

Service Manual

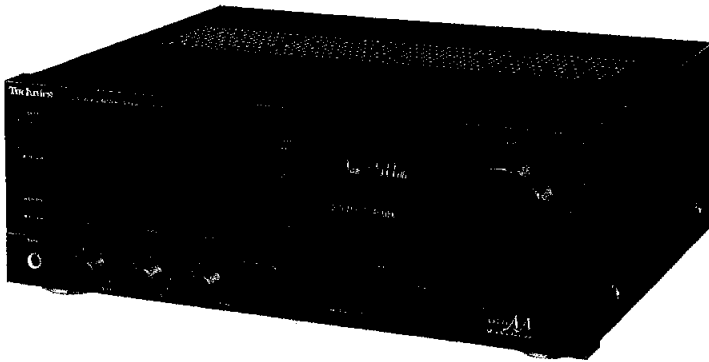
Digital Integrated Amplifier

Amplifier

SU-X999

Color

(K)...Black Type



Area

Country Code	Area	Color
(E), (E5)	Continental Europe	(K)
(EB)	Great Britain	(K)
(EG)	F.R. Germany & Italy	(K)

SPECIFICATIONS

(DIN 45 500)

■ AMPLIFIER SECTION

DIN power output 1 kHz THD:1%	2 x 100 W (8Ω)
Total harmonic distortion rated power at 1 kHz	1% (8Ω)
Harmonic distortion half power at 1 kHz	0.007% (8Ω)
Residual hum and noise	0.2 mV
Damping factor	30 (8Ω)
Input sensitivity and impedance	
PHONO	3mV/47 kΩ
TUNER,AUX,TAPE 1,TAPE 2	150mV/22 kΩ
CD	200mV/22 kΩ
Maximum input voltage (1 kHz,RMS)	
PHONO	100 mV
S/N (rated power 8Ω)	
PHONO	75 dB (IHF,A:79 dB)
TUNER,CD,AUX,TAPE 1,TAPE 2	82 dB (IHF,A:83 dB)
Frequency response	
PHONO	RIAA standard curve ± 0.8dB(30 Hz ~ 15 kHz)
TUNER,CD,AUX,TAPE 1,TAPE 2	10 Hz ~ 60 kHz (-3 dB)
CD,DAT (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	70 Hz, +10 dB
Output voltage	
TAPE 1,TAPE 2,REC OUT	150 mV
Channel balance,AUX 250 Hz ~ 6,300 Hz	±1.0 dB
Channel separation, AUX 1 kHz	60dB
Headphones output level and impedance	660 mV/330 Ω
Load impedance	
A or B	8 Ω ~ 16 Ω
SURROUND	8 Ω ~ 16 Ω

■ GENERAL

Power consumption	460 W
Power supply	
For Great Britain	AC 50 Hz/60 Hz,240V
For others	AC 50 Hz/60 Hz,220V
Dimensions (W x H x D)	360 x 128 x 300 mm (14-3/16" x 5-1/32" x 11-13/16")
Weight	7.9 kg (17.4 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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Central P.O. Box 288, Osaka 530-91, Japan

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■ BEFORE REPAIR

- (1) Turn off the power supply. Using a 10 Ω , 5W resistor connect both ends of power supply capacitors(C701,C702,6800 μ F) 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 50Hz/60Hz in NO SIGNAL mode should be shown below with respect to supply voltage 220V/240V.

Power supply voltage	AC220V	AC240V
Consumed current 50Hz	165 ~ 495mA	152 ~ 456mA
Consumed current 60Hz	158 ~ 474mA	146 ~ 437mA

■ 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.

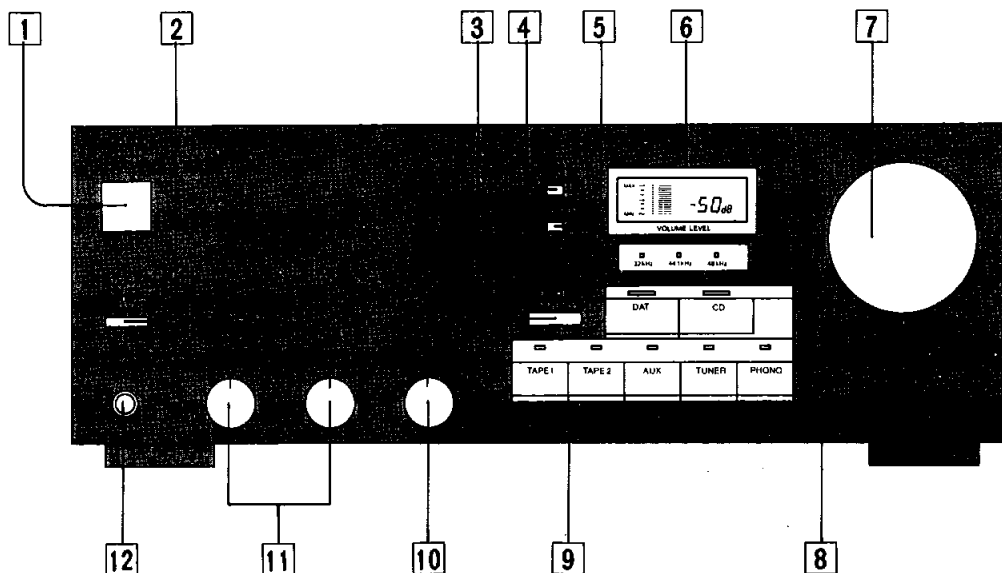
■ ACCESSORY

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

SJA188 For (EB) area only.
SFDAC05E03 For Others.

LOCATION OF CONTROLS

•Front panel



1 Power switch (POWER)

2 Speaker selector (SPEAKERS)

3 Audio muting switch/indicator (MUTING)

4 Surround-sound switch (SURROUND)

5 Super bass switch (SUPER BASS)

6 Volume-level indicator (VOLUME LEVEL)

7 Volume control (VOLUME)

8 Sampling frequency indicators

32 kHz: For digital signals with the 32-kHz mode sampling frequency

44.1 kHz: CD and others

48 kHz: For digital signals with the 48-kHz mode sampling frequency

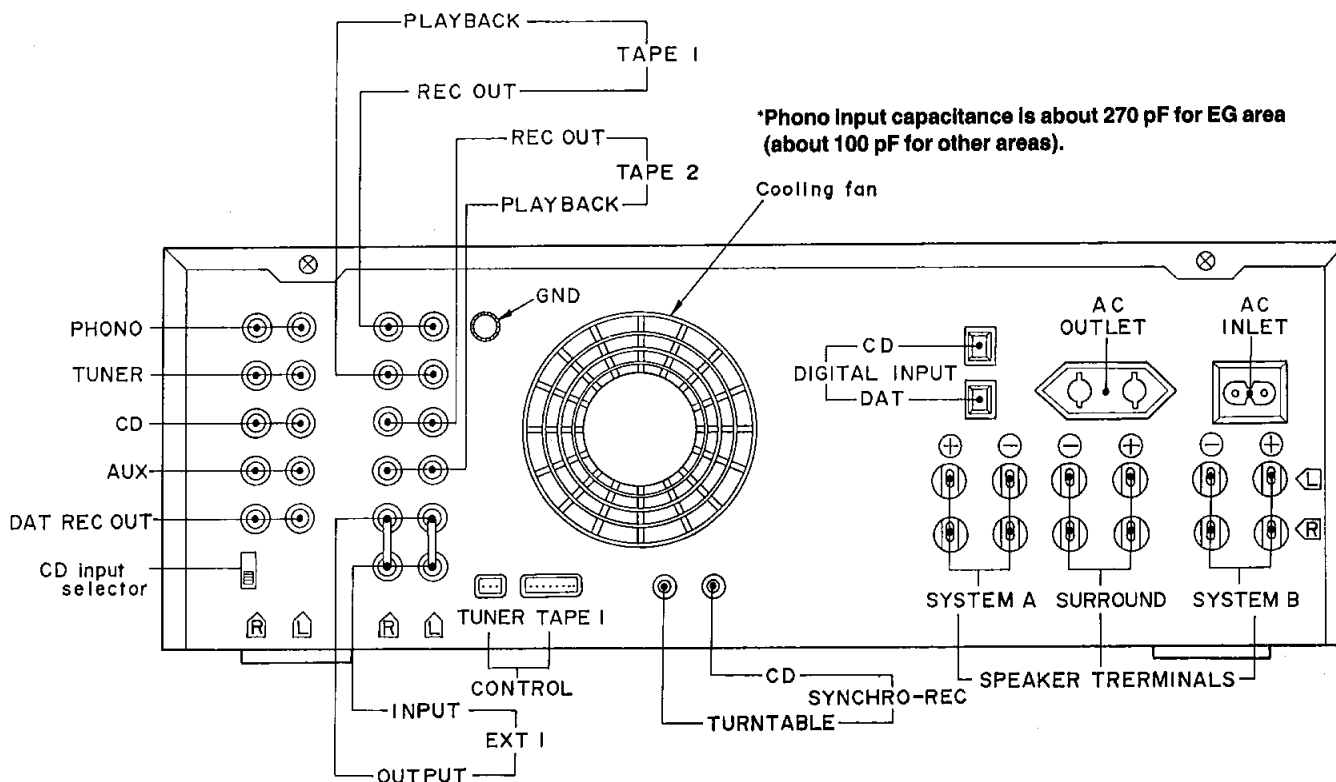
9 Input selectors/indicators (INPUT SELECTOR)

