

# Service Manual

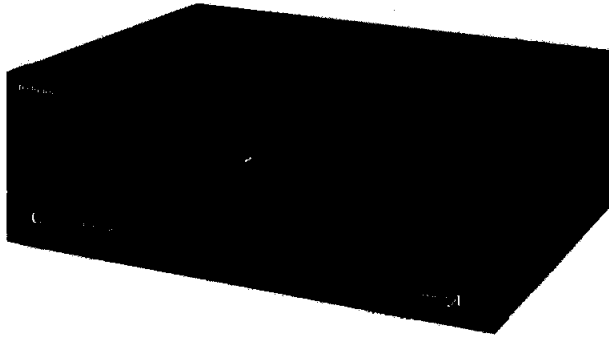
Stereo Integrated Amplifier

Amplifier

## SU-X302

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 × 50 W (8 Ω)
Total harmonic distortion	
rated power at 1 kHz	1 % (8 Ω)
Harmonic distortion	
half power at 1 kHz	0.03 % (8Ω)
Residual hum and noise	0.5 mV
Damping factor	30 (8 Ω)
Input sensitivity and impedance	
PHONO	3 mV/47 kΩ
TUNER, TAPE	150 mV/22 kΩ
CD, AUX1, 2	200 mV/22 kΩ
Maximum input voltage (1 kHz, RMS)	
PHONO	100 mV
S/N (rated power 8 Ω)	
PHONO	73 dB (IHF, A: 79 dB)
TUNER, CD, AUX1, 2, TAPE	82 dB (IHF, A: 83 dB)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
TUNER, CD, AUX1, 2, TAPE	15 Hz~50 kHz (-3 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 REC OUT	150 mV
Channel balance, TUNER 250 Hz~6,300 Hz	±1.0 dB
Channel separation, TUNER 1 kHz	55 dB
Headphones output level and impedance	473 mV/330 Ω
Load impedance	
MAIN	8 Ω~16 Ω
SURROUND	8 Ω~16 Ω

### ■ GENERAL

Power consumption	300 W
Power supply	
For Continental Europe	AC 50 Hz/60 Hz, 220 V
For Great Britain and Oceania	AC 50 Hz/60 Hz, 230~240 V
For others	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	5.4 kg (11.9 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

## ■ CONTENTS

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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	182~425 mA	168~392 mA	92~216 mA	89~207 mA	83~195 mA
Consumed current 60 Hz	168~392 mA	154~360 mA	84~196 mA	81~189 mA	77~166 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.

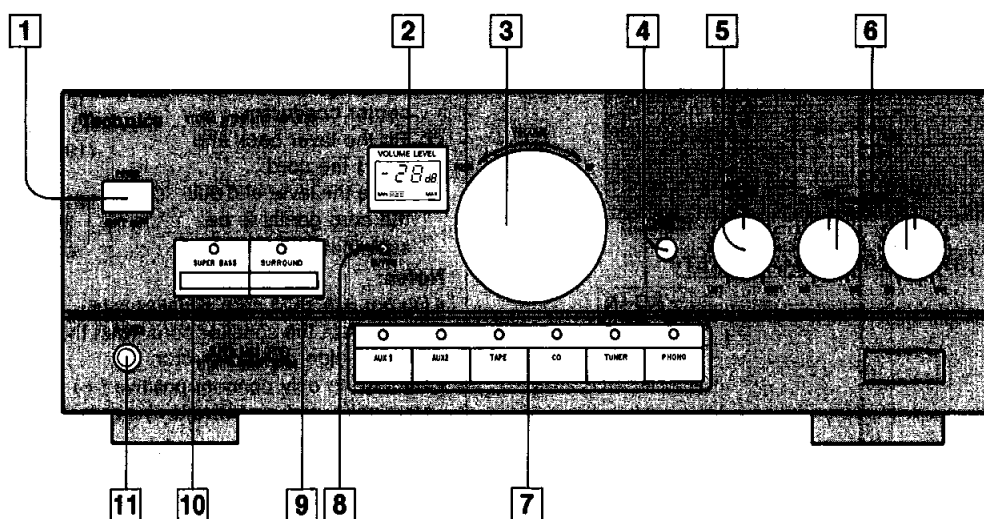
**Note:**

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

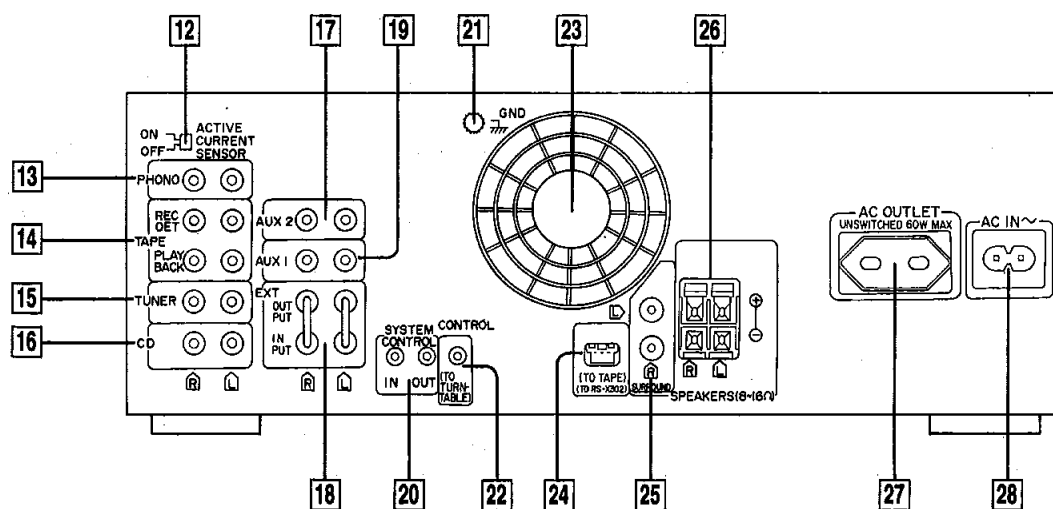
## ■ ACCESSORIES

- |  |                         |                        |                     |
|--|-------------------------|------------------------|---------------------|
| ●AC power supply cord .....                                      | 1                       | ●AC plug adaptor ..... | 1                   |
| Configuration of AC power supply cord differs according to area. |                         |                        |                     |
| SJA187 .....   | For (E) (EG) area only. | SJP9215 .....          | For (GC) area only. |
| SJA173 .....   | For (GN) area only.     |                        |                     |
| SJA188 .....   | For (EB) area only.     |                        |                     |
| RJA0004 .....  | For (GC) area only.     |                        |                     |

## ■ LOCATION OF CONTROLS



- |  |   |
|--|---|
| <b>1</b> Power switch (POWER)                  | <b>7</b> Input selectors/indicators                 |
| <b>2</b> Volume-level indicator (VOLUME LEVEL) | <b>8</b> Muting indicator (MUTING)                  |
| <b>3</b> Volume control (VOLUME)               | <b>9</b> Surround-sound button/indicator (SURROUND) |
| <b>4</b> Volume preset button (VOLUME PRESET)  | <b>10</b> Super bass button/indicator (SUPER BASS)  |
| <b>5</b> Balance control (BALANCE)             | <b>11</b> Headphones jack (PHONES)                  |
| <b>6</b> Tone controls (BASS/TREBLE)           |   |



- |  |   |
|--|---|
| <b>12</b> Active current sensor switch   | <b>21</b> GND terminal                        |
| <b>13</b> Phono input terminal           | <b>22</b> Control terminal (to turntable)     |
| <b>14</b> Tape rec out/playback terminal | <b>23</b> Cooling fan                         |
| <b>15</b> Tuner input terminal           | <b>24</b> Control terminal (to cassette deck) |
| <b>16</b> CD Input terminal              | <b>25</b> Surround-sound speaker terminal     |
| <b>17</b> AUX 2 Input terminal           | <b>26</b> Main speaker terminal               |
| <b>18</b> EXT output/input terminal      | <b>27</b> AC outlet                           |
| <b>19</b> AUX 1 input terminal           | <b>28</b> AC Inlet                            |
| <b>20</b> System control IN/OUT terminal |   |

## STANDARD OPERATIONS

### When listening to music

#### TREBLE

Adjust the high-frequency sound to the desired tone quality.

