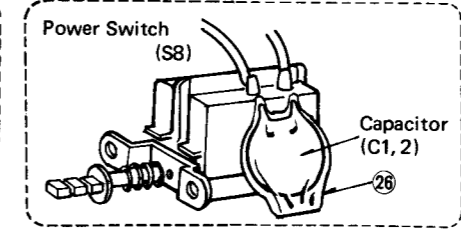
V505(K)

Description & Pcs.	Quantity
Volume & Rec. Selector	(1)
Speaker	(1)
Speaker	(1)
New Class A	(1)
Control Plate	(1)
Fuse	(4)
Power Board	(2)
Speaker	(1)
Input	(1)
Rear	(1)
Rear	(1)
Rear	(1)
Power Source	(1)
Power Source	(1)
Power Source	(1)
Power Source	(1)
g. AC Cord	(1)
g. AC Cord	(1)
g. AC Cord	(1)
Instruction Sheet	(1)
t	(1)
t	(1)
AC Outlet	(1)
r	(2)
r, Rec. Input	(3)
g. 3x8	(2)
g. 3x8	(2)
g. 3x8	(3)
3	(2)
g. 3x12	(3)
g. 4x10	(4)
g. 3x8	(4)
g. 3x8	(4)
t	(2)
t	(2)
g. 3x8	(2)
g. 3x8	(2)
(5)	
(1)	
φ3	(1)
φ3	(2)
φ3	(2)
φ3	(2)
φ3	(2)

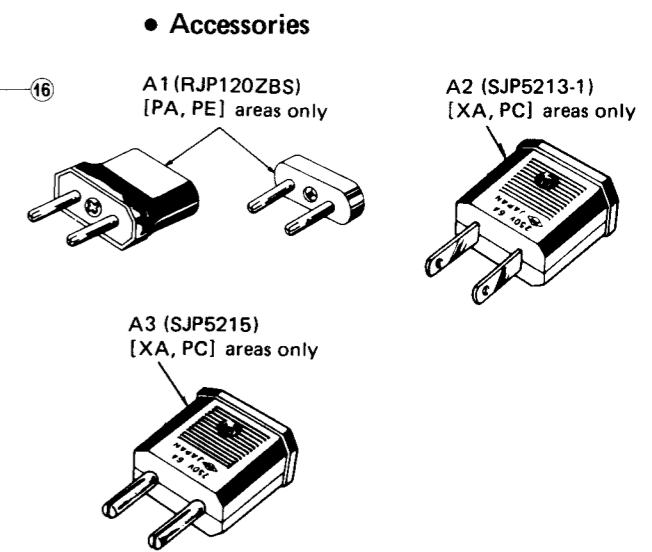
Refer. No.	Part No.	Description & Pcs.	Quantity
<b>ACCESSORIES</b>			
A1 [PA, PE]	RJP120ZBS	Plug, AC Adaptor	(1)
A2 [XA, PC] only	SJP5213-1	Plug, AC Adaptor	(1)
A3 [XA, PC] only	SJP5215	Plug, AC Adaptor	(1)
A4 [PA, PE]	SQF11599	Instruction Book	(1)
A4 [XA, PC]	SQF11597	Instruction Book	(1)
A4 [other]	SQF11595	Instruction Book	(1)
<b>PACKING PARTS</b>			
P1 [XL]	SPG4261	Carton Box	(1)
P1 [EF]	SPG4269	Carton Box	(1)
P1 [other]	SPG4267	Carton Box	(1)
P2 [XL]	SPS3915-3	Pad, Left	(1)
P2 [other]	SPS3915-2	Pad, Right	(1)
P3 [XL]	SPS3921-3	Pad, Left	(1)
P3 [other]	SPS3921-2	Pad, Right	(1)
P4	SPP699	Polyethylene Bag	(1)



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



- Areas**
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# Stereo Integrated Amplifier SU-V505/SU-V505(K)

- This booklet contains the specifications and adjusting procedures for SU-V505, written Germany, French and Spanish, and the circuits to be changed according to areas.
- File this manual together with the SU-V505 service manual (Order No. SD83012365C9).
- Diese Broschüre enthält die technischen Daten und die Beschreibungen der Justiermethoden für SU-V505 in deutscher, französischer und spanischer Sprache, sowie die entsprechend dem Gebiet zu ändernden Schaltungen.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für SU-V505 (Bestell-Nr. SD83012365C9) auf.
- Cette brochure contient les spécifications et les procédures de réglage pour le SU-V505, écrites en allemand, en français et en espagnol et explique les circuits devant être modifiés selon les régions.
- Classer ce manuel en même temps qu'avec le manuel de service du SU-V505 (N° d'ordre : SD83012365C9).
- Este librito contiene las especificaciones y procedimientos de ajuste para SU-V505, escritas en alemán, francés y español, y los circuitos a cambiarse según las áreas.
- Guardar este manual juntamente con el manual de servicio de SU-V505 (Pedido N°. SD83012365C9).

