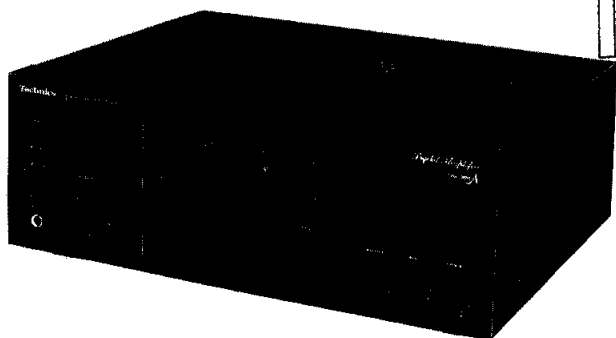


# Service Manual

Amplifier

Stereo Integrated Amplifier

SU-X502



RECEIVED  
25 MAY 1991  
RECEIVED

Color

(K) ..... Black Type

## Areas

Country Code	Area	Color
(E)	Continental Europe	(K)
(EB)	Great Britain	
(EG)	F.R. Germany & Italy	
(GC)	Third Region	
(GN)	Oceania	

## SPECIFICATIONS

(DIN 45 500)

## ■ AMPLIFIER SECTION

## DIN power output

1 kHz THD: 1 % 2 × 60 W (8 Ω)

## Total harmonic distortion

rated power at 1 kHz 1 % (8 Ω)

## Harmonic distortion

half power at 1 kHz (analog section) 0.009 % (8 Ω)

## Residual hum and noise

0.3 mV

## Damping factor

30 (8 Ω)

## Input sensitivity and impedance

PHONO 3 mV/47 kΩ

TUNER, TAPE 150 mV/22 kΩ

CD, VDP, VCR 200 mV/22 kΩ

## Maximum input voltage (1 kHz, RMS)

PHONO 100 mV

## S/N (rated power 8 Ω)

PHONO 75 dB (IHF, A: 79 dB)

TUNER, CD, TAPE, VDP, VCR 82 dB (IHF, A: 83 dB)

## Frequency response

PHONO RIAA standard curve

±0.8 dB (30 Hz~15 kHz)

TUNER, CD, TAPE, VDP, VCR 15 Hz~55 kHz (-3 dB)

CD, DAT, AUX (digital section) 15 Hz~20 kHz (-0.5 dB)

## Tone controls

BASS 50 Hz, +10 dB~-10 dB

TREBLE 20 kHz, +10 dB~-10 dB

## Muting

-20 dB

## Super bass

60 Hz, +8 dB

## Output voltage

TAPE, VCR REC OUT 150 mV

Channel balance, TUNER, 250 Hz~6,300 Hz ±1.0 dB

Channel separation, (TUNER, 1 kHz) (A SPEAKER) 55 dB

Headphones output level and impedance 520 mV/330 Ω

## Load impedance

A or B, A and B 8 Ω~16 Ω

SURROUND 8 Ω~16 Ω

## ■ VIDEO SECTION

## VIDEO OUTPUT

1 Vpp/75 Ω

## VCR MONITOR

1 Vpp/75 Ω

## ■ GENERAL

## Power consumption

330 W

## Power supply

For Great Britain and Oceania AC 50 Hz/60 Hz, 230~240 V

For Continental Europe, F.R. Germany and Italy

AC 50 Hz/60 Hz, 220 V

For Third Region AC 50 Hz/60 Hz, 110 V/127 V/220 V/240 V

Dimensions (W × H × D) 360 × 129 × 305 mm

(14-3/16" × 5-3/32" × 12")

## Weight

6.5 kg (14.3 lb.)

## Notes:

- Specifications are subject to change without notice. Weight and dimensions are approximate.
- Total harmonic distortion is measured by the digital spectrum analyzer.

# Technics

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	Page		Page
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## ■ BEFORE REPAIR

- (1) Turn off the power supply. Using a 10Ω, 5 W resistor connect both ends of power supply capacitors (C711, C712, 3300 μF) in order to discharge the voltage.
- (2) Before turning the power supply on, after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 50 Hz/60 Hz in NO SIGNAL mode should be shown below with respect to supply voltage 110 V/127 V/220 V/240 V.

Power supply voltage	AC 110 V	AC 120 V	AC 220 V	AC 230 V	AC 240 V
Consumed current 50 Hz	323~754 mA	297~694 mA	160~373 mA	154~360 mA	146~341 mA
Consumed current 60 Hz	316~737 mA	291~679 mA	156~365 mA	150~351 mA	144~336 mA

## ■ PROTECTION CIRCUITRY

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

\*No sound is heard when the power is switched ON.

\*Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlined below:

1. Switch OFF the power.
2. Determine the cause of the problem and correct it.
3. Switch ON the power once again.

**Note:**

When the protection circuitry functions, the unit will not operate unless the power is first switched OFF and then ON AGAIN.

## ■ ACCESSORIES

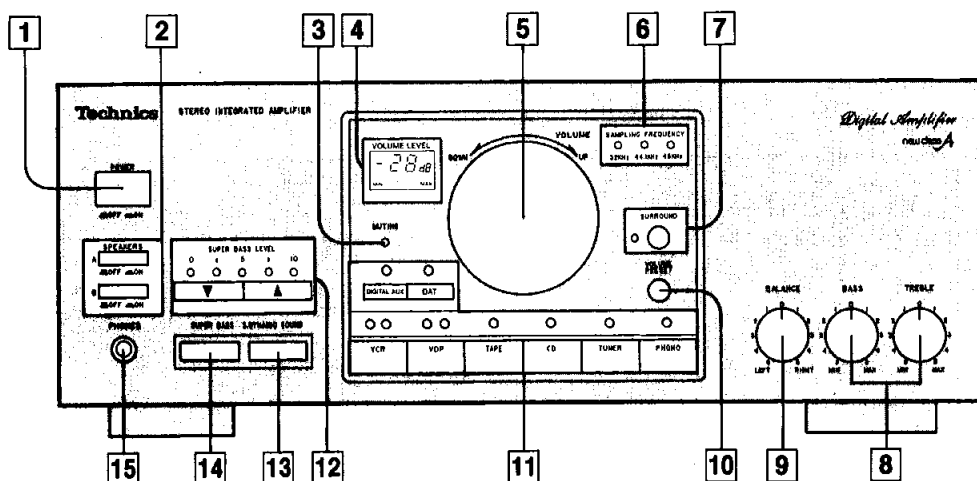
●AC power supply cord ..... 1  
 Configuration of AC power supply cord differs according to area.

●AC plug adaptor ..... 1

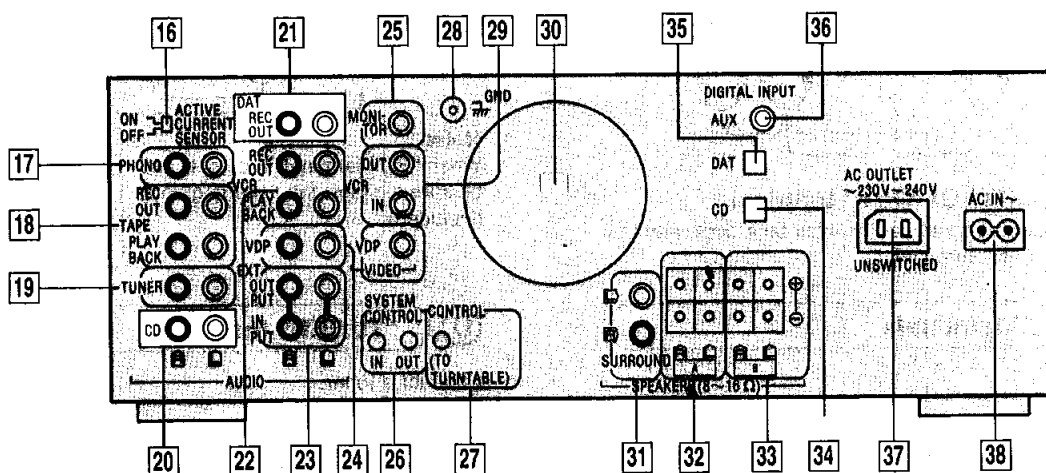
SJA187..... For (E) (EG) area only.  
 SJA173..... For (GN) area only  
 SJA188..... For (EB) area only.  
 RJA0004 ..... For (GC) area only.  
 SFDAC05E03 .... For others.

SJP9215 ..... For (GC) area only.

# LOCATION OF CONTROLS



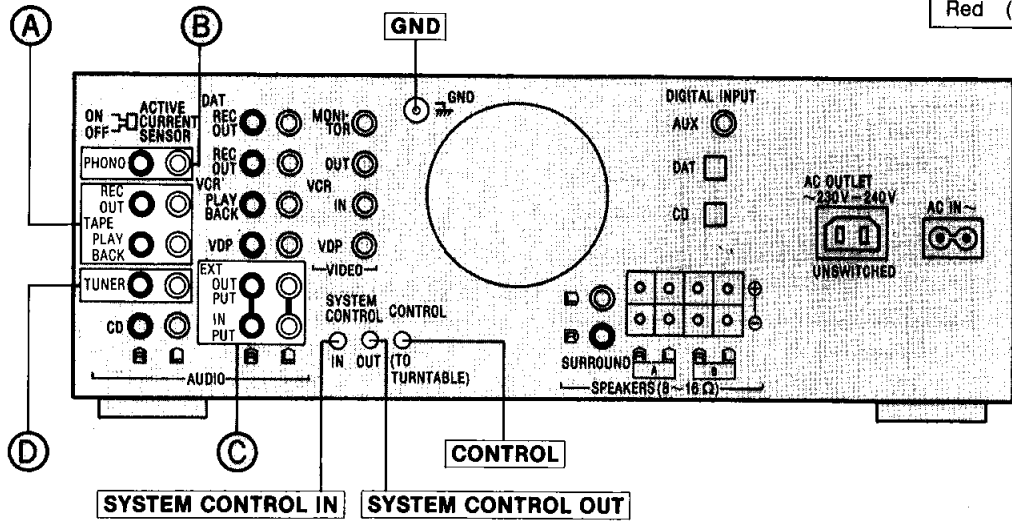
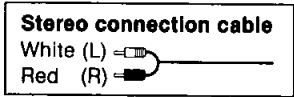
- |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>1 Power switch (POWER)</li> <li>2 Speaker selectors (SPEAKERS)</li> <li>3 Muting indicator (MUTING)</li> <li>4 Volume-level indicator (VOLUME LEVEL)</li> <li>5 Volume control (VOLUME)</li> <li>6 Sampling frequency indicators (SAMPLING FREQUENCY)</li> <li>7 Surround-sound button/indicator (SURROUND)</li> <li>8 Tone controls (BASS/TREBLE)</li> </ul> | <ul style="list-style-type: none"> <li>9 Balance control (BALANCE)</li> <li>10 Volume preset button (VOLUME PRESET)</li> <li>11 Input selectors/indicators</li> <li>12 Super bass level control buttons/indicators (SUPER BASS LEVEL)</li> <li>13 Super dynamic sound button/indicator (S. DYNAMIC SOUND)</li> <li>14 Super bass button/indicator (SUPER BASS)</li> <li>15 Headphones jack (PHONES)</li> </ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>16 Active current sensor switch</li> <li>17 Phono input terminal</li> <li>18 Tape rec out/playback terminal</li> <li>19 Tuner input terminal</li> <li>20 CD Input terminal</li> <li>21 DAT recout terminal</li> <li>22 VCR recout/playback terminal</li> <li>23 EXT output/input terminal</li> <li>24 VDP input terminal</li> <li>25 MONITOR terminal</li> <li>26 System control IN/OUT terminal</li> <li>27 Control terminal (to turntable)</li> </ul> | <ul style="list-style-type: none"> <li>28 GND terminal</li> <li>29 VCR out/in terminal</li> <li>30 Cooling fan</li> <li>31 Surround-sound speaker terminal</li> <li>32 Main speaker A terminal</li> <li>33 Main speaker B terminal</li> <li>34 CD digital input terminal</li> <li>35 DAT digital input terminal</li> <li>36 AUX digital input terminal</li> <li>37 AC outlet</li> <li>38 AC inlet</li> </ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# CONNECTIONS

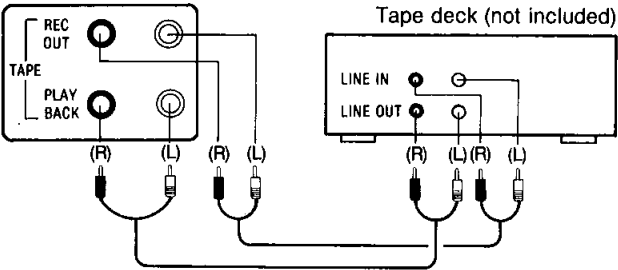
Make connections to each component in the system by using stereo connection cables (not included). See the operating instructions of the tuner (ST-X902L) for details.



