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ORDER NO. HAD8802028C9

Service Manual

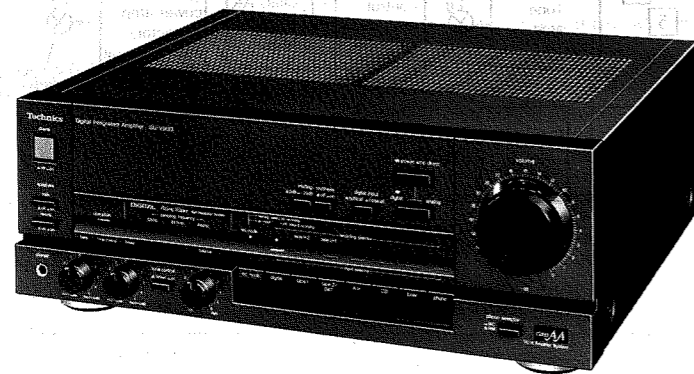
Digital Integrated Amplifier

Amplifier

SU-V90D

Color

(K).....Black Type



Color	Areas
(K)	[E].....Continental Europe.
(K)	[EH].....Holland.
(K)	[EB].....Belgium.
(K)	[EF].....France.
(K)	[EK].....United Kingdom.
(K)	[EG].....F.R.Germany.
(K)	[Ei].....Italy.
(K)	[XL].....Australia.
(K)	[XA].....Asia, Latin America, Middle Near East, Africa & Oceania.
(K)	[PA].....East PX.
(K)	[PE].....European Military.

SPECIFICATIONS (DIN 45 500)

MAIN AMP. SECTION

20 Hz~20 kHz continuous power output
both channels driven 2 × 100W (8Ω)
1 kHz continuous power output
both channels driven 2 × 150W (4Ω)
2 × 115W (8Ω)

Total harmonic distortion
rated power at 20 Hz~20 kHz 0.002% (8Ω)
rated power at 1 kHz 0.0007% (8Ω)
half power at 20 Hz~20 kHz 0.002% (8Ω)
half power at 1 kHz 0.0007% (8Ω)

Intermodulation distortion
rated power at 250 Hz: 8 kHz=4:1, 8Ω 0.005%
rated power at 50 Hz: 7 kHz=4:1, SMPTE, 8Ω 0.005%

Power bandwidth
both channels driven, -3 dB
5 Hz~60 kHz (8Ω, 0.025%)
Residual hum and noise 0.8 mV
Damping factor 30 (4Ω), 60 (8Ω)
Headphones output level and impedance 700 mV/330Ω

Load impedance
MAIN or REMOTE 4Ω~16Ω
MAIN and REMOTE 8Ω~16Ω

PRE AMP. SECTION

Input sensitivity and impedance
PHONO MM 2.5 mV/47kΩ
MC 170 μV/220Ω
TUNER, CD, AUX, TAPE 1, TAPE 2/DAT 150 mV/18kΩ
POWER AMP DIRECT 1V/47kΩ

PHONO maximum input voltage (1 kHz, RMS)
MM 160 mV
MC 12 mV
S/N

rated power (4Ω)
PHONO MM 79 dB (88 dB, IHF, A)
MC 70 dB (72 dB, 250 μV, IHF, A)
TUNER, CD, AUX, TAPE 1, TAPE 2/DAT 100 dB (IHF, A: 106 dB)

POWER AMP DIRECT 106 dB (IHF, A: 115 dB)
-26 dB power (4Ω)
PHONO MM 79 dB
MC 68 dB
TUNER, CD, AUX, TAPE 1, TAPE 2/DAT 86 dB

50 mW power (4Ω)
PHONO MM 76 dB
MC 69 dB
TUNER, CD, AUX, TAPE 1, TAPE 2/DAT 80 dB

Frequency response
PHONO RIAA standard curve
±0.2 dB (20 Hz~20 kHz)
TUNER, CD, AUX, TAPE 1, TAPE 2/DAT 0.8 Hz~150 kHz (-3 dB)
+0, -0.1 dB (20 Hz~20 kHz)

POWER AMP DIRECT 0.8 Hz~150 kHz (-3 dB)
Tone controls
BASS 50 Hz, +10 dB~-10 dB
TREBLE 20 kHz, +10 dB~-10 dB
Loudness control (volume at -30 dB) 50 Hz, +9 dB

Muting -20 dB
Output voltage and impedance
TAPE 1, 2/DAT REC OUT 150 mV
Channel balance, AUX 250 Hz~6,300 Hz ±1 dB
Channel separation, AUX 1 kHz 55 dB

DIGITAL SECTION

Harmonic distortion 0.002%
Total harmonic distortion 0.003%
S/N 110 dB
Dynamic range 99 dB
Frequency response 2 Hz~20 kHz, +0.3 dB, -0.3 dB

GENERAL

Power consumption 765W
Power supply
For continental Europe AC 50 Hz/60 Hz, 220V
For United Kingdom, Australia and others AC 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (W×H×D) 430 × 158 × 397 mm (16-15/16" × 6-7/32" × 15-5/8")
Weight 13.2 kg (29.04 lb.)

Notes:

- Specifications are subject to change without notice. Weight and dimensions are approximate.
- Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

SU-V90D

CONTENTS

BEFORE REPAIR AND ADJUSTMENT	Page 2
PROTECTION CIRCUITRY	2
ACCESSORY	2
LOCATION OF CONTROLS	3, 4
CONNECTIONS	5, 6
DISASSEMBLY INSTRUCTIONS	7 ~ 10
SCHEMATIC DIAGRAM	11 ~ 22
TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S	22

PRINTED CIRCUIT BOARDS	Page 23 ~ 28
BLOCK DIAGRAM	29, 30
WIRING CONNECTION DIAGRAM	31, 32
FUNCTION OF IC TERMINALS	33, 34
MEASUREMENTS AND ADJUSTMENTS	35, 36
EXPLODED VIEW	37 ~ 40
REPLACEMENT PARTS LIST	41 ~ 43
RESISTORS AND CAPACITORS	44 ~ 46

BEFORE REPAIR AND ADJUSTMENT

- Turn off the power supply. Using a 10Ω, 10W resistor, shortcircuit both ends of power supply capacitors (C609, C610) in order to discharge the voltage.
- Before turning on the power switch of the unit.
 - Connect the voltage controller to the primary side.
 - Connect the AC ampere meter to the primary side or connect the DC voltage meter to the "±B" circuit of the secondary side.
 - Turn the VR of ICQ (VR401, VR402, VR551 and VR552) to minimum (counterclockwise).
 - After setting the output to zero of the voltage controller, turn on the power switch of the unit. And increase the output of voltage controller gradually. Then, check carefully whether the current value of primary side become more than following value or whether the DC voltage of secondary side is increasing slowly.
 - If the value of current is increasing unusually or the DC voltage is not increasing, lower the output level of voltage controller immediately.
 - The current value of the primary side at no signal. (Confirm the power supply voltage of each area and provided voltage of the unit.)

Power supply voltage	AC110V	AC127V	AC220V	AC240V
Consumed current 50/60Hz	270 ~ 730mA	240 ~ 630mA	130 ~ 370mA	120 ~ 330mA

PROTECTION CIRCUITRY

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

- No sound is heard when the power is turned 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 the amplifier are used.

If this occurs, follow the procedure outlined below:

- Turn off the power.
- Determine the cause of the problem and correct it.
- Turn on the power once again.

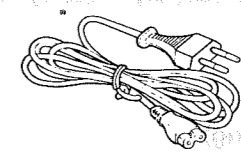
Note:

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

ACCESSORY

- AC power supply cord..... 1

For United Kingdom and some areas, the power cord is directly attached to the unit.
Configuration of AC power supply cord differs according to area.



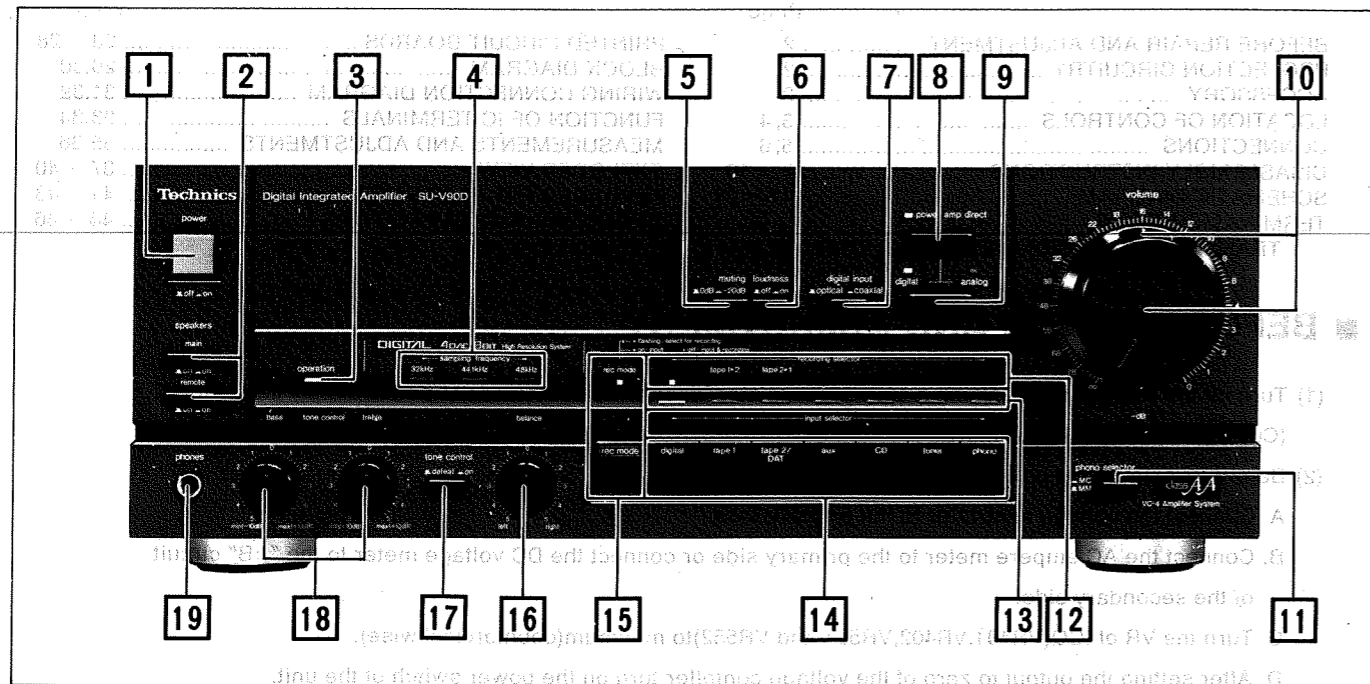
SFDAC05E03
[E, EF, EI, EB, EH, EG]
QFC1205M [EK]
SJA190 [XL]
SJA111 [XA]
RJA52YA [PA, PE]

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

LOCATION OF CONTROLS



1 Power switch (power)

2 Speaker selectors (speakers)

These selectors are used to turn the speaker systems on and off.

3 Operation indicator (operation)

This indicator illuminates approximately 5 seconds after the power is switched ON, indicating that this unit is in the operational condition. If there is any abnormal condition of the output signals to the speaker systems (such as, for example, a short-circuit of the speaker connection wires, etc.), this abnormal condition will be detected, the protection circuitry will function, and this indicator will stop illumination.

4 Sampling frequency indicators (sampling frequency)

These indicators function to illuminate to indicate the detection of the sampling frequency of the digital signals input to the "DIGITAL INPUT" terminals on the rear panel of this unit. (Illumination occurs when digital signals are received, even a digital component is not in the play mode.)

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

44.1 kHz: CD and others

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

5 Audio muting switch (muting)

Set to the "-20 dB" position when a disc is being changed or to temporarily reduce the volume level (approx. 1/10).

6 Loudness switch (loudness)

Set to the "on" position when listening to music at low volume. Auditory perception of sound in the low frequency range falls off at low volume, but when the switch is in this position, this deficiency is compensated for, so that the full impact of the musical performance can be enjoyed.

7 Digital input selector (digital input)

This selector is used when a component connected to one of the "DIGITAL INPUT" terminals (on the rear panel of this unit) is to be used as the sound source.

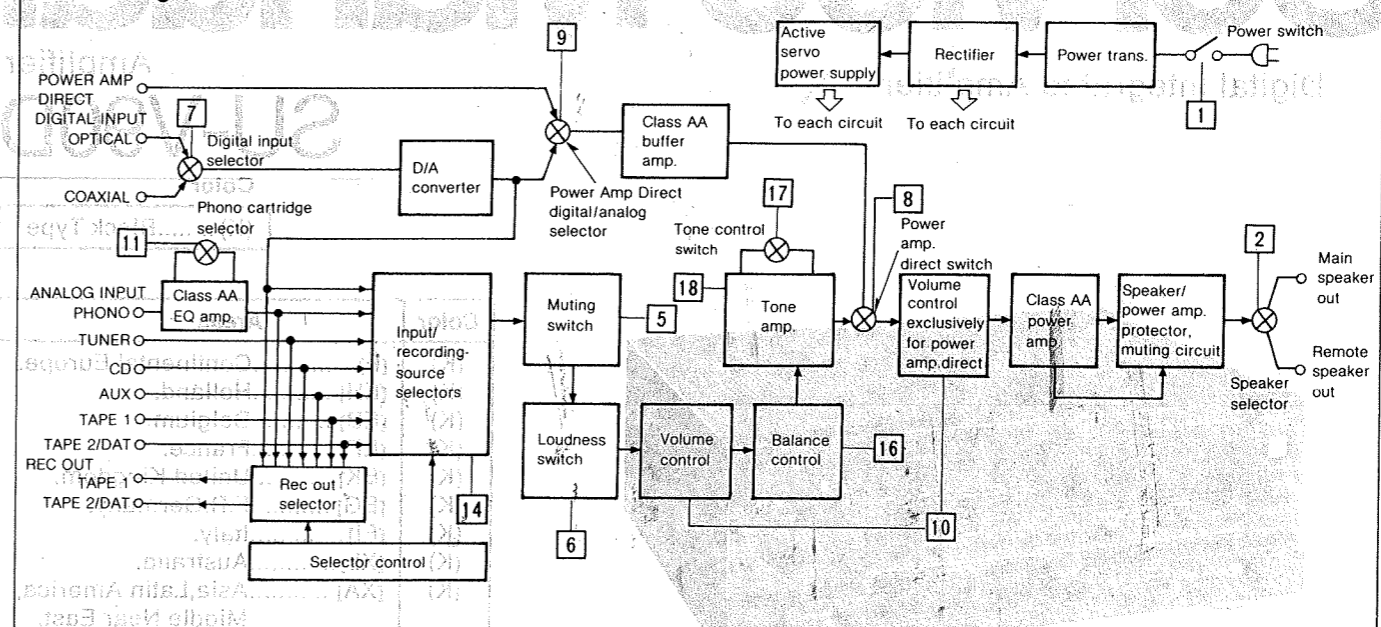
8 Power amplifier direct switch/indicator (power amp direct)

When this switch is switched ON (Indicator will illuminate.), a superior level of tone quality can be obtained, because the signals from the component connected to the "POWER AMP DIRECT" terminals or the "DIGITAL INPUT" terminals are sent directly to the sound volume, without passing through the tone control circuit, etc. of this unit.

9 Digital/analog selector/indicators (digital/analog)

This selector is used (when the **power amp direct** is ON) to select, as the signal source, either the component connected to the "DIGITAL INPUT" terminals or the component connected to the "POWER AMP DIRECT" terminals. One of the indicators will indicate which source is selected.

Block diagram



10 Volume control/indicator (volume)

There are two types of volume scale indications: one for when the **power amp direct** is OFF, and one for when it is ON. (Indicator will illuminate.)

11 Phono cartridge selector (phono selector)

This selector should be set to the position which corresponds to the type of cartridge used on the turntable.

MM (M): Set to this position when using a moving-magnet type cartridge or high-output moving-coil cartridge (1 mV or more).

MC (C): Set to this position when using a moving-coil type cartridge.

12 Recording output signal indicators (recording selector)

These indicators indicate the sound source which can be recorded.

13 Input signal indicators (input selector)

These indicators indicate the sound source of the sound being heard from the speakers.

14 Input/recording-source selectors

Press to select the sound source to be listened to and/or the sound source to be recorded. Note that the function of these selectors changes depending upon the setting of the recording-mode selector. (Refer to "Recording-mode selector/indicator".)

15 Recording-mode selector/indicator (rec mode)

This selector is used to select the signal to be recorded by the connected tape deck.

When this selector is pressed, the indicator flashes ON and OFF repeatedly; when one of the input/recording-source selector is then pressed, this indicator changes from flashing to a steady illumination.

If this selector is pressed while one of the recording output signal indicators is illuminated, the recording-mode indicator will change from a steady illumination to repeated flashing; when it is pressed once again, the indicator will be extinguished.

When the recording-mode indicator is not illuminated: If one of the input/recording-source selectors is pressed, the sound source to be listened to and the recording sound source will both be switched at the same time.

When the recording-mode indicator is flashing: If one of the input/recording-source selectors is pressed, only the recording sound source will be switched.

When the recording-mode indicator is illuminated: If one of the input/recording-source selectors is pressed, only the sound source to be listened to will be switched.

16 Balance control (balance)

This control is used to adjust left/right volume balance.

17 Tone control switch (tone control)

Set this switch to the "on" position if you want to adjust the **bass** or **treble** tone quality.

18 Tone controls (bass/treble)

The bass control is for the low-frequency sound range, and the treble control is for the high-frequency sound range.

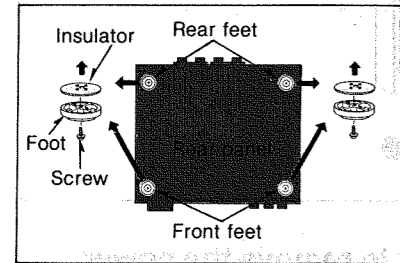
19 Headphones jack (phones)

CONNECTIONS

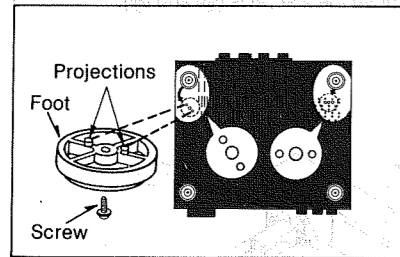
Placement with other equipment

If this unit is to be placed on top of a component that has a lesser depth dimension, be sure to first change the location of the rear "feet" of this unit, as described below.

- Remove the screws from the 4 feet of this unit, and then remove the 4 insulators.



- Re-install the front feet in their former positions, and install the rear feet in the positions shown in the illustration. (Be sure to fit the projections into the holes correctly before tightening the 4 screws).

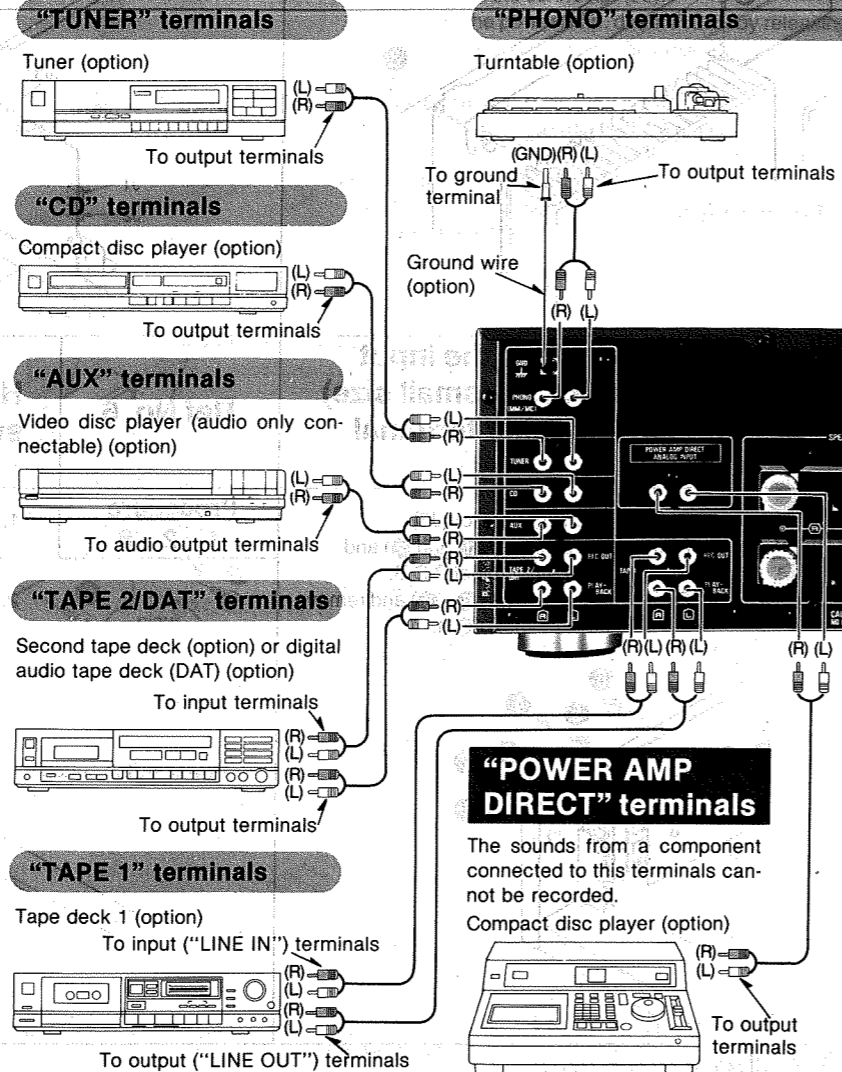


Note:

If the feet are later re-installed at their original locations, be sure to use the insulators in the way that they were originally installed.

