

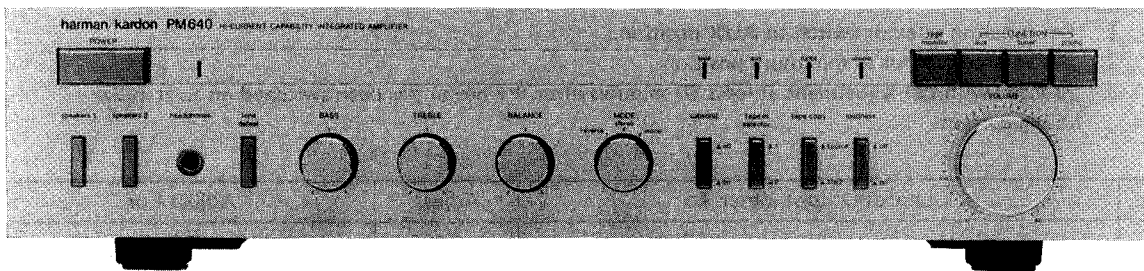
The Harman Kardon Model PM640

Manual No. 21A

HI-CURRENT CAPABILITY INTEGRATED AMPLIFIER

Technical Manual

PM640



harman/kardon

240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797
PRINTED IN JAPAN 1112-H15221A3 P-07817

CONTENTS

SPECIFICATIONS	2	GENERAL UNIT EXPLODED VIEW	8,9
ALIGNMENT PROCEDURES	2	GENERAL UNIT PARTS LIST	10
COMPONENTS AND THEIR FUNCTIONS		ELECTRICAL PARTS LIST	10-13
FRONT PANEL	3,4	PACKAGE	14
REAR PANEL	5	SCHEMATIC DIAGRAM	15
DISASSEMBLY PROCEDURES	6,7	WIRING DIAGRAM	16

SPECIFICATIONS

R.S.M. POWER OUTPUT: 35 W (0.1%)
 FREQUENCY RESPONSE: 1 Hz-120 kHz (-3 dB)
 IM DISTORTION: less than 0.2%
 SLEW RATE: 80 V/u sec.
 OVERALL NEGATIVE FEEDBACK: 17 dB
 S/N (IHF, A) PHONO: 78 dB
 AUX: 80 dB

PHONO OVERLOAD: more than 140 mV at 1 kHz
 POWER SUPPLY: AC120 V, 60 Hz
 DIMENSIONS: 440 (W) x 90 (H) x 320 (D) mm
 WEIGHT: 6.4 kg

Specifications and components subject to change without notice
 Overall performance will be maintained or improved.

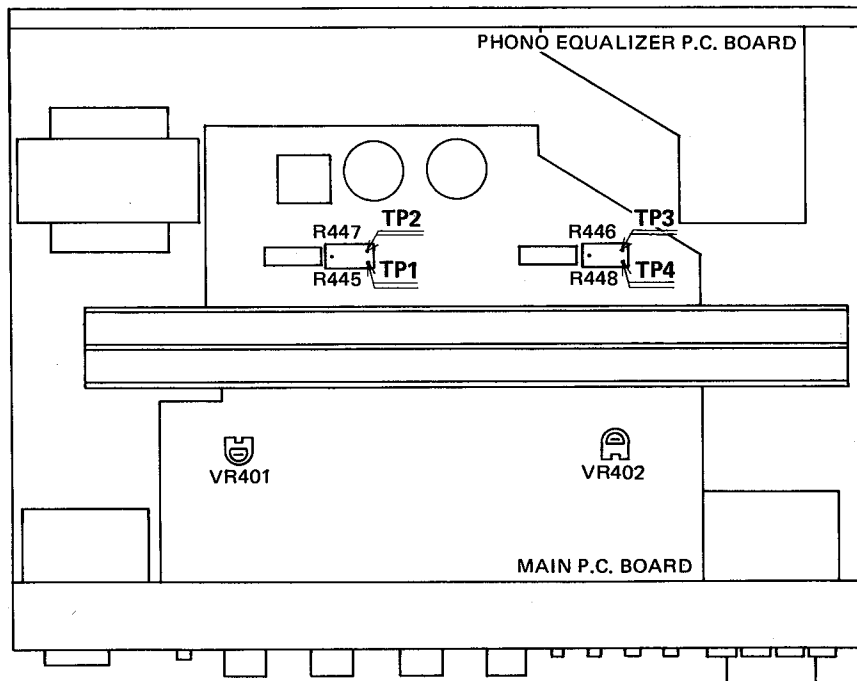
ALIGNMENT PROCEDURE

IDLING CURRENT ADJUSTMENT

Instrument: DC Voltmeter

- Notes:
1. Set function selector switch to AUX position.
 2. Set volume control to minimum position.
 3. Proceed with the adjustment at least 20 minutes after the power has been switched on to stabilize idling current.

Step	Connect Output Meter To	Adjust	Adjust For
1	DC voltmeter to TP1 (+) and TP2 (-)	VR401	33 mV on DC voltmeter
2	DC voltmeter to TP3 (+) and TP4 (-)	VR402	Same as above



Alignment Points Location

PM640

COMPONENTS AND THEIR FUNCTIONS

FRONT PANEL

TONE DEFEAT SWITCH (tone defeat)

For defeating tone control by TONE CONTROL knobs (BASS, TREBLE).
At the depressed position, flat frequency characteristic is obtained irrespective of TONE CONTROL knob positions.

POWER INDICATOR

For indication of power supply to the unit. This indicator illuminates when the POWER switch is pressed to turn on the power.

POWER SWITCH (POWER)

For power on and off.
When this switch is pressed after AC cord connection to an outlet, the POWER indicator illuminates. Press this switch again to turn the power off.

SPEAKER SELECTORS (speakers 1, speakers 2)

For selection of speakers to be sounded.
2 speaker systems can be connected to this unit. When listening to speaker sound, depress the corresponding selector. To sound both speaker systems, depress both switches. Release the switch for listening with headphones only.

STEREO HEADPHONES JACK (headphones)

For connection of stereo headphones.
Output signal is always supplied to this jack.

MODE SELECTOR (MODE)

MONO position:
Select this position for a monaural source program.
STEREO position:
Select this position for stereo playback, reception or recording.
REVERSE position:
Select this position to reverse the right and left channel signals.

SUBSONIC FILTER SWITCH (subsonic)

When depressed, the subsonic filter is validated to prevent distortion resulting from turntable rumble and speaker damage caused by superlow tones.

TAPE IN SELECTOR SWITCH (tape in selector)

"1" position:
Select this position to monitor the tape deck connected to TAPE 1 INPUT jacks.
"2" position:
Select this position to monitor the tape deck connected to TAPE 2 INPUT jacks.

BASS CONTROL KNOB (BASS)

For emphasis or attenuation of low-pitched tone. Turn it clockwise for emphasis, or counterclockwise for attenuation.

TREBLE CONTROL KNOB (TREBLE)

For emphasis or attenuation of high-pitched tone. Turn it clockwise for emphasis, or counterclockwise for attenuation.

BALANCE CONTROL KNOB (BALANCE)

For balance adjustment between left and right channels. Normally place it at the center position.

TAPE MONITOR INDICATOR (tape)

For indication of tape monitoring. This indicator illuminates when the TAPE MONITOR switch is pressed to monitor the tape sound.

FUNCTION INDICATORS (aux/tuner/phono)

For indication of the source selected by any of the FUNCTION selector (AUX, TUNER or PHONO).

FUNCTION SELECTORS (FUNCTION)

AUX switch:
Press this switch to listen to the program source connected to the AUX INPUT jacks.
TUNER switch:
Press this switch to listen to an AM or FM broadcasting program.
PHONO switch:
Press this switch to listen to the record played on the turntable.

VOLUME CONTROL KNOB (VOLUME)

For increase/decrease of the sound volume. Clockwise turn increases the sound volume, and counterclockwise turn decreases it. Set this knob at a minimum level before turning the power on to prevent speaker from being damaged by a sudden booming sound.

TAPE MONITOR SWITCH (tape monitor)

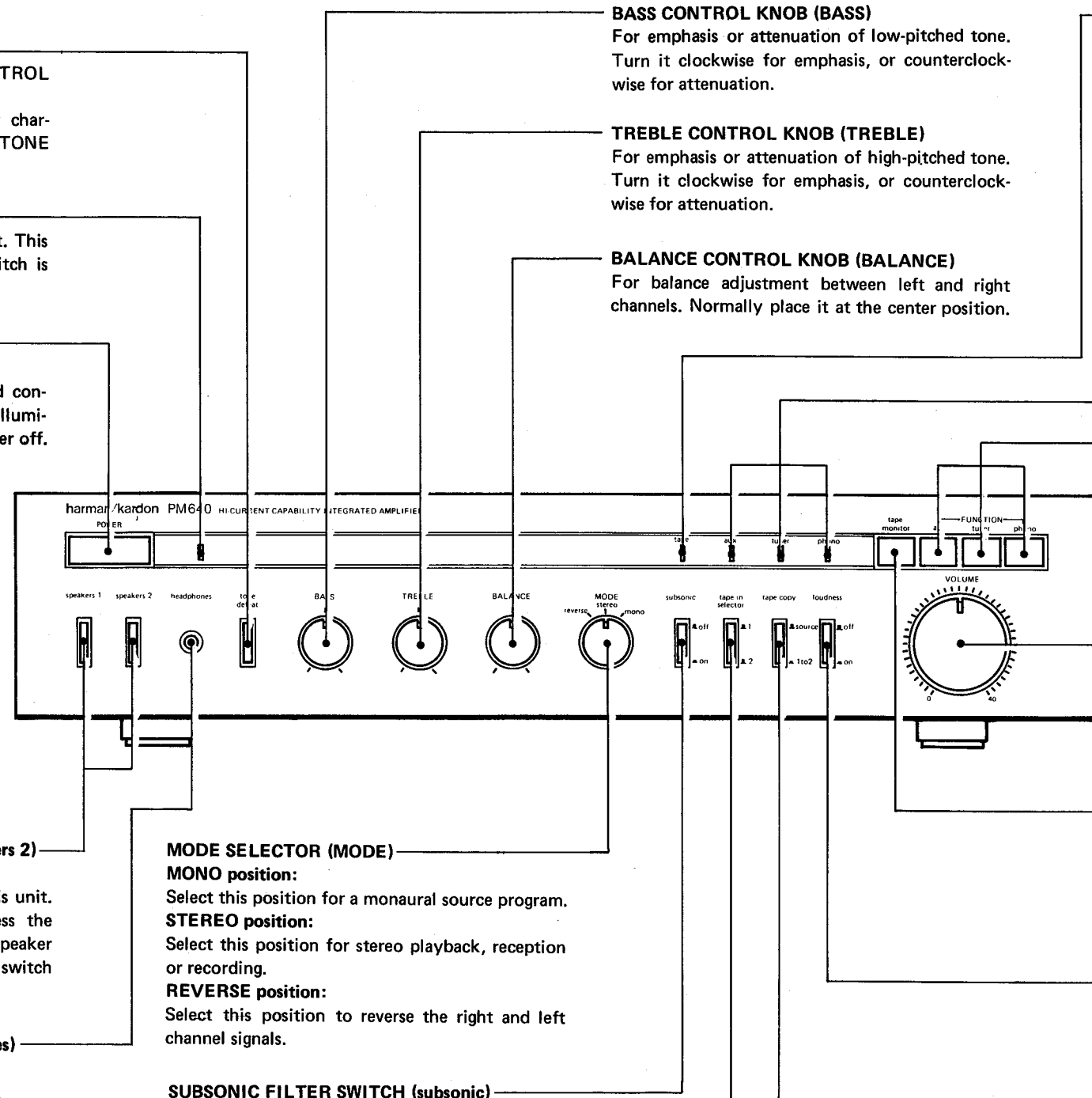
For monitoring the tape deck selected by the TAPE IN SELECTOR switch. When this switch is pressed, the MONITOR indicator illuminates. Press this switch again to stop monitoring.

LOUDNESS SWITCH (loudness)

For emphasis of the low and high frequency ranges to enable impressive reproduction when listening at a low sound volume.

TAPE COPY SWITCH (tape copy)

SOURCE position:
Use this position to record the source selected by the FUNCTION selector (AUX, TUNER or PHONO).
1 TO 2 position:
For tape copying between two tape decks connected to this unit. This position also enables equalized recording if an equalizer is connected to TAPE 1 INPUT/OUTPUT jacks. See Special Operation for details.



COMPONENTS AND THEIR FUNCTIONS

FRONT PANEL

TONE DEFEAT SWITCH (tone defeat)

For defeating tone control by TONE CONTROL knobs (BASS, TREBLE).

At the depressed position, flat frequency characteristic is obtained irrespective of TONE CONTROL knob positions.

POWER INDICATOR

For indication of power supply to the unit. This indicator illuminates when the POWER switch is pressed to turn on the power.

POWER SWITCH (POWER)

For power on and off.

When this switch is pressed after AC cord connection to an outlet, the POWER indicator illuminates. Press this switch again to turn the power off.

SPEAKER SELECTORS (speakers 1, speakers 2)

For selection of speakers to be sounded.

2 speaker systems can be connected to this unit. When listening to speaker sound, depress the corresponding selector. To sound both speaker systems, depress both switches. Release the switch for listening with headphones only.

STEREO HEADPHONES JACK (headphones)

For connection of stereo headphones.

Output signal is always supplied to this jack.

MODE SELECTOR (MODE)

MONO position:

Select this position for a monaural source program.

STEREO position:

Select this position for stereo playback, reception or recording.

REVERSE position:

Select this position to reverse the right and left channel signals.

SUBSONIC FILTER SWITCH (subsonic)

When depressed, the subsonic filter is validated to prevent distortion resulting from turntable rumble and speaker damage caused by superlow tones.

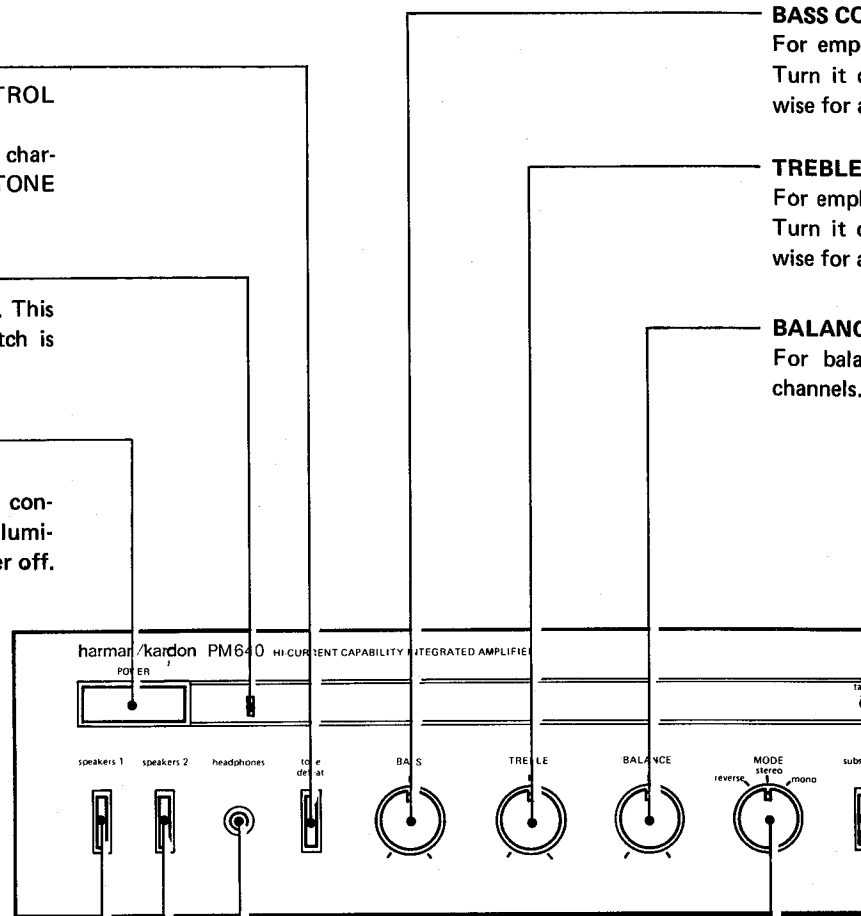
TAPE IN SELECTOR SWITCH (tape in selector)

"1" position:

Select this position to monitor the tape deck connected to TAPE 1 INPUT jacks.