#### BASS

Adjust the low-frequency sound to the desired tone quality.

#### BALANCE

Adjust the balance of the left/right volume.

#### VOLUME

Adjust the volume level.

#### SUPER BASS

Press this button to boost the super-low frequency range. (The indicator will illuminate.)

#### SURROUND

Set to the "ON" position to activate the surround-sound effect. (The indicator will illuminate.)

#### Note:

The surround-sound effect is only effective for phono discs, compact discs, tapes that are recorded in stereo, and for FM and other broadcasts that are broadcast in stereo. It has no effect for monaural AM broadcasts, or for any other monaural source. When listening to a sound source recorded by the surround-sound method, set this switch to the "OFF" position.

#### The effect by using surround-sound speaker systems



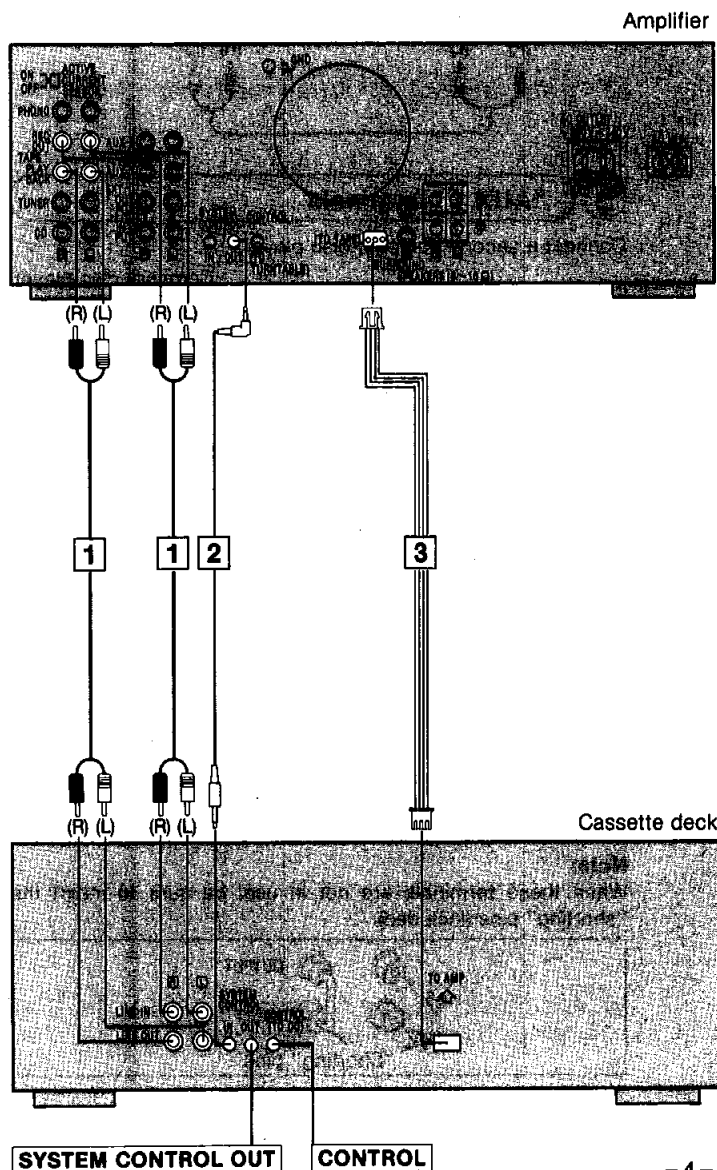
An effect similar to the dynamic sound of a concert hall

#### During recording

Operation of controls or switches other than the surround-sound switch has no influence upon recording.

## CONNECTIONS

### To connect the amplifier with the cassette deck



#### Stereo connection cable

White (L) Red (R)

See the operating instructions of the tuner (ST-X302L) for details.

**1** Connect the stereo connection cables.

**2** Connect the L-type cable.

**3** Connect the flat cable.

#### SYSTEM CONTROL OUT

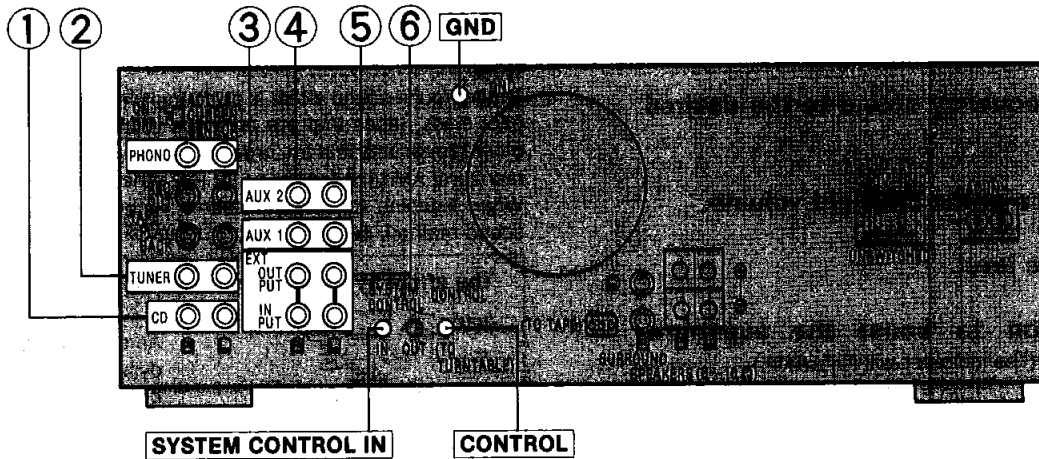
This terminal is used to connect a Technics compact disc player or a Technics stereo graphic equalizer with the "SYSTEM CONTROL IN" terminal.

#### CONTROL

This terminal is used to connect a Technics multi compact disc player with the "CONTROL" terminal.

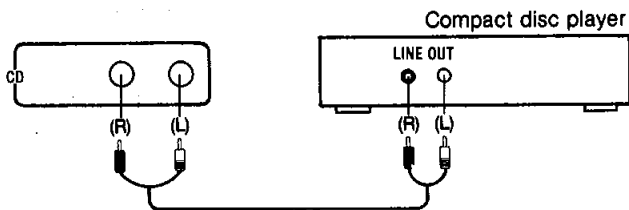
## To connect the amplifier with other units

Make connections to each component in the system by using stereo connection cables (not included).



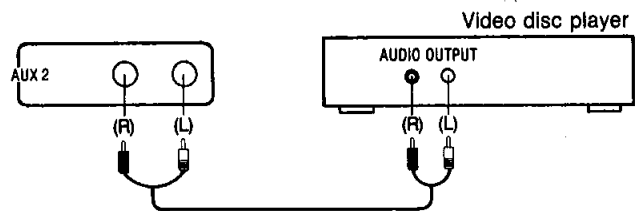
### 1 "CD" terminals

Connect a compact disc player.



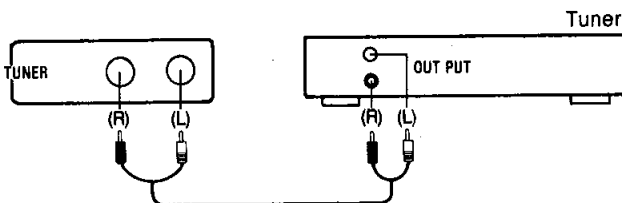
### 4 "AUX 2" terminals

Connect a video disc player etc. (Only the audio is connectable)



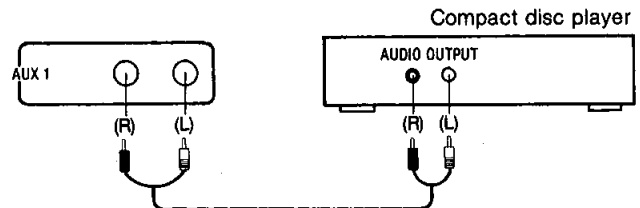
### 2 "TUNER" terminals

Connect a tuner.



### 5 "AUX 1" terminals

Connect a second compact disc player.