Connections to analog terminals

Make connections to each component in the system by using stereo connection cables (option).



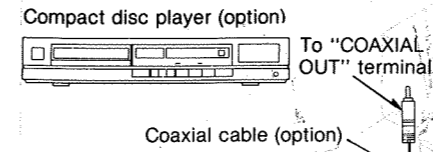
Note: Careful note should be taken of the following points. If these points are not heeded, a malfunction of the unit's operation could occur.

- Only analog-type components should be connected to the analog input terminals.
- Only digital-type components should be connected to the digital input terminals.
- Optical-fiber cables must absolutely never be bent.

Connections to "DIGITAL INPUT" terminals

"COAXIAL" terminal

This terminal can be used for the connection of a compact disc player equipped with a "DIGITAL" terminal or a digital audio tape deck (DAT) used for playback only, etc.

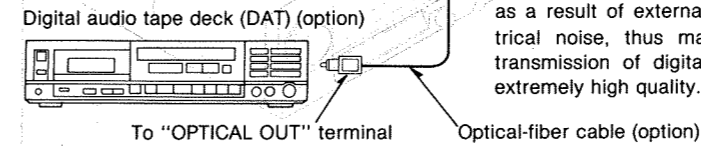


About the "COAXIAL" terminal

This terminal is a 75-ohm coaxial terminal; using a toroidal pulse transformer, it functions to provide electrical oscillation between components, thereby preventing signal deterioration resulting from noise generated within the ground loop, etc.

"OPTICAL" terminal

This terminal can be used for the connection of a compact disc player equipped with a "DIGITAL" terminal or a digital audio tape deck (DAT) used for playback only, etc.

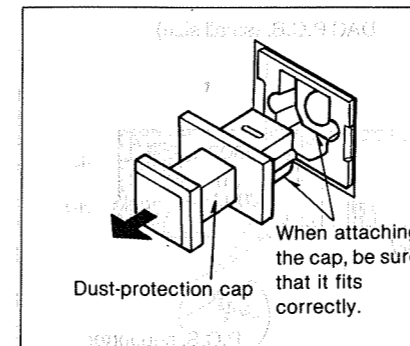


About the "OPTICAL" terminal

This terminal is an optical-connector terminal; because electric signals are converted to optical signals for transmission, there is no adverse effect upon the signals as a result of externally generated electrical noise, thus making possible the transmission of digital audio signals of extremely high quality.

Use of the "OPTICAL" terminal

A dust-protection cap is used to cover and protect the "OPTICAL" terminal. Remove this cap only when the "OPTICAL" terminal is to be used.



Note:

Be sure to use the dust-protection cap to again cover the "OPTICAL" terminal when it is not being used. This cover serves to prevent the entry of dust, etc. into the terminal, because such foreign material can cause incorrect operation.

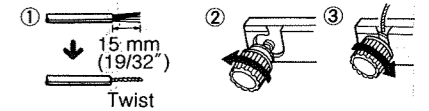
"SPEAKERS" terminals

Load impedance:

- When only the "MAIN" or only the "REMOTE" terminals are used: 4-16 ohms
- When both the "MAIN" and the "REMOTE" terminals are used simultaneously: 8-16 ohms

Connection of speaker wires

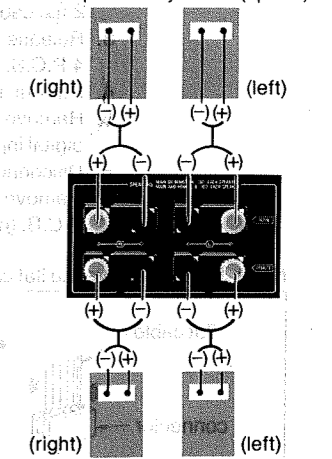
- Strip off the outer covering, and twist the center conductor.
- Turn 5-6 times.
- Insert wire and tighten screw completely.



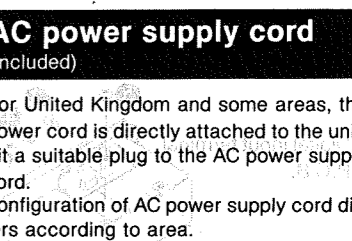
Notes:

- To prevent damage to circuitry, never short-circuit plus (+) and minus (-) speaker terminals.
- Be sure to only connect positive (+) cords to positive (+) terminals, and negative (-) cords to negative (-) terminals.

Main speaker systems (option)

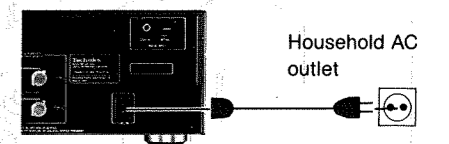


Remote speaker systems (option)

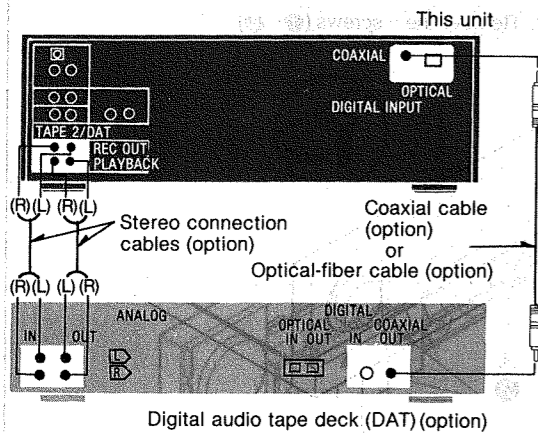


AC power supply cord (included)

- For United Kingdom and some areas, the power cord is directly attached to the unit.
- Fit a suitable plug to the AC power supply cord.
- Configuration of AC power supply cord differs according to area.

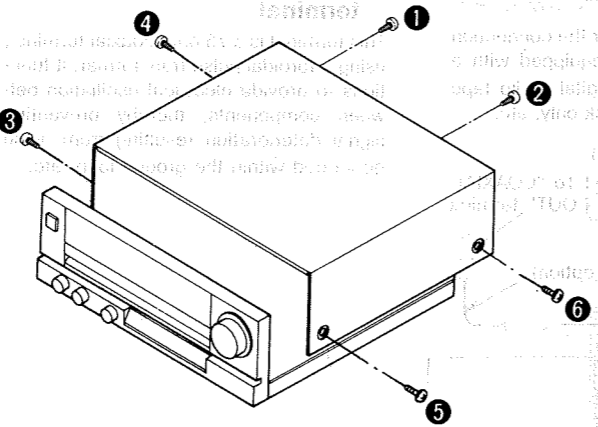
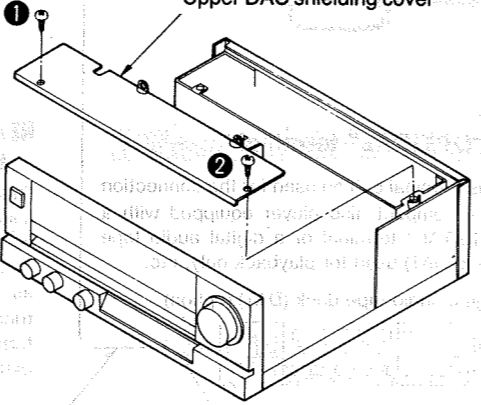
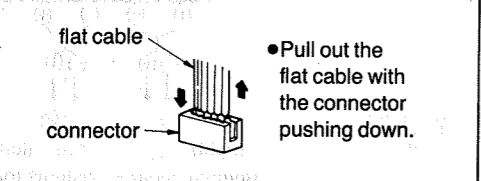
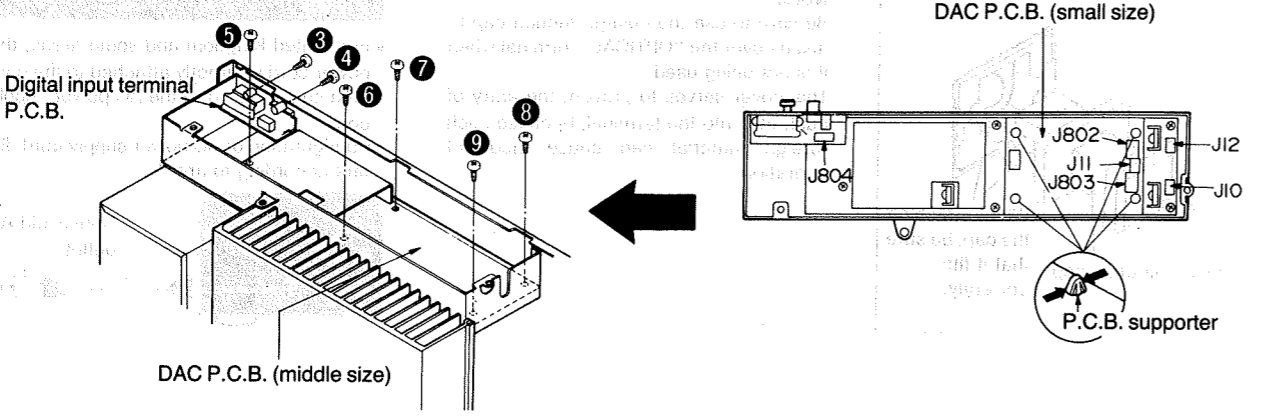


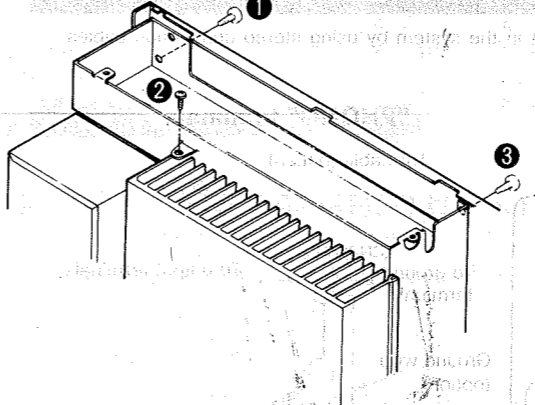
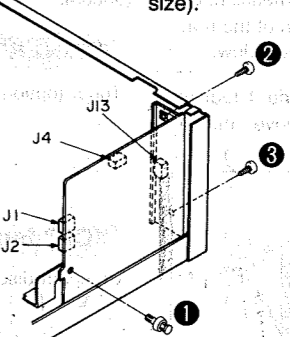
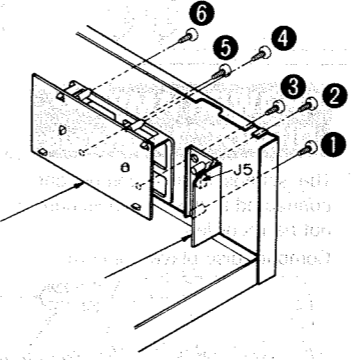
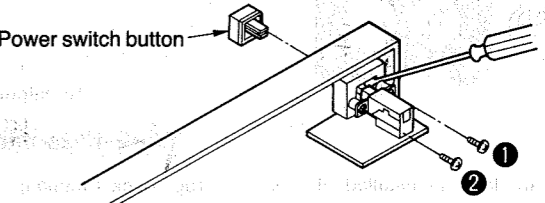
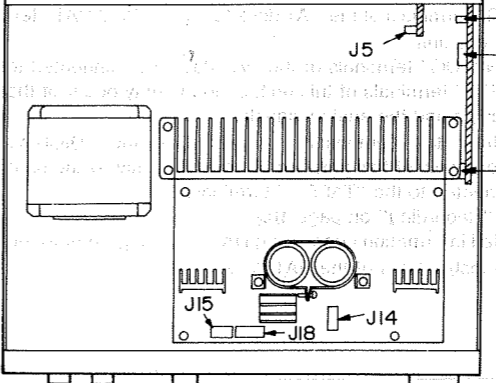
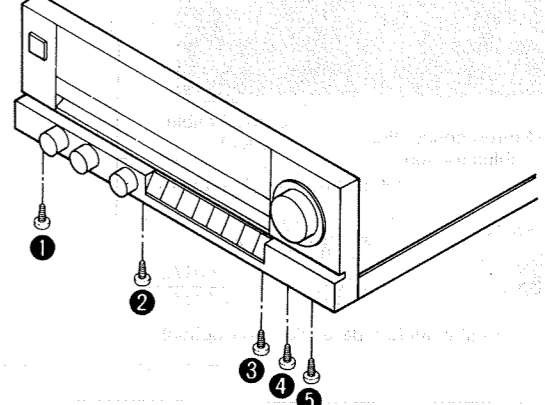
About the "DIGITAL INPUT" terminals and digital audio tape deck (DAT) connections



- If connections are made to this unit from a "DIGITAL OUT" ("OPTICAL" or "COAXIAL") terminal of the digital audio tape deck and, at the same time, from its "ANALOG" ("LINE IN" and "LINE OUT") terminals, make the connection from the "ANALOG" terminals of the DAT deck to the "TAPE 2/DAT" terminals of this unit.
- If the "ANALOG" terminals of the DAT deck are connected to the "TAPE 1" terminals of this unit, a "loop" may occur of the digital signals and the analog signals.
- Sounds from the component connected to the "DIGITAL INPUT" terminals of this unit can be recorded only by the tape deck connected to the "TAPE 1" terminals. (Refer to "Recording" on page 10.) For detailed information concerning DAT recording, refer to the operating instructions of the DAT deck.

DISASSEMBLY INSTRUCTIONS

<p>Ref No. 1</p>	<p>How to remove the cabinet</p>
<p>Procedure 1</p>	<p>1. Remove the 6 screws (1~6) and remove the cabinet.</p>
	
<p>Ref No. 2</p>	<p>How to remove the DAC P.C.B. (small size), the digital input terminal P.C.B. and the DAC P.C.B. (middle size)</p>
<p>Procedure 1→2</p>	<p>1. Remove the 2 screws (1 and 2) and remove the upper DAC shielding cover. 2. Disconnect the connector (J11) and pull out the 2 flat cables (J802 and J803). 3. Release the DAC P.C.B. (small size) from the 4 P.C.B. supporters. 4. Pull out the flat cable (J804). 5. Remove the 2 screws (3 and 4) and remove the digital input terminal P.C.B. 6. Disconnect the 2 connectors (J10 and J12). 7. Remove the 5 screws (5~9) and remove the DAC P.C.B. (middle size).</p>
 <p>Upper DAC shielding cover</p>	
<p>Note: How to remove the flat cable.</p>  <p>flat cable connector Pull out the flat cable with the connector pushing down.</p>	
 <p>DAC P.C.B. (small size)</p> <p>Digital input terminal P.C.B.</p> <p>DAC P.C.B. (middle size)</p> <p>J802, J11, J803, J12, J10, J804, P.C.B. supporter</p>	

<p>Ref No. 3</p>	<p>How to remove the lower DAC shielding cover</p>	<p>Ref No. 4</p>	<p>How to remove the input terminal P.C.B. (large size)</p>
<p>Procedure 1→2→3</p>	<p>1. Remove the 3 screws (1~3).</p>	<p>Procedure 1→2→3→4</p>	<p>1. Disconnect the 4 connectors (J1, J2, J4 and J13). 2. Remove the latch (1). 3. Remove the 2 screws (2 and 3) and remove the input terminal P.C.B. (large size).</p>
			
<p>Ref No. 5</p>	<p>How to remove the input terminal P.C.B. (small size) and the speaker terminal P.C.B.</p>	<p>Ref No. 6</p>	<p>How to remove the power switch</p>
<p>Procedure 1→2→3→4→5</p>	<p>1. Disconnect the connector (J5). 2. Remove the 2 screws (1 and 2) and remove the input terminal P.C.B. 3. Remove the 4 screws (3~6) and remove the speaker terminal P.C.B.</p>	<p>Procedure 1→2→6</p>	<p>1. Push the power switch button from the back of the front cover by using a screwdriver and remove it. 2. Remove the 2 screws (1 and 2).</p>
		 <p>Power switch button</p>	
<p>Ref No. 7</p>	<p>How to remove the front panel</p>		
<p>Procedure 1→2→3→4→7</p>	<p>1. Remove the 5 connectors (J1, J2, J4, J5 and J13) and 3 flat cables (J14, J15 and J18).</p>		<p>2. Remove the 5 screws (1~5).</p>
			

Ref No. 8

How to remove the headphones, the tone, the power amp. direct, the LED, the main volume and phono selector P.C. Boards

Procedure
7→8

●**Headphones P.C.B.**

1. Remove the 2 screws (1) and (2).
2. Remove the headphones P.C.B. by releasing the claw in the direction of the arrow.

●**Tone P.C.B.**

3. Remove the 3 knobs (3~5) and 3 nuts (6~8).
4. Remove the tone P.C.B. by releasing the 2 claws in the direction of the arrows.
5. Disconnect the connector (J17).

●**LED P.C.B.**

6. Remove the LED P.C.B. by releasing the 2 claws in the direction of the arrows.

●**Power amp. direct P.C.B.**

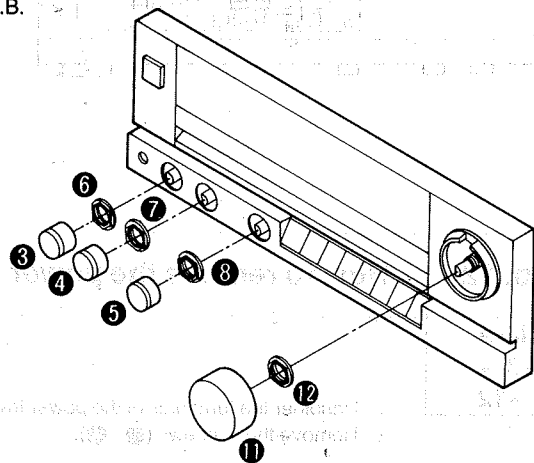
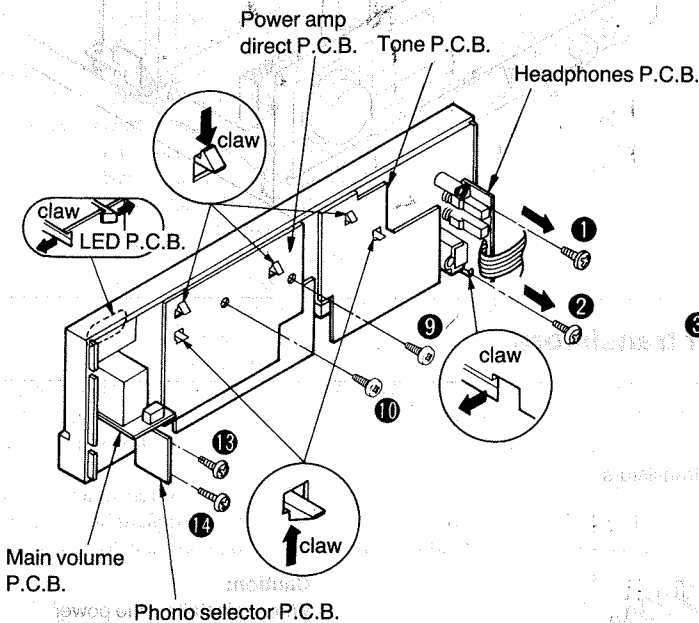
7. Remove the 2 screws (9) and (10).
8. Disconnect the connector (J6).
9. Remove the power amp. direct P.C.B. by releasing the 3 claws in the direction of the arrows.

●**Main volume P.C.B.**

10. Remove the knob (11) and the nut (12).

●**Phono selector P.C.B.**

11. Remove the 2 screws (13) and (14) and remove the phono selector P.C.B.

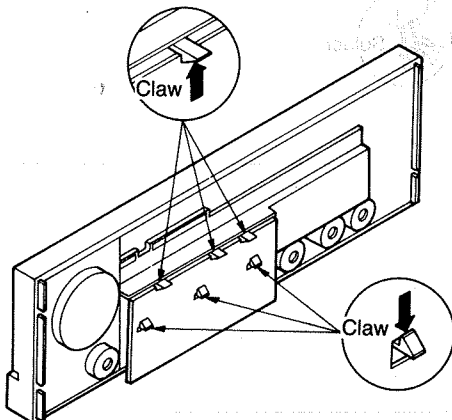


Ref No. 9

How to remove the indicator P.C.B.