"2" position:

Select this position to monitor the tape deck connected to TAPE 2 INPUT jacks.



BASS CO

For emp
Turn it
wise for a

TREBLE

For emp
Turn it
wise for a

BALANCE

For bala
channels.

BASS CONTROL KNOB (BASS)
 For emphasis or attenuation of low-pitched tone. Turn it clockwise for emphasis, or counterclockwise for attenuation.

TREBLE CONTROL KNOB (TREBLE)
 For emphasis or attenuation of high-pitched tone. Turn it clockwise for emphasis, or counterclockwise for attenuation.

BALANCE CONTROL KNOB (BALANCE)
 For balance adjustment between left and right channels. Normally place it at the center position.

TAPE MONITOR INDICATOR (tape)
 For indication of tape monitoring. This indicator illuminates when the TAPE MONITOR switch is pressed to monitor the tape sound.

FUNCTION INDICATORS (aux/tuner/phono)
 For indication of the source selected by any of the FUNCTION selector (AUX, TUNER or PHONO).

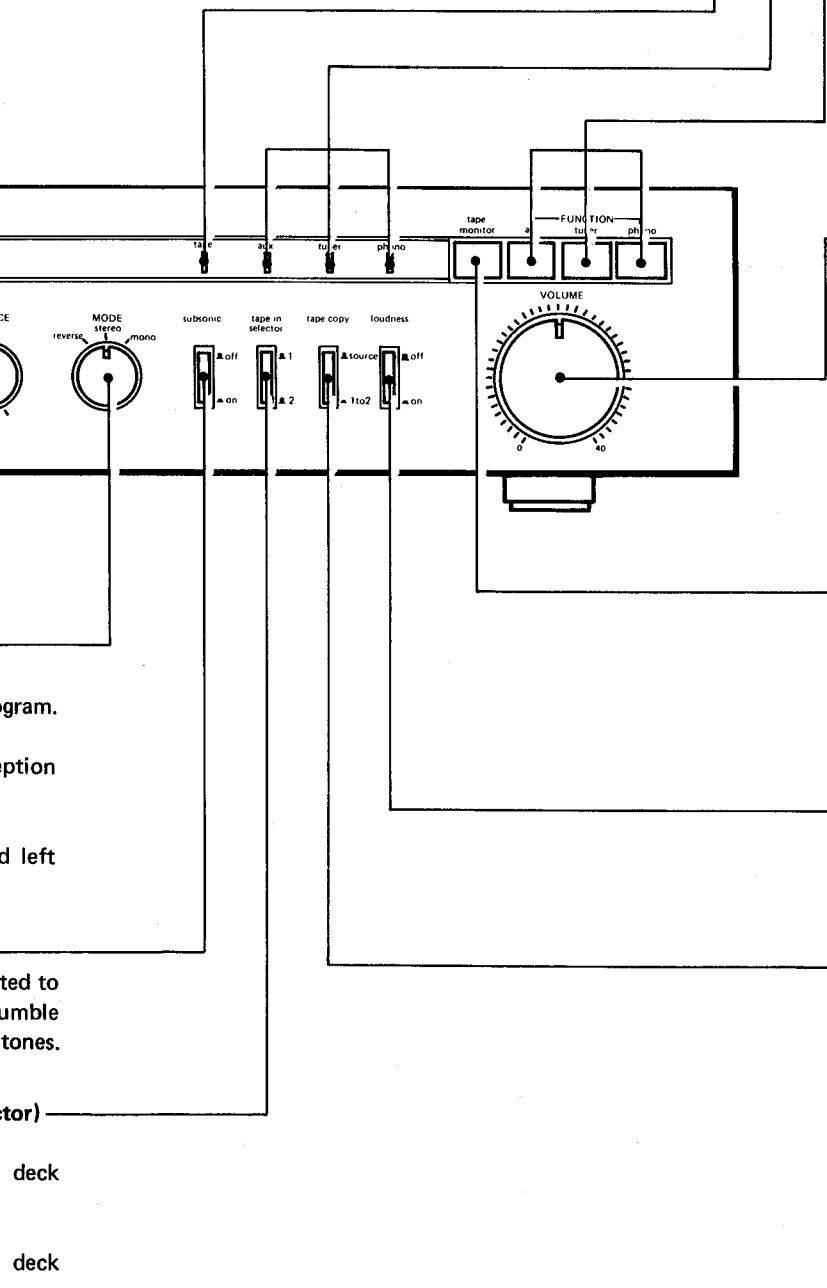
FUNCTION SELECTORS (FUNCTION)
AUX switch:
 Press this switch to listen to the program source connected to the AUX INPUT jacks.
TUNER switch:
 Press this switch to listen to an AM or FM broadcasting program.
PHONO switch:
 Press this switch to listen to the record played on the turntable.

VOLUME CONTROL KNOB (VOLUME)
 For increase/decrease of the sound volume. Clockwise turn increases the sound volume, and counterclockwise turn decreases it. Set this knob at a minimum level before turning the power on to prevent speaker from being damaged by a sudden booming sound.

TAPE MONITOR SWITCH (tape monitor)
 For monitoring the tape deck selected by the TAPE IN SELECTOR switch. When this switch is pressed, the MONITOR indicator illuminates. Press this switch again to stop monitoring.

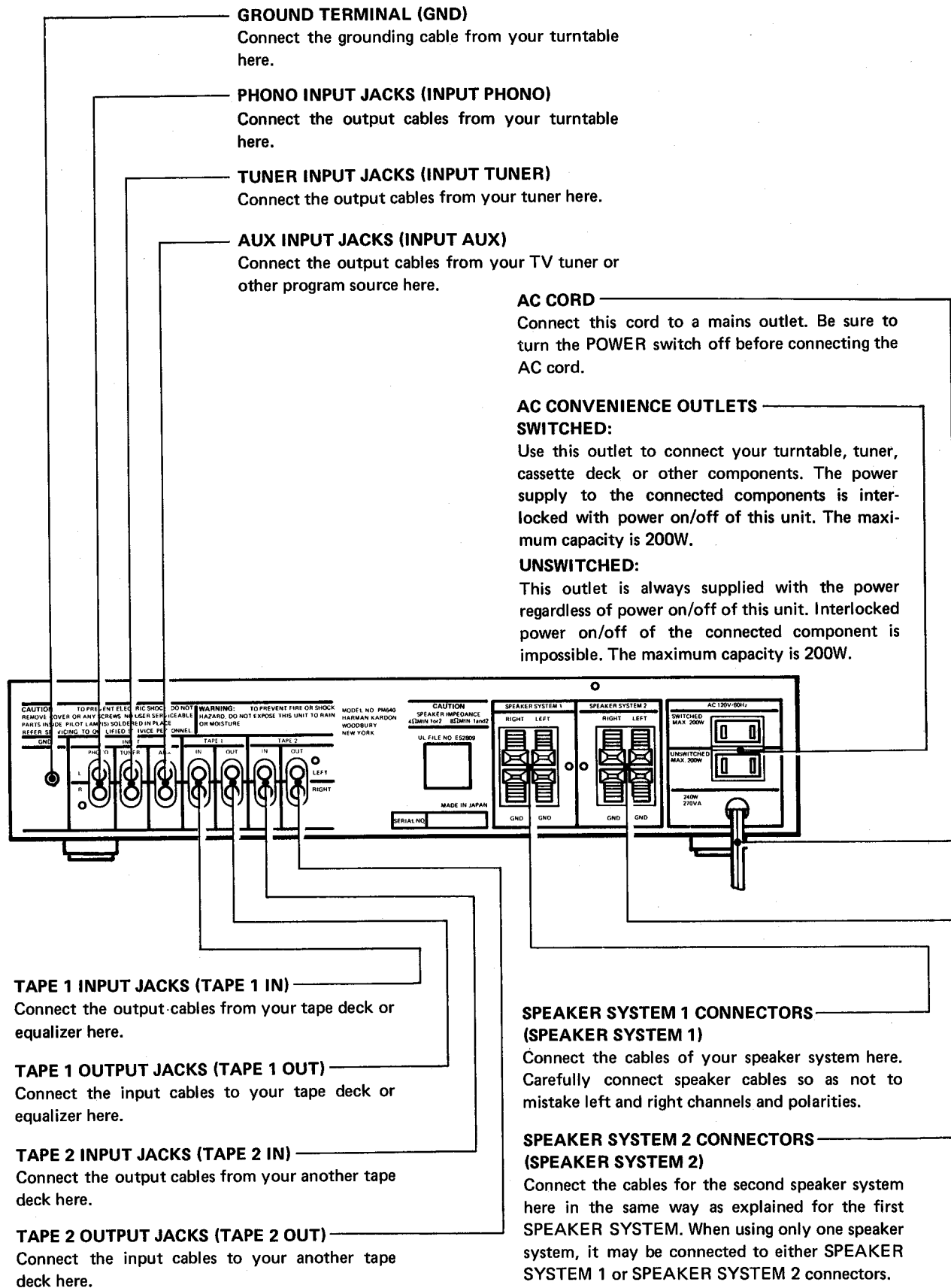
LOUDNESS SWITCH (loudness)
 For emphasis of the low and high frequency ranges to enable impressive reproduction when listening at a low sound volume.

TAPE COPY SWITCH (tape copy)
SOURCE position:
 Use this position to record the source selected by the FUNCTION selector (AUX, TUNER or PHONO).
1 TO 2 position:
 For tape copying between two tape decks connected to this unit. This position also enables equalized recording if an equalizer is connected to TAPE 1 INPUT/OUTPUT jacks. See Special Operation for details.



COMPONENTS AND THEIR FUNCTIONS

REAR PANEL



DISASSEMBLY PROCEDURES

CABINET TOP REMOVAL (Fig. 1)

1. Remove 6 black colored screws ① to ⑥ fixing cabinet top.
2. Slide the cabinet top backward gradually to remove.

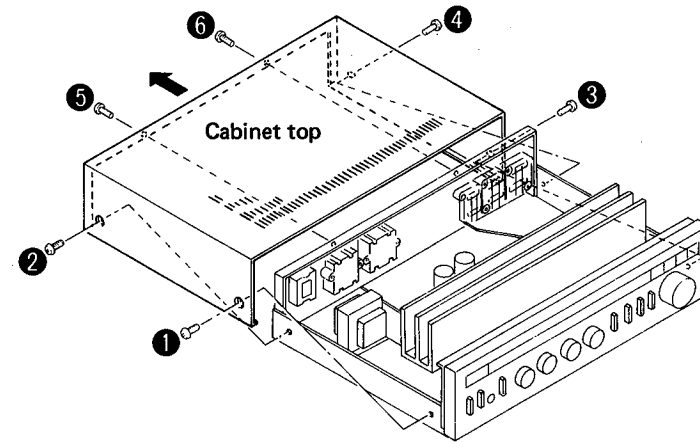


Fig. 1

CABINET BOTTOM ASSEMBLY REMOVAL (Fig. 2)

3. Remove 7 screws ⑦ to ⑬ from the cabinet bottom and remove the cabinet bottom assembly.

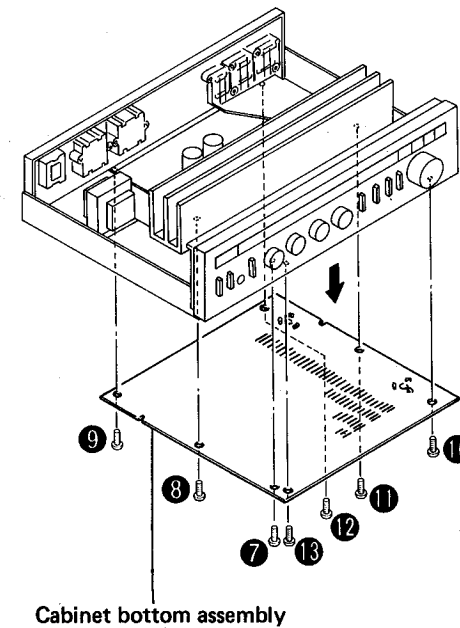


Fig. 2

COMPONENTS AND THEIR FUNCTIONS

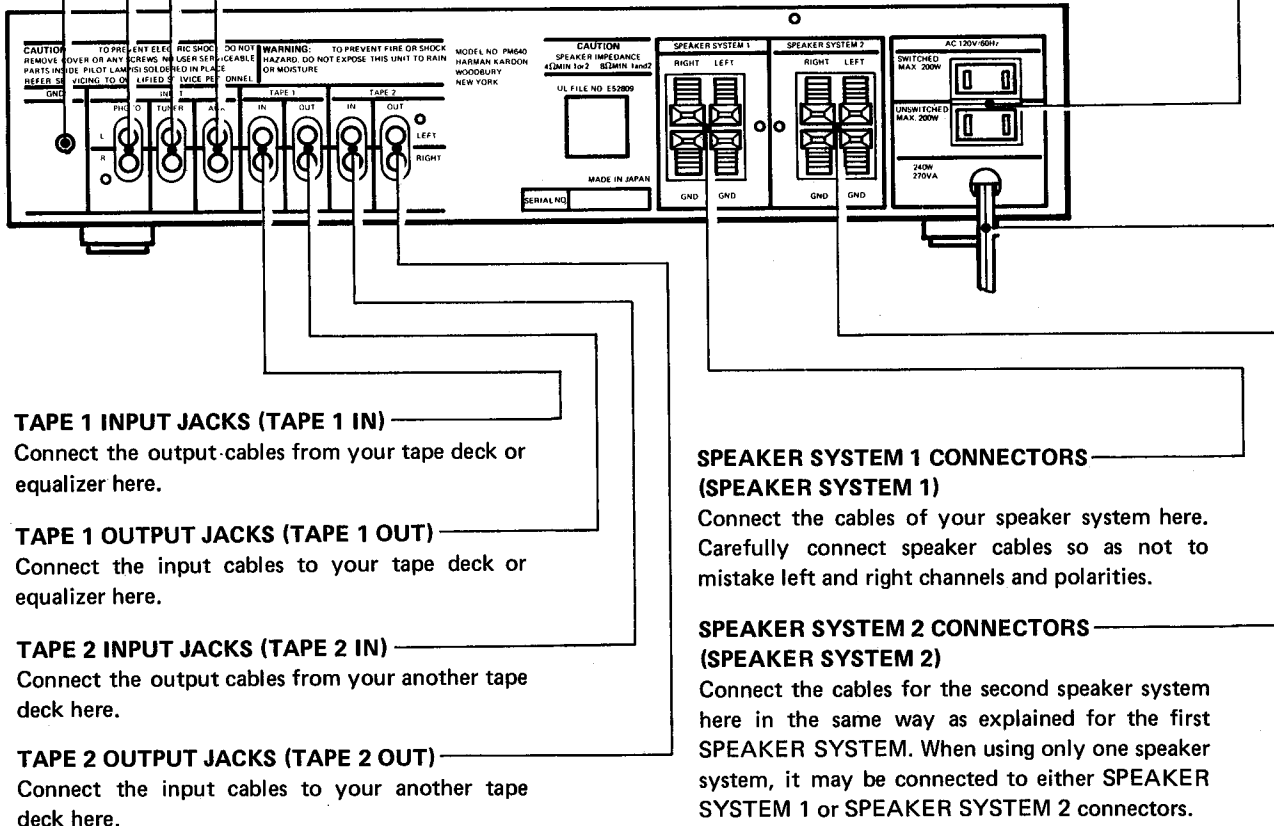
REAR PANEL

- GROUND TERMINAL (GND)**
Connect the grounding cable from your turntable here.
- PHONO INPUT JACKS (INPUT PHONO)**
Connect the output cables from your turntable here.
- TUNER INPUT JACKS (INPUT TUNER)**
Connect the output cables from your tuner here.
- AUX INPUT JACKS (INPUT AUX)**
Connect the output cables from your TV tuner or other program source here.