## DEUTSCH

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

#### (DIN 45 500)

#### ■ VERSTÄRKERTEIL

<b>Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz</b>	
beide Kanäle angesteuert	2 × 60W (4 Ω) 2 × 60W (8 Ω)
<b>Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz</b>	
beide Kanäle angesteuert	2 × 60W (4 Ω) 2 × 60W (8 Ω)
<b>Dauerton-Ausgangsleistung bei 1 kHz</b>	
beide Kanäle angesteuert	2 × 60W (4 Ω) 2 × 60W (8 Ω)
<b>Gesamtklirrfaktor</b>	
Nennleistung bei 20 Hz ~ 20 kHz	0,03% (4 Ω) 0,004% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,03% (4 Ω) 0,004% (8 Ω)
Nennleistung bei 1 kHz	0,007% (4 Ω) 0,003% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,004% (8 Ω)
halbe Nennleistung bei 1 kHz	0,002% (8 Ω)
-26 dB Leistung bei 1 kHz	0,01% (4 Ω)
50 mW Leistung bei 1 kHz	0,01% (4 Ω)
<b>Intermodulationsfaktor</b>	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,03%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,01%
<b>Leistungsbandbreite</b>	
beide Kanäle angesteuert bei -3 dB	5 Hz ~ 50 kHz (4 Ω, T.H.D. 0,03%) 5 Hz ~ 60 kHz (8 Ω, T.H.D. 0,02%)
<b>Restbrumm und Geräusch</b>	0,6 mV
<b>Dämpfungsfaktor</b>	30 (4 Ω), 60 (8 Ω)
<b>Eingangsempfindlichkeit und -impedanz</b>	
Phono - magnetisch (PHONO MM)	2,5 mV/47 kΩ
Phono - dynamisch (PHONO MC)	200 μV/220 Ω
Tuner, Aux/CD/Video	150 mV/22 kΩ
Tape 1 (TAPE 1)	150 mV/22 kΩ
Tape 2 (TAPE 2)	150 mV/22 kΩ
<b>Maximale TA-Eingangsspannung (1 kHz, eff.)</b>	
magnetisch (MM)	170 mV
dynamisch (MC)	15 mV
<b>Klangregler</b>	
Baßregler (BASS)	50 Hz, +10 dB ~ -10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ -10 dB
<b>Tiefenfilter</b>	30 Hz, -6 dB/Okt.

#### Geräuschabstand

##### Nennleistung (4 Ω)

##### Phono - magnetisch (PHONO MM)

76 dB (83 dB nach IHF, A)

##### Phono - dynamisch (PHONO MC) (250 μV)

64 dB (65 dB nach IHF, A)

##### Tuner, Aux/CD/Video, Tape

91 dB (nach IHF, A: 102 dB)

##### -26 dB Leistung (4 Ω)

##### Phono - magnetisch (PHONO MM)

71 dB

##### Phono - dynamisch (PHONO MC)

63 dB

##### Tuner, Aux/CD/Video, Tape

72 dB

##### 50 mW Leistung (4 Ω)

##### Phono - magnetisch (PHONO MM)

68 dB

##### Phono - dynamisch (PHONO MC)

62 dB

##### Tuner, Aux/CD/Video, Tape

68 dB

#### Frequenzgang

##### Phono

RIAA-Standardkurve

±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)