Procedure
7→8→9

1. Remove the indicator P.C.B. by releasing the 6 claws in the direction of the arrows.

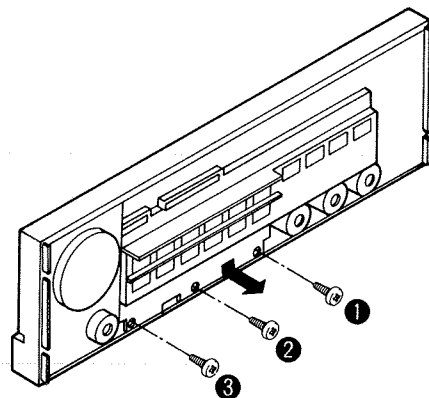


Ref No. 10

How to remove the operation switch P.C.B.

Procedure
7→8→9→10

1. Remove the 3 screws (1~3).
2. Remove the operation switch P.C.B. in the direction of the arrow.

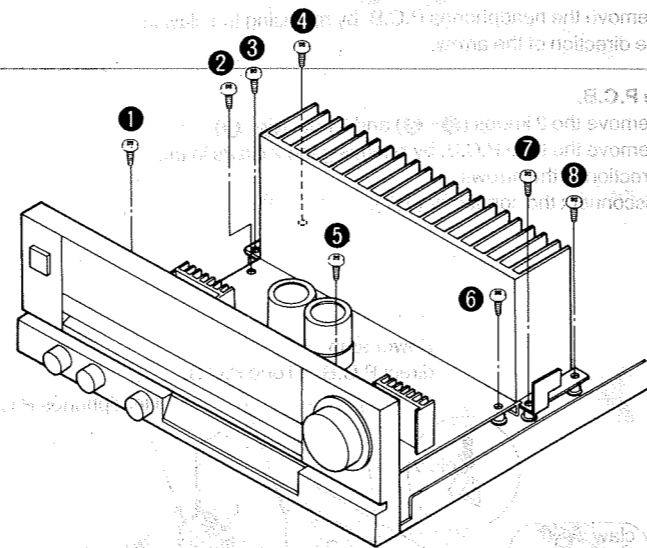
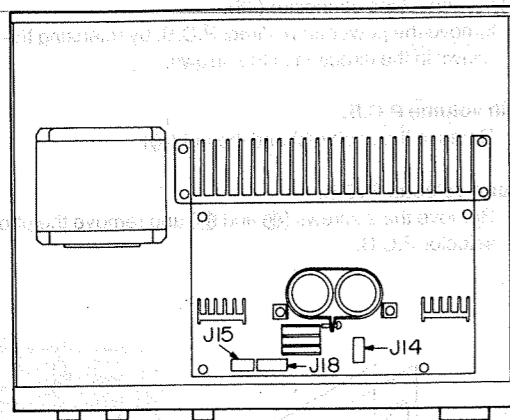


Ref No. 11

How to remove the main P.C.B.

Procedure
1→2→3→4→12

1. Pull out the 3 flat cables (J14, J15 and J18).
2. Remove the 8 screws (①~⑧).

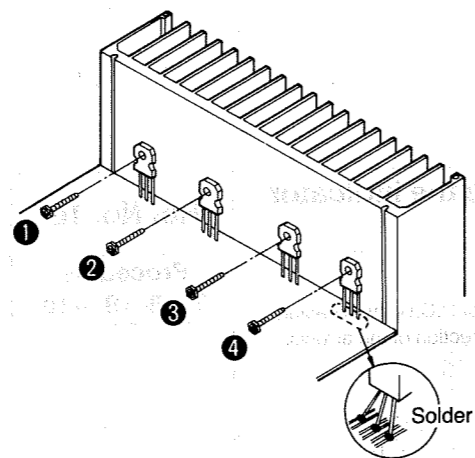


Ref No. 12

How to remove the power transistors

Procedure
1→2→3→
4→11→12

1. Unsolder the terminals of the power transistors.
2. Remove the 4 screws (①~④).



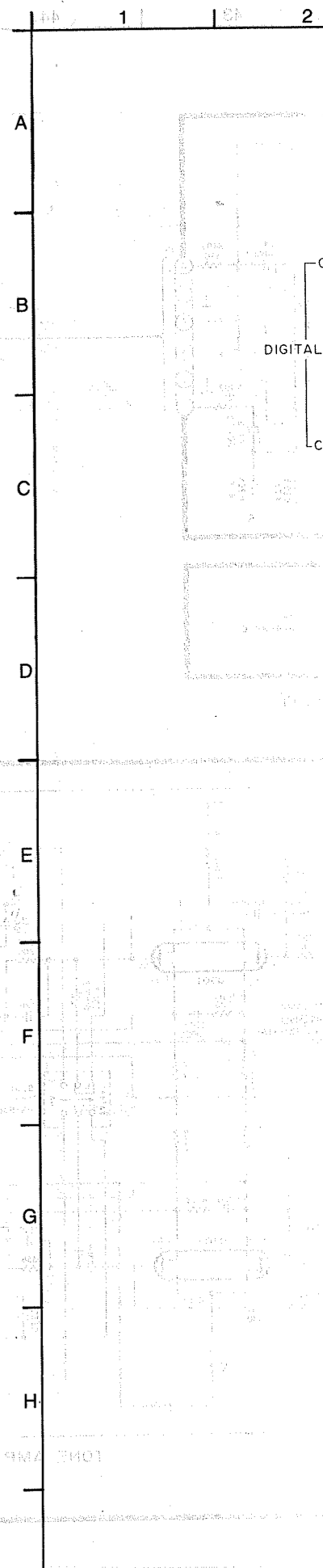
Caution:
When reinstalling the power transistors, be sure to apply silicone compound (SZZ0L15) to the back of the power transistors.

■ SCHEMATIC DIAGRAM

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

1. S1 : Power switch in "on" position.
(■ off, ■ on)
2. S2 : Voltage selector in "240 V" position.
For (EK), (XL), (XA), (PA) and (PC) areas.
3. S101 : Phono selector switch in "MM" position.
(■ MM, ■ MC)
4. S201 : Power amp direct switch in "off" position.
(■ off, ■ on)
5. S202 : Digital/analog selector switch in "analog" position.
(■ analog, ■ digital)
6. S203 : Audio muting switch in "0 dB" position.
(■ 0 dB, ■ -20 dB)
7. S204 : Loudness switch in "off" position.
(■ off, ■ on)
8. S301 : Tone control switch in "defeat" position.
(■ defeat, ■ on)
9. S501-1 : Speaker select switch in "on" position.
(■ off, ■ on)
10. S501-2 : Speaker select switch in "main" position.
(■ main, ■ remote)
11. S701~S706, S708, S709 : Input/recording-source selector switch in "phono" position.
S701: phono S702: digital S703: tuner
S704: CD S705: aux S706: tape 1
S708: tape 2/DAT S709: rec mode
12. S801 : Digital input selector switch in "optical" position.
(■ optical, ■ coaxial)
13. : Optical signal (Lch). : Phono signal (Lch).
14. : Positive voltage lines.
15. : Negative voltage lines.
16. 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.
17. 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.

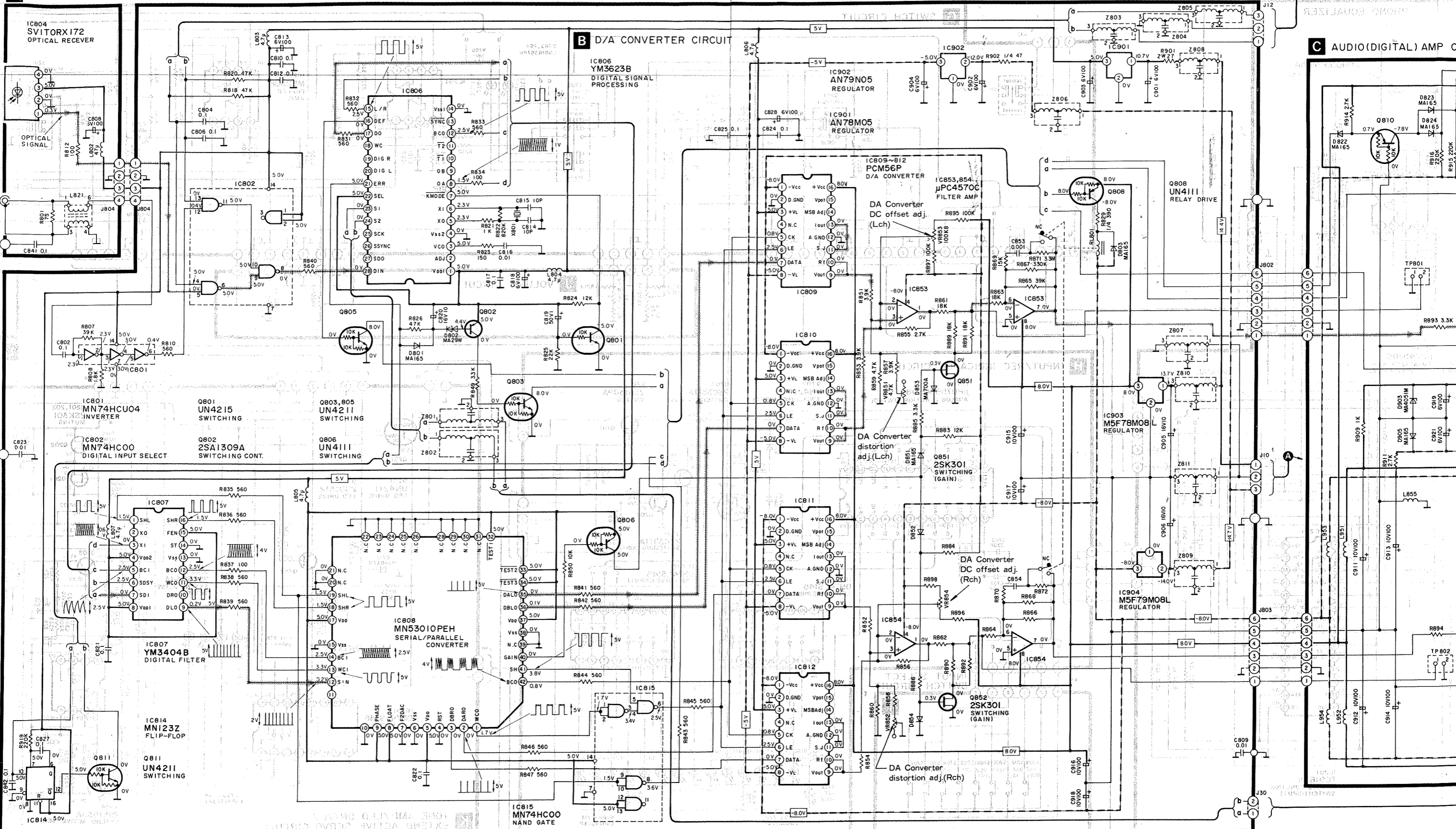
***Caution!**
IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
*Cover the parts boxes made of plastics with aluminum foil.
*Ground the soldering iron.
*Put a conductive mat on the work table.
*Do not touch the legs of IC or LSI with the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