AC CORD
Connect this cord to a mains outlet. Be sure to turn the POWER switch off before connecting the AC cord.

AC CONVENIENCE OUTLETS SWITCHED:
Use this outlet to connect your turntable, tuner, cassette deck or other components. The power supply to the connected components is interlocked with power on/off of this unit. The maximum capacity is 200W.

UNSWITCHED:
This outlet is always supplied with the power regardless of power on/off of this unit. Interlocked power on/off of the connected component is impossible. The maximum capacity is 200W.



DISAS

CABINE

1. R
2. S

CABIN

3. R

DISASSEMBLY PROCEDURES

CABINET TOP REMOVAL (Fig. 1)

1. Remove 6 black colored screws ① to ⑥ fixing cabinet top.
2. Slide the cabinet top backward gradually to remove.

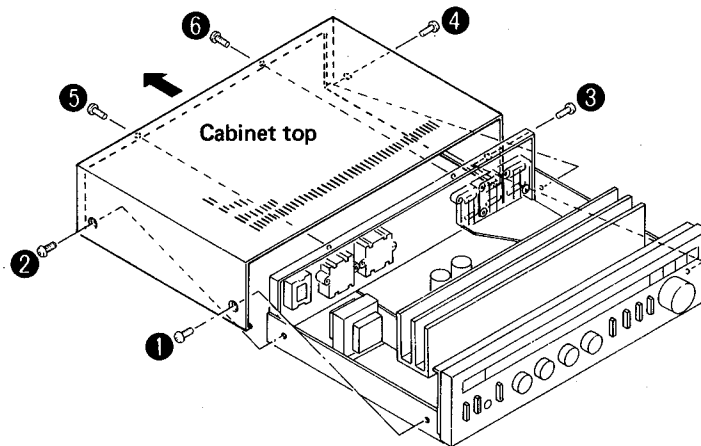


Fig. 1

CABINET BOTTOM ASSEMBLY REMOVAL (Fig. 2)

3. Remove 7 screws ⑦ to ⑬ from the cabinet bottom and remove the cabinet bottom assembly.

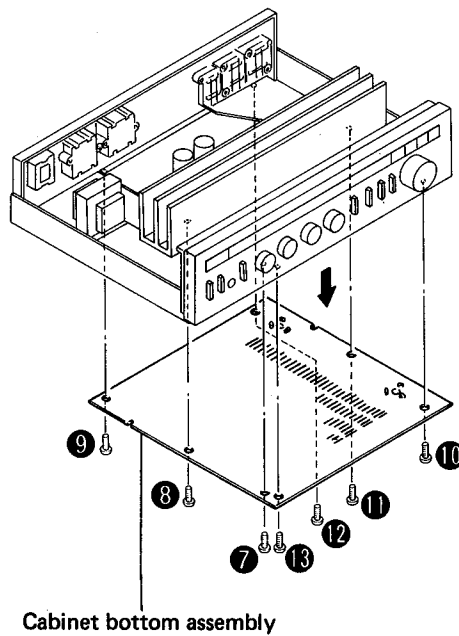


Fig. 2

FRONT PANEL ASSEMBLY REMOVAL (Fig. 3)

4. Complete steps 1 and 2.
5. Pull off the Volume knob.
6. Remove 6 screws 14 to 19 fixing front panel assembly.
7. Pull the front panel assembly toward you to remove.

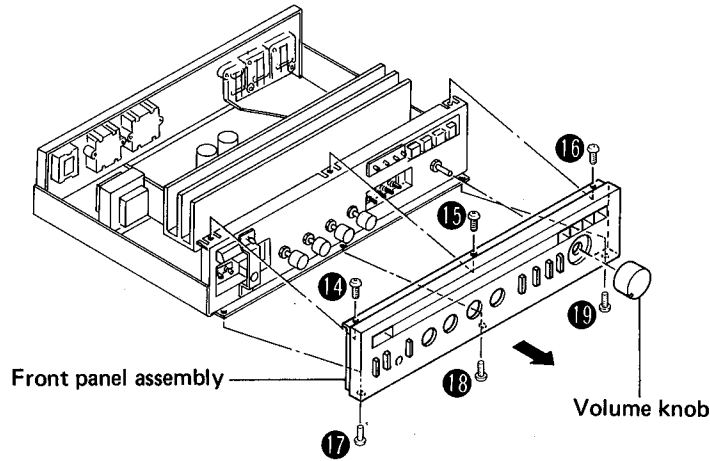


Fig. 3

MAIN P.C. BOARD ASSEMBLY REMOVAL (Fig. 4)

8. Complete steps 4 through 7.
9. Pull off the Bass, Treble, Balance and Mode selector knobs.
10. Remove 5 nuts fixing Bass, Treble, Balance and Volume controllers and Mode switch.
11. Remove 2 screws 20 and 21 fixing Tone Defeat switch and remove 2 screws 22 and 23 fixing Subsonic, Tape In Selector, Tape Copy and Loudness switches.
12. Remove 1 screw 24 fixing lug.
13. Remove 2 screws 25 and 26 fixing main P.C. board on the chassis.
14. Remove 4 screws 27 to 30 fixing heat sink.
15. Lift up rear side of main P.C. board to prevent touch the heat sink to power transformer and then take out the P.C. board by sliding the backward. Remove the lead wires, if necessary.

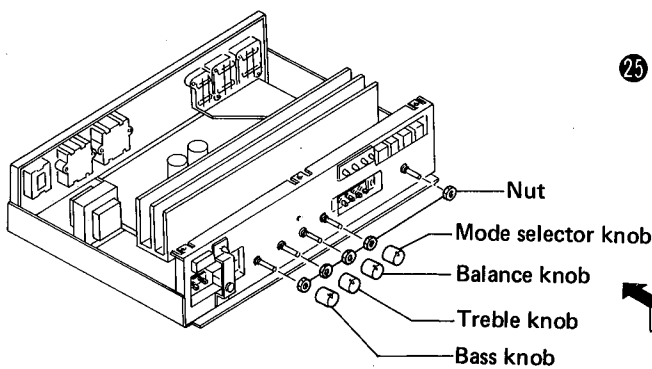


Fig. 4-1

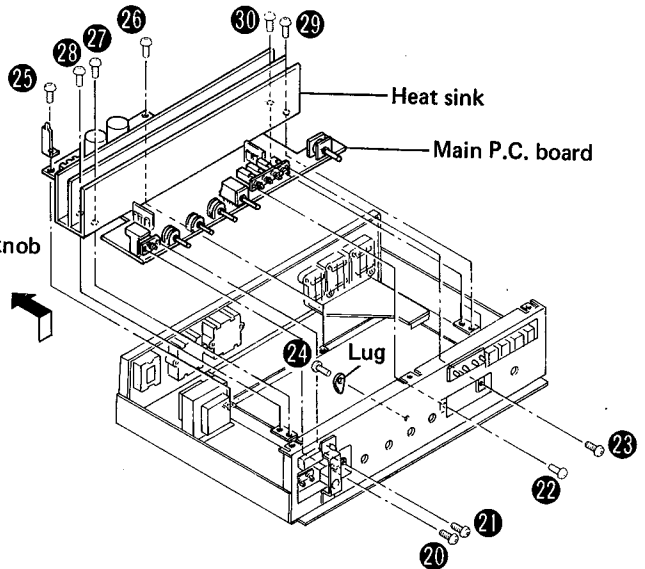
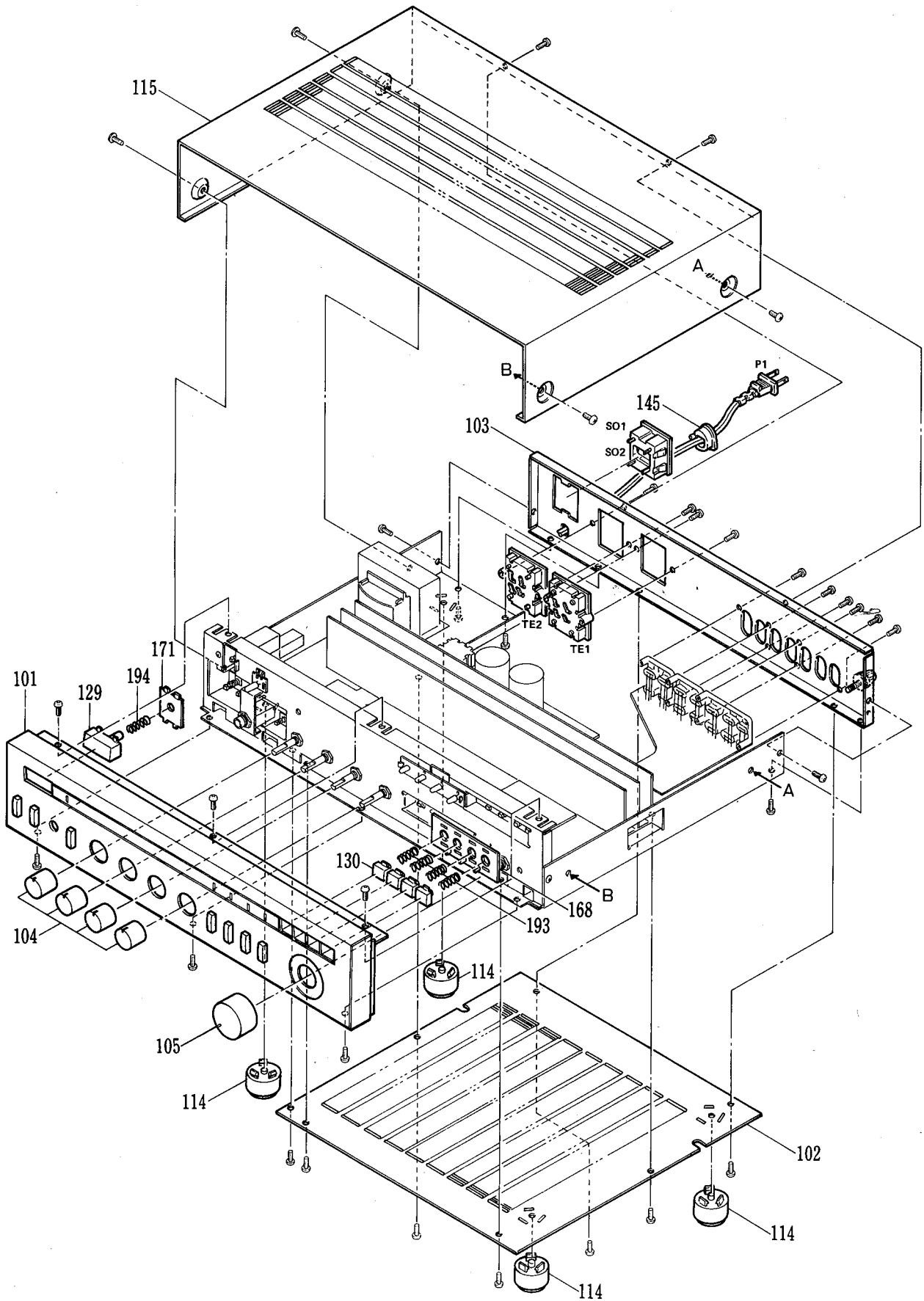
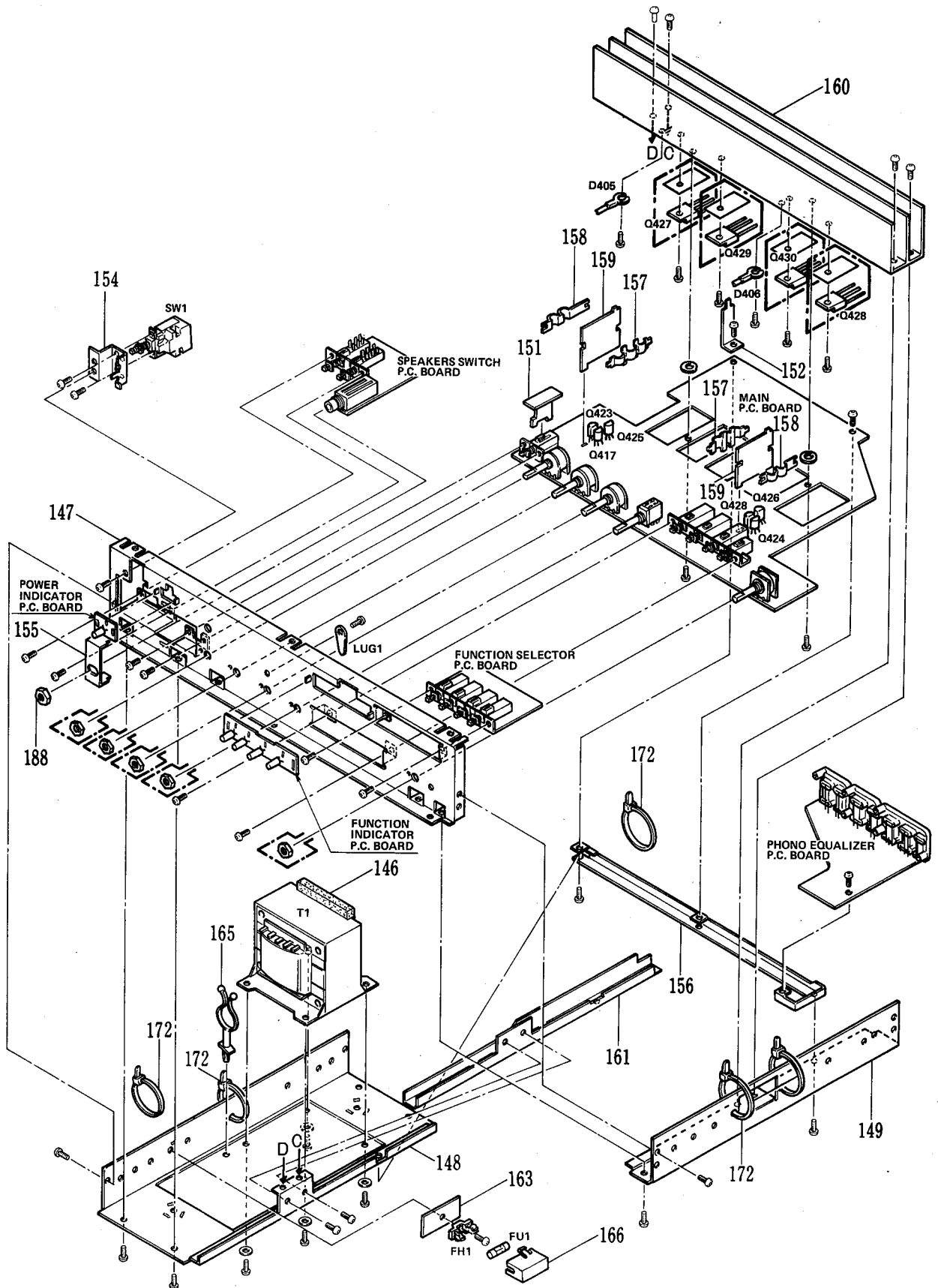