## Connecting audio components

### A "TAPE" terminals

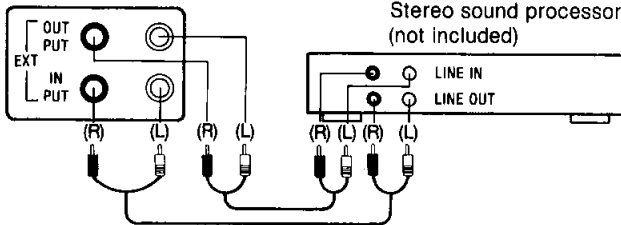
Connect a tape deck.

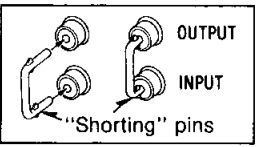


■ **"SYSTEM CONTROL OUT" terminal**  
 This terminal is used to connect a Technics tape deck with the "SYSTEM CONTROL IN" terminal.

### C "EXT" terminals

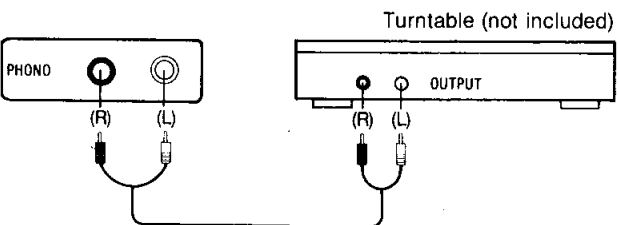
Connect a stereo sound processor.



**Note:**  
 When these terminals are not in use, be sure to insert the "shorting" pins (included).  


### B "PHONO" terminals

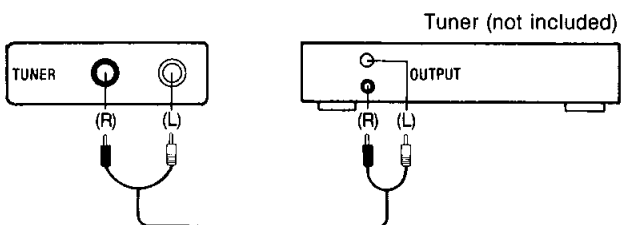
Connect a turntable.



■ **"GND" terminal**  
 This terminal is for use with a turntable which has a ground wire.

### D "TUNER" terminals

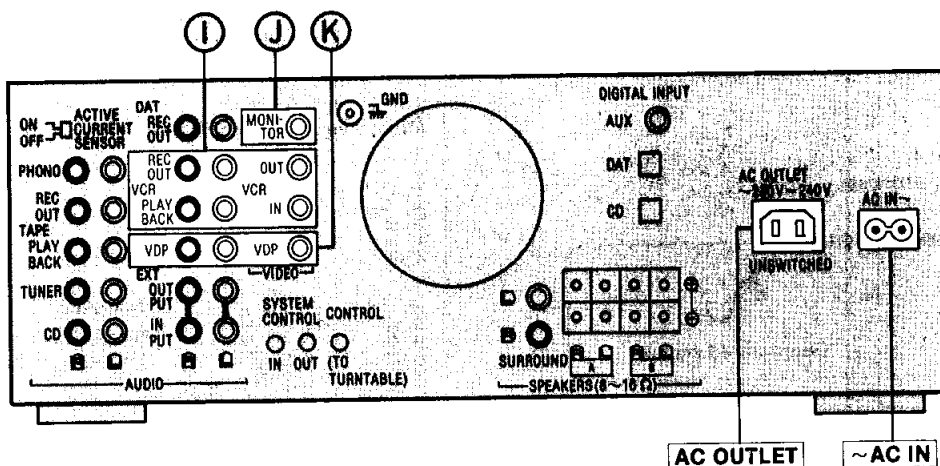
Connect a tuner.



■ **"SYSTEM CONTROL IN" terminal**  
 This terminal is used to connect a Technics tuner with the "SYSTEM CONTROL OUT" terminal.

■ **"CONTROL" terminal**  
 This terminal is used to connect a Technics turntable with the "REMOTE/SYNCHRO REC" terminal.

Make connections to each component by using stereo connection cables (not included) and video connection cables (not included).

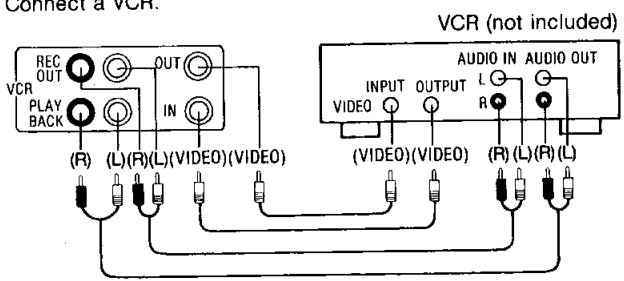


AC OUTLET      ~AC IN

### Connecting video equipment

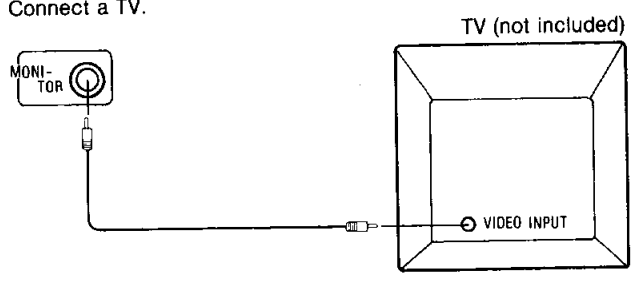
#### I "VCR" terminals

Connect a VCR.



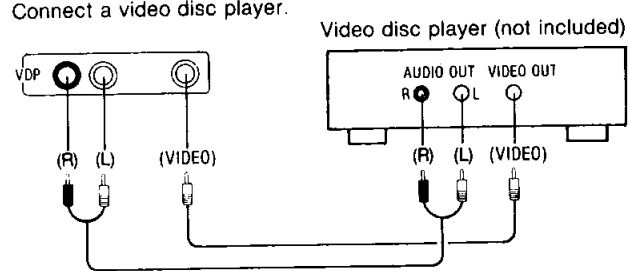
#### J "MONITOR" terminal

Connect a TV.



#### K "VDP" terminals

Connect a video disc player.



### AC outlet ("AC OUTLET")

Do not connect video equipment (such as a TV, etc.) to the AC outlet of this unit. (This outlet is intended for audio equipment.) Do not exceed the indicated power ratings when connecting to this outlet.

#### "UNSWITCHED" outlet:

Power is always available, regardless of power switch. Audio equipment rated up to 60 W can be connected here.

#### Note:

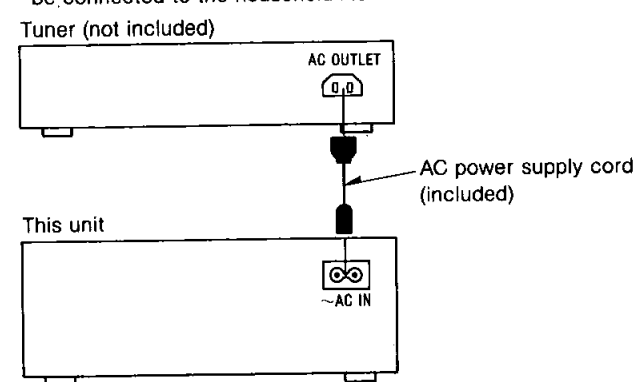
The configuration of the AC outlet differs according to area.

### AC power supply cord

Connect the AC power supply cord (included) after all other cables and cords are connected.

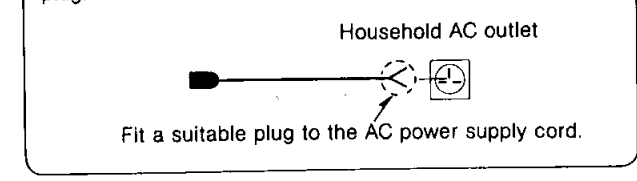
#### Notes:

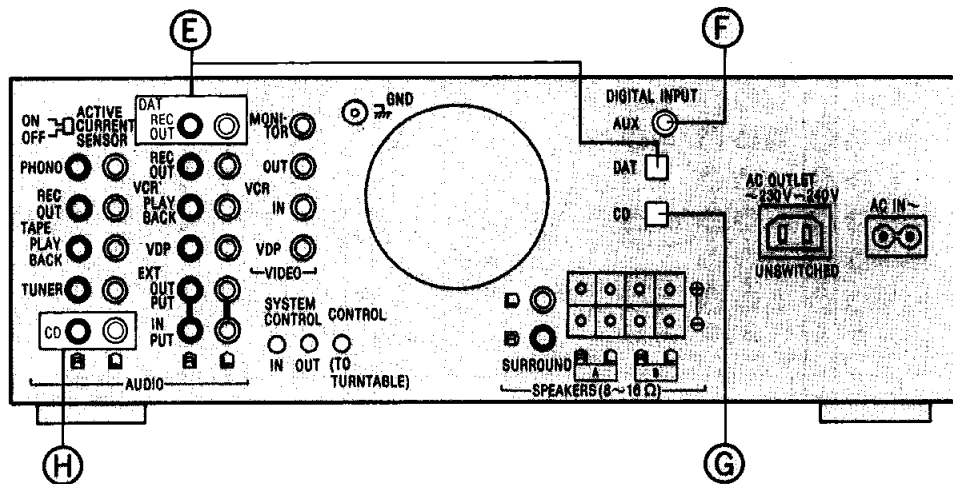
- Configuration of the AC outlet and AC power supply cord differs according to area.
- If this unit is not to be connected with the tuner, the cord is to be connected to the household AC outlet.



### For United Kingdom

Cut off and dispose of the plug and replace with a suitable plug.

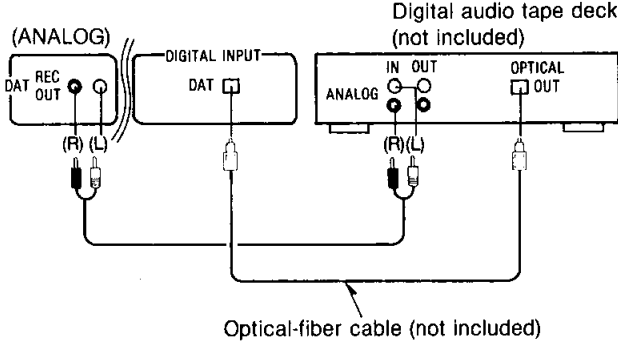




**Connecting audio components**

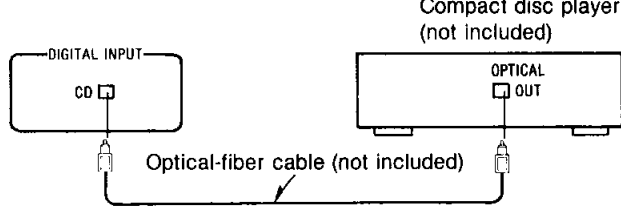
**E "DAT" terminals (ANALOG/DIGITAL)**

Connect a digital audio tape deck. Recordings can be made to the digital audio tape deck.