#### Gehörliche Lautstärkekorrektur (Loudness)

##### (bei -30 dB Ausgangsleistung)

50 Hz, +9 dB

#### Ausgangsspannung und -impedanz

##### Aufnahmeausgang (REC OUT)

150 mV

#### Kanalabweichung (Aux/CD/Video, 250 Hz ~ 6300 Hz)

±1 dB

#### Übersprechdämpfung (Aux/CD/Video, 1 kHz)

63 dB

#### Kopfhörerpegel und -impedanz

520 mV/330 Ω

#### Lautsprecherimpedanz

##### MAIN oder REMOTE

4 Ω ~ 16 Ω

##### MAIN und REMOTE

8 Ω ~ 16 Ω

#### ■ ALLGEMEINE DATEN

##### Leistungsaufnahme

370 W

##### Netzspannung

Für Kontinentaleuropa Wechselstrom 50 Hz/60 Hz, 220V

Für andere Länder Wechselstrom 50 Hz/60 Hz,

110V/120V/200V/240V

##### Abmessungen (B×H×T)

430 × 109 × 290 mm

##### Gewicht

7,6 kg

#### Bemerkung:

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

DEUTSCH

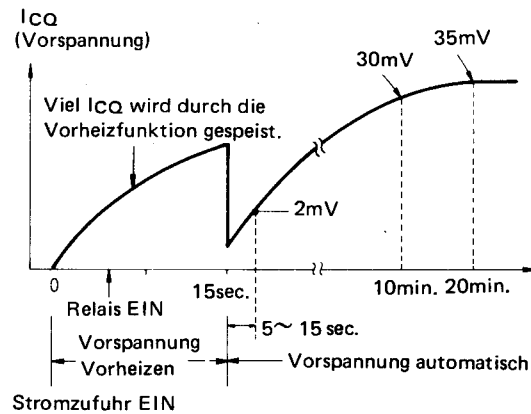
# ■ MESSUNGEN UND JUSTIERUNGEN

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

- (1) Die Stromzufuhr abschalten.
- (2) VR701 so abgleichen, daß die Zeit bis zum Einschalten des Relais 5~7 Sekunden vom Einschalten der Stromzufuhr beträgt.
  - \* Wenn VR701 entgegen dem Uhrzeigersinn (in Richtung A) gedreht wird, verlängert sich die Zeit (Frequenz verringert sich).
  - \* Wenn VR701 im Uhrzeigersinn (Richtung B) gedreht wird verkürzt sich die Zeit (Frequenz erhöht sich).
- (Anmerkung) Die Taktgeberfrequenz von 400kHz wird an TP701 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 (IcQ) (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 IcQ-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 TP303 (+) und TP305 (-) (linker Kanal) oder TP304 (+) und TP306 (-) (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 IcQ durch den Mikrocomputer gesteuert, und IcQ 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 IcQ 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 TP301 und dem Chassis (L. Kanal) oder TP302 und Chassis (R. Kanal) anschließen.
- (5) VR301 (L.Kanal) so justieren, daß die Spannung von TP301 -200mV beträgt.

**ANMERKUNG**  
Unbedingt zuerst VR301 (L. Kanal) vor VR302 (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 5 Sek. nach Einschalten des Netzschalters erreicht wird, und daß die Ausgangsleistung sofort beim Ausschalten der Stromzufuhr Null wird.



### ● 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" erlöscht.
    - 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 préavis.)

#### (DIN 45 500)

##### ■ SECTION AMPLIFICATEUR

Puissance de sortie continue de 20 Hz~20 kHz, les deux canaux en circuit	2 × 60W (4Ω)
Puissance de sortie continue de 40 Hz~16 kHz, les deux canaux en circuit	2 × 60W (8Ω)
Puissance de sortie continue à 1 kHz, les deux canaux en circuit	2 × 60W (4Ω)
Puissance de sortie continue à 1 kHz, les deux canaux en circuit	2 × 60W (8Ω)
<b>Distorsion harmonique totale</b>	
à puissance nominale (20 Hz~20 kHz)	0,03% (4Ω), 0,004% (8Ω)
à puissance nominale (40 Hz~16 kHz)	0,03% (4Ω), 0,004% (8Ω)
à puissance nominale (1 kHz)	0,007% (4Ω), 0,003% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,004% (8Ω)
à demi-puissance (1 kHz)	0,002% (8Ω)
puissance de -26 dB à 1 kHz	0,01% (4Ω)
puissance de 50 mW à 1 kHz	0,01% (4Ω)
<b>Distorsion d'intermodulation</b>	
à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω	0,03%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,01%
<b>Réponse de fréquences</b>	
les deux canaux en circuit, -3 dB 5 Hz~50 kHz (4Ω, T.H.D. 0,03%)	
5 Hz~60 kHz (8Ω, T.H.D. 0,02%)	
<b>Bruit et ronflement résiduels</b>	
Coefficient d'amortissement	30 (4Ω), 60 (8Ω)
<b>Sensibilité et impédance d'entrée</b>	
PHONO, AIMANT MOBILE (PHONO MM)	2,5 mV/47kΩ
PHONO, BOBINE MOBILE (PHONO MC)	200 μV/220Ω
SYNTOISATEUR, AUX/CD/VIDEO	150 mV/22kΩ
BANDE 1 (TAPE 1)	150 mV/22kΩ
BANDE 2 (TAPE 2)	150 mV/22kΩ
<b>PHONO (tension d'entrée maximum, 1 kHz RMS)</b>	
AIMANT MOBILE (MM)	170 mV
BOBINE MOBILE (MC)	15 mV
<b>Réponse de fréquence</b>	
PHONO	Courbe nominale RIAA, ±0,8 dB (30 Hz~15 kHz)
SYNTOISATEUR, AUX/CD/VIDEO, BANDE	5 Hz~140 kHz (-3 dB), +0 dB, -0,2 dB (20 Hz~20 kHz)
<b>Réglage de la tonalité</b>	
BASSES (BASS)	50 Hz, +10 dB~ -10 dB
AIGUS (TREBLE)	20 kHz, +10 dB~ -10 dB