Fig. 4-2

GENERAL UNIT EXPLODED VIEW



GENERAL UNIT EXPLODED VIEW



GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-PM640	Front Panel Assembly
102	A423-PM640	Cabinet Bottom Assembly
103	A424-PM640	Cabinet Back Assembly
104	A630-PM640-A	Knob Assembly, Bass, Treble, Balance, Mode
105	A630-PM640-B	Knob Assembly, Volume
114	1319-0139	Foot
115	1414-02301	Cabinet Top
129	1662-08001BW	Push Button, Power
130	1662-08101BW	Push Button, Tape Monitor, AUX, Tuner, Phono
145	2114-415027	Bushing
146	2112-11726	Protector
147	2211-7216	Chassis
148	2211-7217	Chassis
149	2211-7218	Chassis
151	2216-7120	Shield Plate, Main P.C. board
152	2218-7011	Holding Bracket
154	2219-7782	Bracket
155	2219-7786	Bracket
156	2219-7796	Bracket
157	2222-7100	Heat Sink
158	2222-7101	Heat Sink
159	2222-7103	Heat Sink
160	2222-7121	Heat Sink
161	2219-7820	Bracket
163	2224-7061	Insulator
165	2240-7050	Holder
166	2240-7118	Protector
168	2240-7167	Holder
171	2240-7173	Holder
172	2240-7120	Holder
188	2440-61	Special Nut
193	2651-210195	Spring
194	2651-210196	Spring

ELECTRICAL PARTS LIST

MAIN P.C. BOARD

RESISTORS

R11,12,427, 428,429,430	5102-8204713	82 Ω , \pm 2%, 1/4W, Fuse
R445/447,446/448 R449,450	5273-R22672 5175-220571	0.22 Ω , \pm 10%, 3W x 2, Cement (Special Dual) 22 Ω , \pm 5%, 3W, Metal

CONTROLS

VR401,402	5101-10271920	1 k Ω (B)
VR501	5113-1048122	100 k Ω (C), Bass Control
VR502	5113-50383122	50 k Ω (C), Treble Control
VR503	5113-50381122	50 k Ω (M, N), Balance Control
VR504	5113-1047612	100 k Ω (B), Volume Control

Ref. No.	Part No.	Description
CAPACITORS		
C4,5	5341-808Y0351	8000 uF, ± 20%, 45V, Electrolytic
C6	5345-107D041	100 uF, +50% -10%, 25V, Electrolytic
C7	5345-106-16	10 uF, +50% -10%, 16V, Electrolytic
C8	5345-476C0211	47 uF, ± 20%, 16V, Electrolytic
C401,402	5345-226F0228	22 uF, ± 20%, 50V, Electrolytic
C405,406	5359-1015851	100 pF, ± 5%, 100V, Polypropylene
C409,410	5345-106F0226	10 uF, ± 20%, 50V, Electrolytic
C411,412	5345-107F041	100 uF, +50% -10%, 50V, Electrolytic
C417,418	5353-010934	1 pF, ± 0.5 pF, 500V, Mica
C419	5345-226-16	22 uF, +50% -10%, 16V, Electrolytic
C420	5345-104F0212	0.1 uF, ± 20%, 50V, Electrolytic
C505,506	5359-1815851	180 pF, ± 5%, 100V, Polypropylene
C507,508	5345-105F0226	1 uF, ± 20%, 50V, Electrolytic
C517,518	5345-227B0226	220 uF, ± 20%, 10V, Electrolytic
C519,520	5345-107-16	100 uF, +50% -10%, 16V, Electrolytic
C521,522	5359-2215851	220 pF, ± 5%, 100V, Polypropylene
TRANSISTORS		
Q1,2	5611-1115(E)	2SA1115(E)or(F), Muting, Voltage Regulator
Q401,403	5613-2240(BL)	2SC2240(BL)
Q405,409	5613-2603(E)	2SC2603(E)or(F)
Q407	5611-992(F)	2SA992(F)
Q411	5611-1115(E)	2SA1115(E)or(F)
Q413,425	5612-647A(C)	2SB647A(C)
Q415,423	5614-667A(C)	2SD667A(C)
Q417	5613-945(K)	2SC945(K)or(P)
Q427	5613-2581(Y)	2SC2581(Y)or(P)or(O)
Q429	5611-1106(Y)	2SA1106(Y)or(P)or(O)
Q402,404	5613-2240(BL)	2SC2240(BL)
Q406,410	5613-2603(E)	2SC2603(E)or(F)
Q408	5611-992(F)	2SA992(F)
Q412	5611-1115(E)	2SA1115(E)or(F)
Q414,426	5612-647A(C)	2SB647A(C)
Q416,424	5614-667A(C)	2SD667A(C)
Q418	5613-945(K)	2SC945(K)or(P)
Q428	5613-2581(Y)	2SC2581(Y)or(P)or(O)
Q430	5611-1106(Y)	2SA1106(Y)or(P)or(O)
DIODES		
D1	5685-D5FB20F1	Bridge Silicon, D5FB20
D4,5	5636-1S2471	1S2471
D6	5635-RD10EB3	Zener, RD10EB3
D7	5636-1S2472	1S2472
D401,402	5636-1S2473	1S2473
D403	5635-RD13EB2	Zener, RD13EB2
D405,406	5641-MV12YM	Varistor, MV12YM
COILS		
L401,402	5991-7125	Coil, RF Choke
L403,404,405,406	5597-35502	Ferrite Bead
MISCELLANEOUS		
FU2,3	5732-502028	Fuse, 5A 125V
CB401,402	45361-252014	Speaker Protector
SW501	4431-01048494	Push Switch, Tone Defeat
SW502	4411-403711	Rotary Switch, Mode
SW503,504,505,506	4431-04147857	Push Switch, Subsonic, Tape In Selector, Tape Copy, Loudness

Left Channel Power Amp.

Right Channel Power Amp.

Ref. No.	Part No.	Description
MISCELLANEOUS		
JM501	4242-030012	Jumper Lead, 3-Wire
	4472-7113	Fuse Holder
	2132-7048	Spacer, R417,R418
	2132-7049	Spacer, R449,R450

PHONO EQUALIZER P.C. BOARD

RESISTORS		
R613,614	5174-821381	820 Ω , \pm 1%, 1/4W, Metal
R615,616	5174-102381	1 k Ω , \pm 1%, 1/4W, Metal
R621,622	5174-624381	620 k Ω , \pm 1%, 1/4W, Metal
R623,624	5174-Z412228	41.2 k Ω , \pm 0.5%, 1/4W, Metal

CAPACITORS		
C9,10	5345-476-25	47 μ F, +50% -10%, 25V, Electrolytic
C11	5345-107-25	100 μ F, +50% -10%, 25V, Electrolytic
C601,602	5345-336F0228	33 μ F, \pm 20%, 50V, Electrolytic
C603,604	5359-1215851	120 pF, \pm 5%, 100V, Polypropylene
C605,606	5345-477B0228	470 μ F, \pm 20%, 10V, Electrolytic
C609,610,615,616	5359-2025851	2000 pF, \pm 5%, 100V, Polypropylene
C611,612	5345-106F0228	10 μ F, \pm 20%, 50V, Electrolytic
C613	5345-106-16	10 μ F, +50% -10%, 16V, Electrolytic
C617,618	5345-227-25	220 μ F, +50% -10%, 25V, Electrolytic

TRANSISTORS		
Q3	5614-667(C)	2SD667(C), Voltage Regulator
Q4	5612-647(C)	2SB647(C), Voltage Regulator
Q601	5613-2320L(F)	2SC2320L(F)or(G)
Q603	5611-999L(E)	2SA999L(E)or(F)
Q605,607	5611-1115(E)	2SA1115(E)or(F)
Q609	5613-2603(E)	2SC2603(E)or(F)
Q602	5613-2320L(F)	2SC2320L(F)or(G)
Q604	5611-999L(E)	2SA999L(E)or(F)
Q606,608	5611-1115(E)	2SA1115(E)or(F)
Q610	5613-2603(E)	2SC2603(E)or(F)

DIODES		
D2,3	5635-RD20EB3	Zener, RD20EB3
D601	5635-RD5R1EB2	Zener, RD5.1EB2

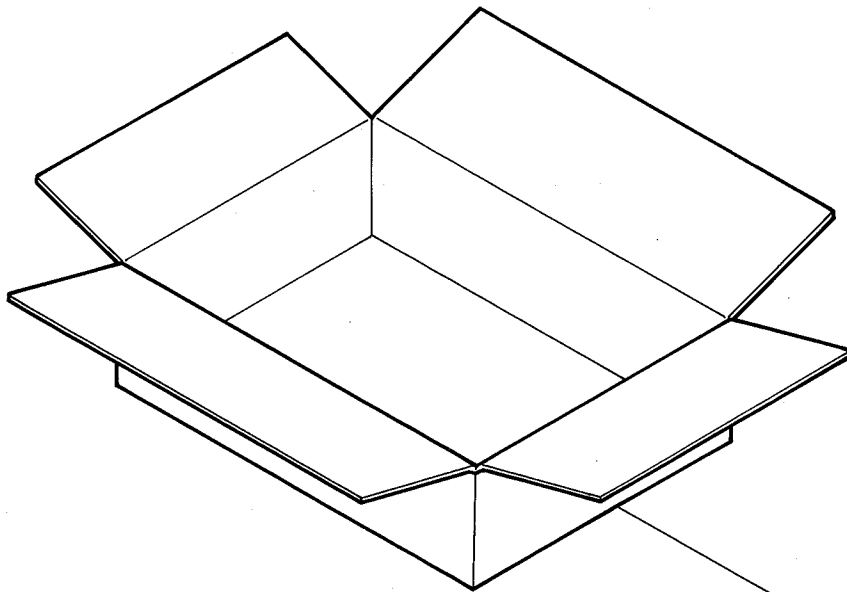
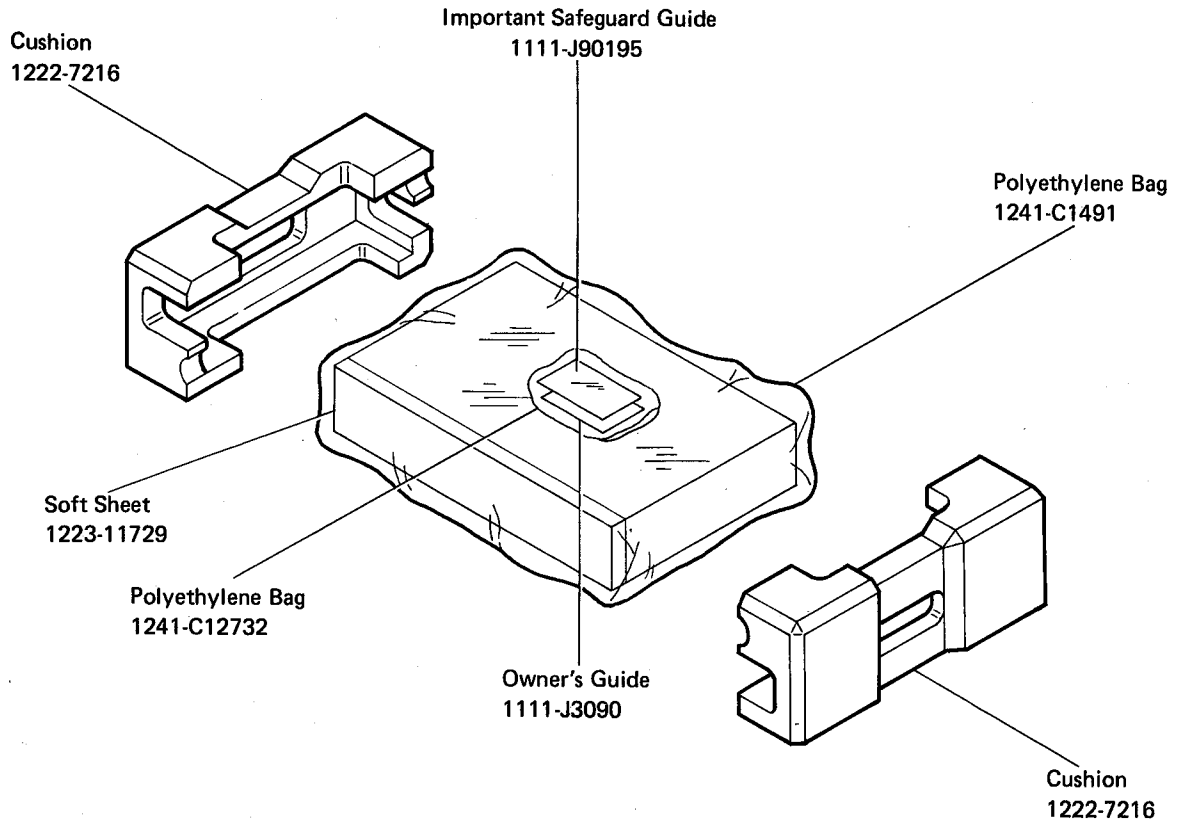
MISCELLANEOUS		
J601,602,603, 604,605,606	4486-9	6-Pin Jack, Phono, Tuner, AUX
J607,608,609, 610,611,612, 613,614	4484-31	4-Pin Jack, Tape 1, Tape 2

SPEAKERS SWITCH P.C. BOARD

R455,456	5171-331581	Resistor, 330 Ω , \pm 5% ,1W, Metal
J401	4451-00121	Jack, Headphones
SW401,402	4431-02047451	Push Switch, Speakers 1, Speakers 2

