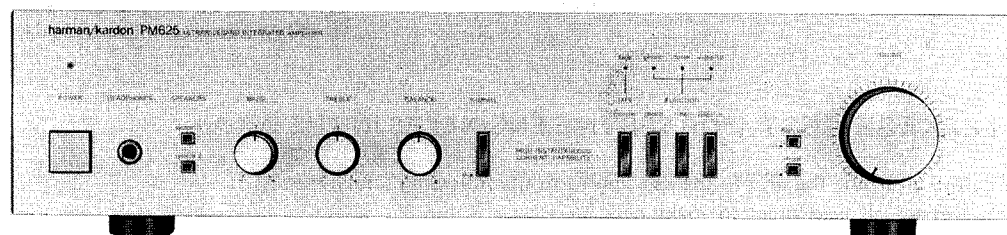


The Harman Kardon Model PM625

Manual 84A

ULTRAWIDEBAND INTEGRATED AMPLIFIER

Technical Manual



PM625

harman/kardon

240 Crossways Park West, Woodbury, N.Y. 11797
1112-H15284A8 P-088502 1850 Printed in Japan

SPECIFICATIONS

	Nominal	Limit
RMS Output Power		
8Ω, 1kHz, THD 0.1%	24W	≥ 20W
4Ω, 1kHz, THD 0.1%	38W	≥ 35W
High Instantaneous Current Capability (HCC)	18A	
Half Power Bandwidth	10Hz ~ 90kHz	
Frequency Response at -3dB	4Hz ~ 110kHz	
Usable Sensitivity		
Video/CD, Tuner	135mV ± 25mV	
Phono	2.2mV ± 0.3mV	
Signal to Noise Ratio		
Video/CD, Tuner	86dB	≥ 78dB
Phono	80dB	≥ 72dB
Channel Separation at 10 kHz		
Video/CD, Tuner	57dB	≥ 45dB
Phono	56dB	≥ 50dB
IM Distortion Ratio	0.03%	≤ 0.1%
Damping Factor at 1kHz	85	≥ 60
Tone Control Characteristics		
Bass at 50 Hz		
Boost	10dB	± 2dB
Cut	-10dB	± 2dB
Treble at 10kHz		
Boost	10dB	± 2dB
Cut	-10dB	± 2dB

	Nominal	Limit
Loudness Control (with Volume control at -40dB)		
at 10kHz	3dB	± 1.5dB
at 50Hz	10dB	± 2dB
DC Output Voltage		
L channel	0mV	± 60mV
R channel	0mV	± 60mV
RIAA Equalization	0.6dB	≤ 1.5dB / 0.2dB ≤ 1.5dB
at Tape Out (20Hz/20kHz)		
(No load)		
Phono Overload (No load)	140mV	≥ 100mV
Dimensions (W x H x D)	17-1/2" x 4-1/16" x 13-7/8"	
	(443 x 103 x 353 mm)	
Weight	12 lbs. 13 oz.	(5.8 kg)
Power Supply		
U.S.A. and Canada models	AC120V, 60Hz	
General and German models	AC220/240V, 50/60Hz	
Power Consumption		
U.S.A. and Canada models	165W	
General and German models	120W	

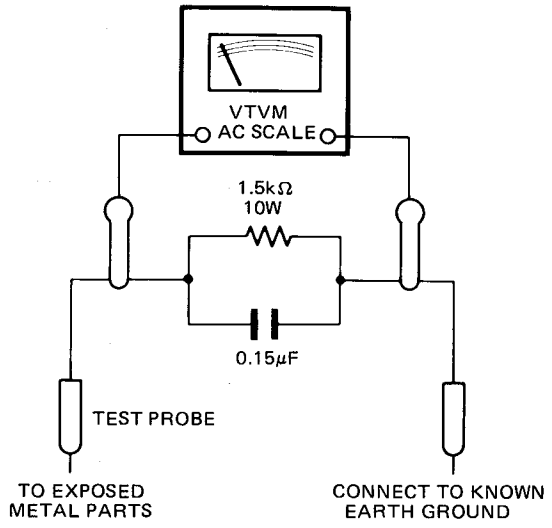
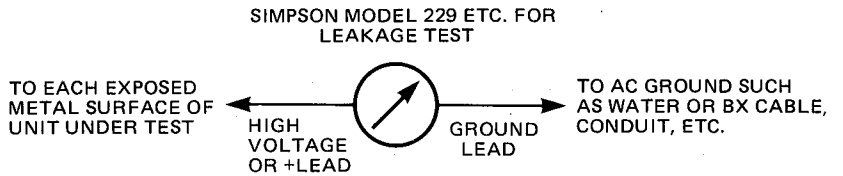
This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument. Specifications and components subject to change without notice. Overall performance will be maintained or improved.

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.



PM625

ALIGNMENT PROCEDURES

IDLING ADJUSTMENT

Conditions: ● Press the video/CD switch.
● Set the volume to minimum.

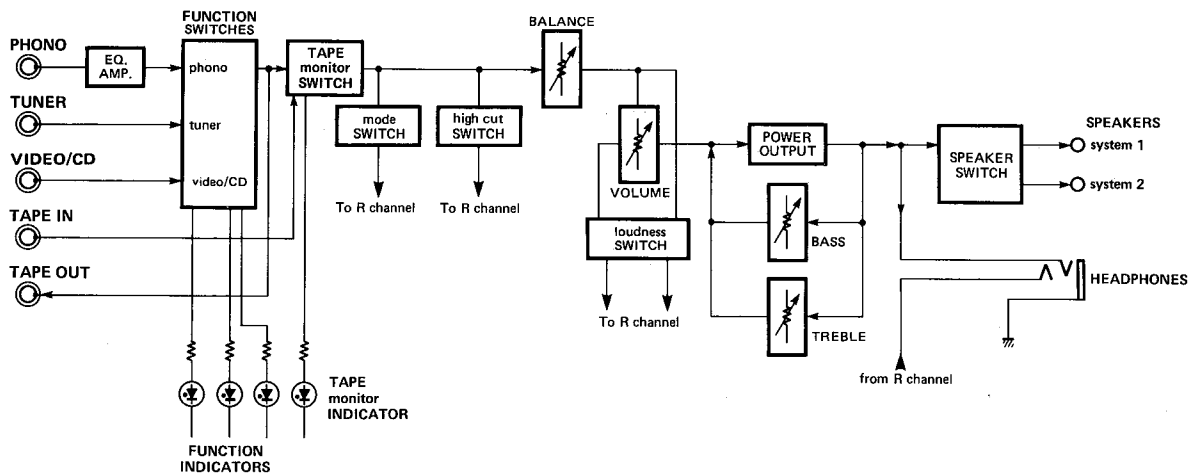
- Set the speaker system switches 1 and 2 to OFF.
- Make the adjustment at a room temperature of 25°C.

Step	Connections required	Adjustment location	Adjustment value
1	Connect the digital voltmeter to TP1 and TP2.	VR401(L channel)	26mV
2	Connect the digital voltmeter to TP3 and TP4.	VR402(R channel)	26mV
3	Repeat steps 1 and 2 after aging for 15 minutes.	VR401/VR402	26mV/26mV

DC BALANCE CONFIRMATION

Step	Connections required	Correct value
1	Connect the digital voltmeter between TP5 and ground.	$0 \pm 60\text{mV}$
2	Connect the digital voltmeter between TP6 and ground.	$0 \pm 60\text{mV}$

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

● OVERLOAD PROTECTION Lch (Rch)

As soon as the current over rated power flows, the voltage between TP1 (TP3) and TP2 (TP4) rises and Q3 (Q4), Q5 and Q13 are turned ON. So Q7 (Schmit trigger circuit) is turned ON. The base of Q1 becomes 0V and Q1 is turned OFF. The operation of power amp. circuit stops and the circuit is protected.

DISASSEMBLY PROCEDURES (REFER TO PAGES 5 AND 10)

1 CABINET TOP REMOVAL

Remove 6 screws **A** and then remove the cabinet top.

2 FRONT PANEL ASSEMBLY REMOVAL

1. Remove the cabinet top (refer to step **1**).
2. Pull off Volume, Bass, Treble and Balance knobs (103 and 104).
3. Open the lid of connector (J551) on the tape monitor & function switches P.C. board (PCB-3) and then disconnect P551 from J551.
4. Remove 6 screw **B** mounting the front panel assembly with function & tape monitor indicators and power indicator P.C. boards (PCB-9 and PCB-10), and pull the them toward you to remove.

3 TAPE MONITOR & FUNCTION SWITCHES P.C. BOARD (PCB-3) REMOVAL

1. Remove the front panel assembly (refer to step **2**).
2. Remove 2 screws **C** and then remove the tape monitor & function switches P.C. board (PCB-3).
If necessary, unsolder the leads.

4 MAIN P.C. BOARD (PCB-1) REMOVAL

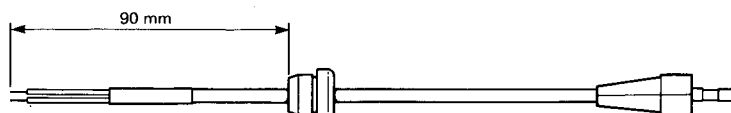
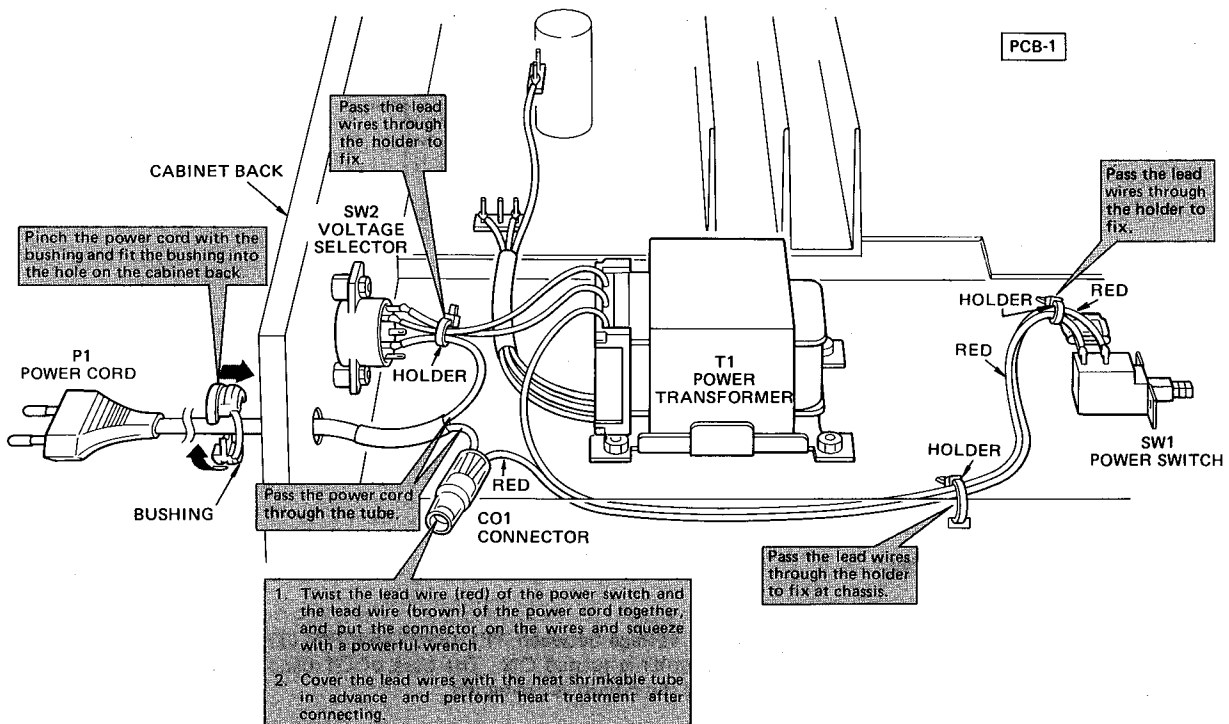
1. Remove the tape monitor & function switches P.C. board (PCB-3) (refer to step **3**).
2. Disconnect J501 from P501 on the volume control P.C. board (PCB-8).
3. Remove 7 screws **D** and 4 screws **E**, and remove cabinet back assembly (102) with speaker terminals P.C. board (PCB-6). If necessary, unsolder the leads.
4. Remove 3 hexagonal nuts **F**.
5. Remove 4 screws **G** and 4 screws **H**, and remove the main P.C. board (PCB-1) backward.

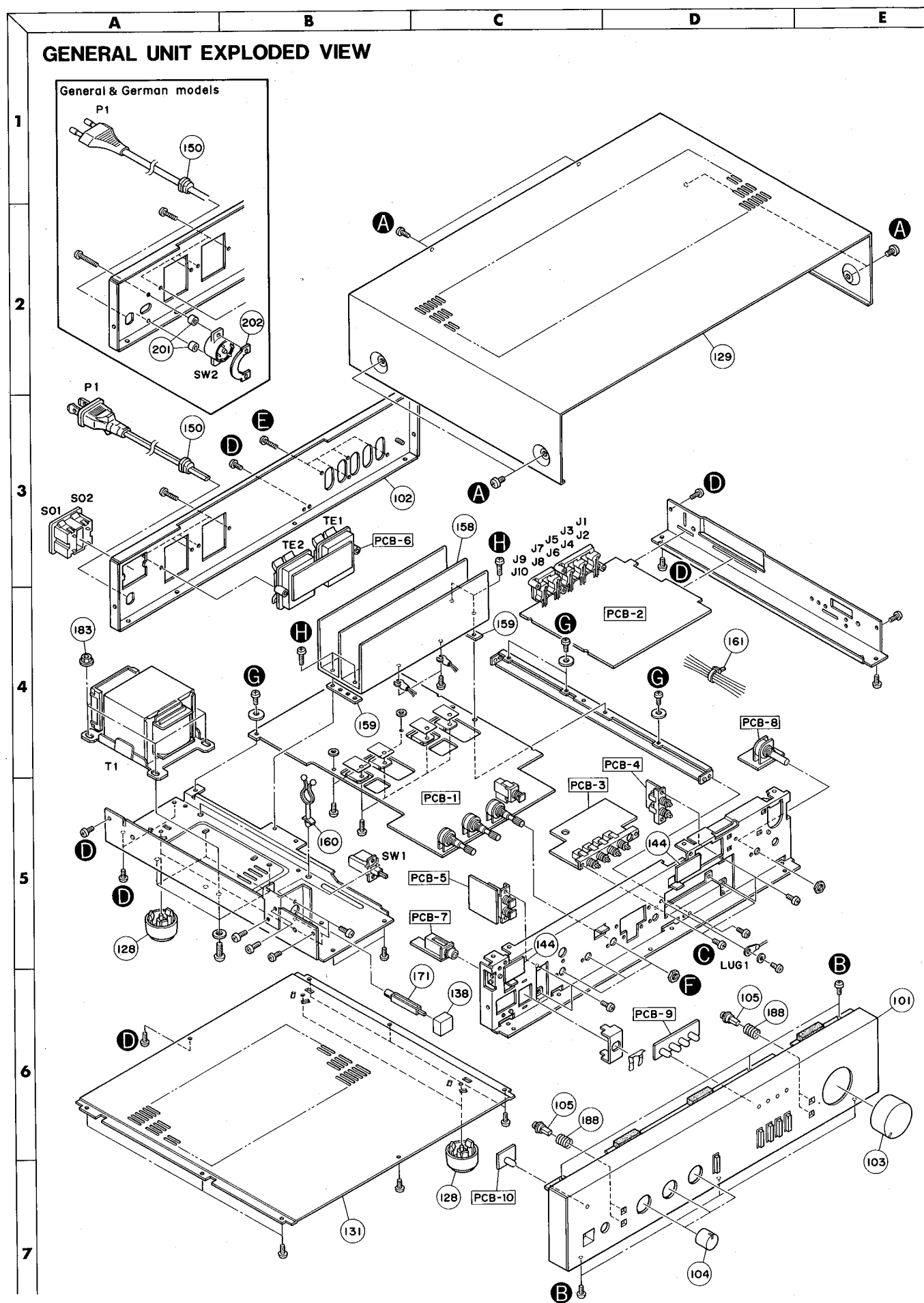
5 EQUALIZER P.C. BOARD (PCB-2) REMOVAL

1. Remove the cabinet top (refer to step **1**).
2. Remove 4 screws **I** and 2 screws **J** mounting the equalizer P.C. board (PCB-2) and remove it.

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 PARTS LIST

Ref. No.	Part No.	Description
101	A443-PM625A	Front Panel Assembly (Includes: Push Buttons)
102	A424-PM625A	Cabinet Back Assembly (for U.S.A. model)
"	A424-PM625B	Cabinet Back Assembly (for Canada model)
"	A424-PM625C	Cabinet Back Assembly (for General and German models)
103	A630-PM625A	Knob Assembly, Volume
104	A630-PM625B	Knob Assembly, Bass, Treble, Balance
105	A662-PM625A	Push Button Assembly, Speakers, High Cut, Mode
128	1319-0139	Foot
129	1414-03301	Cabinet Top
131	1424-08701	Cabinet Bottom
138	1660-00401	Push Button, Power
144	2224-7086	Insulator
150	2114-415027	Bushing
158	2222-7143	Heat Sink
159	2224-7069	Insulator
160	2240-7050	Holder
161	2240-7120	Holder
171	2672-7018	Lever
183	2440-60	Special Nut
184	2440-61	Special Nut
188	2651-210187	Spring
201	2132-7116	Spacer (only General and German models)
202	2440-7017	Special Nut (only General and German models)
	2211-7267	Chassis, Front
	2211-7243	Chassis, T1
	2211-7234	Chassis, Right
	2219-8042	Bracket, SW1
	2219-7879	Bracket, PCB-7
	2219-7880	Bracket, Center
	1111-J30197	Owner Guide (for U.S.A. model)
	1111-J30198	Owner Guide (for Canada, General and German models)
	1222-7216	Packing Cushion (2 Used)
	1221-807144	Packing Box

ELECTRICAL PARTS LIST

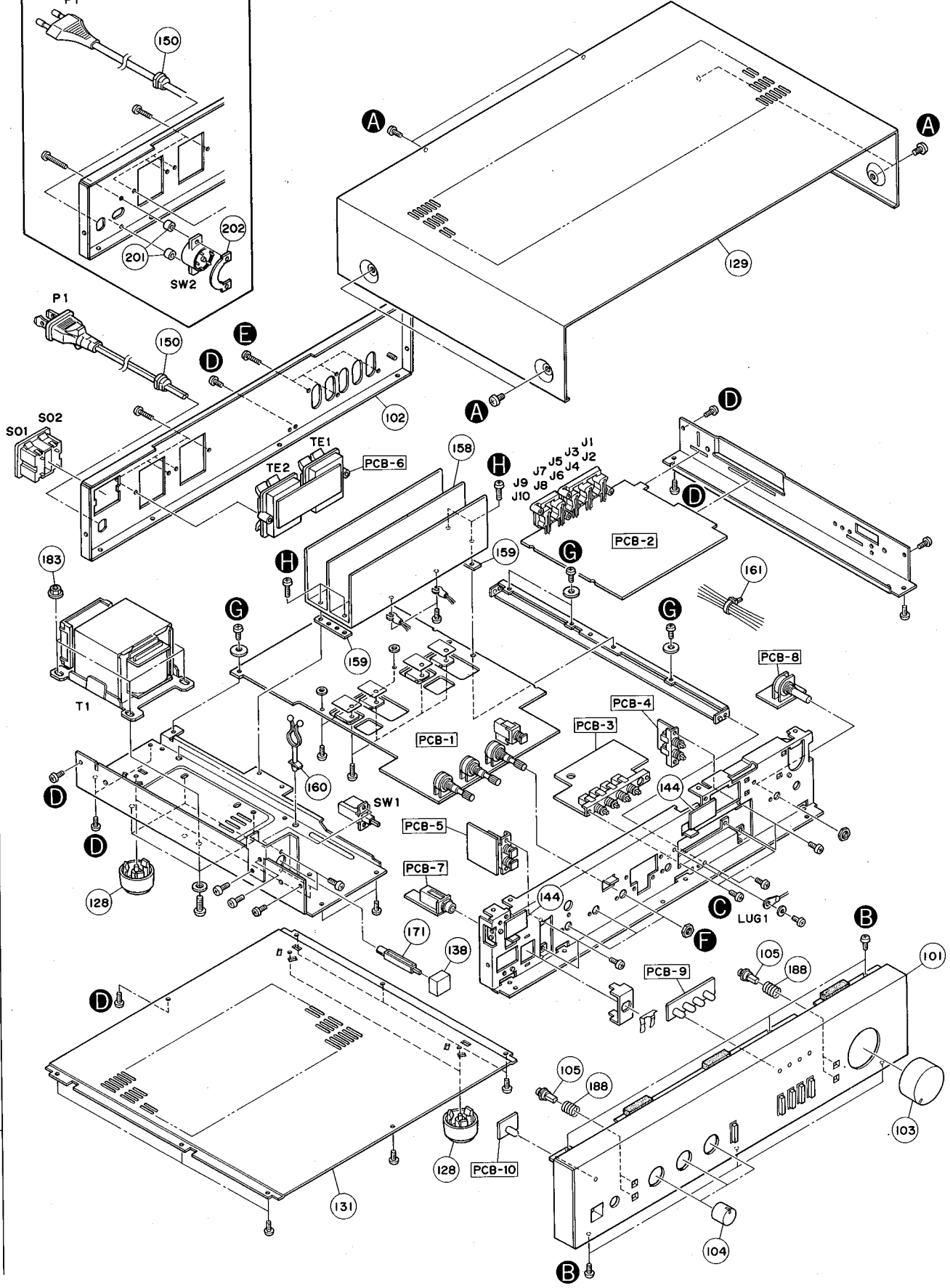
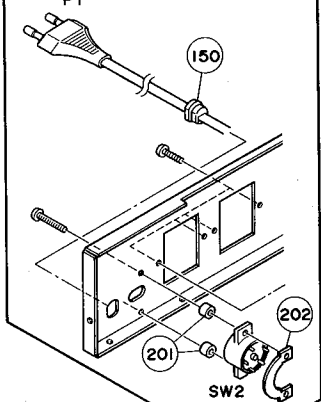
Ref. No.	Part No.	Description
CHASSIS MISCELLANEOUS		
△P1	4161-71151	Power Cord (for U.S.A. and Canada models)
△"	4161-7256	Power Cord (for General and German models)
△"	4132-16421	Power Cord (for Britain model)
△"	4161-71185	Power Cord (for Australia model)
△T1	5584-703410	Power Transformer (for U.S.A. and Canada models)
△"	5584-202419	Power Transformer (for General and German models)
△CO1	4443-712	Connector, Power Cord (only General and German models)
△SO1/2	4474-157	AC Socket, Unswitched, Switched (only U.S.A. and Canada models)
△SW1	4431-A01056	Push Switch, Power
△SW2	4411-102719	Rotary Switch, Voltage Selector (only General and German models)
△C16	5361-1030419	Capacitor, 0.01μF, +100% -0%, AC125V, Ceramic (for U.S.A. and Canada models)
△"	5352-1030958	Capacitor, 0.01μF, ±20%, AC250V, Metalized Polyester (for General and German models)
LUG1	4211-4	Lug Terminal
PCB-1 MAIN P.C. BOARD		
RESISTORS		
△R29	5102-1815114	180Ω, ±5%, 1/2W, Fuse
△R33, 34	5102-1014713	100Ω, ±2%, 1/4W, Fuse
△R39	5102-4R74713	4.7Ω, ±2%, 1/4W, Fuse
R415, 416	5174-561381	560Ω, ±1%, 1/4W, Metal
△R417, 418, 479, 480	5102-3314715	330Ω, ±2%, 1/4W, Fuse
△R419, 420	5102-3314713	330Ω, ±2%, 1/4W, Fuse

△ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

GENERAL UNIT EXPLODED VIEW

General & German models

1
2
3
4
5
6
7



GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-PM625A	Front Panel Assembly (Includes: Push Buttons)
102	A424-PM625A	Cabinet Back Assembly (for U.S.A. model)
"	A424-PM625B	Cabinet Back Assembly (for Canada model)
"	A424-PM625C	Cabinet Back Assembly (for General and German models)
103	A630-PM625A	Knob Assembly, Volume
104	A630-PM625B	Knob Assembly, Bass, Treble, Balance
105	A662-PM625A	Push Button Assembly, Speakers, High Cut, Mode
128	1319-0139	Foot
129	1414-03301	Cabinet Top
131	1424-08701	Cabinet Bottom
138	1660-00401	Push Button, Power
144	2224-7086	Insulator
150	2114-415027	Bushing
158	2222-7143	Heat Sink
159	2224-7069	Insulator
160	2240-7050	Holder
161	2240-7120	Holder
171	2672-7018	Lever
183	2440-60	Special Nut
184	2440-61	Special Nut
188	2651-210187	Spring
201	2132-7116	Spacer (only General and German models)
202	2440-7017	Special Nut (only General and German models)
	2211-7267	Chassis, Front
	2211-7243	Chassis, T1
	2211-7234	Chassis, Right
	2219-8042	Bracket, SW1
	2219-7879	Bracket, PCB-7
	2219-7880	Bracket, Center
	1111-J30197	Owner Guide (for U.S.A. model)
	1111-J30198	Owner Guide (for Canada, General and German models)
	1222-7216	Packing Cushion (2 Used)
	1221-807144	Packing Box

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
CHASSIS MISCELLANEOUS		
△P1	4161-71151	Power Cord (for U.S.A. and Canada models)
△"	4161-7256	Power Cord (for General and German models)
△"	4132-16421	Power Cord (for Britain model)
△"	4161-71185	Power Cord (for Australia model)
△T1	5584-703410	Power Transformer (for U.S.A. and Canada models)
△"	5584-202419	Power Transformer (for General and German models)
△CO1	4443-712	Connector, Power Cord (only General and German models)
△SO1/2	4474-157	AC Socket, Unswitched, Switched (only U.S.A. and Canada models)
△SW1	4431-A01056	Push Switch, Power
△SW2	4411-102719	Rotary Switch, Voltage Selector (only General and German models)
△C16	5361-1030419	Capacitor, 0.01 μ F, +100% -0%, AC125V, Ceramic (for U.S.A. and Canada models)
△"	5352-1030958	Capacitor, 0.01 μ F, \pm 20%, AC250V, Metalized Polyester (for General and German models)
LUG1	4211-4	Lug Terminal
PCB-1 MAIN P.C. BOARD		
RESISTORS		
△R29	5102-1815114	180 Ω , \pm 5%, 1/2W, Fuse
△R33, 34	5102-1014713	100 Ω , \pm 2%, 1/4W, Fuse
△R39	5102-4R74713	4.7 Ω , \pm 2%, 1/4W, Fuse
R415, 416	5174-561381	560 Ω , \pm 1%, 1/4W, Metal
△R417, 418, 479, 480	5102-3314715	330 Ω , \pm 2%, 1/4W, Fuse
△R419, 420	5102-3314713	330 Ω , \pm 2%, 1/4W, Fuse

! SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

Ref. No.	Part No.	Description
R421, 422	5174-331381	330Ω, ±1%, 1/4W, Metal
R431, 432, 437, 438	5174-220381	22Ω, ±1%, 1/4W, Metal
△R439, 440, 445, 446	5102-2204715	22Ω, ±2%, 1/4W, Fuse
R447, 448	5174-820381	82Ω, ±1%, 1/4W, Metal
R455/457, 456/458	5273-R22672	0.22Ω, ±10%, 3Wx2, Cement
R475, 476	5173-100571	10Ω, ±5%, 2W, Metal
CONTROLS		
VR401, 402	5101-10271920	1kΩB
VR501/502	5113-50385122	50kΩM/N, Balance
VR505/506	5113-10486122	100kΩC, Bass
VR507/508	5113-50387122	50kΩC, Treble
CAPACITORS		
C3, 7	5345-106C041	10μF, ±20%, 16V, Electrolytic
C4, 5	5345-476C041	47μF, ±20%, 16V, Electrolytic
C12, 13	5341-688E0955	6800μF, ±20%, 35V, Electrolytic
C20	5345-107C041	100μF, ±20%, 16V, Electrolytic
C51, 52	5345-334F0951	0.33μF, ±20%, 50V, Electrolytic
C401, 402	5345-476B0951	47μF, ±20%, 10V, Electrolytic
C405, 406	5345-227A041	220μF, ±20%, 6.3V, Electrolytic
C407, 408, 413, 414	5345-227E041	220μF, ±20%, 35V, Electrolytic
C411, 412	5359-1015851	100pF, ±5%, 100V, Polypropylene
C417, 418	5345-106E041	10μF, ±20%, 35V, Electrolytic
C421, 422	5359-2215851	220pF, ±5%, 100V, Polypropylene
C427, 428	5353-020934	2pF, ±0.5pF, 500V, Mica
C503, 504	5359-1815851	180pF, ±5%, 100V, Polypropylene
C505, 506	5345-225F0951	2.2μF, ±20%, 50V, Electrolytic
C511, 512	5345-106C0951	10μF, ±20%, 16V, Electrolytic
C517, 518	5359-1015851	100pF, ±5%, 100V, Polypropylene
C707	5352-4741957	0.47μF, ±10%, 250V, Metalized Polyester (only German model)
TRANSISTORS		
Q1, 7, 8, 10, 13	5611-1115(E)	2SA1115(E) or 2SA1115(F)
Q3, 4	5611-872(E)	2SA872(E)
Q5, 425, 426	5613-2603(E)	2SC2603(E) or 2SC2603(F)
Q401, 402, 403, 404, 405, 406	5613-1775(F)	2SC1755(F)
Q407, 408, 409, 410	5611-970(BL)	2SA970(BL)
Q411, 412	5612-646(C)	2SB646(C)
Q413, 414	5614-666(C)	2SD666(C)
Q415, 416	5613-945(K)	2SC945(K) or 2SC945(P)
Q417, 418	5613-2235(Y)	2SC2235(Y)
Q419, 420	5611-965(Y)	2SA965(Y)
Q421, 422	5614-716(O)	2SD716(O) (w/Insulator)
Q423, 424	5612-686(O)	2SB686(O) (w/Insulator)
DIODES		
D1, 15, 21, 401, 402, 403, 404	5631-1S2473	1S2473
D3, 10	5635-RD11EB2	Zener, RD11EB2
△D4, 5	5636-1S2471	1S2471
△D6, 7, 8, 9	5632-ERC402FL	ERC402FL
D407, 408, 409, 410	5632-DS135E	DS135E
D411, 412	5641-MV12YM	Varistor, MV12YM
COILS		
L405, 406	5991-7165	
MISCELLANEOUS		
△F1, 2	5732-402029	Fuse, 4A, 125V (for U.S.A. and Canada models)
△ "	5732-402030	Fuse, T4A, 250V (for General and German models)
SW501	4431-A027210	Push Switch, Loudness
J501	4163-71165	Connector with Lead Wires, 11 Pos.
	4472-0130	Fuse Holder (for U.S.A. and Canada models)
	4472-0131	Fuse Holder (for General and German models)
	2132-7049	Spacer, R29 (Except German model)

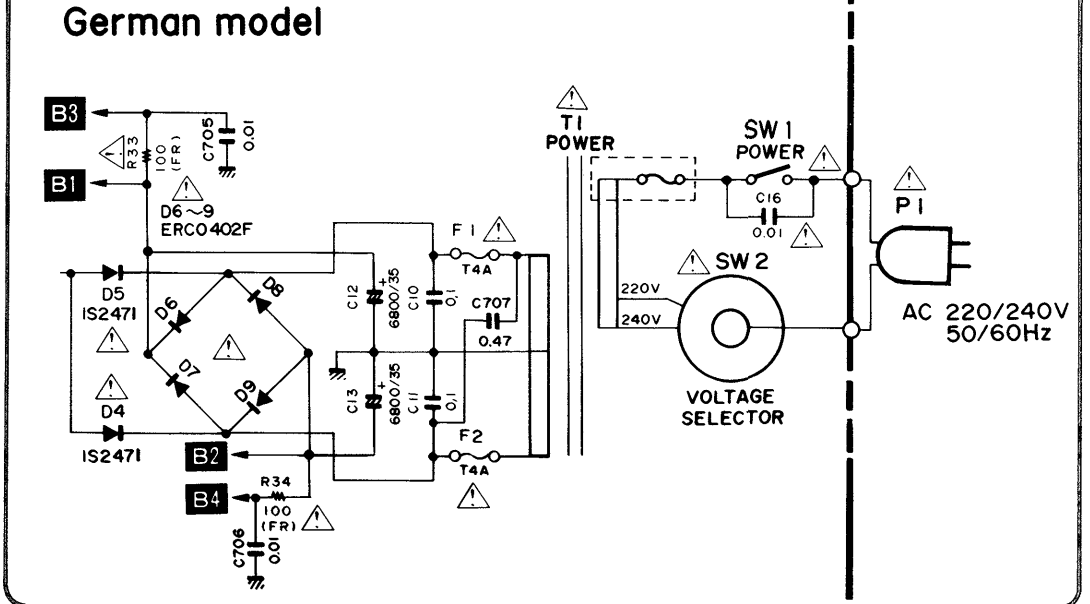
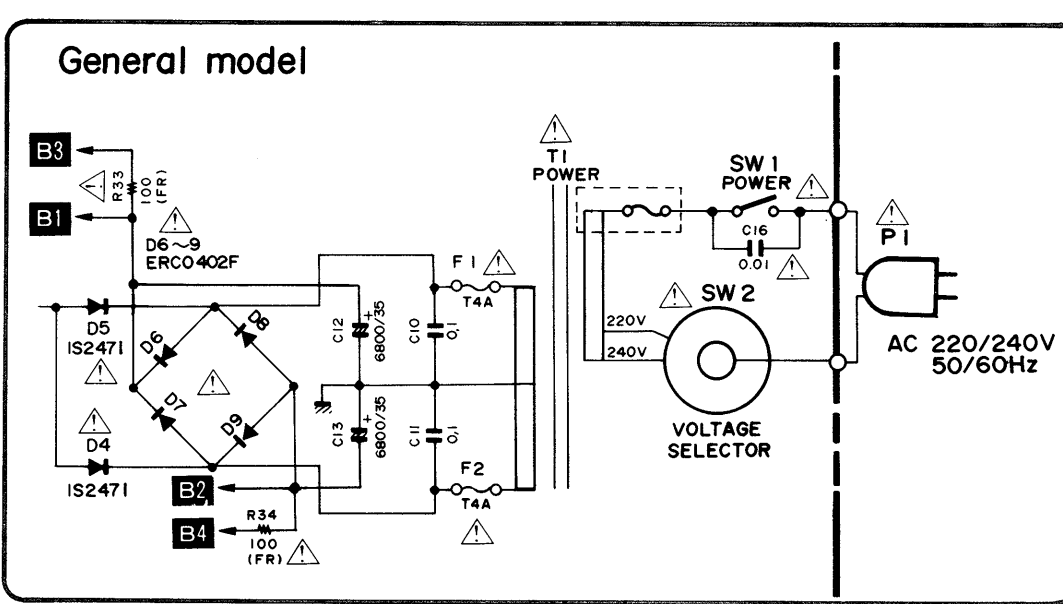
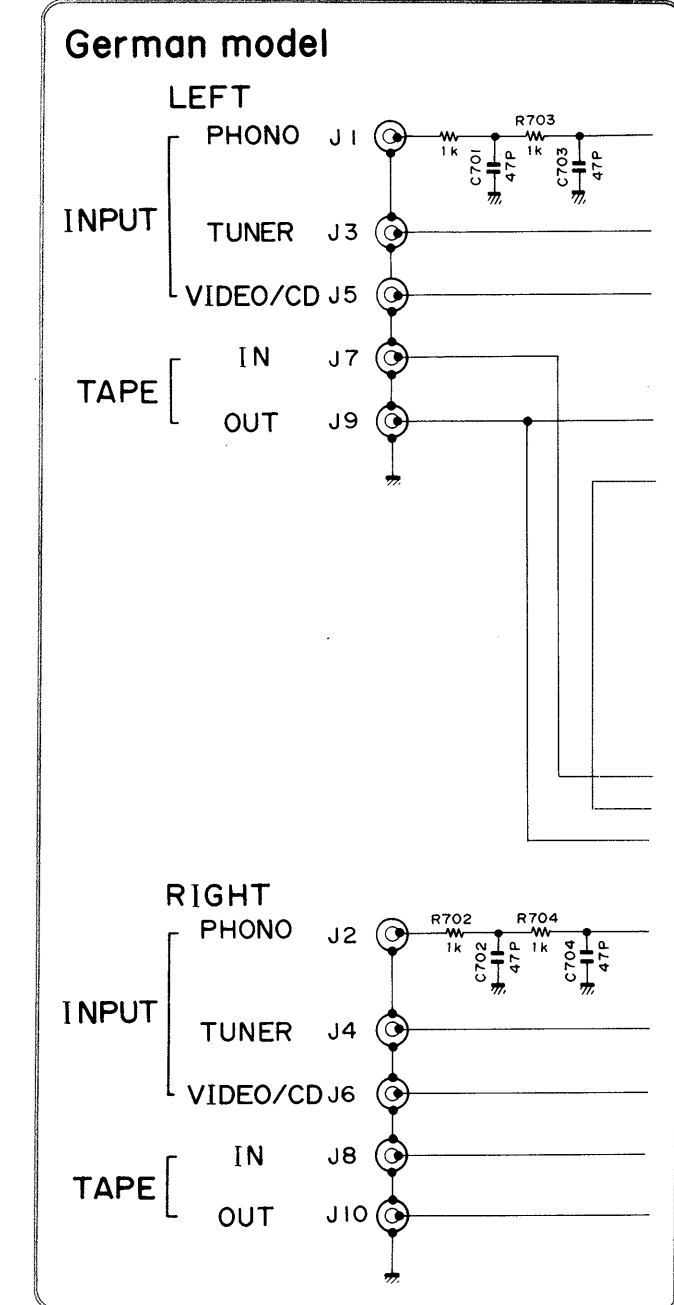
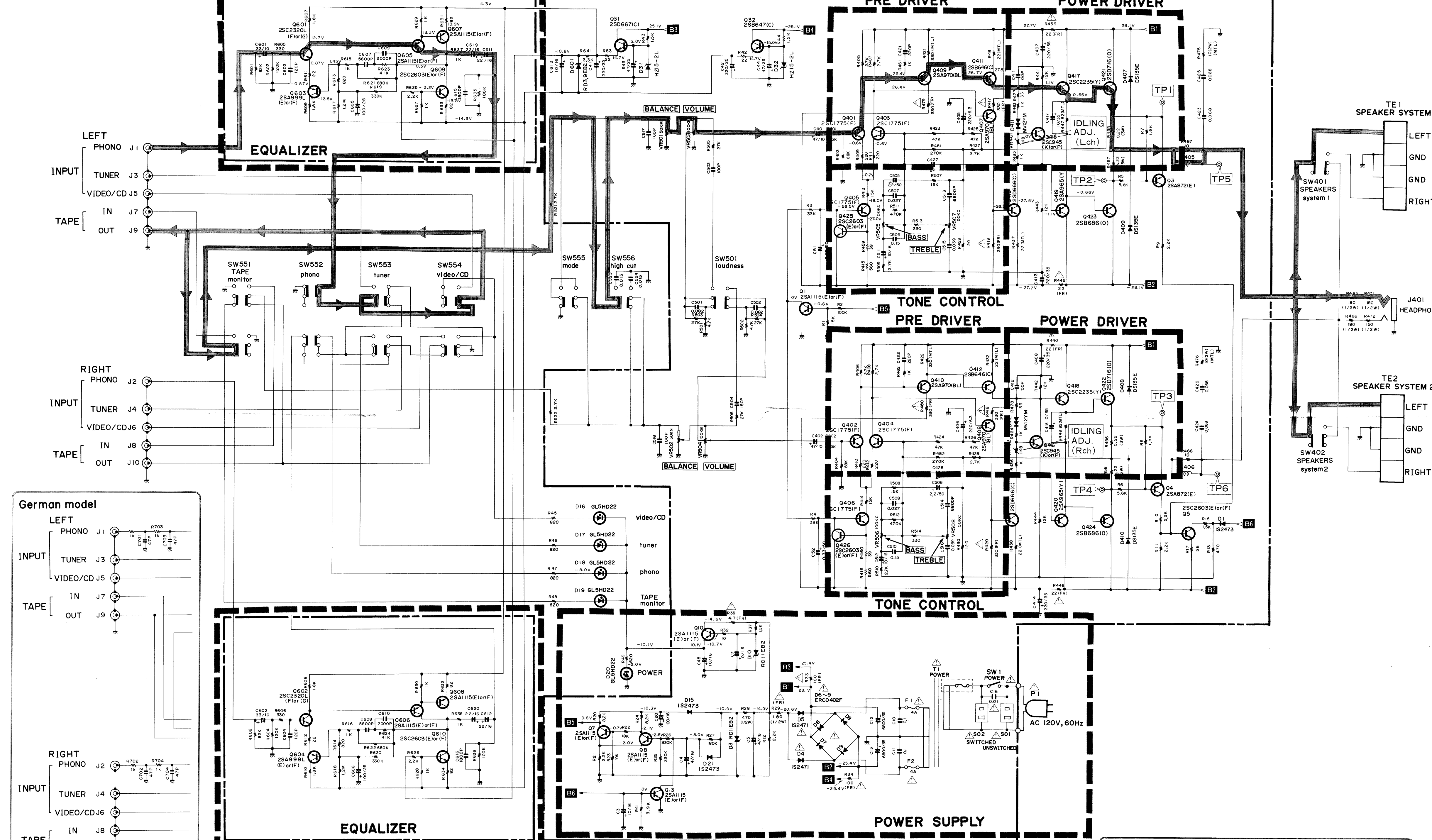
△ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