##### Signal/Bruit

à puissance nominale (4Ω)

PHONO, AIMANT MOBILE (PHONO MM)	76 dB (83 dB, IHF, A)
PHONO, BOBINE MOBILE (PHONO MC) (250 μV)	64 dB (65 dB, IHF, A)
SYNTOISATEUR, AUX/CD/VIDEO, BANDE	91 dB (IHF, A: 102 dB)
	30 Hz -6 dB/oct.

##### Filtre subsonique

puissance de -26 dB (4Ω)

PHONO, AIMANT MOBILE (PHONO MM)	71 dB
PHONO, BOBINE MOBILE (PHONO MC)	63 dB
SYNTOISATEUR, AUX/CD/VIDEO, BANDE (TUNER, AUX/CD/VIDEO, TAPE)	72 dB

puissance de 50 mW (4Ω)

PHONO, AIMANT MOBILE (PHONO MM)	68 dB
PHONO, BOBINE MOBILE (PHONO MC)	62 dB
SYNTOISATEUR, AUX/CD/VIDEO, BANDE	68 dB

Compensateur physiologique (volume à -30 dB)

5 Hz, +9 dB

##### Tension de sortie et impédance

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	63 dB
Niveau de sortie des casques et impédance	50 mV/330Ω

##### Impédance de charge

PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)	4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)	8Ω~16Ω

##### ■ DIVERS

Consommation	370W
<b>Alimentation</b>	
Pour l'Europe	CA 50 Hz/50 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 109 × 290 mm
Poids	7,6 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).

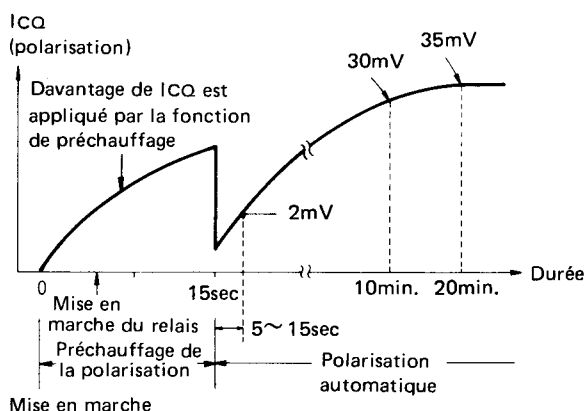
## MESURAGES ET RÉGLAGES

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

- (1) Mettre hors circuit l'alimentation.
  - (2) Ajuster VR701 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 VR701 tourné dans le sens inverse des aiguilles d'une montre (dans la direction de A). (La fréquence diminue.)
    - \* La durée raccourcit avec VR701 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 TP701. 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 OV 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 TP303 (+) et à TP305 (-) (canal de gauche) ou à TP304 (+) et TP306 (-) (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 TP301 et le châssis (canal de gauche) ou TP302 et le châssis (canal de droite).
- (5) Ajuster VR301 (canal de gauche) de telle sorte que la tension de TP301 soit de -200mV.
- (6) Ajuster VR302 (canal de droite) de telle sorte que la tension de TP302 soit de -200mV.

#### NOTA

S'assurer d'ajuster VR302 (canal de droite) après l'ajustement de VR301 (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 5 -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").