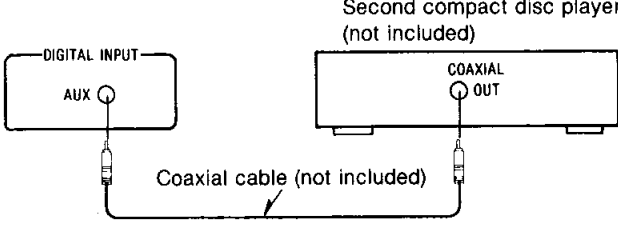
**G "CD" terminal (DIGITAL)**

Connect a compact disc player.



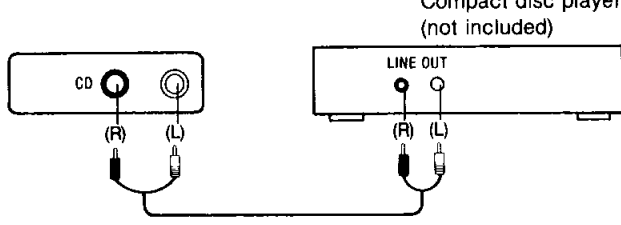
**F "AUX" terminal (DIGITAL)**

Connect a second compact disc player, etc.



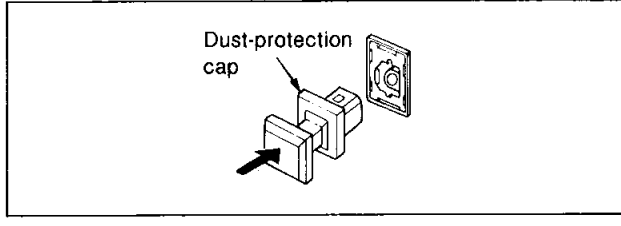
**H "CD" terminals (ANALOG)**

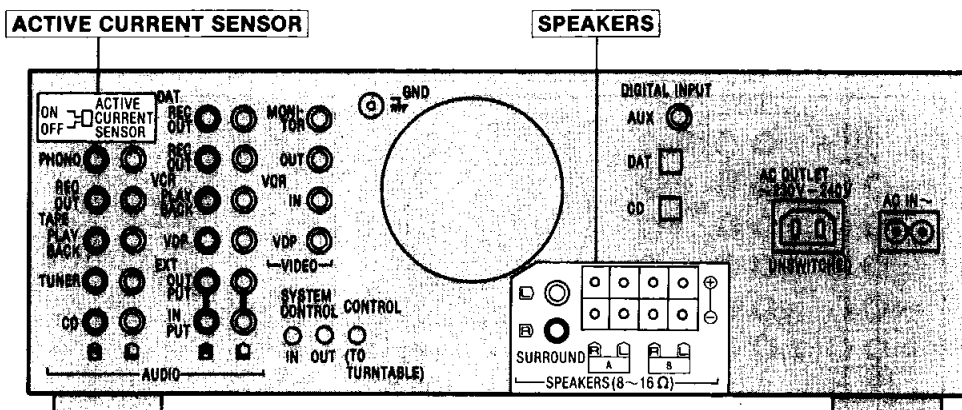
Connect a compact disc player.



**"DIGITAL INPUT" (DAT, CD) terminals of this unit**

These terminals are protected by dust-protection caps to avoid damage by dust, etc. Remove the caps only when the "DIGITAL INPUT" terminals are to be used. When these terminals are not being used, attach the caps as shown in the illustration at right.





## Connection of speaker systems

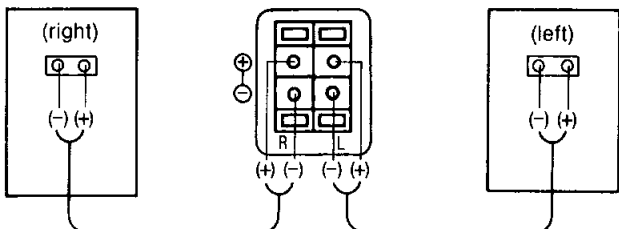
Three pairs of speaker systems (main, second, surround-sound) can be connected to this unit.

Speaker systems that can be connected to any of the speaker connection terminals of this unit are speaker systems with an impedance of 8 to 16 ohms.

Make connections to each speaker system by using speaker cords (not included).

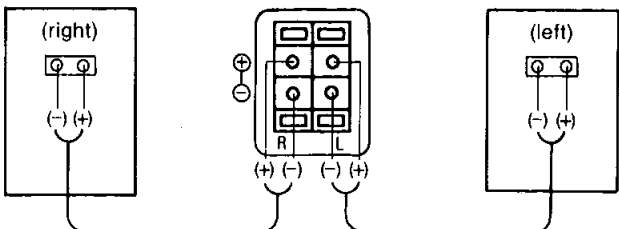
### Main speaker systems (not included)

Connect to the "A" terminals.



### Second speaker systems (not included)

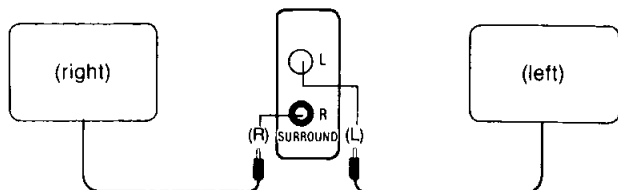
Connect to the "B" terminals.



### Surround-sound speaker systems (not included)

Connect to the "SURROUND" terminals.

- Be sure to connect both speaker systems. If only one side is connected, no sound will be heard.



### How to use the active current sensor

The selector is used to enjoy powerful super-bass sound.

**ON:** Switch ON when connecting the Technics system speakers (SU-X902: SB-CS90, SU-X502: SB-CS90/CS70).

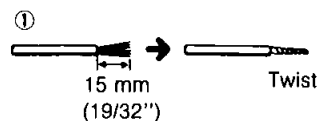
**OFF:** Switch OFF when connecting speakers other than Technics system speakers.

**Notes:**

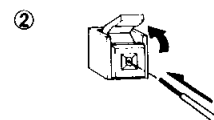
- When connecting speakers other than system speakers, sound from the speakers may not be heard if the selector is pressed ON, because the protecting circuit on the amplifier becomes active.
- The active current sensor activates only for the speaker systems connected to the "A" terminals.

### To connect cords to terminals

- Strip off the outer covering, and twist the center conductor.



- Tilt the lever back and insert the cord.



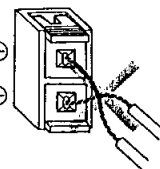
- Close the lever and pull the cord gently to be sure that it is secure.

**Note:**

Be sure to only connect positive (+) cords to positive (+) terminals, and negative (-) cords to negative (-) terminals.

**Note:**

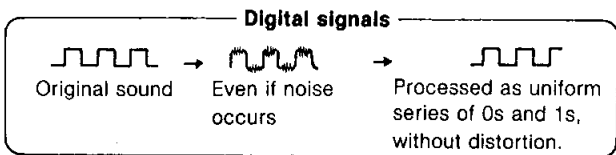
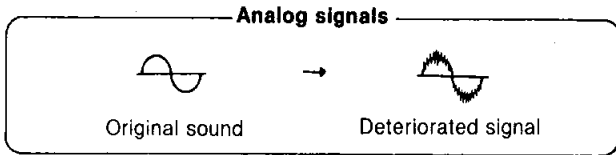
To prevent damage to circuitry, never short-circuit the plus (+) and minus (-) speaker wire.



# ■ DIGITALIZATION OF AUDIO SIGNALS

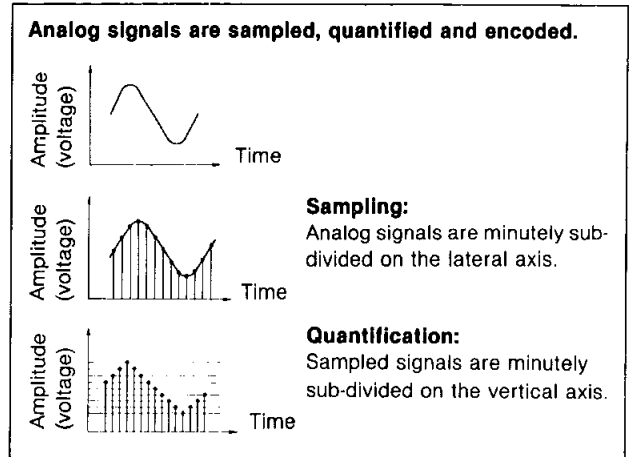
## ■ Why digitize?

- Audio signals are analog signals with a continuous form.
- When these audio signals are subjected to repeated electronic processing (recording, playback, etc.), they become noisy and distortion occurs, thus resulting in deterioration of the sound quality.
- When these signals are first digitized before processing, they have the following advantages that prevent deterioration of the sound quality:
  - (1) Resistance to noise
  - (2) Extremely low distortion
  - (3) Flat, even frequency response

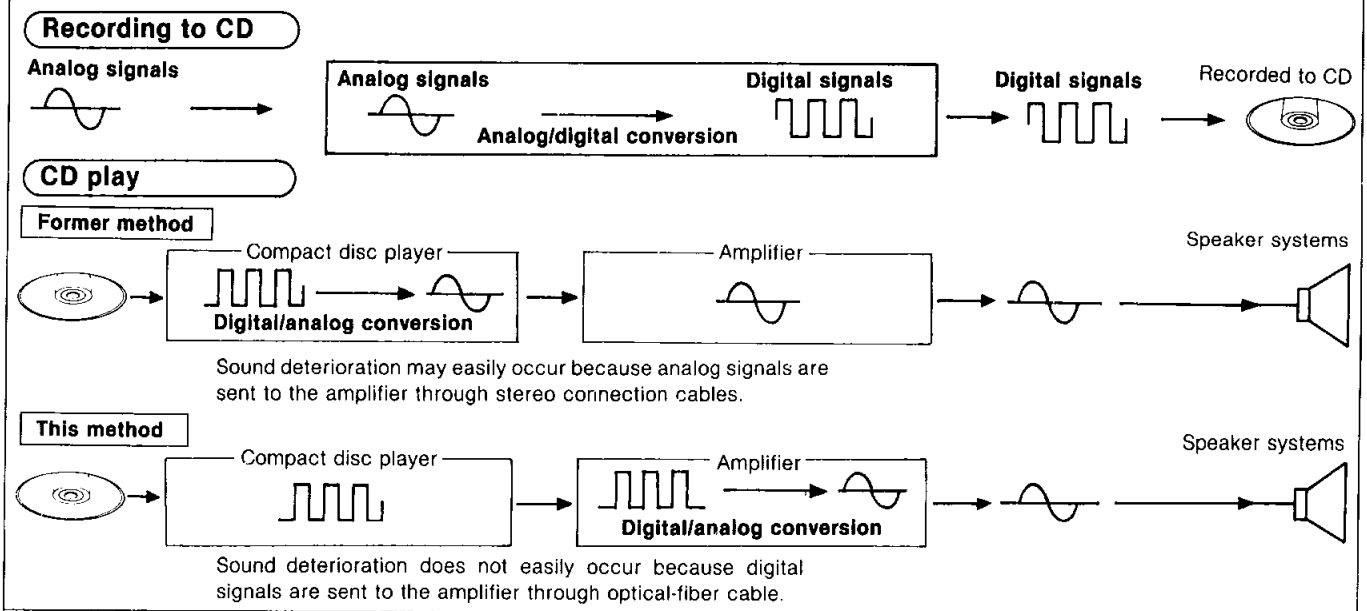


## ■ How signals are digitized

If it is known to what degree of minuteness the human ear can distinguish sounds, it is then possible, by using that data as the standard reference, to digitize them by dividing analog signals into minute pieces, after which they can be transmitted with a high degree of precision, and thereafter recorded and played back in the digitized format.



## Digitalization example (recording to CD and play of CD)



### What the sampling frequency is

The sampling frequency expresses the degree of minuteness to which signals can be cut, relative to a certain specified time interval, during sampling.  
 For compact disc sound:  
 Analog signals are cut 44,100 times (i.e., 44.1 kHz) during one second.  
 This 44.1 kHz is, therefore, the sampling frequency for compact disc sound.