Ref. No.	Part No.	Description
PCB-2 EQUALIZER P.C. BOARD		
RESISTORS		
R623, 624	5174-Z412228	41.2kΩ, ±0.5%, 1/4W, Metal
CAPACITORS		
C41, 42	5345-227-25	220μF, +50%—10%, 25V, Electrolytic
C43, 44	5345-476-25	47μF, +50%—10%, 25V, Electrolytic
C601, 602	5345-336B0951	33μF, ±20%, 10V, Electrolytic
C603, 604	5359-1215851	120pF, ±5%, 100V, Polypropylene
C605, 606	5345-107D0952	100μF, ±20%, 25V, Electrolytic
C609, 610	5359-2025851	2000pF, ±5%, 100V, Polypropylene
C611, 612, 619, 620	5345-226C0226	22μF, ±20%, 16V, Electrolytic
C613	5345-106-16	10μF, +50%—10%, 16V, Electrolytic
C615, 616	5359-1825851	1800pF, ±5%, 100V, Polypropylene
C701, 702, 703, 704	5353-470534	47pF, ±5%, 500V, Mica (only German model)
TRANSISTORS		
Q31	5614-667(C)	2SD667(C)
Q32	5612-647(C)	2SB647(C)
Q601, 602	5613-2320L(F)	2SC2320L(F) or 2SC2320L(G)
Q603, 604	5611-999L(F)	2SA999L(F) or 2SA999L(E)
Q605, 606, 607, 608	5611-1115(E)	2SA1115(E) or 2SA115(F)
Q609, 610	5613-2603(E)	2SC2603(E) or 2SC2603(F)
DIODES		
D31, 32	5635-HZ15-2L	Zener, HZ15-2L
D601	5635-RD3R9EB2	Zener, RD3.9EB2
MISCELLANEOUS		
J1/2/3/4/5/6	4486-9	6-Pin Jack, Phono, Tuner, Video/CD
J7/8/9/10	4484-31	4-Pin Jack, Tape In, Tape Out
	2132-7049	Spacer, D31 & D32 (Except German model)
PCB-3 TAPE MONITOR & FUNCTION SWITCHES P.C. BOARD		
CAPACITORS		
C45	5345-106C041	10μF, ±20%, 16V, Electrolytic
MISCELLANEOUS		
SW551/552/553/554	4431-04167166	Push Switch, Tape Monitor, Phono, Tuner, Video/CD
J551	4443-060185	Connector, 6 Pos.
PCB-4 MODE & HIGH CUT SWITCHES P.C. BOARD		
SW555/556	4431-02047363	Push Switch, Mode, High Cut
PCB-5 SPEAKER SYSTEM SELECTORS P.C. BOARD		
SW401/402	4431-02047164	Push Switch, Speaker System 1, Speaker System 2
PCB-6 SPEAKER TERMINALS P.C. BOARD		
TE1, 2	4214-133	Terminal, Speaker System 1, Speaker System 2
PCB-7 HEADPHONE JACK P.C. BOARD		
J401	4451-00159	Jack, Headphones
PCB-8 VOLUME CONTROL P.C. BOARD		
CONTROLS		
VR503/504	5113-10419122	100kΩB, Volume
MISCELLANEOUS		
P501	4443-117114	Connector, 11 Pos.
PCB-9 FUNCTION & TAPE MONITOR INDICATORS P.C. BOARD		
D16, 17, 18, 19	5637-GL5HD22	L.E.D., GL5HD22, Red, Video/CD, Tuner, Phono, Tape Monitor
P551	4242-061307	Jumper Lead, 6 Pos.
PCB-10 POWER INDICATOR P.C. BOARD		
D20	5637-GL5HD22	L.E.D., GL5HD22, Red, Power

Ref. No.	Part No.	Description
R421, 422	5174-331381	330Ω, ±1%, 1/4W, Metal
R431, 432, 437, 438	5174-220381	22Ω, ±1%, 1/4W, Metal
△R439, 440, 445, 446	5102-2204715	22Ω, ±2%, 1/4W, Fuse
R447, 448	5174-820381	82Ω, ±1%, 1/4W, Metal
R455/457, 456/458	5273-R22672	0.22Ω, ±10%, 3Wx2, Cement
R475, 476	5173-100571	10Ω, ±5%, 2W, Metal
CONTROLS		
VR401, 402	5101-10271920	1kΩB
VR501/502	5113-50385122	50kΩM/N, Balance
VR505/506	5113-10486122	100kΩC, Bass
VR507/508	5113-50387122	50kΩC, Treble
CAPACITORS		
C3, 7	5345-106C041	10μF, ±20%, 16V, Electrolytic
C4, 5	5345-476C041	47μF, ±20%, 16V, Electrolytic
C12, 13	5341-688E0955	6800μF, ±20%, 35V, Electrolytic
C20	5345-107C041	100μF, ±20%, 16V, Electrolytic
C51, 52	5345-334F0951	0.33μF, ±20%, 50V, Electrolytic
C401, 402	5345-476B0951	47μF, ±20%, 10V, Electrolytic
C405, 406	5345-227A041	220μF, ±20%, 6.3V, Electrolytic
C407, 408, 413, 414	5345-227E041	220μF, ±20%, 35V, Electrolytic
C411, 412	5359-1015851	100pF, ±5%, 100V, Polypropylene
C417, 418	5345-106E041	10μF, ±20%, 35V, Electrolytic
C421, 422	5359-2215851	220pF, ±5%, 100V, Polypropylene
C427, 428	5353-020934	2pF, ±0.5pF, 500V, Mica
C503, 504	5359-1815851	180pF, ±5%, 100V, Polypropylene
C505, 506	5345-225F0951	2.2μF, ±20%, 50V, Electrolytic
C511, 512	5345-106C0951	10μF, ±20%, 16V, Electrolytic
C517, 518	5359-1015851	100pF, ±5%, 100V, Polypropylene
C707	5352-4741957	0.47μF, ±10%, 250V, Metalized Polyester (only German model)
TRANSISTORS		
Q1, 7, 8, 10, 13	5611-1115(E)	2SA1115(E) or 2SA1115(F)
Q3, 4	5611-872(E)	2SA872(E)
Q5, 425, 426	5613-2603(E)	2SC2603(E) or 2SC2603(F)
Q401, 402, 403, 404, 405, 406	5613-1775(F)	2SC1755(F)
Q407, 408, 409, 410	5611-970(BL)	2SA970(BL)
Q411, 412	5612-646(C)	2SB646(C)
Q413, 414	5614-666(C)	2SD666(C)
Q415, 416	5613-945(K)	2SC945(K) or 2SC945(P)
Q417, 418	5613-2235(Y)	2SC2235(Y)
Q419, 420	5611-965(Y)	2SA965(Y)
Q421, 422	5614-716(O)	2SD716(O) (w/Insulator)
Q423, 424	5612-686(O)	2SB686(O) (w/Insulator)
DIODES		
D1, 15, 21, 401, 402, 403, 404	5631-1S2473	1S2473
D3, 10	5635-RD11EB2	Zener, RD11EB2
△D4, 5	5636-1S2471	1S2471
△D6, 7, 8, 9	5632-ERC402FL	ERC402FL
D407, 408, 409, 410	5632-DS135E	DS135E
D411, 412	5641-MV12YM	Varistor, MV12YM
COILS		
L405, 406	5991-7165	
MISCELLANEOUS		
△ F1, 2	5732-402029	Fuse, 4A, 125V (for U.S.A. and Canada models)
△ "	5732-402030	Fuse, T4A, 250V (for General and German models)
SW501	4431-A027210	Push Switch, Loudness
J501	4163-71165	Connector with Lead Wires, 11 Pos.
	4472-0130	Fuse Holder (for U.S.A. and Canada models)
	4472-0131	Fuse Holder (for General and German models)
	2132-7049	Spacer, R29 (Except German model)

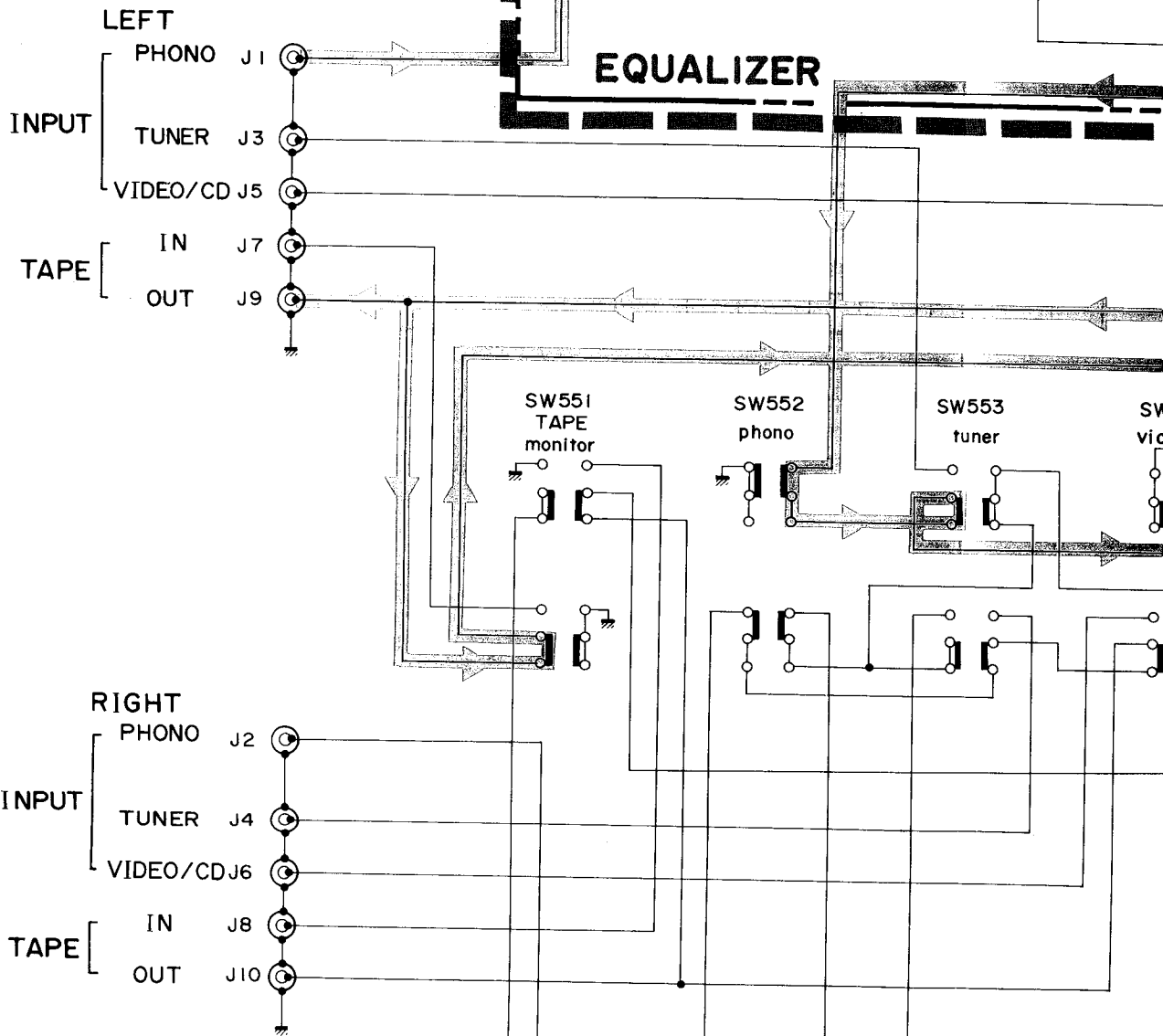
Ref. No.	Part No.	Description
PCB-2 EQUALIZER P.C. BOARD		
RESISTORS		
R623, 624	5174-Z412228	41.2k Ω , \pm 0.5%, 1/4W, Metal
CAPACITORS		
C41, 42	5345-227-25	220 μ F, +50%–10%, 25V, Electrolytic
C43, 44	5345-476-25	47 μ F, +50%–10%, 25V, Electrolytic
C601, 602	5345-336B0951	33 μ F, \pm 20%, 10V, Electrolytic
C603, 604	5359-1215851	120pF, \pm 5%, 100V, Polypropylene
C605, 606	5345-107D0952	100 μ F, \pm 20%, 25V, Electrolytic
C609, 610	5359-2025851	2000pF, \pm 5%, 100V, Polypropylene
C611, 612, 619, 620	5345-226C0226	22 μ F, \pm 20%, 16V, Electrolytic
C613	5345-106-16	10 μ F, +50%–10%, 16V, Electrolytic
C615, 616	5359-1825851	1800pF, \pm 5%, 100V, Polypropylene
C701, 702, 703, 704	5353-470534	47pF, \pm 5%, 500V, Mica (only German model)
TRANSISTORS		
Q31	5614-667(C)	2SD667(C)
Q32	5612-647(C)	2SB647(C)
Q601, 602	5613-2320L(F)	2SC2320L(F) or 2SC2320L(G)
Q603, 604	5611-999L(F)	2SA999L(F) or 2SA999L(E)
Q605, 606, 607, 608	5611-1115(E)	2SA1115(E) or 2SA115(F)
Q609, 610	5613-2603(E)	2SC2603(E) or 2SC2603(F)
DIODES		
D31, 32	5635-HZ15-2L	Zener, HZ15-2L
D601	5635-RD3R9EB2	Zener, RD3.9EB2
MISCELLANEOUS		
J1/2/3/4/5/6	4486-9	6-Pin Jack, Phono, Tuner, Video/CD
J7/8/9/10	4484-31	4-Pin Jack, Tape In, Tape Out
	2132-7049	Spacer, D31 & D32 (Except German model)
PCB-3 TAPE MONITOR & FUNCTION SWITCHES P.C. BOARD		
CAPACITORS		
C45	5345-106C041	10 μ F, \pm 20%, 16V, Electrolytic
MISCELLANEOUS		
SW551/552/553/554	4431-04167166	Push Switch, Tape Monitor, Phono, Tuner, Video/CD
J551	4443-060185	Connector, 6 Pos.
PCB-4 MODE & HIGH CUT SWITCHES P.C. BOARD		
SW555/556	4431-02047363	Push Switch, Mode, High Cut
PCB-5 SPEAKER SYSTEM SELECTORS P.C. BOARD		
SW401/402	4431-02047164	Push Switch, Speaker System 1, Speaker System 2
PCB-6 SPEAKER TERMINALS P.C. BOARD		
TE1, 2	4214-133	Terminal, Speaker System 1, Speaker System 2
PCB-7 HEADPHONE JACK P.C. BOARD		
J401	4451-00159	Jack, Headphones
PCB-8 VOLUME CONTROL P.C. BOARD		
CONTROLS		
VR503/504	5113-10419122	100k Ω B, Volume
MISCELLANEOUS		
P501	4443-117114	Connector, 11 Pos.
PCB-9 FUNCTION & TAPE MONITOR INDICATORS P.C. BOARD		
D16, 17, 18, 19	5637-GL5HD22	L.E.D., GL5HD22, Red, Video/CD, Tuner, Phono, Tape Monitor
P551	4242-061307	Jumper Lead, 6 Pos.
PCB-10 POWER INDICATOR P.C. BOARD		
D20	5637-GL5HD22	L.E.D., GL5HD22, Red, Power

SCHEMATIC DIAGRAM

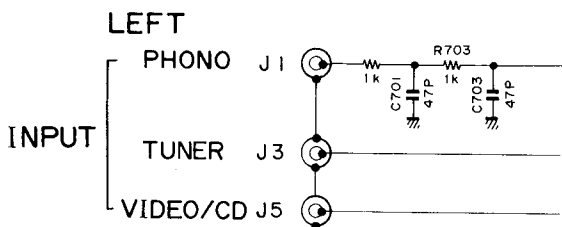


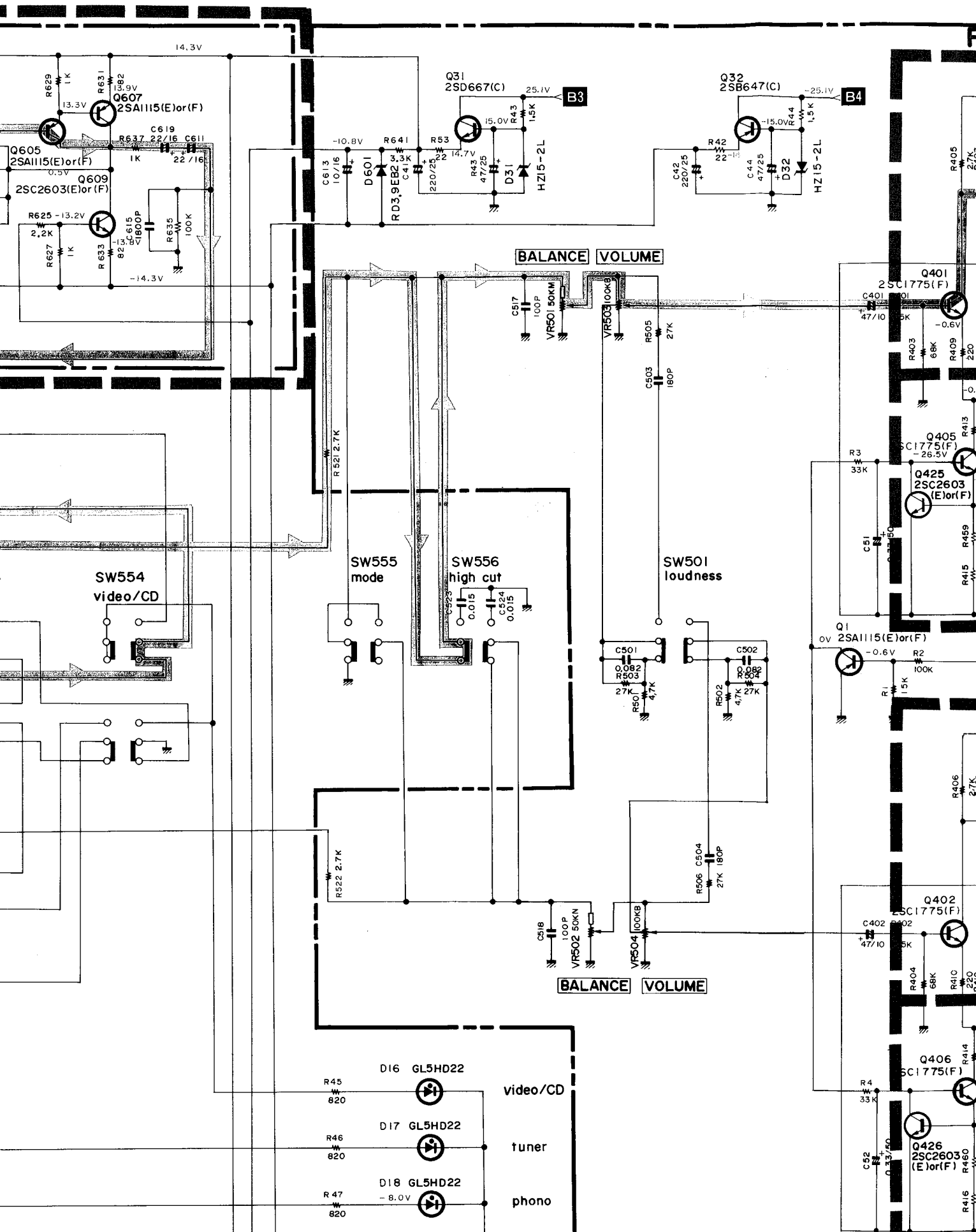
- 1. ALL RESISTANCES VALUES ARE IN Ω .
 $K\Omega=1000\Omega$, $M\Omega=1000K\Omega$.
- 2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
- 3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. $P=\mu F$
- 4. V: DC VOLTAGE AT NO SIGNAL
- 5. Δ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE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