10 Balance control (BALANCE)

11 Tone controls (BASS/TREBLE)

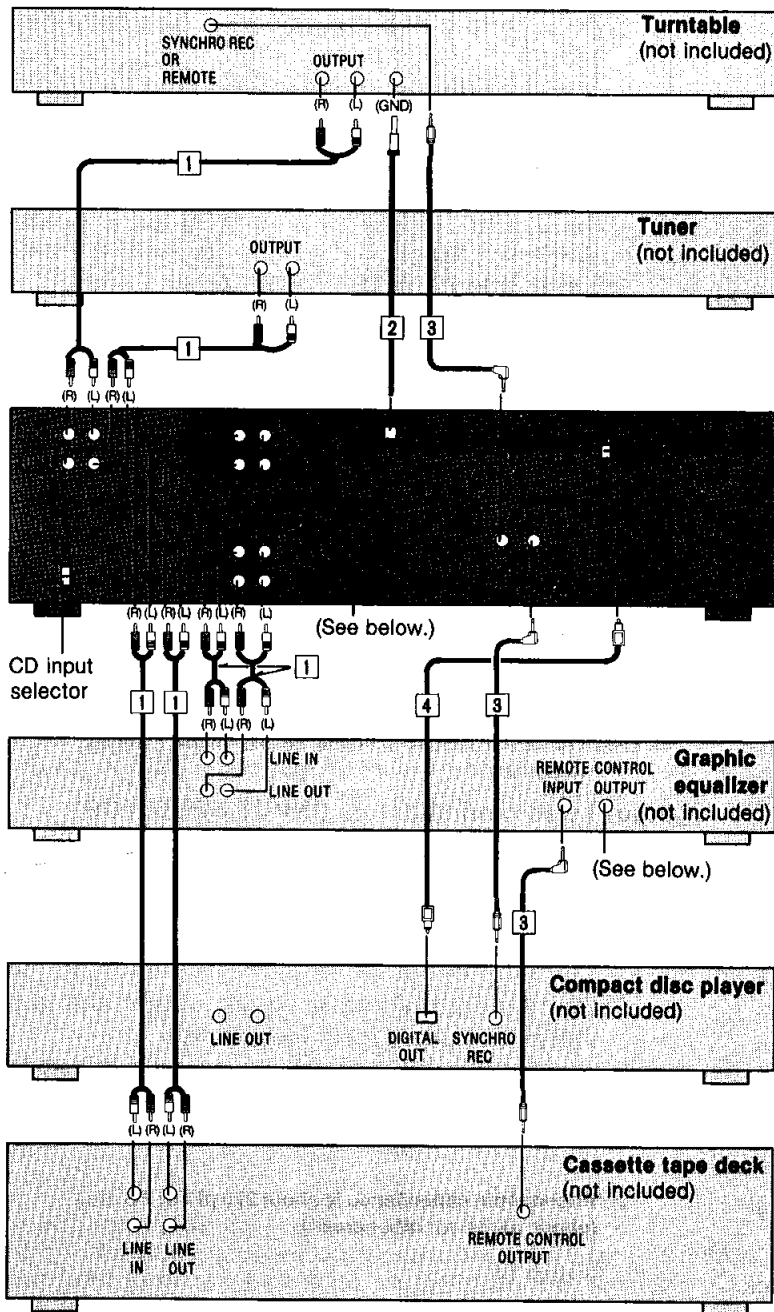
12 Headphones jack (PHONES)

•Rear panel



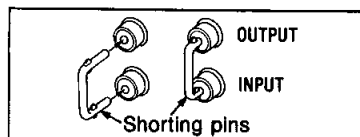
*Phono input capacitance is about 270 pF for EG area (about 100 pF for other areas).

CONNECTIONS



“EXT” terminals of this unit

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



“REMOTE CONTROL OUTPUT” terminal of the graphic equalizer

This terminal is used to connect the compact disc player with the remote-control terminal.

Connection diagrams shown are for connections to a Technics hi-fi component system.

Make connections in the numbered sequential order.

- 1 **Connect the stereo connection cables** (included with the turntable, tuner, graphic equalizer, and cassette tape deck).
- 2 **Connect the ground wire** (included with the turntable).
- 3 **Connect the L-type cables** (included with the turntable, compact disc player, and graphic equalizer).
- 4 **Connect the optical-fiber cable** (included with the compact disc player).

Compact disc player connections

If your compact disc player does not have the “DIGITAL OUTPUT” terminal, use stereo connection cables (not included) to make the connections between the “CD” terminals of this unit and the “LINE OUT” terminals of the compact disc player. If this type of connection is made, this unit’s CD input selector should be set to “ANALOG”.

CD input selector of this unit

This selector is used for selection of the format (analog or digital) of the input signals from the compact disc player.

ANALOG: Set to this position if stereo connection cables are used.

DIGITAL: Set to this position if an optical-fiber cable is used.

Notes:

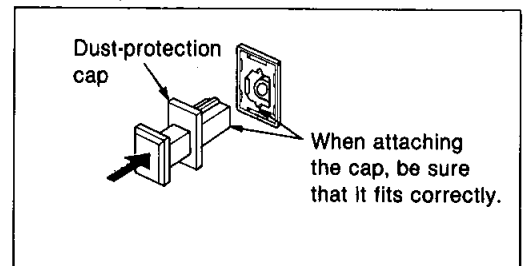
1. Be sure the power switch of this unit is switched OFF before changing the setting of this selector. (Interference noise may be emitted if the power switch is ON.)
2. The setting of this selector must be made correctly; if not, no sound will be emitted when the “CD” input selector of the front panel of this unit is selected.

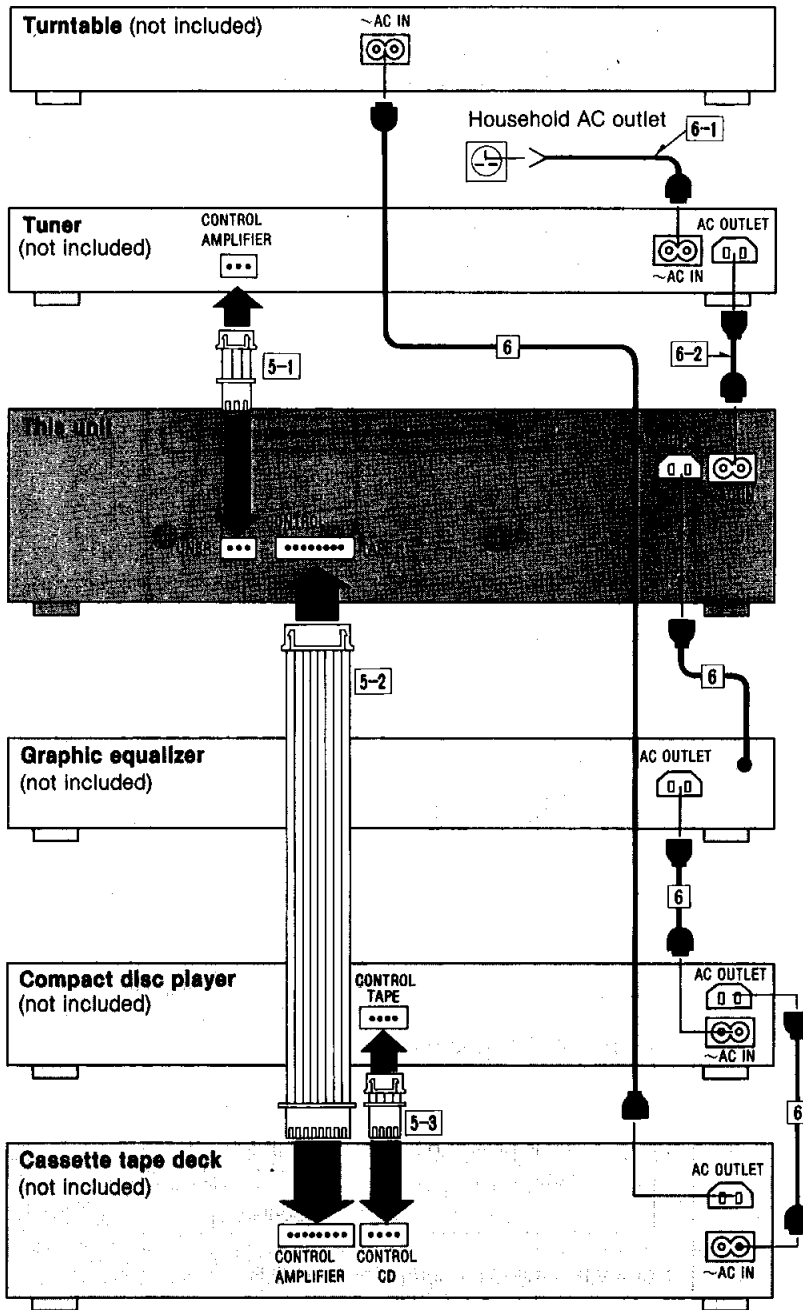
“DIGITAL INPUT” terminals of this unit

These terminals are protected by the dust-protection caps to avoid damage by the 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 below.



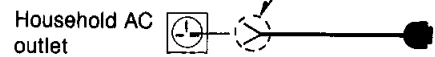


5 Connect the flat cables.

- 5-1** Connect the 3-core flat cable (included with the tuner).
- 5-2** Connect the 8-core flat cable (included with the cassette tape deck).
- 5-3** Connect the 4-core flat cable (included with the cassette tape deck).

6 Connect the AC power supply cords.

- 6-1**
 - ① Connect this cord only after all other cables and cords have been connected.
 - ② Fit a suitable plug to an AC power supply cord.



- 6-2** If the cord is to be connected to the household AC outlet, cut off and dispose of the plug and replace with a suitable plug.

Note:

If the graphic equalizer is not used in combination with these components, connect the AC power supply cord of the compact disc player to the AC outlet of the amplifier. If the compact disc player is not used in combination with these components, connect the AC power supply cord of the cassette tape deck to the AC outlet of the graphic equalizer.

■ About the AC outlets of the each components

Do not connect video-related equipment (such as a TV, etc.) to the AC outlets of these components. (These outlets are especially for audio equipment.) Also do not exceed the indicated power ratings when connecting to these outlets.