### What analog/digital conversion is

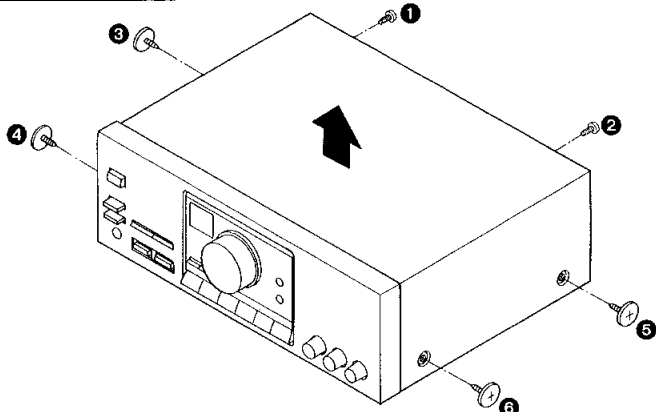
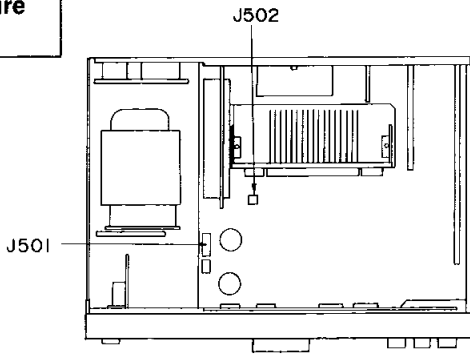
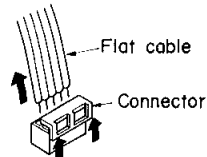
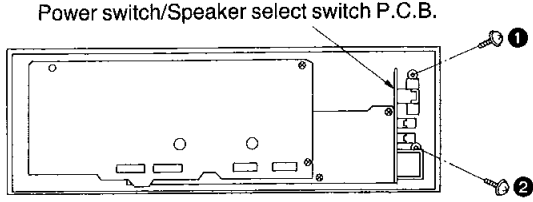
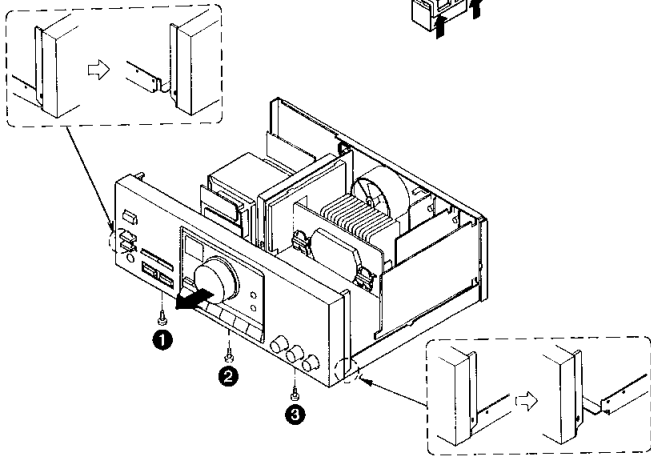
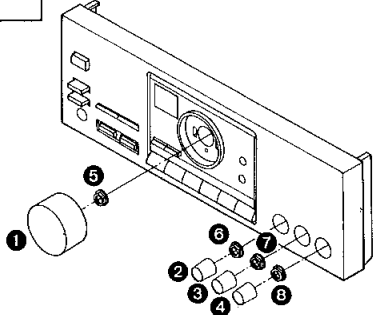
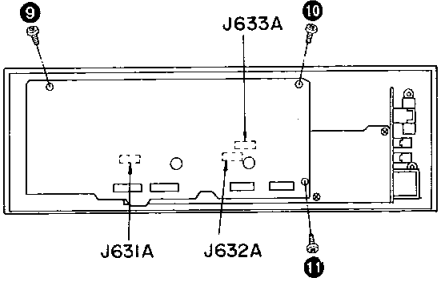
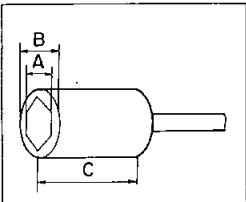
Audio signals (analog signals) are taken out (sampled) at certain fixed time intervals. The points at which this sampling frequency occurs are digitally encoded and converted to digital signals.

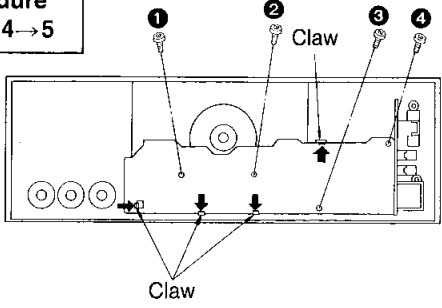
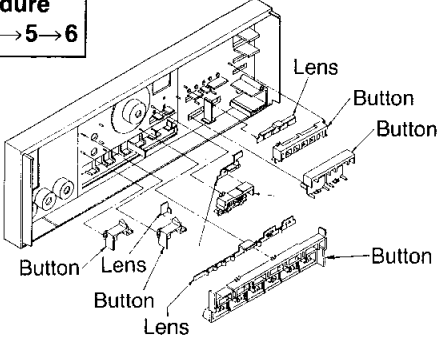
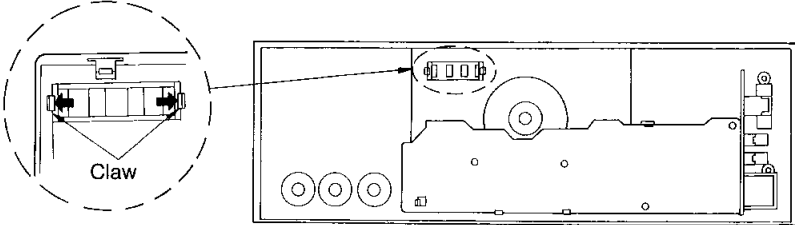
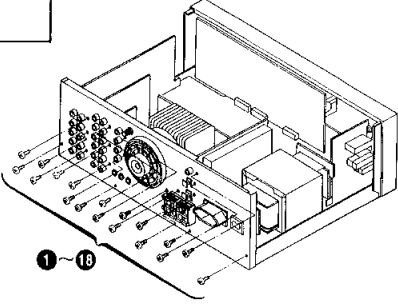
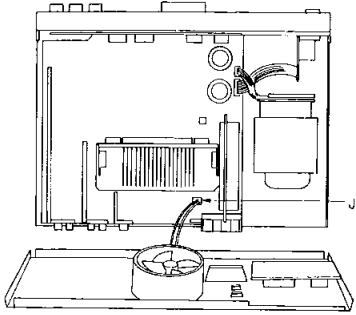
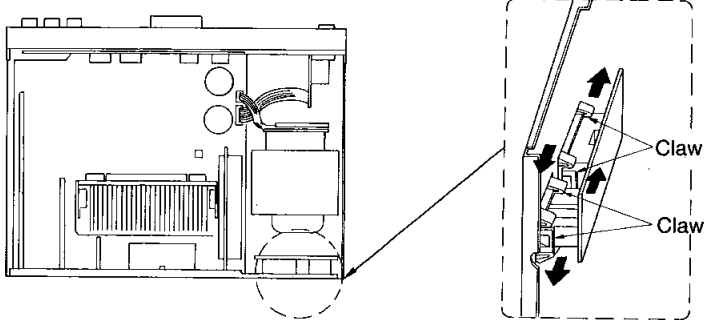
### What digital/analog conversion is

Each sampling frequency point is returned (converted) to voltage, thus converting digital signals to the analog signals that we can hear.



# DISASSEMBLY INSTRUCTIONS

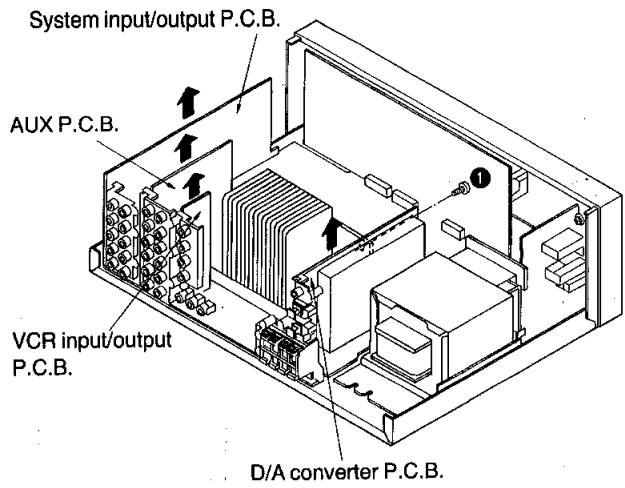
<p>Ref. No. 1</p>	<p>Removal of the Cabinet</p>	<p>Ref. No. 2</p>	<p>Removal of the Front Panel Unit</p>
<p>Procedure 1</p>	 <ol style="list-style-type: none"> <li>Remove the 6 screws (1~6).</li> <li>Remove the cabinet in the direction of the arrow.</li> </ol>	<p>Procedure 1→2</p>	 <ol style="list-style-type: none"> <li>Remove the 2 connectors (J501, J502).</li> </ol> <p>—Removal of the Connector—</p> 
<p>Ref. No. 3</p>	<p>Removal of the Power Switch/Speaker Select Switch P.C.B.</p>		
<p>Procedure 1→2→3</p>	 <p>Power switch/Speaker select switch P.C.B.</p> <ul style="list-style-type: none"> <li>Remove the 2 screws (1, 2).</li> </ul>		 <ol style="list-style-type: none"> <li>Remove the 3 screws (1~3).</li> <li>Remove the front panel unit in the direction of the arrow.</li> </ol>
<p>Ref. No. 4</p>	<p>Removal of FL Drive P.C.B.</p>		
<p>Procedure 1→2→4</p>	 <ol style="list-style-type: none"> <li>Remove the 4 knobs (1~4).</li> <li>Remove the 4 nuts (5~8).</li> </ol>		  <p>A: 11 mm B: 16 mm C: longer than 22 mm</p> <ul style="list-style-type: none"> <li>Use a wrench of the dimensions shown in the illustration above to remove nuts.</li> </ul> <ol style="list-style-type: none"> <li>Remove the 3 screws (9~11).</li> <li>Remove the 3 connectors (J631A, J632A, J633A).</li> </ol>

<p>Ref. No. 5</p>	<p><b>Removal of the Operation P.C.B.</b></p>	<p>Ref. No. 6</p>	<p><b>Removal of the Operation Buttons</b></p>
<p>Procedure 1→2→4→5</p>	 <p>1. Remove the 4 screws (1~4). 2. Release the 4 claws in the direction of the arrow.</p>	<p>Procedure 1→2→4→5→6</p>	 <p>•Pull out the buttons and Lens.</p>
<p>Ref. No. 7</p>	<p><b>Removal of the Sampling Frequency Indicator Lens</b></p>		
<p>Procedure 1→2→4→7</p>	 <p>•Release the 2 claws.</p>		
<p>Ref. No. 8</p>	<p><b>Removal of the Rear Panel</b></p>		
<p>Procedure 1→8</p>	 <p>1. Remove the 18 screws (1~18).</p>		 <p>2. Release the connector (J551).</p>
<p>Ref. No. 9</p>	<p><b>Removal of the AC OUTLET/AC IN P.C.B.</b></p>		
<p>Procedure 1→9</p>	 <p>•Release the 4 claws.</p>		

**Ref. No. 10**  
**Removal of the P.C.B.s**

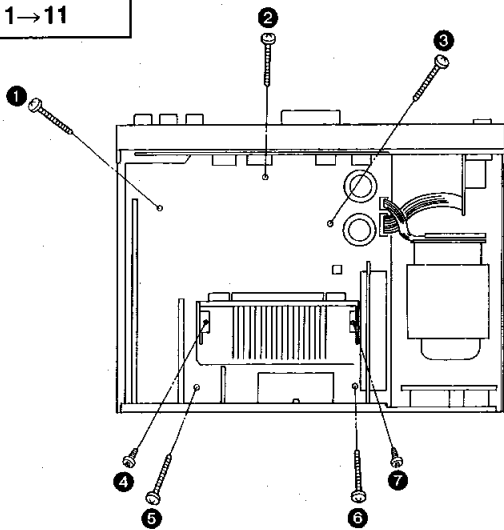
**Procedure**  
1→8→10

- **Removal of the D/A converter P.C.B.**
  1. Remove the screw (1).
  2. Remove the D/A converter P.C.B. in the direction of the arrow.
- **Removal of the other P.C.B.**
  - Remove the P.C.B. in the direction of the arrow.