SCHEMATIC DIAGRAM



German model





D16 GL5HD22

R45
820

video/CD

D17 GL5HD22

R46
820

tuner

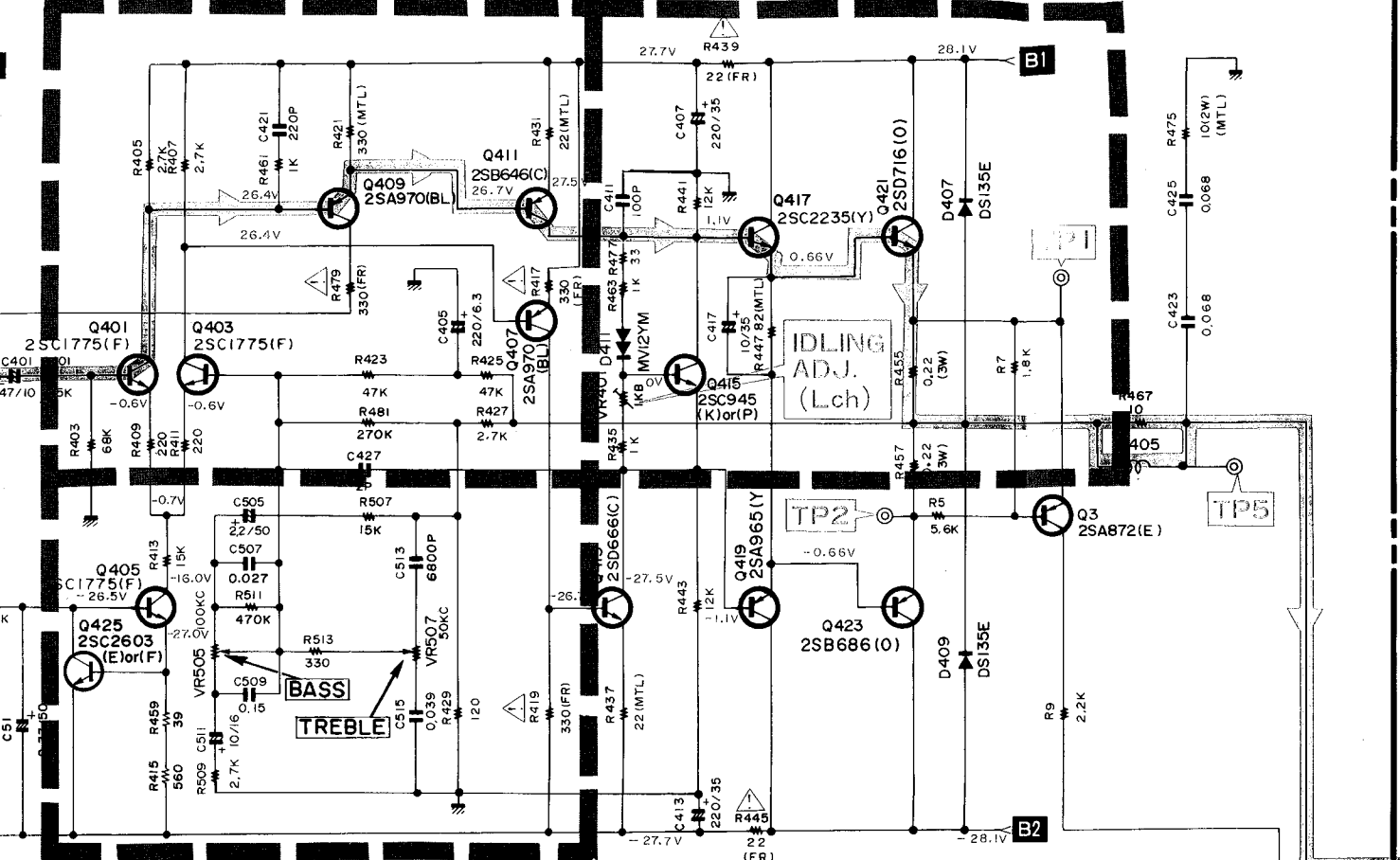
D18 GL5HD22

R47
820

phono

PRE DRIVER

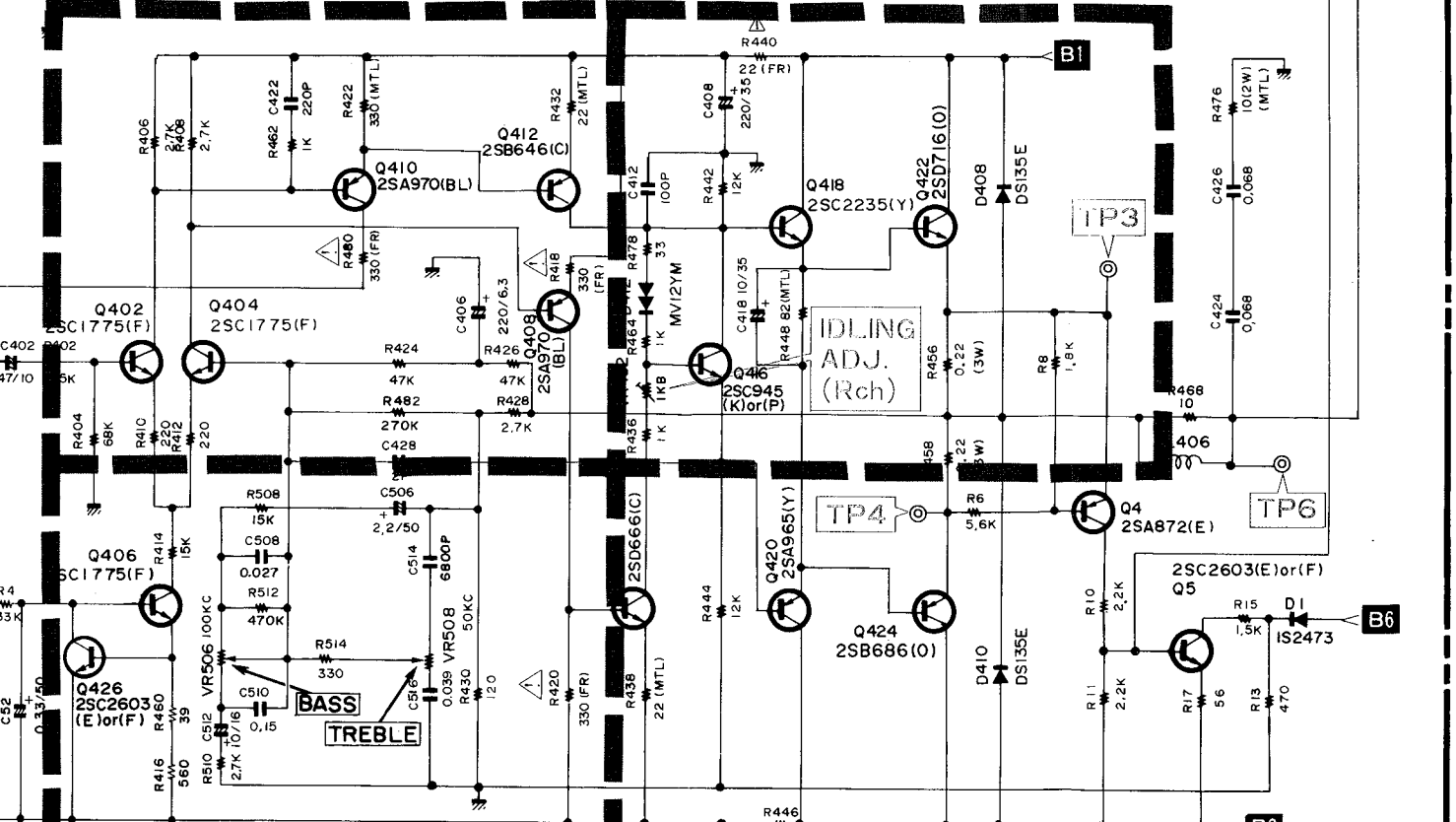
POWER DRIVER



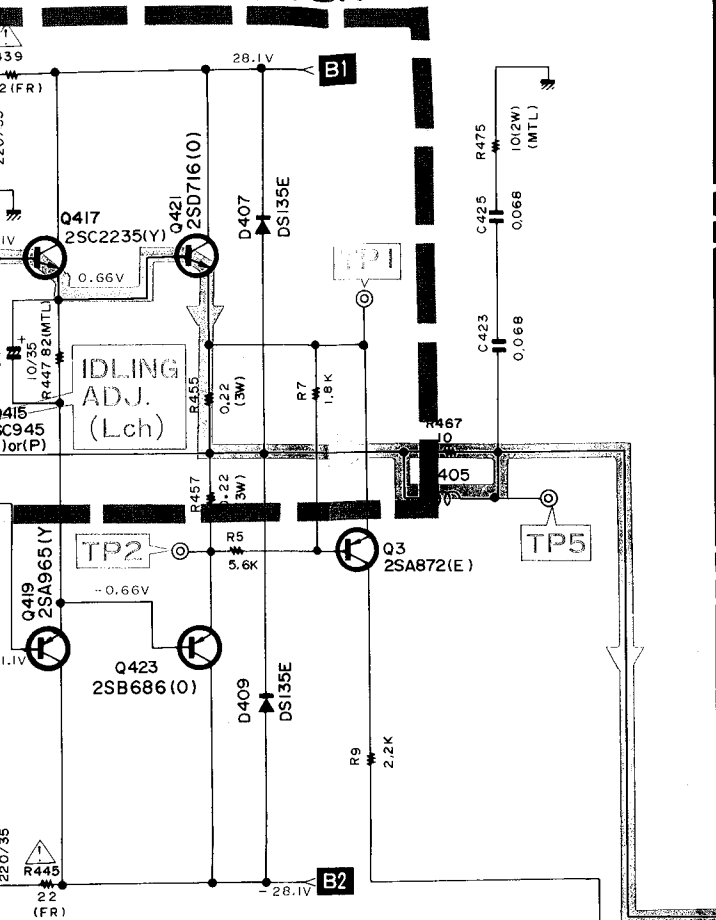
TONE CONTROL

PRE DRIVER

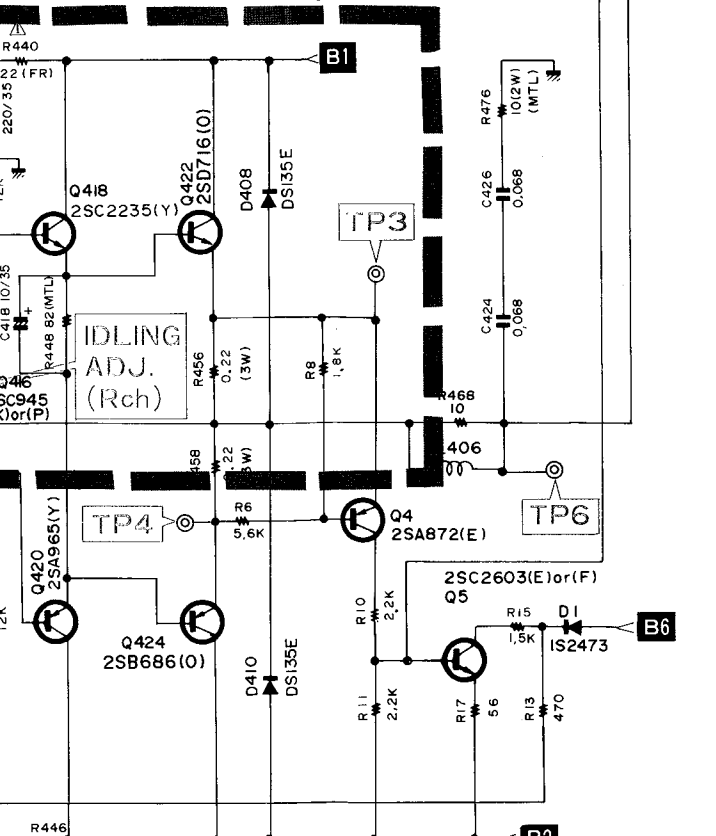
POWER DRIVER



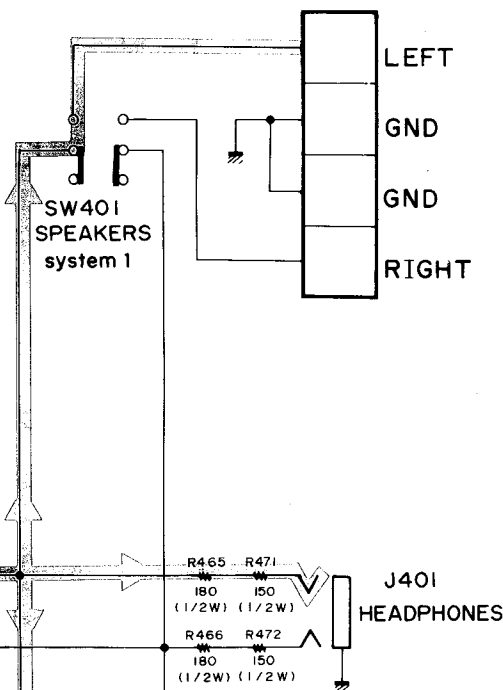
POWER DRIVER



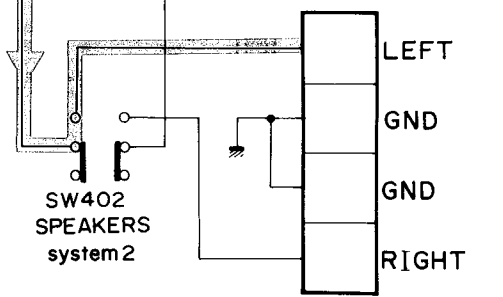
POWER DRIVER



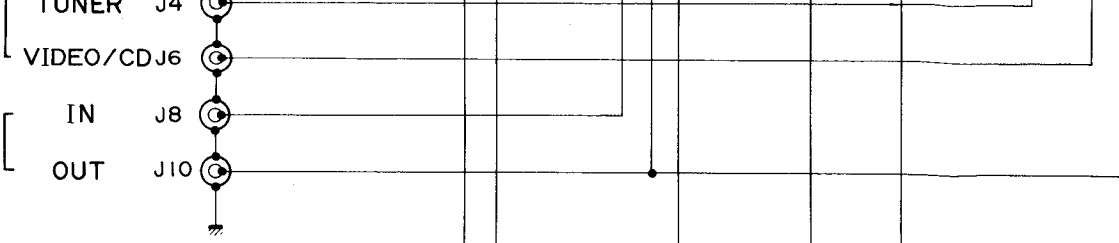
TE1 SPEAKER SYSTEM 1



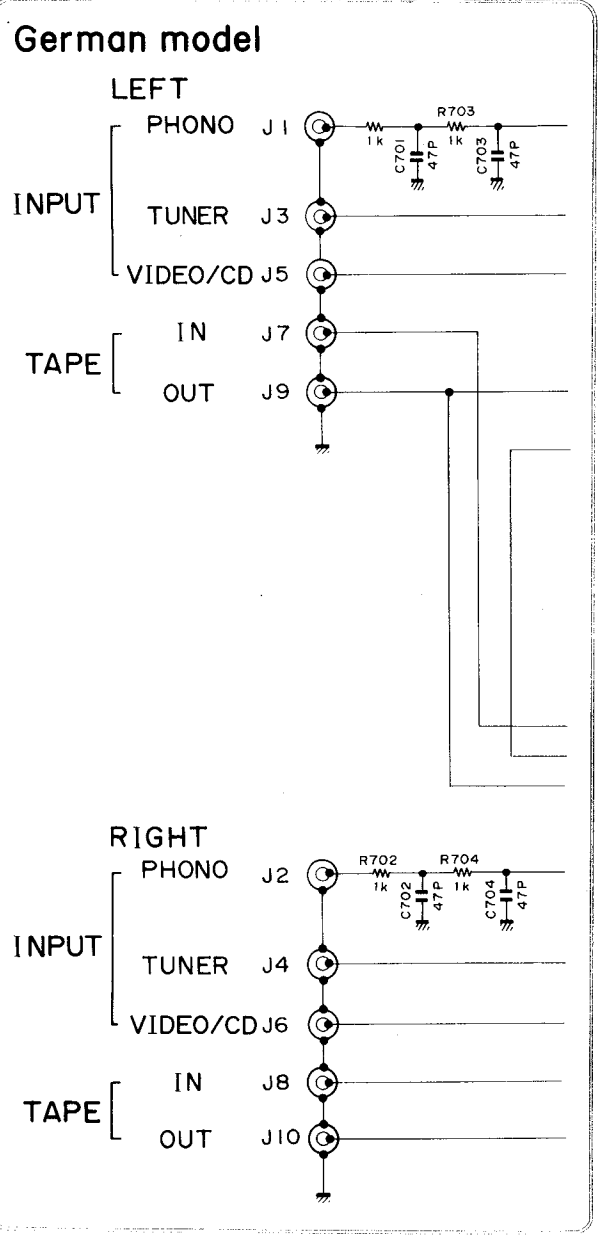
TE2 SPEAKER SYSTEM 2



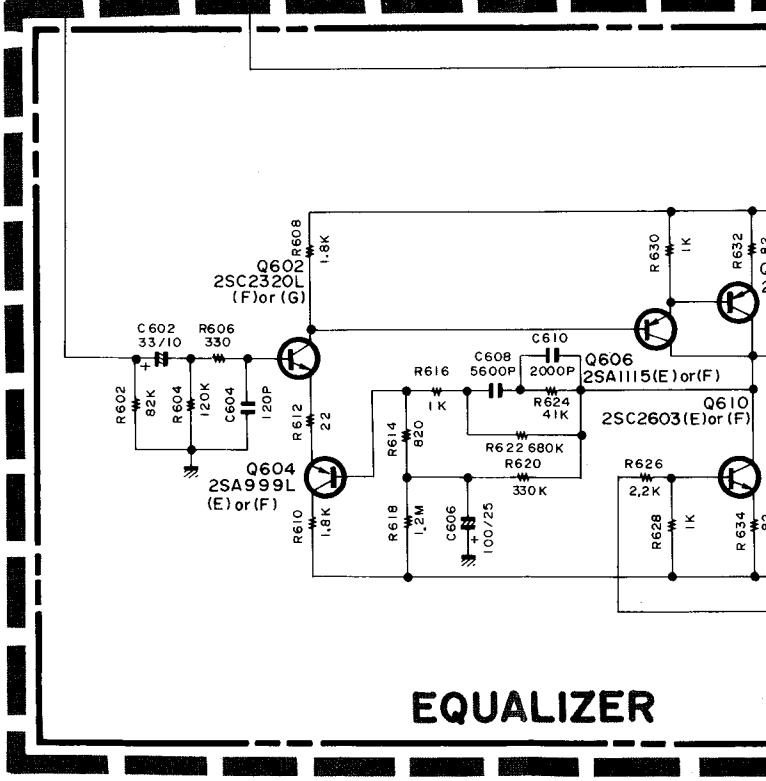
5



6



7



8