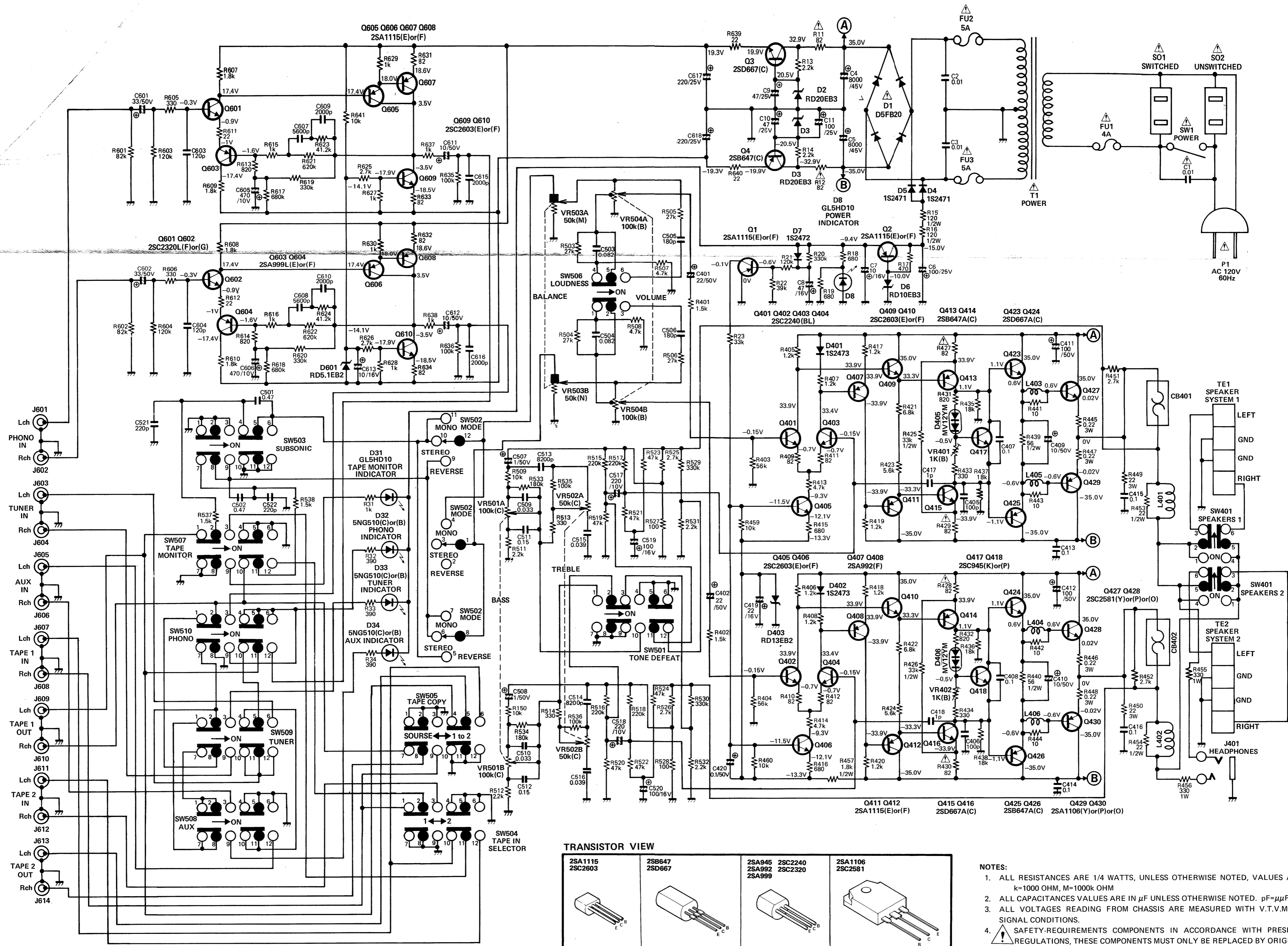
Ref. No.	Part No.	Description
FUNCTION INDICATOR P.C. BOARD		
D31	5637-GL5HD10	Light Emitting Diode, GL5HD10, Tape Monitor Indicator
D32,33,34	5637-5NG510(C)	Light Emitting Diode, 5NG510(C)or(B), Phono, Tuner, AUX Indicator
FUNCTION SELECTOR P.C. BOARD		
SW507,508,509,510	4431-04167757	Push Switch, Tape Monitor, Function Selector
POWER INDICATOR P.C. BOARD		
D8	5637-GL5HD10	Light Emitting Diode, GL5HD10, Power Indicator
CHASSIS MISCELLANEOUS		
P1	4161-71147	AC Line Cord
SO1,2	4474-157	External AC Socket, Switched, Unswitched
SW1	4431-01017358	Push Switch, Power
T1	5584-701365	Power Transformer
FU1	5732-402031	Fuse, 4A 125V
FH1	4472-0125	Fuse Holder, FU1
TE1,2	4214-87	Speaker Terminal, Speaker System 1, 2
LUG1	4211-4	Lug Terminal
JM1,2	4242-070032	Jumper Lead, 7-Wire
JM3,5	4242-030022	Jumper Lead, 3-Wire
JM4	4242-070012	Jumper Lead, 7-Wire
JM6	4242-030012	Jumper Lead, 3-Wire
JM7	4242-030032	Jumper Lead, 3-Wire
JM8	4242-070042	Jumper Lead, 7-Wire
JM9	4242-050022	Jumper Lead, 5-Wire
JM10	4242-047015	Jumper Lead, Speaker Lead