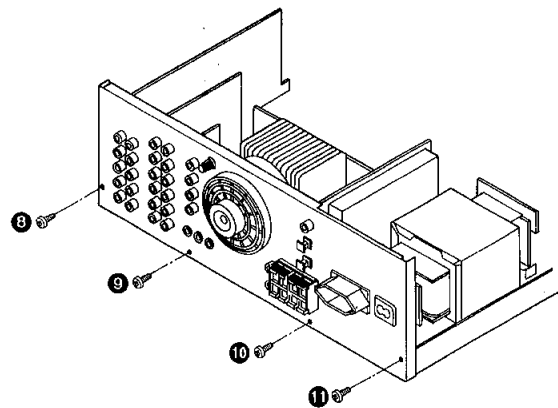


**Ref. No. 11**  
**Check of the main P.C.B.**

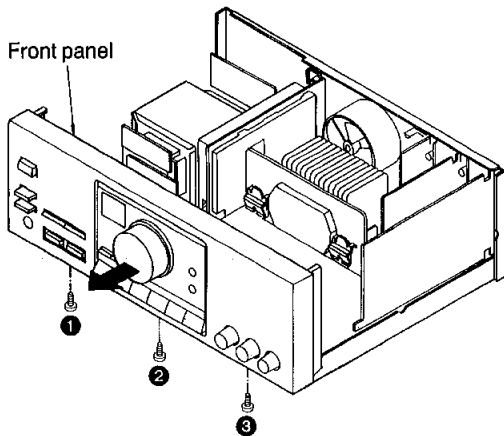
**Procedure**  
1→11



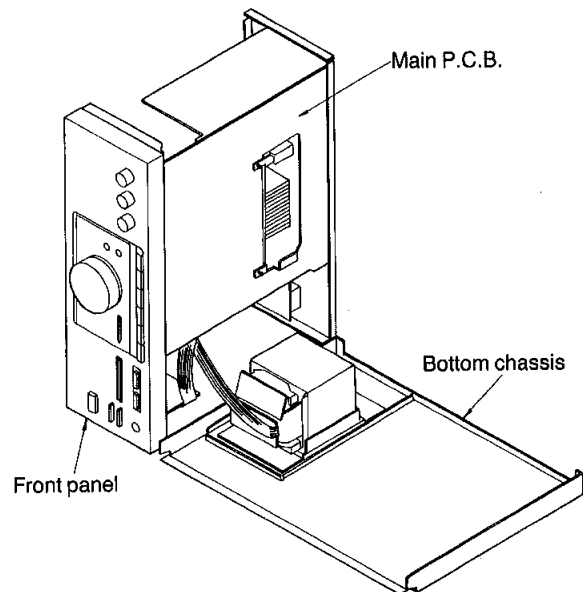
1. Remove the 7 screws (1~7).



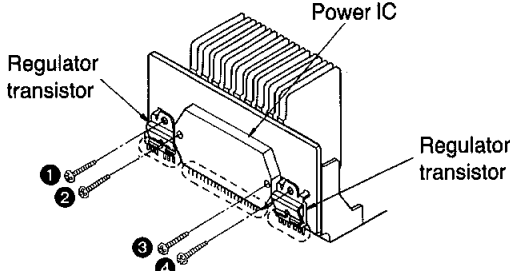
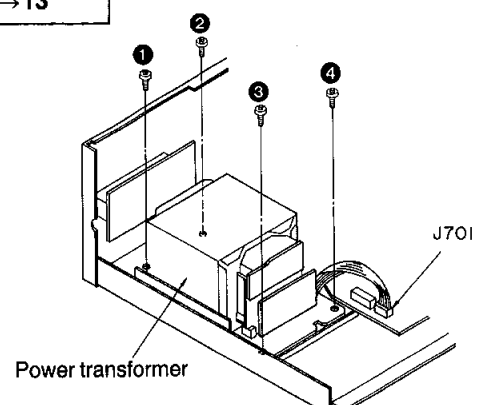
2. Remove the 4 screws (8~11).

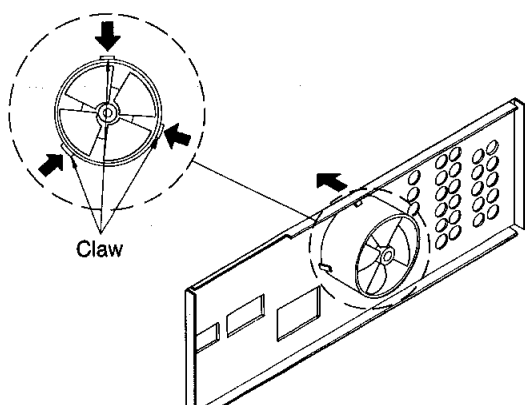
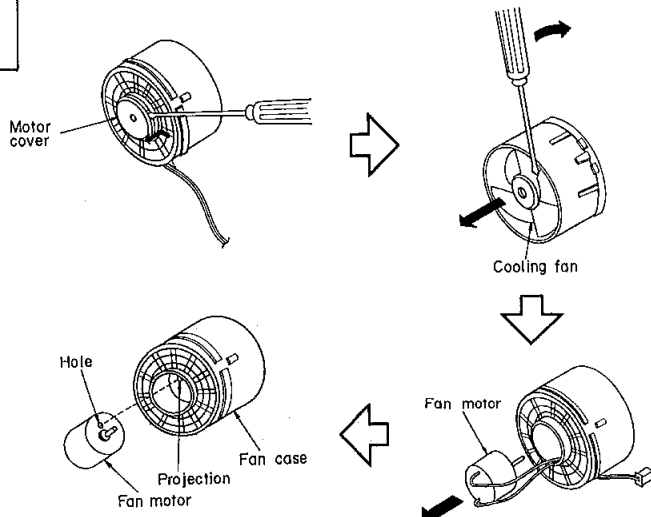


3. Remove the 3 screws (12~14).
4. Remove the front panel unit in the direction of the arrow.  
\*Connect 2 flat cables (J501A, J502).



5. Remove the bottom chassis.
6. Reinstall the front panel unit to the main P.C.B.

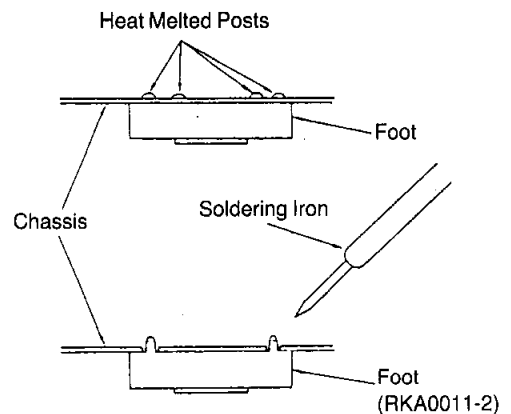
Ref. No. 12	Removal of the Power IC and Regulator Transistor	Ref. No. 13	Removal of the Power Transformer
Procedure 1→11→12	<ol style="list-style-type: none"> <li>1. Unsolder the power IC or regulator transistor.</li> <li>2. Remove the 4 screws (①~④).</li> </ol>	Procedure 1→13	
 <p><b>Note:</b> When mounting the power IC, or regulator transistor apply silicon terminal compound (SZZ0L15) to the rear of the power IC or regulator transistor.</p>		 <ol style="list-style-type: none"> <li>1. Remove the 1 flat cable (J701).</li> <li>2. Remove the 4 screws (①~④).</li> </ol>	

Ref. No. 14	Removal of the Fan Motor		
Procedure 1→8→14			
 <ol style="list-style-type: none"> <li>1. Remove the 1 connector (J209).</li> <li>2. Release the 3 claws.</li> </ol>		 <ol style="list-style-type: none"> <li>3. Insert a screwdriver at the root of the cooling fan. Force it out of the motor shaft.</li> <li>4. Remove the motor cover by used ⊖ screwdriver.</li> <li>5. Remove the motor from the fan casing.</li> <li>6. When mounting the motor fan, align the fan casing's projection with the hole of the fan motor.</li> </ol>	

**“ATTENTION SERVICER”**  
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

**●Replacement of the Foot.**

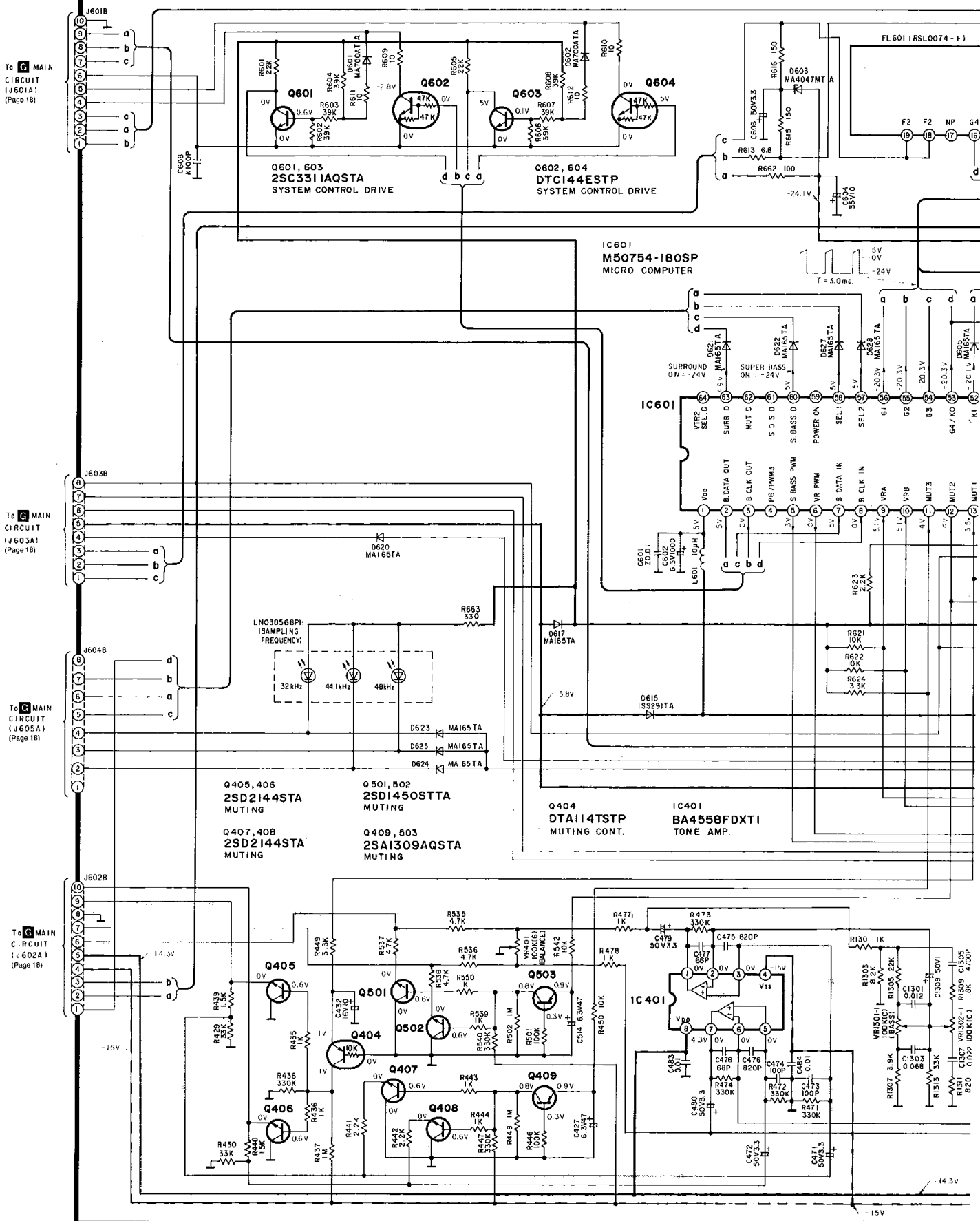
1. Remove the 4 heat melted posts on the chassis with a pair of nippers or similar tool.
2. To replace the foot (RKA0011-2) on the chassis, melt the 4 posts with a soldering iron.