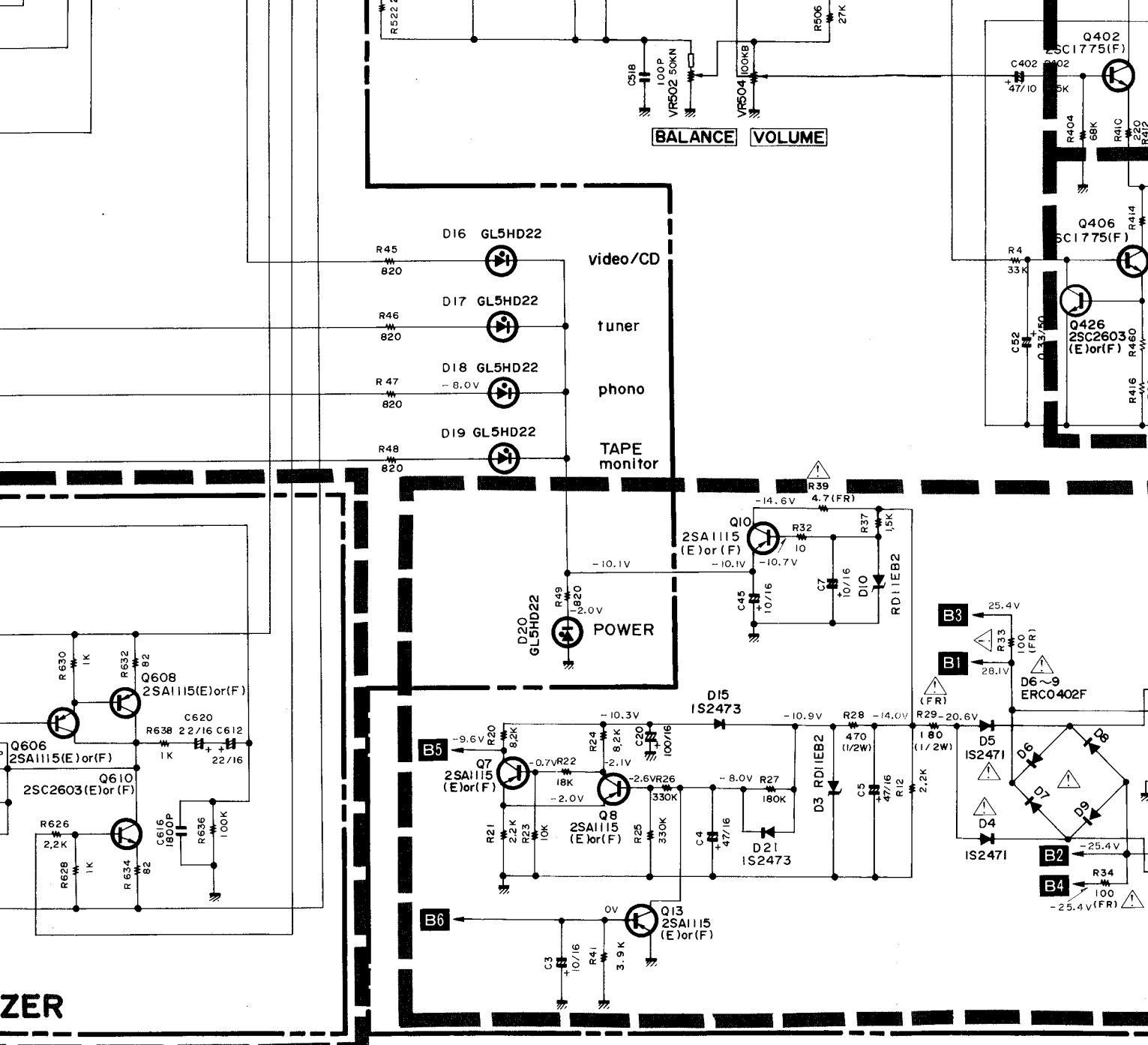
EQUALIZER

9

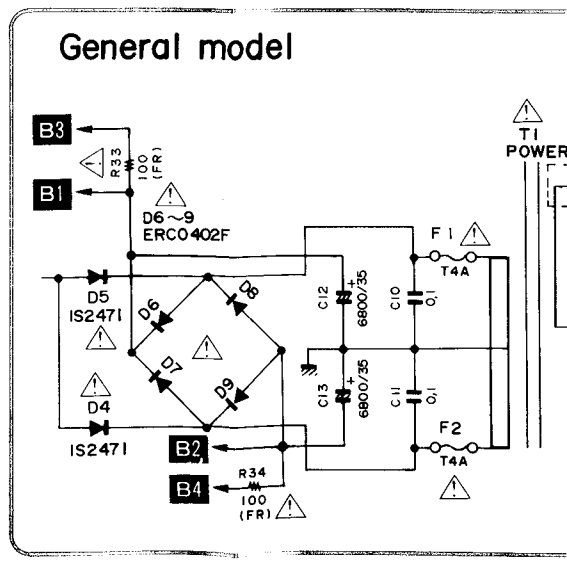
..... PHONO SIGNAL

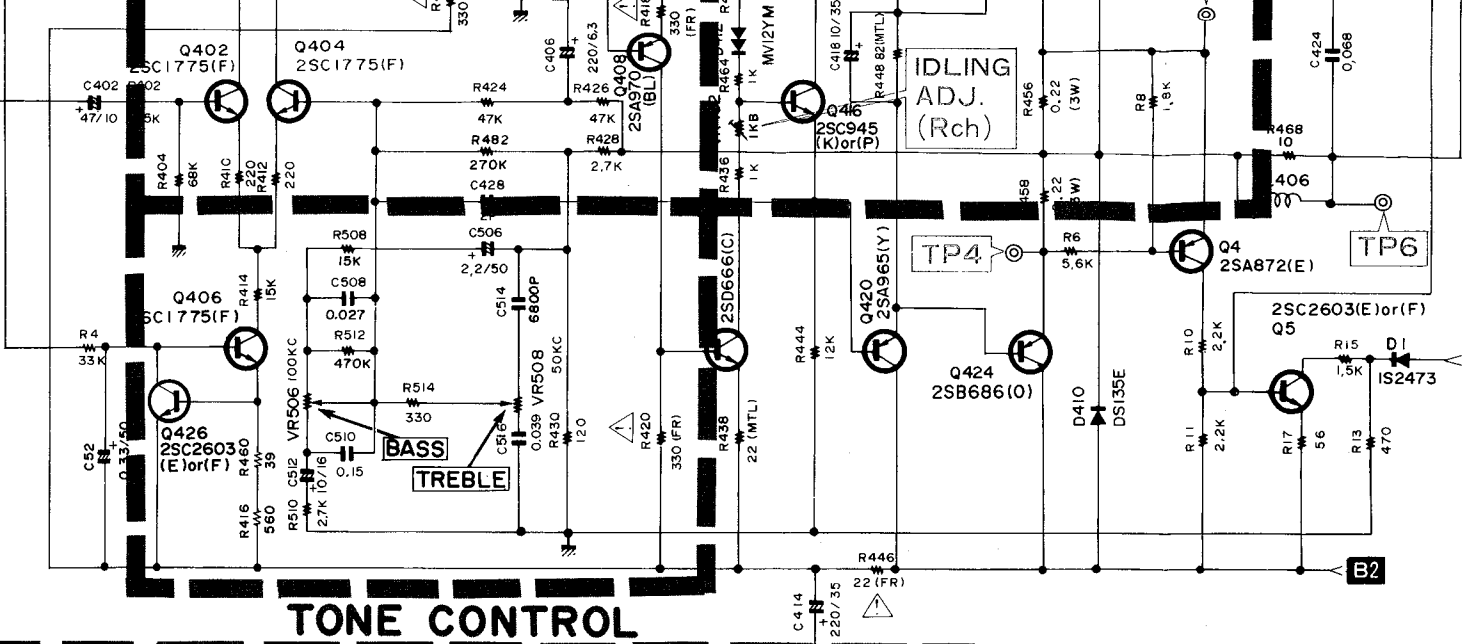
1. ALL RESISTANCES VALUES ARE IN Ω .
 $K\Omega=1000\Omega$, $M\Omega=1000K\Omega$.
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. $P=\mu\mu F$
4. V: DC VOLTAGE AT NO SIGNAL
5. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT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

10

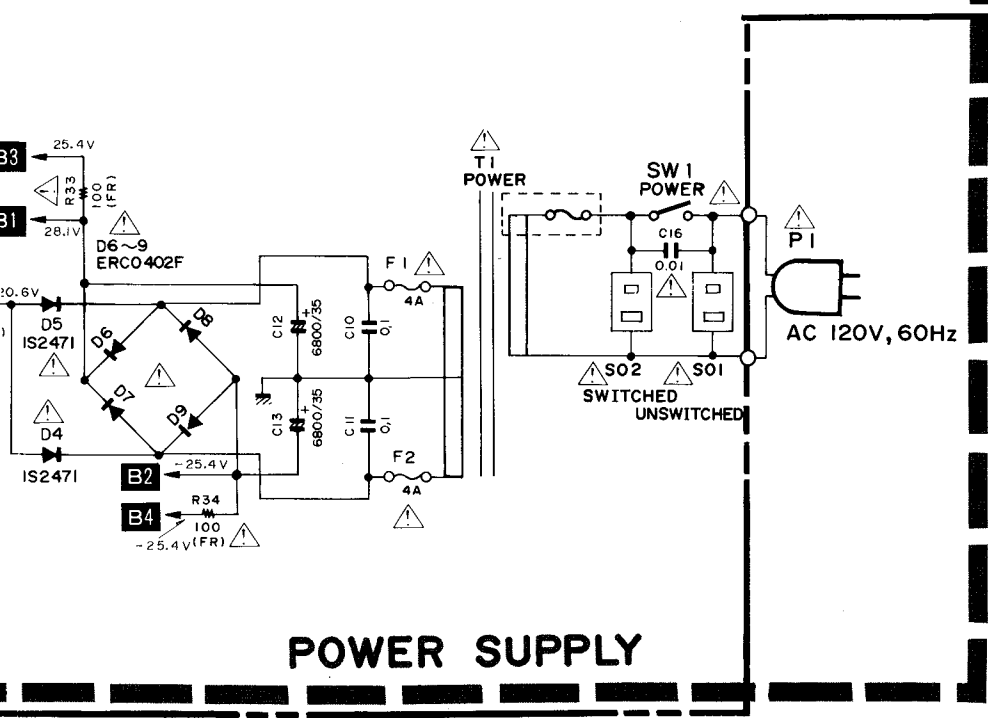


ZER

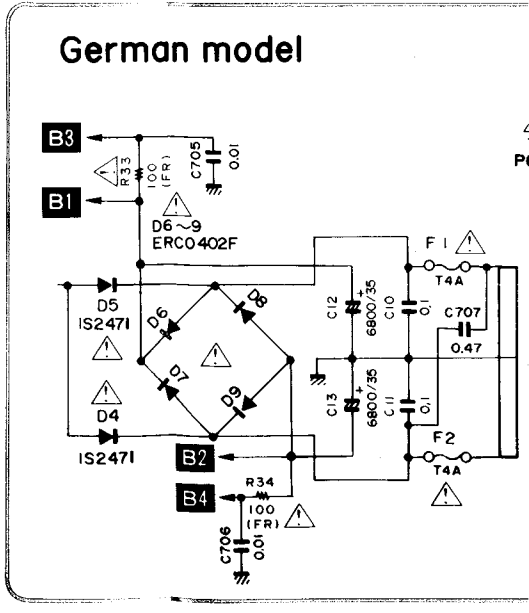
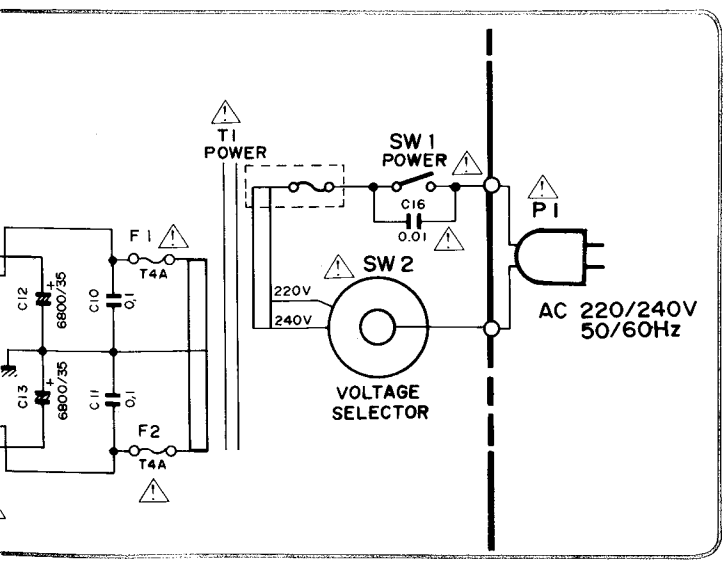




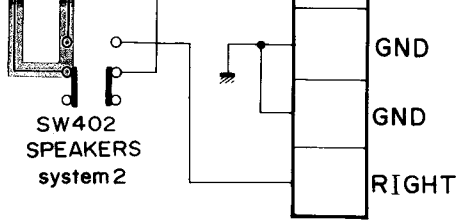
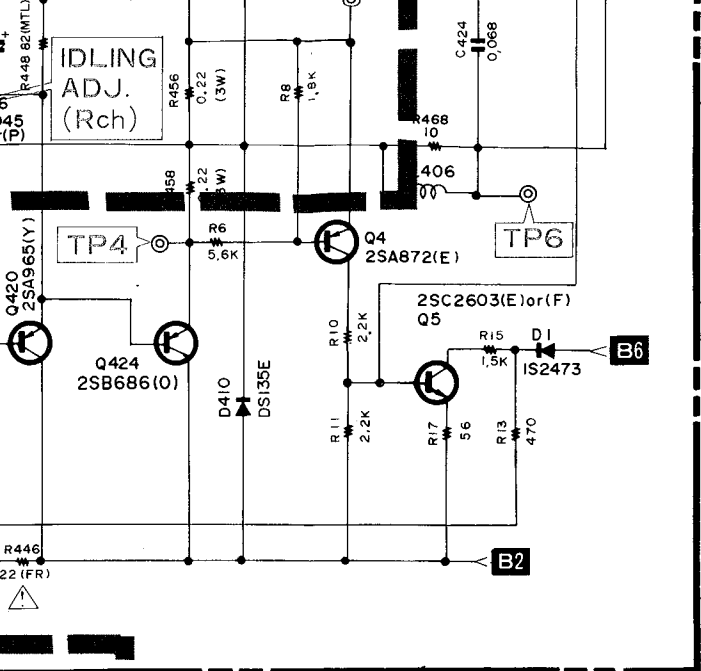
tone control