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

- (1) Appliquer un signal de sortie d'à peu près 1,5V à 1 kHz à la borne d'entrée AUX.  
 (2) 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.

- (3) 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

<b>Potencia continua de 20 Hz~20 kHz en ambos canales</b>	2 × 60W (4Ω) 2 × 60W (8Ω)
<b>Potencia continua de 40 Hz~16 kHz en ambos canales</b>	2 × 60W (4Ω) 2 × 60W (8Ω)
<b>Potencia continua de 1 kHz en ambos canales</b>	2 × 60W (4Ω) 2 × 60W (8Ω)
<b>Distorsión armónica total</b>	
<b>potencia de régimen a 20 Hz~20 kHz</b>	0,03% (4Ω) 0,004% (8Ω)
<b>potencia de régimen a 40 Hz~16 kHz</b>	0,03% (4Ω) 0,004% (8Ω)
<b>potencia de régimen a 1 kHz</b>	0,007% (4Ω) 0,003% (8Ω)
<b>mitad de potencia a 20 Hz~20 kHz</b>	0,004% (8Ω)
<b>mitad de potencia a 1 kHz</b>	0,002% (8Ω)
<b>-26 dB de potencia a 1 kHz</b>	0,01% (4Ω)
<b>50 mW de potencia a 1 kHz</b>	0,01% (4Ω)
<b>Distorsión por intermodulación</b>	
<b>potencia de régimen a 250 Hz: 8 kHz=4:1, 4Ω</b>	0,03%
<b>potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω</b>	0,01%
<b>Ancho de banda de potencia con ambos canales, -3 dB</b>	
5 Hz~50 kHz (4Ω, T.H.D. 0,03%)	
5 Hz~60 kHz (8Ω, T.H.D. 0,02%)	
<b>Zumbido residual y ruido</b>	0,6 mV
<b>Factor de amortiguamiento</b>	30 (4Ω), 60 (8Ω)
<b>Sensibilidad e impedancia de entrada</b>	
<b>TOCADISC. I. M. (PHONO MM)</b>	2,5 mV/47kΩ
<b>TOCADISC. B. M. (PHONO MC)</b>	200 μV/220Ω
<b>SINTON., AUX./CD/VIDEO (TUNER, AUX/CD/VIDEO)</b>	150 mV/22kΩ
<b>GRAB. 1 (TAPE 1)</b>	150 mV/22kΩ
<b>GRAB. 2 (TAPE 2)</b>	150 mV/22kΩ
<b>Voltaje máximo de entrada de PHONO (1 kHz, RMS)</b>	
<b>I. M. (MM)</b>	170 mV
<b>B. M. (MC)</b>	15 mV
<b>Filtro subsónico</b>	30 Hz, -6 dB/oct.
<b>Control de sonoridad (volumen a -30 dB)</b>	50 Hz, +9 dB
<b>Voltaje e impedancia de salida</b>	
<b>SAL. GRAB. (REC OUT)</b>	150 mV

#### Relación de señal a ruido

##### potencia de régimen (4Ω)

##### TOCADISC. I. M. (PHONO MM)

76 dB (83 dB, IHF, A)

##### TOCADISC. B. M. (PHONO MC) (250 μV)

64 dB (65 dB, IHF, A)

##### SINTON., AUX./CD/VIDEO, GRAB.

##### (TUNER, AUX/CD/VIDEO, TAPE)

91 dB (IHF, A: 102 dB)

##### -26 dB de potencia (4Ω)

##### TOCADISC. I. M. (PHONO MM)

71 dB

##### TOCADISC. B. M. (PHONO MC)

63 dB

##### SINTON., AUX./CD/VIDEO, GRAB.

##### (TUNER, AUX/CD/VIDEO, TAPE)

72 dB

##### 50 mW de potencia (4Ω)

##### TOCADISC. I. M. (PHONO MM)

68 dB

##### TOCADISC. B. M. (PHONO MC)

62 dB

##### SINTON., AUX./CD/VIDEO, GRAB.

##### (TUNER, AUX/CD/VIDEO, TAPE)

68 dB

#### Respuesta de frecuencia

##### TOCADISC. (PHONO)

curva RIAA estándar

±0,8 dB (30 Hz~15 kHz)