PACKAGE

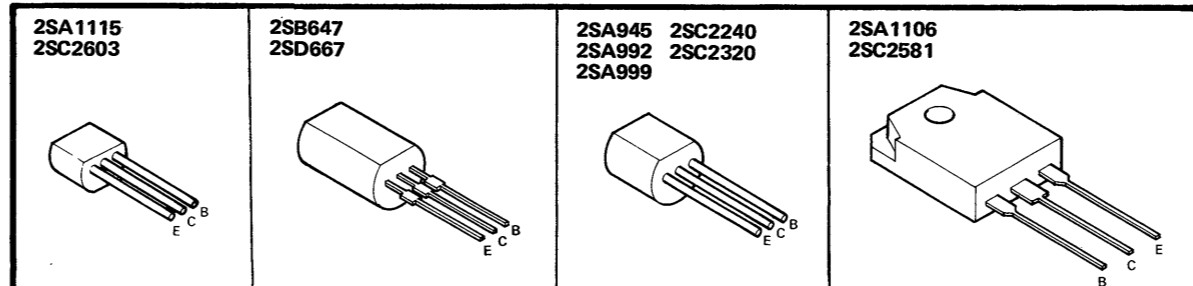


Carton Box
1221-717144

SCHEMATIC DIAGRAM



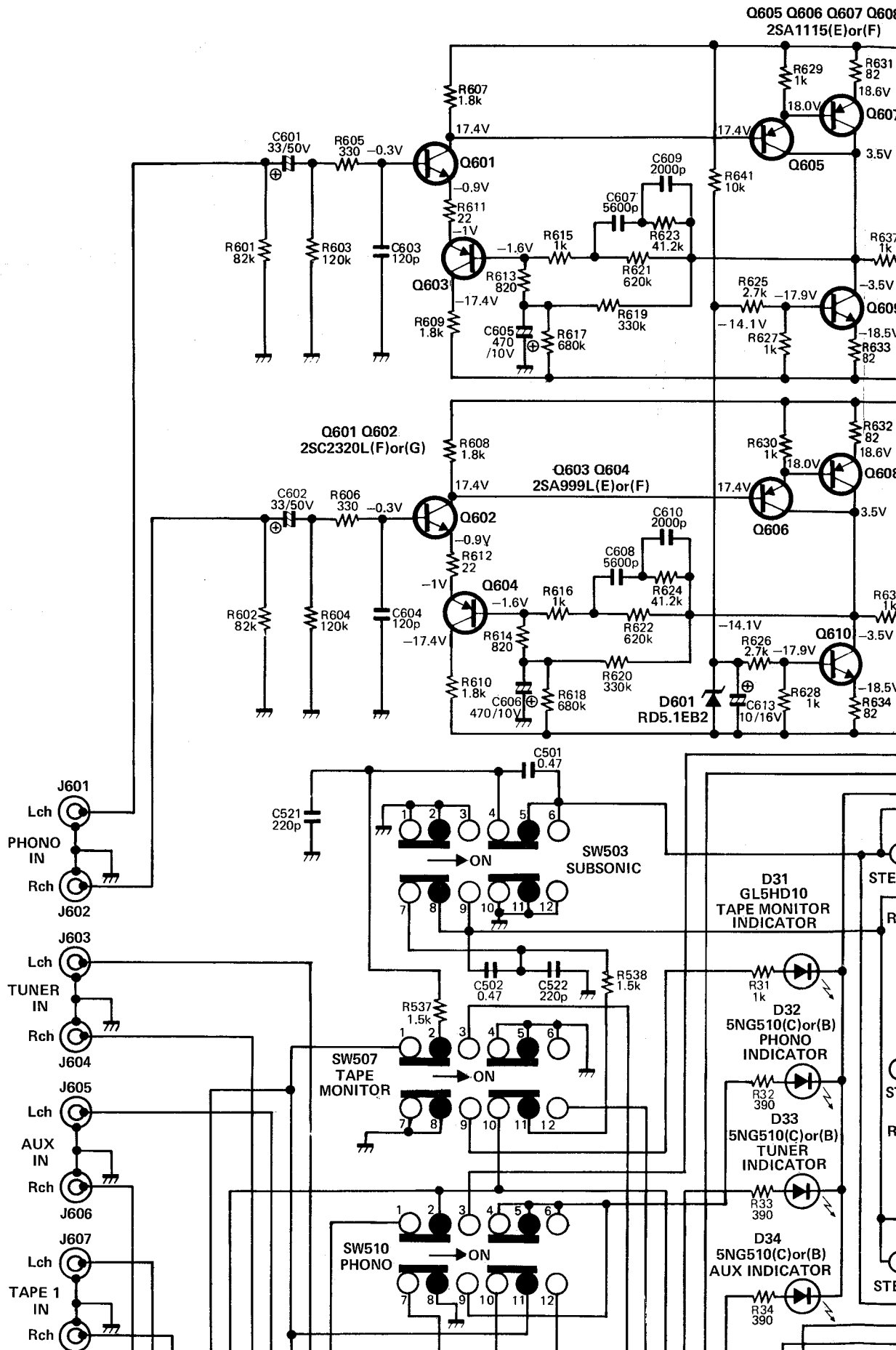
TRANSISTOR VIEW

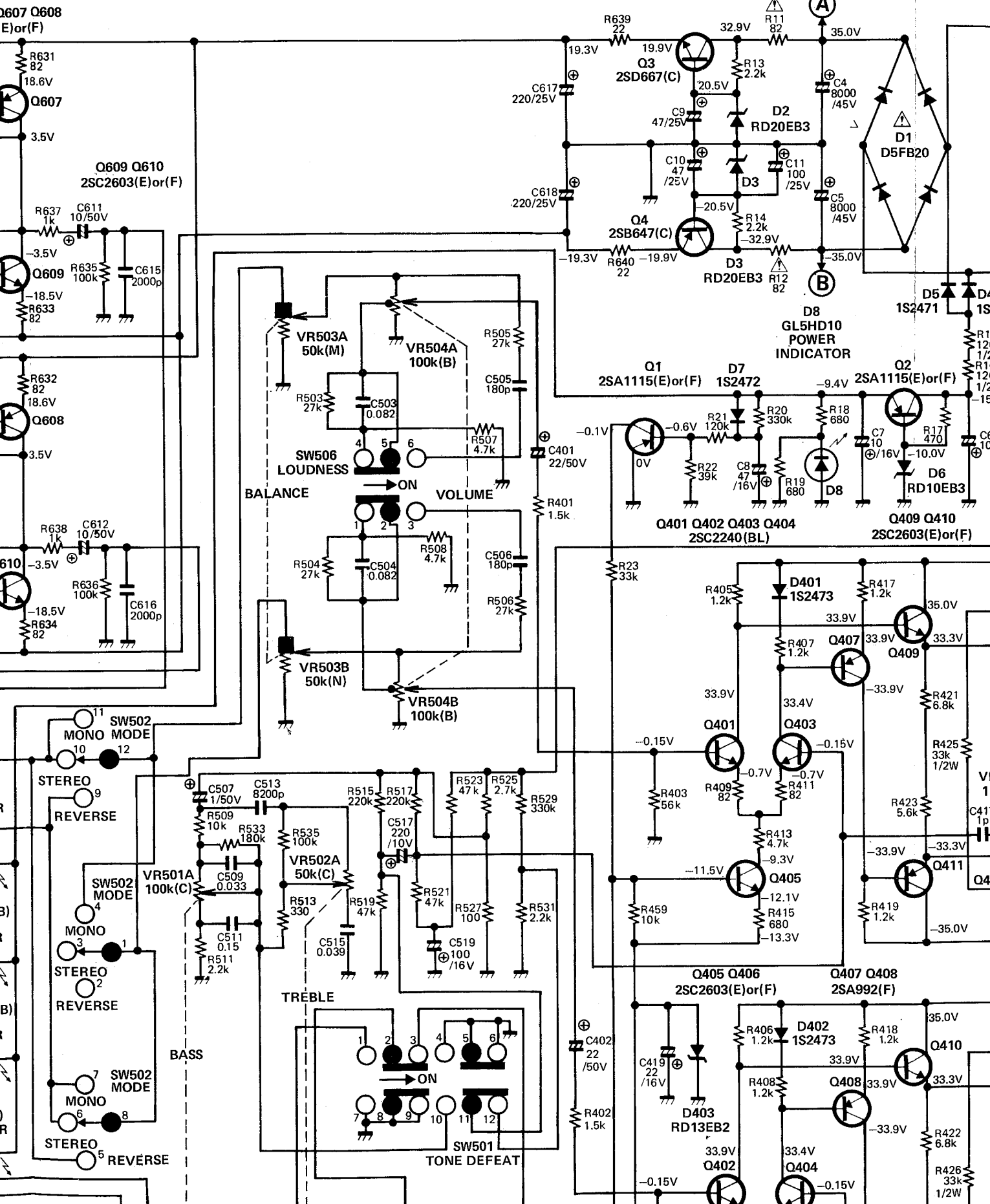


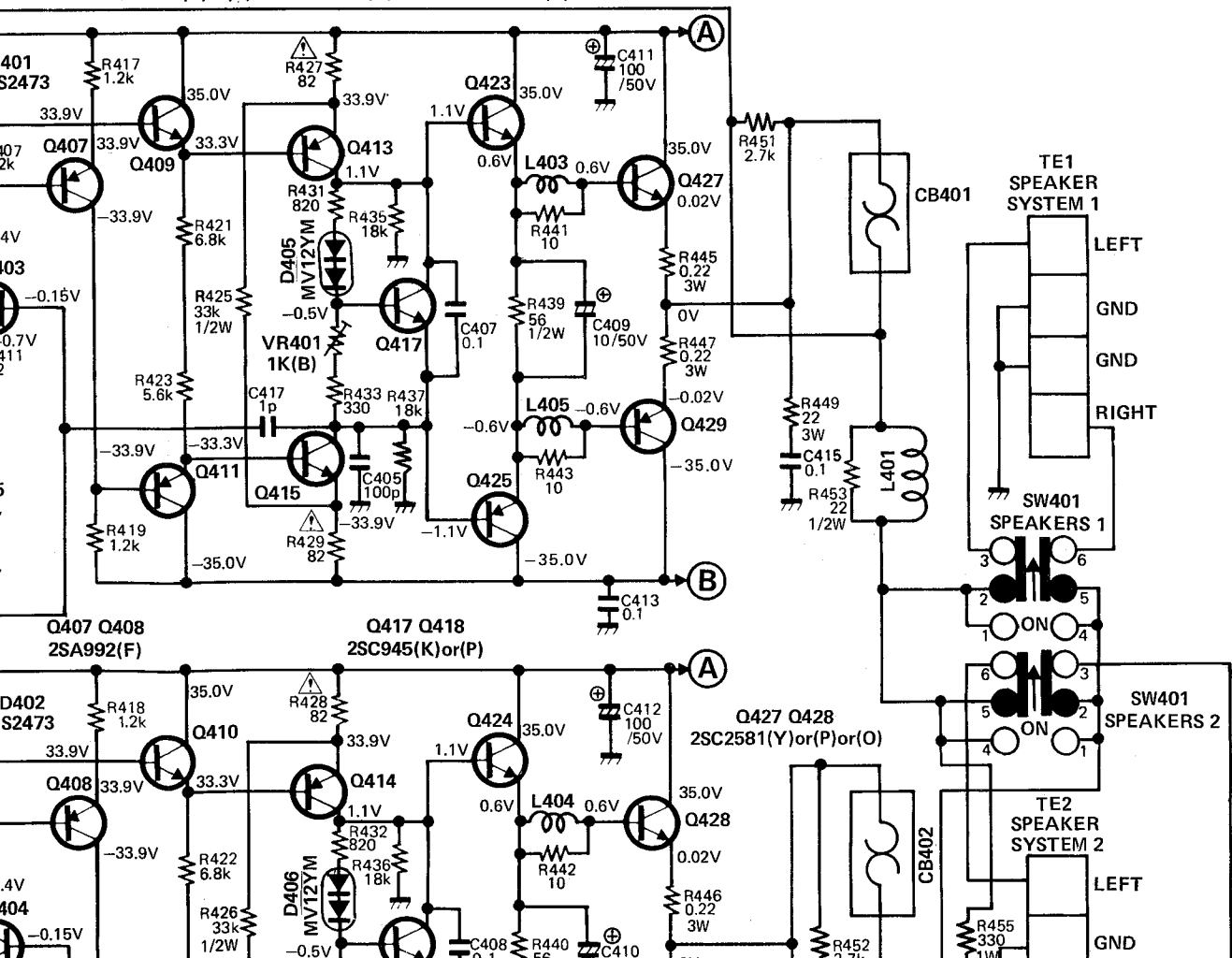
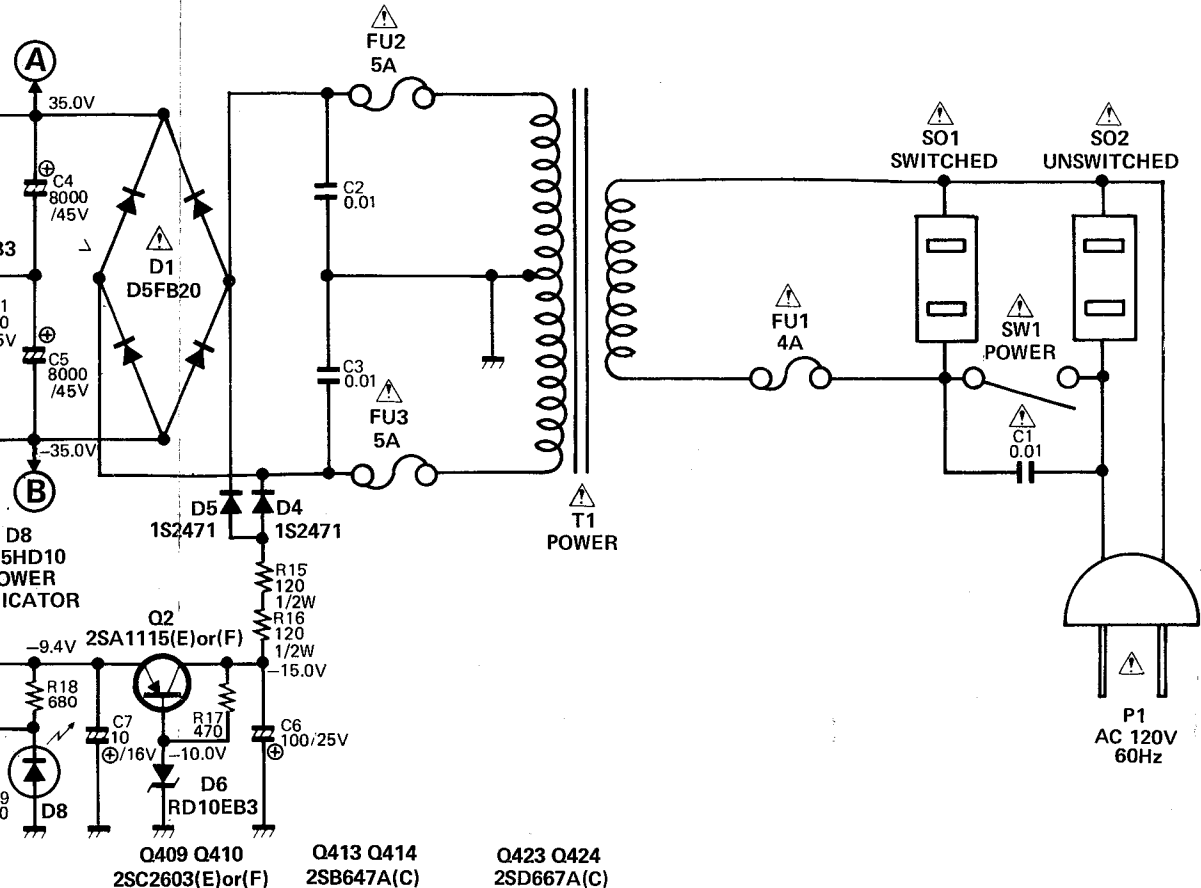
NOTES:

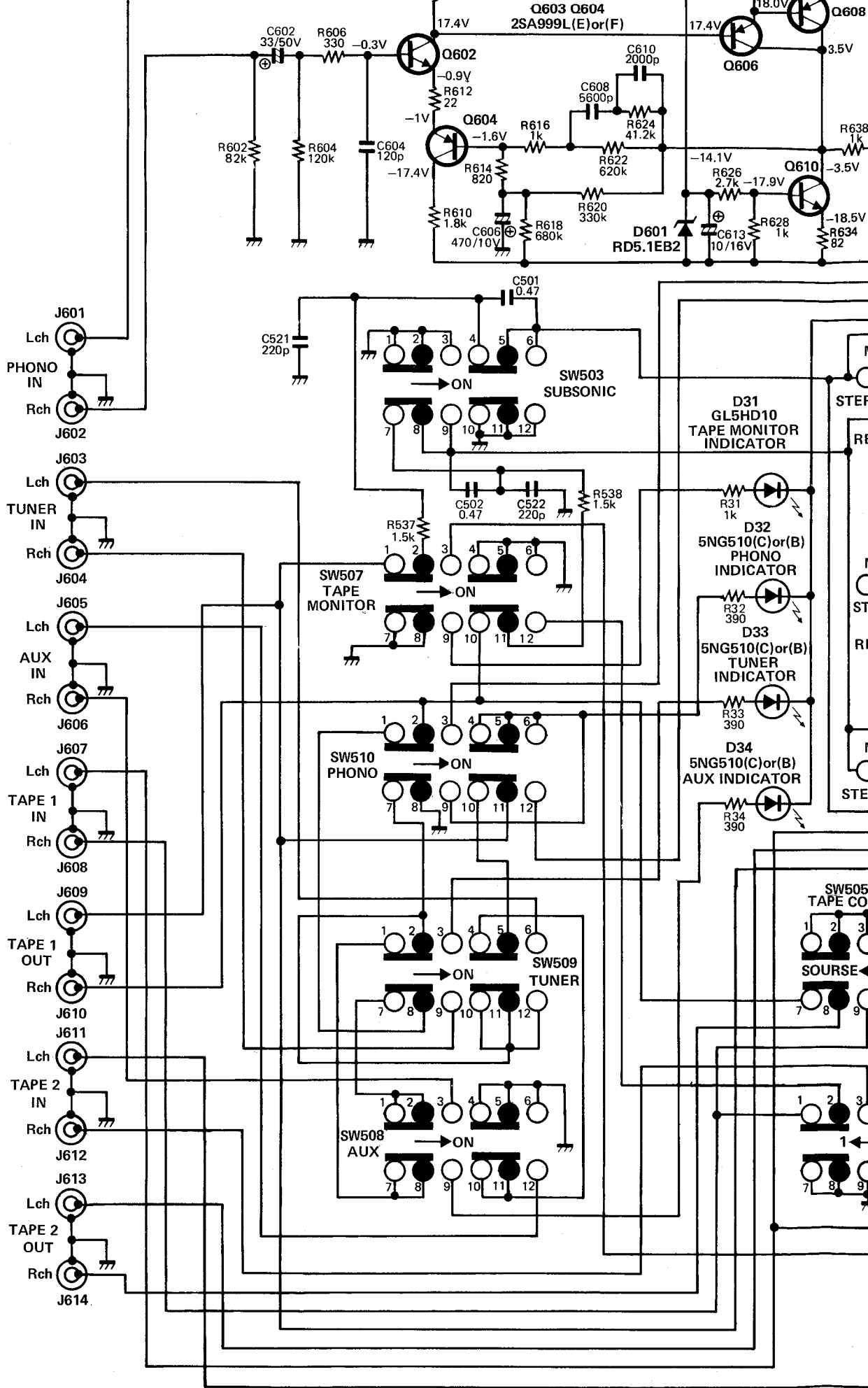
1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHM. k=1000 OHM, M=1000k OHM
2. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. pF= μ F
3. ALL VOLTAGES READING FROM CHASSIS ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL CONDITIONS.
4. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