power supply

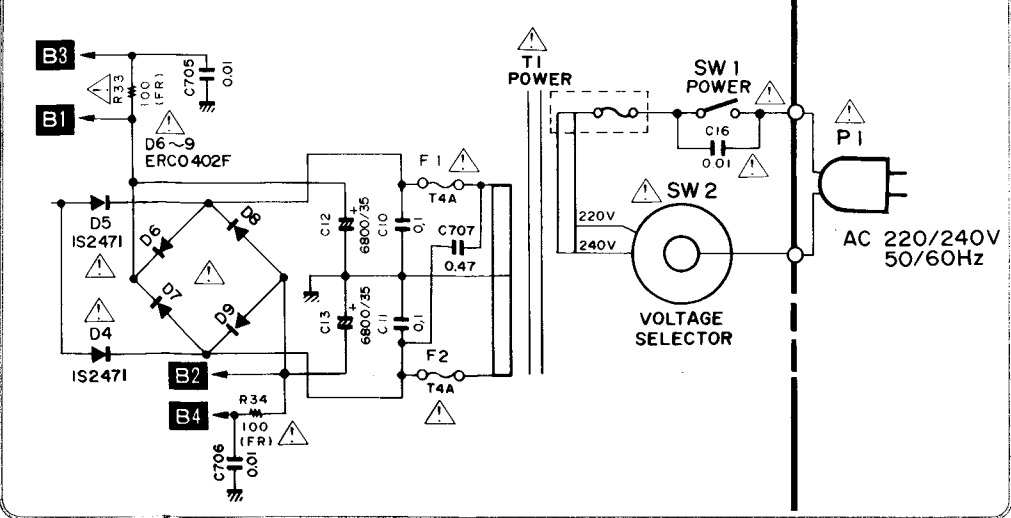


German model

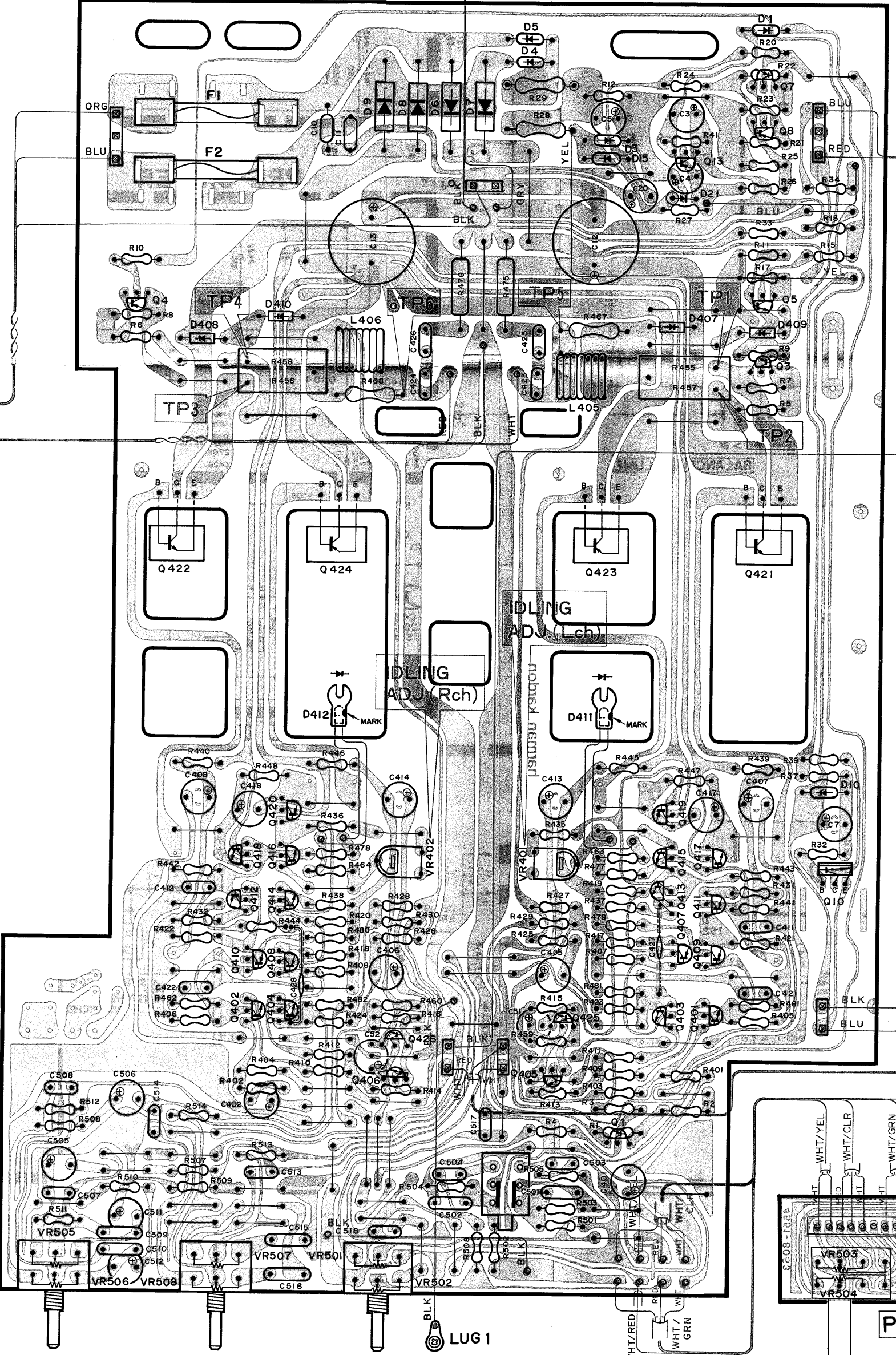
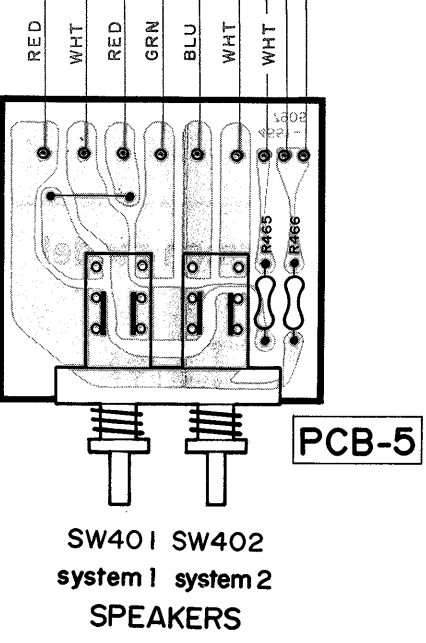
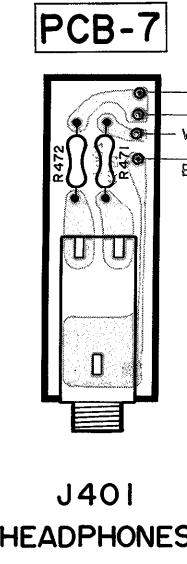
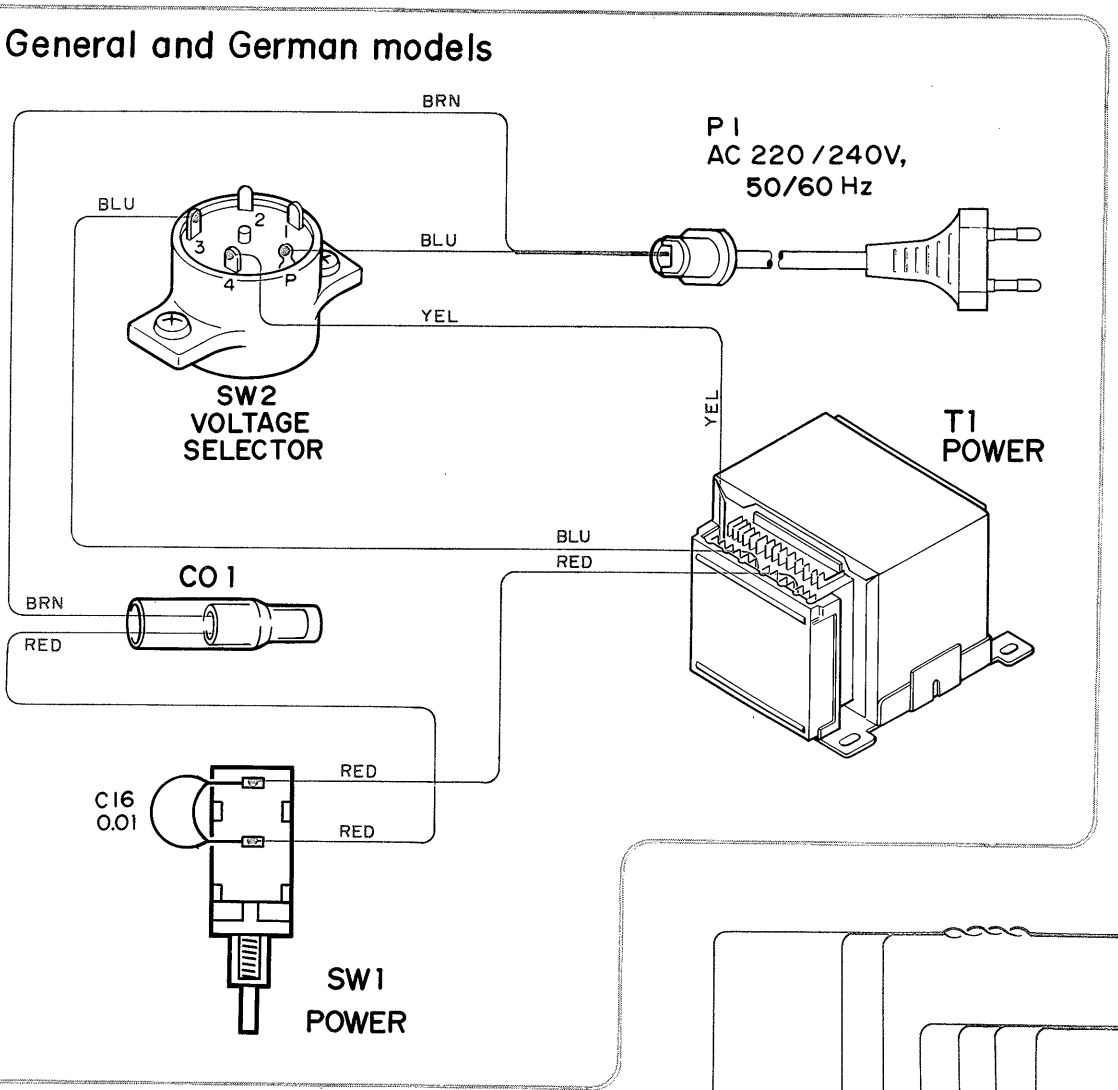
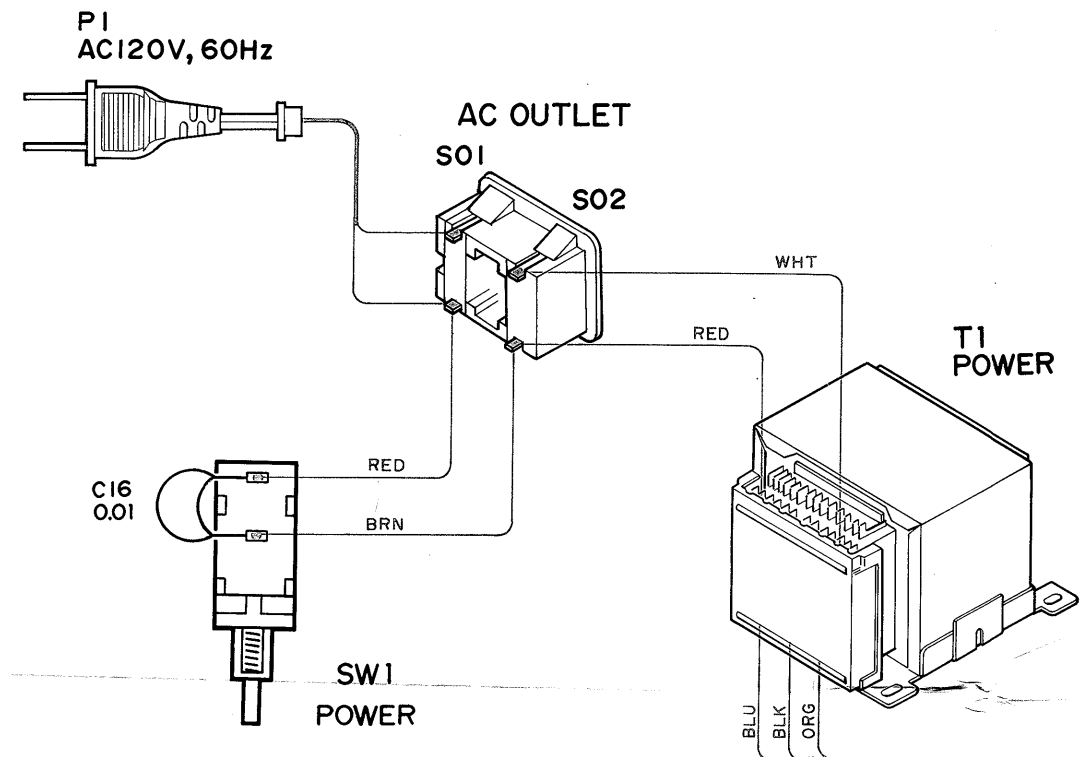
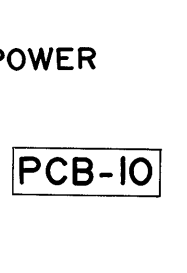
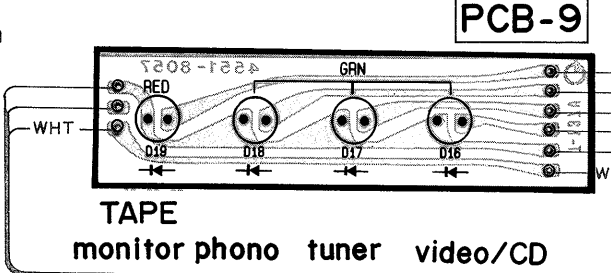
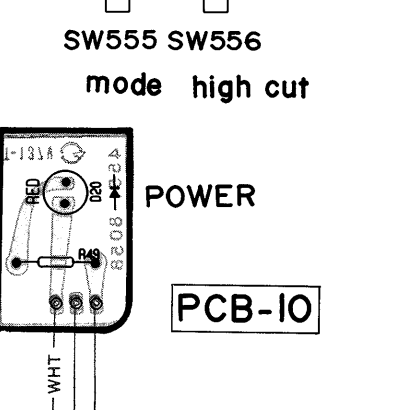
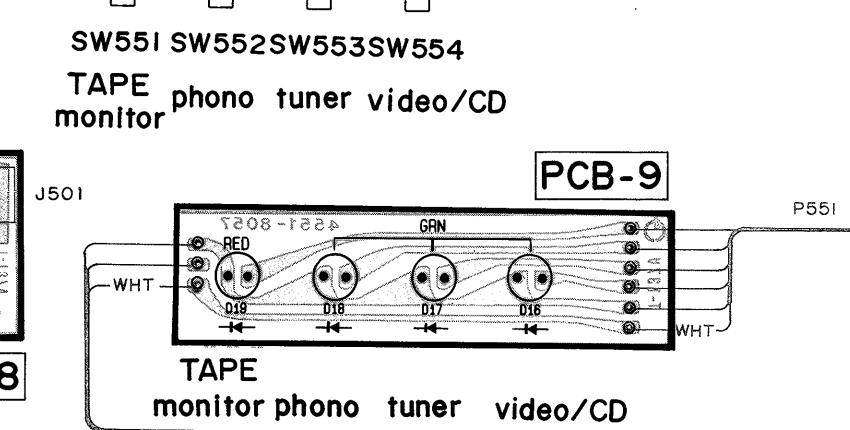
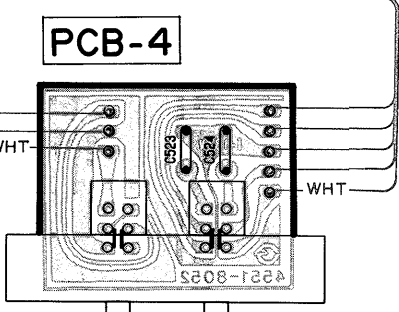
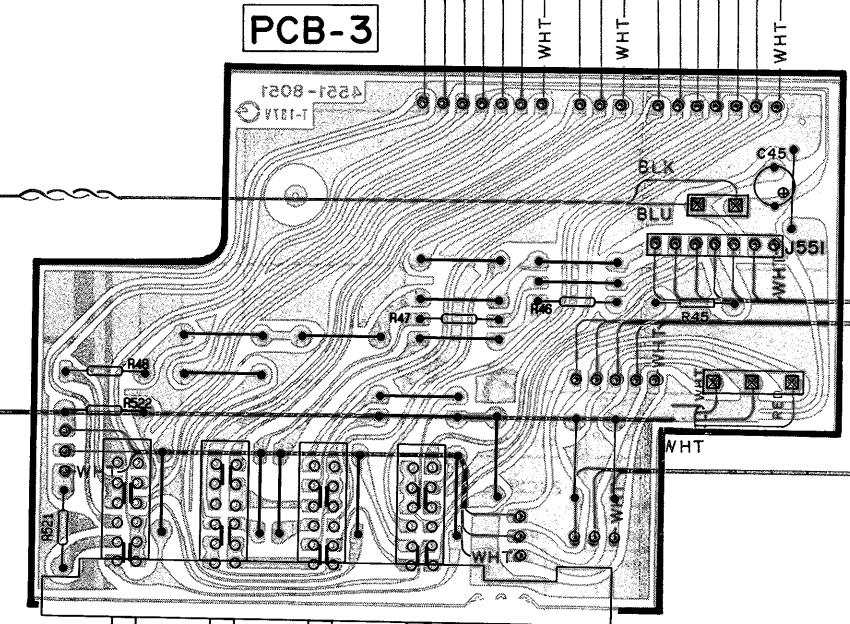
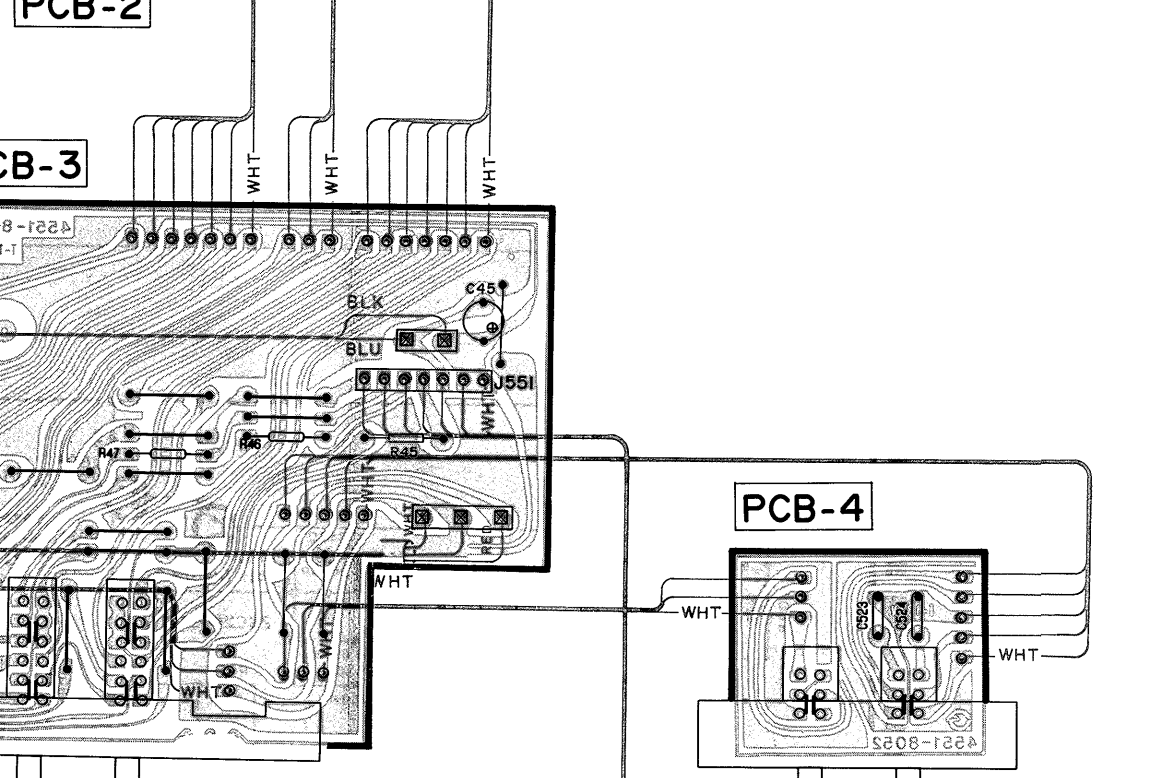
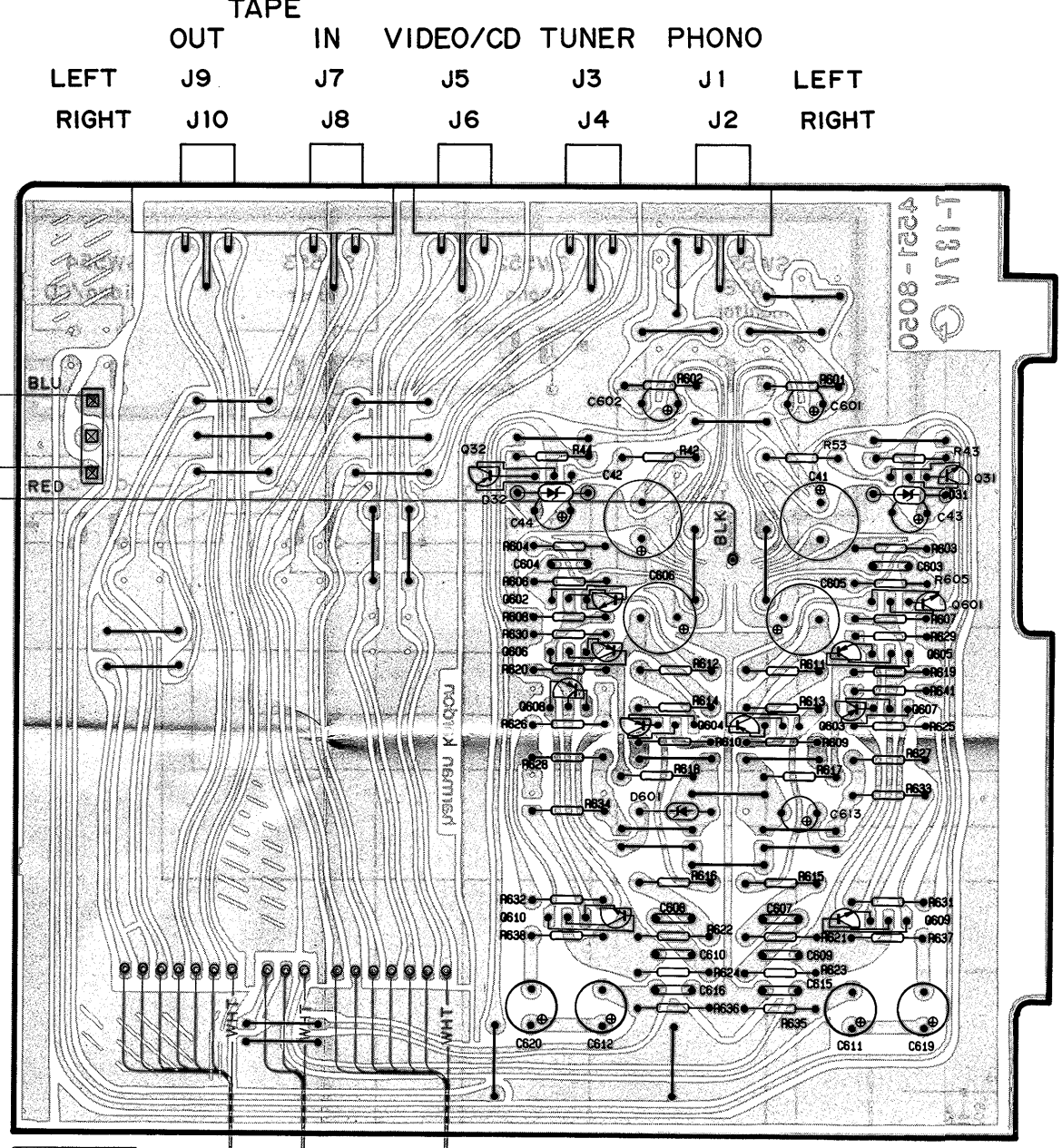
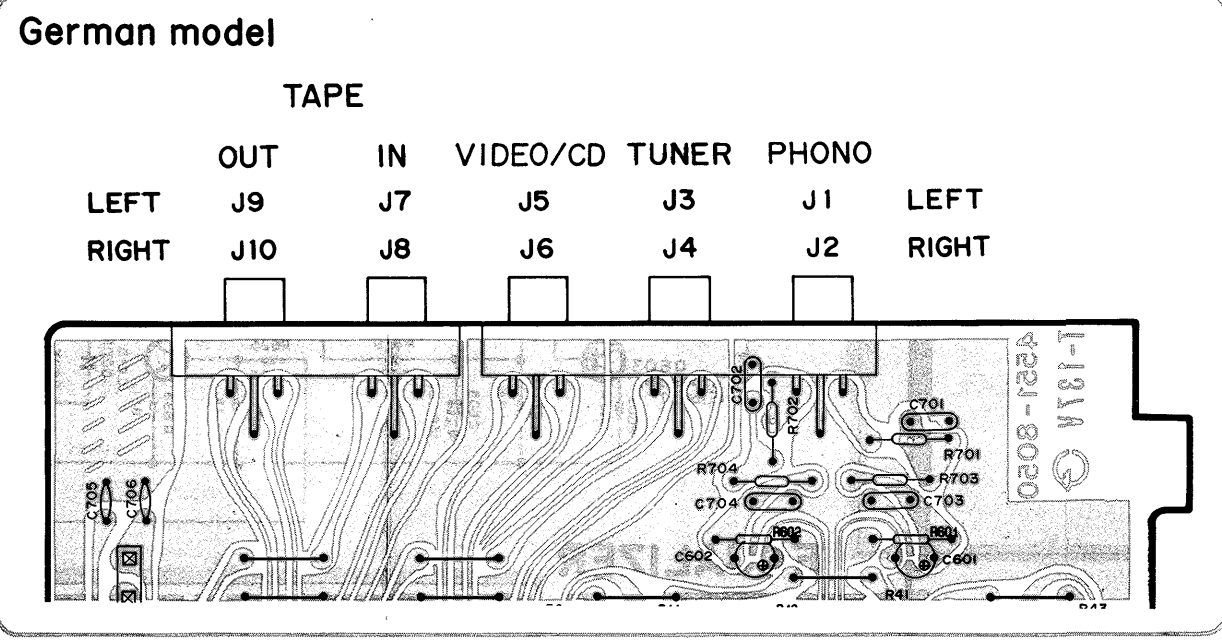
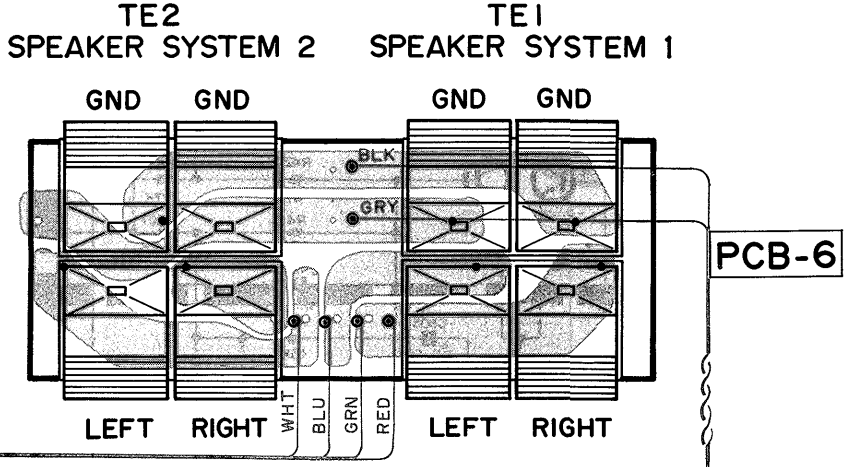
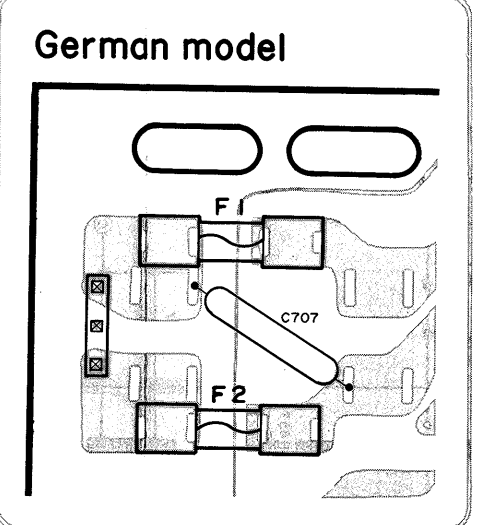
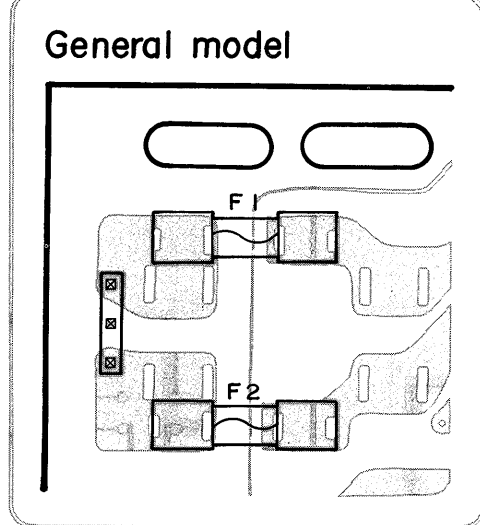


OV, 60Hz

German model



WIRING DIAGRAM



PIN-CONNECTION DIAGRAM OF TRANSISTORS AND DIODES

2SA1115(E) or (F) :Q1, 7, 8, 10, 13, 605 ~ 608 2SC2605(E) or (F) :Q5, 425, 426, 609, 610	2SA872(E): Q3, 4 2SD3687(C): Q31 2SA970(BL): Q407 ~ 410 2SC945(K) or (P) :Q415, 416 2SC2320(L(F) or (G) :Q601, 602	2SA999(L(F) or (E) :Q603, 604	2SB647(C): Q32 2SC1755(F): Q401 ~ 406 2SB646(C): Q411, 412 2SD666(C): Q413, 414 2SC2235(Y): Q417, 418 2SA965(Y): Q419, 420	2SD716(O): Q421, 422 2SB686(O): Q423, 424	1S2473 : D1, 15, 21, 401 ~ 404 RD11EB2 : D3, 10 1S2471 : D4, 5 HZ15-2L : D31, 32 RD3.9EB2 : D601	ERC0402FL : D6 ~ 9	DS135E: D407 ~ 410	MV12YM: D411, 412	GL5HD22: D16 ~ 20
---	--	----------------------------------	---	--	---	--------------------	--------------------	-------------------	-------------------

WIRE COLOR ABBREVIATIONS

RED: Red	GRN: Green
WHT: White	ORC: Orange
BLK: Black	YEL: Yellow
GRY: Gray	BRN: Brown
BLU: Blue	CLR: Clear