##### SINTON., AUX./CD/VIDEO, GRAB.

##### (TUNER, AUX/CD/VIDEO, TAPE)

5 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

#### Equilibrio de canales, AUX/CD/VIDEO 250 Hz~6 300Hz ±1 dB

#### Separación de canales, AUX/CD/VIDEO 1 kHz 63 dB

#### Impedancia y nivel de salida de los auriculares 520 mV/330Ω

#### Impedancia de carga

##### MAIN o REMOTE

4Ω ~16Ω

##### MAIN y REMOTE

8Ω ~16Ω

#### ■ GENERAL

#### Consumo de energía

370W

#### Alimentación de energía

##### Para Europa continental

CA 50 Hz/60Hz, 220V

##### Para otros países

CA 50 Hz/60 Hz, 110V/120V/200V/240V

#### Dimensiones (An.XAl.XProf.)

430 × 109 × 290 mm

#### Peso

7,6 kg

#### Nota:

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

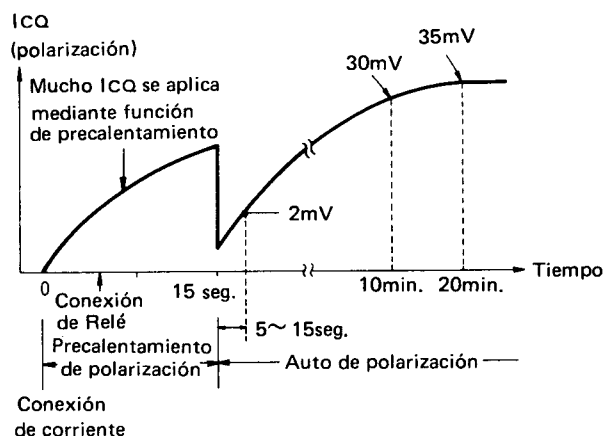
## MEDICIONES Y AJUSTE

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

- (1) Desconecte la fuente de alimentación.
- (2) Ajuste VR701 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 VR701 girado a la izquierda (en la dirección de A). (La frecuencia disminuye.)
  - \* El tiempo se acorta con VR701 girado a la derecha (en la dirección de B). (La frecuencia aumenta.)
- (Nota) La frecuencia de reloj de 400 kHz se obtiene en TP701. 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)

- (1) 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.
- (2) Gire completamente el control ICQ (VR301, 302) a la izquierda.
- (3) 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.
- (4) Conecte el voltímetro electrónico de CC a TP303 (+) y TP305 (-) (canal izquierdo) o TP304 (+) y TP306 (-) (canal derecho).
- (5) 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)

- (1) Conecte una carga con  $6,5\Omega$  (resistencia de carbón de 1/2W) o  $3,3\Omega$  conectados en serie y  $3,3\Omega$  (1/2W,  $\pm 5\%$ ) a los terminales de altavoz "principal".
- (2) Ponga el selector de altavoz en la posición "principal".
- (3) Conecte TP601 y chasis.
- (4) Conecte un voltímetro de CC entre TP301 y chasis (canal I.) o TP302 y chasis (canal D.)
- (5) Ajuste VR301 (canal I.) de manera que el voltaje de TP301 sea  $-200\text{mV}$ .
- (6) Ajuste VR302 (canal D.) de manera que el voltaje de TP302 sea  $-200\text{mV}$ .

#### NOTA

Asegúrese de ajustar VR302 (canal D.) después de ajustar VR301 (canal I.)

#### \* Chequeos de Circuito de Protección Después de Reparación y Ajuste

##### ● Chequeo de Silenciamiento con Conexión/Desconexión de Corriente.

- (1) Conecte voltímetro de CA y carga de  $8\Omega$  (resistor o altavoz) a terminales de altavoz principal.
- (2) Ajuste el volumen de sonido a un nivel apropiado.
- (3) Aplique señal de 1 kHz 100 mV a terminal de entrada AUX.
- (4) Asegúrese de que salida ha ganado 5 - 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

- (1) Aplique señal de salida de aprox. 1,5V a 1kHz a terminal de entrada AUX.
- (2) 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.