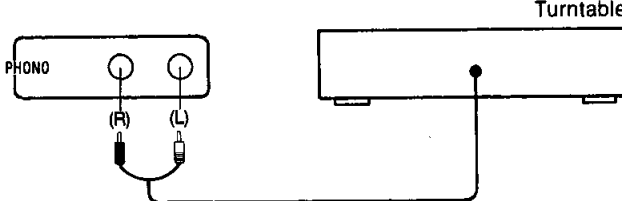


### 3 "PHONO" terminals

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

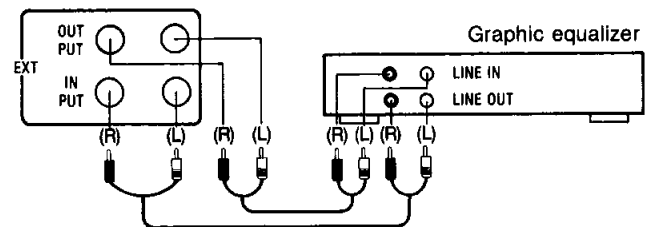
### 3 "PHONO" terminals

Connect a turntable.



### 6 "EXT" terminals

Connect a graphic equalizer.



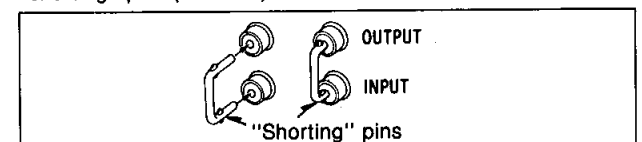
### "GND" terminal of the amplifier

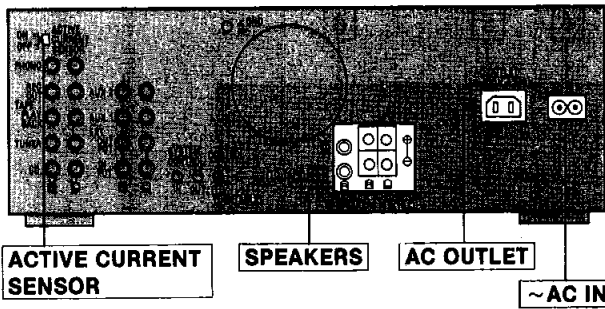
This terminal is for use with a turntable which has a ground wire.

### "CONTROL (TO TURNTABLE)" terminal

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

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



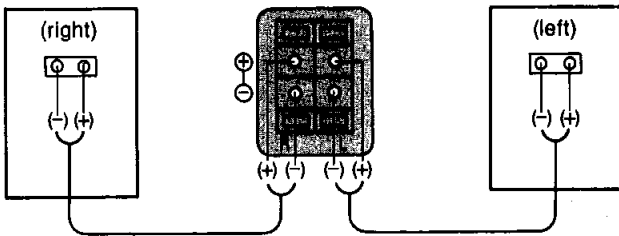


### Connection of speaker systems

Two pairs of speaker systems (main, surround-sound) can be connected to the amplifier. Speaker systems that can be connected to any of the speaker connection terminals of the amplifier are speaker systems with an impedance of 8 to 16 ohms. Make connections to each speaker system by using speaker cords (not included).

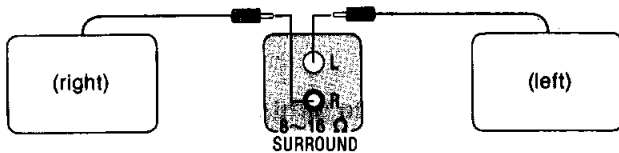
#### Main speaker systems (not included)

Connect to the "SPEAKER" 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.



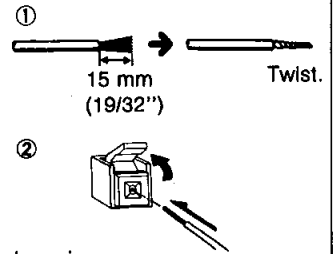
#### How to use the active current sensor

The selector is used to enjoy powerful super-bass sound.  
**ON:** Switch ON when connecting the Technics system speakers (SB-CS60).  
**OFF:** Switch OFF when connecting speakers other than Technics system speakers.

**Note:** 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.

#### 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.

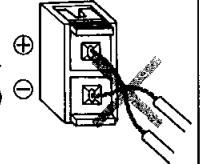


**Notes:**

- Do not use solid core speaker wire.
- To connect the speaker cord, twist the strands on the end. Do not solder the conductor.
- 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 wires.



#### 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.

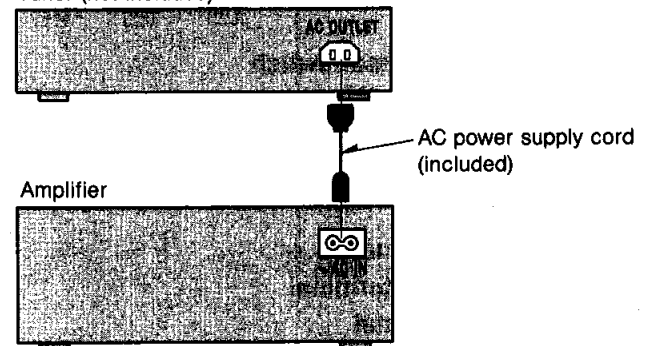
#### AC power supply cord

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

**Notes:**

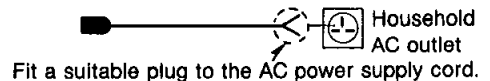
- Configuration of the AC outlet and AC power supply cord differs according to area.
- If this unit is not to be connected with the tuner, the cord is to be connected to the household AC outlet.

Tuner (not included)

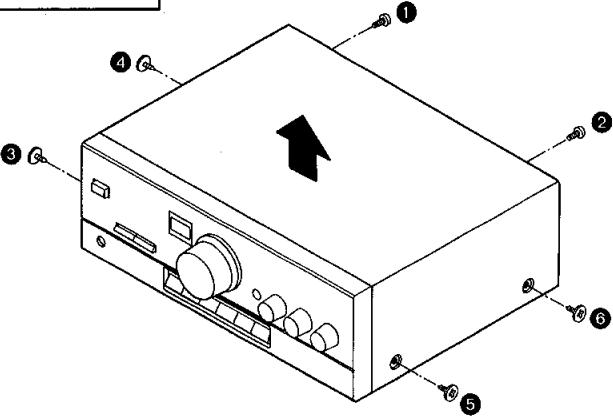
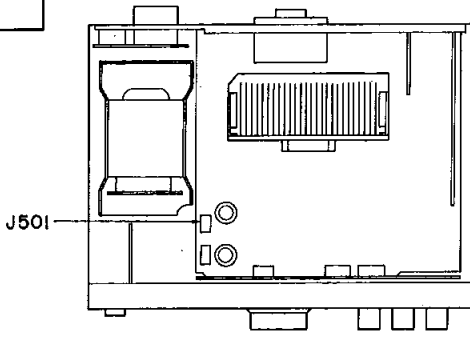
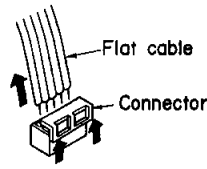
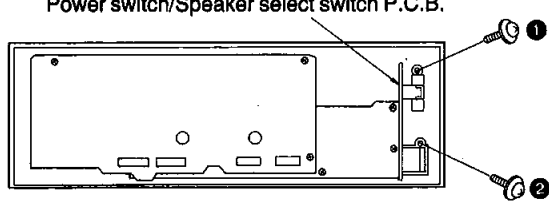
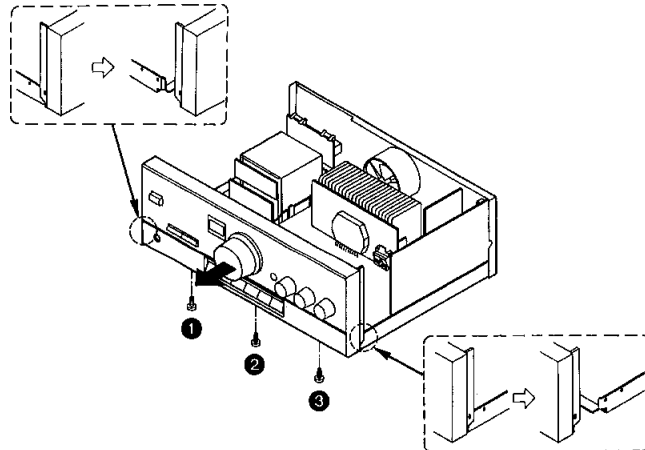
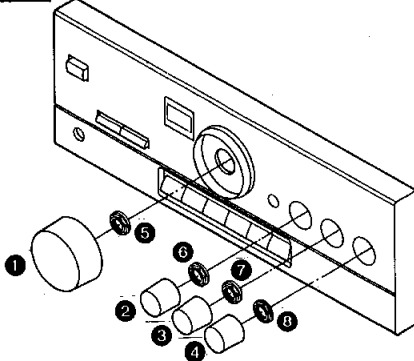
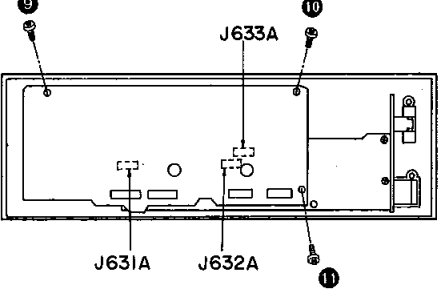
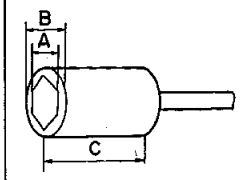