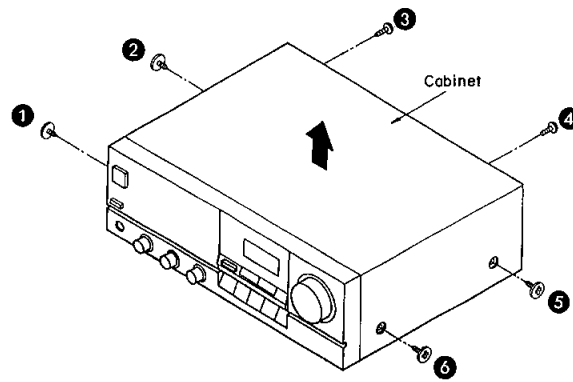
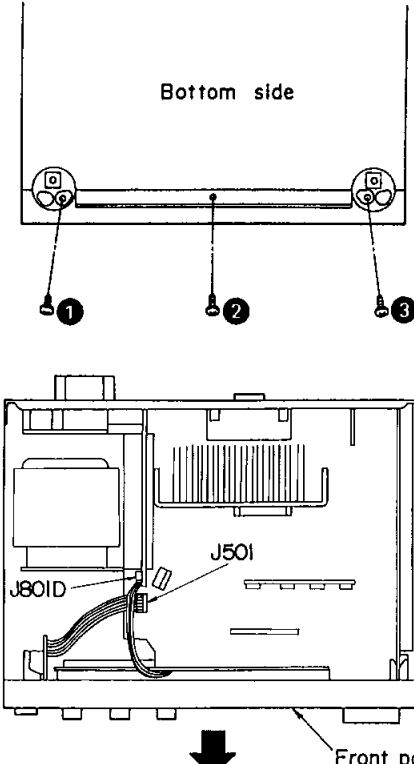
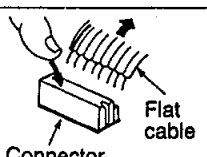
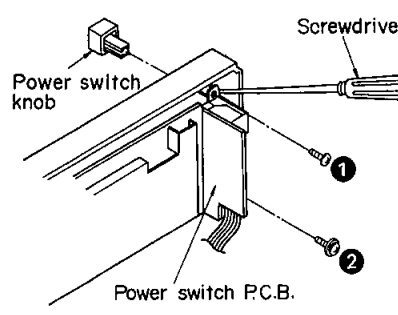
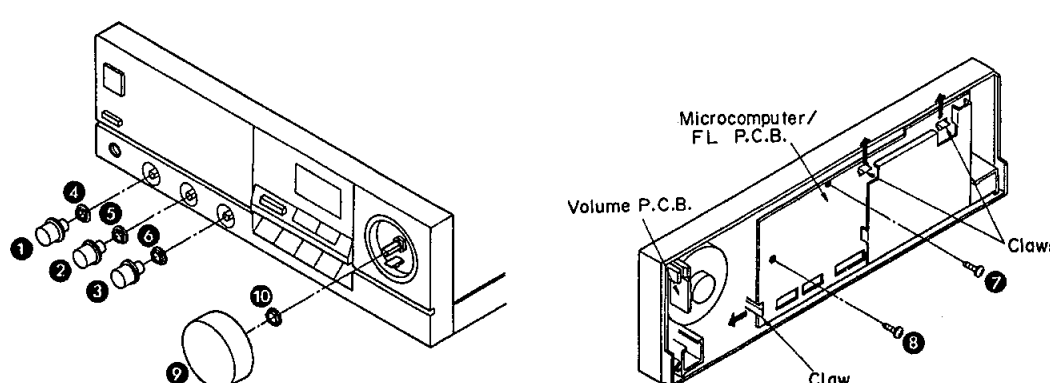
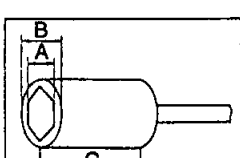
- **“SWITCHED” outlets** (For tuner, this unit, cassette tape deck)

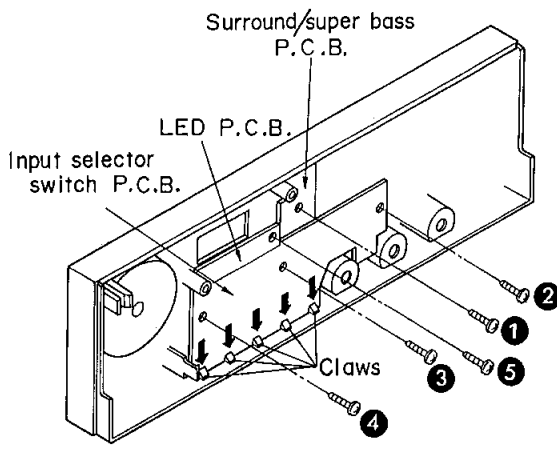
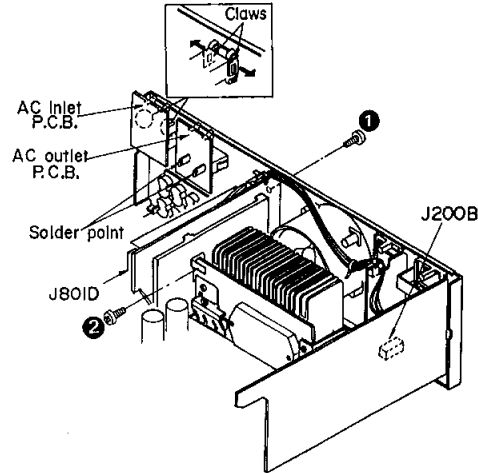
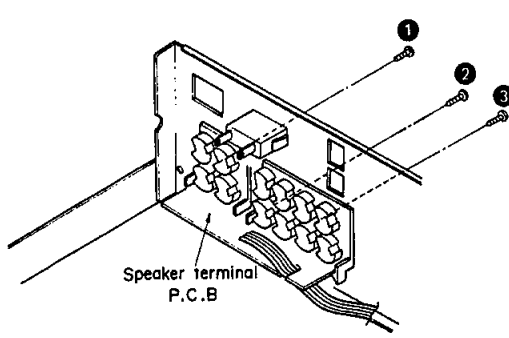
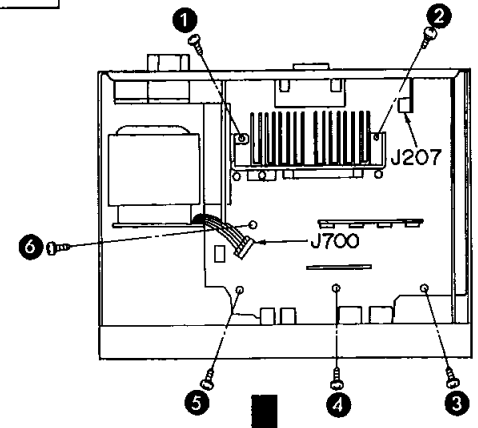
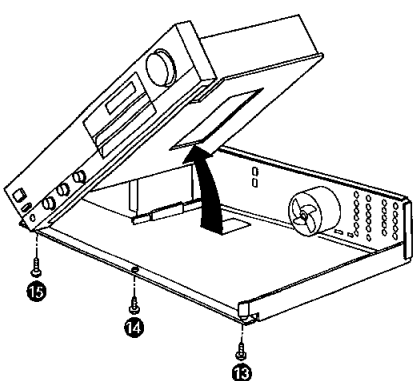
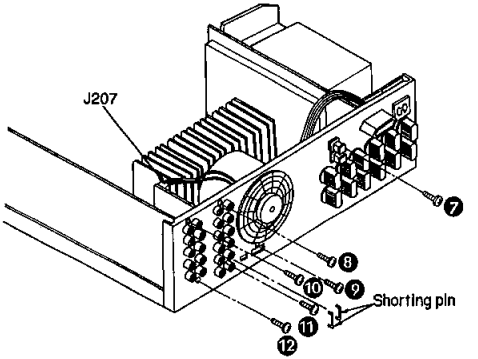
Power is controlled by the power switch of each unit.

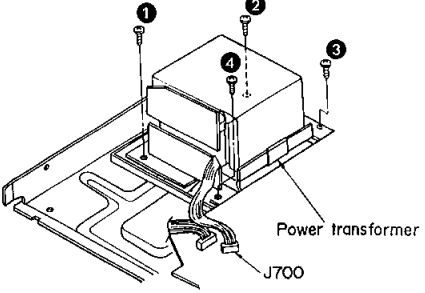
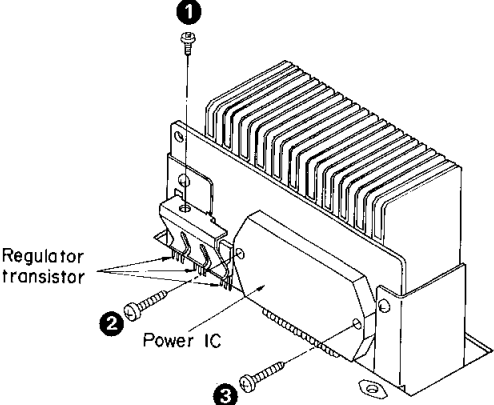
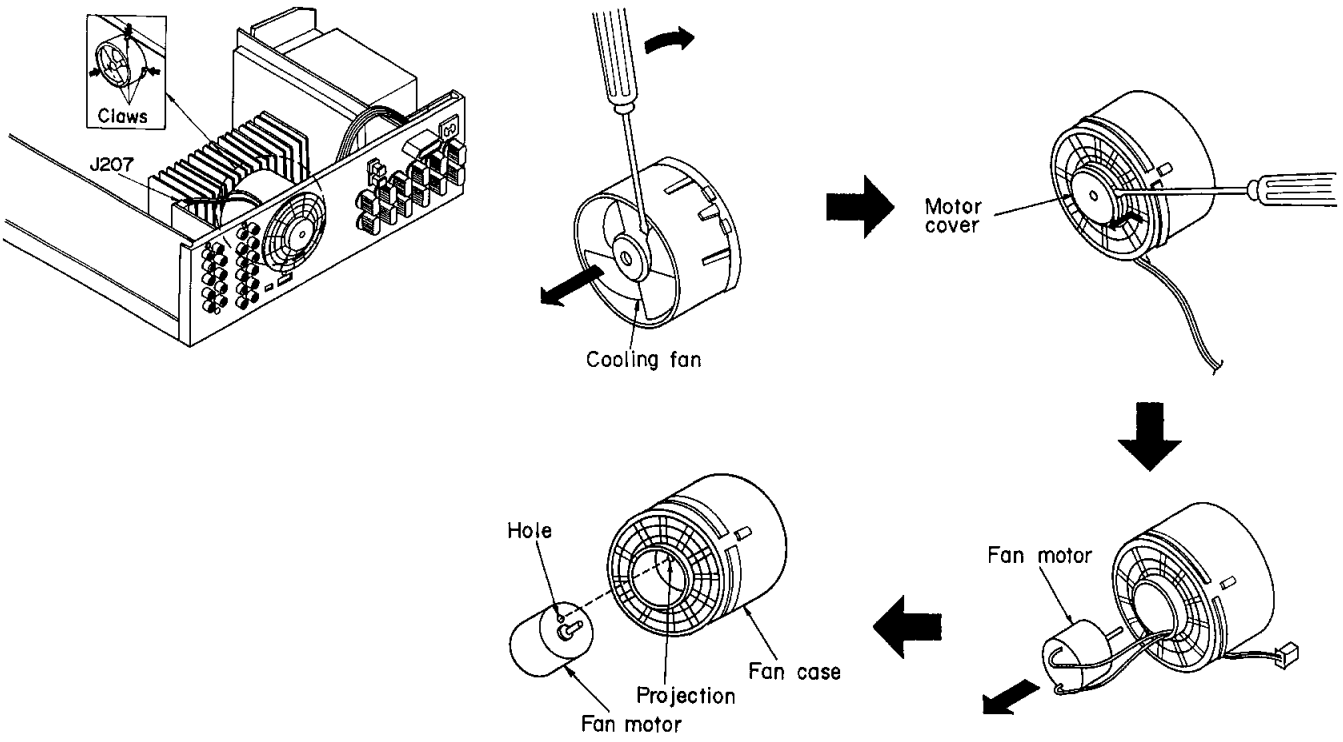
- **“UNSWITCHED” outlets** (For compact disc player, graphic equalizer)

Power is always available, regardless of power switch setting.