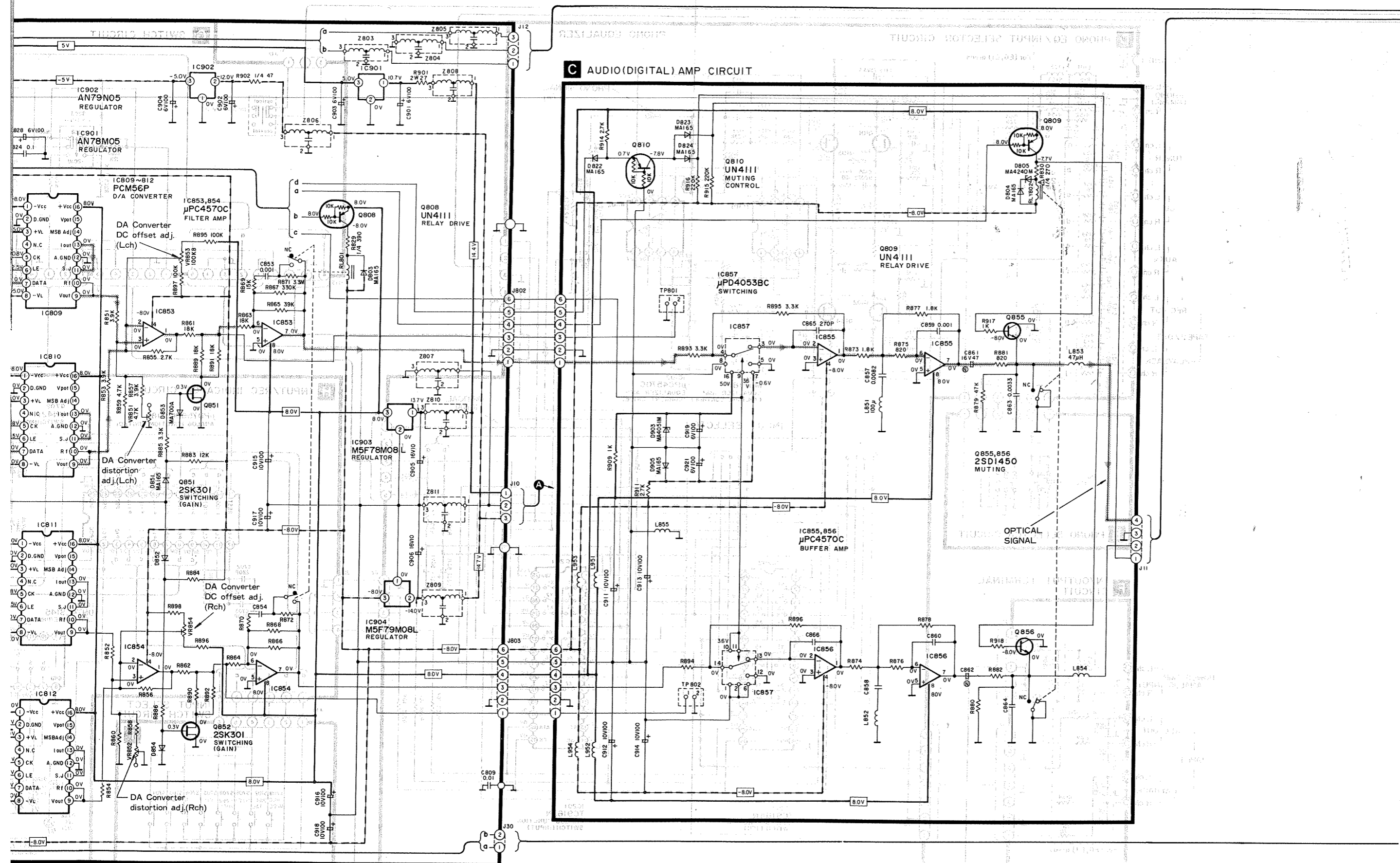


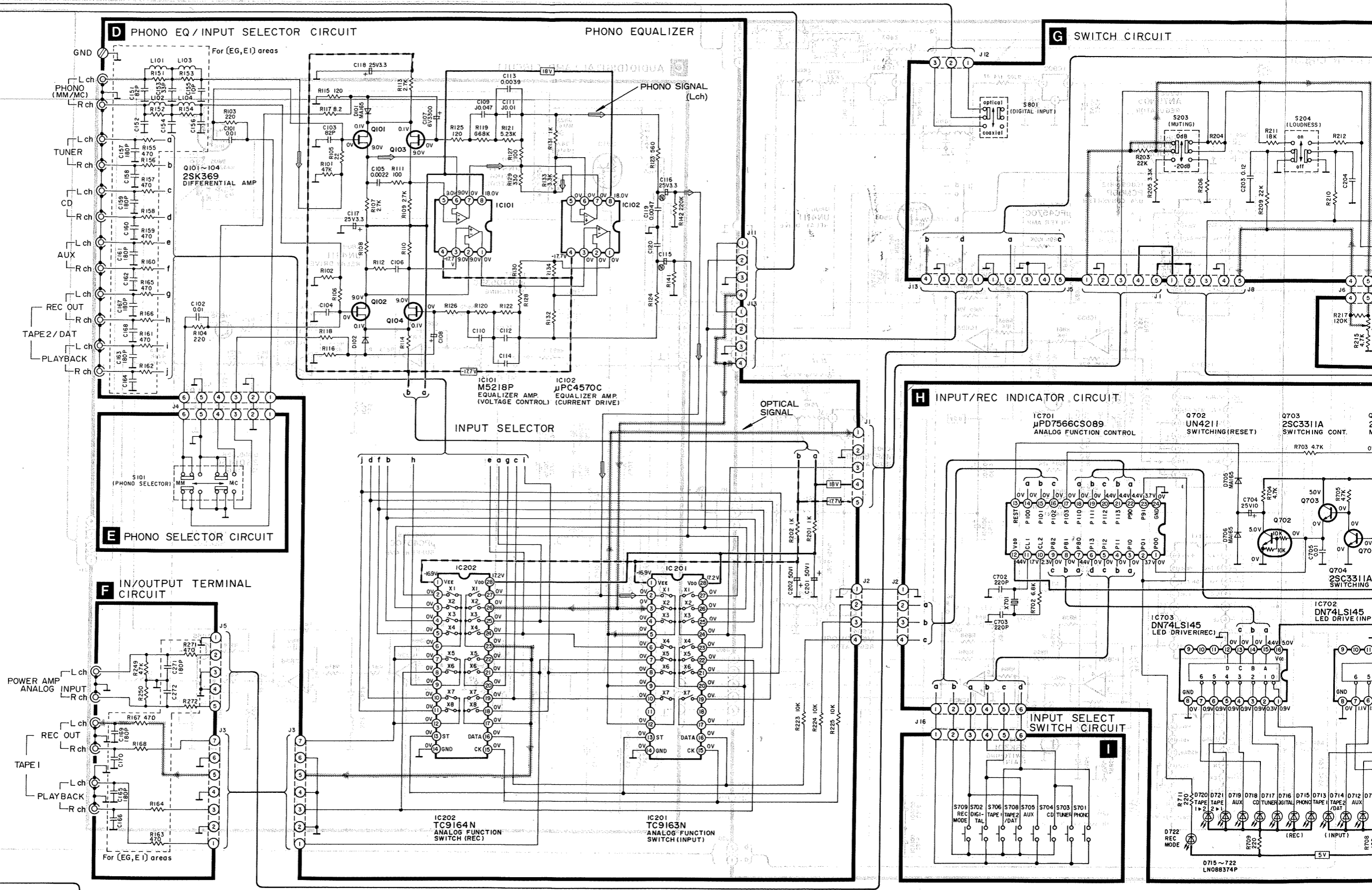
A DIGITAL INPUT TERMINAL CIRCUIT

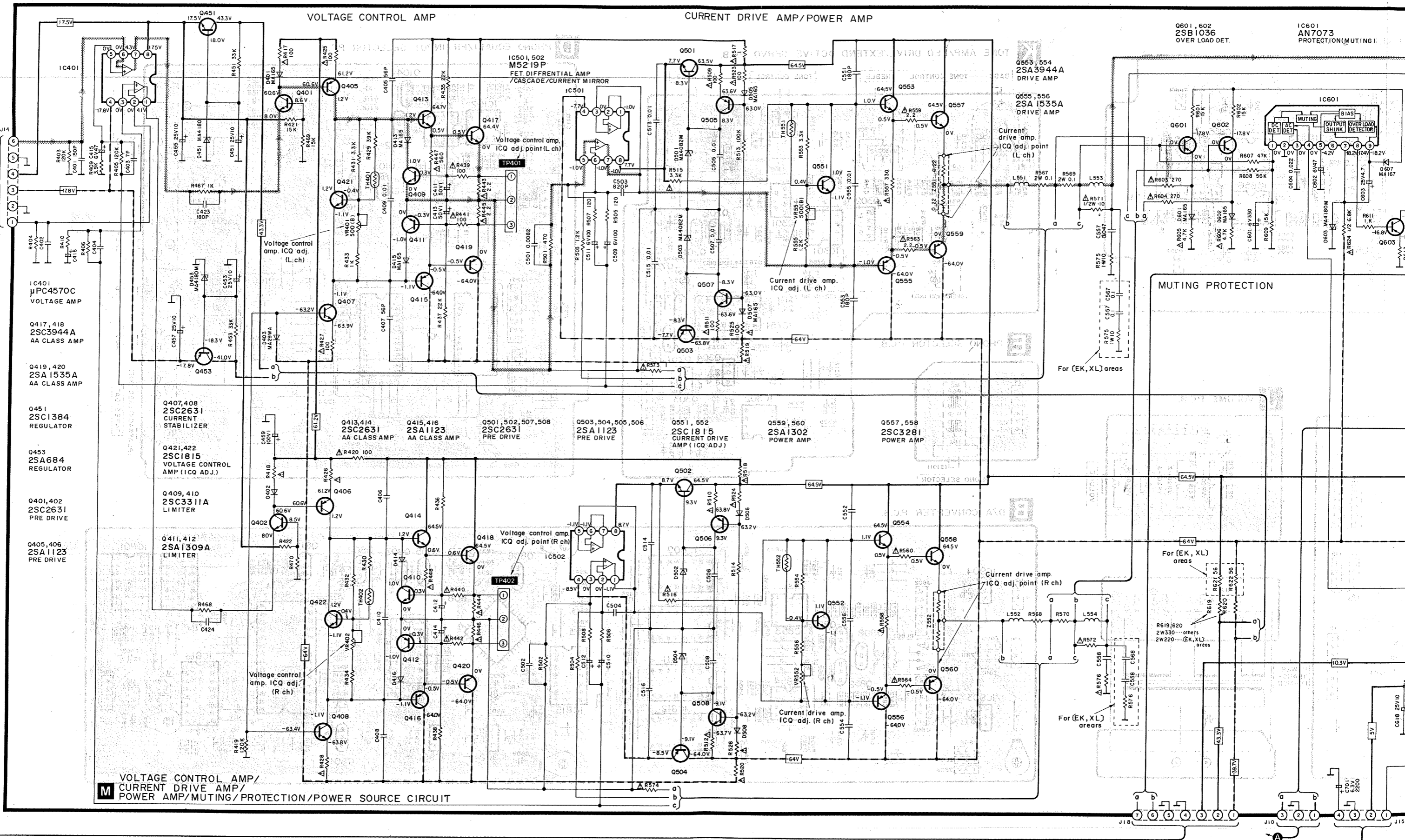
B D/A CONVERTER CIRCUIT

C AUDIO (DIGITAL) AMP CI





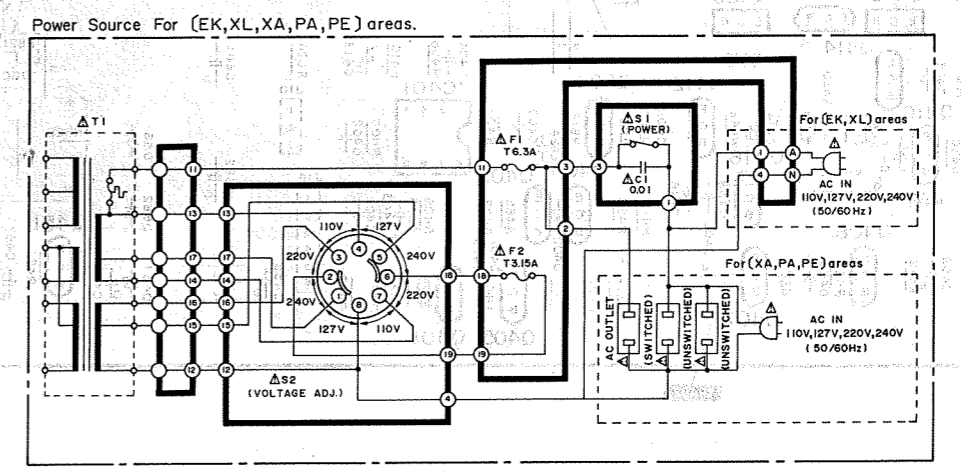
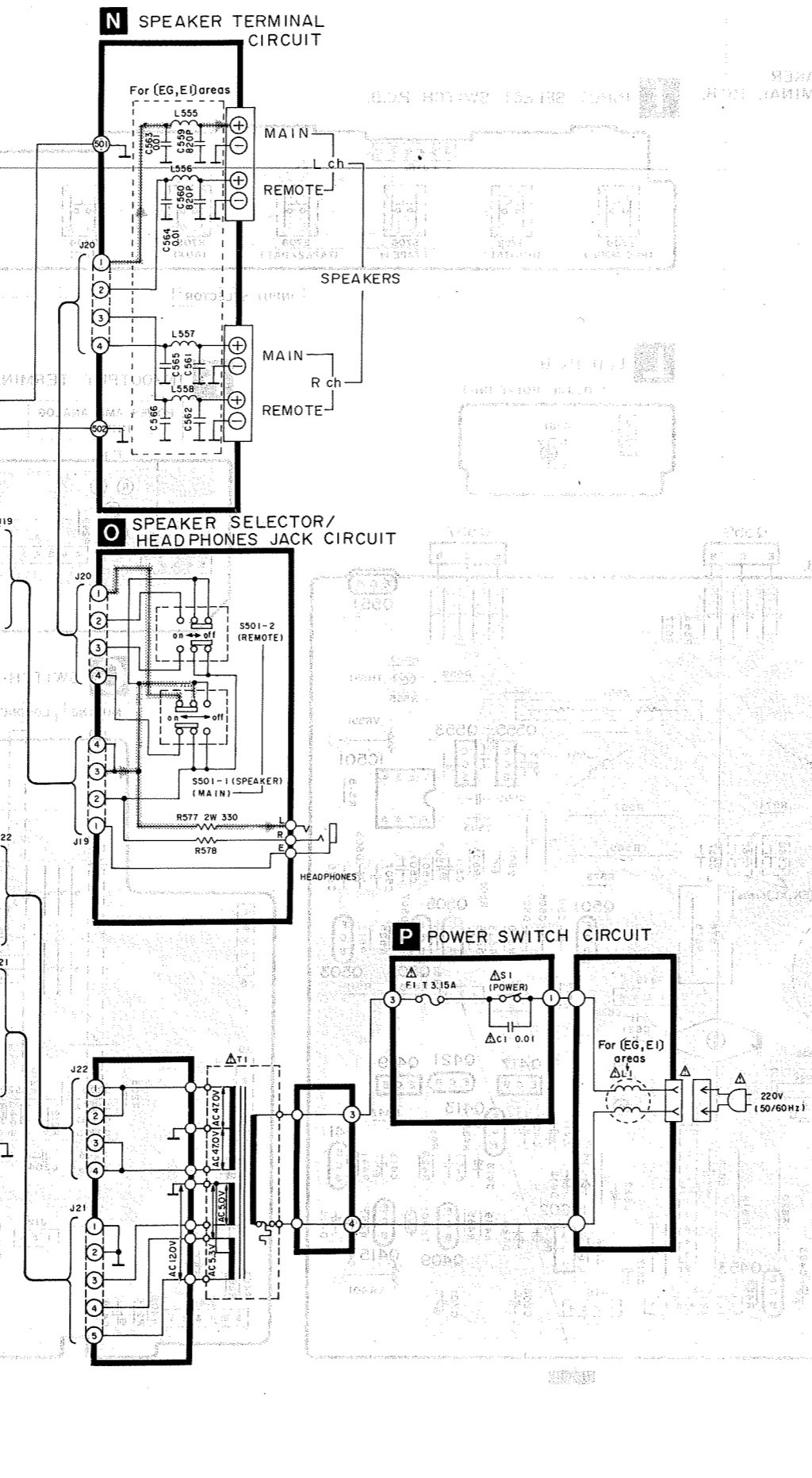
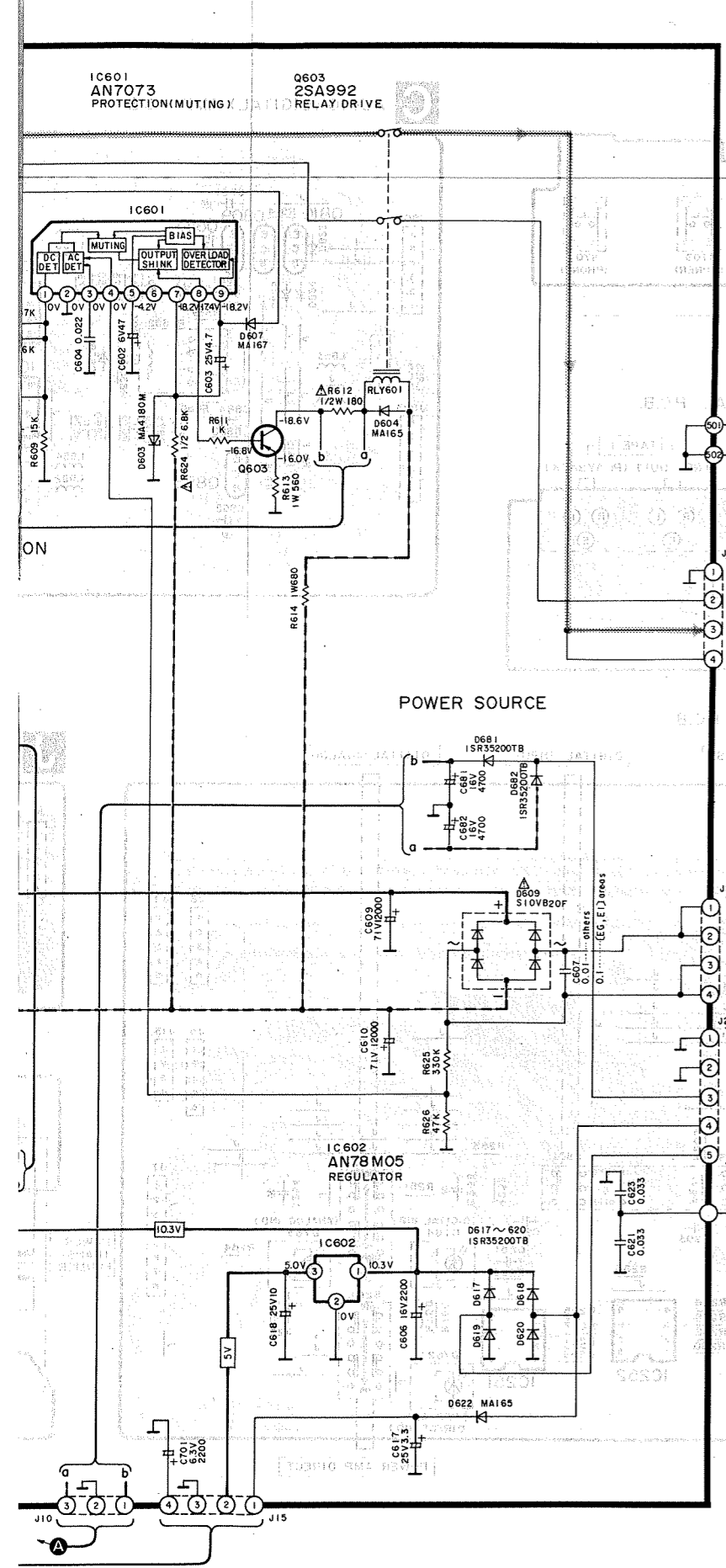


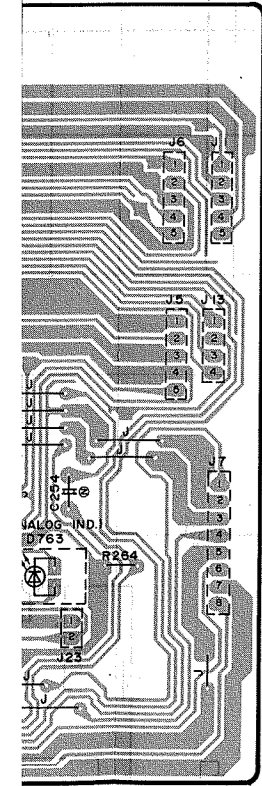
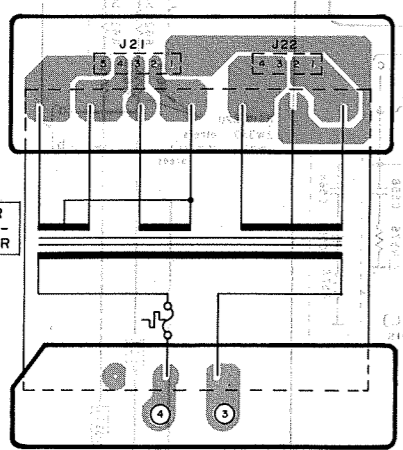
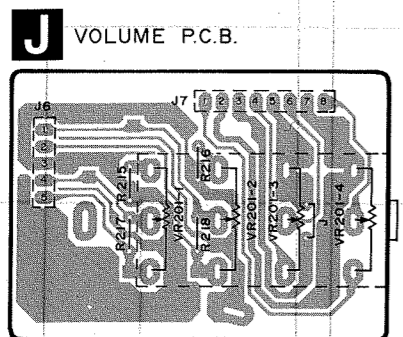
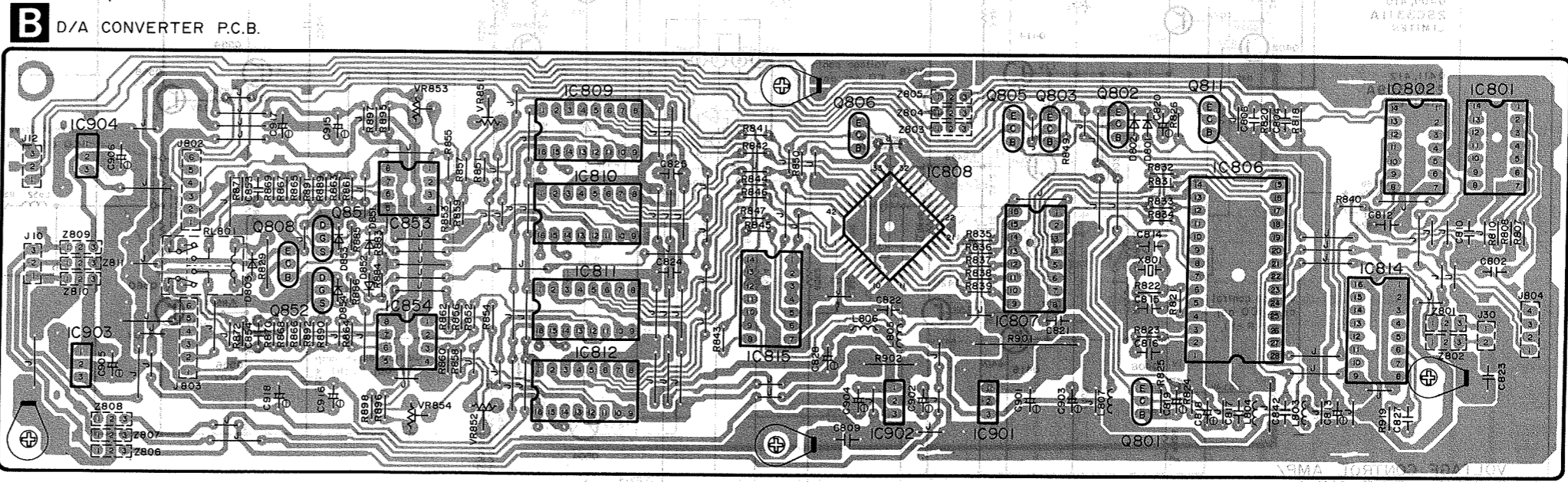
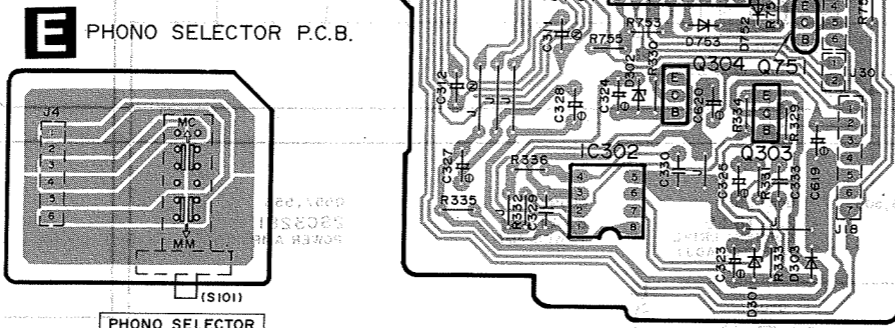
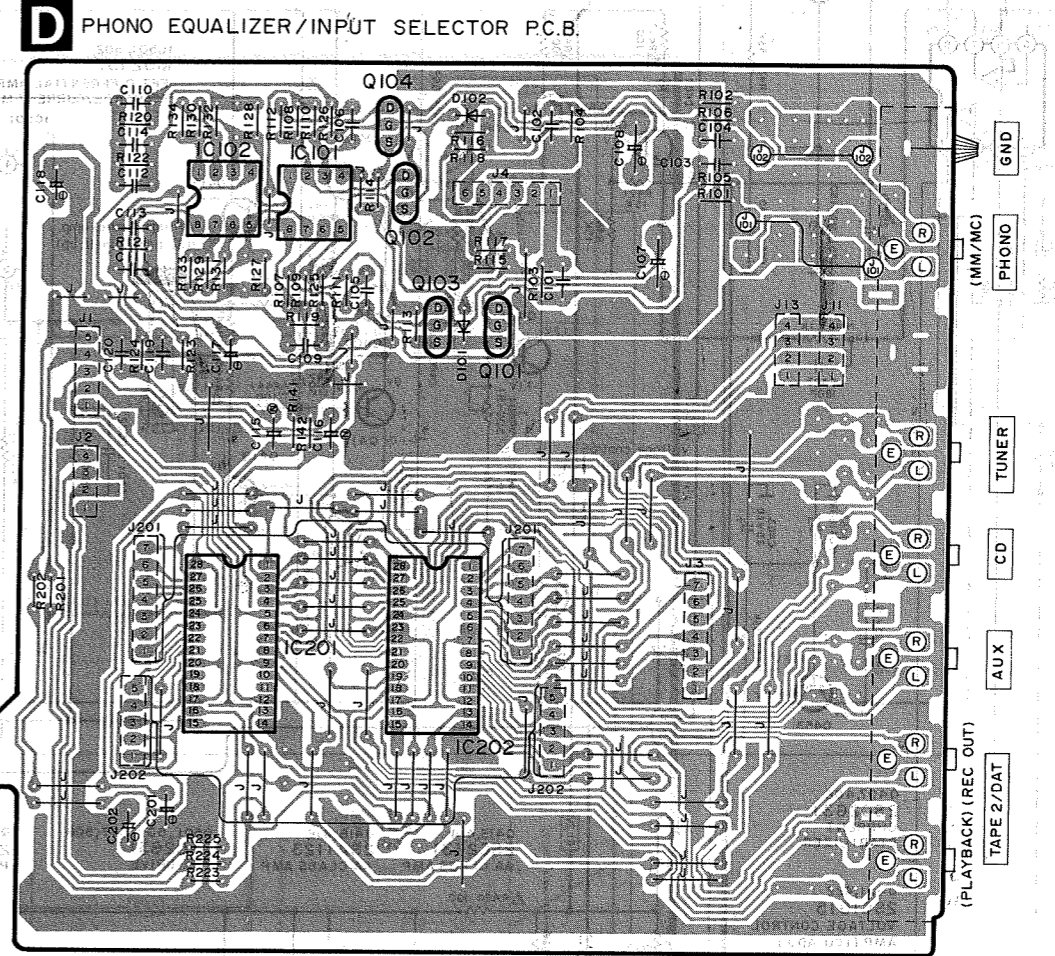
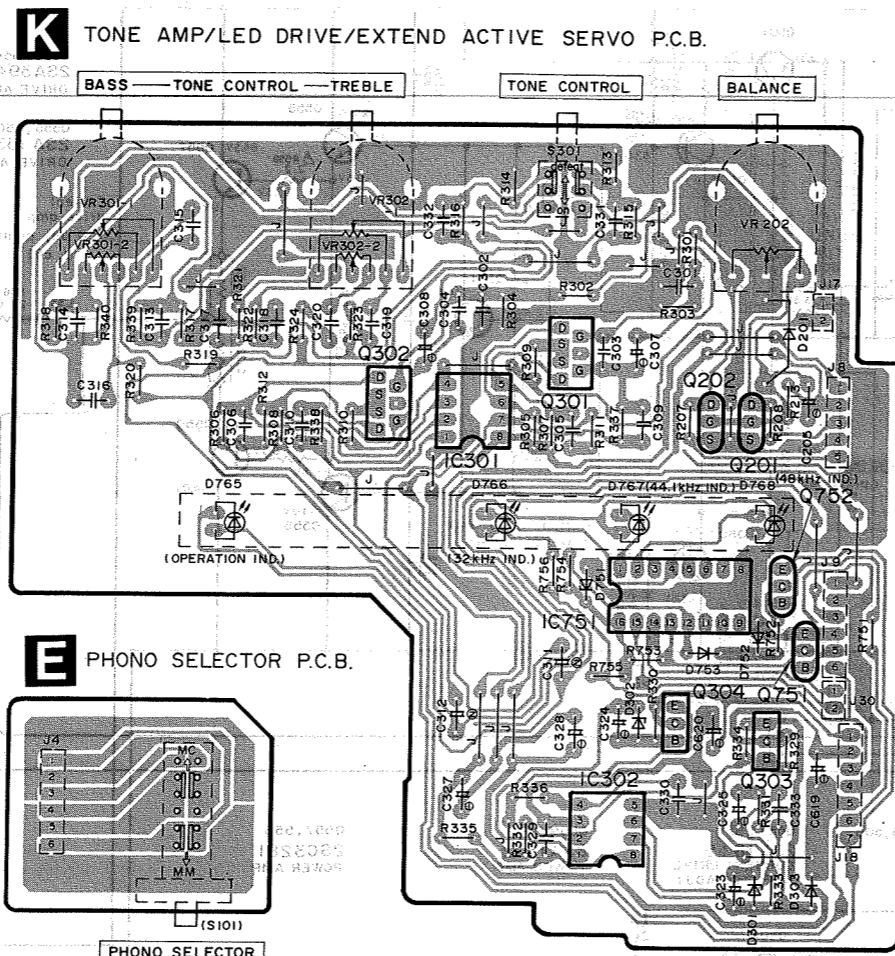
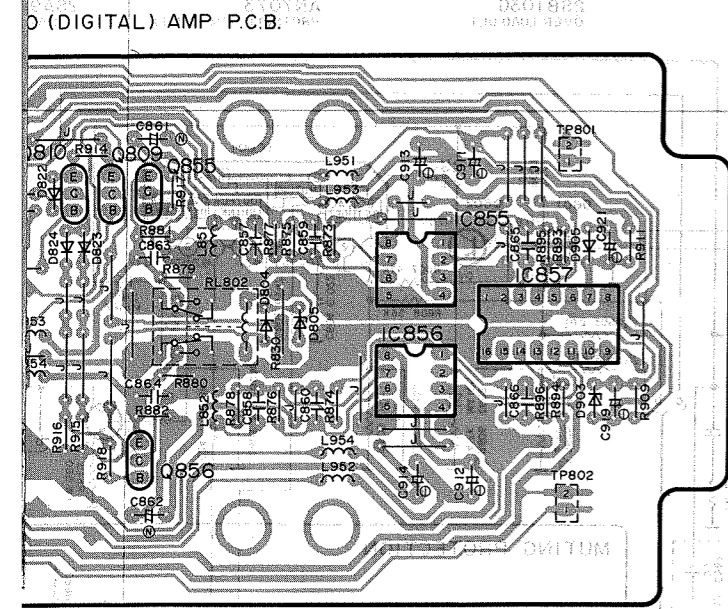


M VOLTAGE CONTROL AMP/
CURRENT DRIVE AMP/
POWER AMP/MUTING/PROTECTION/POWER SOURCE CIRCUIT

Terminal guide of transistors, diodes and IC's.