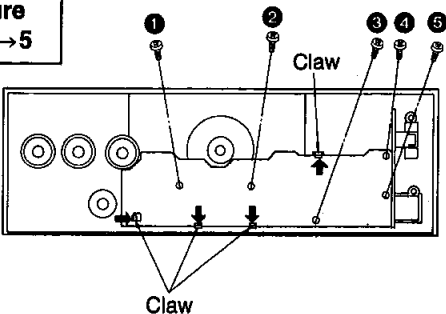
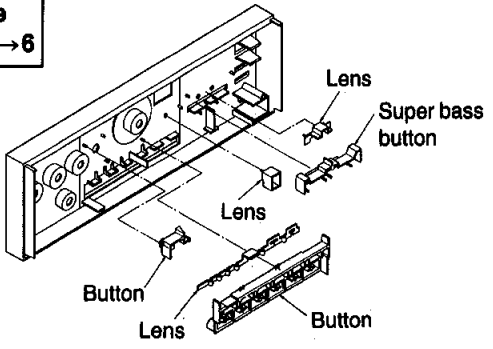
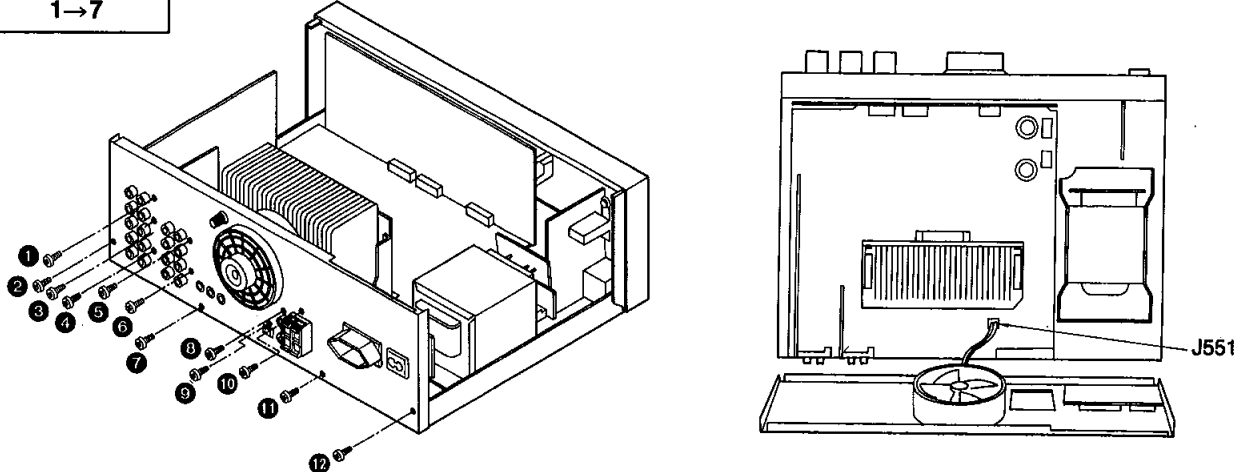
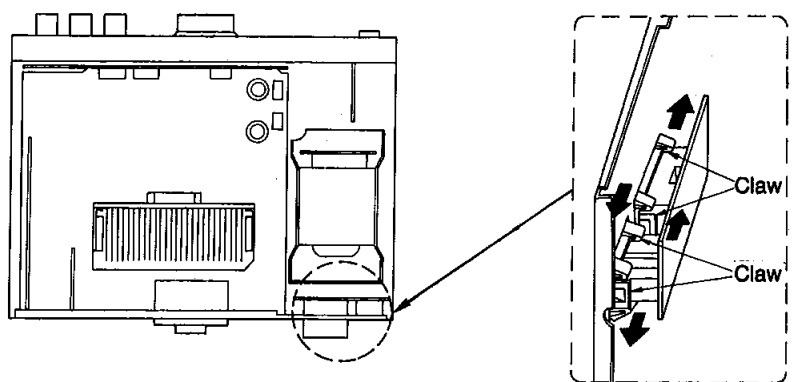
#### For United Kingdom

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



# DISASSEMBLY INSTRUCTIONS

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

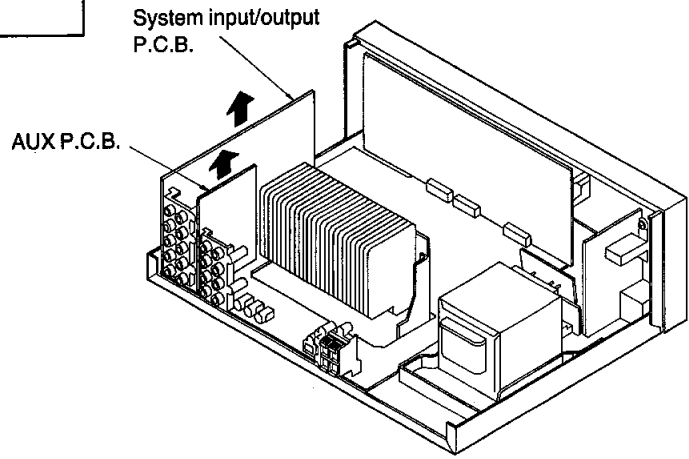
<p><b>Ref. No.</b> 5</p>	<p><b>Removal of the Operation P.C.B.</b></p>	<p><b>Ref. No.</b> 6</p>	<p><b>Removal of the Operation Buttons</b></p>
<p><b>Procedure</b> 1→2→4→5</p>	 <p>1. Remove the 5 screws (①~⑤). 2. Release the 4 claws in the direction of arrow.</p>	<p><b>Procedure</b> 1→2→4→5→6</p>	 <p>●Pull out the operation buttons and lens.</p>
<p><b>Ref. No.</b> 7</p>	<p><b>Removal of the Rear Panel</b></p>		
<p><b>Procedure</b> 1→7</p>	 <p>1. Remove the 12 screws (①~⑫).</p> <p>2. Release the connector (J551).</p>		
<p><b>Ref. No.</b> 8</p>	<p><b>Removal of the AC OUTLET/AC IN P.C.B.</b></p>		
<p><b>Procedure</b> 1→8</p>	 <p>●Release the 4 claws.</p>		



**Ref. No.**  
9

**Removal of the P.C.B.s**

**Procedure**  
1→7→9

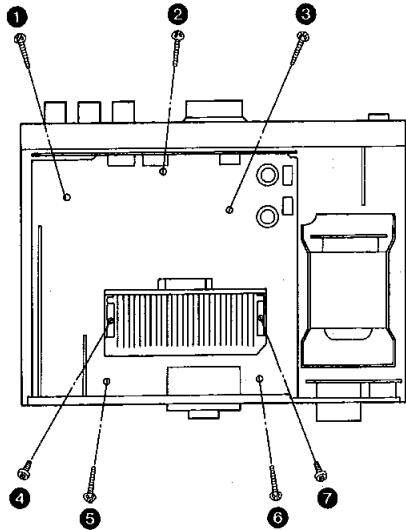


•Remove the P.C.B. in the direction of the arrow.