DISASSEMBLY INSTRUCTIONS

<p>Ref. No. 1</p> <p>Removal of the cabinet</p> <p>Procedure 1</p>	<p>•Remove the 6 screws (①~⑥).</p> 	<p>Ref. No. 2</p> <p>Removal of the front panel</p> <p>Procedure 1→2</p> <ol style="list-style-type: none"> 1. Remove the 3 screws (①~③). 2. Remove the flat cable (J501). 3. Pull out the 1 connector (J801D). 4. Remove the front panel in the direction of the arrow.  <p>Removal of the flat cable</p> <p>Pull out the flat cable while pressing the connector.</p> 
<p>Ref. No. 3</p> <p>Removal of the power switch P.C.B.</p> <p>Procedure 1→2→3</p>	<ol style="list-style-type: none"> 1. Remove the power switch knob by pushing it from behind the front panel. 2. Remove the 2 screws (①, ②). 	<p>Ref. No. 4</p> <p>Removal of the microcomputer/FL P.C.B. and volume P.C.B.</p> <p>Procedure 1→2→4</p> <ol style="list-style-type: none"> 1. Remove the 1 knob (⑨). 2. Remove the 1 nut (⑩). <p>Removal of the microcomputer/FL P.C.B.</p> <ol style="list-style-type: none"> 1. Remove the 3 knobs (①~③). 2. Remove the 3 nuts (④~⑥). 3. Remove the 2 screws (⑦, ⑧). 4. Push the 3 claws and remove the microcomputer/FL P.C.B.   <p>A: 11 mm B: 16 mm C: longer than 18 mm</p> <p>•Use a wrench of the dimensions shown in the illustration above to remove nuts.</p>

<p>Ref. No. 5</p>	<p>Removal of the surround/super bass P.C.B., input selector switch P.C.B. and LED P.C.B.</p>	<p>Ref. No. 6</p>	<p>Removal of the digital input P.C.B. AC outlet P.C.B. and AC Inlet P.C.B.</p>
<p>Procedure 1→2→4→5</p> <p>Removal of the surround/super bass P.C.B. ●Remove the 1 screw (1).</p> <p>Removal of the input selector switch P.C.B. 1. Remove the 3 screws (2~4). 2. Push the 5 claws and remove the input selector switch P.C.B.</p> <p>Removal of the LED P.C.B. ●Remove the 1 screw (5).</p>		<p>Procedure 1→6</p> <p>Removal of the digital input P.C.B. 1. Pull out the 2 connectors (J200B, J801D). 2. Remove the 2 screws (1, 2).</p> <p>Removal of the AC inlet P.C.B. ●Pull out the 2 claws in the direction of the arrow.</p> <p>Removal of the AC outlet P.C.B. ●Unsolder the 2 terminals.</p>	
<p>Ref. No. 7</p>	<p>Removal of the speaker terminal P.C.B.</p>	<p>Ref. No. 8</p>	<p>Checking of the main P.C.B.</p>
<p>Procedure 1→6→7</p> <p>●Remove the 3 screws (1~3).</p>		<p>Procedure 1→6→8</p> <p>1. Remove the 6 screws (1~6). 2. Remove the flat cable (J207, J700).</p>	
 <p>6. Remove the 3 screws (13~15).</p>			 <p>3. Remove the 6 screws (7~12) 4. Remove the shorting pin. 5. Pull out the 1 connector (J207).</p>

Ref. No. 9	Removal of the power transformer	Ref. No. 10	Removal of the power IC and regulator transistor
Procedure 1→6→8→9	<ol style="list-style-type: none"> 1. Remove the 4 screws (①~④). 2. Remove the flat cable (J700). 	Procedure 1→8→10	<ol style="list-style-type: none"> 1. Unsolder the power IC or regulator transistor. 2. Remove the 3 screws (①~③).
		 <p> •When mounting the power IC or regulator transistor. Apply silicone compound (SZZOL15) to the rear side of power IC or regulator transistor. </p>	
Ref. No. 11	Removal of the fan motor	<ol style="list-style-type: none"> 3. Insert a screwdriver at the root of the cooling fan. Force it out of the motor shaft. 4. Remove the motor cover by used ⊖ screwdriver. 5. Remove the motor from the fan casing. 6. When mounting the motor fan, align the fan casing's projection with the hole of the fan motor. 	
Procedure 1→11	<ol style="list-style-type: none"> 1. Pull out the 1 connector (J207). 2. Release the 3 claws. 		
			

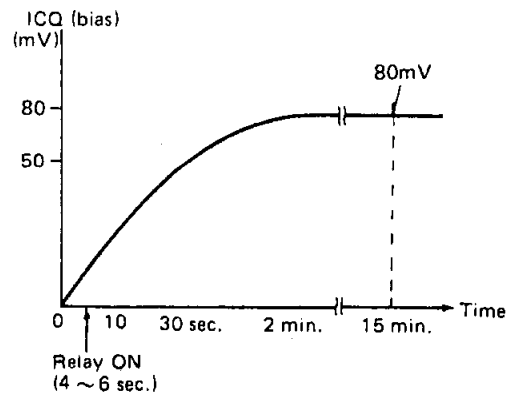
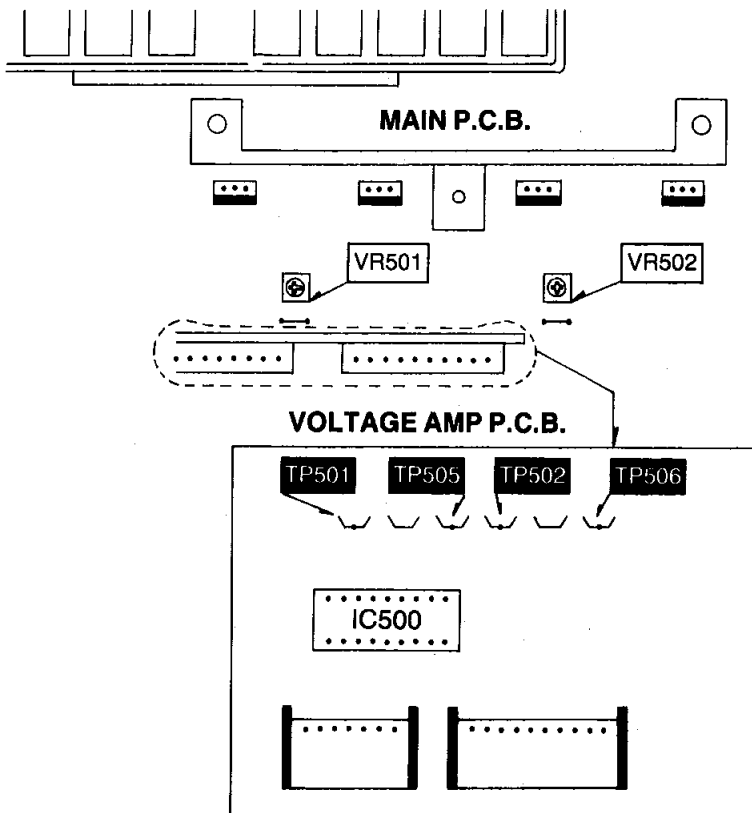
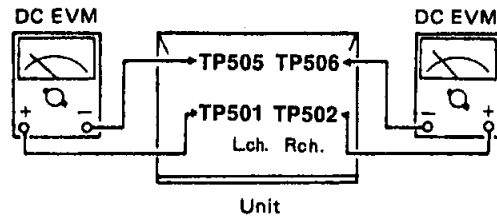
■ MEASUREMENTS AND ADJUSTMENTS

Control positions and equipment used.

- Volume knob.....∞ (Minimum)
- Main speaker selector.....off
- Remote speaker selector.....off
- DC electronic voltmeter(EVM)

VOLTAGE CONTROL(V)AMP.IDLING(ICQ) ADJUSTMENT

1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Completely turn the (V) amp. adjusting volumes (VR501, VR502) counter-clockwise.
3. Turn ON the set when it is cold, and 15 sec. later, adjust VR501 and VR502 so that the voltage is 50mV. Also, check that the voltage is 60 ~ 85mV (standard : 80mV) after lapse of 10 - 15 minutes. (Below 85mV after lapse of 60 min.)



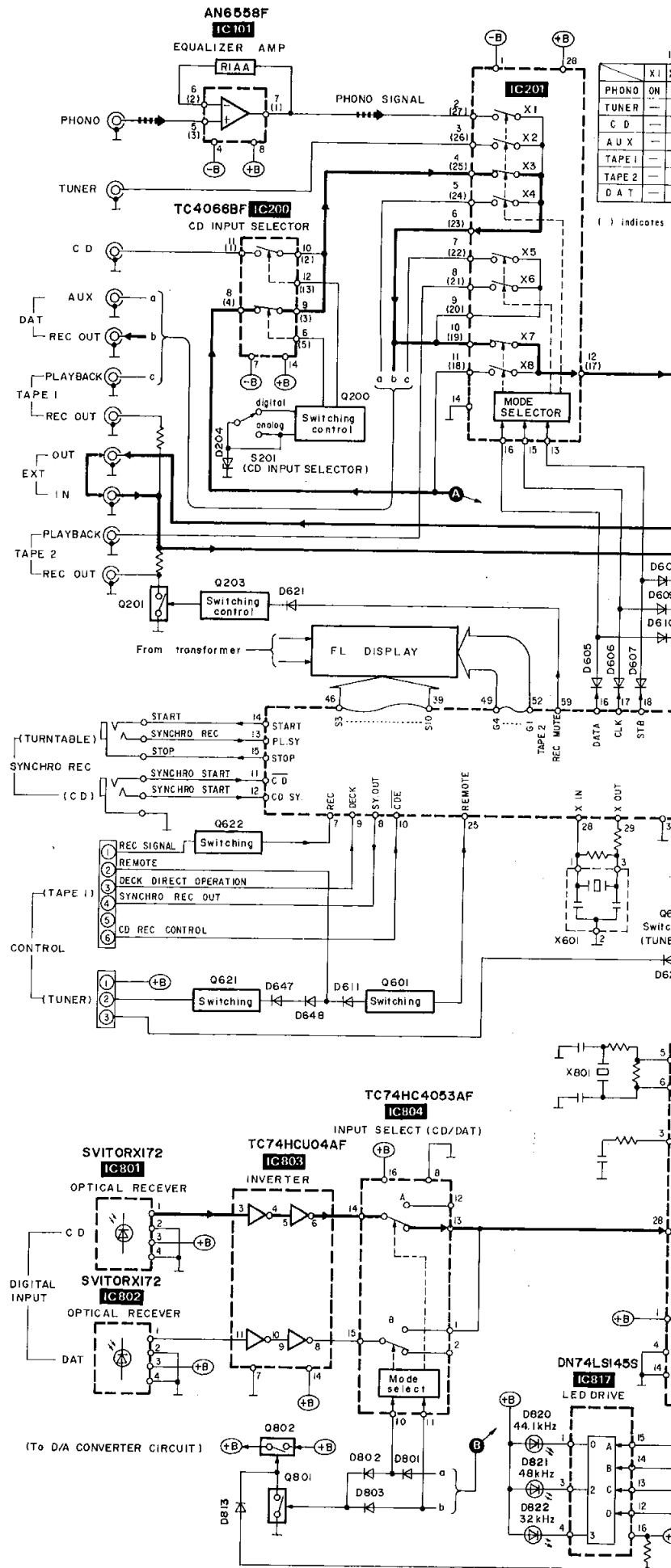
●Test point

- TP501...L ch ⊕ Voltage control amp I_{cc} adj.
- TP505...L ch ⊖ Voltage control amp I_{cc} adj.
- TP502...R ch ⊕ Voltage control amp I_{cc} adj.
- TP506...R ch ⊖ Voltage control amp I_{cc} adj.

