

ERIC NELSON

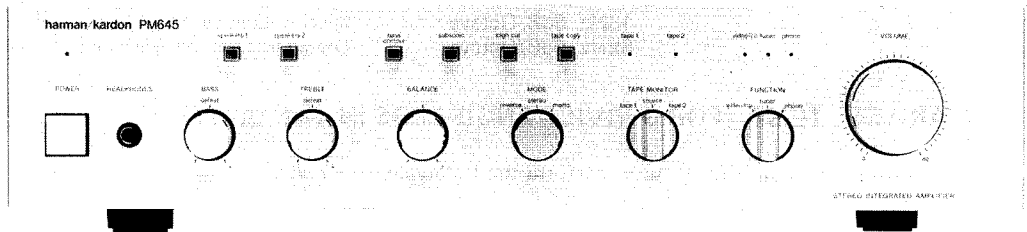
# The Harman Kardon Model PM645

Manual No.79A

## STEREO INTEGRATED AMPLIFIER

# Technical Manual

PM645



**SPECIFICATIONS**

	Nominal	Limit
RMS Output Power		
8Ω, 1kHz, THD 0.1%	45.1W	≥ 40W
4Ω, 1kHz, THD 1.0%	77.6W	≥ 70W
High Instantaneous Current Capability (HCC)	35A	
Half Power Bandwidth	10Hz ~ 100kHz	
Frequency Response at -3dB	4Hz ~ 135kHz	
Input Sensitivity		
Video/CD, Tuner	130mV ± 25mV	
Phono	2.2mV ± 0.2mV*	
Signal to Noise Ratio		
Video/CD, Tuner	82.6dB	≥ 75dB
Phono	81.4dB	≥ 75dB
Channel Separation at 10kHz		
Video/CD, Tuner	57.3dB	≥ 45dB
Phono	61dB	≥ 45dB
IM Distortion Ratio	0.08%	0.25%
Damping Factor at 1kHz	85	≥ 65
Tone Control Characteristics		
Bass at 50Hz		
Boost	10dB	± 2dB
Cut	-10dB	± 2dB
Treble at 10kHz		
Boost	10dB	± 2dB
Cut	-10dB	± 2dB
Filters		
Subsonic	15Hz, 6dB/Octave	
High Cut	6kHz, 6dB/Octave	

	Nominal	Limit
Bass Contour		
Boost at 50Hz	+10dB	
DC Output Voltage		
L channel	0mV ± 60mV	
R channel	0mV ± 60mV	
RIAA Equalization at Tape Out (20Hz ~ 20kHz) (No load)	0.6dB	≤ 1.5dB
Phono Overload (No load)	140mV	≥ 120mV
Dimensions (W x H x D)	17-1/2" x 4-1/16" x 13-7/8"	
	(443 x 103 x 351 mm)	
Weight	14 lbs. 5 oz. (6.5 kg)	
Power Supplies		
U.S.A. and Canada models	AC120V, 60Hz	
General and German models	AC220/240V, 50/60Hz	
Power Consumption		
U.S.A. and Canada models	220W (270VA)	
General and German models	160W	

\* Input Sensitivity (Phono) for German model is 2.3mV ± 0.2mV.

This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

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

PM645

**LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)**

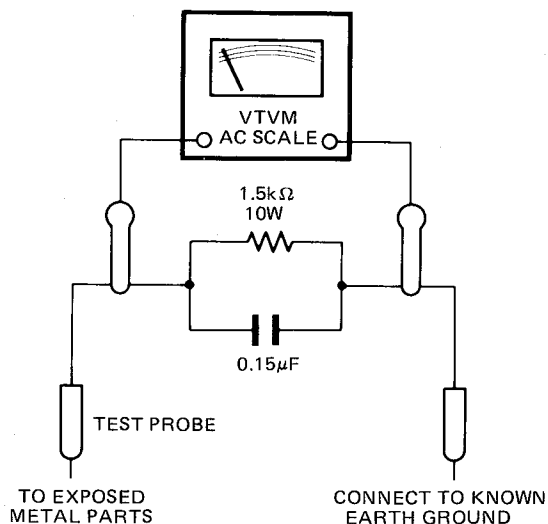
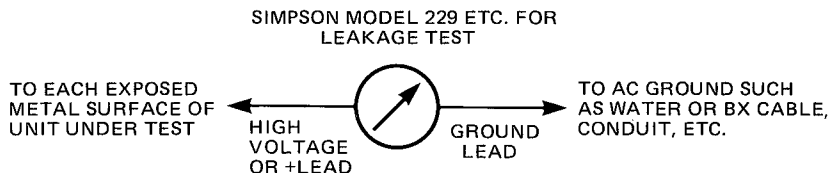
Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:

Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 Ohm, 10-watt resistor paralleled by a 0.15μF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit.

Use a VTVM or VOM with 1000 Ohms per volt, or higher, sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



## ALIGNMENT PROCEDURES (REFER TO PAGES 10 AND 11)

- Conditions:
- Set the Function selector to the "video/CD" position.
  - Set the Volume control to minimum.
  - Depress the Speaker 1 switch (button in).
  - After the Power switch is pushed on, wait for 20 minutes before adjusting so that the most stable operation is obtained.

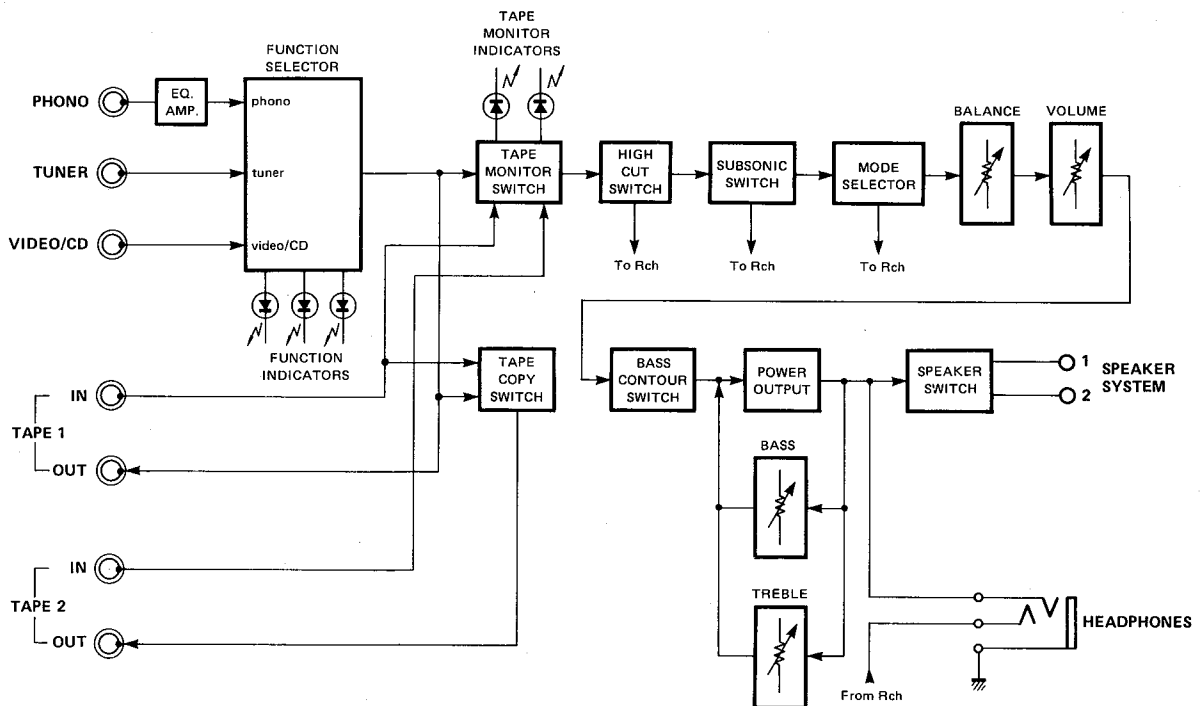
### DC BALANCE CONFIRMATION

Step	Connection Equipments	For
1	● Connect the DC Volt Meter to Speaker System 1 terminal (Left and GND).	0 ± 50mV
2	● Connect the DC Volt Meter to Speaker System 1 terminal (Right and GND).	0 ± 50mV

### IDLING CURRENT ADJUSTMENT

Step	Connection Equipments	Adjustment	For
1	● Connect the DC Volt Meter to TP1 (+) and TP2 (-).	VR401	33mV
2	● Connect the DC Volt Meter to TP3 (+) and TP4 (-).	VR402	33mV

## BLOCK DIAGRAM



## DISASSEMBLY PROCEDURES (REFER TO PAGES 5 AND 11)

### 1 CABINET TOP (122) REMOVAL

Remove 6 screws (A) and remove the Cabinet Top (122).

### 2 FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (122). (Refer to step 1.)
2. Remove 6 screws (B) and remove the Front Panel Assembly (101).

### 3 SPEAKER SWITCHES P.C. BOARD (PCB-10) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Remove 2 screws (C) and remove the Speaker Switches P.C. Board (PCB-10).

### 4 BASS CONTOUR P.C. BOARD (PCB-2) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Remove 2 screws (D) and remove the Bass Contour P.C. Board (PCB-2).

### 5 FUNCTION AND TAPE MONITOR SWITCHES P.C. BOARD (PCB-6) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Pull out the Function and Tape Monitor Knob Assemblies (103).
3. Remove 2 hexagon nuts (E) and remove the Function And Tape Monitor Switches P.C. Board (PCB-6).

### 6 VOLUME CONTROL P.C. BOARD (PCB-9) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Pull out the Volume Knob Assembly (104).
3. Remove hexagon nut (F) and remove the Volume Control P.C. Board (PCB-9).

### 7 HEADPHONE JACK P.C. BOARD (PCB-11) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Remove the fixture (G) fixing the Headphone Jack P.C. Board (PCB-11) and remove the Headphone Jack P.C. Board (PCB-11).

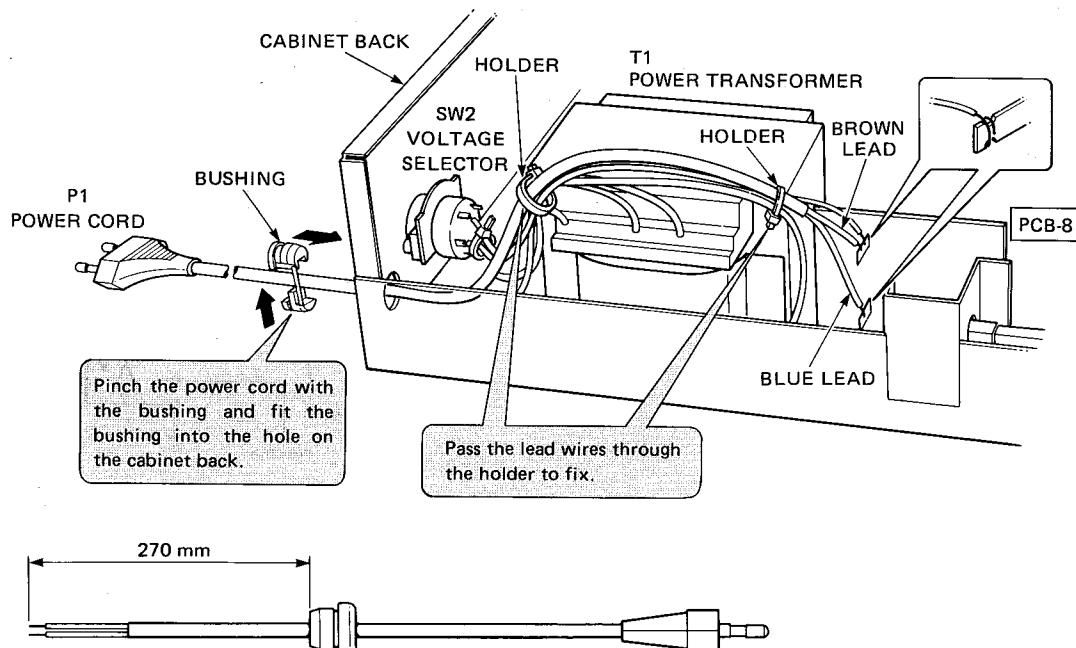
### 8 MAIN P.C. BOARD (PCB-1) REMOVAL

1. Remove the Speaker Switches (PCB-10), Bass Contour (PCB-2), Function and Tape Monitor Switches (PCB-6), Volume Control (PCB-9) and Headphone Jack (PCB-11) P.C. Boards. (Refer to Steps 1 through 7.)
2. Straighten the catches fixing the Power Indicator P.C. Board (PCB-12) and Function Indicator P.C. Board (PCB-7) respectively and remove each P.C. Board.
3. Pull out the 4 Knob Assemblies (102), Power Push Button (136) and Levers (166).
4. Remove 4 hexagon nuts (H).
5. Remove screw (I) and remove the LUG1 with lead wire from the Chassis (148).
6. Remove 8 screws (J) and remove the Chassis (148).
7. Remove 4 screws (K) and remove the Main P.C. Board (PCB-1) with the Heat Sink (146). If necessary, unsolder the lead wires.