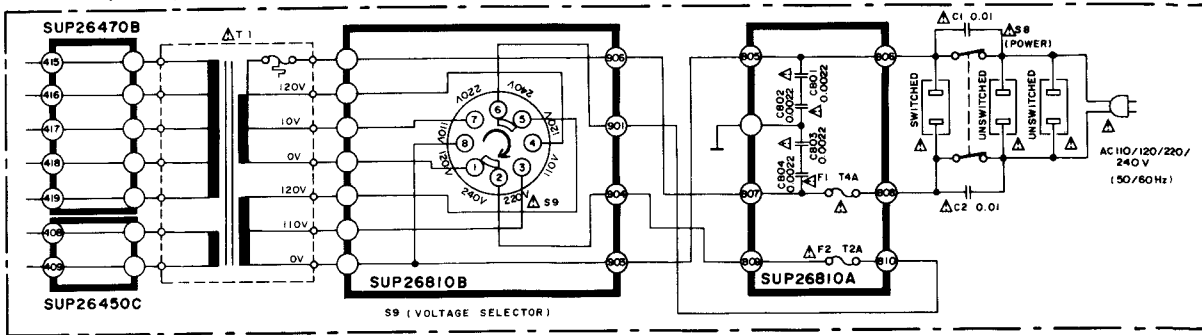
- (3) Asegúrese de que el estado de (2) ha ganado con circuito de salida abierto. Similarmente, chequee el canal derecho también.

\* 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.

# CIRCUITS TO BE CHANGED AND THE AREAS

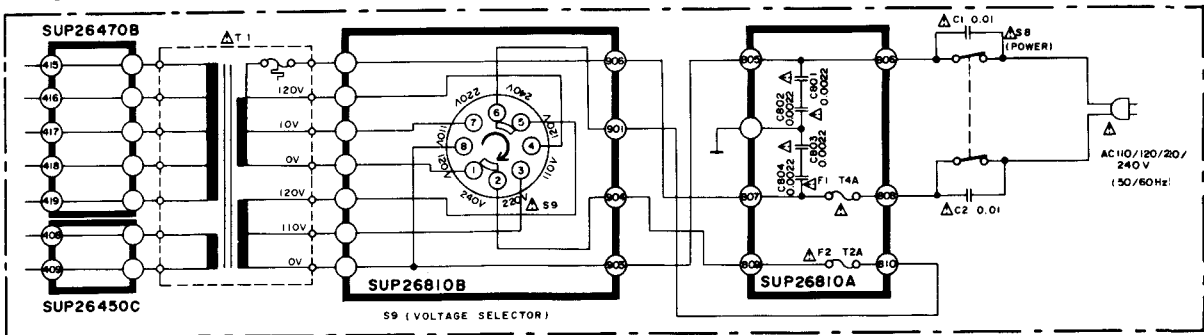
## • Power source circuit

For [XA], [PA], [PE] and [PC] areas.



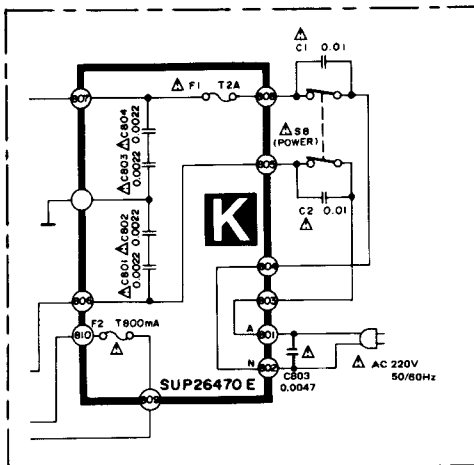
- \* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- \* [PA] is available in Far East PX.
- \* [PE] is available in European Military.
- \* [PC] is available in European Audio Club.

For [EK] area.



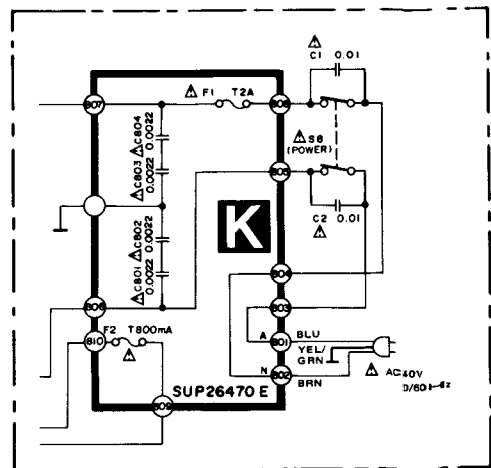
- \* [EK] is available in United Kingdom.

For [EF], [EH], [Ei] areas.



- \* [EF] is available in France.
- \* [EH] is available in Holland.
- \* [Ei] is available in Italy.

For [XL] area.



- \* [XL] is available in Australia.