●Adjustment VR

- VR501...L ch Voltage control amp I_{cc} adj.
- VR502...R ch Voltage control amp I_{cc} adj.

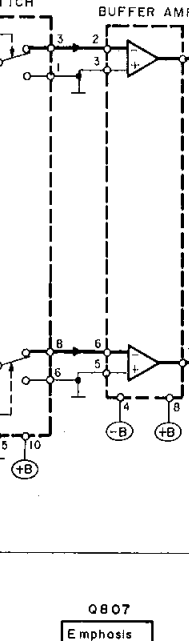
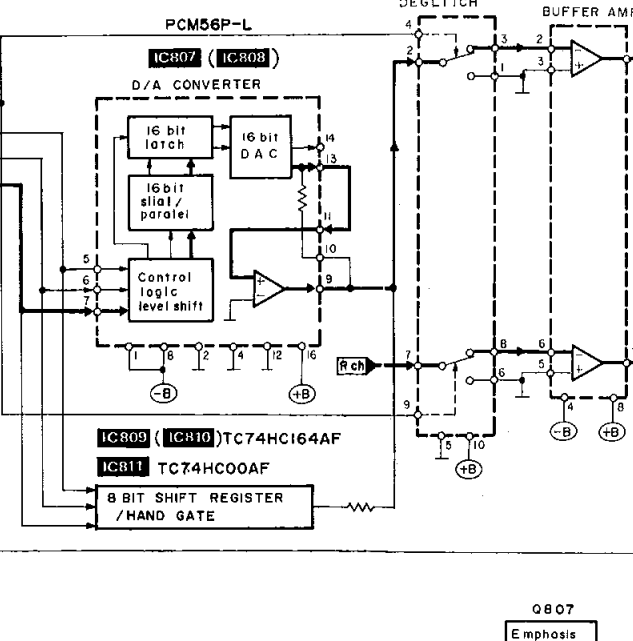
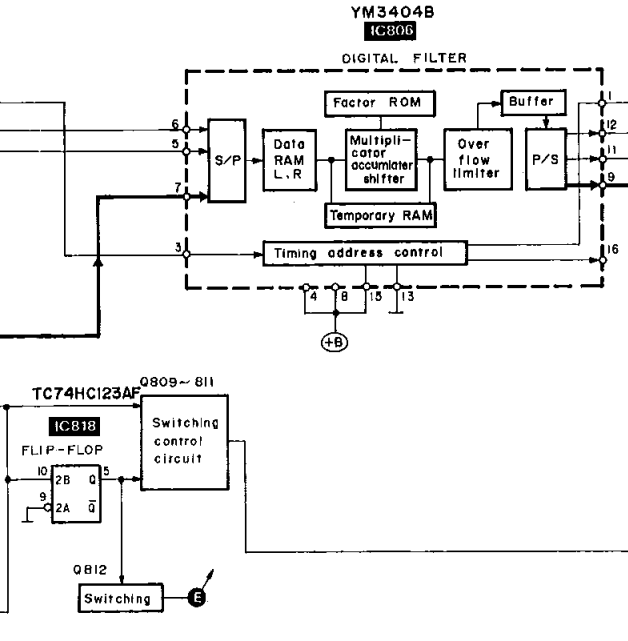
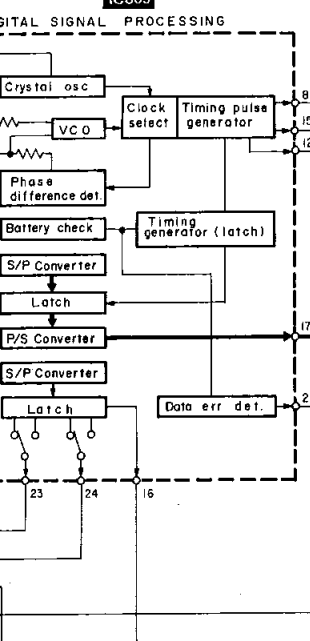
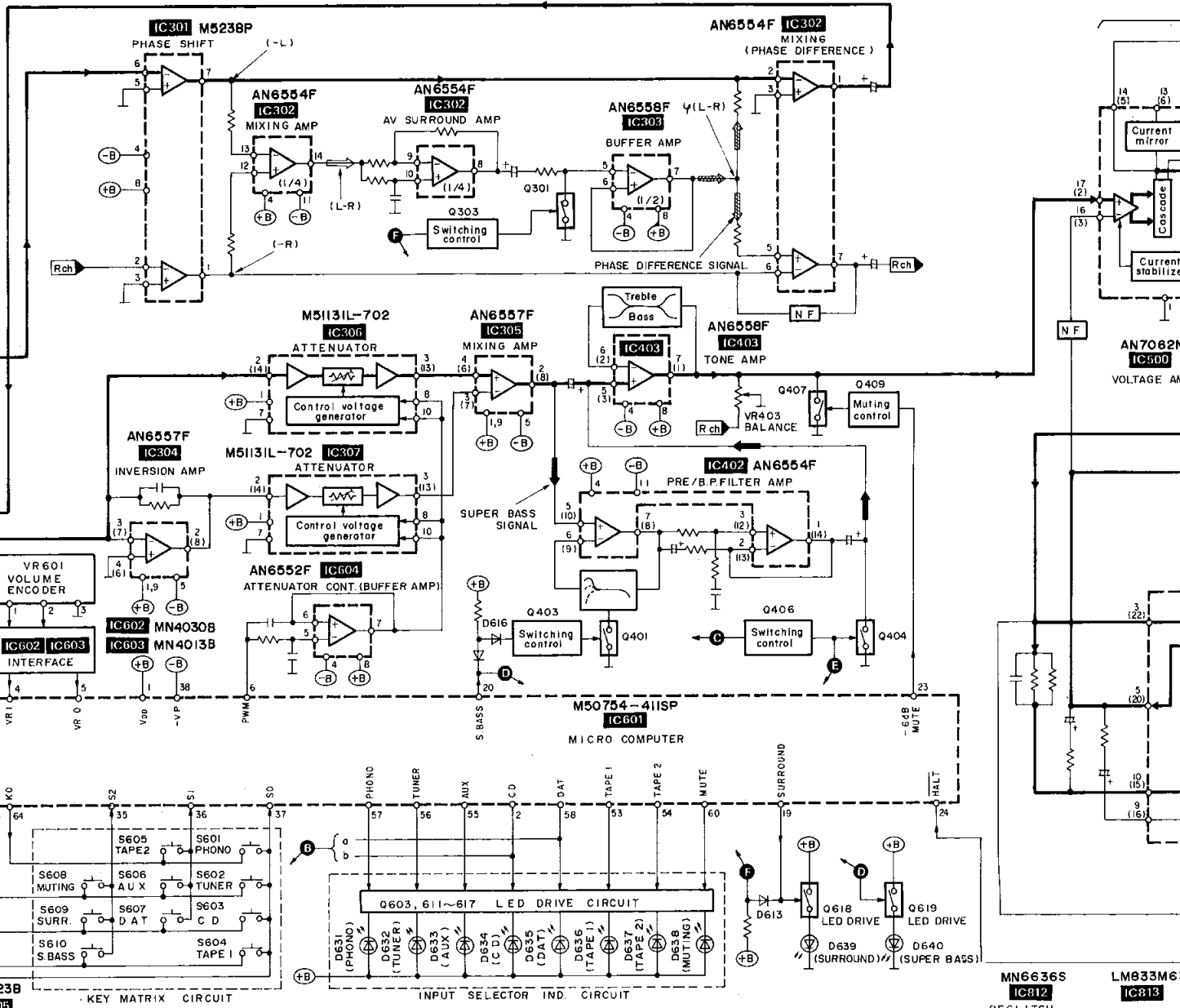
■ BLOCK DIAGRAM



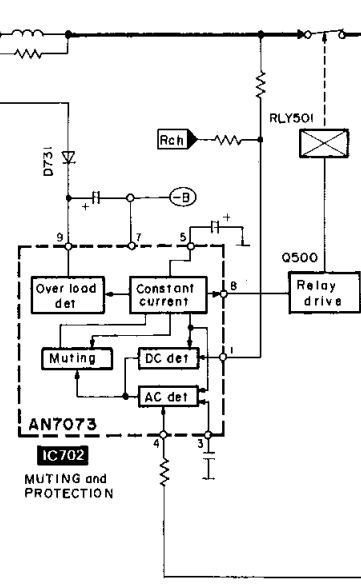
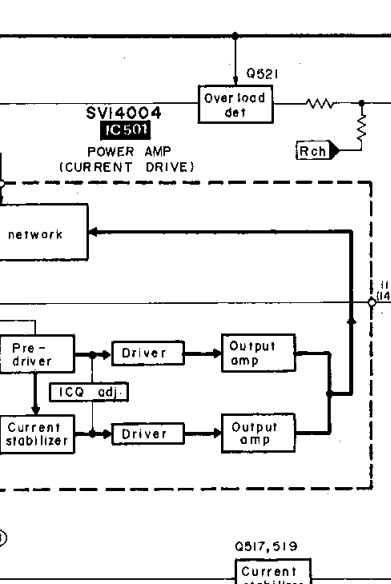
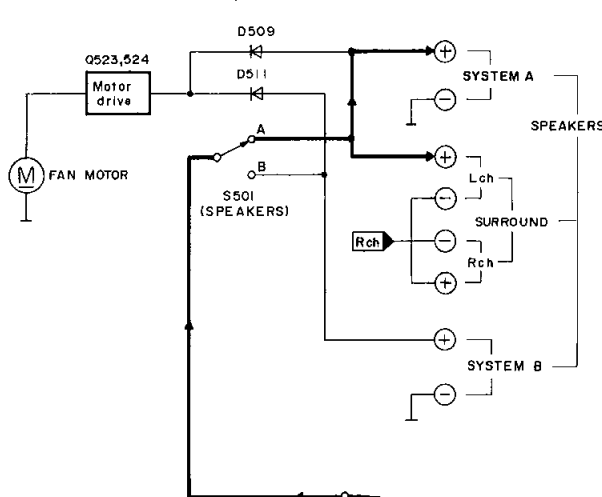
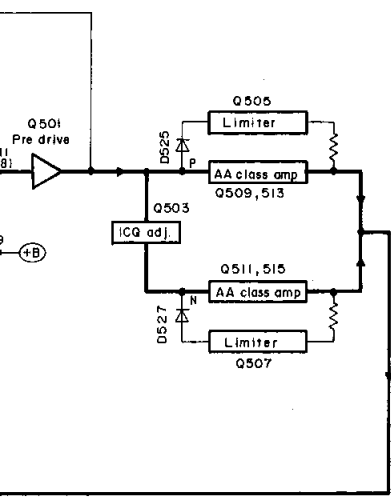
SELECTOR