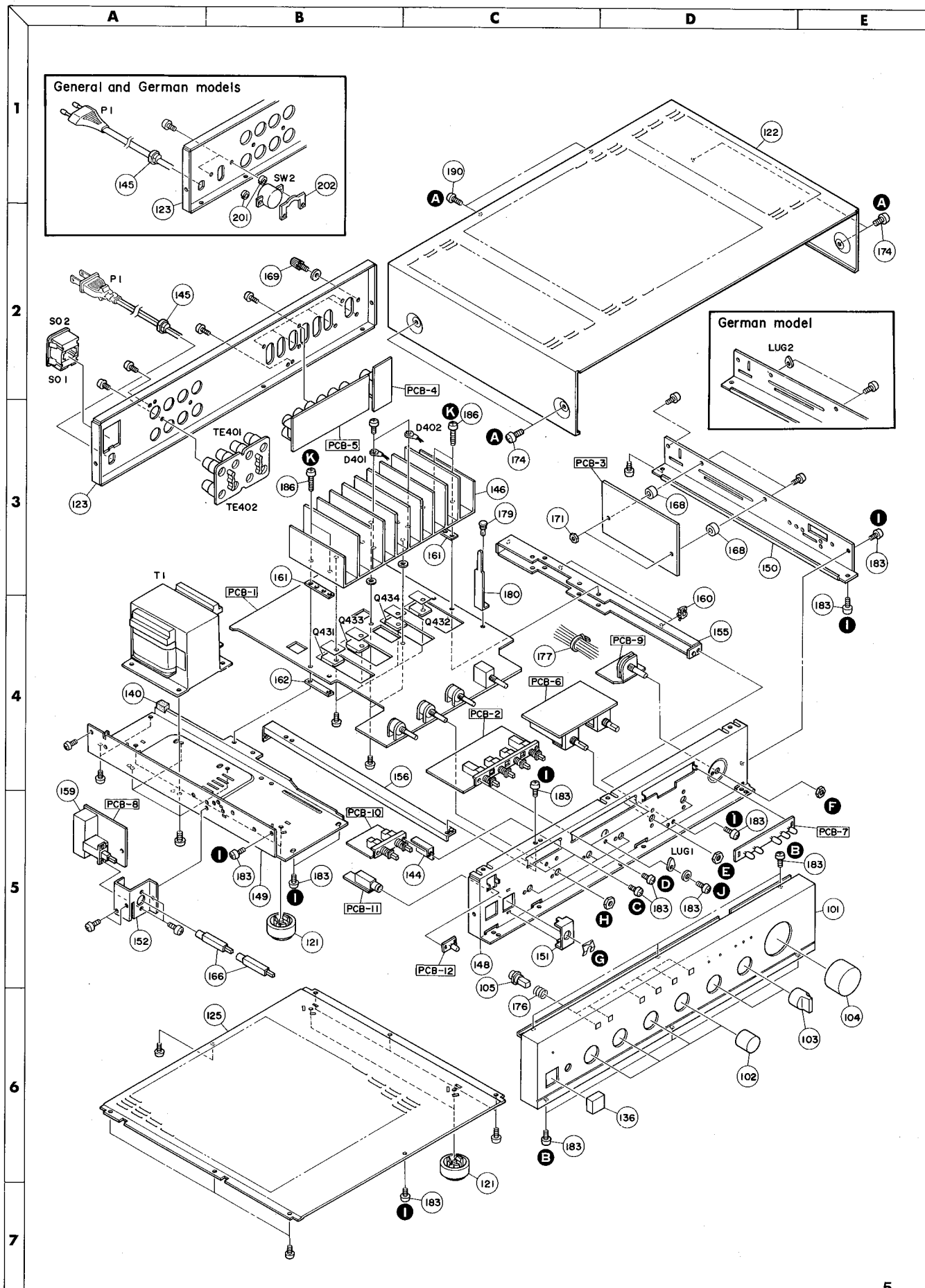
## POWER CORD REPLACEMENT

### (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the parts with the standard supply parts.



# GENERAL UNIT EXPLODED VIEW



## GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-PM645A	Front Panel Assembly <i>A443-PM645C (BLACK)</i>
102	A630-PM645A <i>(G Bck)</i>	Knob Assembly, Bass, Treble, Balance, Mode
103	A630-PM645B <i>(H Bck)</i>	Knob Assembly, Tape Monitor, Function
104	A630-PM645C <i>(J Bck)</i>	Knob Assembly, Volume
105	A662-PM645A <i>(K Bck)</i>	Push Button Assembly, Speakers 1/2, Bass Contour, Subsonic, High Cut, Tape Copy
121	1319-0139	Foot
122	1414-04901	Cabinet Top
123	1424-12301	Cabinet Back (for U.S.A. and Canada models)
"	1424-12401	Cabinet Back (for General and German models)
125	1424-13101	Cabinet Bottom
136	1660-00401 <i>(00403 Bck)</i>	Push Button, Power
140	2112-11236	Sponge
144	2216-7152	Shield Plate
145	2214-415027	Bushing
146	2222-7167	Heat Sink
148	2211-7257	Chassis
149	2211-7261	Chassis
150	2211-7262	Chassis
151	2219-7879	Bracket
152	2219-7987	Bracket
155	2219-7990	Bracket
156	2219-7991	Bracket
159	2240-7176	Protector
160	2240-7061	Holder
161	2224-7069	Insulator
162	2224-7090	Insulator
166	2672-7018	Lever
168	2132-01405	Spacer
169	2310-7017	Special Screw
171	2446-301Z9	Hexagon Nut
174	2347-400647	Self-tapping Screw (+) (4 x 6 mm)
176	2651-210189	Spring
177	2240-7120	Holder
179	2459-3003511	Fastener
180	2218-7011	Holding Bracket
183	2347-300627	Self-tapping Screw (+) (3 x 6 mm)
186	2347-301227	Self-tapping Screw (+) (3 x 12 mm)
190	2347-300647	Self-tapping Screw (+) (3 x 6 mm)
201	2132-7116	Spacer (only General and German models)
202	2440-7017	Special Nut (only General and German models)
	1111-J30171	Owner Guide (for U.S.A. model)
	1111-J30172	Owner Guide (for Canada, General and German models)
	1221-797144	Packing Box
	1222-7216	Packing Cushion (2 Used)

## ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
<b>CHASSIS MISCELLANEOUS</b>		
△ P1	4161-71151	Power Cord (for U.S.A. and Canada models)
△ "	4161-7256	Power Cord (for General and German models)
△ T1	5584-701462	Power Transformer (for U.S.A. and Canada models)
△ "	5584-701463	Power Transformer (for General and German models)
△ SW2	4411-102729	Rotary Switch, Voltage Selector (General and German models only)
△ SO1/2	4474-157	AC Outlet, Unswitched, Switched (only U.S.A. and Canada models)
TE401/402	4214-121	Speaker Terminal, Speaker System 1, Speaker System 2
△ F1	5732-402031	Fuse, 4A, 125V (for U.S.A. and Canada models)
△ "	5732-202030	Fuse, T2A, 250V (for General and German models)
LUG1	4211-4	Lug Terminal
LUG2	4211-4	Lug Terminal (only German model)
<b>PCB-1 MAIN P.C. BOARD</b>		
<b>RESISTORS</b>		
△ R15	5102-8204715	82Ω, ±2%, 1/4W, Fuse
△ R47, 48	5102-8204713	82Ω, ±2%, 1/4W, Fuse
R431, 432	5174-910381	91Ω, ±1%, 1/4W, Metal
△ R449, 450, 451, 452	5102-4704713	47Ω, ±2%, 1/4W, Fuse
△ R467, 468, 469, 470	5102-1004713	10Ω, ±2%, 1/4W, Fuse
R483, 484	5174-680381	68Ω, ±1%, 1/4W, Metal
R489/493, 490/494	5273-R22672	0.22Ω, ±10%, 3W x 2, Cement
R491, 492	5171-471572	470Ω, ±5%, 1W, Metal
R497, 498	5173-150571	15Ω, ±5%, 2W, Metal
<b>CONTROLS</b>		
VR401, 402	5101-10271920	1kΩB
VR501/502	5113-50381122	50kΩMN, Balance (w/Hexagon Nut)
VR505/506	5113-10420122	100kΩ, Bass (w/Hexagon Nut)
VR507/508	5113-50321122	50kΩC, Treble (w/Hexagon Nut)
<b>CAPACITORS</b>		
C5, 6	5341-808Y0959	8000μF, ±20%, 45V, Electrolytic
C9	5345-336B041	33μF, ±20%, 10V, Electrolytic
C10	5345-476F041	47μF, ±20%, 50V, Electrolytic
C21, 22, 23, 24	5345-227D041	220μF, ±20%, 25V, Electrolytic
C401, 402	5345-476B0951	47μF, ±20%, 10V, Electrolytic
C405, 406	5345-227A0951	220μF, ±20%, 6.3V, Electrolytic
C407, 408	5353-020934	2pF, ±0.5pF, 500V, Mica
C409, 410	5359-1015851	100pF, ±5%, 100V, Polypropylene
C411, 412	5345-106E041	10μF, ±20%, 35V, Electrolytic
C421, 422, 423, 424	5345-337F041	330μF, ±20%, 50V, Electrolytic
C505, 506	5345-225F0951	2.2μF, ±20%, 50V, Electrolytic
C511, 512	5345-106C0951	10μF, ±20%, 16V, Electrolytic
C517, 518	5359-2215851	220pF, ±5%, 100V, Polypropylene
C803	5352-4741957	0.47μF, ±10%, 250V, Metalized Polyester (only German model)
<b>TRANSISTORS</b>		
Q3, 4, 11, 12, 409, 410, 415, 416	5611-970(BL)	2SA970(BL)
Q5, 401, 402, 403, 404, 411, 412, 413, 414	5613-2240(BL)	2SC2240(BL)
Q6, 9, 13, 405, 406, 407, 408	5613-2603(F)	2SC2603(F) or 2SC2603(E)
Q7, 8, 10, 14	5611-1115(F)	2SA1115(F) or 2SA1115(E)
Q15	5611-817(Y)	2SA817(Y) or 2SA817(O)
Q16	5613-1627(Y)	2SC1627(Y) or 2SC1627(O)
Q417, 418	5612-646A(C)	2SB646A(C)
Q419, 420	5614-666A(C)	2SD666A(C)
Q421, 422	5613-945(K)	2SC945(K) or 2SC945(P)