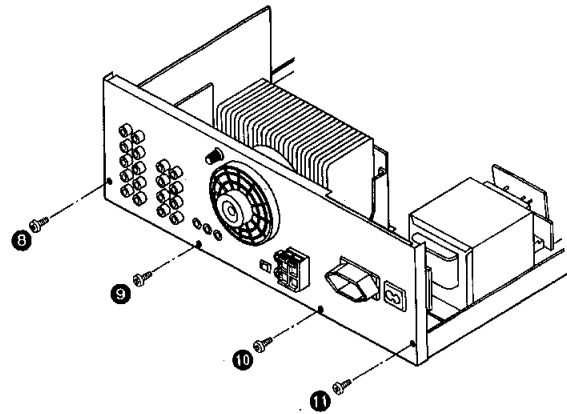
**Ref. No.**  
10

**Check of the main P.C.B.**

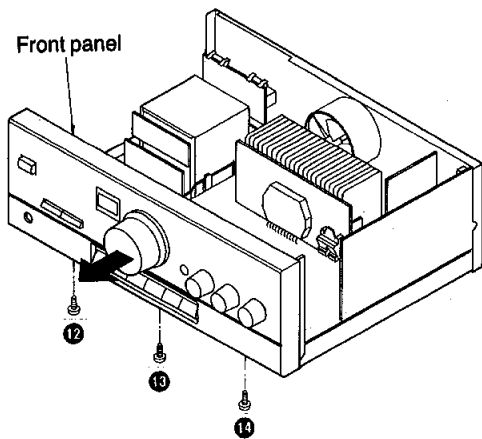
**Procedure**  
1→10



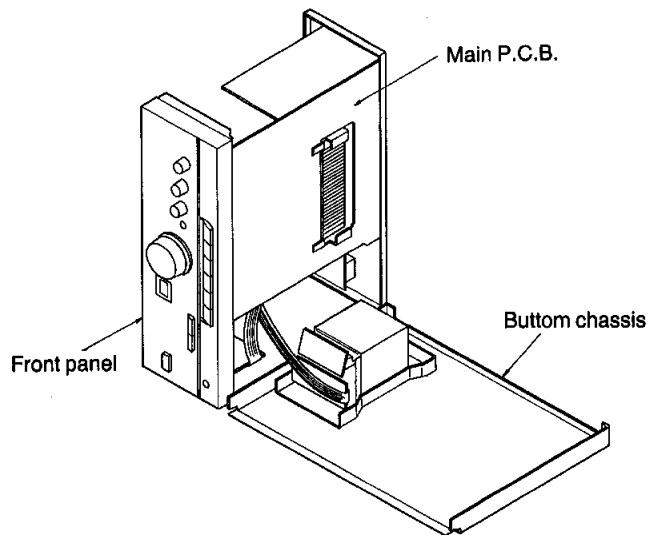
1. Remove the 7 screws (1~7).



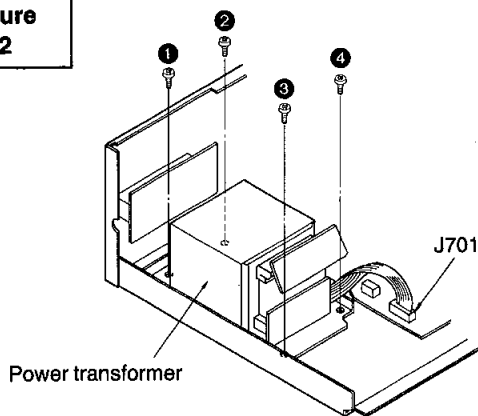
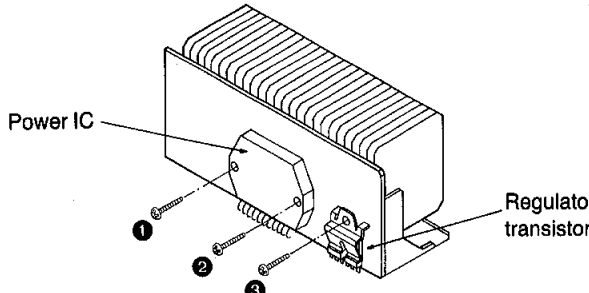
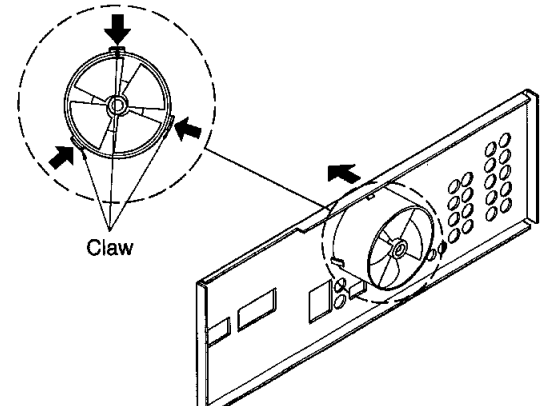
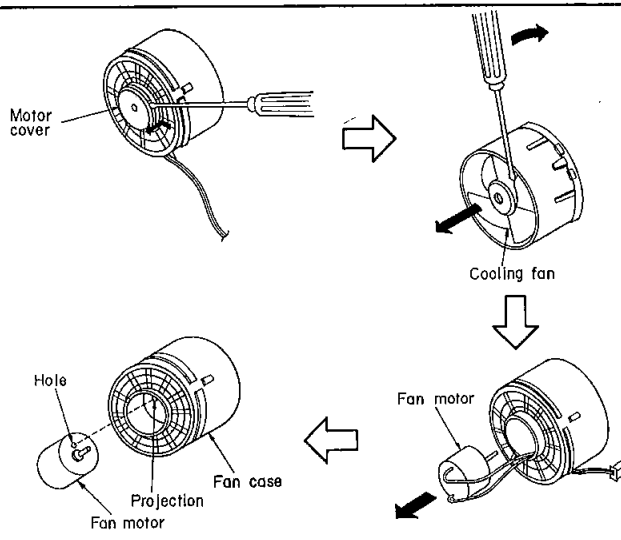
2. Remove the 4 screws (8~11).



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.

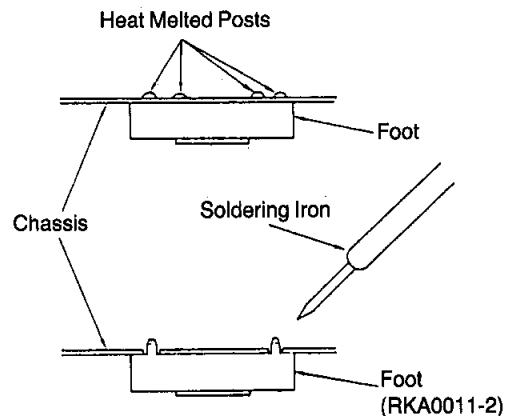
Ref. No. 11	Removal of the Power IC and Regulator Transistor	Ref. No. 12	Removal of the Power Transformer
Procedure 1→10→11	<ol style="list-style-type: none"> <li>1. Unsolder the power IC or regulator transistor.</li> <li>2. Remove the 3 screws (①~③).</li> </ol>	Procedure 1→12	
	 <p><b>Note:</b> When 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. 13	Removal of the Fan Motor		
Procedure 1→7→13			
 <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.