X4	X5	X6	X7	X8
ON	ON	ON	ON	ON
ON	ON	ON	ON	ON
ON	ON	ON	ON	ON
ON	ON	ON	ON	ON
ON	ON	ON	ON	ON

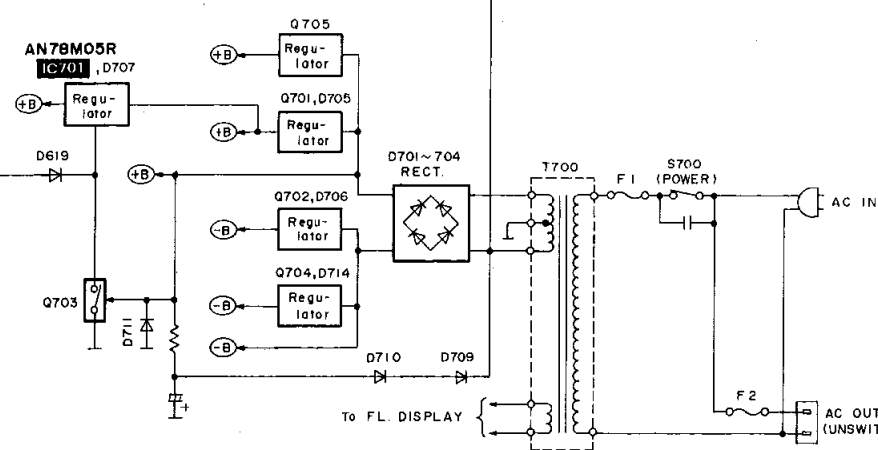
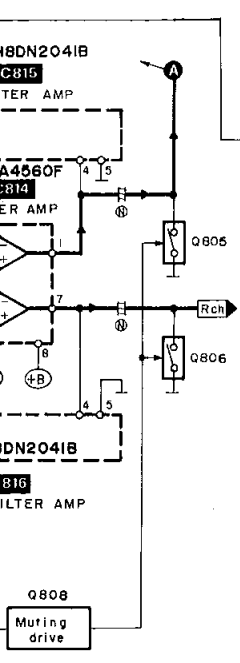
of right channel.



voltage control amplifier



- Notes :
- CD (DIGITAL) SIGNAL
 - ▬ PHONO SIGNAL
 - ⇨ MAIN SIGNAL
 - ▨ PHASE DIFFERENCE SIGNAL
 - ➔ SUPER BASS SIGNAL

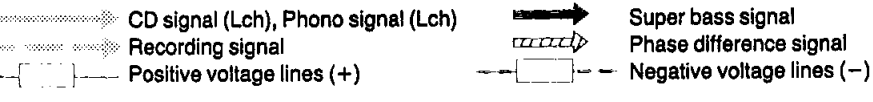


SCHEMATIC DIAGRAM

(Parts list on page 29~34)

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

- Notes:
- S201 : CD input selector switch in "digital" position
 - S501 : Speaker selector switch in "A" position.
 - S601~S608 : Input selector switches
 [S601: Phono, S602: Tuner, S603: CD, S604: Tape 1]
 [S605: Tape 2, S606: Aux, S607: Dat, S608: Muting]
 - S609 : Surround-sound switch
 - S610 : Super bass switch
 - S700 : Power switch in "on" position



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.

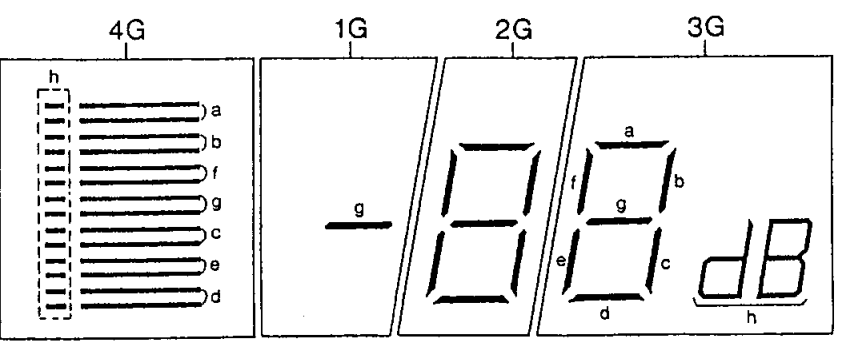
Important safety notice:
 Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Caution!

- ICs 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.

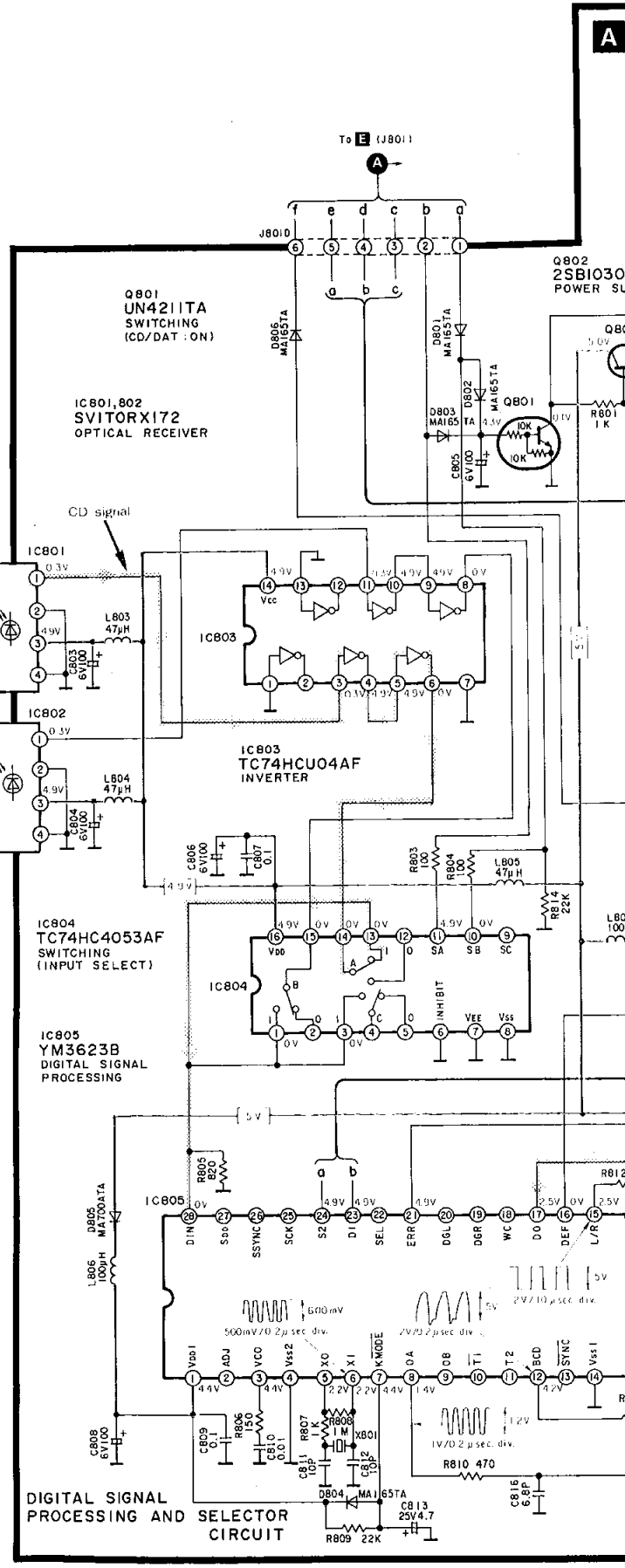
DESCRIPTION OF FL PANEL

GRID ASSIGNMENT



PIN CONNECTION

Pin No.	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Connection	F2	F2	NP	a	4G	b	c	d	1G	e	f	2G	g	3G	NP	h	3G	NP	F1	F1