Ref. No.	Part No.	Description
Q423, 424, 425, 426	5614-667A(C)	2SD667A(C)
Q427, 428, 429, 430	5612-647A(C)	2SB647A(C)
Q431, 432	5613-3182(O)	2SC3182(O)
Q433, 434	5611-1265(O)	2SA1265(O) } <i>O.P.</i>
<b>DIODES</b>		
△ D1, 2, 3, 4	5632-ERC102FL	ERC102FL
△ D5, 6, 403, 404, 405, 406	5632-DS135E	DS135E
D8	5635-HZ11B2L	Zener, HZ11B-2L
D10	5635-HZ6A-2L	Zener, HZ6A-2L
D11, 407, 408	5631-1S2473	1S2473
D13, 14	5635-HZ15-2L	Zener, HZ15-2L
D401, 402	5641-MV12YM	Varistor, MV12YM
<b>COILS</b>		
L401, 402, 403, 404	5597-45502	Ferrite Bead
L405, 406	5991-7165	
<b>MISCELLANEOUS</b>		
SW503	4411-403711	Rotary Switch, Mode
CN1	4443-060185	Connector, 6 Pos.
CN2	4443-030185	Connector, 3 Pos.
	2132-5049	Spacer, R16, R17 (only General and German models)
<b>PCB-2 BASS CONTOUR P.C. BOARD</b>		
<b>CAPACITORS</b>		
C521, 522	5345-104F0951	0.1 $\mu$ F, $\pm$ 20%, 50V, Electrolytic
C525, 526	5345-107D041	100 $\mu$ F, $\pm$ 20%, 25V, Electrolytic
C529, 530	5345-224F0951	0.22 $\mu$ F, $\pm$ 20%, 50V, Electrolytic
C581, 582	5345-227D041	220 $\mu$ F, $\pm$ 20%, 25V, Electrolytic
<b>TRANSISTORS</b>		
Q501, 502, 505, 506	5613-2603(F)	2SC2603(F) or 2SC2603(E)
Q503, 504	5611-1115(F)	2SA1115(F) or 2SA1115(E)
<b>DIODES</b>		
D521, 522	5635-HZ12B2L	Zener, HZ12B-2L
<b>MISCELLANEOUS</b>		
SW511/512/513/514	4431-04127170	Push Switch, Tape Copy, High Cut, Subsonic, Bass Contour
<b>PCB-3 PHONO EQUALIZER P.C. BOARD</b>		
<b>RESISTORS</b>		
R623, 624	5174-Z412228	41.2k $\Omega$ , $\pm$ 0.5%, 1/4W, Metal
<b>CAPACITORS</b>		
C601, 602	5345-336B0951	33 $\mu$ F, $\pm$ 20%, 10V, Electrolytic
C603, 604	5359-1215851	120pF, $\pm$ 5%, 100V, Polypropylene
C605, 606	5345-337A0952	330 $\mu$ F, $\pm$ 20%, 6.3V, Electrolytic
C607, 608	5359-5625851	5600pF, $\pm$ 5%, 100V, Polypropylene
C609, 610, 617, 618	5359-1825851	1800pF, $\pm$ 5%, 100V, Polypropylene
C611, 612	5359-1015851	100pF, $\pm$ 5%, 100V, Polypropylene
C613, 614, 615, 616	5345-106C0951	10 $\mu$ F, $\pm$ 20%, 16V, Electrolytic
C621, 622	5345-227D041	220 $\mu$ F, $\pm$ 20%, 25V, Electrolytic
<b>TRANSISTORS</b>		
Q601, 602	5613-2320L(F)	2SC2320L(F)
Q603, 604	5611-999L(F)	2SA999L(F)
Q605, 606, 607, 608	5611-1115(F)	2SA1115(F) or 2SA1115(E)
Q609, 610, 611, 612	5613-2603(F)	2SC2603(F) or 2SC2603(E)
<b>PCB-4 PHONO INPUT JACKS P.C. BOARD</b>		
J601/602	4482-7117	2-Pin Jack, Phono
C701, 702	5353-470534	Capacitor, 47pF, $\pm$ 5%, 500V, Mica (only German model)

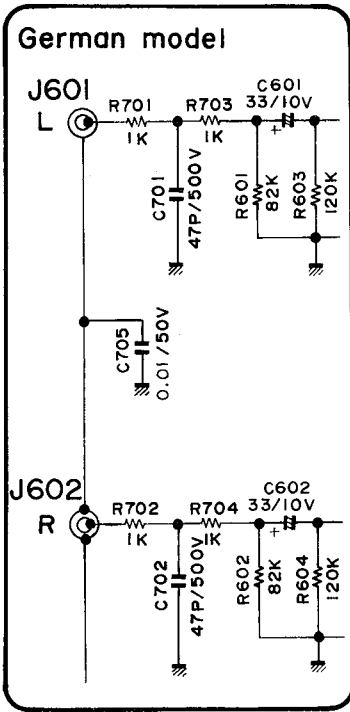


Ref. No.	Part No.	Description
<b>PCB-5 INPUT/OUTPUT JACKS P.C. BOARD</b>		
J501/502/503/504/505/506, 507/508/509/510/511/512 C707, 708	4486-8 5353-470534	6-Pin Jack, Tuner, Video/CD, Tape 1 In/Out, Tape 2 In/Out Capacitor, 47pF, $\pm 5\%$ , 500V, Mica (only German model)
<b>PCB-6 FUNCTION AND TAPE MONITOR SWITCHES P.C. BOARD</b>		
SW501, 502	4412-043742	Rotary Slide Switch, Function, Tape monitor
<b>PCB-7 FUNCTION INDICATORS P.C. BOARD</b>		
C571 D571, 572, 573, 574, 575	5345-106C0951 5637-GL5HD10	Capacitor, 10 $\mu$ F, $\pm 20\%$ , 16V, Electrolytic L.E.D., GL5HD10, Red, Tape 1, Tape 2, Video/CD, Tuner, Phono Indicators
<b>PCB-8 POWER SWITCH P.C. BOARD</b>		
$\Delta$ C1	5352-1030959	Capacitor, 0.01 $\mu$ F, $\pm 20\%$ , AC125V, Metalized Polyester (for U.S.A. and Canada models)
$\Delta$ C1	5352-1030958	Capacitor, 0.01 $\mu$ F, $\pm 20\%$ , AC250V, Metalized Polyester (for General and German models)
$\Delta$ R70	5135-335J50P	Resistor, 3.3M $\Omega$ , $\pm 5\%$ , 1/2W, Carbon (only General and German models)
$\Delta$ SW1	4431-A01716 4472-0131	Push Switch, Power Fuse Holder (X2)
<b>PCB-9 VOLUME CONTROL P.C. BOARD</b>		
VR503/504	5113-10419122	Control, 100k $\Omega$ B, Volume (w/Hexagon Nut)
<b>PCB-10 SPEAKER SWITCHES P.C. BOARD</b>		
SW401/402	4431-02047464	Push Switch, Speakers 1, Speakers 2
<b>PCB-11 HEADPHONE JACK P.C. BOARD</b>		
J401	4451-00159	Jack, Headphones
<b>PCB-12 POWER INDICATOR P.C. BOARD</b>		
C2 D7	5345-106C0951 5637-GL5HD10	Capacitor, 10 $\mu$ F, $\pm 20\%$ , 16V, Electrolytic L.E.D., GL5HD10, Red, Power Indicator

$\Delta$  SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

# SCHEMATIC DIAGRAM

## German model



## EQUALIZER

PHONO

INPUT

## SW501 FUNCTION

phono-tuner-video/CD phono-tuner-video/CD

J501  
L  
TUNER

J502  
R

J503  
L  
VIDEO/CD

J504  
R

J505  
L

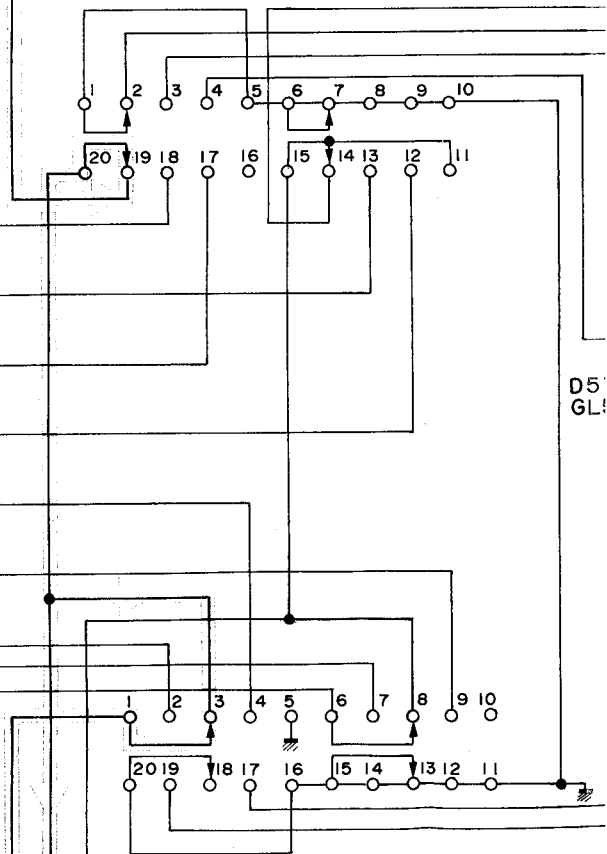
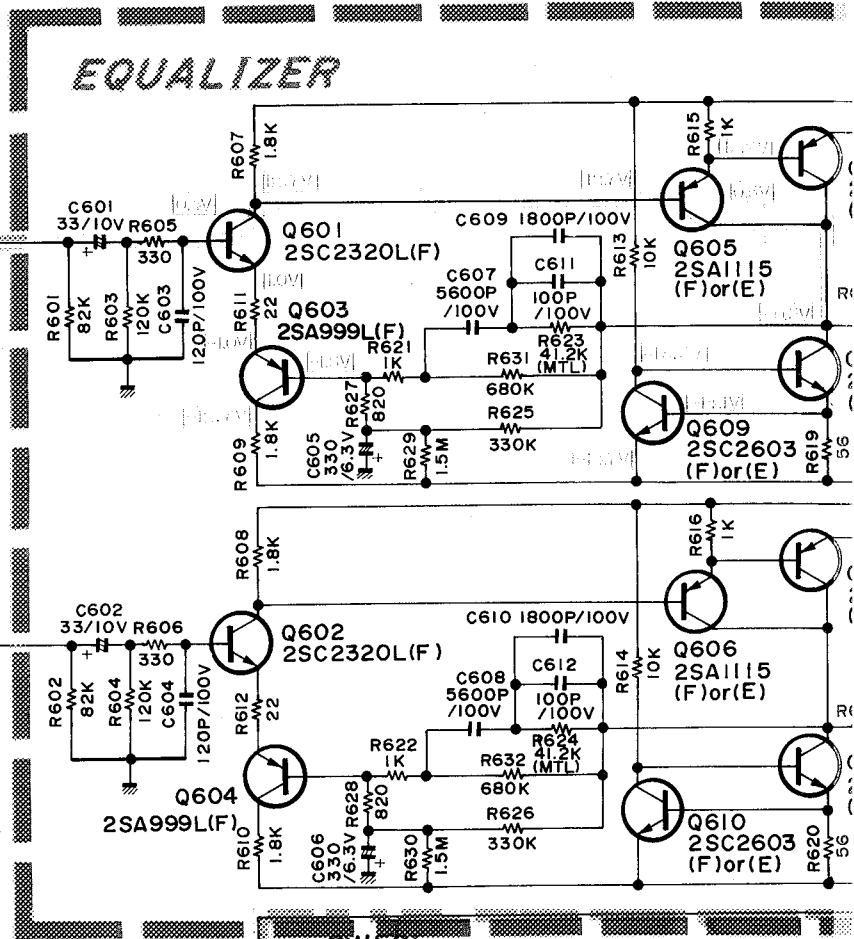
IN

J506  
R

J507

TAPE I

J507



D5  
GL!