A

B

C

D

WIRING DIAGRAM

1

2

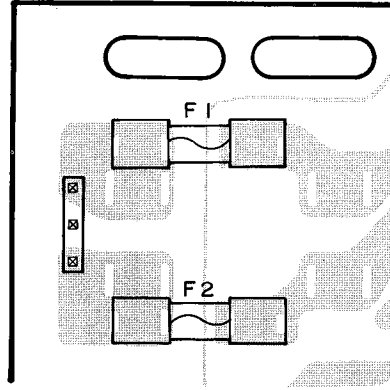
3

4

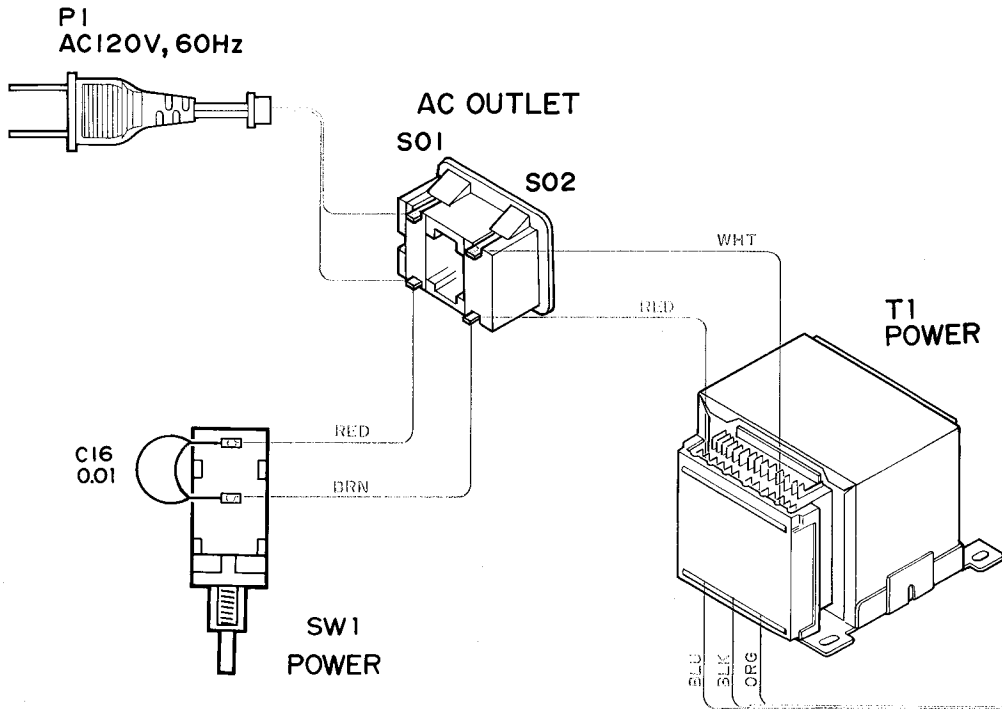
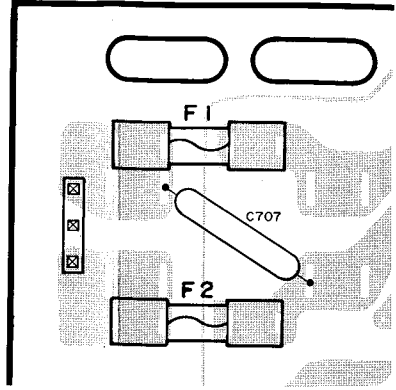
5

6

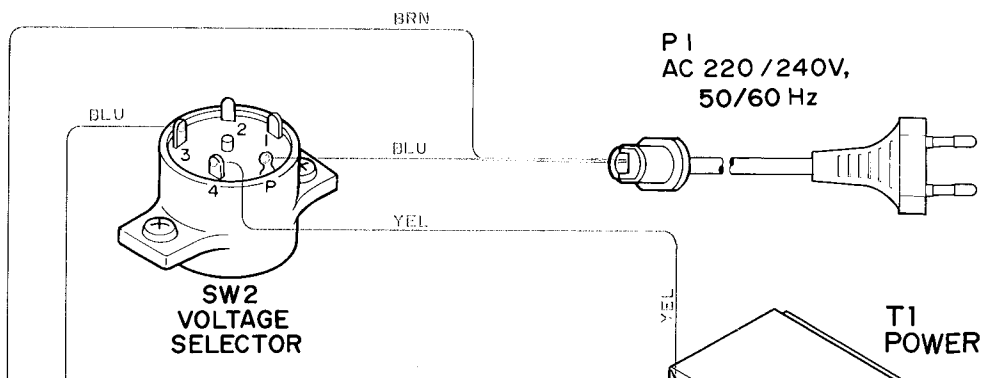
General model



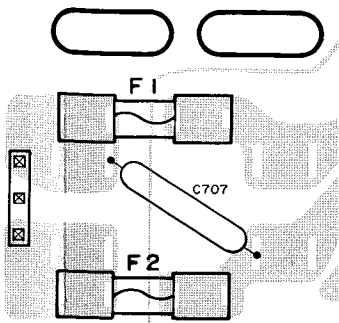
German model



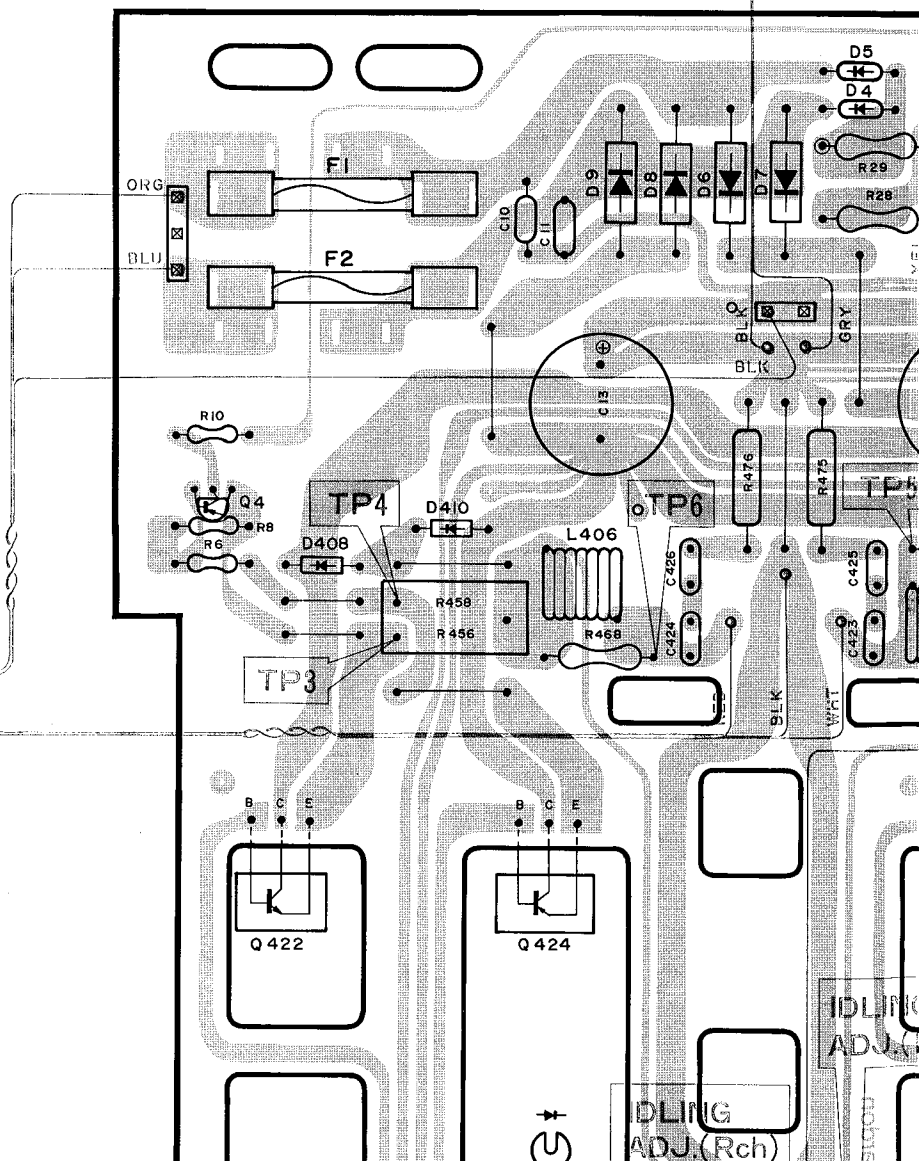
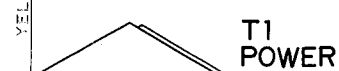
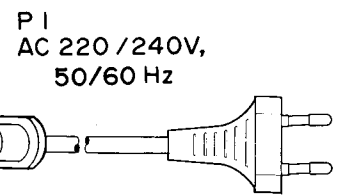
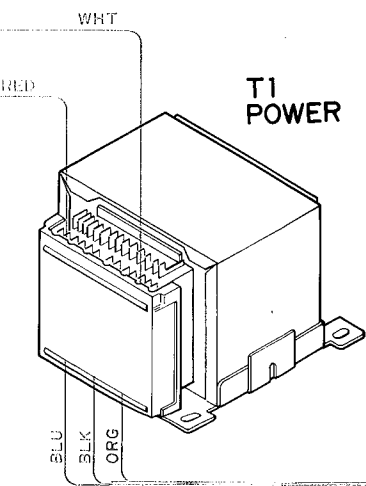
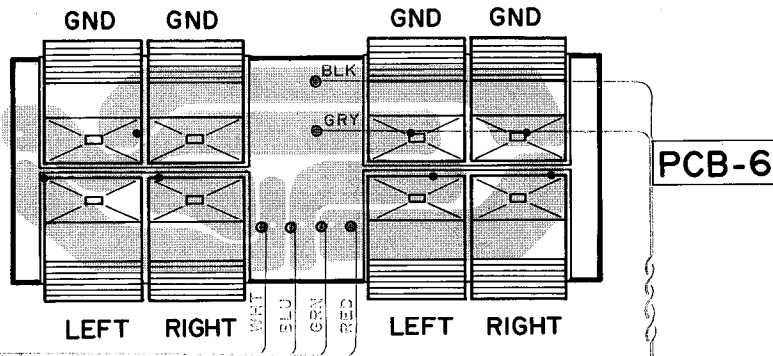
General and German models



German model

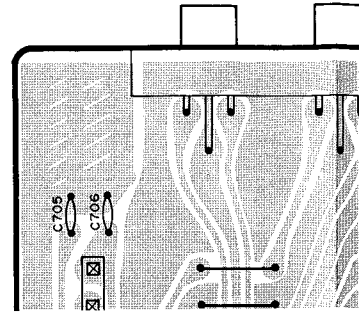


TE2 SPEAKER SYSTEM 2 TE1 SPEAKER SYSTEM 1

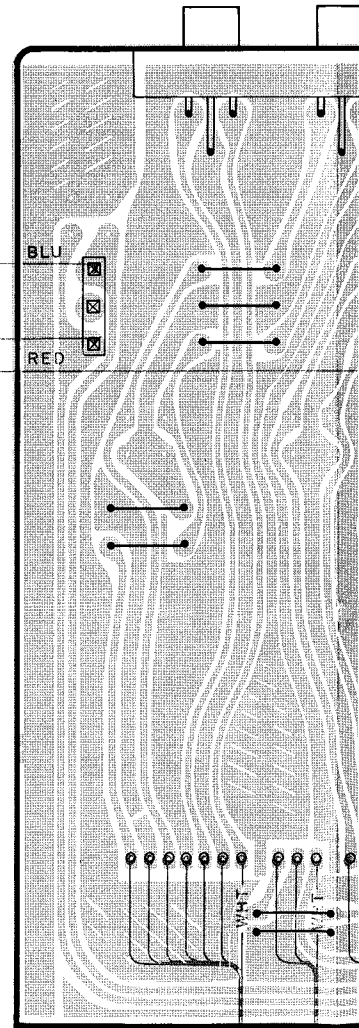


German model

TAPE		
	OUT	IN
LEFT	J9	J7
RIGHT	J10	J8



TAPE		
	OUT	IN
LEFT	J9	J7
RIGHT	J10	J8



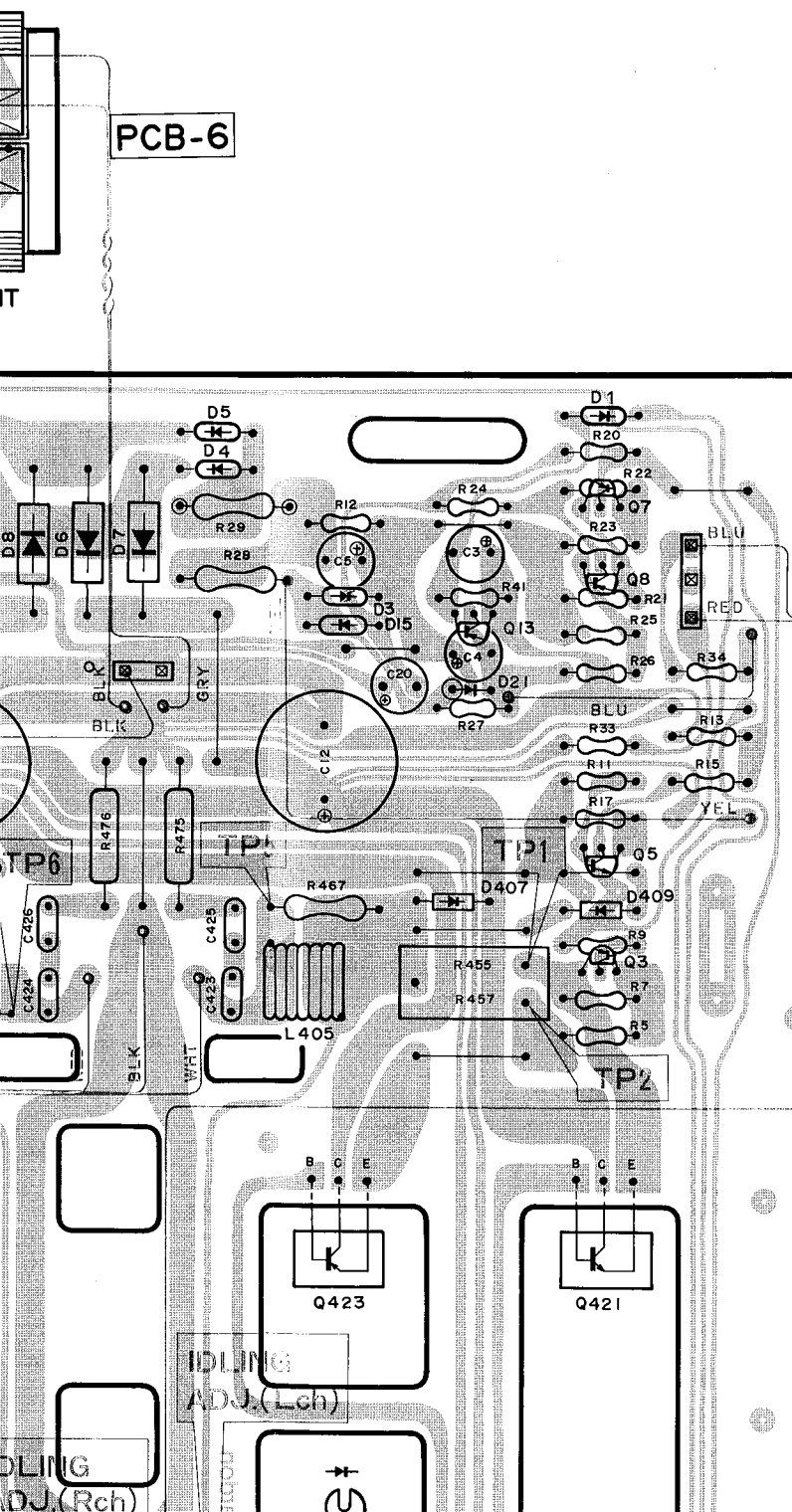
FEM 1

PCB-6

IT

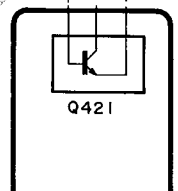
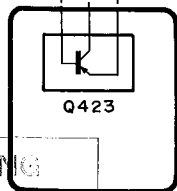
PCB-1

PCB-2



IDLING ADJ. (Lch)

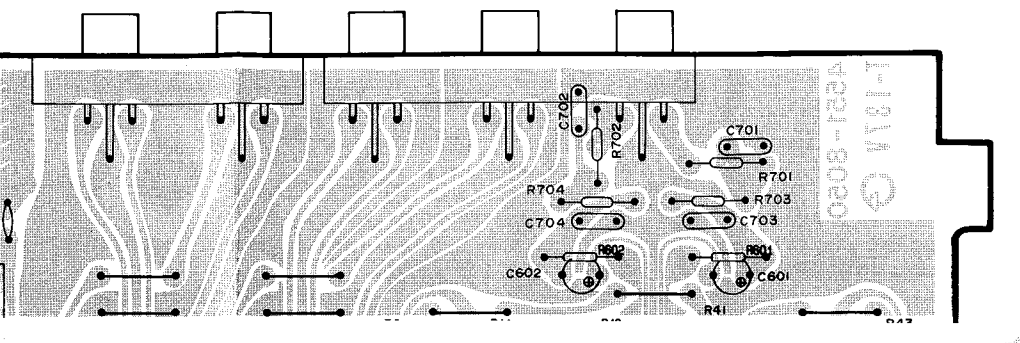
IDLING ADJ. (Rch)