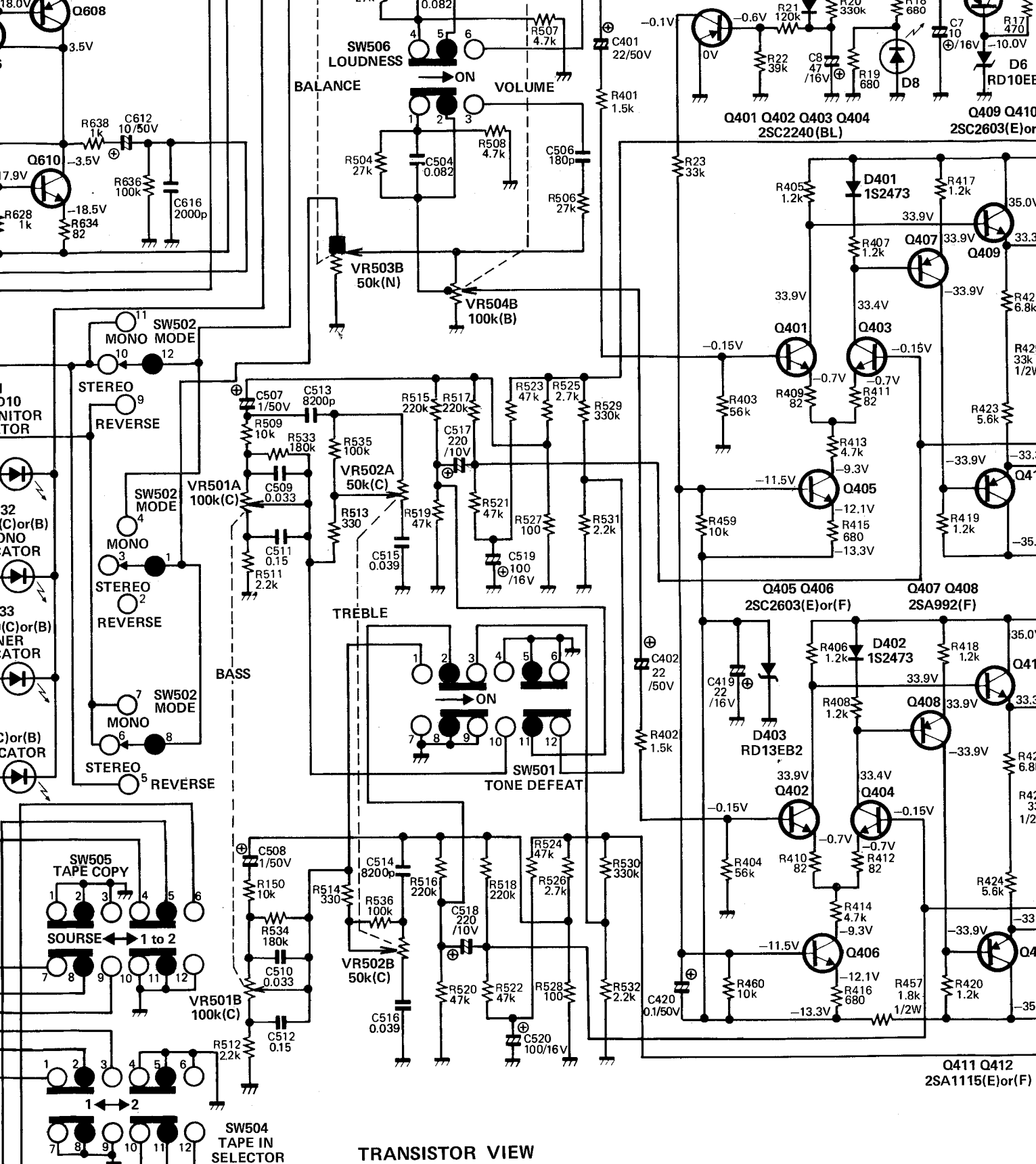
SCHEMATIC DIAGRAM



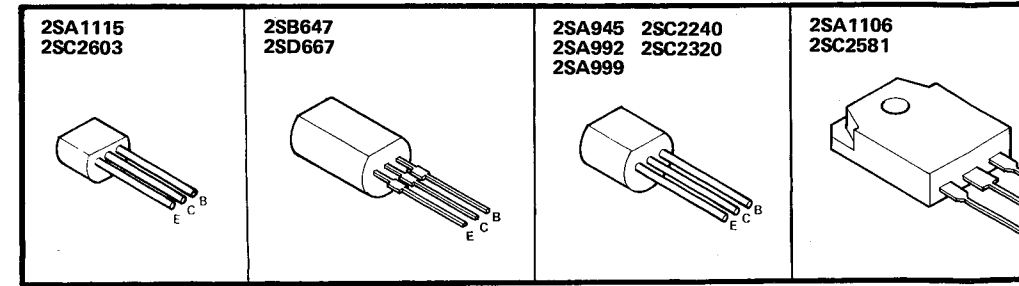




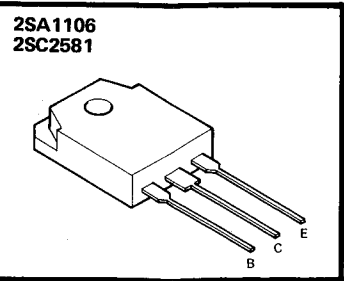
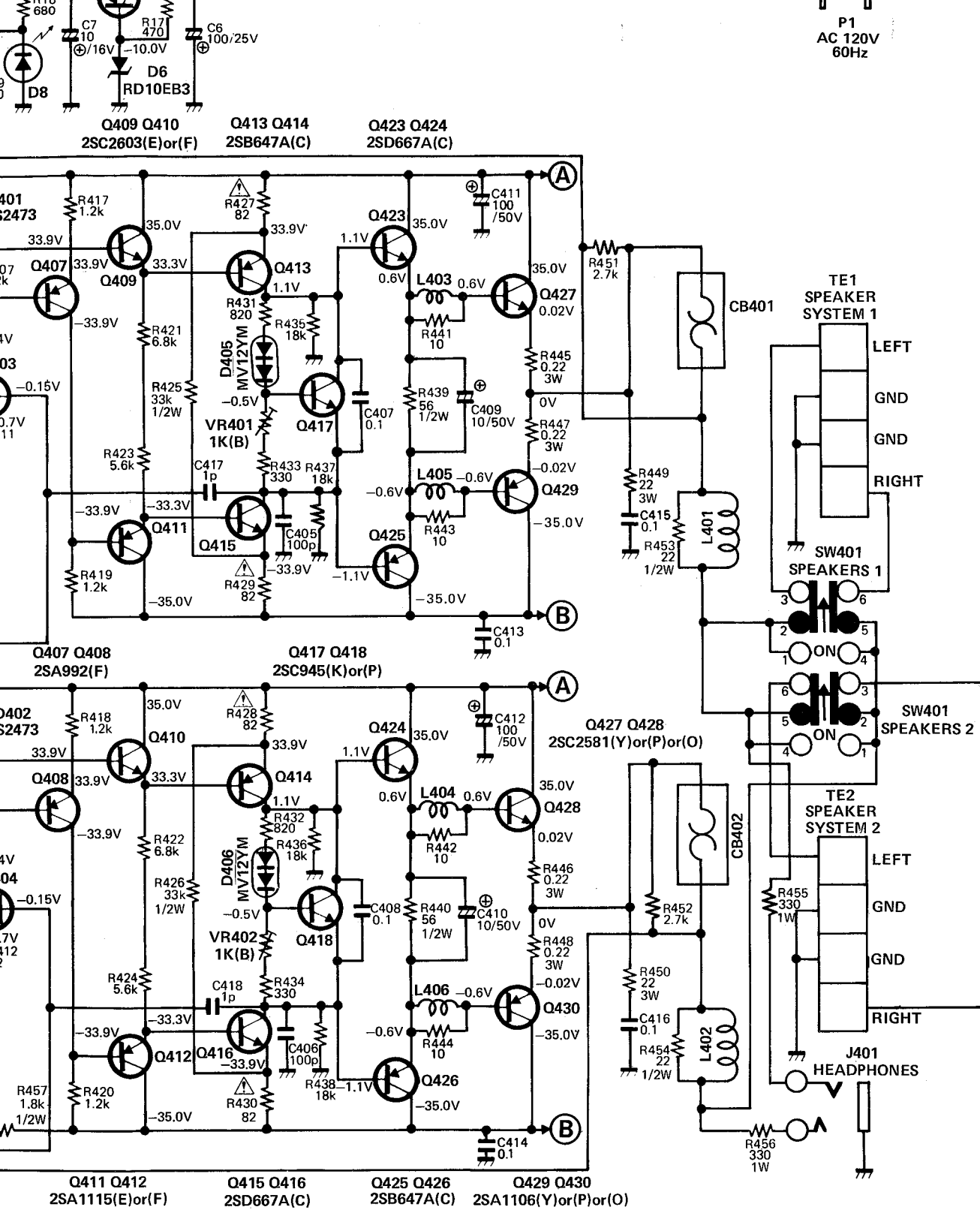





TRANSISTOR VIEW



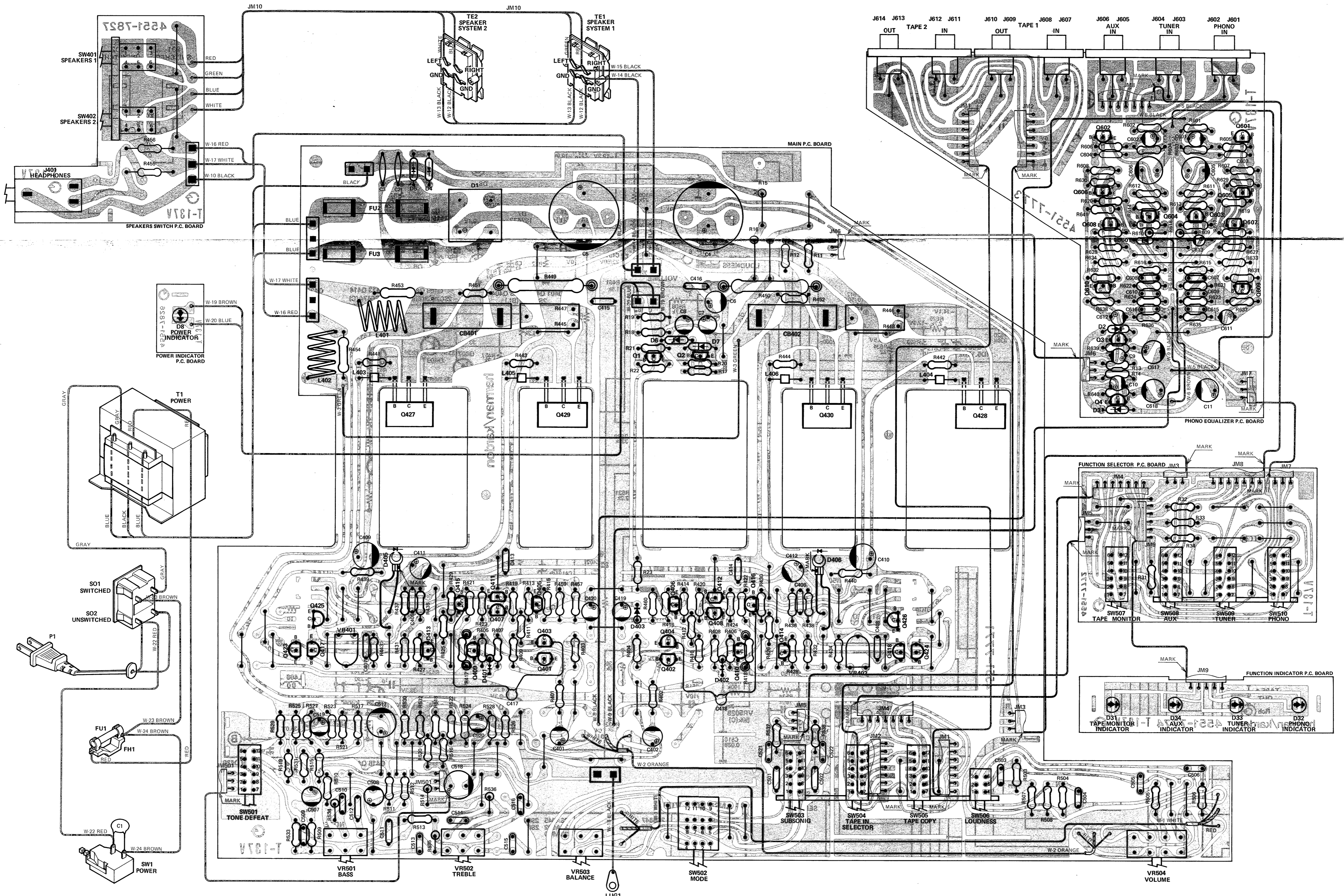
P1
AC 120V
60Hz



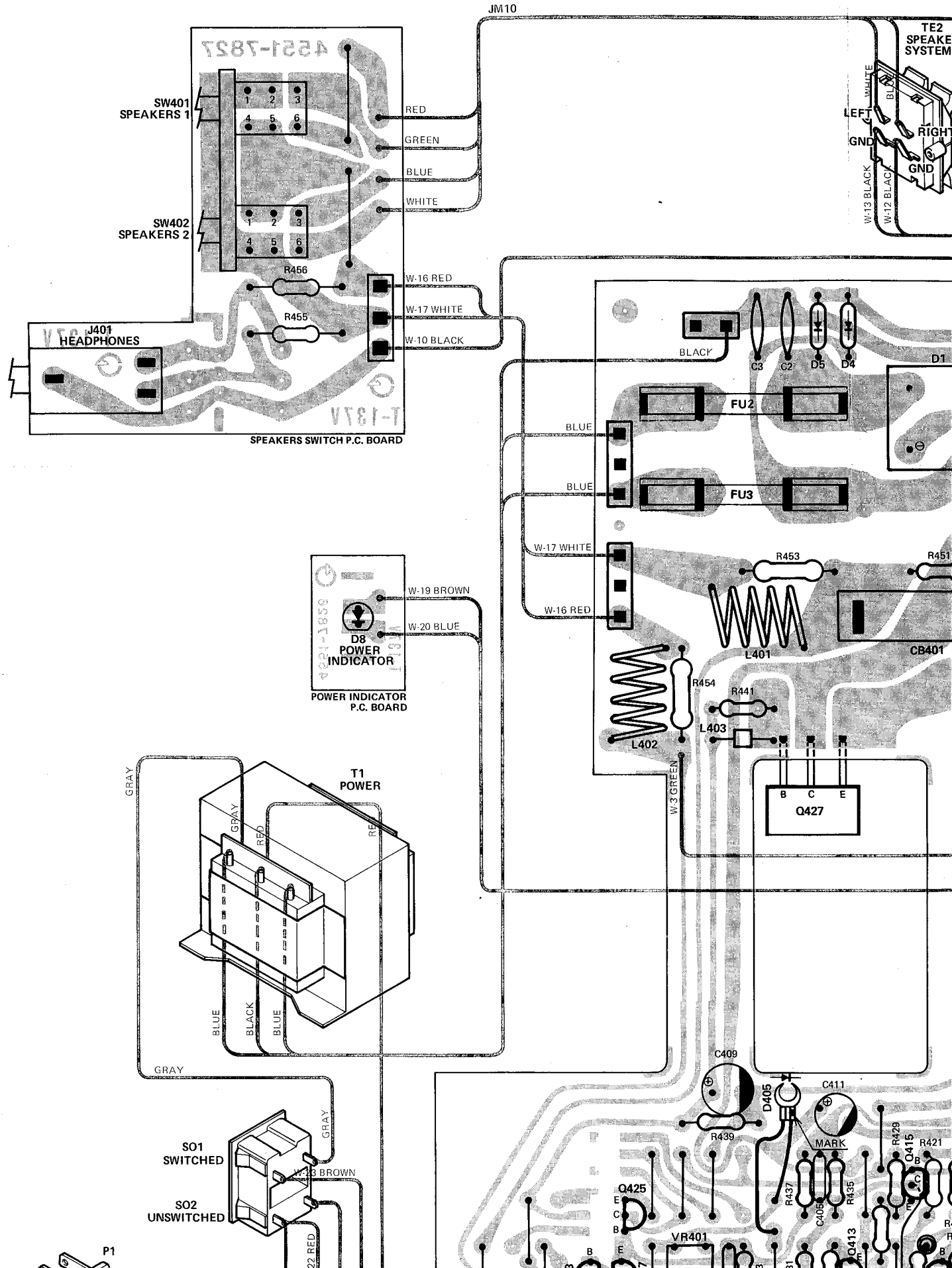
NOTES:

1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHM. k=1000 OHM, M=1000k OHM
2. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. $\text{pF}=\mu\mu\text{F}$
3. ALL VOLTAGES READING FROM CHASSIS ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL CONDITIONS.
4.  SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