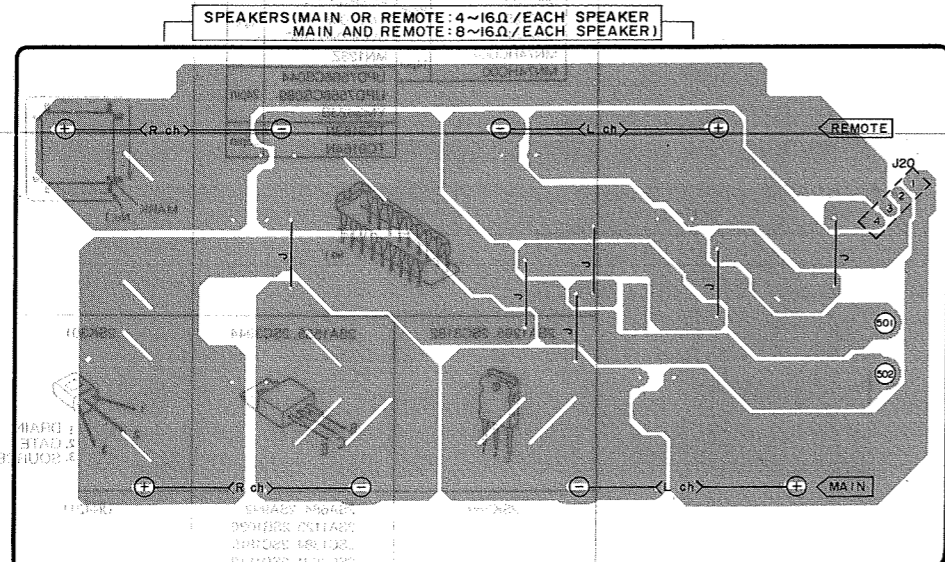
SUIUPC4570C M5218P M5219P M5238P MN74HCU04 MN74HC00	8pin 14pin	DN74LS145 PCM56P-J YM3404B SUIUPD4053BC MN123Z UPD7566CS044 UPD7566CS089 YM3623B TC9163N TC9164N	16pin 24pin 28pin	MN53010PEH 42pin	AN7073
2SA1265, 2SC3182	2SA1535, 2SC3944	2SK301	2SK369	AN78M05 MSF79M0BL MSF79M03L AN79N05	
2SK389	2SA684, 2SA992 2SA1123, 2SB1036 2SC1384, 2SC1815 2SC2631, 2SD1512	UN4211	UN4111	UN4215	2SA1309, 2SC3311 2SD1450
UN4215	LN846RP-C	SVDSIOVB20F	MA29WA, MA165 MA167, 20A90	MA4047M, MA4082M MA4030M, MA4180M MA4240H	



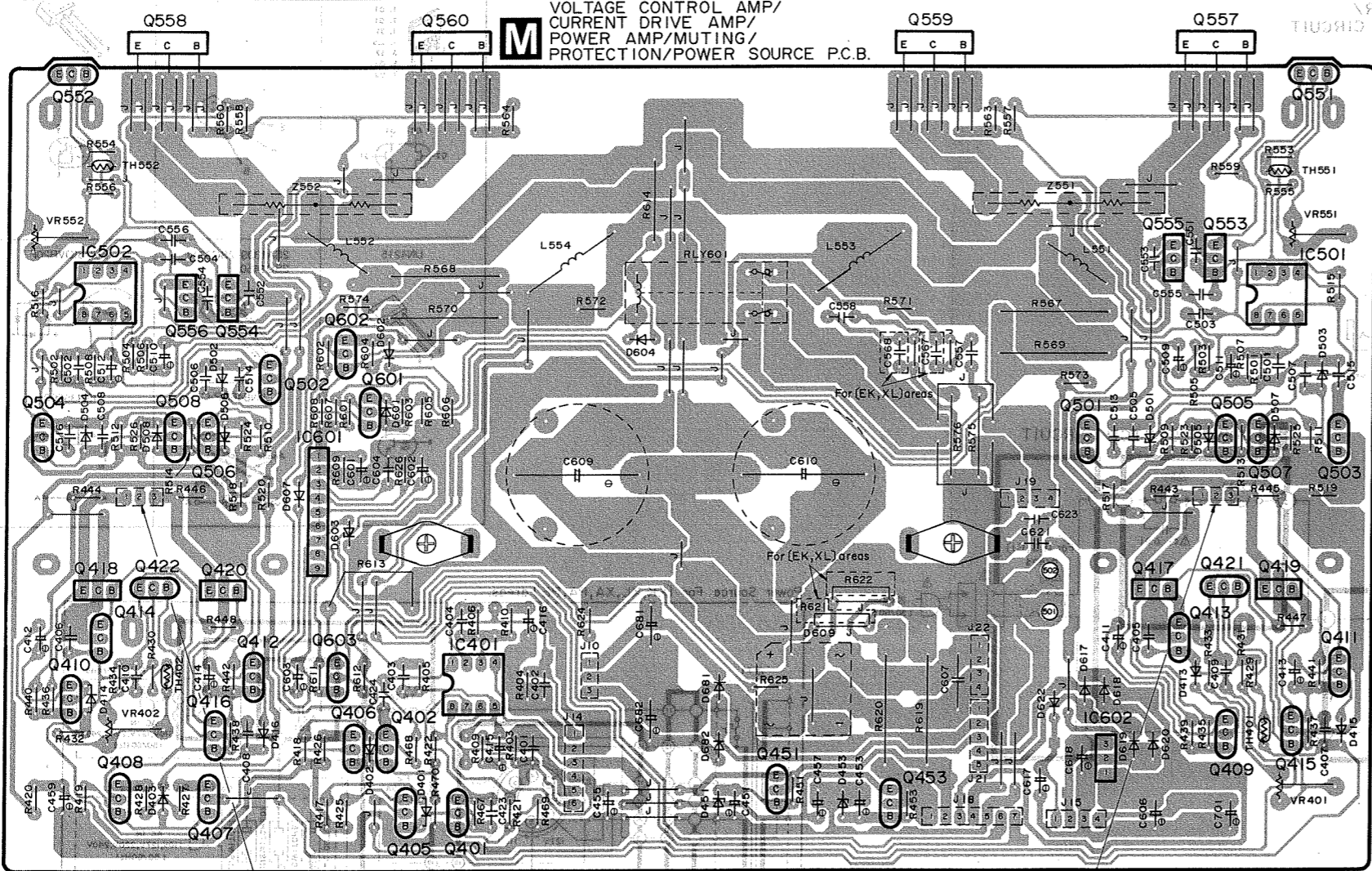
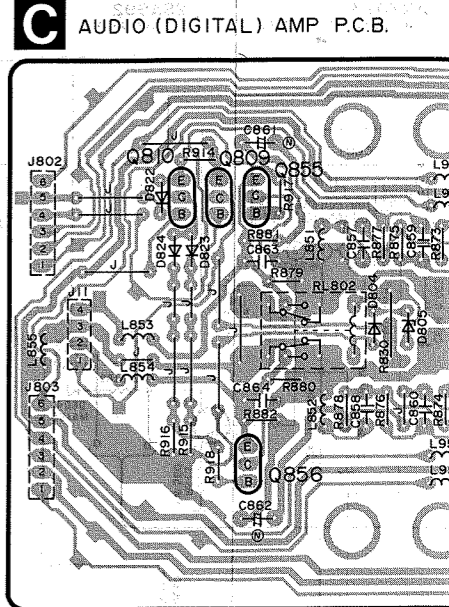
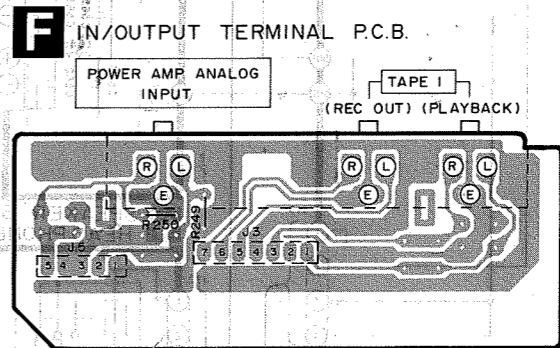
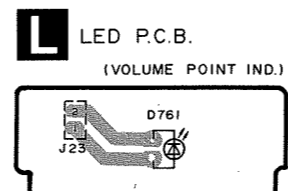
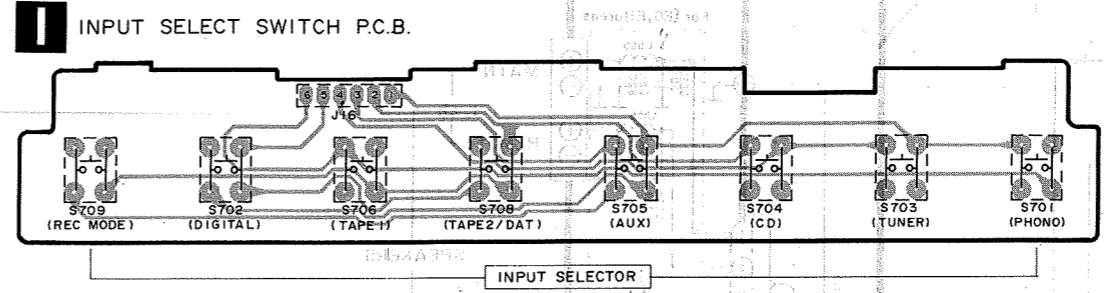


1 2 3 4 5 6 7 8 9 10 11 12 13 14

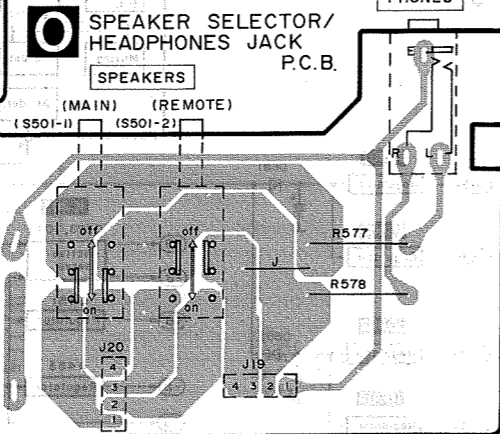
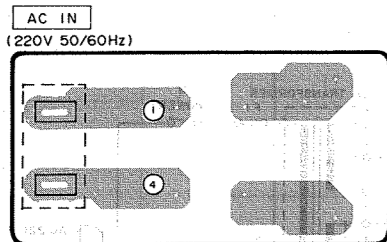
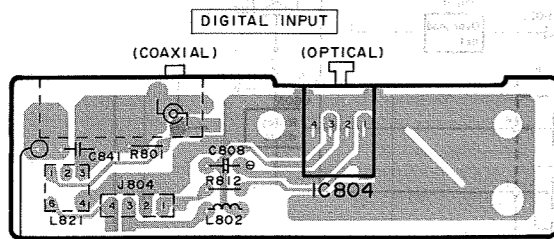
A
B
C
D
E
F
G
H



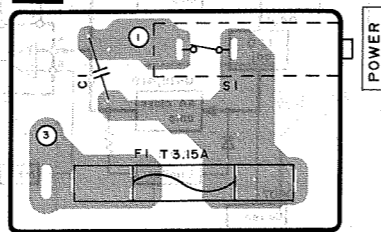
N SPEAKER TERMINAL P.C.B.



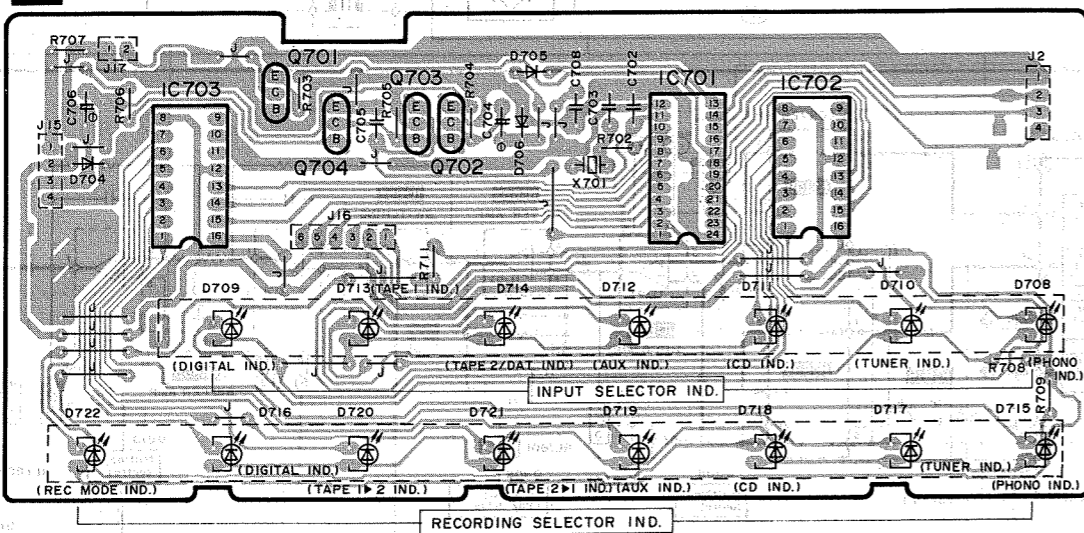
A DIGITAL INPUT TERMINAL P.C.B.



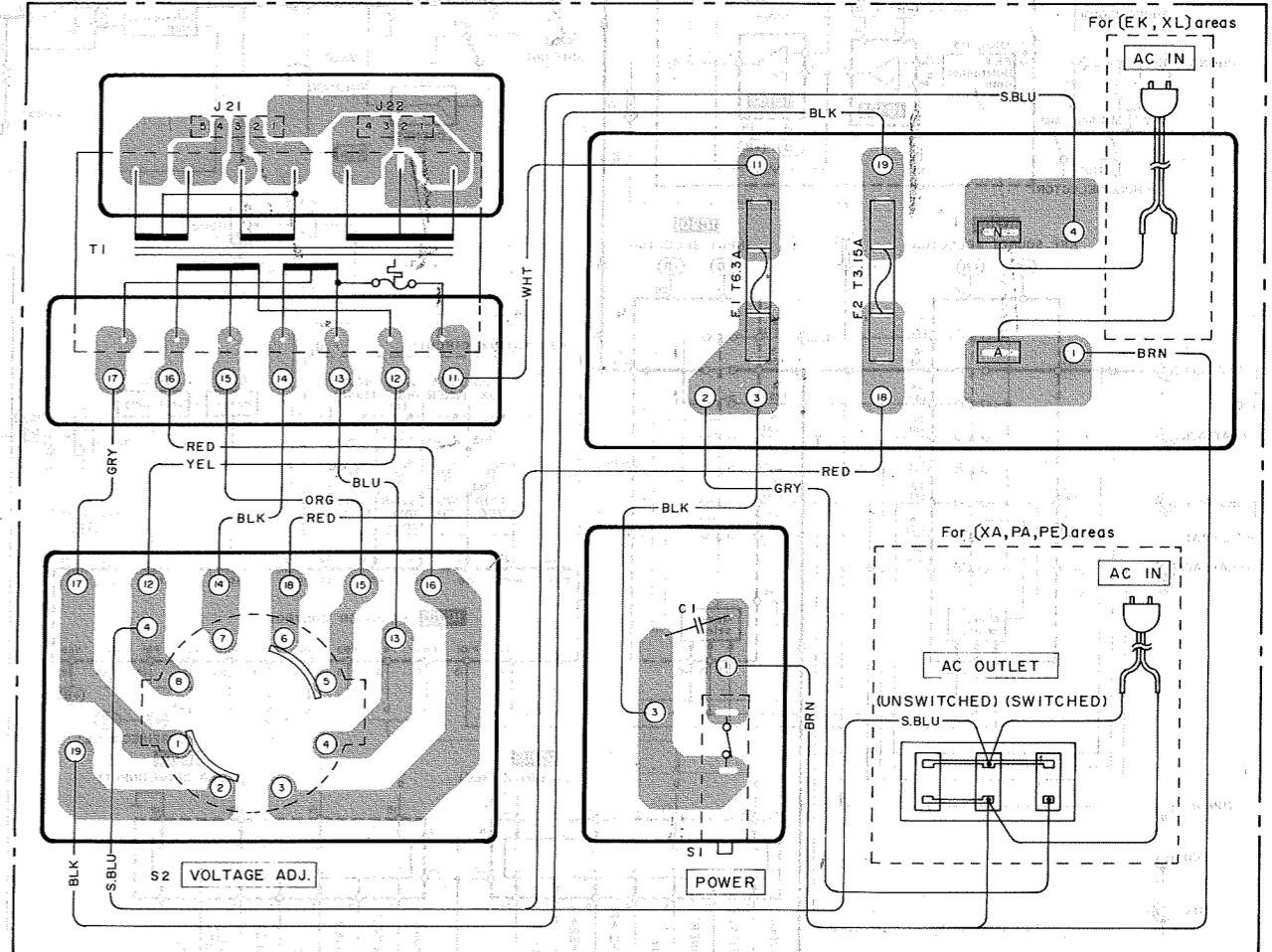
P POWER SWITCH P.C.B.