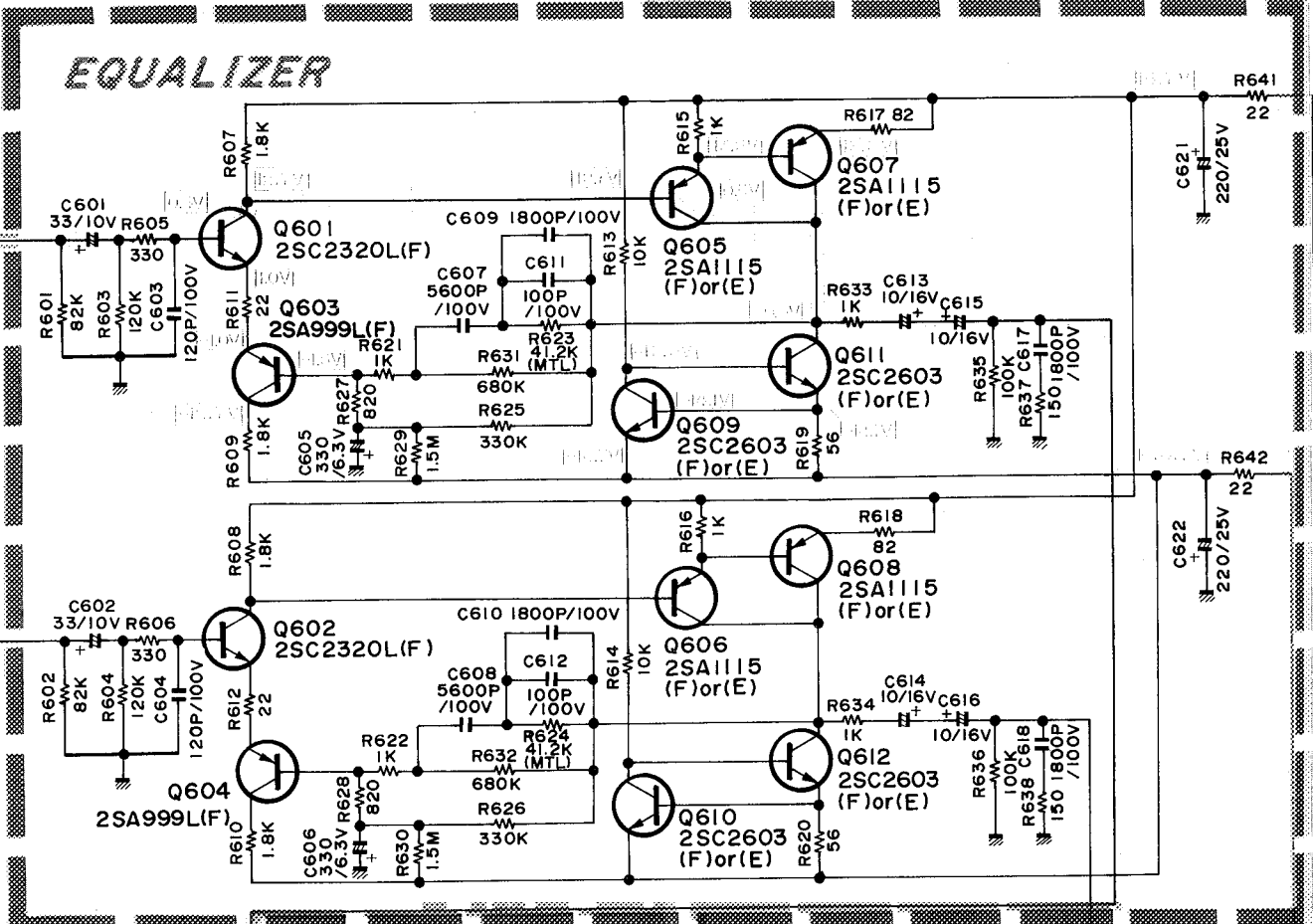
B

C

D

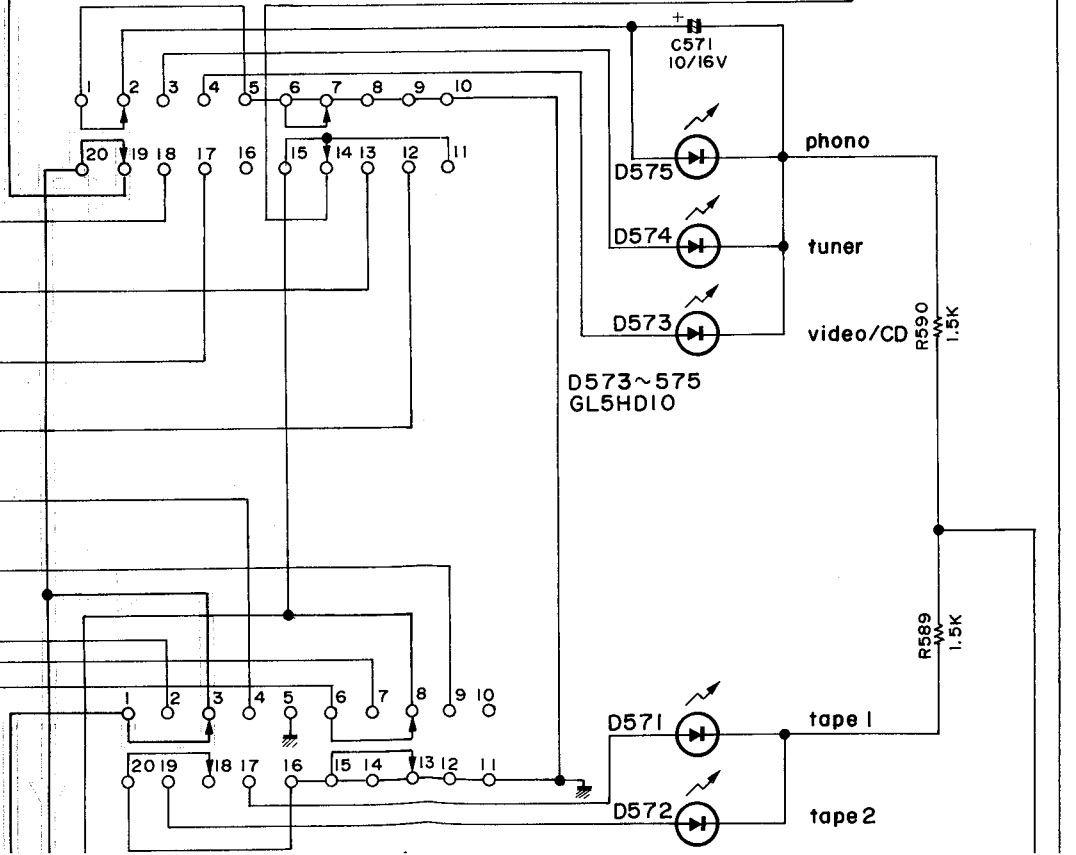
E

# EQUALIZER



## SW501 FUNCTION

phono-tuner-video/CD phono-tuner-video/CD



J601 L

PHONO

J602 R

PUT

J501 L

TUNER R

J502 R

J503 L

VIDEO/CD R

J504 R

J505 L

IN R

J506 R

PE I

J507

R641 22

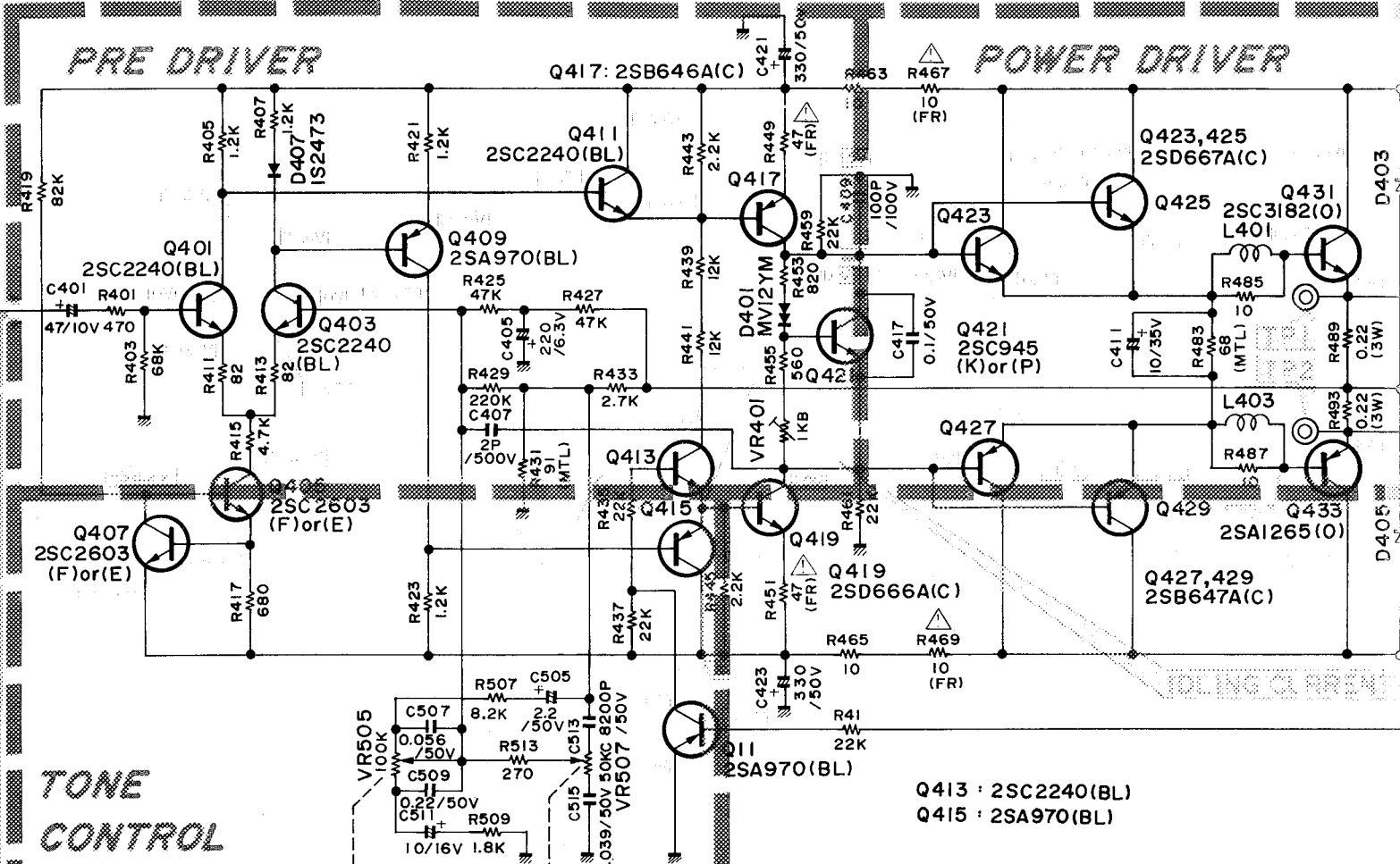