n model

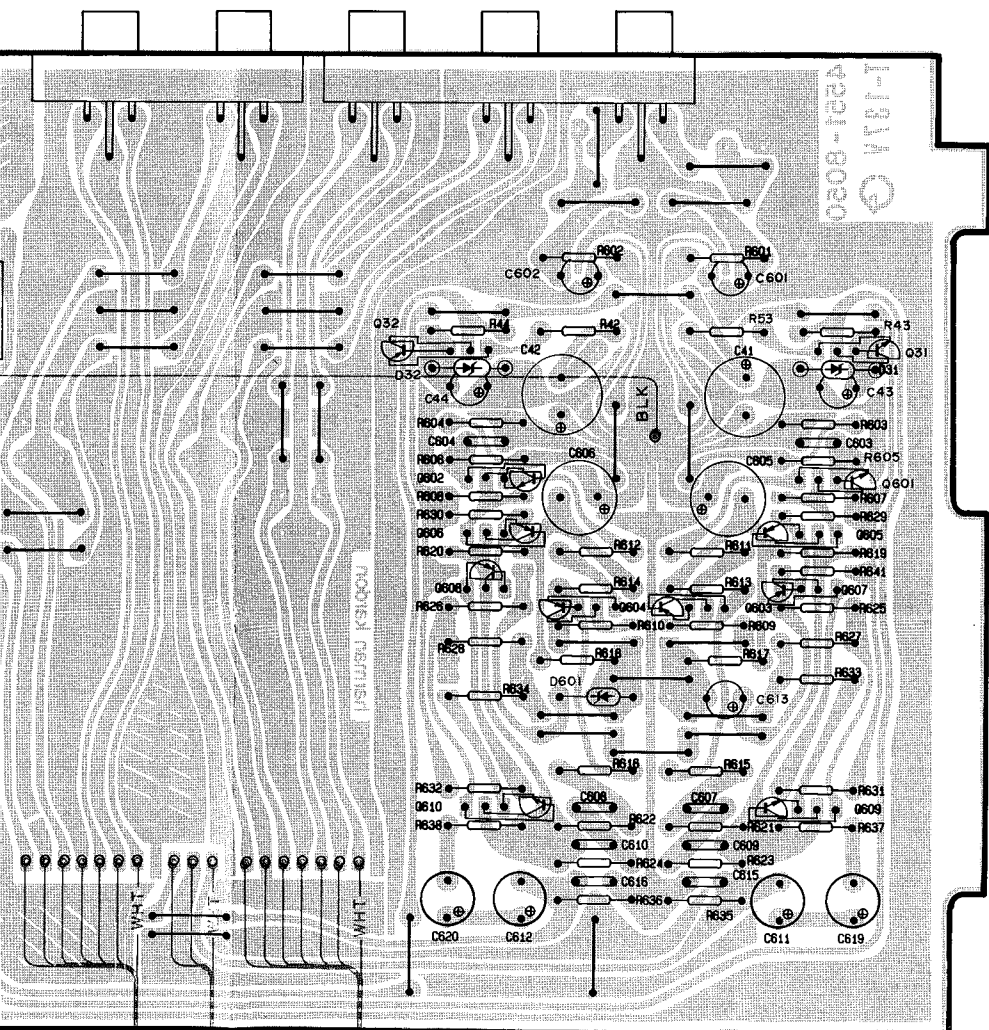
TAPE

OUT	IN	VIDEO/CD	TUNER	PHONO	LEFT
J9	J7	J5	J3	J1	LEFT
J10	J8	J6	J4	J2	RIGHT



TAPE

OUT	IN	VIDEO/CD	TUNER	PHONO	LEFT
J9	J7	J5	J3	J1	LEFT
J10	J8	J6	J4	J2	RIGHT

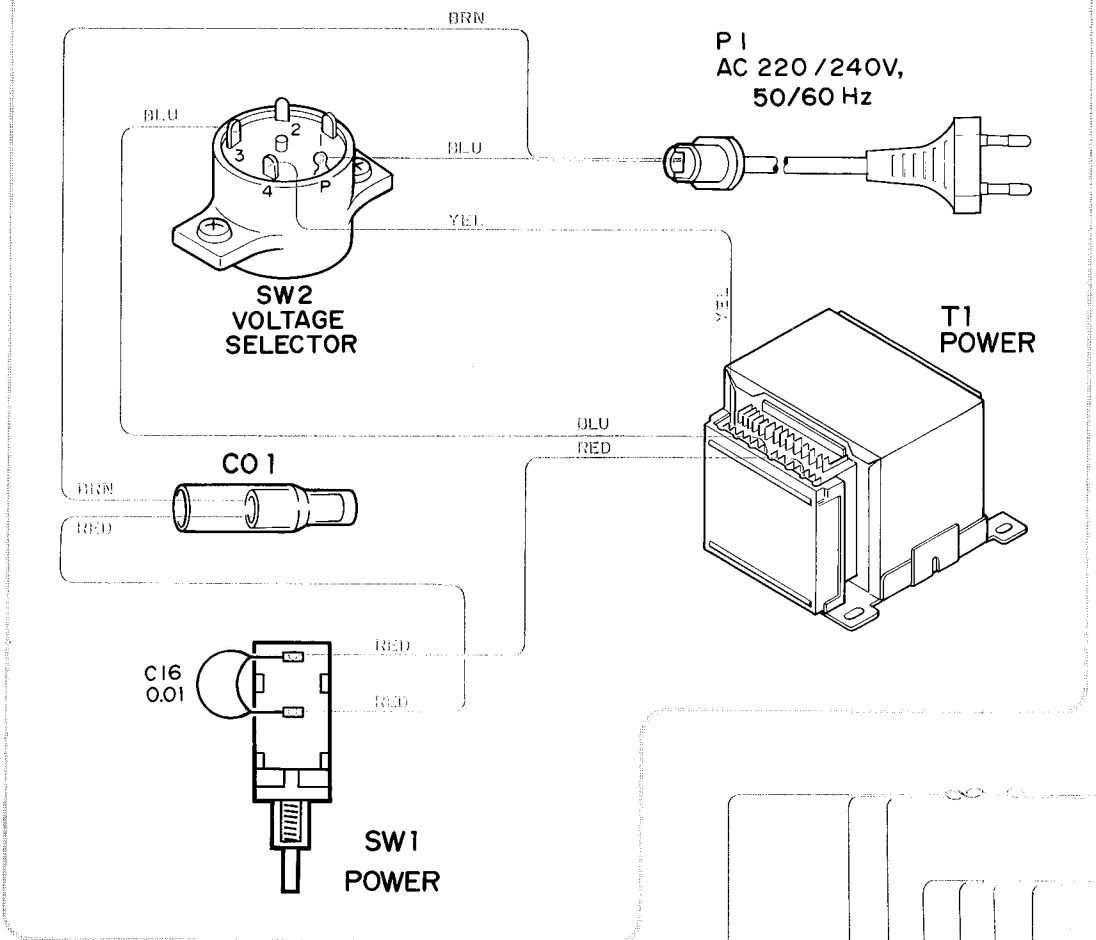


SW1
POWER

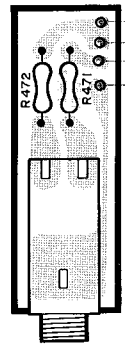
BLU
BLK
ORG

5
6
7
8
9
10

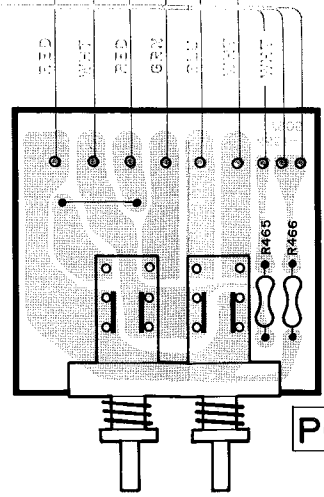
General and German models



PCB-7



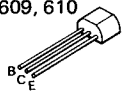
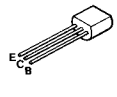
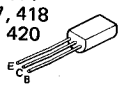
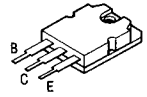
J401
HEADPHONES

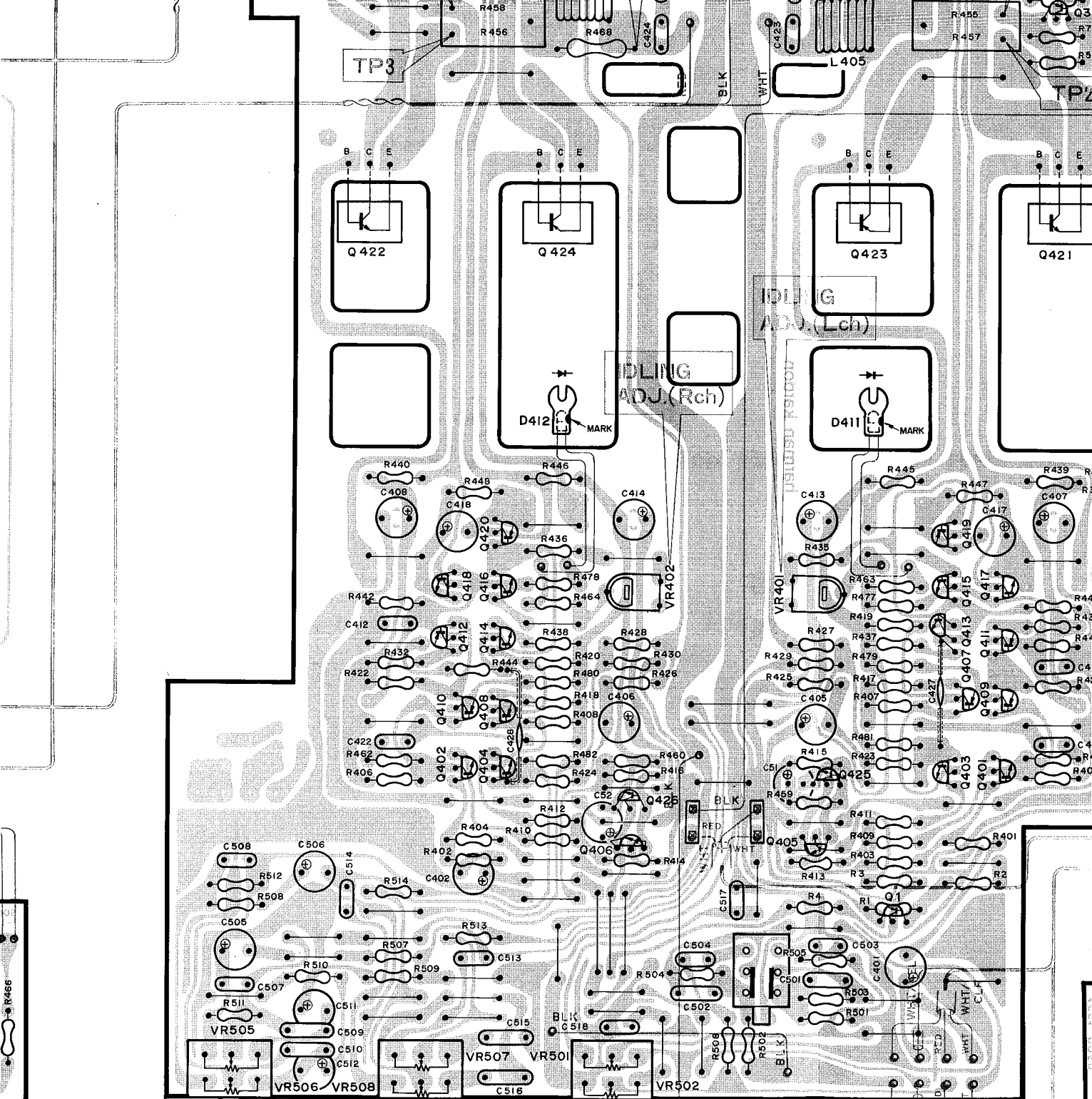


PCB-5

SW401 SW402
system 1 system 2
SPEAKERS

PIN-CONNECTION DIAGRAM OF TRANSISTORS AND DIODES

<p>2SA1115(E) or (F) : Q1, 7, 8, 10, 13, 605 ~ 608 2SC2605(E) or (F) : Q5, 425, 426, 609, 610</p>  <p>B C E</p>	<p>2SA872(E): Q3, 4 2SD667(C): Q31 2SA970(BL): Q407 ~ 410 2SC945(K) or (P) : Q415, 416 2SC2320L(F) or (G) : Q601, 602</p> <p>2SA999L(F) or (E) : Q603, 604</p>  <p>E C B</p>	<p>2SB647(C): Q32 2SC1755(F): Q401 ~ 406 2SB646(C): Q411, 412 2SD666(C): Q413, 414 2SC2235(Y): Q417, 418 2SA965(Y): Q419, 420</p>  <p>E C B</p>	<p>2SD716(O): Q421, 422 2SB686(O): Q423, 424</p>  <p>B C E</p>
--	---	--	---



PCB-5

BASS

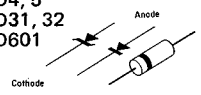
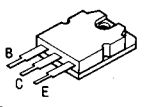
TREBLE

BALANCE

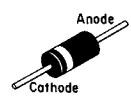
SW501
loudness

2SD716(O): Q421, 422
2SB686(O): Q423, 424

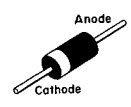
1S2473 : D1, 15, 21,
401 ~ 404
RD11EB2 : D3, 10
1S2471 : D4, 5
HZ15-2L : D31, 32
RD3.9EB2 : D601



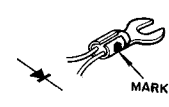
ERC0402FL : D6 ~ 9



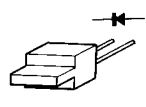
DS135E: D407 ~ 410



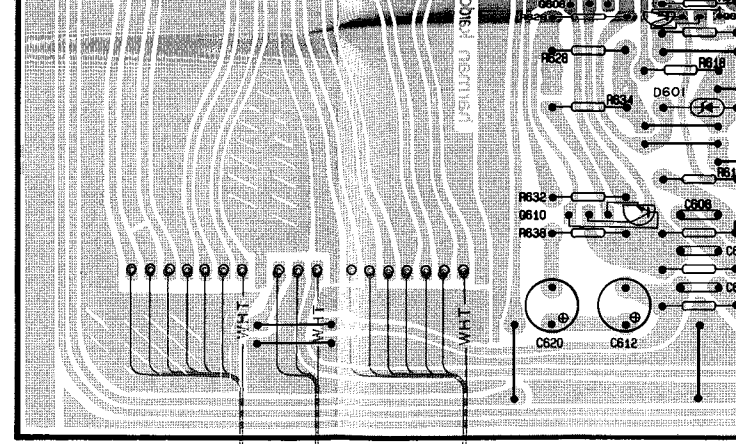
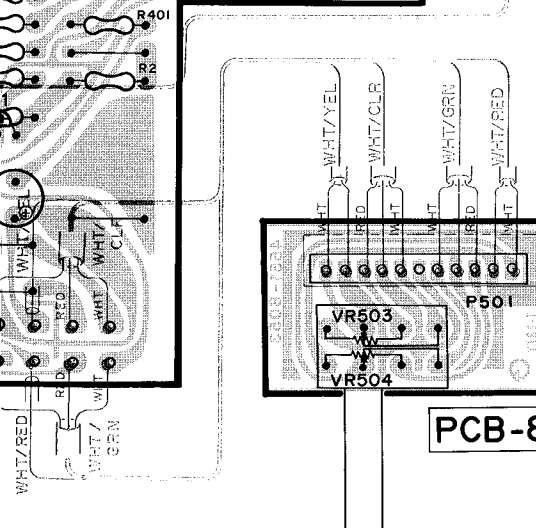
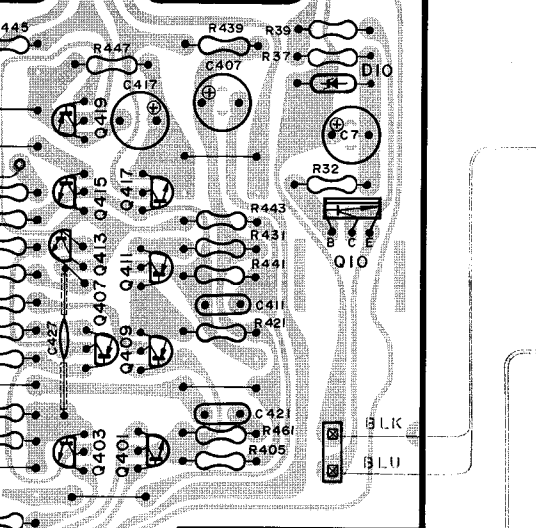
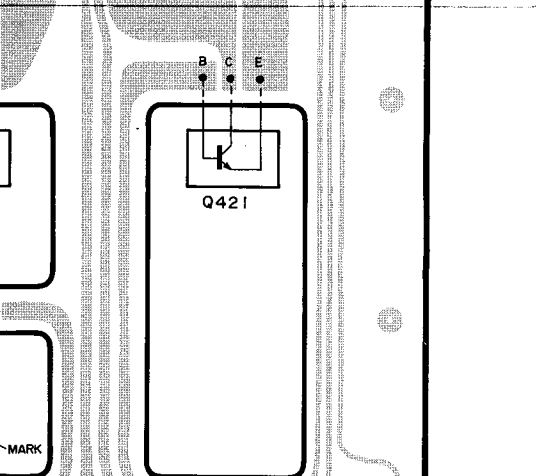
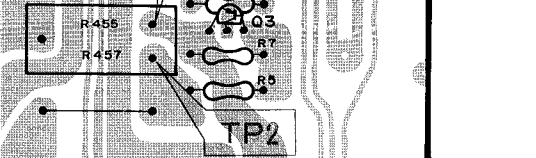
MV12YM: D411, 412



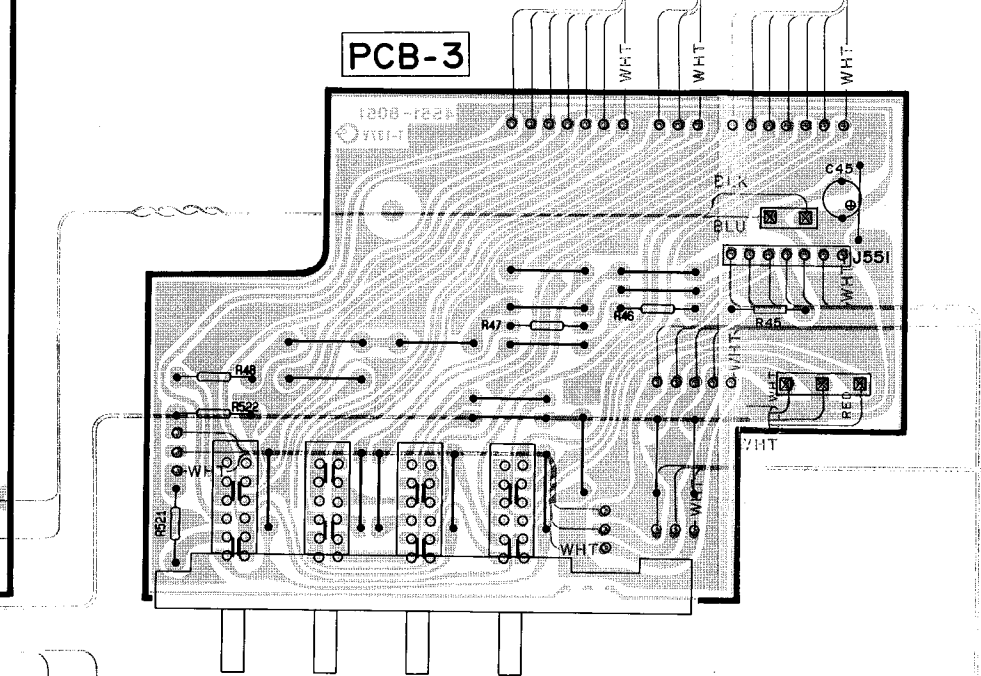
GL5HD22: D16 ~ 20



W
R
W
B
G
B

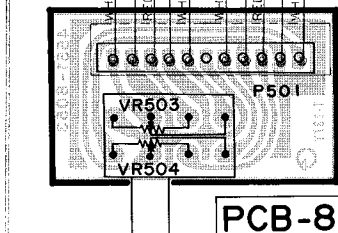


PCB-2



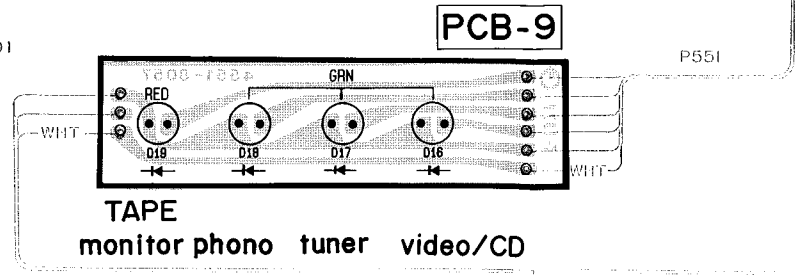
PCB-3

SW551 SW552 SW553 SW554
TAPE phono tuner video/CD
 monitor



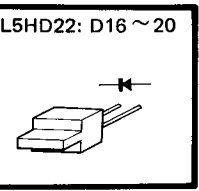
PCB-8

VOLUME



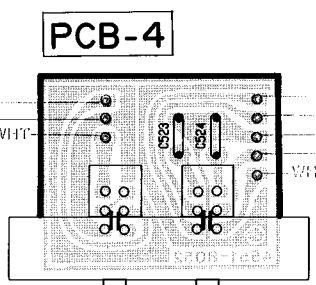
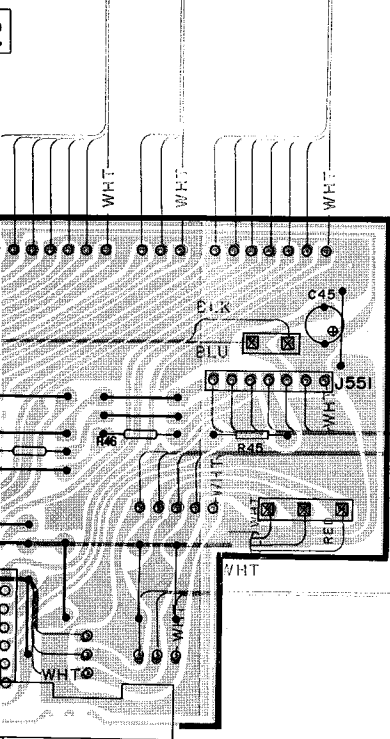
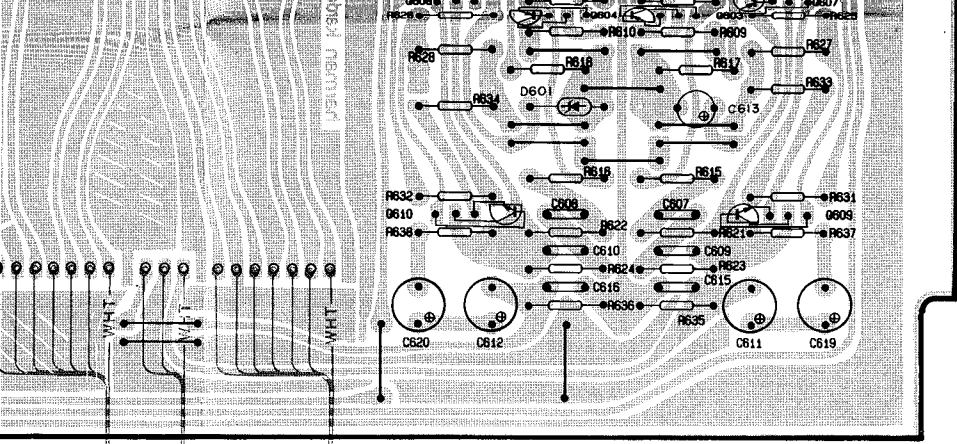
PCB-9

TAPE
 monitor phono tuner video/CD

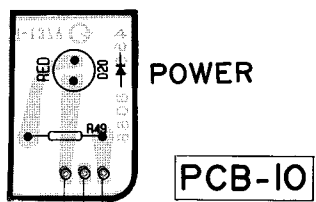


WIRE COLOR ABBREVIATIONS

- RED: Red
- WHT: White
- BLK: Black
- GRY: Gray
- BLU: Blue
- GRN: Green
- ORG: Orange
- YEL: Yellow
- BRN: Brown
- CLR: Clear



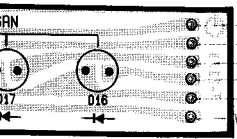
SW555 SW56
mode high cut



POWER

54
o/CD

PCB-9



er video/CD

P551