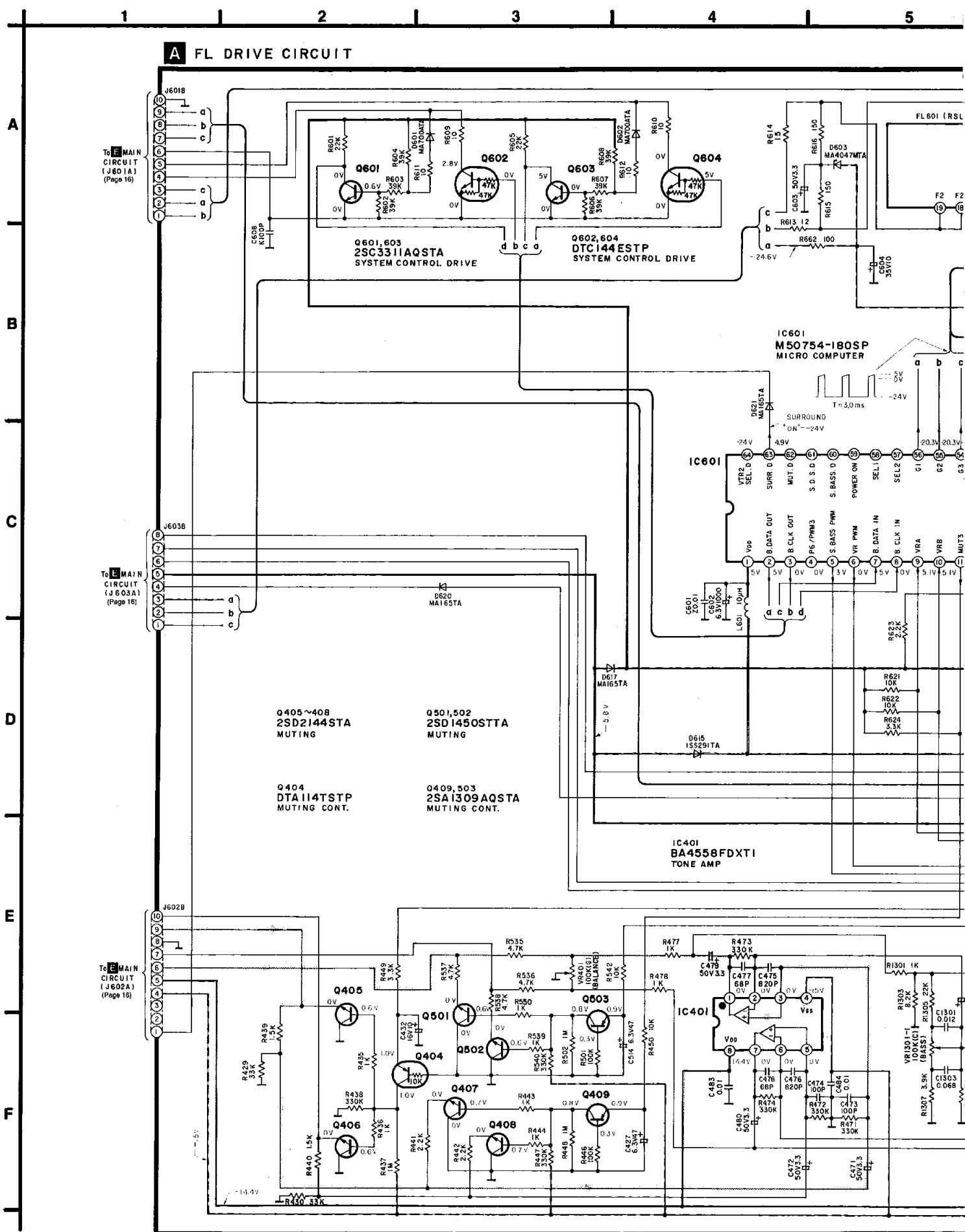
**●Replacement of the Foot.**

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.

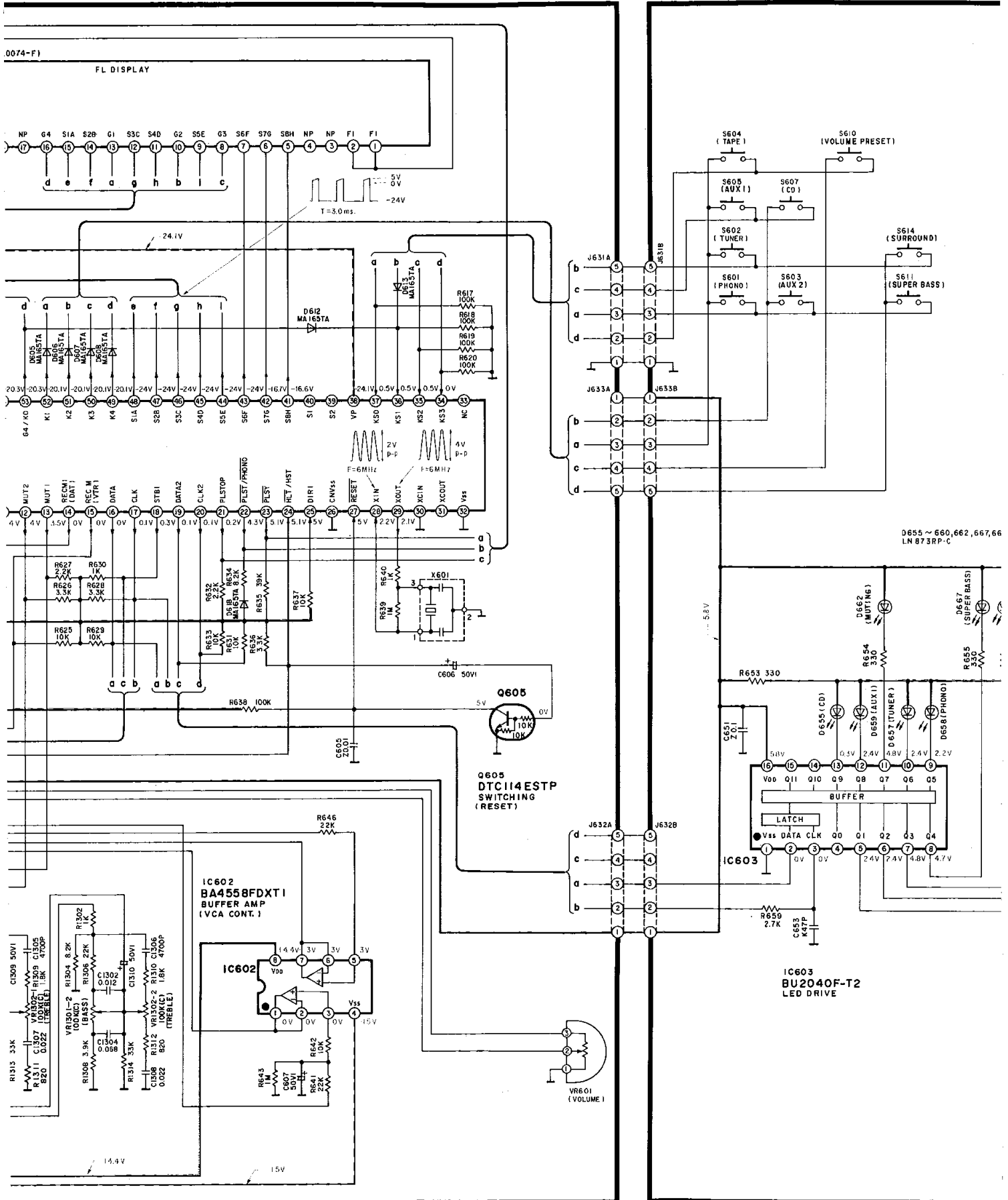


# SCHEMATIC DIAGRAM

## A FL DRIVE CIRCUIT



**B OPERATION SWITCH CIRCUIT**



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

- S601 :PHONO input switch.
- S602 :TUNER input switch.
- S603 :AUX 2 input switch.
- S604 :TAPE input switch.
- S605 :AUX 1 input switch.
- S607 :CD input switch.
- S610 :VOLUME PRESET switch.
- S611 :SUPER BASS switch.
- S614 :SURROUND switch.

- ⋯⋯⋯⋯⋯⋯> CD signal (Lch), Phono signal (Lch)
- Positive voltage lines (+)
- - - - - Negative voltage lines (-)

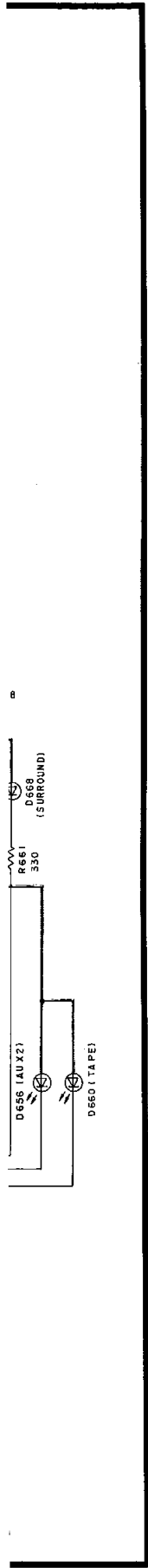
●Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

●Important safety notice:

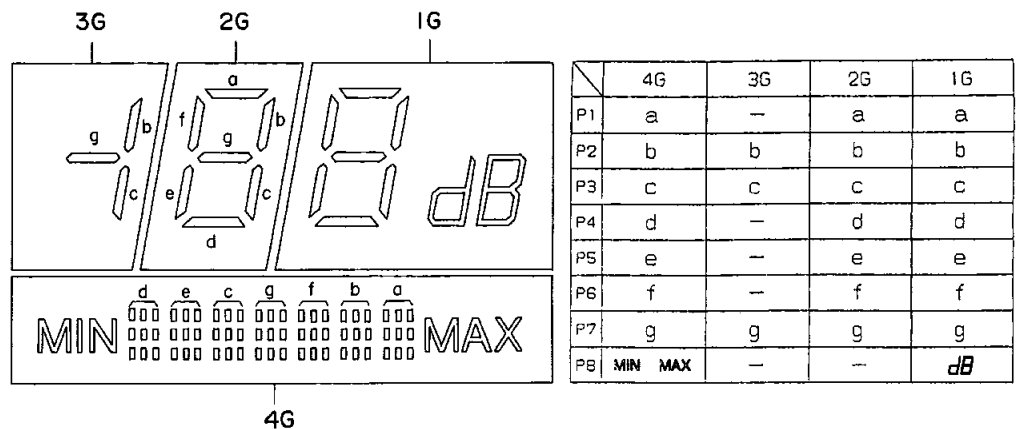
Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

**\*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.



**DESCRIPTION OF FL PANEL**

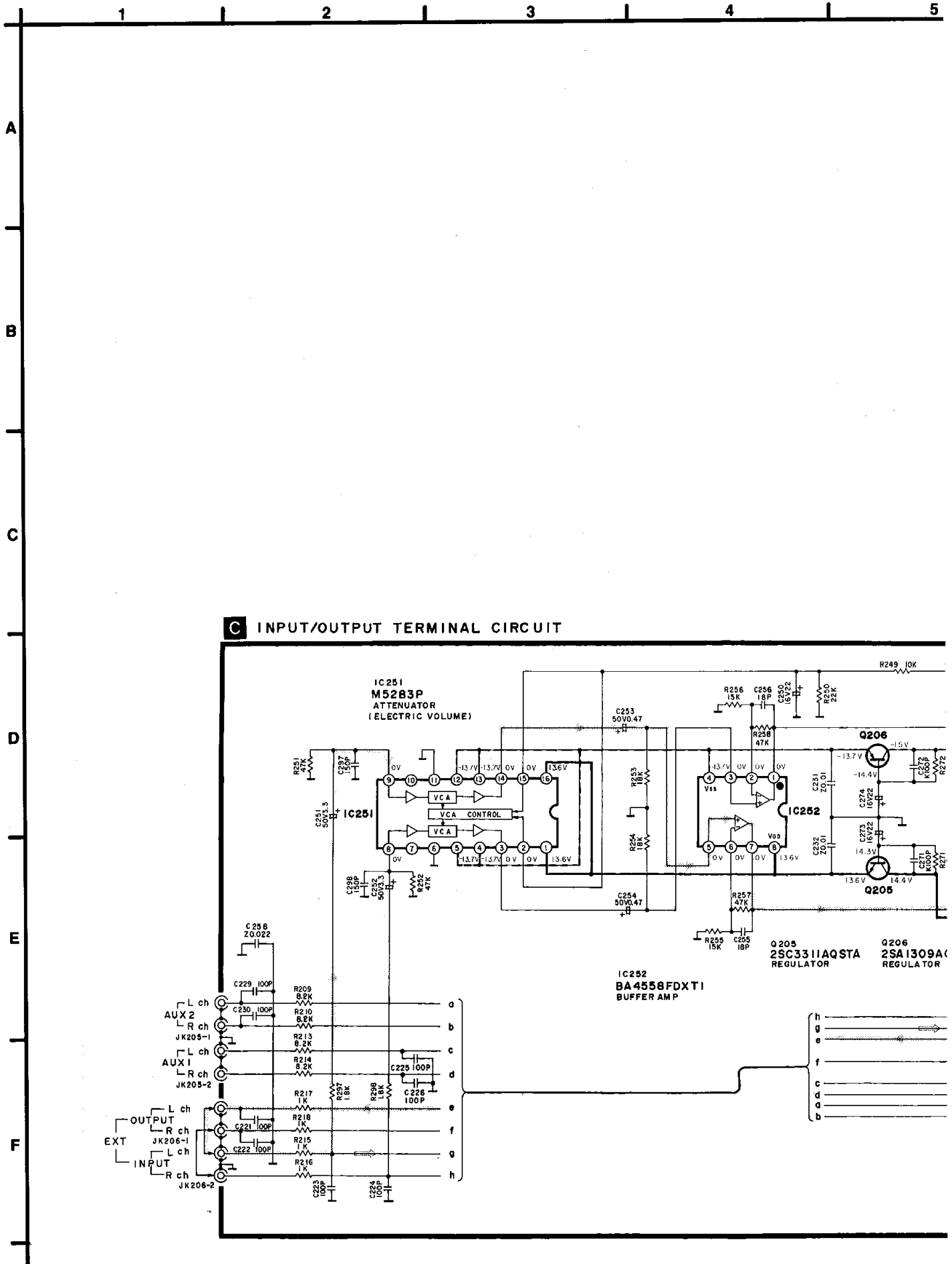


**PIN CONNECTION**

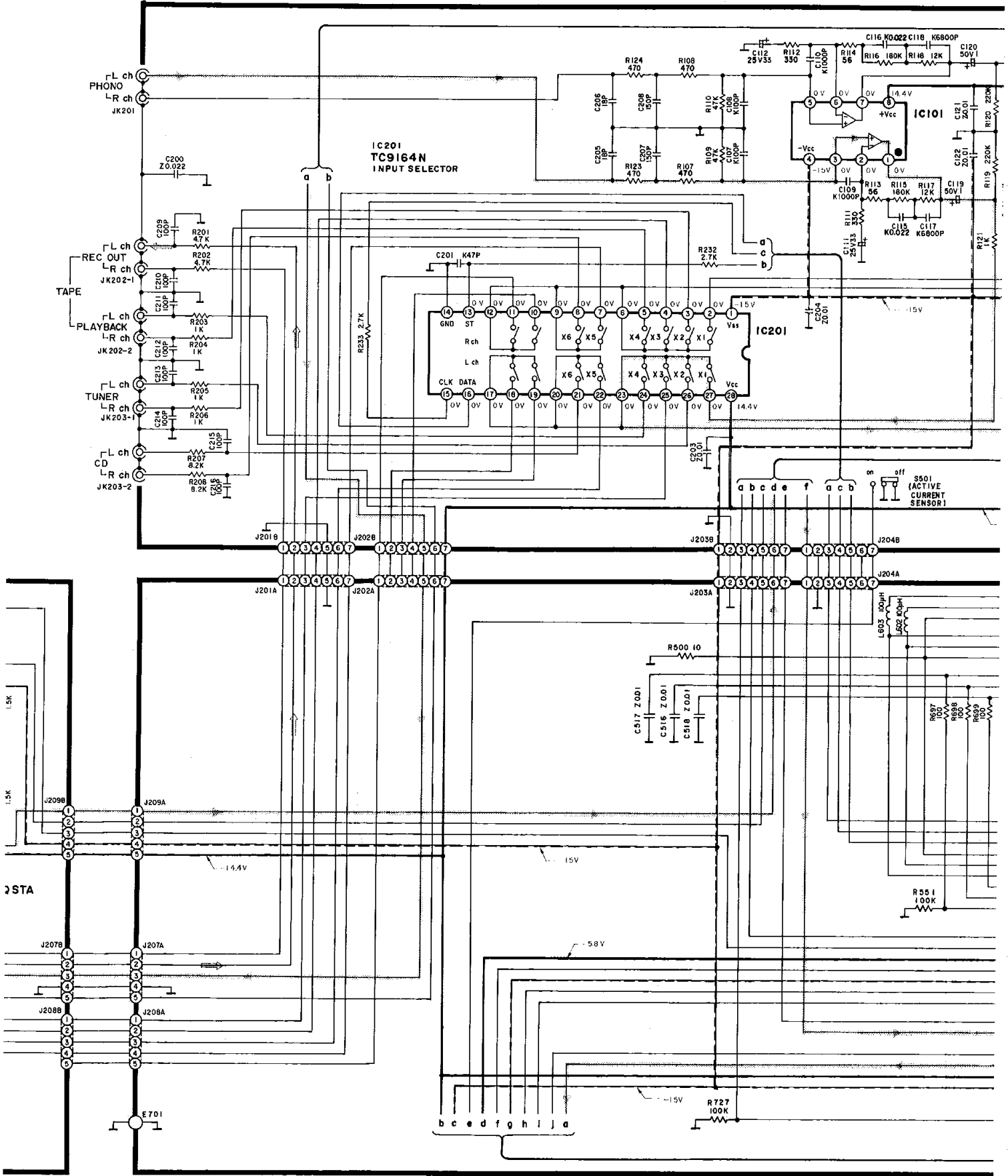
PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CONNECTION	F	F	N	4	P	P	3	P	P	2	P	1	P	P	P	N	N	F	F	
	2	2	P	G	1	2	G	3	4	G	5	G	6	7	8	P	P	1	1	