R642 22

R590 1.5K

R589 1.5K

PRE DRIVER

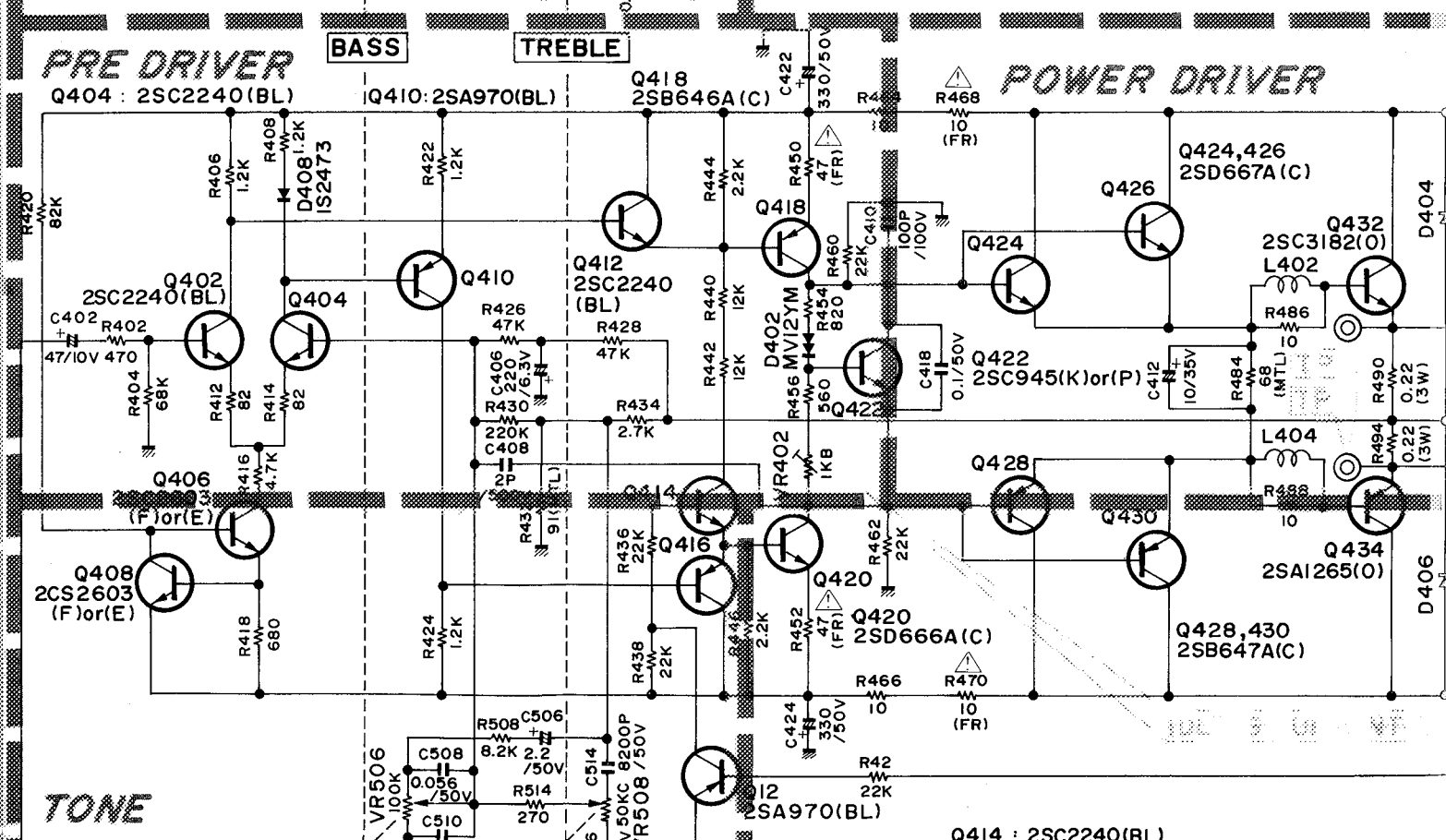
POWER DRIVER



TONE CONTROL

PRE DRIVER

POWER DRIVER



TONE

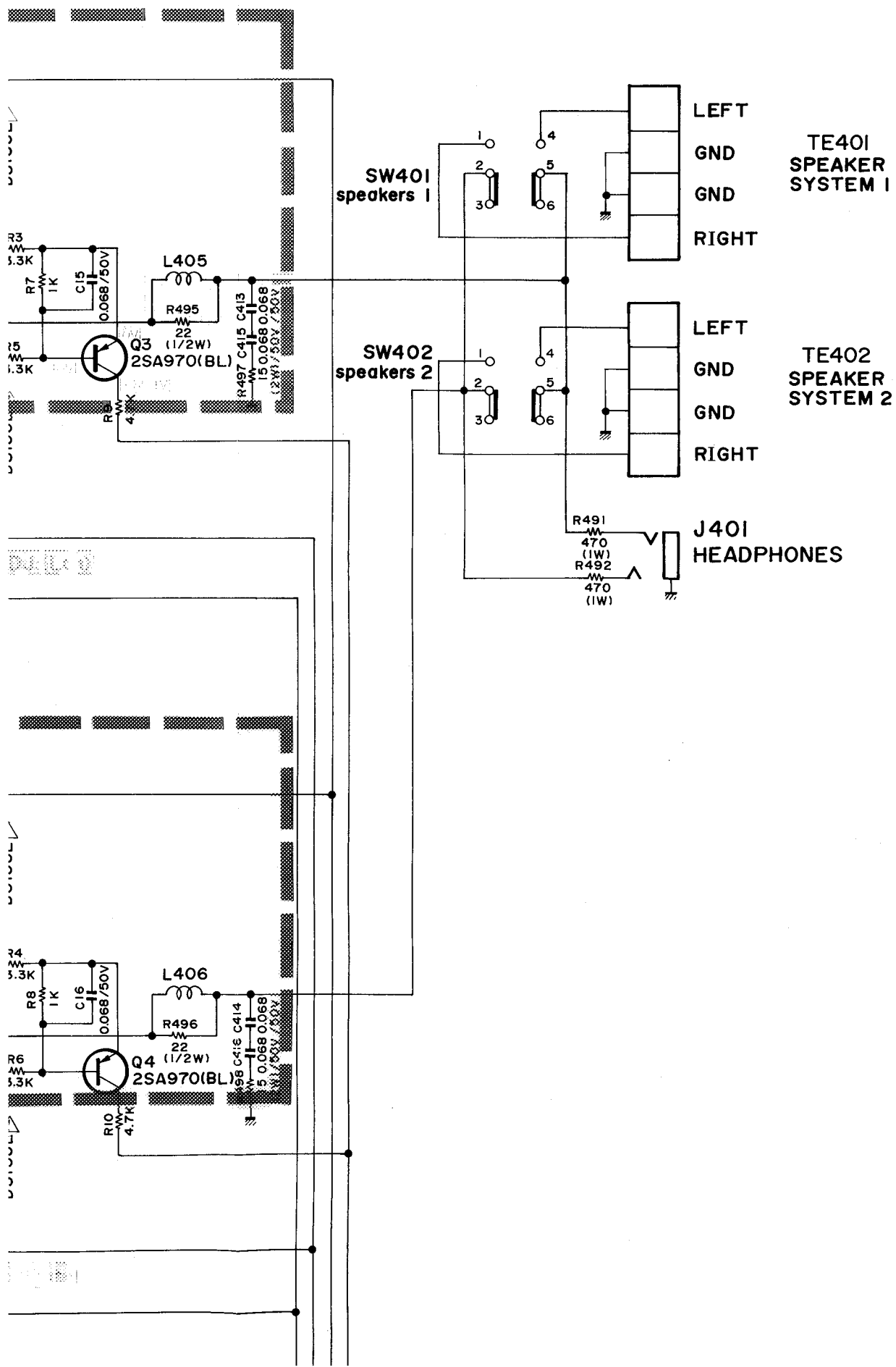
Q414 : 2SC2240(BL)

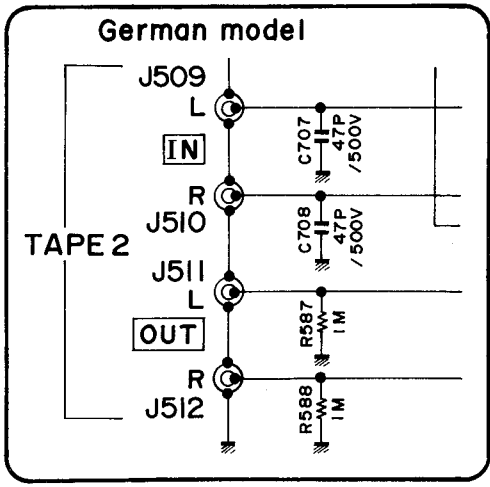
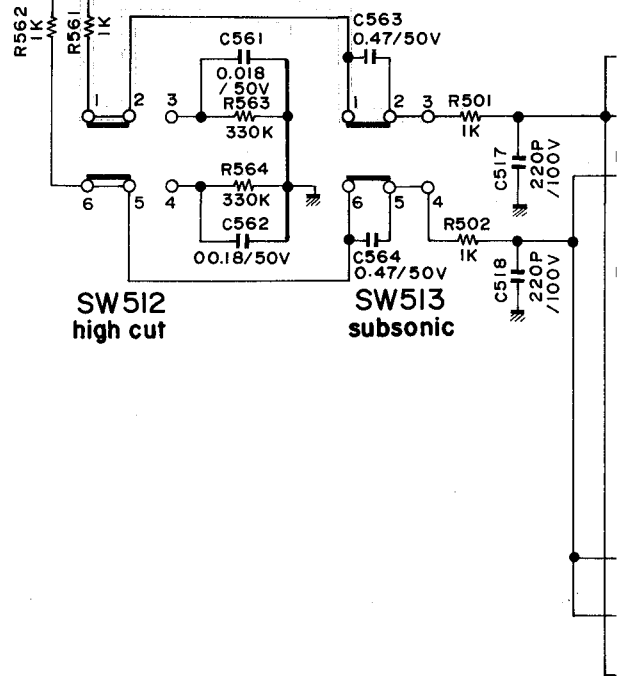
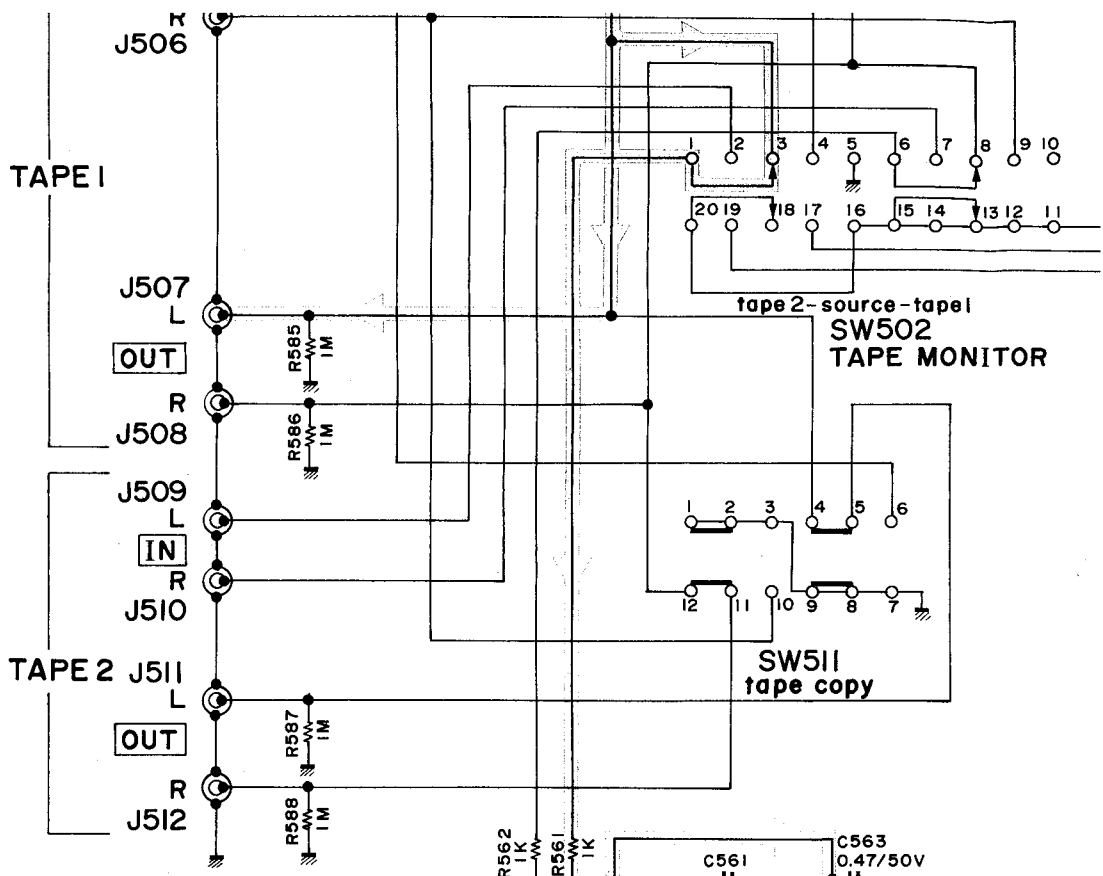
K

