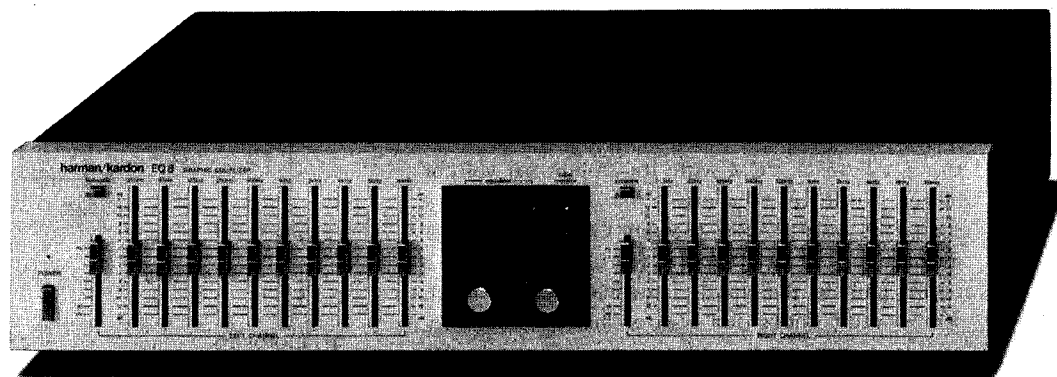


The Harman Kardon Model EQ8 GRAPHIC EQUALIZER

Manual No. 61A

Technical Manual



SPECIFICATIONS

	Nominal	Limit
Input Sensitivity at 1V Output	1.1V	$\pm 1\text{dB}$
Input Impedance	35k Ω	$\geq 30\text{k}\Omega$
Signal-to-Noise Ratio (IHF-A)	115dB	$\geq 112\text{dB}$
Crosstalk at 10kHz	68dB	$\geq 65\text{dB}$
Overload (20 ~ 20kHz)	5.0V	$\geq 4.5\text{V}$
Overload Indicator	4.4V	$\geq 4.2\text{V}$
Frequency Response at 0dB	0.25Hz	~ 180kHz
THD at 2V Output (20 ~ 20kHz)	0.005%	$\leq 0.01\%$
Center Frequency	31.5, 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16kHz	
Equalizer Control Action		$\pm 12.5\text{dB} \pm 1.0\text{dB}$
Input Level Control		$-20\text{dB} \pm 1.0\text{dB}$
Subsonic Filter 5Hz		$3.5\text{dB} \pm 1\text{dB}$
30Hz		$3.5\text{dB} \pm 1\text{dB}$
Square Wave Tilt (20Hz)		$3.5\% \leq 5\%$
Square Wave Response (1kHz)		$0.14\text{V} \leq 0.25\text{V}$

Dimensions (W x H x D)	17-7/16" x 4" x 13-7/16" (443 x 102 x 341mm)
Weight	9lbs. 15oz. (4.5kg)
Power Supplies	
U.S. & Canadian models	AC 120V, 60Hz
General model	AC 100/120/220/240V, 50/60Hz
Power Consumption	8W

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

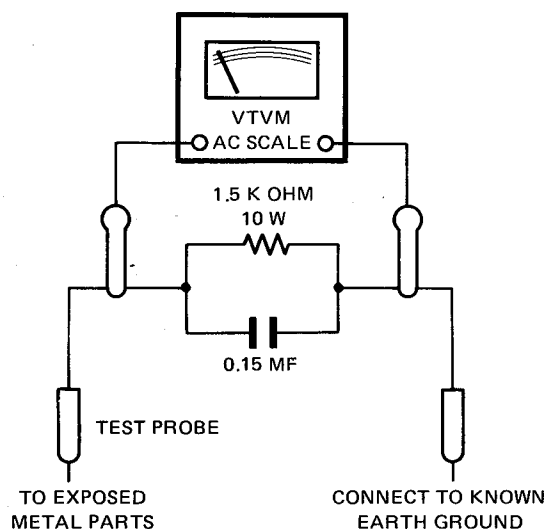
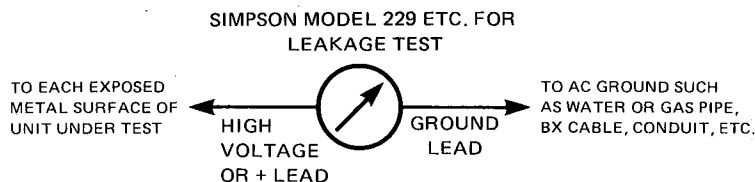
Specifications and components subject to change without notice. Overall performance will be maintained or improved.

harman/kardon
240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797
1112-H15261A8 P-08834 1650 PRINTED IN JAPAN

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. Replace all protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
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 AC line 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 0.15mf 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.