WIRING DIAGRAM



WIRING DIAGRAM



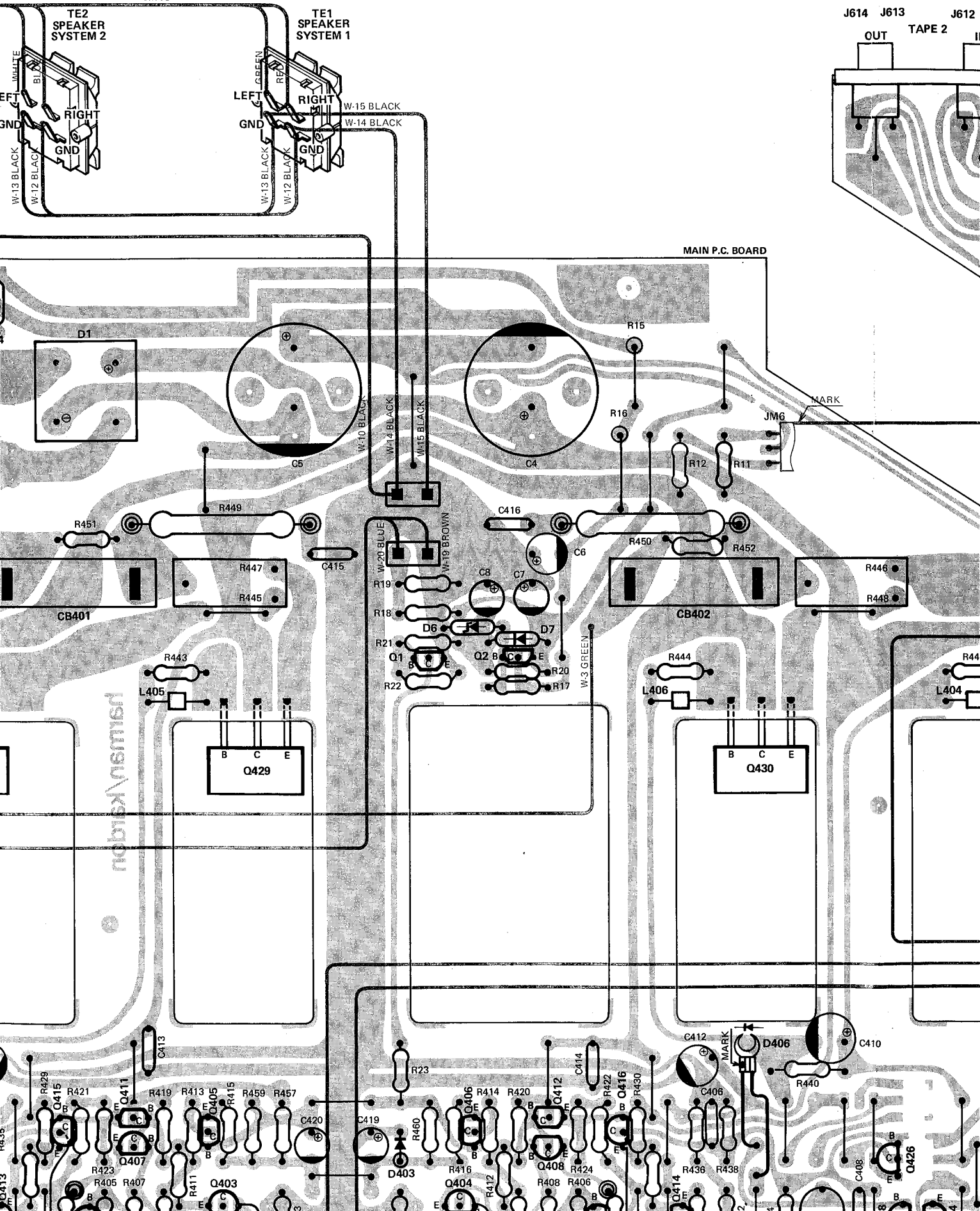
JM10

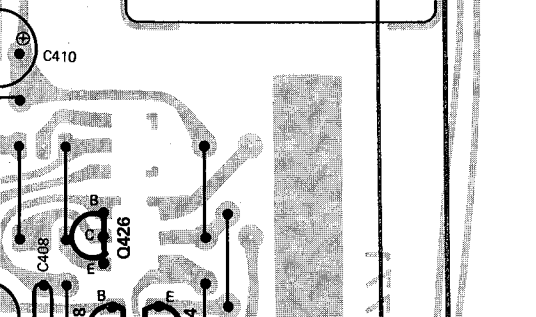
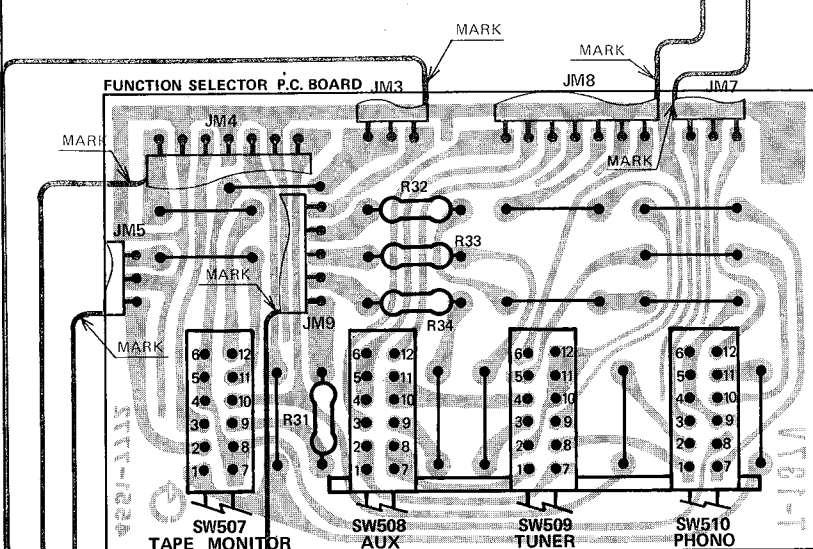
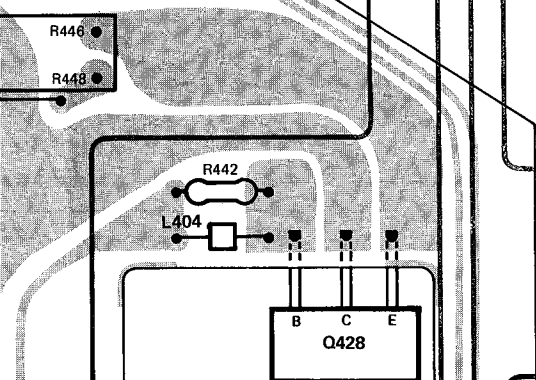
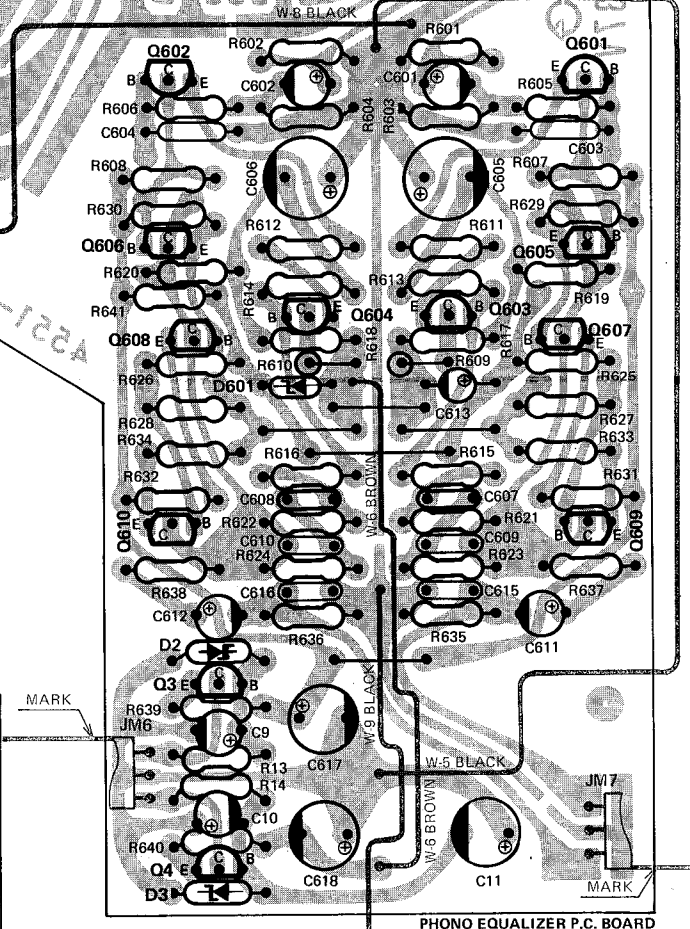
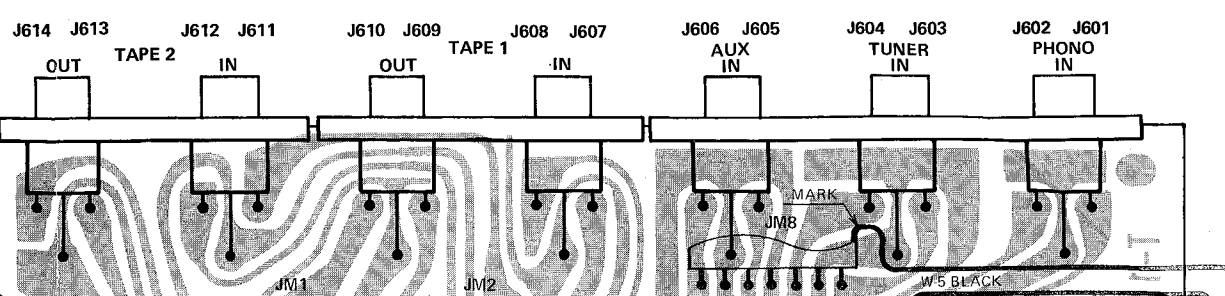
TE2
SPEAKER
SYSTEM 2

TE1
SPEAKER
SYSTEM 1

J614 J613 J612

OUT TAPE 2

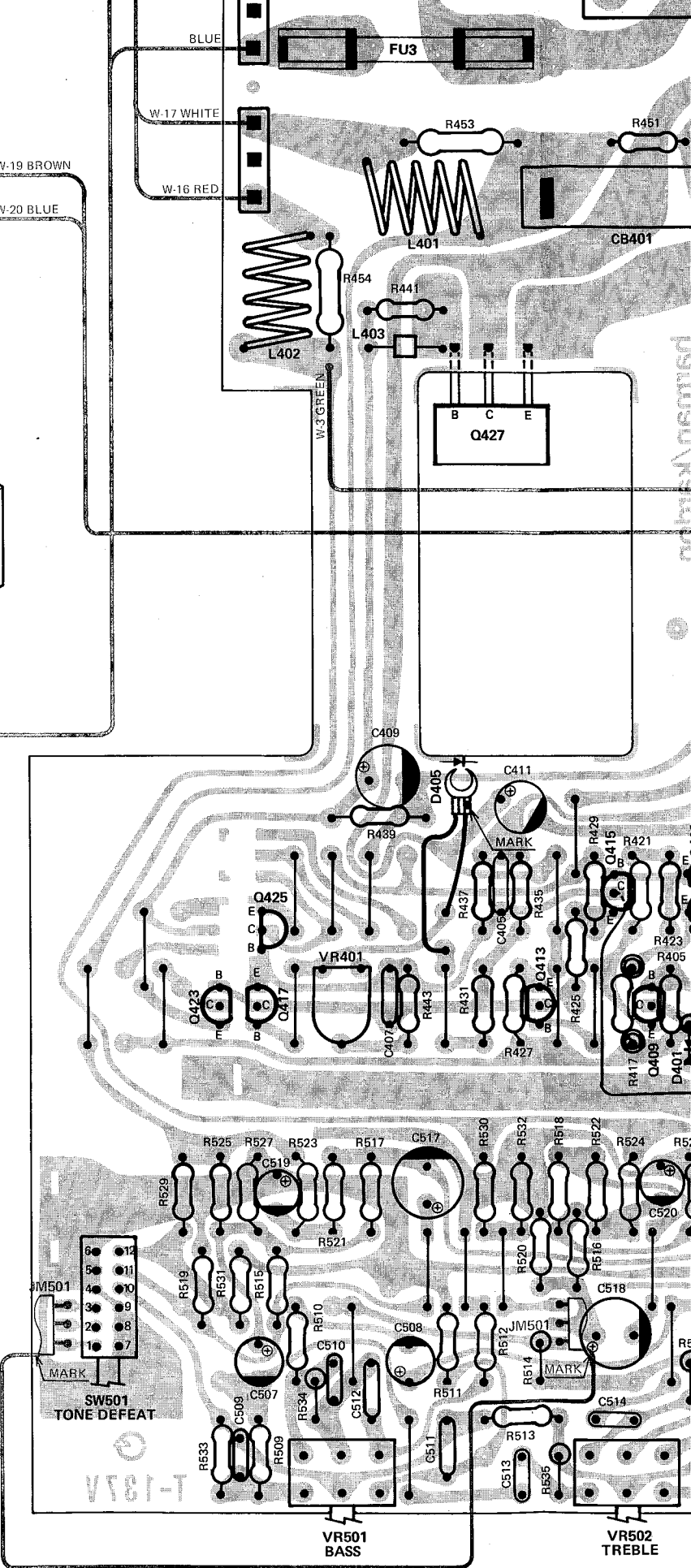
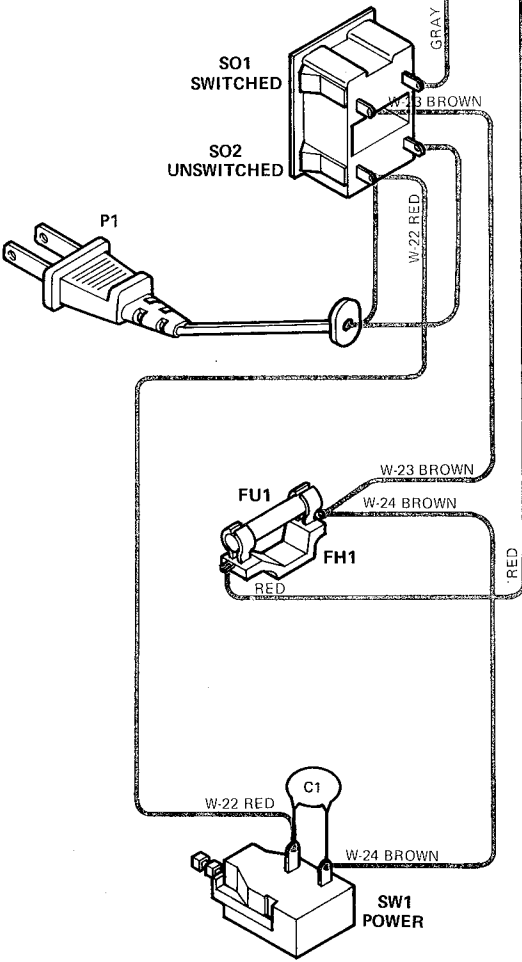
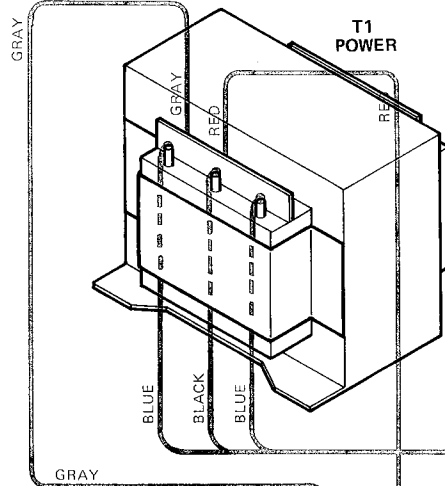
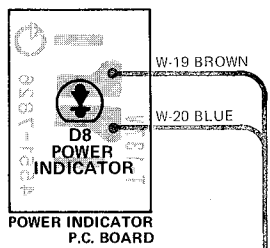


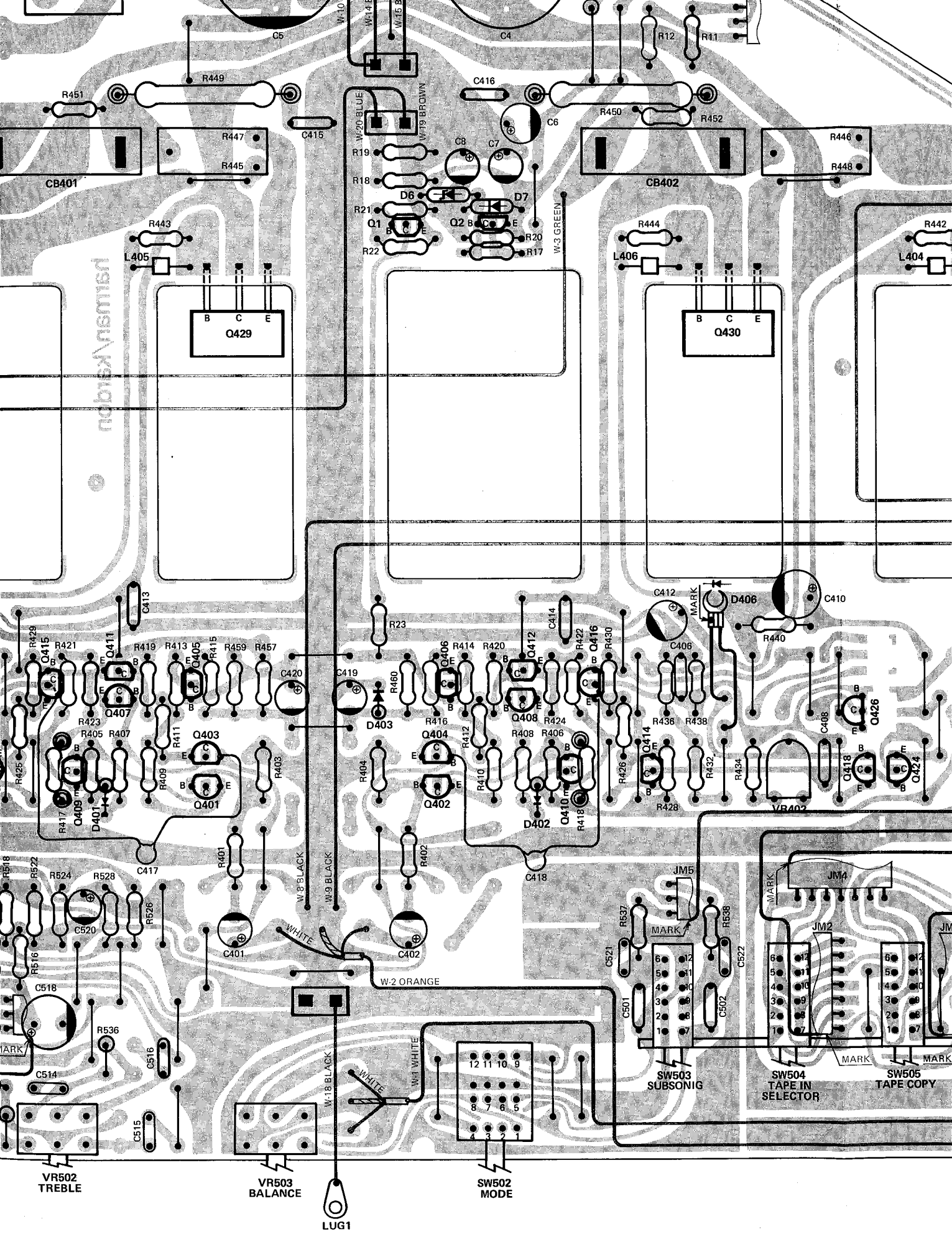


4521-123A

4521-123A

4521-1





LUG1