L

M

N





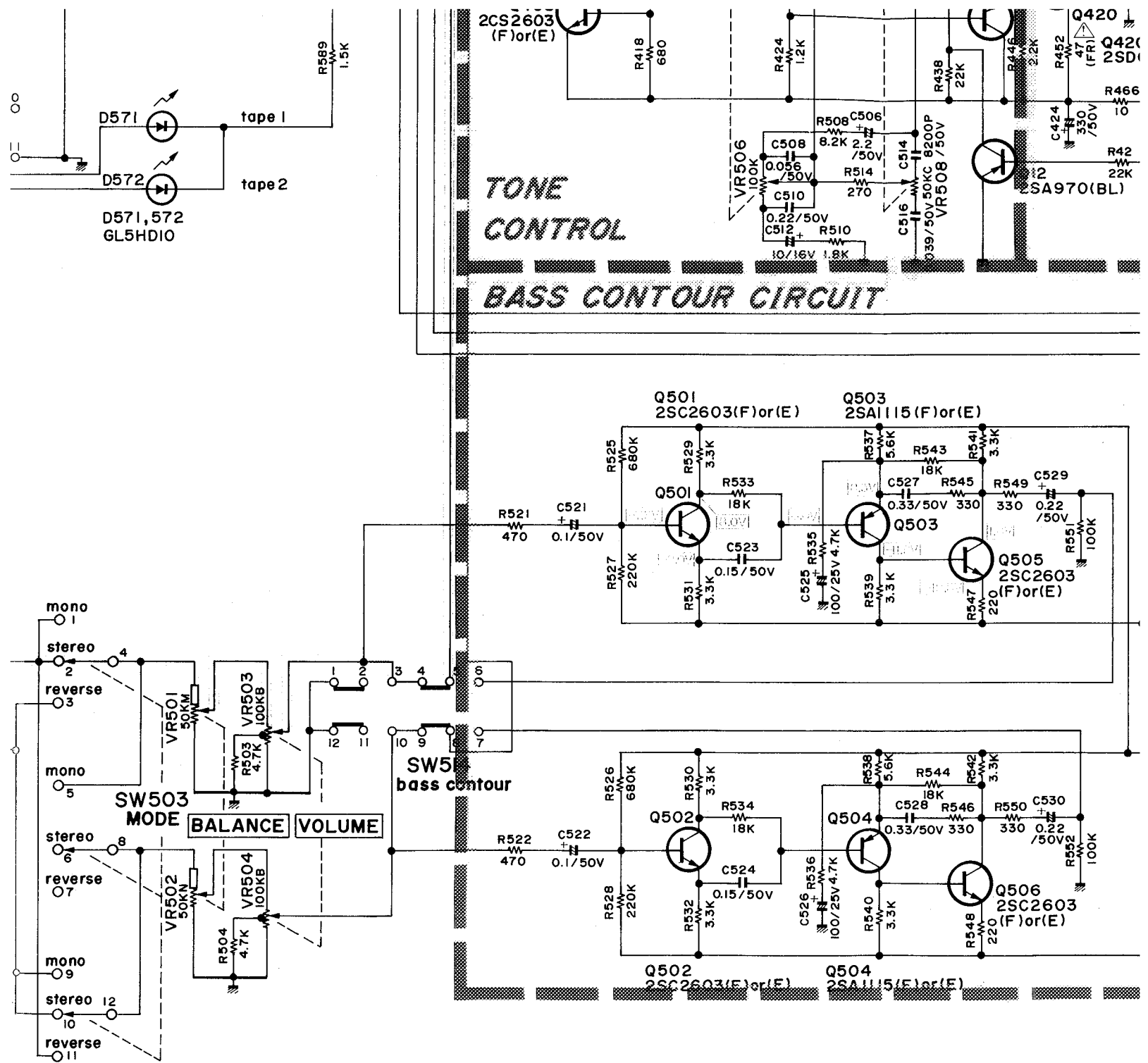
6


7

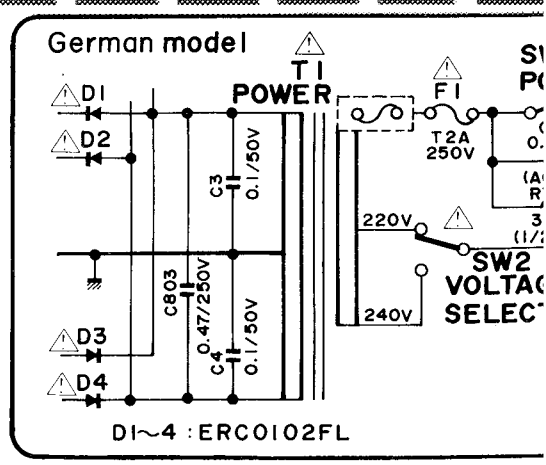
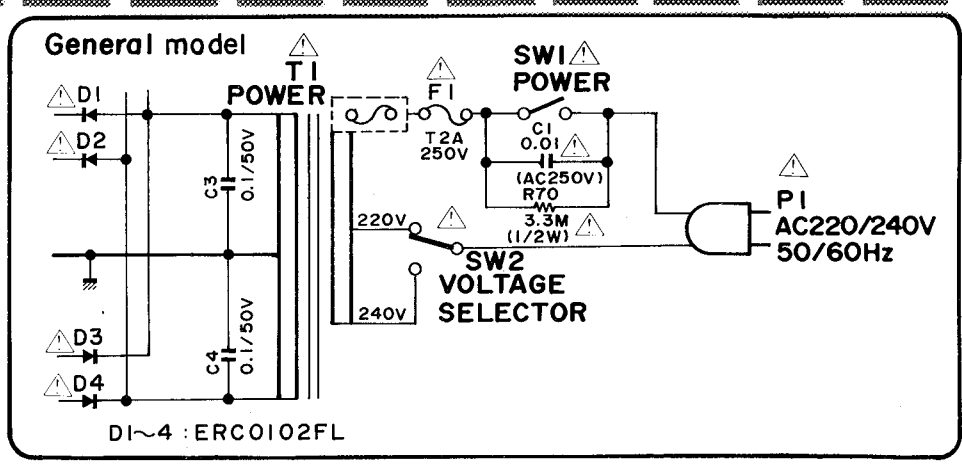
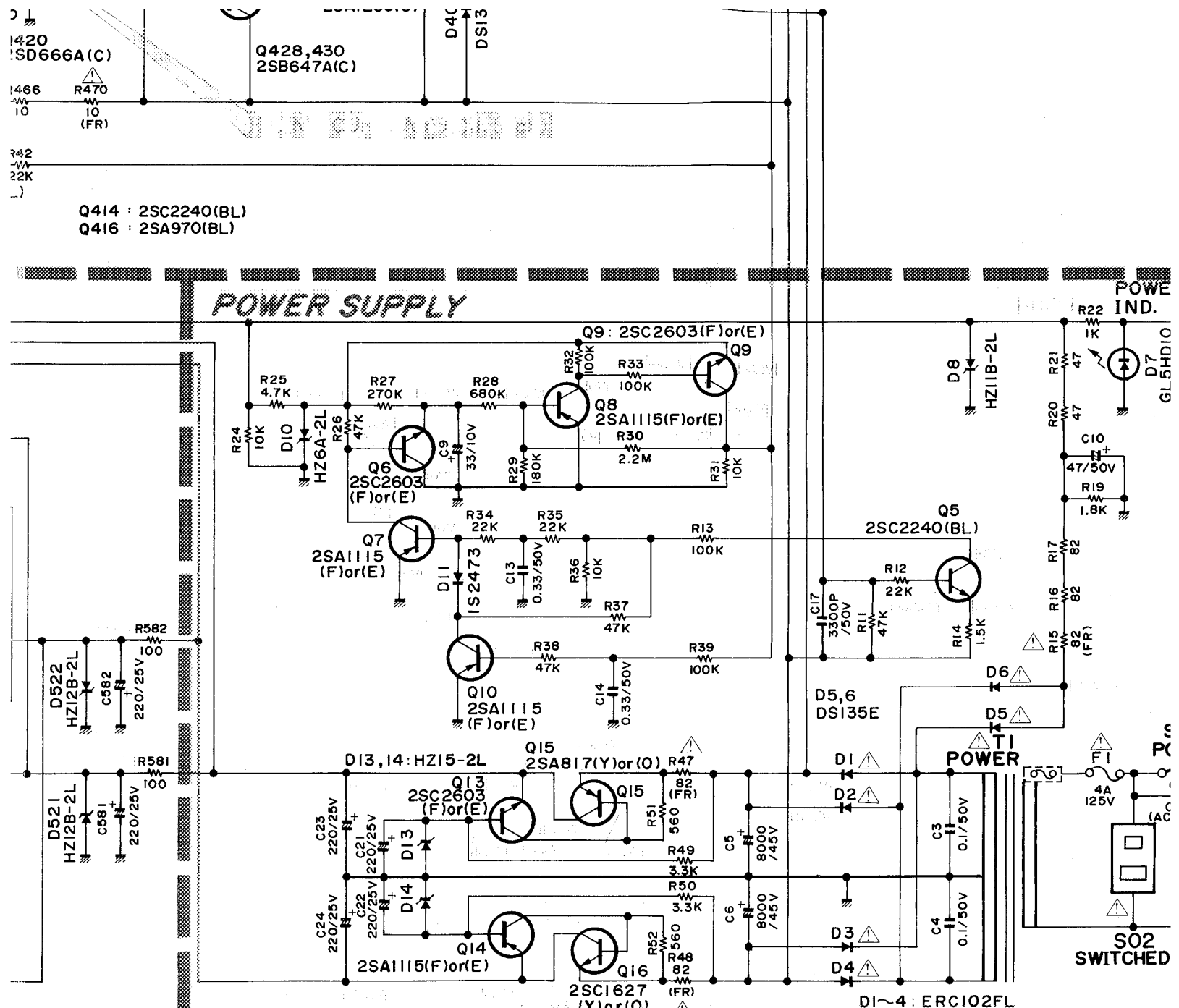
8

9

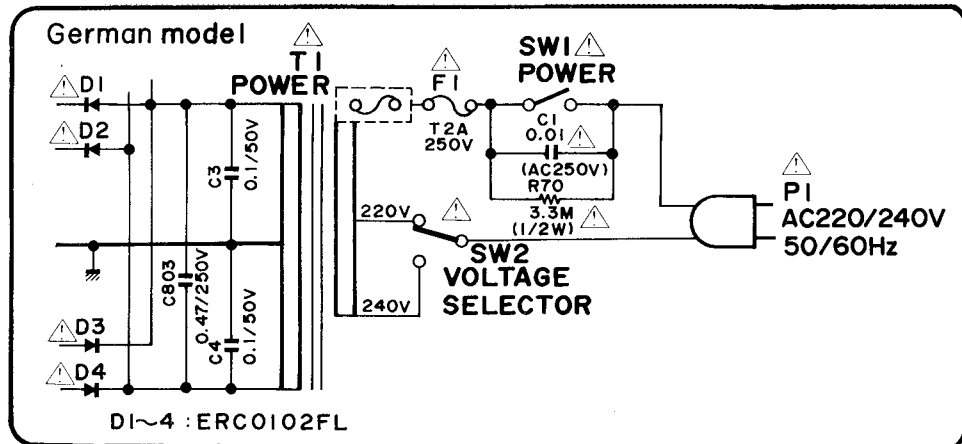
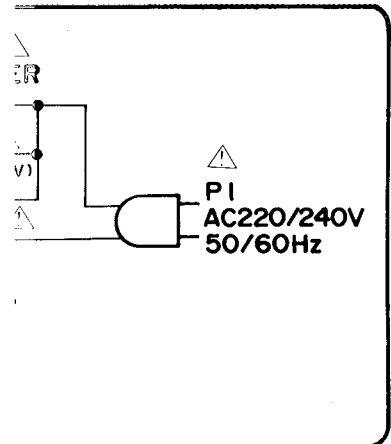
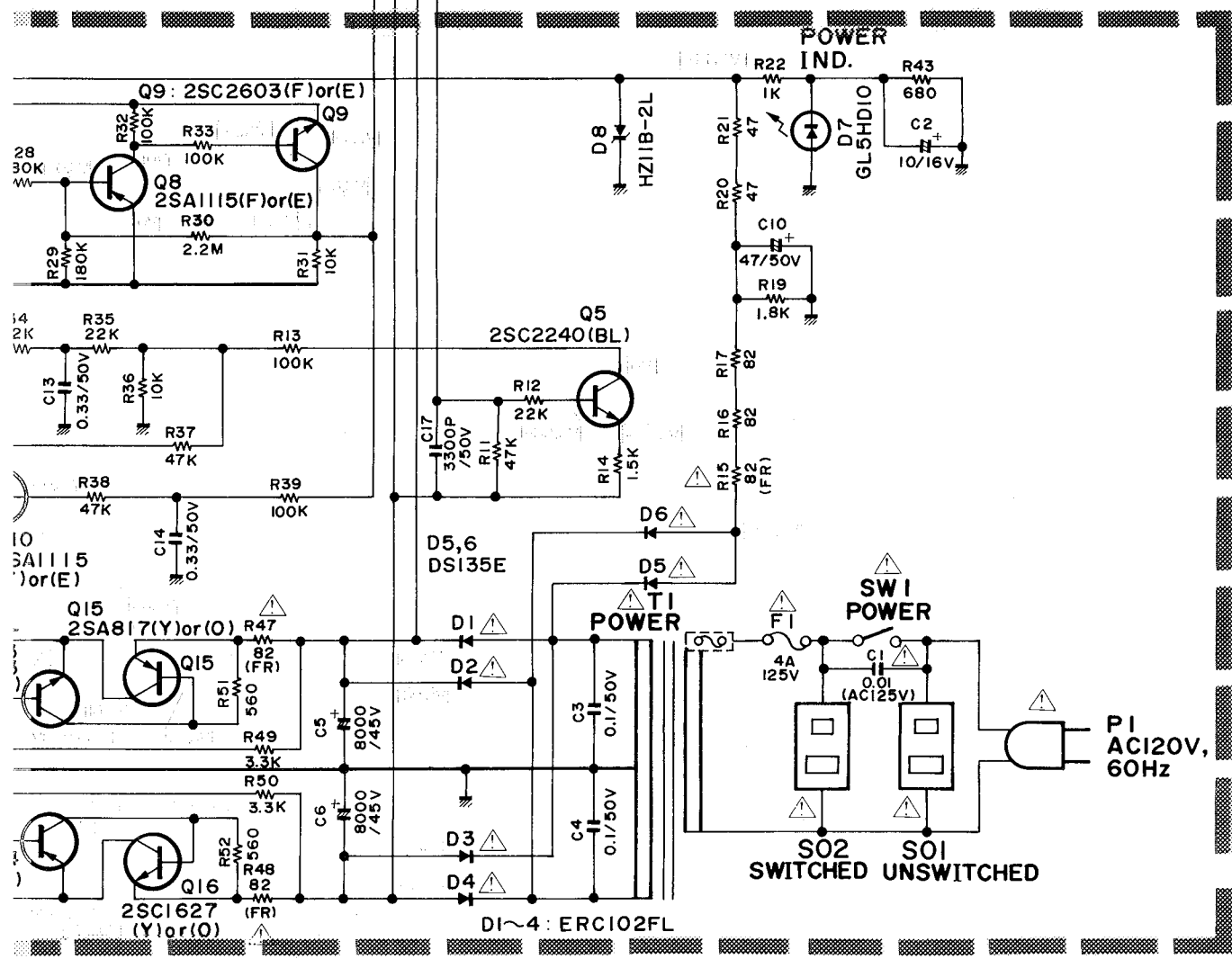
10



1. ALL RESISTANCES VALUES ARE IN  $\Omega$ .  
K $\Omega$ =1000 $\Omega$ , M $\Omega$ =1000K $\Omega$ .
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN  $\mu$ F UNLESS OTHERWISE NOTED. P= $\mu$ mF
4.  $\dots$  V : DC VOLTAGE AT NO SIGNAL
5.  SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.