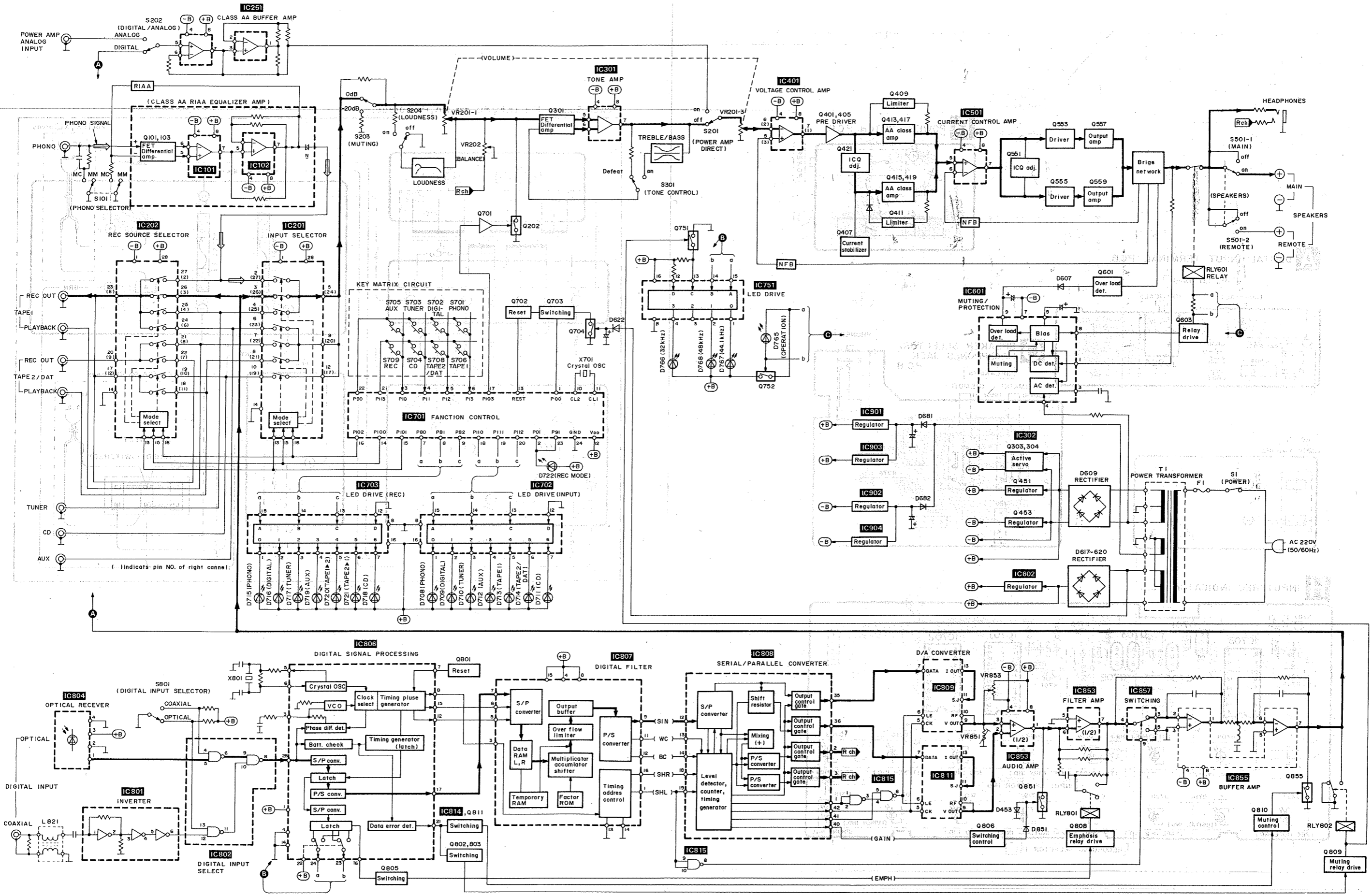
H INPUT/REC INDICATOR P.C.B.



Power Source For (EK, XL, XA, PA, PE) areas.

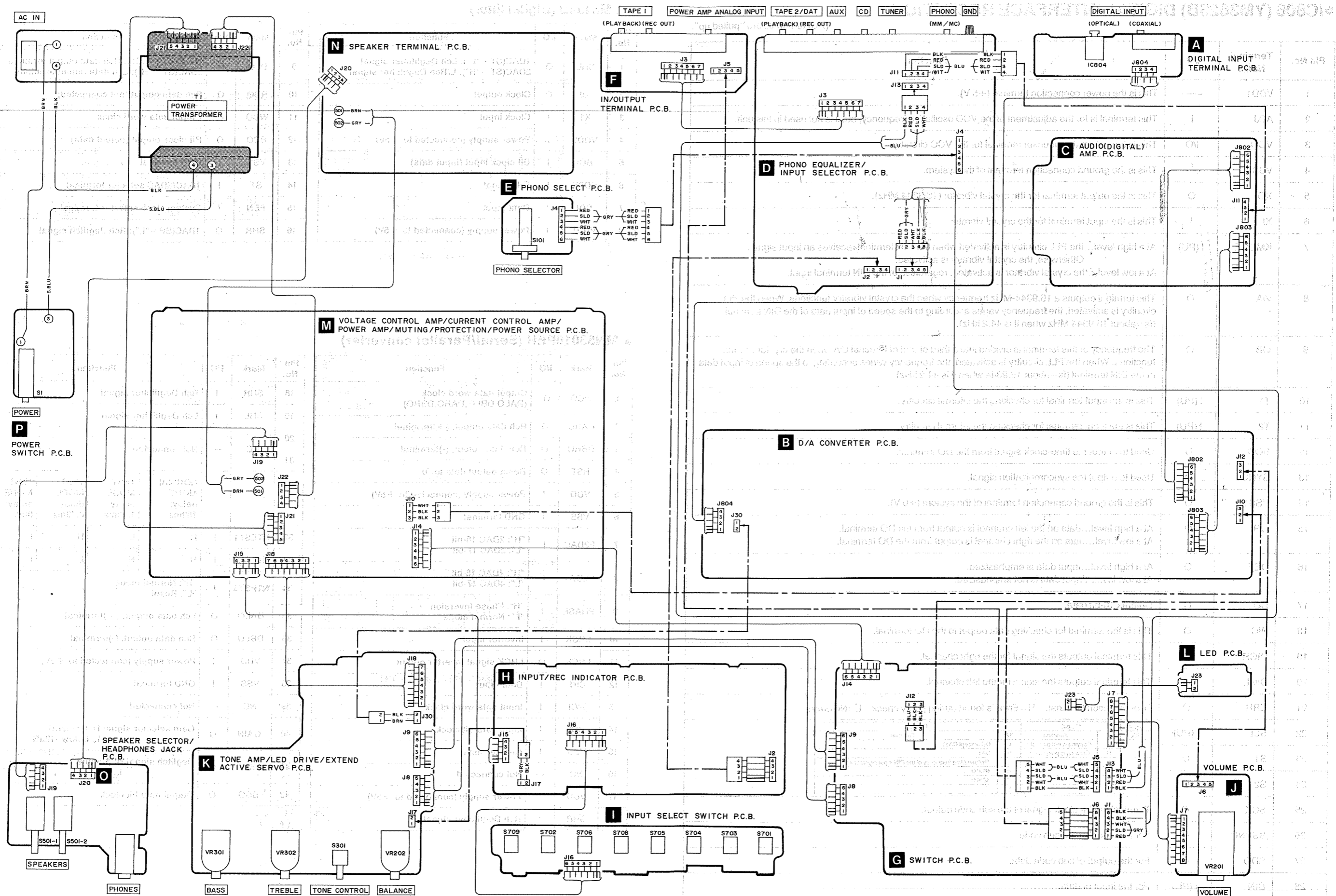


■ BLOCK DIAGRAM



WIRING CONNECTION DIAGRAM

FUNCTIONS OF IC TERMINALS



FUNCTIONS OF IC TERMINALS

IC806 (YM3623B) DIGITAL INTERFACE RECEPTION

(PU) terminals are "pulled up".

Pin No.	Terminal Name	I/O	Function																															
1	VDD1	—	This is the power connection terminal (+5 V).																															
2	ADJ	I	This terminal is for the adjustment of the VCO oscillation frequency, but it is not used in this unit.																															
3	VCO	I/O	This is the external condenser terminal for the VCO circuitry.																															
4	VSS2	—	This is the ground connection terminal of the system.																															
5	XO	O	This is the output terminal for the crystal vibrator (16.9344 MHz).																															
6	XI	I	This is the input terminal for the crystal vibrator.																															
7	KMODE	I (PU)	At a high level... the PLL circuitry is activated when the DIN terminal receives an input signal. Otherwise, the crystal vibrator is activated. At a low level... the crystal vibrator is activated, regardless of the DIN terminal input.																															
8	ØA	O	This terminal outputs a 16.9344-MHz frequency when the crystal vibrator functions. When the PLL circuitry is activated, the frequency varies according to the speed of input data of the DIN terminal (fs=about 16.9344 MHz when it is 44.2 kHz).																															
9	ØB	O	The frequency of this terminal is divided into a third of that of terminal ØA when the crystal vibrator functions. When the PLL circuitry is activated, the frequency varies according to the speed of input data of the DIN terminal (fs=about 16.9344 when it is 44.2 kHz).																															
10	T1	I (PU)	This is the input terminal for checking the internal circuitry.																															
11	T2	I (PU)	This is the input terminal for checking the internal circuitry.																															
12	BCO	O	Used to output the time-clock signal from the DO terminal.																															
13	SYNC	O	Used to output the synchronization signal.																															
14	VSS1	O	This is the ground connection terminal of the system (+0 V).																															
15	L/R	O	At a high level... data on the left channel is output from the DO terminal. At a low level... data on the right channel is output from the DO terminal.																															
16	DEF	O	At a high level... input data is emphasized. At a low level... input data is not emphasized.																															
17	DO	O	Outputs 16-bit data.																															
18	WC	O	This is the terminal for checking data output to the DO terminal.																															
19	DIGR	O	This terminal outputs the signal for the right channel.																															
20	DIGL	O	This terminal outputs the signal for the left channel.																															
21	ERR	O	Error detection terminal. H=Error is found during parity check L=No errors																															
22	SEL	I (PU)	<table border="1"> <thead> <tr> <th>Input</th> <th>S1</th> <th>Output</th> <th>S2</th> <th>Output</th> </tr> <tr> <th>SEL</th> <th>Function</th> <th>L</th> <th>Function</th> <th>L</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>Copying is not possible</td> <td>L</td> <td>DC (except DAT)</td> <td>L</td> </tr> <tr> <td>H</td> <td>Copying is possible</td> <td>H</td> <td>DAT</td> <td>H</td> </tr> <tr> <td>L</td> <td rowspan="3">The sampling frequency of the DIN input signal is 44.1 kHz.</td> <td>L</td> <td>48 kHz</td> <td>L</td> </tr> <tr> <td>H</td> <td>32 kHz</td> <td>H</td> </tr> <tr> <td>H</td> <td>—</td> <td>L</td> </tr> </tbody> </table>	Input	S1	Output	S2	Output	SEL	Function	L	Function	L	L	Copying is not possible	L	DC (except DAT)	L	H	Copying is possible	H	DAT	H	L	The sampling frequency of the DIN input signal is 44.1 kHz.	L	48 kHz	L	H	32 kHz	H	H	—	L
Input	S1	Output	S2	Output																														
SEL	Function	L	Function	L																														
L	Copying is not possible	L	DC (except DAT)	L																														
H	Copying is possible	H	DAT	H																														
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H		32 kHz	H																															
H		—	L																															
23	S1	O																																
24	S2	O																																
25	SCK	O	Terminal for the clock-signal of the sub code output.																															
26	SSYNC	O	For the signal of the sub code.																															
27	SDO	O	For the output of sub code data.																															
28	DIN	I (PU)	For the input of data.																															

YM3404B (Digital filter)

Pin No.	Mark	I/O	Function
1	SHL	O	1DAC(ST="L"): Lch Deglitcher signal 2DAC(ST="H"): L/Rch Deglitcher signal
2	X0	O	Clock output
3	X1	I	Clock input
4	VDD2	I	Power supply (connected to +5V)
5	BCI	I	Bit clock input (input data)
6	SDSY	I	R/L signal
7	SDI	I	Data input
8	VDD1	I	Power supply (connected to +5V)

Pin No.	Mark	I/O	Function
9	DLO	O	1DAC(ST="L"): L/Rch data output terminal 2DAC(ST="H"): Lch data output terminal
10	RDO	O	Rch data output (not connected)
11	WCO	O	Output data word clock
12	BCO	O	Bit clock output (output data)
13	VSS	I	GND terminal
14	ST	I	1DAC/2DAC selector terminal
15	FEN	I	System clock selector terminal
16	SHR	O	1DAC(SP="L"): Rch deglitch signal.

MN53010PEH (Serial/Parallel converter)

Pin No.	Mark	I/O	Function
1	WCO	O	Output data word clock (DALO,DBLO,DARO,DBRO)
2	DARO	O	Rch data output, (+)terminal
3	DBRO	O	Rch data output, (-)terminal
4	RST	O	Reset output data to "0"
5	VDD	I	Power supply (connected to +5V)
6	VSS	I	GND terminal
7	F2DAC	I	"H": 2DAC 18-bit "L": 2DAC 17-bit
8	FLOAT	I	"H": 4DAC 18-bit "L": 4DAC 17-bit
9	PHASE	I	"H": Phase inversion "L": Normal mode
10	LRCK	I	Inverter input
11	LRCK	O	LRCK signal inverter output
12	SIN	I	Data input
13	WCI	I	Input data word clock
14	BCI	I	Input data bit clock
15	VSS	I	GND terminal
16	NC	---	Not connected
17	VDD	I	Power supply (connected to +5V)
18	SHR	I	Rch Deglitcher signal

Pin No.	Mark	I/O	Function												
18	SHR	I	Rch Deglitcher signal												
19	SHL	I	Lch Deglitcher signal												
20	NC	---	Not connected												
31															
			<table border="1"> <thead> <tr> <th>NORMAL MODE</th> <th>TEST MODE</th> <th>TEST MODE</th> <th>TEST MODE</th> </tr> <tr> <th>delay:</th> <th>delay:</th> <th>delay:</th> <th>delay:</th> </tr> </thead> <tbody> <tr> <td>180ms</td> <td>1.45ms</td> <td>0.73ms</td> <td>0ms</td> </tr> </tbody> </table>	NORMAL MODE	TEST MODE	TEST MODE	TEST MODE	delay:	delay:	delay:	delay:	180ms	1.45ms	0.73ms	0ms
NORMAL MODE	TEST MODE	TEST MODE	TEST MODE												
delay:	delay:	delay:	delay:												
180ms	1.45ms	0.73ms	0ms												
32	NTEST1	I	H L H L												
33	NTEST2	I	H H L L												
34	NTEST3	I	"H": Normal mode "L": Reset												
35	DALO	O	Lch data output, (+)terminal												
36	DBLO	O	Rch data output, (-)terminal												
37	VDD	I	Power supply (connected to +5V)												
38	VSS	I	GND terminal												
39	NC	---	Not connected												
40	GAIN	O	Gain selector signal H: 0~-12dB L: below -12dB												
41	SH	O	Deglitch signal H: Sample L: Hold												
42	BCO	O	Output data bit clock												

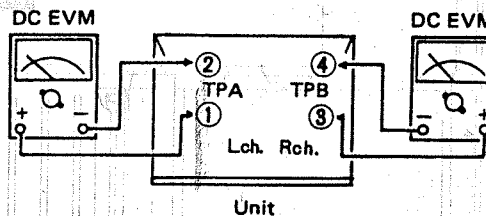
MEASUREMENTS AND ADJUSTMENTS

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

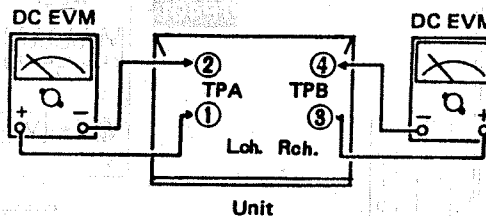
1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Completely turn the (V) amp. adjusting volumes (VR401, VR402) counter-clockwise.
3. Turn ON the set when it is cold, and immediately adjust VR401 and VR402 so that the voltage is 25mV. Also, check that the voltage is 25 ~ 30mV (standard: 27mV) after lapse of 10 ~ 15 minutes. (Below 30mV after lapse of 20 min.)



TPA=TP401, TPB=TP402

CURRENT DRIVE(C)AMP.IDLING(ICQ)ADJUSTMENT

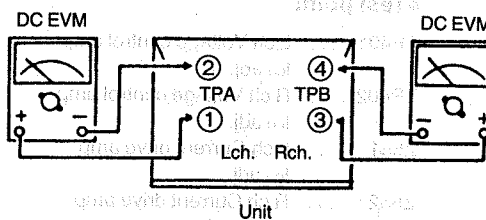
1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Completely turn the (C) amp. adjusting volumes (VR551, VR552) counter-clockwise.
3. Turn ON the set when it is cold, and after the adjustment of the (V) amp. ICQ, adjust VR551 and VR552 so that the voltage is 3mV. Also, check that the voltage is 4 ~ 7mV (standard: 5mV) after lapse of 10 ~ 15 minutes. (Below 10mV after lapse of 20 min.)



TPA=Z551, TPB=Z552

DA CONVERTER DC OFFSET ADJUSTMENT

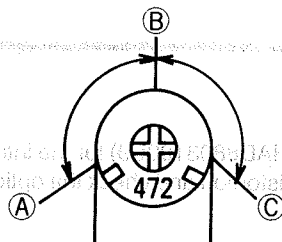
1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Adjust VR853 and VR854 so that the voltage are less than 1 mV in 3 mV range.



TPA=TP801, TPB=TP802

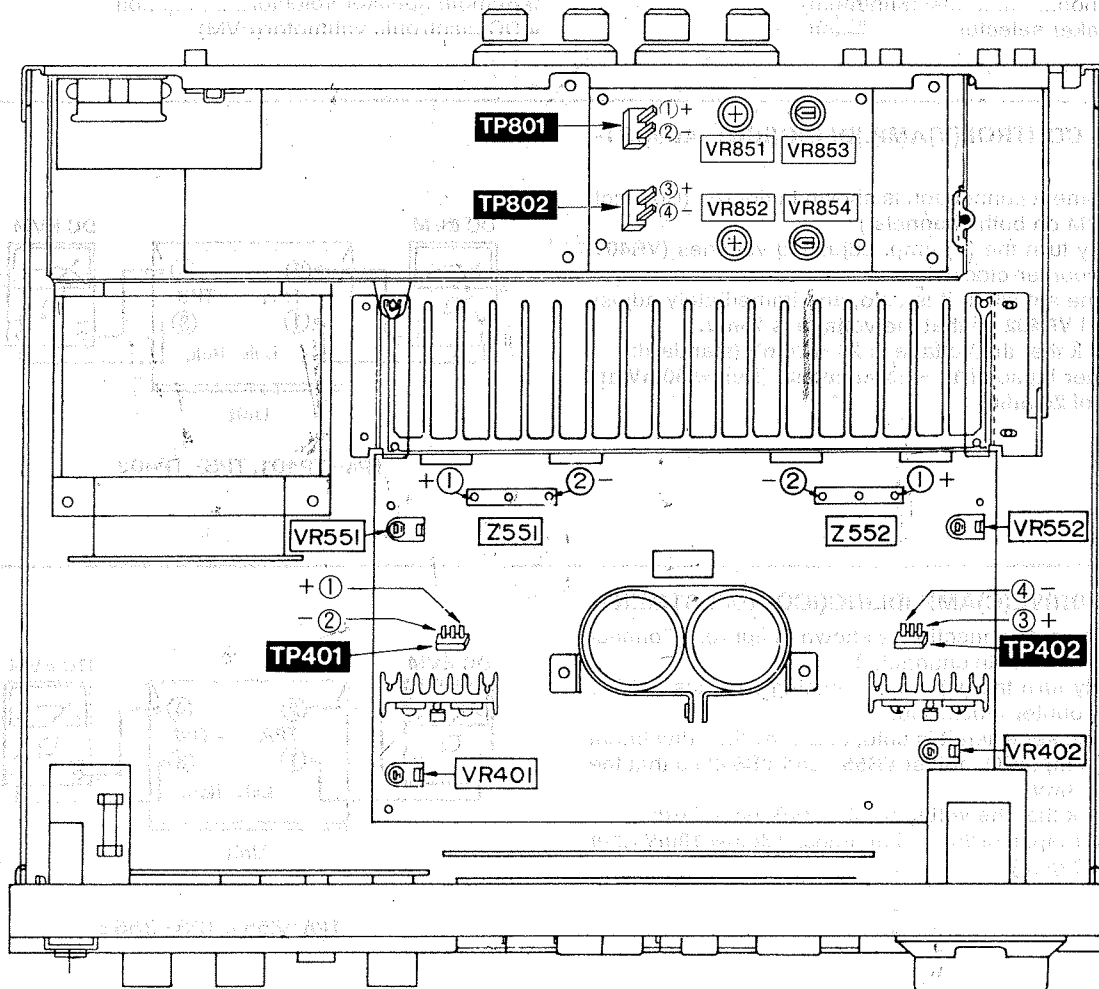
Note:

After replacing or repairing IC809-812 (Part No. PCM56P-J), rotate VR851 and VR852 fully clockwise (to point C) and counterclockwise (to point A). Afterwards, set the middle points between A and C to their center positions (B).



VR851 and VR852

● Adjustment points



● Test point

- TP401 L ch Voltage control amp
I_{cc} adj.
- TP402 R ch Voltage control amp
I_{cc} adj.
- Z551 L ch Current drive amp
I_{cc} adj.
- Z552 R ch Current drive amp
I_{cc} adj.
- TP801 Lch DA Converter
DC offset adj.
- TP802 Rch DA Converter
DC offset adj.