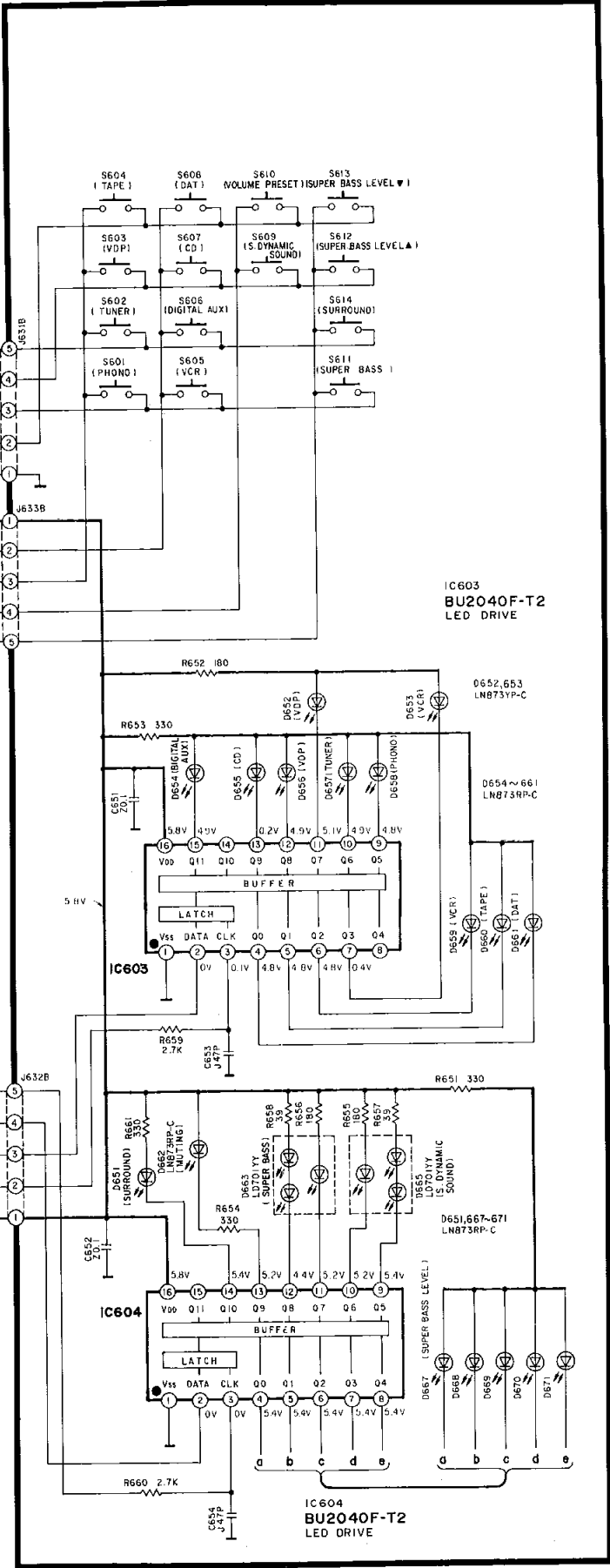
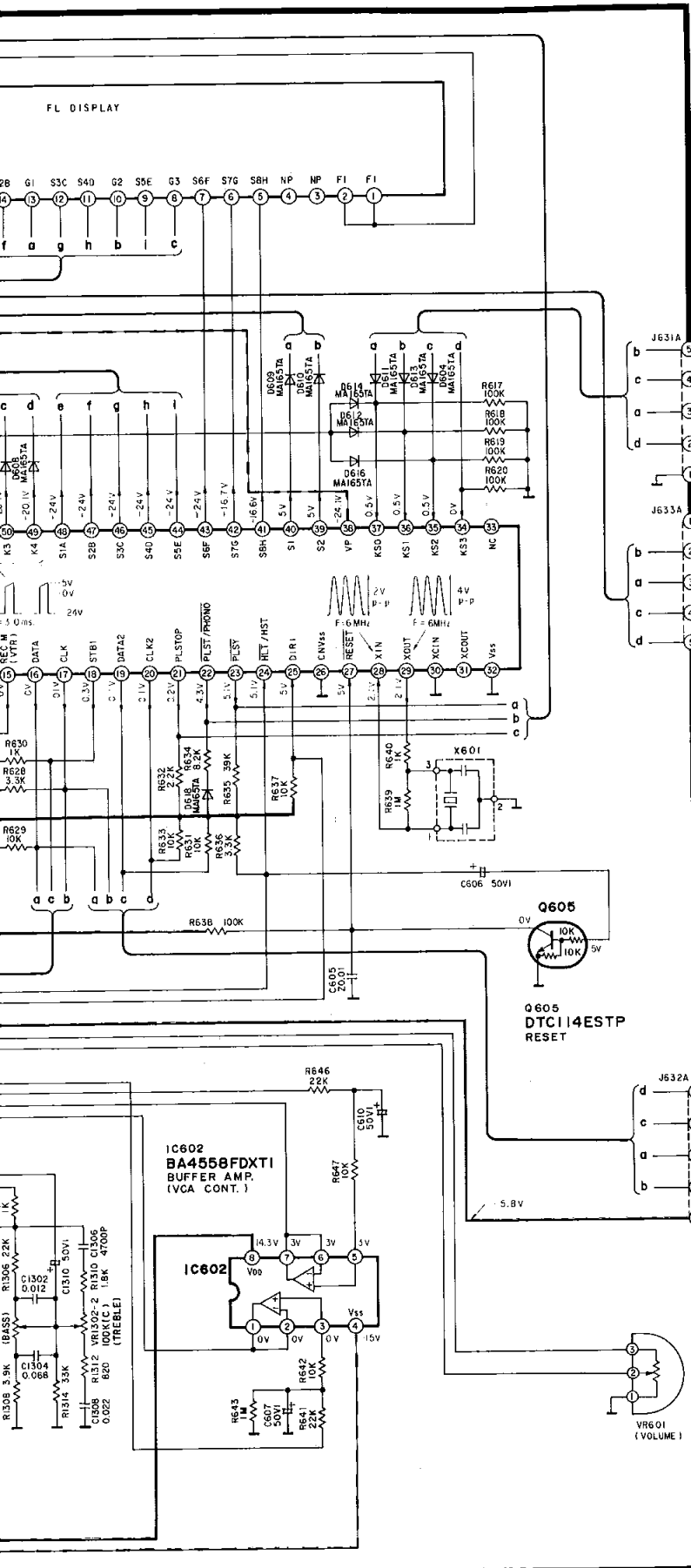
# MATIC DIAGRAM