DISASSEMBLY PROCEDURES

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 out the equalizer level and subsonic frequency control knobs (133).
3. Remove 6 screws **B** and then remove the front panel assembly.

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

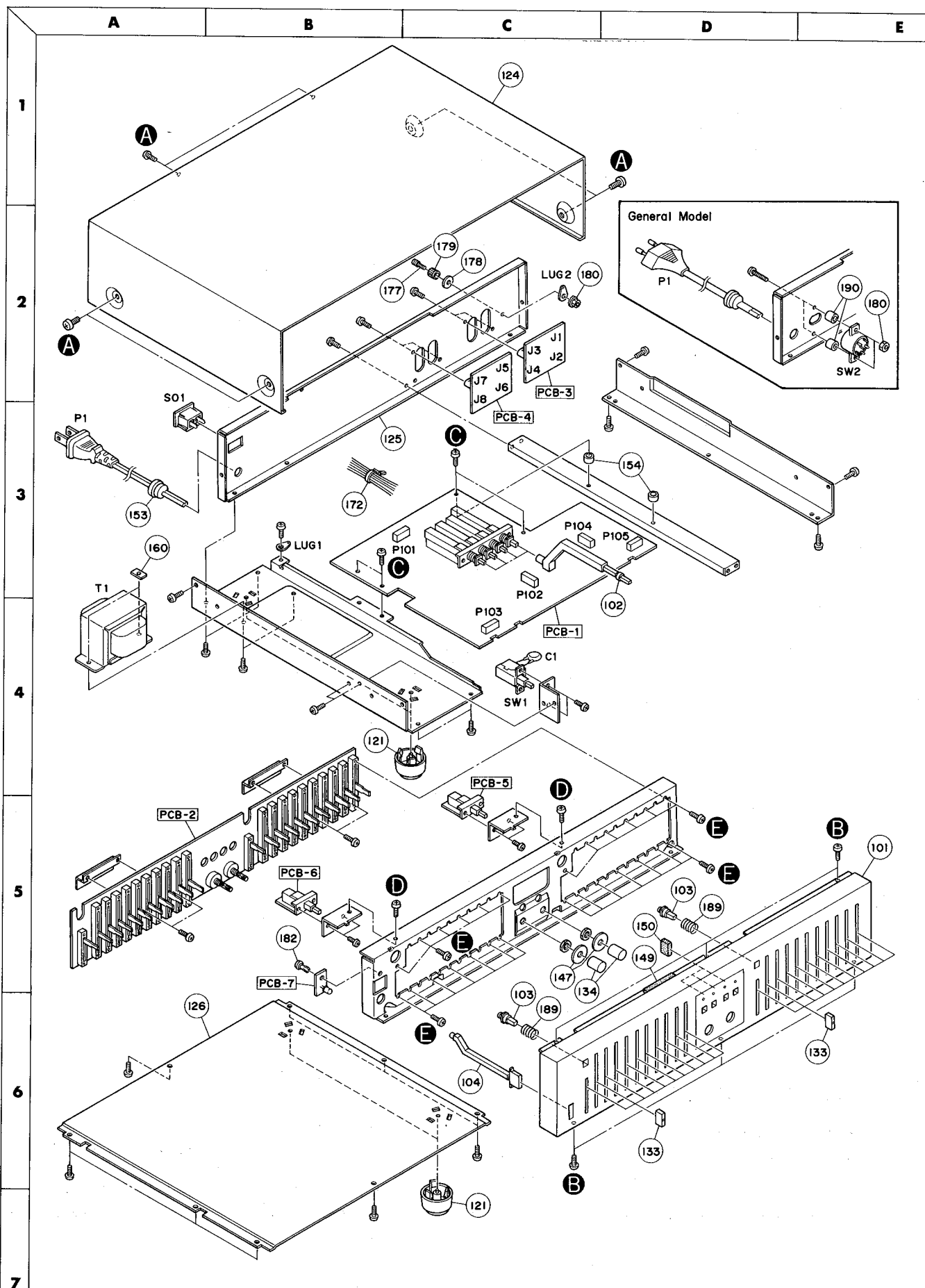
1. Remove the cabinet top and front panel assembly (refer to steps 1 and 2).
2. Open the lid of connectors (P101, 102, 103, 104, 105) on the main P.C. board (PCB-1) and then disconnect lead wires.