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

# SCHEMATIC DIAGRAM



D PHONO/TAPE/TUNER/CD TERMINAL CIRCUIT

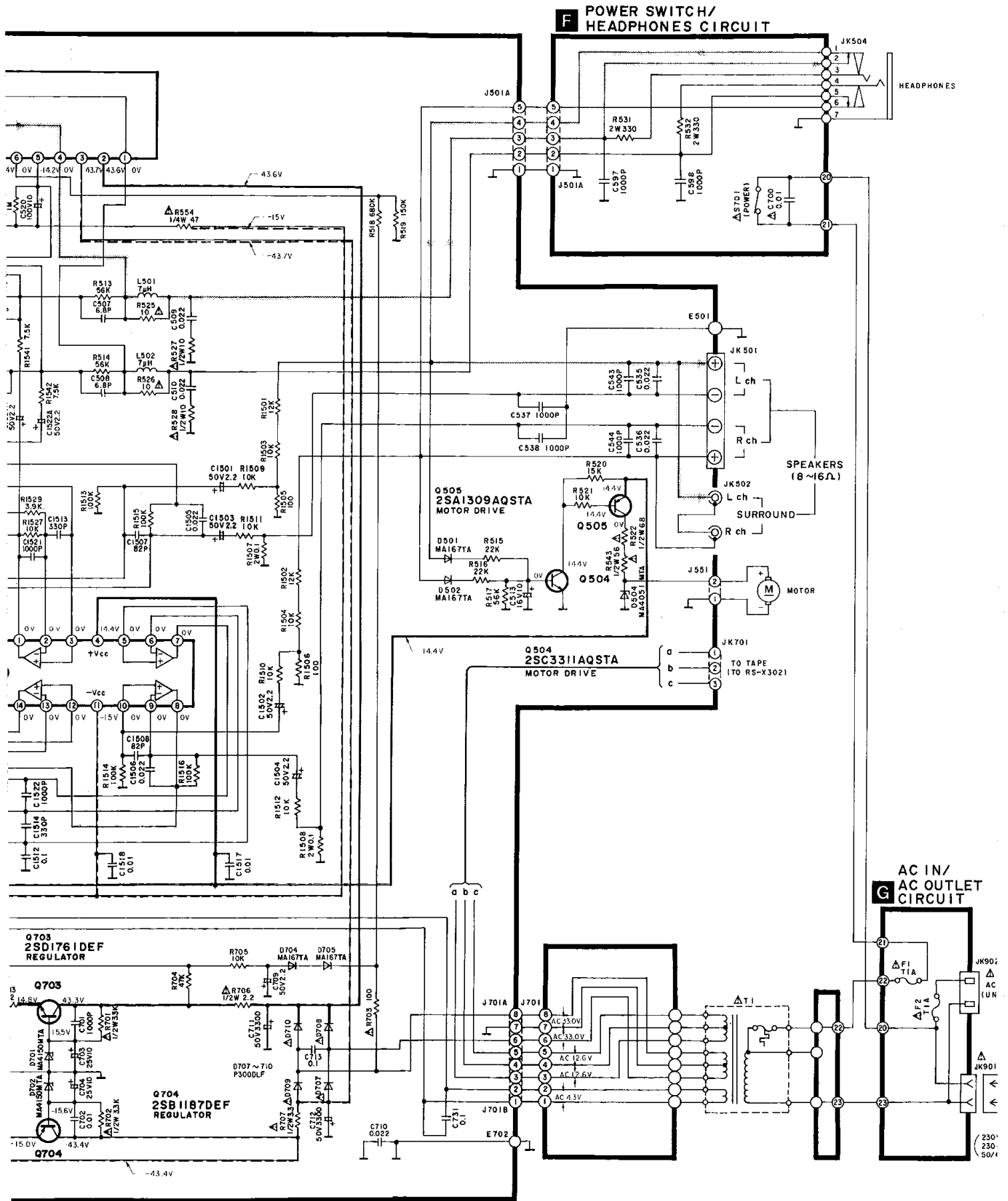


E MAIN CIRCUIT



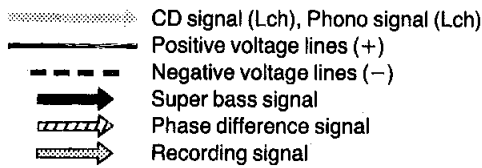






**Notes: (This schematic diagram may be modified at any time with the development of new technology.)**

- S501 : Active current sensor switch in "OFF" position.
- S701 : POWER switch in "ON" position.
- S702 : Voltage select switch in "220 V" position. [for (GC) only.]



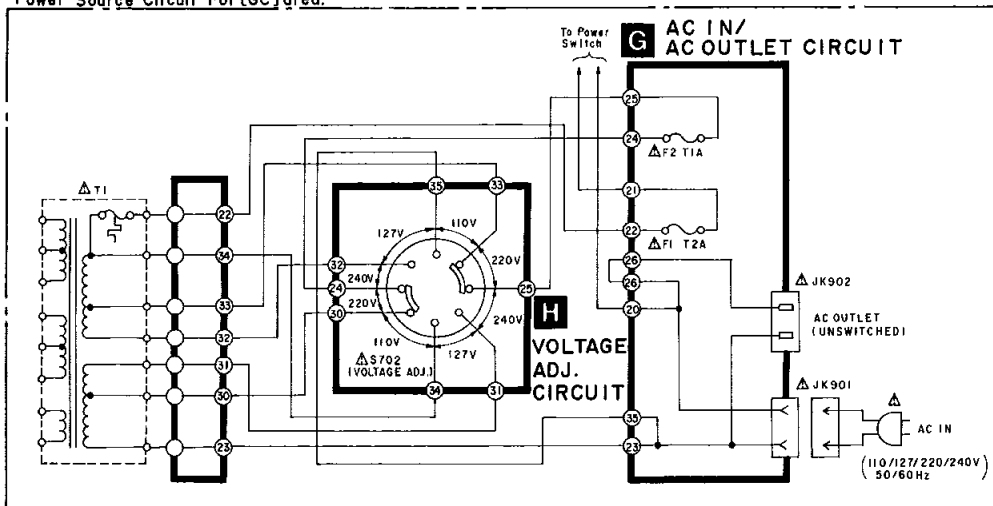
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
- Important safety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

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

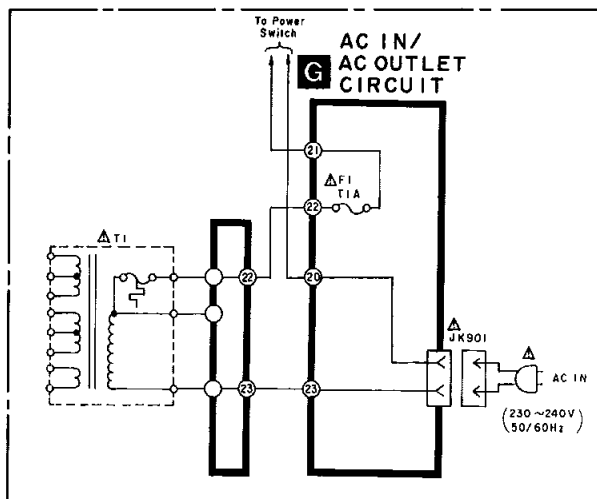
**\*Caution!**

- 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.

Power Source Circuit For [GC] area.



Power Source Circuit For [GN] area.



OUTLET SWITCHED)



V -- (E, EG)  
~240V -- (EB)  
50Hz