1 | 2 | 3 | 4 | 5 | 6

## A FL DRIVE CIRCUIT



B OPERATION SWITCH CIRCUIT



# C D/A CONVERTER CIRCUIT

2

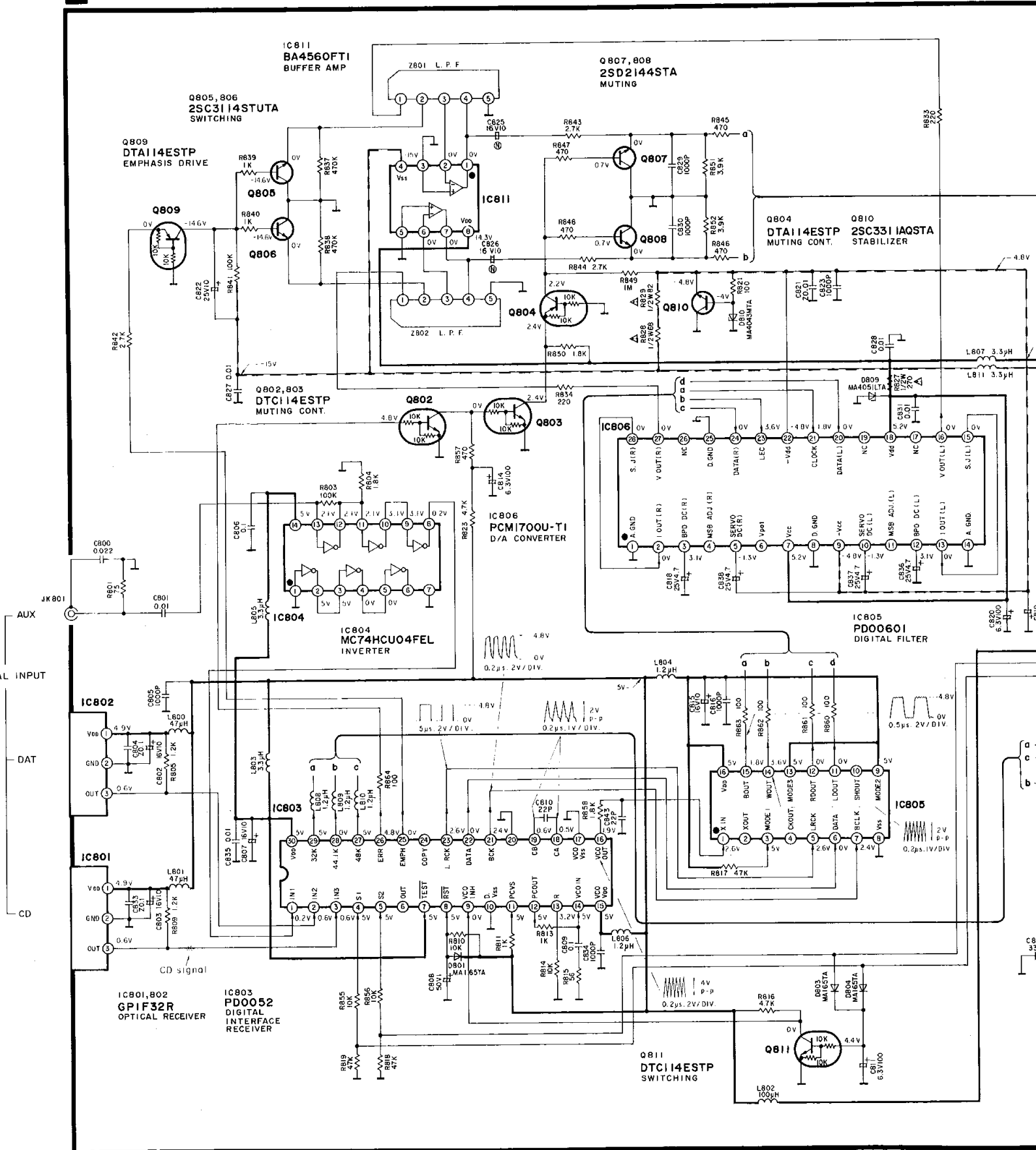
3

4

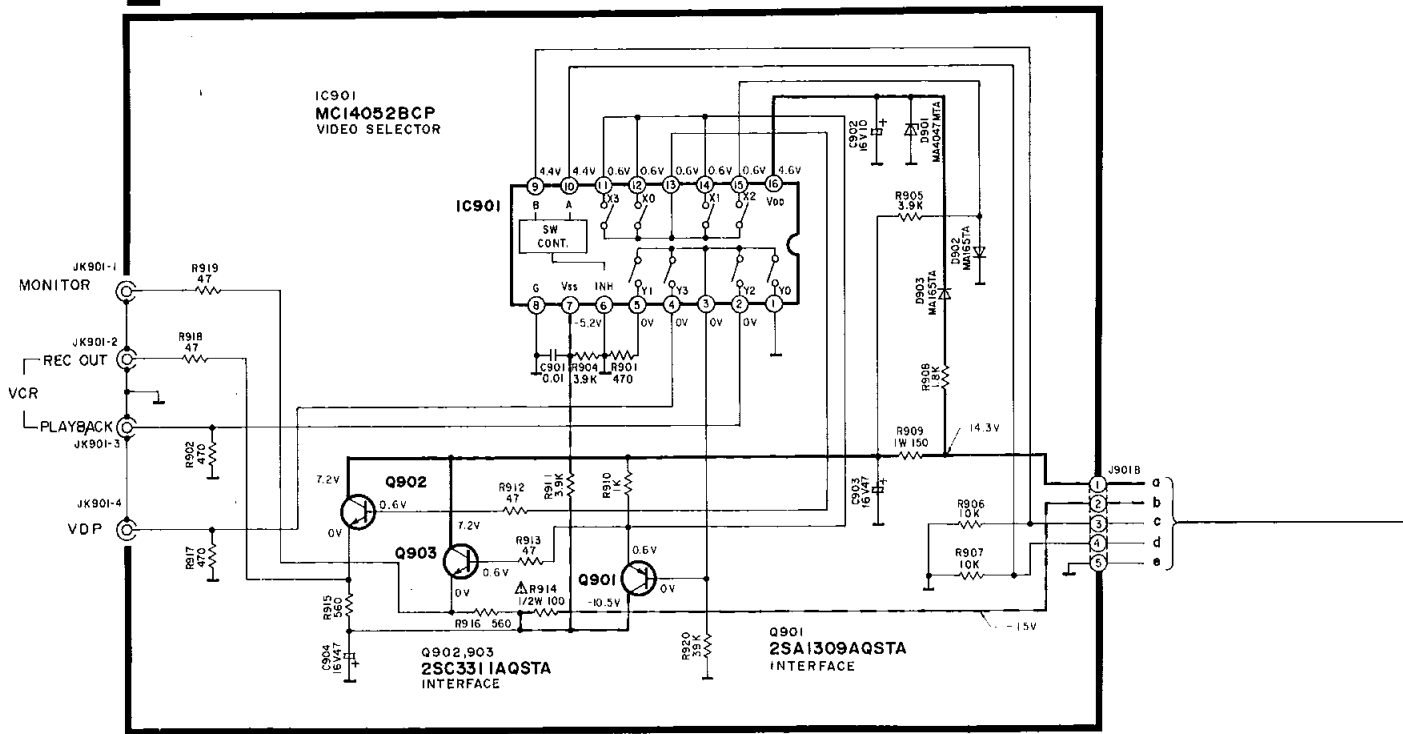
5

6

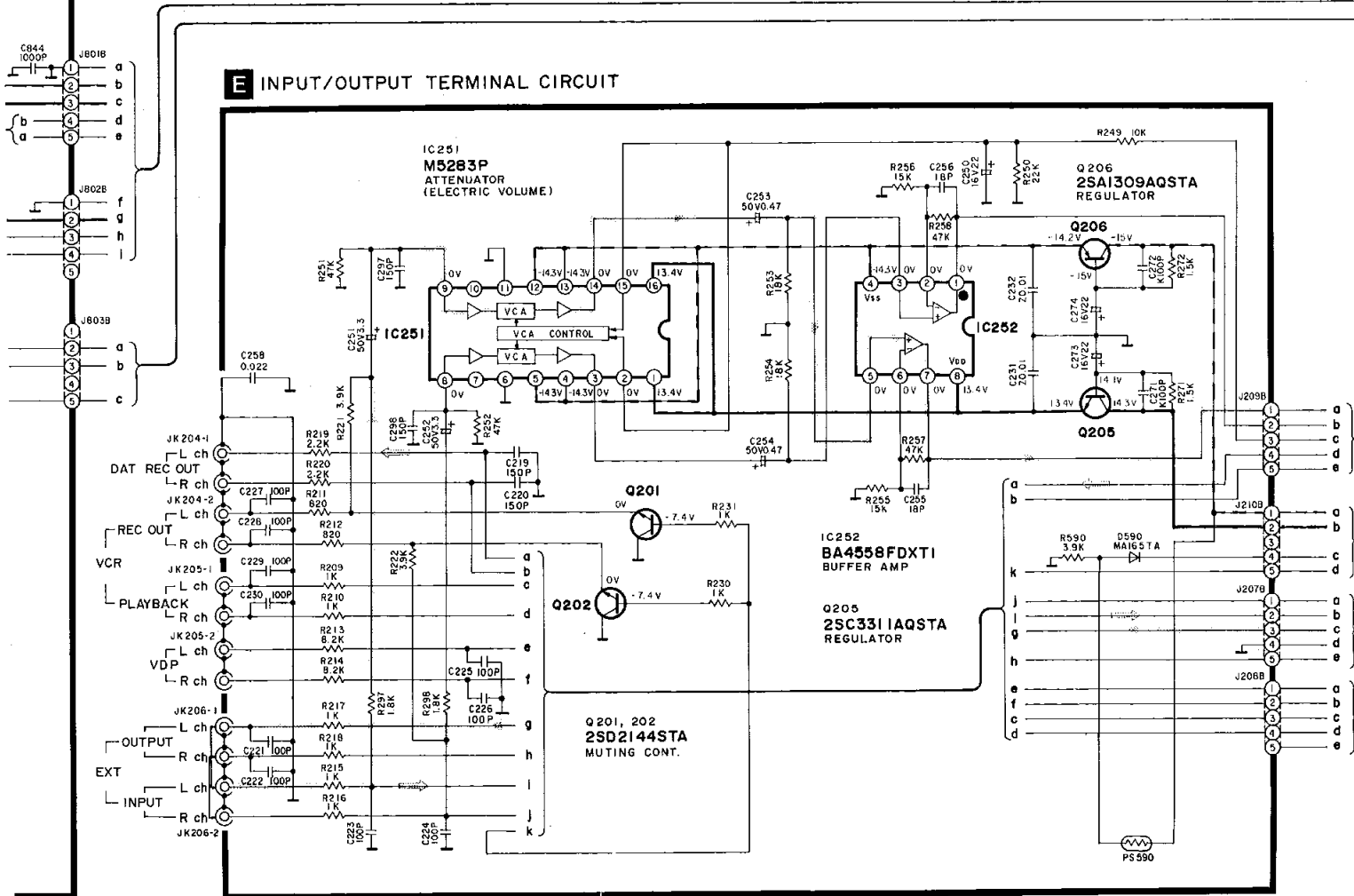
## C D/A CONVERTER CIRCUIT



D VIDEO IN/OUT TERMINAL CIRCUIT

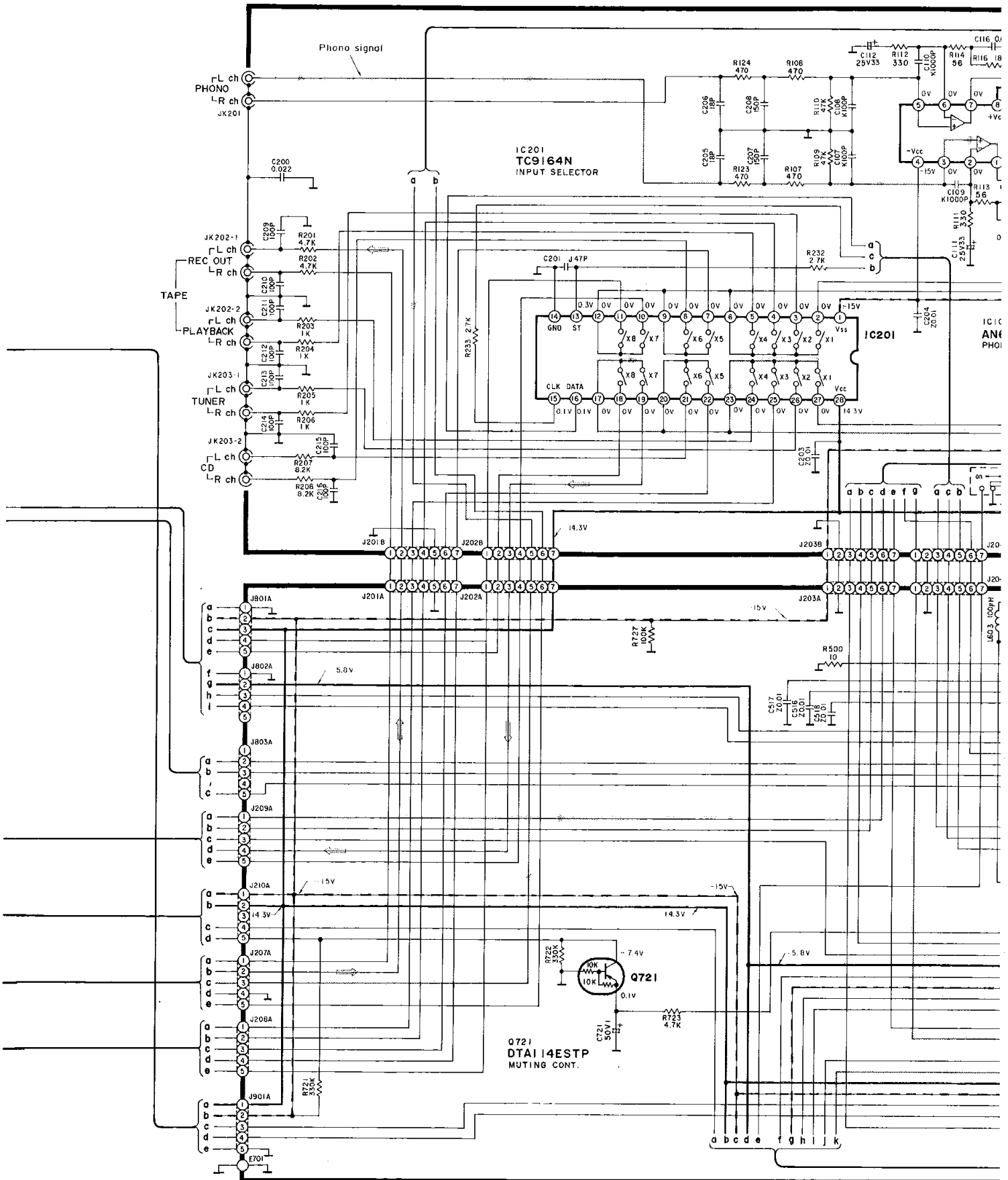


E INPUT/OUTPUT TERMINAL CIRCUIT

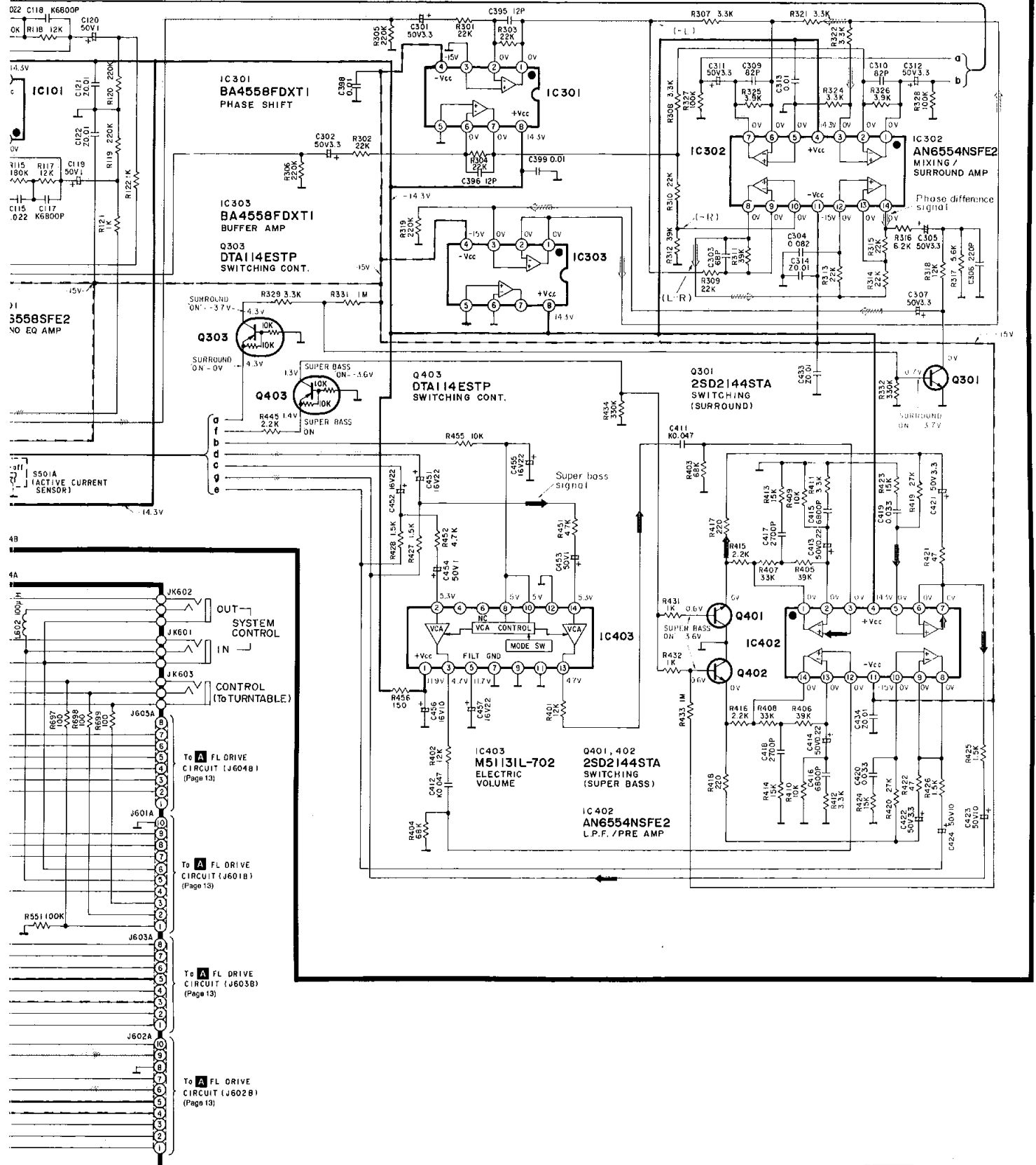




F PHONO/TAPE/TUNER/CD TERMINAL CIRCUIT



G MAIN CIRCUIT



Q1551, 1552  
2SC3312RSTA  
CURRENT STABILIZER

IC501  
SV13204  
POWER AMP

Q510  
2SA992EFPTA  
RELAY DRIVE

IC504  
M5218AP  
BUFFER AMP

IC501

Q1501, 1503  
2SA1309AQSTA  
BIAS CONTROL

Q1501

Q1503

Q1504

Q1502

Q1502, 1504  
2SA1309AQSTA  
BIAS CONTROL

IC502  
AN6554F  
SIGNAL LEVEL DET.

IC503

IC503  
TC4066B  
SWITCHING

Q1505  
DTC114ESTP  
A.C.S. CONTROL

Q1506  
DTA114ESTP  
A.C.S. CONTROL

Q702  
2SB621AQRSTA  
REGULATOR

Q705  
2SD1761DEF  
REGULATOR

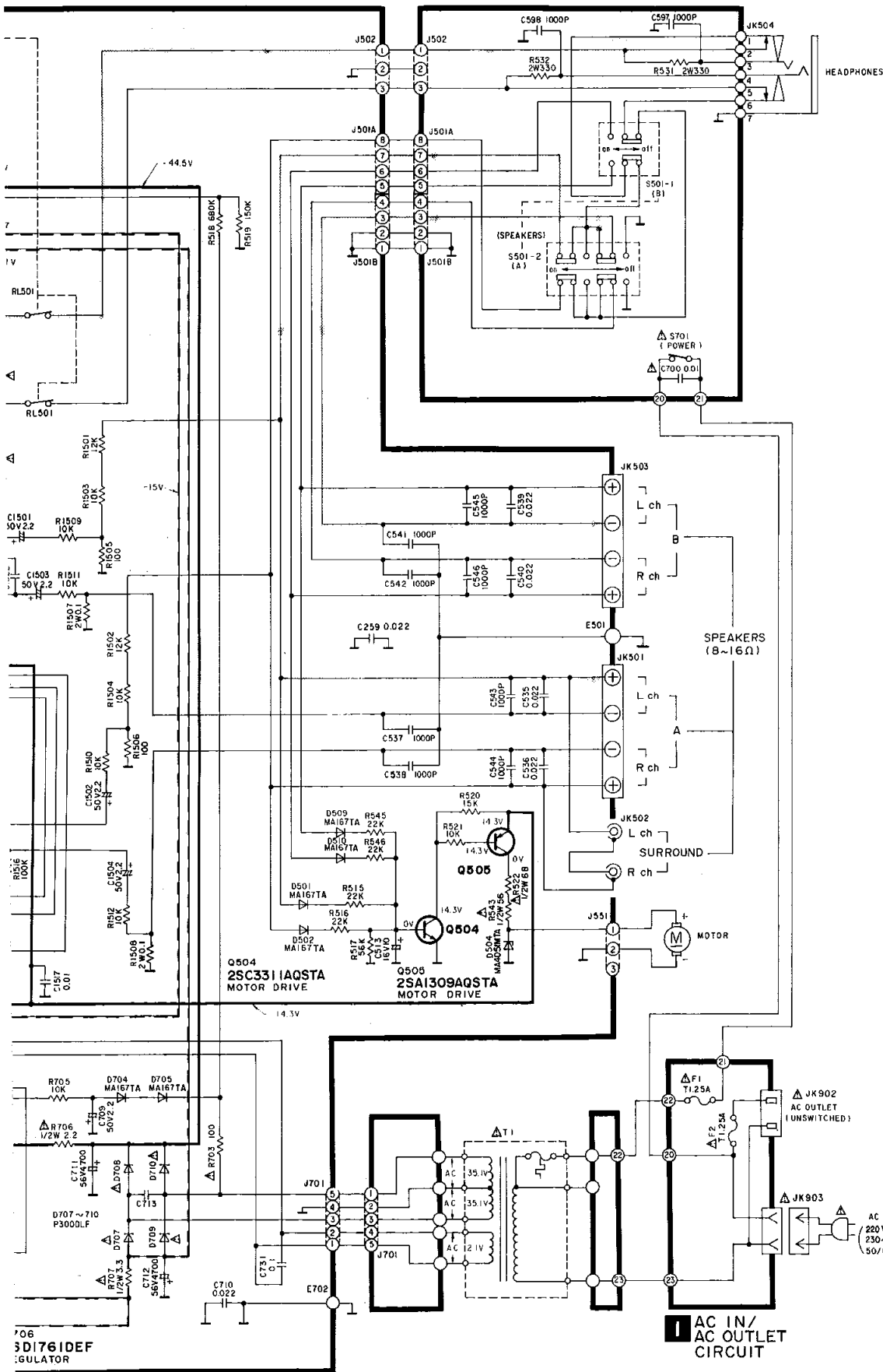
Q701  
UN4215TA  
STABILIZER

Q703

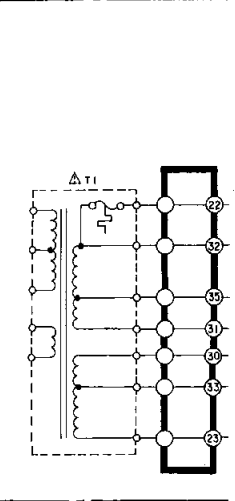
Q703  
2SD1761DEF  
REGULATOR

Q704  
2SB1187DEF  
REGULATOR

**H** POWER SWITCH/HEADPHONES CIRCUIT



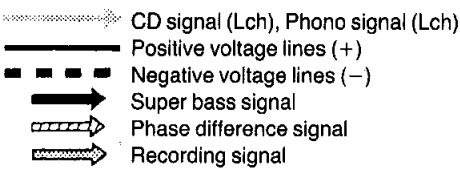
Power Source Circuit For



# DESCRIPTION OF FL PANEL

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

- S501A : Active current sensor switch in "OFF" position.
- S501 : Speaker ON/OFF switch.  
(S501-1: SPEAKER A in "ON" position)  
(S501-2: SPEAKER B in "OFF" position)