R CIRCUIT

DEGLITCH/BUFFER AMP CIRCUIT

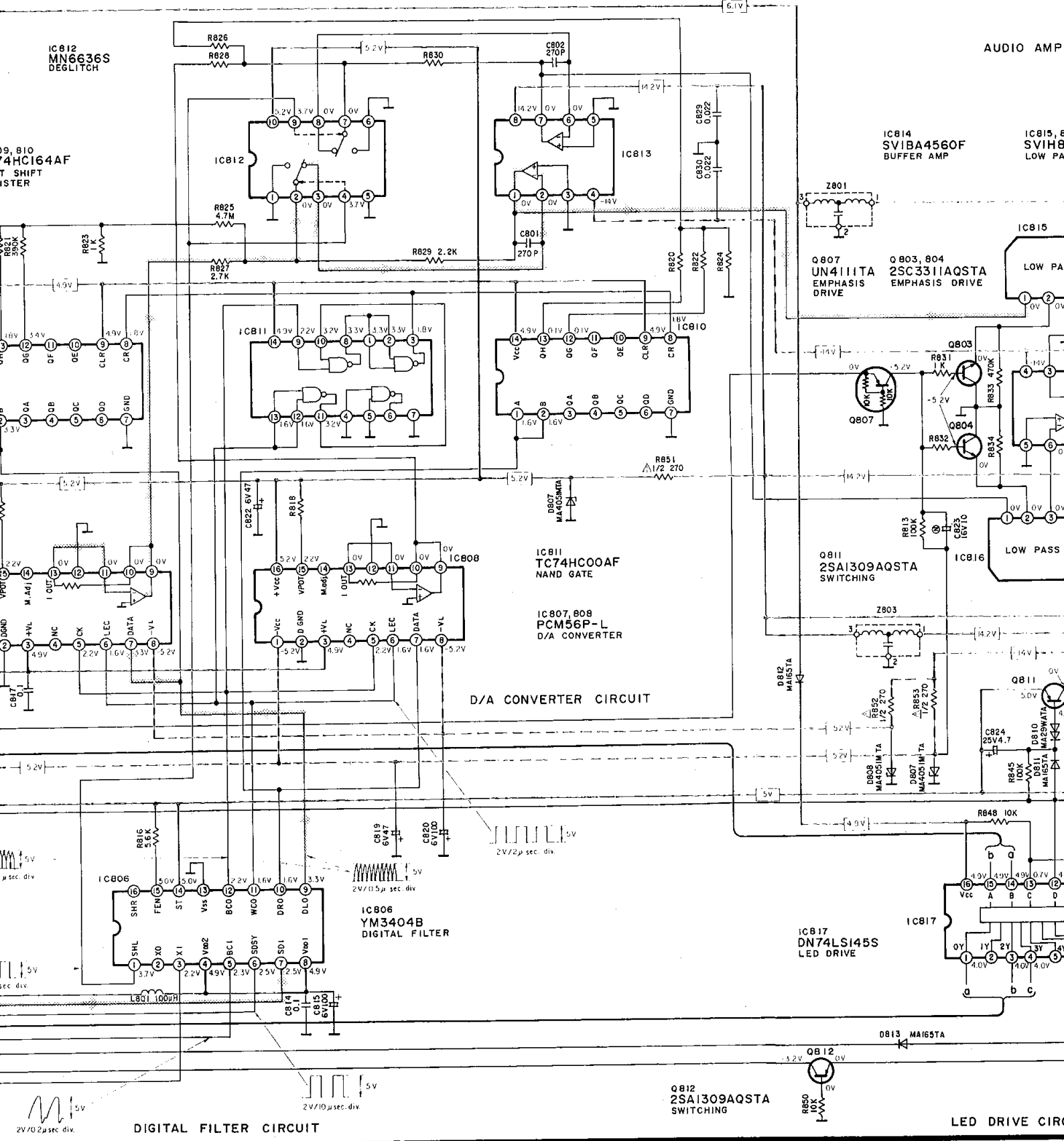
IC813
LM833M63
BUFFER AMP

AUDIO AMP

IC812
MN6636S
DEGLITCH

IC814
SVIBA4560F
BUFFER AMP

IC815, 8
SVIH8
LOW PA



DIGITAL FILTER CIRCUIT

Q812
2SA1309AQSTA
SWITCHING

LED DRIVE CIRCUIT

CIRCUIT

N2041B
FILTER

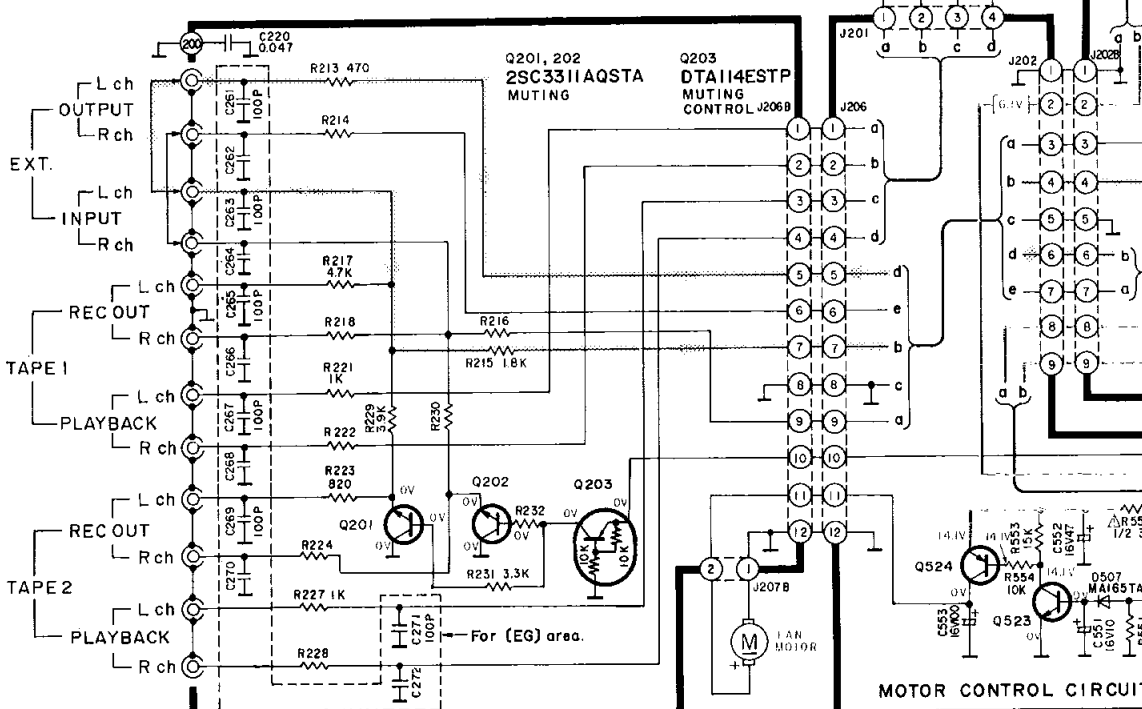
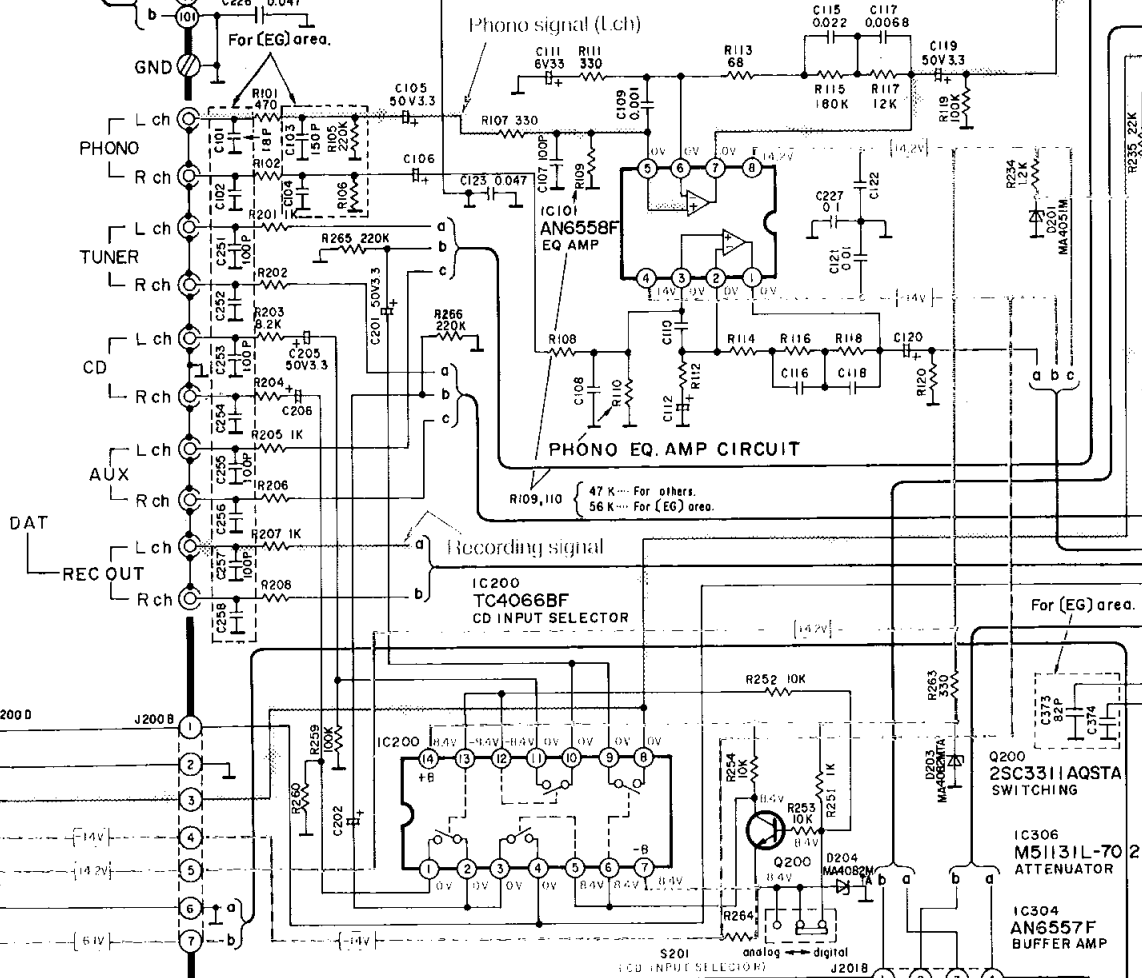
Q805, 806
2SD145ORSTTA
MUTING

Q808
UN4111TA
MUTING CONT.