A

B

C

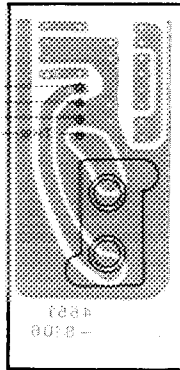
D

# WIRING DIAGRAM

1

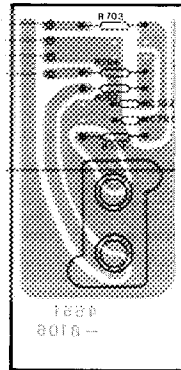
German model

PCB-4



L J601  
PHONO  
R J602

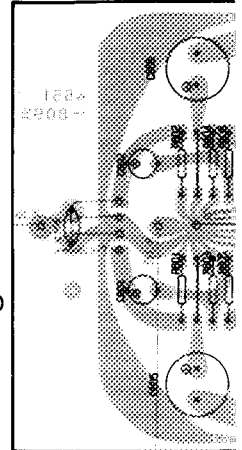
PCB-4



LUG2

L J601  
PHONO  
R J602

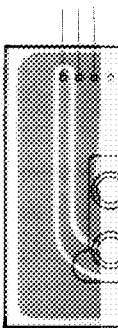
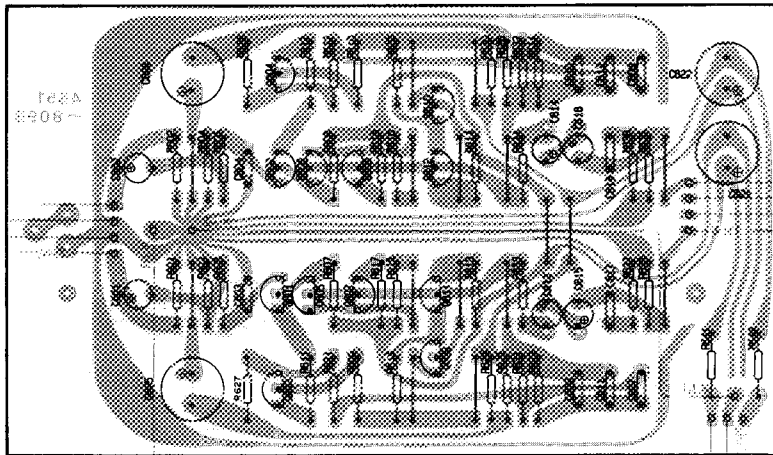
PCB-3



2

3

PCB-3



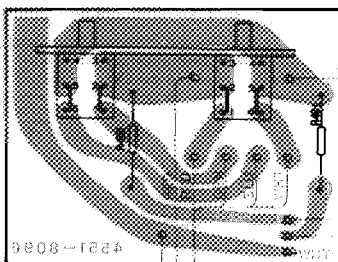
LEFT J5C  
RIGHT J5C  
TUN

4

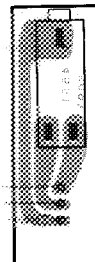
SW402 SW401  
speakers 2 speakers 1

J401  
HEADPHONES

5



PCB-10



PCB-11

TE4

B

C

D

E

German model

German model

4

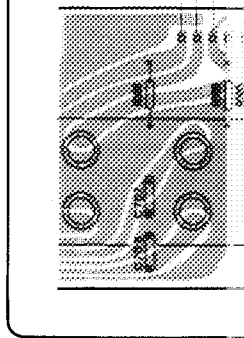
PCB-3

PCB-4

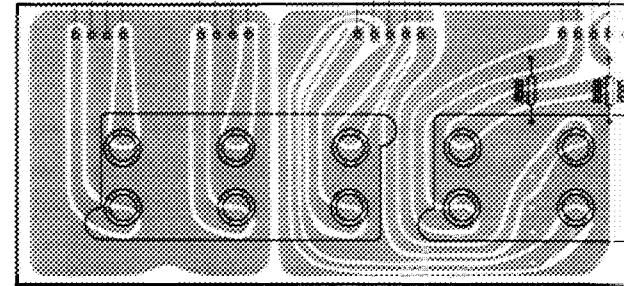
LUG2

L J601  
PHONO  
R J602

L J601  
PHONO  
R J602



3

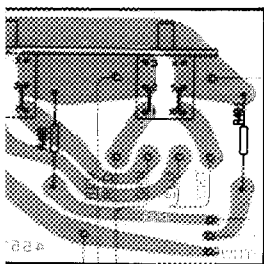


LEFT	J501	J503	J505	J507	J509
RIGHT	J502	J504	J506	J508	J510
	TUNER	VIDEO/CD	IN	OUT	IN
	INPUT		TAPE I		TA

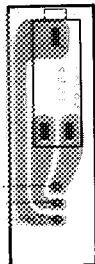
J402 SW401  
speakers 2 speakers 1

J401  
HEADPHONES

SPEAKER SYSTEM 1  
LEFT GND  
GND RIGHT



PCB-10



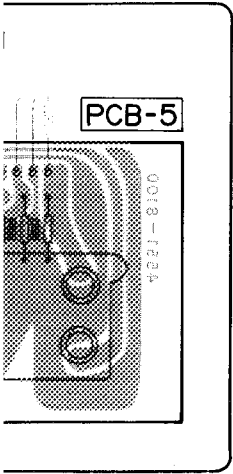
PCB-11

TE401

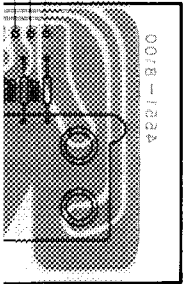
TE402

LEFT GND  
GND RIGHT  
SPEAKER SYSTEM 2

PCB-5



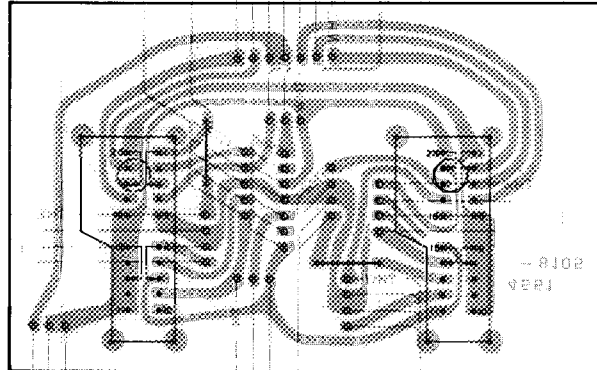
PCB-5



J511  
J512  
OUT

APE2

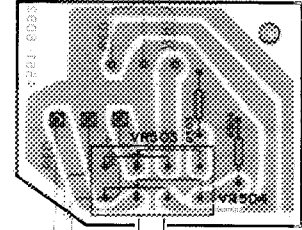
PCB-6



SW502  
TAPE  
MONITOR

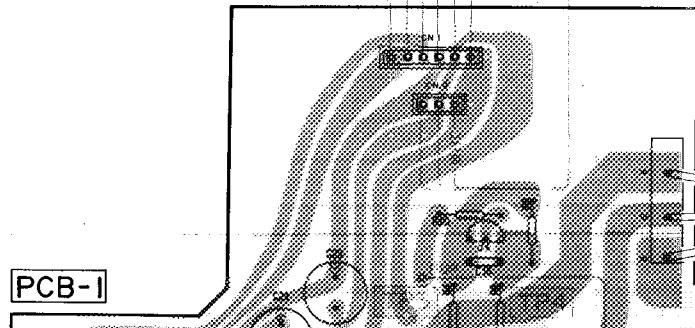
SW501  
FUNCTION

PCB-9

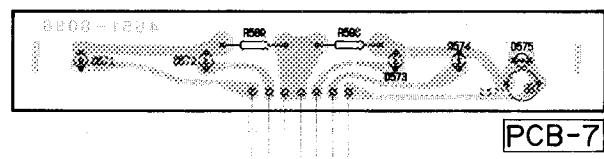


VOLUME

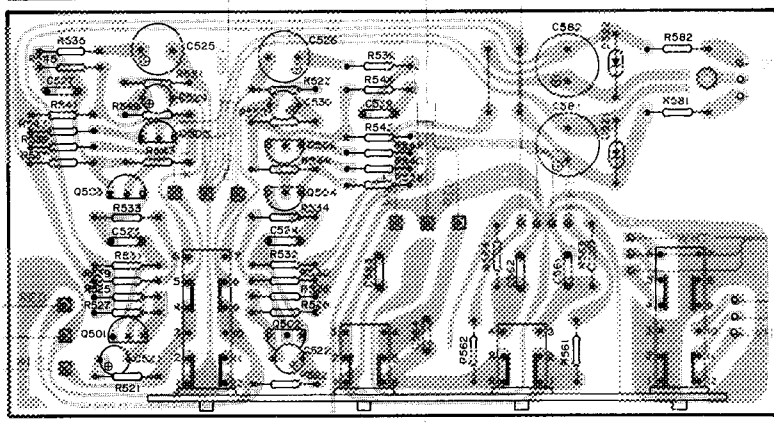
PCB-1



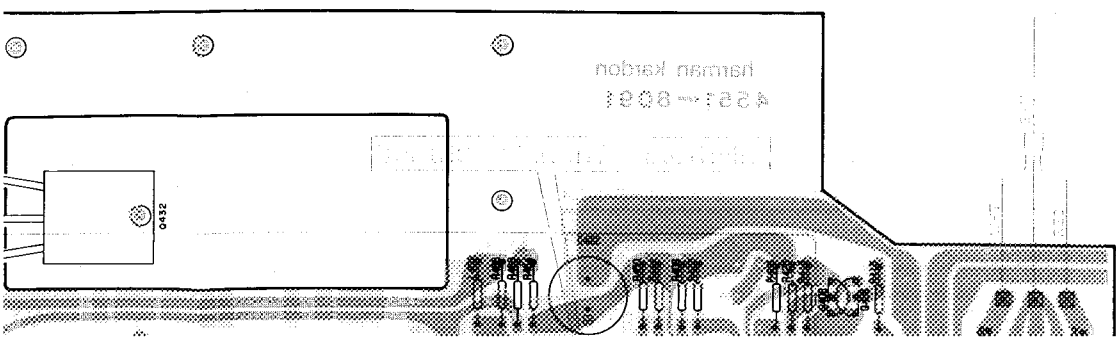
tape1      tape2      video/CD      phono  
tuner



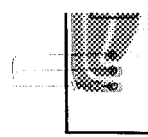
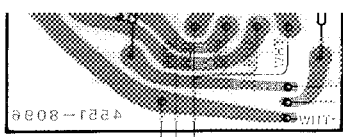
PCB-2



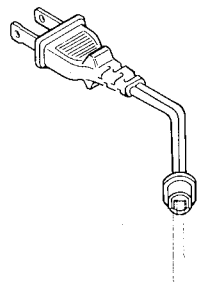
SW514      SW513      SW512      SW511  
bass          subsonic      high cut      tape copy  
contour



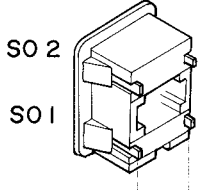
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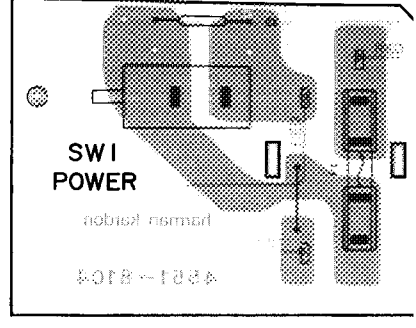
PI  
AC120V, 60Hz



AC OUTLET

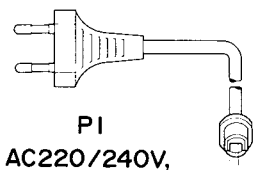


PCB-8



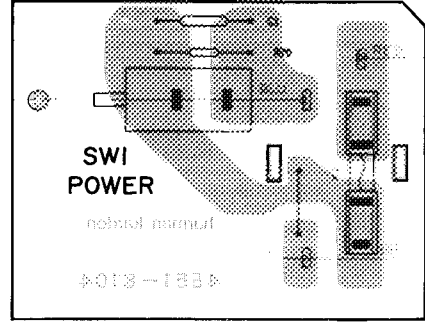
7

General and German models



PI  
AC220/240V,  
50/60Hz

PCB-8



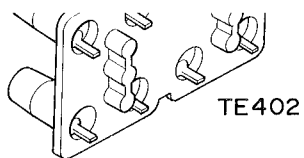
8

9

PIN CONNECTION DIAGRAM OF TRANSISTORS AND DIODES

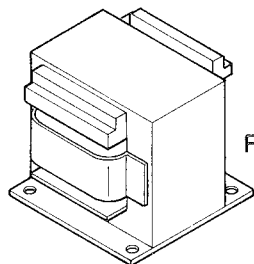
<p>2SA970 2SC2240 2SA817 2SC945 2SC2320L 2SA999L</p>	<p>2SC2603 2SA1115 2SC1627</p>	<p>2SB646A 2SD666A 2SD667A 2SB647A</p>	<p>2SC3182 2SA1265</p>	<p>ERC102FL DS135E</p>	<p>HZ11B2L HZ6A-2L 1S2473 HZ15-2L HZ12B2L</p>
--	--	--	----------------------------	----------------------------	---