● Adjustment VR

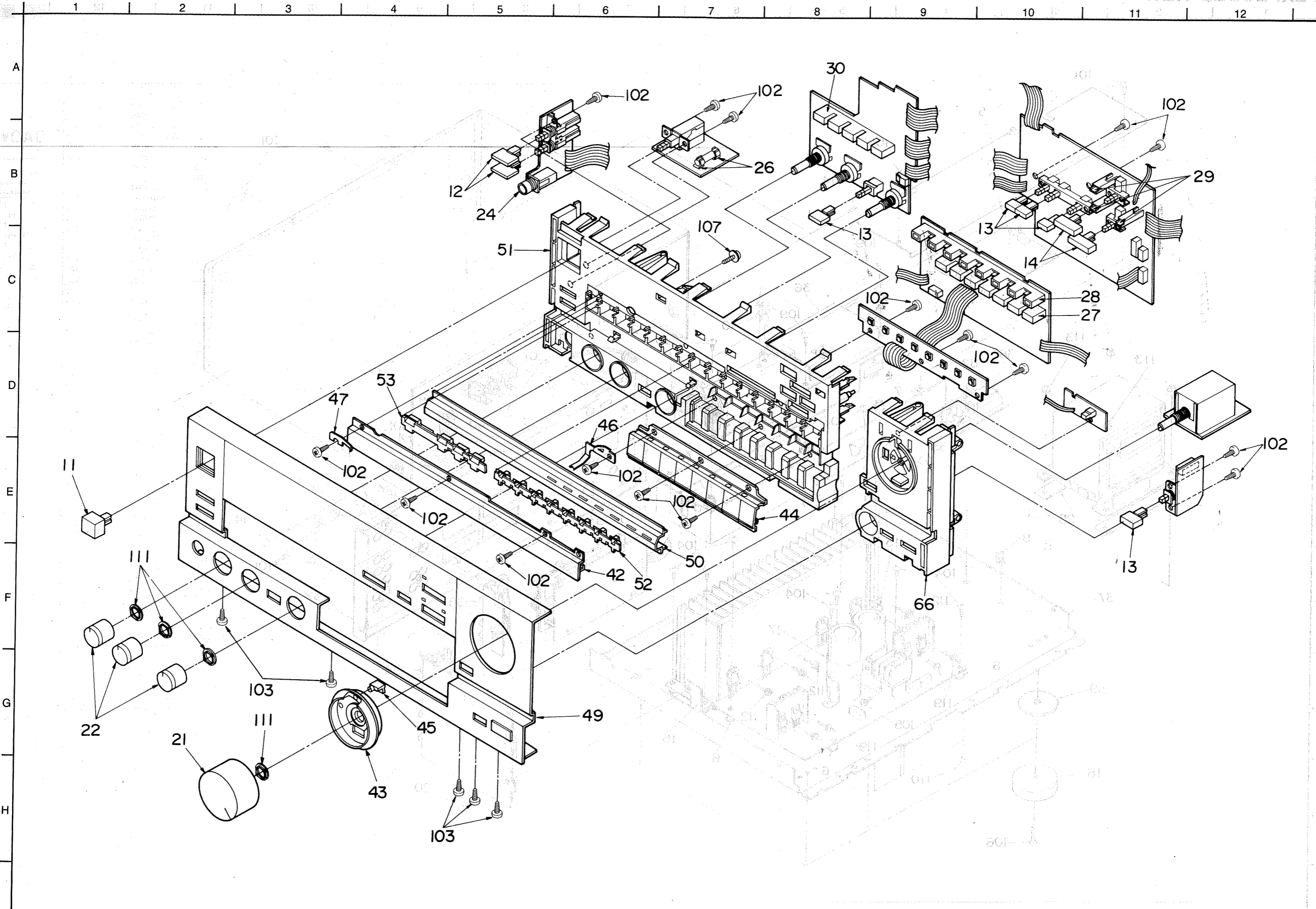
- VR401 L ch Voltage control amp
I_{cc} adj.
- VR402 R ch Voltage control amp
I_{cc} adj.
- VR551 L ch Current drive amp
I_{cc} adj.
- VR552 R ch Current drive amp
I_{cc} adj.
- VR851 L ch DA Converter distortion adj.
- VR852 R ch DA Converter distortion adj.
- VR853 Lch DA Converter DC offset adj.
- VR854 Rch DA Converter DC offset adj.

Note:

Refer to the Supplement (Order No. HAD8803100S9) for the information about how to adjust the DA Converter DC offset, DA Converter distortion and check the optical terminal.

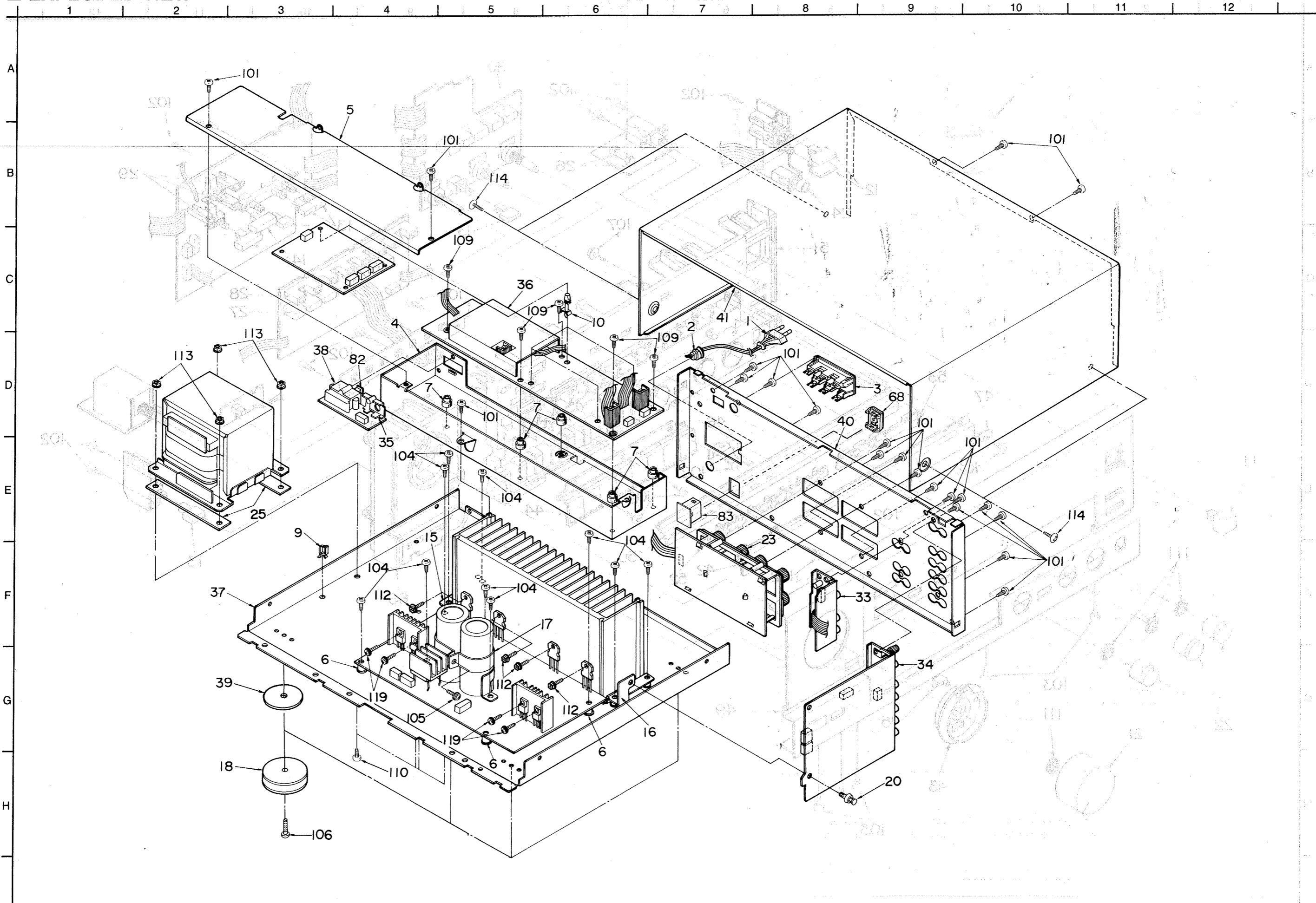
EXPLODED VIEW

SU-V90D



EXPLODED VIEW

SU-V90D SU-V90D



REPLACEMENT PARTS LIST

ELECTRIC PARTS LIST

Notes : * 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.
 * Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
 Parts without these indications can be used for all areas.

CABINET AND CHASSIS PARTS LIST (Refer to 37~40 page)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CABINET AND CHASSIS			(XA, PA, PE)		
1 (E.K)	Δ QFC1205M	POWER CORD	41	SKC2011K991	CABINET
1 (PA, PE)	Δ RJA52Y	POWER CORD	42	SGW490T03A	PANEL
1 (XA)	Δ SJA111	POWER CORD	43	SGX7941	ORNAMENT
1 (XL)	Δ SJA190	POWER CORD	44	SBC991-2	BUTTON, SELECTOR
2 (XL, XA, PA)	SHR127	SPACER, POWER CORD	45	SGL250	ORNAMENT
2 (PE)	SHR129	BUSHING	46	SUS873	SPRING
3 (E.K)	Δ SJS601-3	SOCKET	47	SUS839	COIL SPRING
4 (XA, PA, PE)	SMC1276	SHIELD COVER	49	SGWUV90DKE1	FRONT PANEL
5	SMC1277	SHIELD COVER	50	SGWUV90DKE2	ORNAMENT
6	SHE181	HOLDER	51	SGXUV90D-KE1	GRILLE ASS-Y
7	SHE170-1	SPACER	52	SGLUV100DKN1	ORNAMENT
9	SHR9814	PLASTIC SPACER	53	SGLUV100DKN2	ORNAMENT
10	SHR9813	PLASTIC SPACER	66	SGXUV90D-KE3	GRILLE ASS-Y
11	SBC666-5	BUTTON, POWER	68	SJS9231A	AC INLET COVER
12	SBC723-1	BUTTON, SPEAKER	(E, EF, EI, EB)		
13	SBC993	BUTTON, TONE	(EH, EG)		
14	SBC992	BUTTON, POWER AMP	70	SJT30243-V	CONNECTOR(2P)
15	SUW3036	BRACKET	70	SJT30340LX-V	CONNECTOR(3P)
16	SUW3101	ANGLE	70	SJT30440LX-V	CONNECTOR(4P)
17	SMN2061	ANGLE	70	SJT30543-V	CONNECTOR(5P)
18	SKL306	INSULATOR	70	SJT30640LX-V	CONNECTOR(6P)
19	SHR301	CLAMPER	70	SJT30740LX-V	CONNECTOR(7P)
20	SHR415	LOCK PIN	71	SJT3213	CONNECTOR(2P)
21	SBN1230-1	KNOB, MAIN VOL	71	SJT3319	CONNECTOR(3P)
22	SBN1218-1	KNOB, TONE	71	SJT3415	CONNECTOR(4P)
23	SJF4817	TERMINAL BOARD	71	SJT3511	CONNECTOR(5P)
24	SJJD17B	JACK	71	SJT3611	CONNECTOR(6P)
25	SHG6352-3	RUBBER SPACER	72	SJT3215	CONNECTOR(2P)
26	SJT390	FUSE HOLDER	72	SJT3417	TERMINAL(4P)
(E, EF, EI, EB)			72	SJT3513	CONNECTOR(5P)
(EH, EG)			73	SJS5331	SOCKET(3P)
27	LN074373P	DIODE, GAASP	73	SJS5425	SOCKET(4P)
28	LN088374P	DIODE, GAASP	73	SJS5523	SOCKET(5P)
29	LN018397PH	LED ASS-Y	73	SJS5629	CONNECTOR(6P)
30	LN041373P1	LED ASS-Y	74	SJT783	CONTACT
33	SJF3062-18	TERMINAL	75	SJS5217	SOCKET(2P)
34	SJF3062-6	TERMINAL	75	SJS5337	CONNECTOR(3P)
35	SJF3107-1N	TERMINAL PLATE	75	SJS5431	SOCKET(4P)
36	SMC1279	SHIELD PLATE	75	SJS5529	SOCKET(5P)
37	SKU11850-1	BOTTOM BOARD	75	SJS5633	CONNECTOR(6P)
38	SGX7912	HOLDER	76	SJT785	CONTACT
39	SHG6405	SPACER	82	VJA7135	CAP
40	SGPUV90D-KEF	REAR PANEL	83	Δ SJS9231-1B	AC INLET
(EF, EI, EB)			(E, EF, EI, EB)		
(EH)			(EH, EG)		
40 (XL)	SGPUV90D-KXL	REAR PANEL	SCREWS, WASHERS AND NUTS		
40 (E)	SGP7230-1A	REAR PANEL	101	XTBS3*8JFZ1	SCREW
40 (EG)	SGP7230-1B	REAR PANEL	102	XTB3*8G	SCREW
40 (E.K)	SGP7230-2A	REAR PANEL	103	XTBS3*10JFZ1	TAPPING SCREW
40	SGP7230-3A	REAR PANEL	104	XTV3*20F	TAPPING SCREW
			105	XYN3*F14	TAPPING SCREW
			106	XTW3*8T	SCREW
			107	XTWS3*10Q	SCREW
			108	XTB3*12JFZ	SCREW
			109	XTBS3*12F1	SCREW
			110	XTB4*10F	TAPPING SCREW
			111	SNE4021	NUT
			112	SNE2117-1	SCREW
			113	SNE4065	BRACKET
			114	SNE2095-5	SCREW
			118	XTBS3*8JFZ1	SCREW
			119	XTW3*8T	SCREW

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
INTEGRATED CIRCUITS					
IC101	M5218P	I.C. EQ AMP	Q451	2SA684-RNC	TRANSISTOR
IC102	SV1UPC4570C	I.C. EQ AMP	Q501	2SC2631-Q	TRANSISTOR
IC201	TC9163N	I.C. ANALOG FUN	Q502	2SC2631-Q	TRANSISTOR
IC202	TC9164N	I.C. ANALOG FUN	Q503	2SA1123R	TRANSISTOR
IC251	M5238P	I.C. BUFFER AMP	Q504	2SA1123R	TRANSISTOR
IC252	M5238P	I.C. BUFFER AMP	Q505	2SA1123R	TRANSISTOR
IC301	M5218P	I.C. TONE AMP	Q506	2SA1123R	TRANSISTOR
IC302	M5218P	I.C. EXTEND ACTIVE	Q507	2SC2631-Q	TRANSISTOR
IC401	SV1UPC4570C	I.C. VOLTAGE AMP	Q508	2SC2631-Q	TRANSISTOR
IC501	M5219P	I.C. FET DIFFERENTIAL	Q551	2SC1815BG	TRANSISTOR
IC502	M5219P	I.C. FET DIFFERENTIAL	Q552	2SC1815BG	TRANSISTOR
IC601	AN7073	I.C. PROTECTION	Q553	2SC3944AQRS	TRANSISTOR
IC602	AN78M05	I.C. RERULATOR	Q554	2SC3944AQRS	TRANSISTOR
IC701	UPD7566CS089	I.C. ANALOG FUN	Q555	2SA1535AQRS	TRANSISTOR
IC702	DN74LS145	I.C. LED DRIVER	Q556	2SA1535AQRS	TRANSISTOR
IC703	DN74LS145	I.C. LED DRIVER	Q557	2SC3281R	TRANSISTOR
IC751	DN74LS145	I.C. LED DRIVER	Q558	2SC3281R	TRANSISTOR
IC801	MN74HC04	I.C. DIGITAL INPUT	Q559	2SA1302R	TRANSISTOR
IC802	MN74HC00	I.C. DIGITAL INPUT	Q560	2SA1302R	TRANSISTOR
IC804	SV1TORX172	I.C. OPTICAL RE.	Q601	2SB1036R	TRANSISTOR
IC806	YM3623B	I.C. DIGITAL SIG.	Q602	2SB1036R	TRANSISTOR
IC807	YM3404B	I.C. DIGITAL FILTER	Q603	2SA992E	TRANSISTOR
IC808	MN53010PEH	I.C. SERIAL/PARA	Q701	2SA1309A-R	TRANSISTOR
IC809	PCM56P-J	I.C. D/A CONVERTER	Q702	UN4211	TRANSISTOR
IC810	PCM56P-J	I.C. D/A CONVERTER	Q703	2SC3311A-Q	TRANSISTOR
IC811	PCM56P-J	I.C. D/A CONVERTER	Q704	2SC3311A-Q	TRANSISTOR
IC812	PCM56P-J	I.C. D/A CONVERTER	Q751	UN4211	TRANSISTOR
IC814	MN123Z	I.C. FLIP-FLOP	Q752	2SD1512R	TRANSISTOR
IC853	SV1UPC4570C	I.C. AUDIO AMP	Q801	UN4215	TRANSISTOR
IC854	SV1UPC4570C	I.C. AUDIO AMP	Q802	2SA1309AQS	TRANSISTOR
IC855	SV1UPC4570C	I.C. BUFFER	Q803	UN4211	TRANSISTOR
IC856	SV1UPC4570C	I.C. BUFFER	Q805	UN4211	TRANSISTOR
IC857	SV1UPD4053BC	I.C. SWITCHING	Q806	UN4111	TRANSISTOR
IC858	SV1UPD4053BC	I.C. SWITCHING	Q808	UN4111	TRANSISTOR
IC901	AN78M05	I.C. REGULATOR	Q809	UN4111	TRANSISTOR
IC902	AN79N05	I.C. REGULATOR	Q810	UN4111	TRANSISTOR
IC903	M5F79M08L	I.C. REGULATOR	Q811	UN4211	TRANSISTOR
IC904	M5F79M08L	I.C. REGULATOR	Q851	2SD1330R	TRANSISTOR
TRANSISTORS					
Q101	2SK369-GR	TRANSISTOR	Q852	2SD1330R	TRANSISTOR
Q102	2SK369-GR	TRANSISTOR	Q853	2SD1330R	TRANSISTOR
Q103	2SK369-GR	TRANSISTOR	Q854	2SD1330R	TRANSISTOR
Q104	2SK369-GR	TRANSISTOR	Q855	2SD1330R	TRANSISTOR
Q201	2SK301	TRANSISTOR	Q856	2SD1330R	TRANSISTOR
Q202	2SK301	TRANSISTOR	DIODES		
Q301	2SK389BG	TRANSISTOR	D101	MA165	DIODE
Q302	2SK389BG	TRANSISTOR	D102	MA165	DIODE
Q303	2SC3944AQRS	TRANSISTOR	D201	20A90	DIODE
Q304	2SA1535AQRS	TRANSISTOR	D301	MA4180-M	DIODE
Q401	2SC2631-Q	TRANSISTOR	D302	MA4180-M	DIODE
Q402	2SC2631-Q	TRANSISTOR	D303	MA165	DIODE
Q405	2SA1123R	TRANSISTOR	D401	MA165	DIODE
Q406	2SA1123R	TRANSISTOR	D402	MA165	DIODE
Q407	2SC2631-Q	TRANSISTOR	D403	MA29WA	DIODE
Q408	2SC2631-Q	TRANSISTOR	D413	MA165	DIODE
Q409	2SC3311A-Q	TRANSISTOR	D414	MA165	DIODE
Q410	2SC3311A-Q	TRANSISTOR	D415	MA165	DIODE
Q411	2SA1309A-R	TRANSISTOR	D416	MA165	DIODE
Q412	2SA1309A-R	TRANSISTOR	D451	MA4180-M	DIODE
Q413	2SC2631-Q	TRANSISTOR	D453	MA4180-M	DIODE
Q414	2SC2631-Q	TRANSISTOR	D501	MA4082M	DIODE
Q415	2SA1123R	TRANSISTOR	D502	MA4082M	DIODE
Q416	2SA1123R	TRANSISTOR	D503	MA4082M	DIODE
Q417	2SC3944AQRS	TRANSISTOR	D504	MA4082M	DIODE
Q418	2SC3944AQRS	TRANSISTOR	D505	MA165	DIODE
Q419	2SA1535AQRS	TRANSISTOR	D506	MA165	DIODE
Q420	2SA1535AQRS	TRANSISTOR	D508	MA165	DIODE
Q421	2SC1815BG	TRANSISTOR	D601	MA165	DIODE
Q422	2SC1815BG	TRANSISTOR	D602	MA165	DIODE
Q451	2SC1384A-R	TRANSISTOR	D603	MA4180-M	DIODE
			D604	MA165	DIODE