- S601 : Turntable input switch. (PHONO)
- S602 : Tuner input switch. (TUNER)
- S603 : Video disc player input switch. (VDP)
- S604 : Tape deck input switch. (TAPE)
- S605 : Video cassette recorder input switch. (VCR)
- S606 : Digital AUX input switch. (DIGITAL AUX)
- S607 : CD input switch. (CD)
- S608 : Digital audio tape deck input switch. (DAT)
- S609 : Super dynamic sound switch. (S. DYNAMIC SOUND)
- S610 : Volume preset switch. (VOLUME PRESET)
- S611 : Super bass switch. (SUPER BASS)
- S612 : Super bass level control switch. (SUPER BASS LEVEL ▲)
- S613 : Super bass level control switch. (SUPER BASS LEVEL ▼)
- S614 : Surround-sound switch. (SURROUND)
- S701 : Power switch. (POWER)

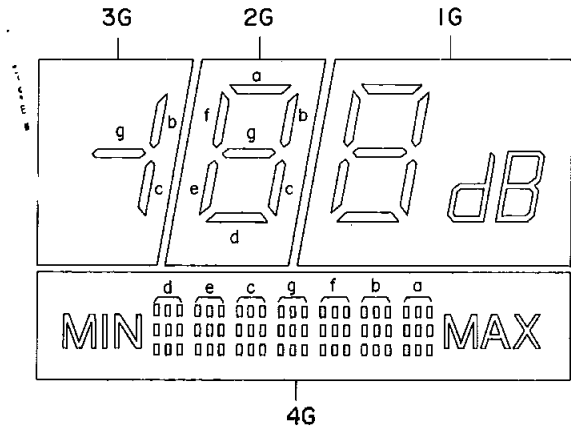


● Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

● 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.

**Caution!**

- IC and LSI are sensitive to static electricity.
- Secondary trouble can be prevented by taking care during repair.
- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.



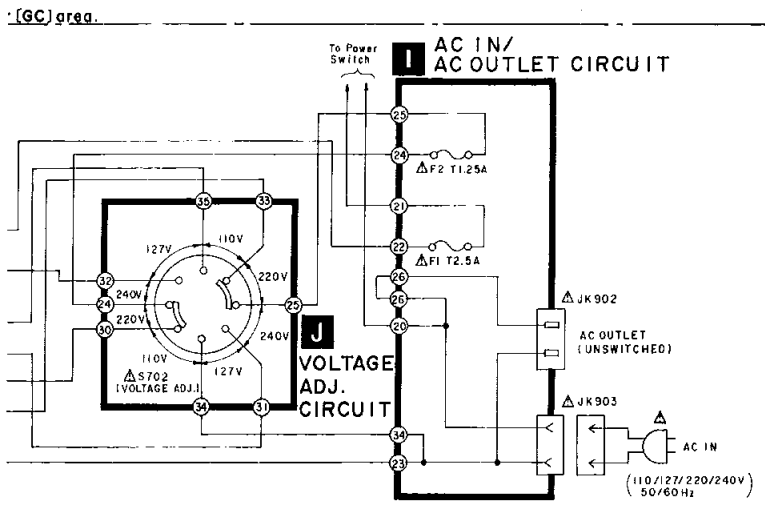
	4G	3G	2G	1G
P1	a	—	a	a
P2	b	b	b	b
P3	c	c	c	c
P4	d	—	d	d
P5	e	—	e	e
P6	f	—	f	f
P7	g	g	g	g
PB	MIN MAX	—	—	dB

**PIN CONNECTION**

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CONNECTION	F	F	N	P	P	P	P	P	1	P	P	P	N	N	F	F	F	F	F	F
	2	2	P	G	1	2	G	3	4	G	5	6	6	7	8	P	1	1	1	1

**Notes:**

- F1, F2 ..... Filament
- NP ..... No pin
- 1G~4G..... Grid



**Power Source Circuit For [GN]area.**