3. Remove 4 screws **C** and then remove the main P.C. board (PCB-1) with push button assemblies (102). If necessary, unsolder the lead wires.

4 CONTROL P.C. BOARD (PCB-2) REMOVAL

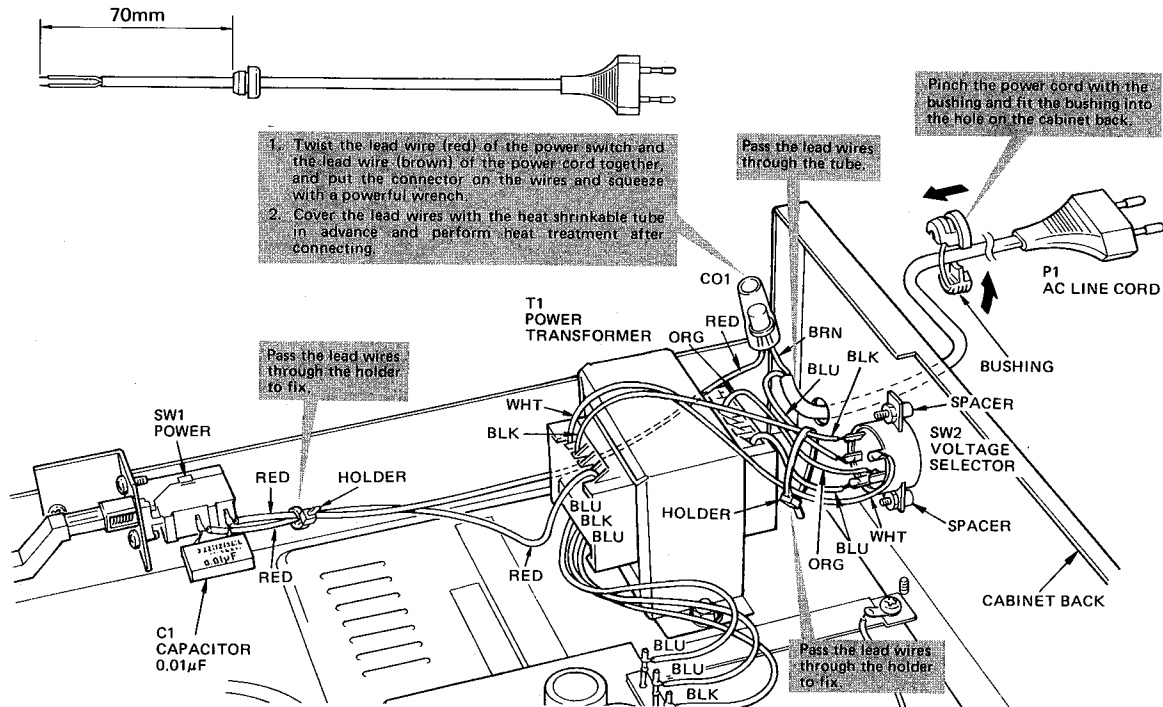
1. Remove the cabinet top, front panel assembly and main P.C. board (refer to steps 1 through 3).
2. Remove 2 screws **D** and then remove the subsonic switch P.C. boards (PCB-5 & PCB-6).
3. Pull off the Input Level knobs and remove input level control mounting nuts.
4. Remove 28 screws **E** and then remove the control P.C. board (PCB-2).