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
RESISTORS (VALUE, WATTAGE)								
R101	ERDS2T J473	47K 1/4	R204	ERDS2T J223	22K 1/4	R403	ERD25T J124	120K 1/4
R102	ERDS2T J473	47K 1/4	R205	ERDS2T J332	3.3K 1/4	R404	ERD25T J124	120K 1/4
R103	ERDS2T J221	220 1/4	R206	ERDS2T J332	3.3K 1/4	R405	ERD25T J124	120K 1/4
R104	ERDS2T J221	220 1/4	R207	ERD25F J561	560 1/4	R406	ERD25T J124	120K 1/4
R105	ERDS2T J220	22 1/4	R208	ERD25F J561	560 1/4	R409	ERD25F J392	3.9K 1/4
R106	ERDS2T J220	22 1/4	R209	ERDS2T J223	22K 1/4	R410	ERD25F J392	3.9K 1/4
R107	ERD25F J272	2.7K 1/4	R210	ERD25F J101	100 1/4	R417	ERD25F J101	100 1/4
R108	ERD25F J272	2.7K 1/4	R211	ERDS2T J183	18K 1/4	R418	ERD25F J101	100 1/4
R109	ERD25F J272	2.7K 1/4	R212	ERDS2T J183	18K 1/4	R419	ERDS2T J124	120K 1/4
R110	ERD25F J272	2.7K 1/4	R213	ERDS2T J334	330K 1/4	R420	ERD25F J101	100 1/4
R111	ERDS2T J101	100 1/4	R215	ERD25F J472	4.7K 1/4	R421	ERDS2T J153	15K 1/4
R112	ERDS2T J101	100 1/4	R216	ERD25F J472	4.7K 1/4	R422	ERDS2T J153	15K 1/4
R113	ERD25F J272	2.7K 1/4	R217	ERD25F J124	120K 1/4	R425	ERD25F J101	100 1/4
R114	ERD25F J272	2.7K 1/4	R218	ERD25T J124	120K 1/4	R426	ERD25F J101	100 1/4
R115	ERDS2T J121	120 1/4	R223	ERDS2T J103	10K 1/4	R427	ERD25F J101	100 1/4
R116	ERDS2T J121	120 1/4	R224	ERDS2T J103	10K 1/4	R428	ERD25F J101	100 1/4
R117	ERDS2T J8R2	8.2 1/4	R225	ERDS2T J103	10K 1/4	R429	ERDS2T J393	39K 1/4
R118	ERDS2T J8R2	8.2 1/4	R249	ERD25T J473	47K 1/4	R430	ERDS2T J393	39K 1/4
R119	ERDS2TKG6802	68K 1/4	R250	ERD25T J473	47K 1/4	R431	ERDS2T J332	3.3K 1/4
R120	ERDS2TKG6802	68K 1/4	R251	ERD25F J221	220 1/4	R432	ERDS2T J332	3.3K 1/4
R121	ERDS2TKF5231	5.23K 1/4	R252	ERD25F J221	220 1/4	R433	ERDS2T J102	1K 1/4
R122	ERDS2TKF5231	5.23K 1/4	R253	ERDS2T J334	330K 1/4	R434	ERDS2T J102	1K 1/4
R123	ERDS2T J561	560 1/4	R254	ERDS2T J334	330K 1/4	R435	ERDS2T J223	22K 1/4
R124	ERDS2T J561	560 1/4	R255	ERDS2T J101	100 1/4	R436	ERDS2T J223	22K 1/4
R125	ERDS2T J121	120 1/4	R256	ERDS2T J101	100 1/4	R437	ERDS2T J223	22K 1/4
R126	ERDS2T J121	120 1/4	R257	ERDS2T J331	330 1/4	R438	ERDS2T J223	22K 1/4
R127	ERDS2T J101	100 1/4	R258	ERDS2T J331	330 1/4	R439	ERD25F J101	100 1/4
R128	ERDS2T J101	100 1/4	R259	ERDS2T J102	1K 1/4	R440	ERD25F J101	100 1/4
R129	ERDS2T J331	330 1/4	R260	ERDS2T J102	1K 1/4	R441	ERD25F J101	100 1/4
R130	ERDS2T J331	330 1/4	R261	ERDS2T J332	3.3K 1/4	R442	ERD25F J101	100 1/4
R131	ERDS2T J102	1K 1/4	R262	ERDS2T J332	3.3K 1/4	R443	ERD25F J2R2	2.2 1/4
R132	ERDS2T J102	1K 1/4	R263	ERD25T J473	47K 1/4	R444	ERD25F J2R2	2.2 1/4
R133	ERDS2T J332	3.3K 1/4	R264	ERD25T J473	47K 1/4	R445	ERD25F J2R2	2.2 1/4
R134	ERDS2T J332	3.3K 1/4	R265	ERD25T J473	47K 1/4	R446	ERD25F J2R2	2.2 1/4
R141	ERDS2T J224	220K 1/4	R266	ERD25T J473	47K 1/4	R447	ERD25F J561	560 1/4
R142	ERDS2T J224	220K 1/4	R271	ERDS2T J471	470 1/4	R448	ERD25F J561	560 1/4
R151	ERDS2T J222	2.2K 1/4	(E1, EG)			R451	ERDS2T J333	33K 1/4
(E1, EG)			R272	ERDS2T J471	470 1/4	R453	ERDS2T J333	33K 1/4
R152	ERDS2T J222	2.2K 1/4	(E1, EG)			R467	ERDS2T J102	1K 1/4
(E1, EG)			R301	ERDS2T J101	100 1/4	R468	ERDS2T J102	1K 1/4
R153	ERDS2T J222	2.2K 1/4	R302	ERDS2T J101	100 1/4	R469	ERDS2T J153	15K 1/4
(E1, EG)			R303	ERDS2T J473	47K 1/4	R470	ERDS2T J153	15K 1/4
R154	ERDS2T J222	2.2K 1/4	R304	ERDS2T J473	47K 1/4	R501	ERDS2T J471	470 1/4
(E1, EG)			R305	ERDS2T J472	4.7K 1/4	R502	ERDS2T J471	470 1/4
R155	ERDS2T J471	470 1/4	R306	ERDS2T J472	4.7K 1/4	R503	ERDS2T J122	1.2K 1/4
(E1, EG)			R307	ERDS2T J472	4.7K 1/4	R504	ERDS2T J122	1.2K 1/4
R156	ERDS2T J471	470 1/4	R308	ERDS2T J472	4.7K 1/4	R505	ERDS2T J121	120 1/4
(E1, EG)			R309	ERDS2T J472	4.7K 1/4	R506	ERDS2T J121	120 1/4
R157	ERDS2T J471	470 1/4	R310	ERDS2T J472	4.7K 1/4	R507	ERDS2T J121	120 1/4
(E1, EG)			R311	ERDS2T J221	220 1/4	R508	ERDS2T J121	120 1/4
R158	ERDS2T J471	470 1/4	R312	ERDS2T J221	220 1/4	R509	ERD25F J101	100 1/4
(E1, EG)			R313	ERD25F J821	820 1/4	R510	ERD25F J101	100 1/4
R159	ERDS2T J471	470 1/4	R314	ERD25F J821	820 1/4	R511	ERD25F J101	100 1/4
(E1, EG)			R315	ERD25F J472	4.7K 1/4	R512	ERD25F J101	100 1/4
R160	ERDS2T J471	470 1/4	R316	ERD25F J472	4.7K 1/4	R513	ERDS2T J104	100K 1/4
(E1, EG)			R317	ERD25F J392	3.9K 1/4	R514	ERDS2T J104	100K 1/4
R161	ERDS2T J471	470 1/4	R318	ERD25F J392	3.9K 1/4	R515	ERD25F J332	3.3K 1/4
(E1, EG)			R319	ERDS2T J223	22K 1/4	R516	ERD25F J332	3.3K 1/4
R162	ERDS2T J471	470 1/4	R320	ERDS2T J223	22K 1/4	R517	ERD25F J1R0	1 1/4
(E1, EG)			R321	ERDS2T J102	1K 1/4	R518	ERD25F J1R0	1 1/4
R163	ERDS2T J471	470 1/4	R322	ERDS2T J102	1K 1/4	R519	ERD25F J1R0	1 1/4
(E1, EG)			R323	ERDS2T J562	5.6K 1/4	R520	ERD25F J1R0	1 1/4
R164	ERDS2T J471	470 1/4	R324	ERDS2T J562	5.6K 1/4	R523	ERD25F J101	100 1/4
(E1, EG)			R329	ERDS2T J223	22K 1/4	R524	ERD25F J101	100 1/4
R165	ERDS2T J471	470 1/4	R330	ERDS2T J223	22K 1/4	R525	ERD25F J101	100 1/4
(E1, EG)			R331	ERDS2T J102	1K 1/4	R526	ERD25F J101	100 1/4
R166	ERDS2T J471	470 1/4	R332	ERDS2T J153	15K 1/4	R526	ERD25F J101	100 1/4
(E1, EG)			R333	ERDS2T J823	82K 1/4	R553	ERDS2T J332	3.3K 1/4
R167	ERDS2T J471	470 1/4	R334	ERDS2T J153	15K 1/4	R554	ERDS2T J332	3.3K 1/4
(E1, EG)			R335	ERDS2T J102	1K 1/4	R555	ERDS2T J122	1.2K 1/4
R168	ERDS2T J471	470 1/4	R336	ERDS2T J102	1K 1/4	R556	ERDS2T J122	1.2K 1/4
(E1, EG)			R337	ERDS2T J224	220K 1/4	R557	ERD25F J331	330 1/4
R201	ERDS2T J102	1K 1/4	R338	ERDS2T J224	220K 1/4	R558	ERD25F J331	330 1/4
R202	ERDS2T J102	1K 1/4	R339	ERDS2T J223	22K 1/4	R559	ERD25F J2R2	2.2 1/4
R203	ERDS2T J223	22K 1/4	R340	ERDS2T J223	22K 1/4	R560	ERD25F J2R2	2.2 1/4
			R401	ERD25F J331	330 1/4	R563	ERD25F J2R2	2.2 1/4
			R402	ERD25F J331	330 1/4	R564	ERD25F J2R2	2.2 1/4
						R567	ERF2AKR10	0.1 2

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
R568	ERF2AKR10	0.1 2	R841	ERDS2T J561	560 1/4	C113	ECQM1H392JZ	0.0039 50
R569	ERF2AKR10	0.1 2	R842	ERDS2T J561	560 1/4	C114	ECQM1H392JZ	0.0039 50
R570	ERF2AKR10	0.1 2	R843	ERDS2T J561	560 1/4	C115	ECEA1EPN3R3	3.3 25
R571	ERDS1F J100	100 1/2	R844	ERDS2T J561	560 1/4	C116	ECEA1EPN3R3	3.3 25
R572	ERDS1F J100	100 1/2	R845	ERDS2T J561	560 1/4	C117	ECEA1EK3R3	3.3 25
R573	ERD25F J1R0	1 1/4	R846	ERDS2T J561	560 1/4	C118	ECEA1EK3R3	3.3 25
R574	ERD25F J1R0	1 1/4	R847	ERDS2T J561	560 1/4	C119	ECQM1H472JZ	0.0047 50
R575	ERX1ANJ100	1	R849	ERDS2T J332	3.9K 1/4	C120	ECQM1H472JZ	0.0047 50
R576	ERX1ANJ100	1	R851	ERD25F J392	3.9K 1/4	C151	ECCD1H820K	82P 50
R577	ERGS2J331	330 2	R852	ERD25F J392	3.9K 1/4	(EG, E1)		
R578	ERGS2J331	330 2	R853	ERD25F J392	3.9K 1/4	C152	ECCD1H820K	82P 50
R601	ERDS2T J153	15K 1/4	R854	ERD25F J392	3.9K 1/4	(EG, E1)		
R602	ERDS2T J153	15K 1/4	R855	ERD25F J272	2.7K 1/4	C153	ECCD1H330K	33P 50
R603	ERD25F J271	270 1/4	R856	ERD25F J272	2.7K 1/4	(EG, E1)		
R604	ERD25F J271	270 1/4	R857	ERDS2T J392	3.9K 1/4	C154	ECCD1H330K	33P 50
R605	ERD25F J472	4.7K 1/4	R858	ERDS2T J392	3.9K 1/4	(EG, E1)		
R606	ERD25F J472	4.7K 1/4	R859	ERD25F J472	4.7K 1/4	C155	ECCD1H100K	10P 50
R607	ERDS2T J473	47K 1/4	R860	ERD25F J472	4.7K 1/4	(EG, E1)		
R608	ERDS2T J563	56K 1/4	R861	ERD25F J182	1.8K 1/4	C156	ECCD1H100K	10P 50
R609	ERDS2T J153	15K 1/4	R862	ERD25F J182	1.8K 1/4	(EG, E1)		
R611	ERDS2T J102	1K 1/4	R863	ERD25F J182	1.8K 1/4	C157	ECCD1H181K	180P 50
R612	ERD25F J121	120 1/4	R864	ERD25F J182	1.8K 1/4	(EG, E1)		
R613	ERGANJ561	560 1	R865	ERD25F J392	3.9K 1/4	C158	ECCD1H181K	180P 50
R614	ERGANJ561	560 1	R866	ERD25F J392	3.9K 1/4	(EG, E1)		
R619	ERGS2ANJ221	220 2	R867	ERDS2T J333	33K 1/4	C159	ECCD1H181K	180P 50
(EK, XL)			R868	ERDS2T J333	33K 1/4	(EG, E1)		
R620	ERGS2ANJ221	220 2	R869	ERDS2T J824	820K 1/4	C160	ECCD1H181K	180P 50
(EK, XL)			R870	ERDS2T J824	820K 1/4	(EG, E1)		
R621	ERD2FCG560	56 1/4	R871	ERD25F J152	1.5K 1/4	C161	ECCD1H181K	180P 50
(EK, XL)			R872	ERD25F J152	1.5K 1/4	(EG, E1)		
R622	ERD2FCG560	56 1/4	R873	ERD25F J182	1.8K 1/4	C162	ECCD1H181K	180P 50
(EK, XL)			R874	ERD25F J182				

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
C324	ECEA1EK100	10 25	C557	ECQM1H473JZ	0.047 50	C802	ECFR1E104ZF	0.1 25
C325	ECEA1EK100	10 25	(E, EF, EI, EB)			C804	ECFR1E104ZF	0.1 25
C327	ECEA1EK3R3	3.3 25	(EH, EG, XA)			C806	ECFR1E104ZF	0.1 25
C328	ECEA1EK3R3	3.3 25	(PA, PE)			C808	ECEA0JPU101	100 6.3
C329	ECKD1H103PF	0.01 50	C558	ECQM1H104JZP	0.1 50	C809	ECKD1H103PF	0.01 50
C330	ECKD1H103PF	0.01 50	(EK, XL)			C810	ECFR1E104ZF	0.1 25
C331	ECCD1H101K	100P 50	C558	ECQM1H473JZ	0.047 50	C812	ECFR1E104ZF	0.1 25
C332	ECCD1H101K	100P 50	(E, EF, EI, EB)			C813	ECEA0JPU101	100 6.3
C333	ECKD1H821KB	820P 50	(EH, EG, XA)			C814	ECCD1H100KC	10P 50
C401	ECCD1H151K	150P 50	(PA, PE)			C815	ECCD1H100KC	10P 50
C402	ECCD1H151K	150P 50	C559	ECKD1H821KB	820P 50	C816	ECQM1H103JZ	0.01 50
C403	ECCD2H070D	7P 500	(EG, EI)			C817	ECFR1E104ZF	0.1 25
C404	ECCD2H070D	7P 500	C560	ECKD1H821KB	820P 50	C818	ECEA0JPU101	100 6.3
C405	ECCD2H560K	56P 500	(EG, EI)			C819	ECEA1HK010	1 50
C406	ECCD2H560K	56P 500	C561	ECKD1H821KB	820P 50	C820	ECEA1CKS100	10 16
C407	ECCD2H560K	56P 500	(EG, EI)			C821	ECFR1E104ZF	0.1 25
C408	ECCD2H560K	56P 500	C562	ECKD1H821KB	820P 50	C822	ECFR1E104ZF	0.1 25
C409	ECKD1H103PF	0.01 50	(EG, EI)			C823	ECKD1H103PF	0.01 50
C410	ECKD1H103PF	0.01 50	C563	ECQM1H103JZ	0.01 50	C824	ECFR1E104ZF	0.1 25
C411	ECEA1HK010	1 50	(EG, EI)			C825	ECFR1E104ZF	0.1 25
C412	ECEA1HK010	1 50	C564	ECQM1H103JZ	0.01 50	C826	ECFR1E104ZF	0.1 25
C413	ECEA1HK010	1 50	(EG, EI)			C827	ECFR1E104ZF	0.1 25
C414	ECEA1HK010	1 50	C565	ECQM1H103JZ	0.01 50	C828	ECEA0JPU101	100 6.3
C415	ECEA0JPS470	47 6.3	(EG, EI)			C833	ECFR1E104ZF	0.1 25
C416	ECEA0JPS470	47 6.3	C566	ECQM1H103JZ	0.01 50	C841	ECFR1E104ZF	0.1 25
C417	ECEA1HPS2R2	2.2 50	(EG, EI)			C853	ECQP2A103JSP	0.01 100
C418	ECEA1HPS2R2	2.2 50	C567	ECQM1H473JZ	0.047 50	C854	ECQP2A103JSP	0.01 100
C423	ECCD1H181K	180P 50	(EK, XL)			C857	ECQP1822FZ	0.0082 100
C424	ECCD1H181K	180P 50	C568	ECQM1H473JZ	0.047 50	C858	ECQP1822FZ	0.0082 100
C451	ECEA1EK100	10 25	(EK, XL)			C859	ECQP1102JZ	0.001 100
C453	ECEA1EK100	10 25	C601	ECEA0JS331	330 6.3	C860	ECQP1102JZ	0.001 100
C455	ECEA1EK100	10 25	C602	ECEA0JK470	47 6.3	C861	ECEA1CPN470E	47 16
C457	ECEA1EK100	10 25	C603	ECEA1EK470	4.7 25	C862	ECEA1CPN470E	47 16
C459	ECEA2AU010	1 100	C604	ECKD1H223PF	0.022 50	C863	ECQP1392JZ	0.0039 100
C501	ECQM1H822JZ	0.0082 50	C606	ECEA1CU222	2200 16	C864	ECQP1392JZ	0.0039 100
C502	ECQM1H822JZ	0.0082 50	C607	ECKD2H103PE	0.01 500	C865	ECQP2A271JSP	270P 100
C503	ECKD1H102KB	0.001 50	(E, EF, EI, EB)			C866	ECQP2A271JSP	270P 100
C504	ECKD1H102KB	0.001 50	(EH, EG, XA)			C867	ECQP2A271JSP	270P 100
C505	ECKD1H103PF	0.01 50	(PA, PE)			C868	ECQP2A271JSP	270P 100
C506	ECKD1H103PF	0.01 50	C607	ECQE2104KS	0.1 250	C869	ECEA0JPN221E	220 6.3
C507	ECKD1H103PF	0.01 50	(EG, EI)			C870	ECEA0JPN221E	220 6.3
C508	ECKD1H103PF	0.01 50	C609	ECET71V123XM	12000 71	C901	ECEA0JPU101	100 6.3
C509	ECEA0JPS101	100 6.3	C610	ECET71V123XM	12000 71	C902	ECEA0JPU101	100 6.3
C510	ECEA0JPS101	100 6.3	C617	ECEA1EK3R3	3.3 25	C903	ECEA0JPU101	100 6.3
C511	ECEA0JPS101	100 6.3	C618	ECEA1EK100	10 25	C904	ECEA0JPU101	100 6.3
C512	ECEA0JPS101	100 6.3	C619	ECEA2APS010	1 100	C905	ECEA1CKS100	10 16
C513	ECKD1H103PF	0.01 50	C620	ECEA2APS010	1 100	C906	ECEA1CKS100	10 16
C514	ECKD1H103PF	0.01 50	C621	ECKD1H333PF	0.033 50	C911	ECEA1APS101E	100 10
C515	ECKD1H103PF	0.01 50	C623	ECKD1H333PF	0.033 50	C912	ECEA1APS101E	100 10
C516	ECKD1H103PF	0.01 50	C681	ECEA1CPU472E	4700 16	C913	ECEA1APS101E	100 10
C551	ECKT2H181KB	180P 500	C682	ECEA1CPU472E	4700 16	C914	ECEA1APS101E	100 10
C552	ECKT2H181KB	180P 500	C701	ECEA0JU222	2200 6.3	C915	ECEA1APS101E	100 10
C553	ECKT2H181KB	180P 500	C702	ECKD1H221KB	220P 50	C916	ECEA1APS101E	100 10
C554	ECKT2H181KB	180P 500	C703	ECKD1H221KB	220P 50	C917	ECEA1APS101E	100 10
C555	ECKD1H103PF	0.01 50	C704	ECEA1EK100	10 25	C918	ECEA1APS101E	100 10
C556	ECKD1H103PF	0.01 50	C705	ECKD1H103PF	0.01 50	C919	ECEA0JPS101	100 6.3
C557	ECQM1H104JZP	0.1 50	C706	ECEA0JU101	100 6.3	C920	ECEA0JPS101	100 6.3
(EK, XL)			C708	ECKD1H103PF	0.01 50	C921	ECEA0JPS101	100 6.3
						C922	ECEA0JPS101	100 6.3