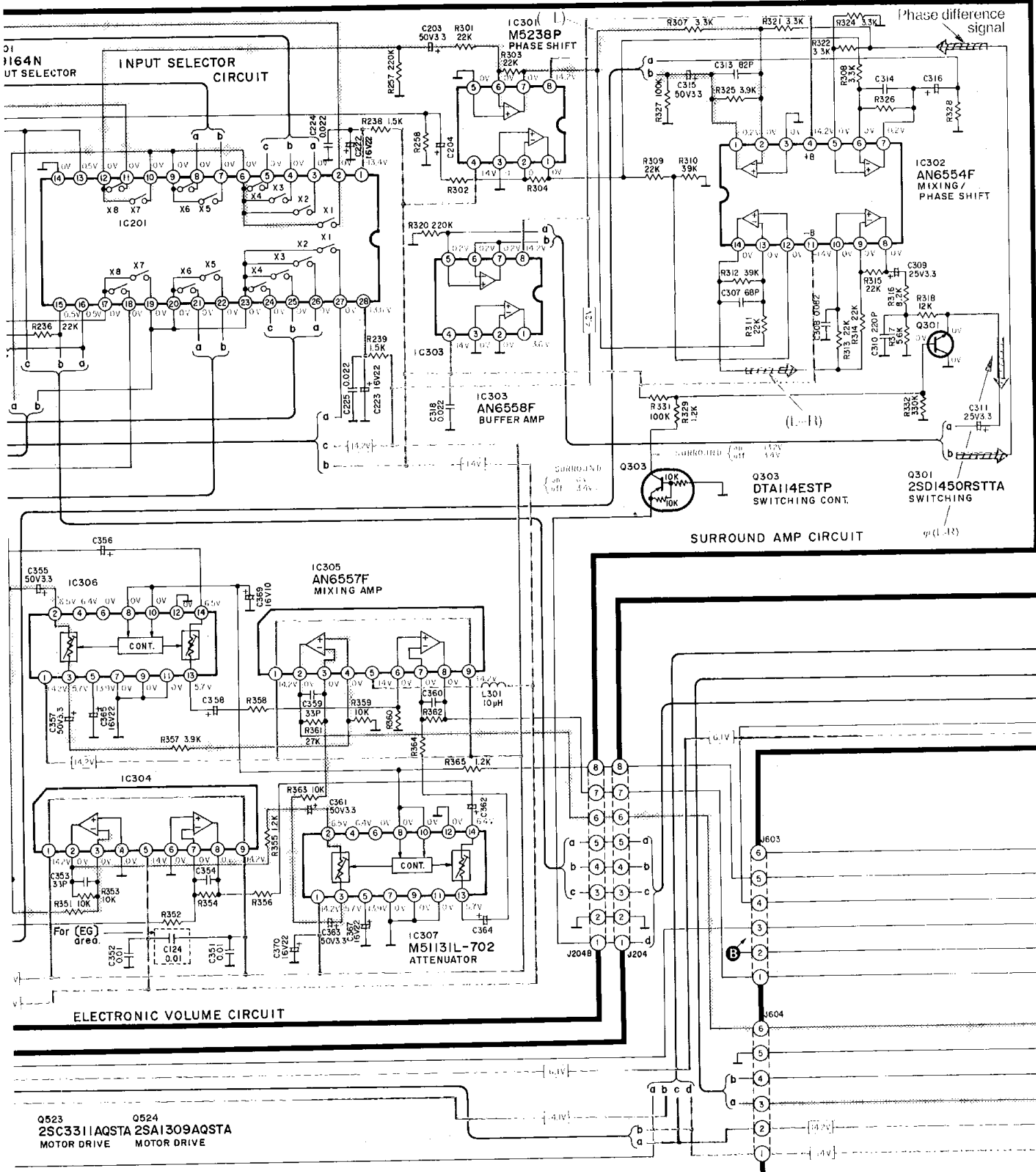
Q809, 810
UN4211TA
SWITCHING

IT

B PHONO EQ. AMP/ATTENUATOR/SURROUND AMP/ INPUT SELECTOR CIRCUIT

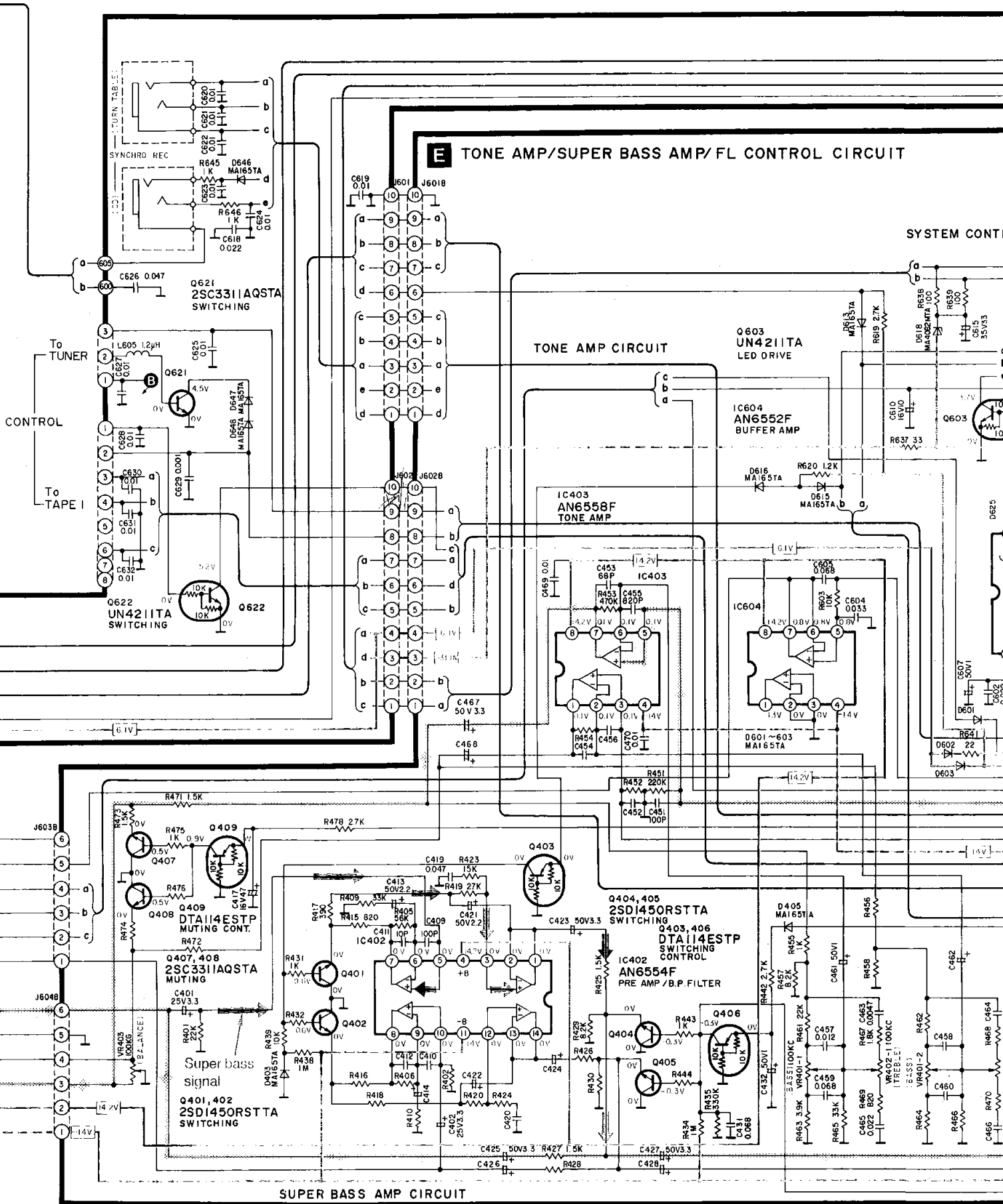


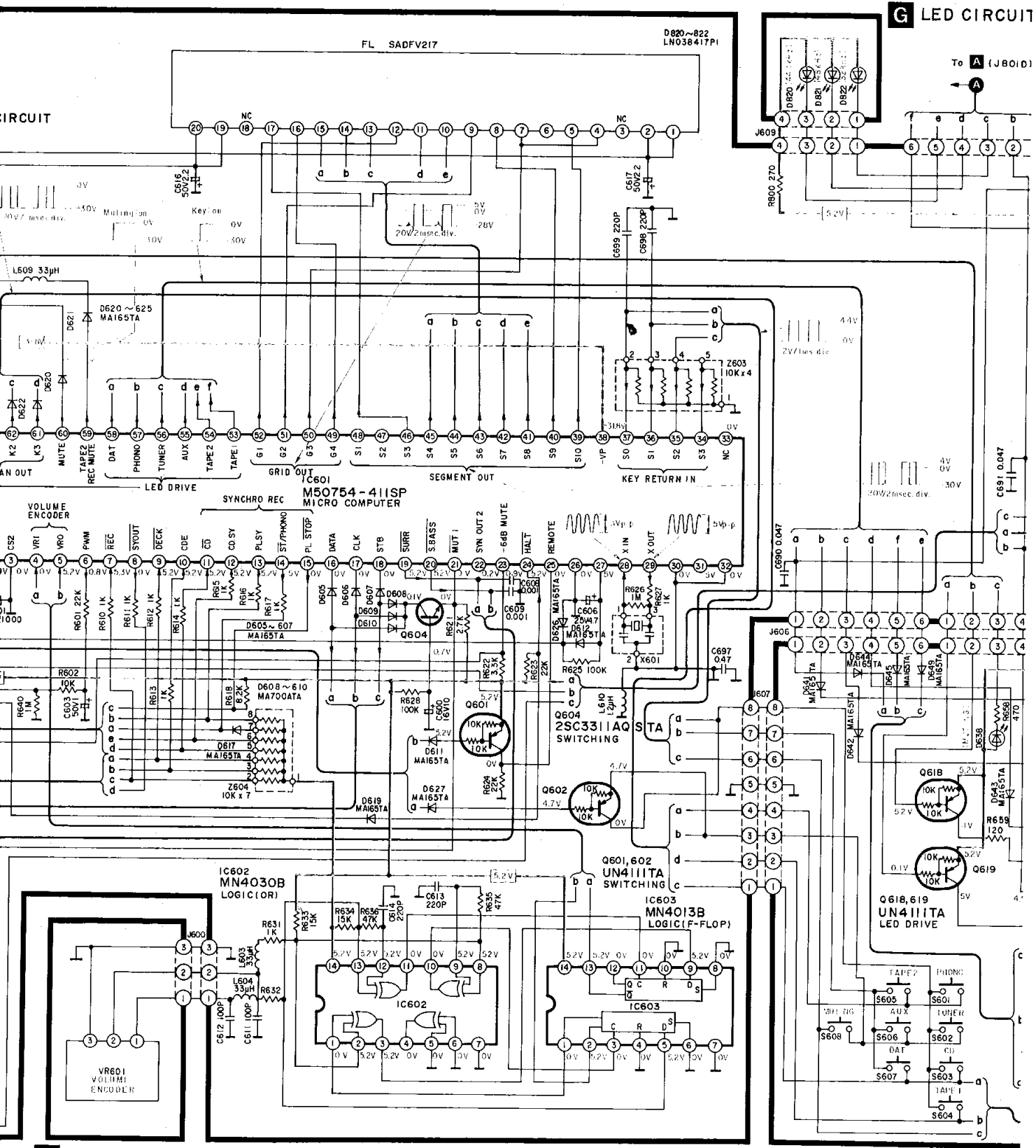
C INPUT/OUTPUT TERMINAL CIRCUIT



**D MOTOR CONTROL/VOLTAGE CONTROL AMP/POWER AMP/
CURRENT DRIVE AMP/MIXING/PROTECTION/POWER SOURCE CIRCUIT**

Q523 2SC3311AQSTA MOTOR DRIVE
Q524 2SA1309AQSTA MOTOR DRIVE





F VOLUME CIRCUIT

H INPUT SELECT SWITCH/LED

G LED CIRCUIT