10

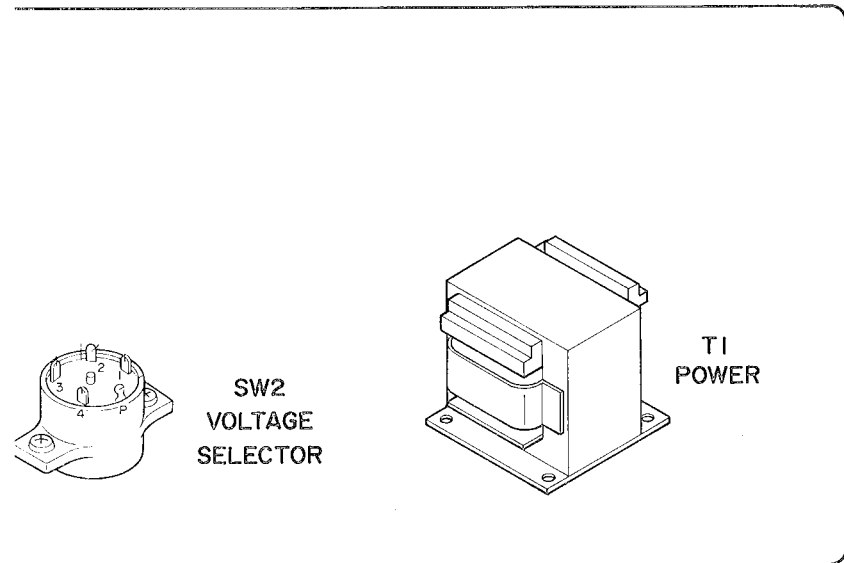


TE402

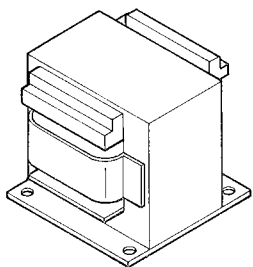
LEFT GND  
GND RIGHT  
SPEAKER SYSTEM 2



TI  
POWER

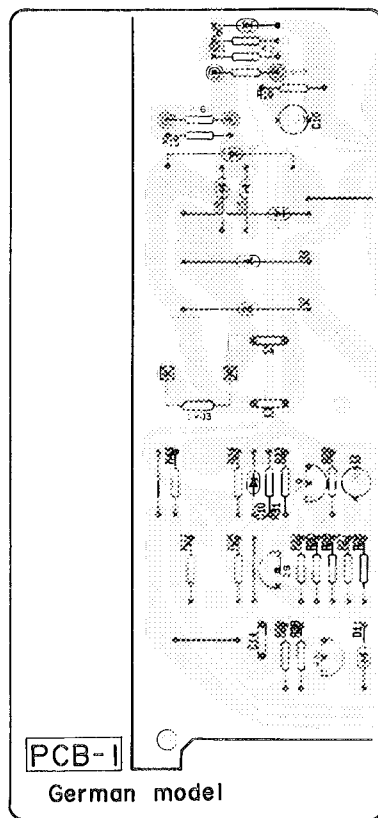
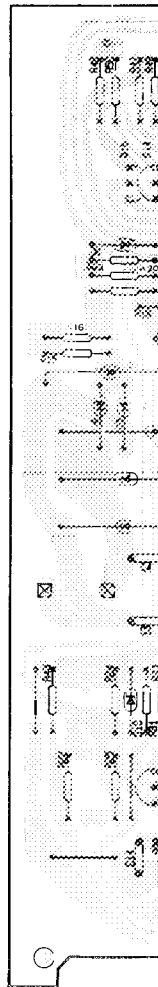


SW2  
VOLTAGE  
SELECTOR



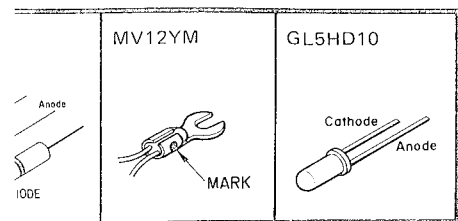
TI  
POWER

PCB-1



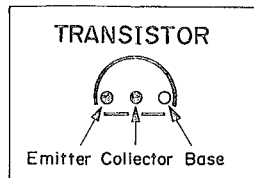
PCB-1

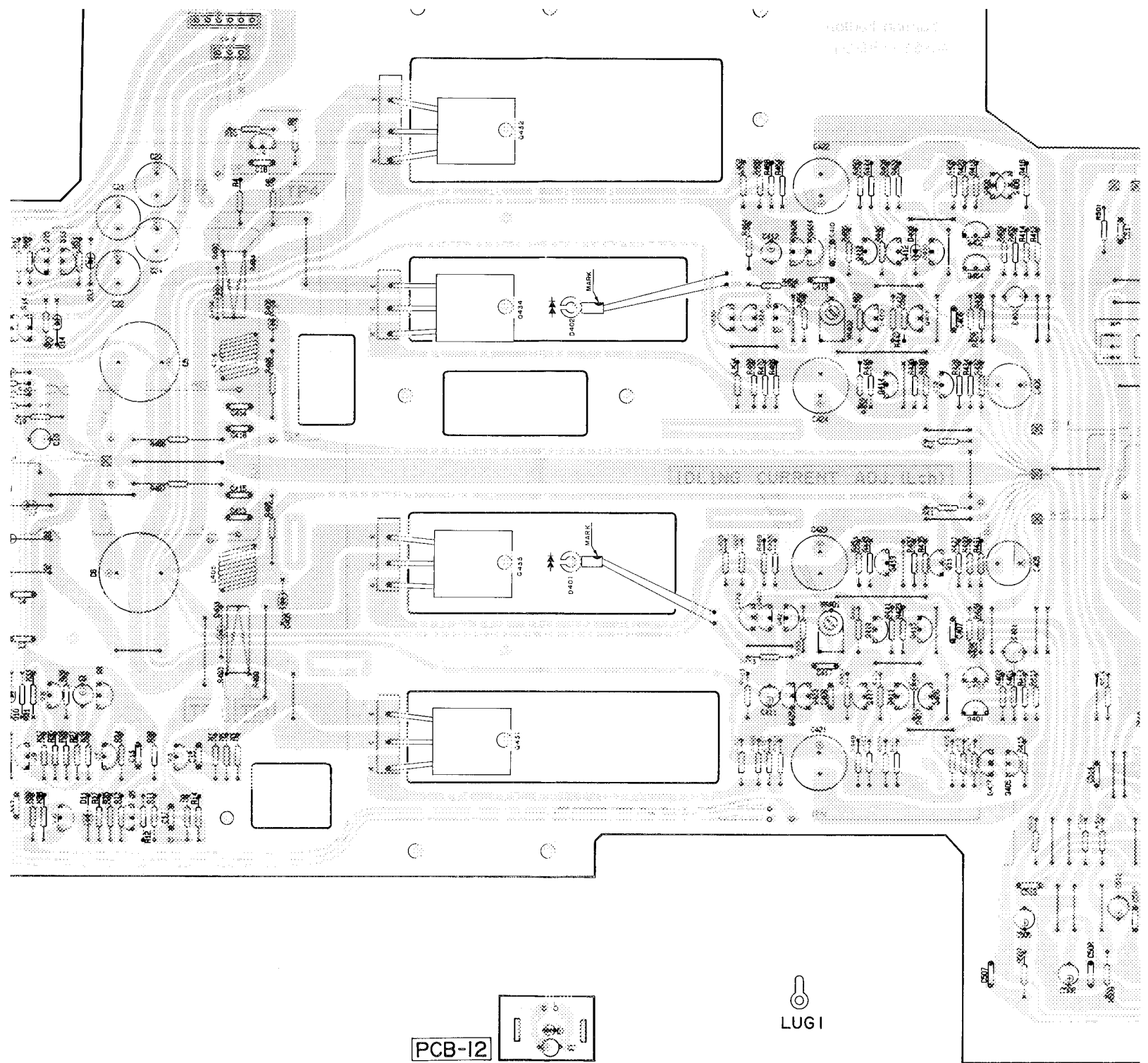
German model



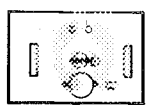
◦ WIRE COLOR ABBREVIATIONS

- RED : Red
- ORG : Orange
- BLU : Blue
- WHT : White
- GRN : Green
- BLK : Black
- YEL : Yellow
- PUP : Purple
- PIK : Pink





PCB-12

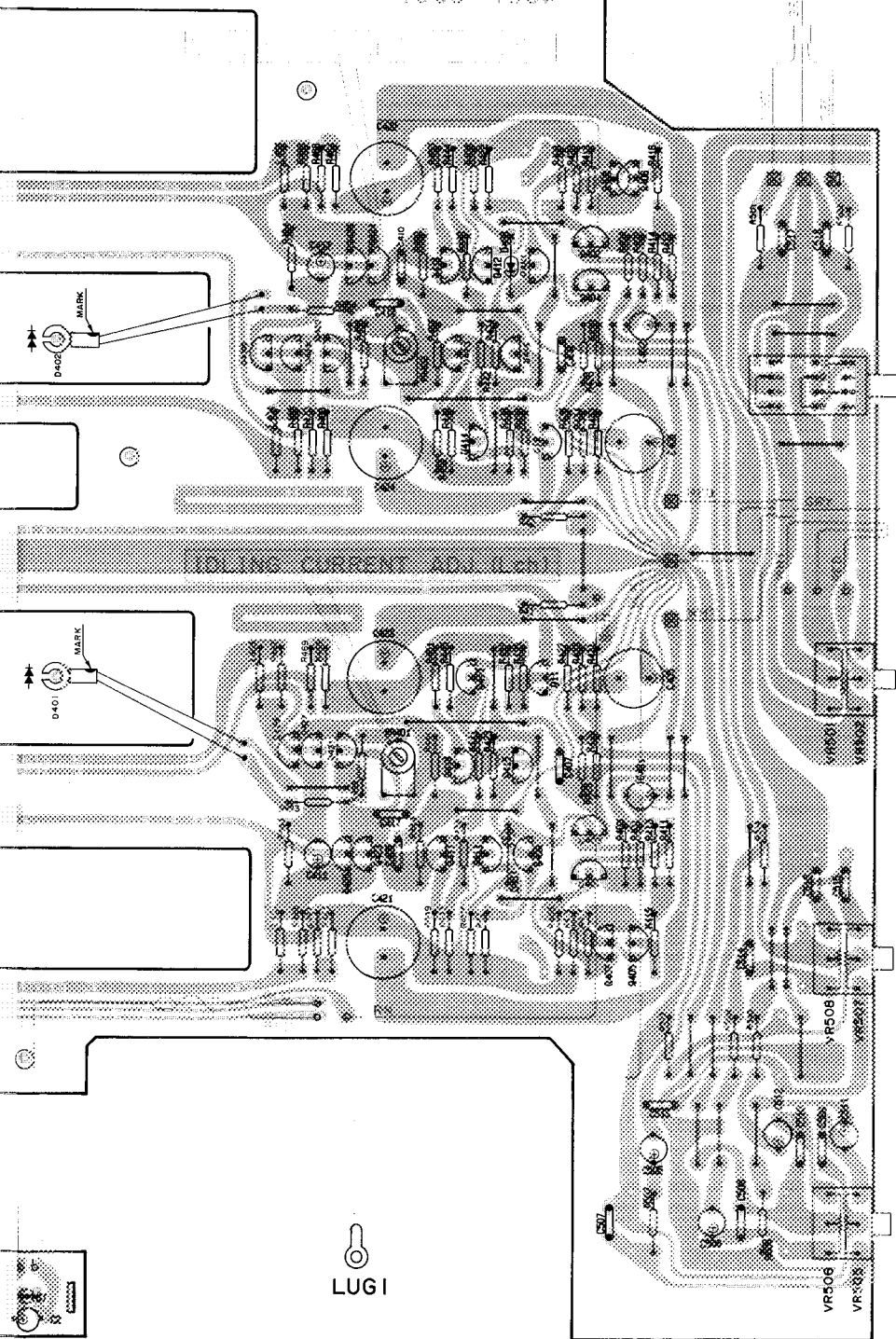


POWER IND.



LUG 1





SW503  
MODE

BALANCE

TREBLE

BASS

LUG 1

POWER IND.