GENERAL UNIT EXPLODED VIEW

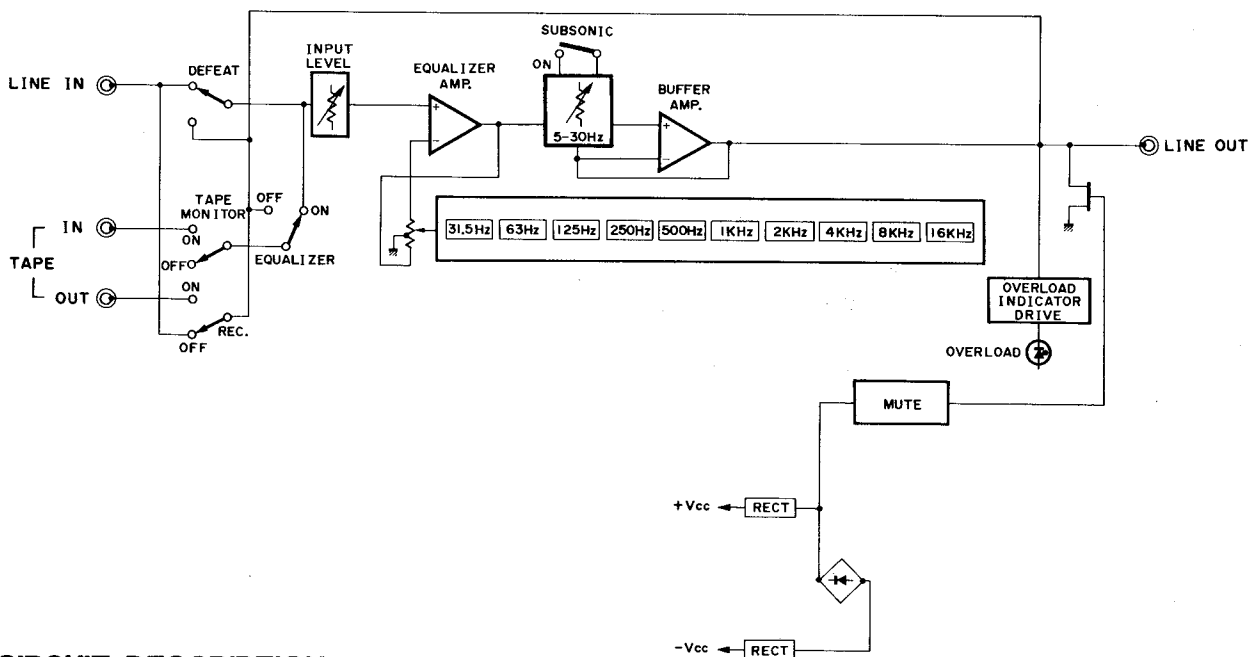


POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS IN OTHER THAN NORTH AMERICA)

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.



BLOCK DIAGRAM



CIRCUIT DESCRIPTION

- **SIGNAL PATH (Lch)**

Signal is fed to ⑤ pin of the equalizer amp. IC101-2/2 through input level volume. The equalizer amp. has to high pass filters in its feed back loop. ⑦ pin output of the equalizer amp. IC101-2/2 is fed to ③ pin of the buffer amp. IC101-1/2.

- **MUTING**

After the power switch is set to on, Q5 (2SC2603) stays off until C11 and C12 are charged up and the base of Q5 (2SC2603) becomes 0.7V. Q101 (2SK363) and Q102 (2SC363) becomes on and muting operation is completed.

Ref. No.	Part No.	Description
GENERAL UNIT PARTS LIST		
101	A443-EQ8A	Front Panel Assembly
102	A662-EQ8A	Push Button Assembly, Equalizer Selector, Tape Monitor
103	A662-EQ8B	Push Button Assembly, Subsonic
104	A662-EQ8C	Push Button Assembly, Power
121	1319-0139	Foot
124	1414-04001	Cabinet Top
125	1424-09701	Cabinet Back (U.S. & Canadian models)
"	1424-11201	" (General model)
126	1424-09801	Cabinet Bottom
133	1642-03201VN	Knob, Equalizer Level & Subsonic Frequency Controls
134	1634-04301	Knob, Input Level
147	2111-13115	Felt
149	2112-11762	Sponge
150	2112-11231	Sponge
153	2114-415027	Bushing
154	2132-01406	Spacer
160	2219-7091	Bracket
172	2240-7120	Holder
177	2310-7015	Special Screw
178	2410-7005	Special Washer
179	2440-7011	Special Nut
180	2440-7016	Special Nut
182	2459-3004511	Rivet
189	2651-210187	Spring
190	2132-7116	Spacer
	2211-7233	Chassis, T1
	2211-7234	Chassis, Right
	2211-7244	Chassis, Front
	2219-7933	Bracket, PCB-5 & PCB-6
	2219-7934	Bracket, PCB-1 Mounting
	2219-7935	Bracket, PCB-2
	2219-7936	Bracket, SW1
	1111-J30149	Owner's Guide (U.S. model)
	1111-J30150	Owner's Guide (General & Canadian models)
	1111-J90195	Important Safeguards Guide (for U.S. model)
	1221-787144	Carton Box
	1222-7216	Cushion (2 Used)

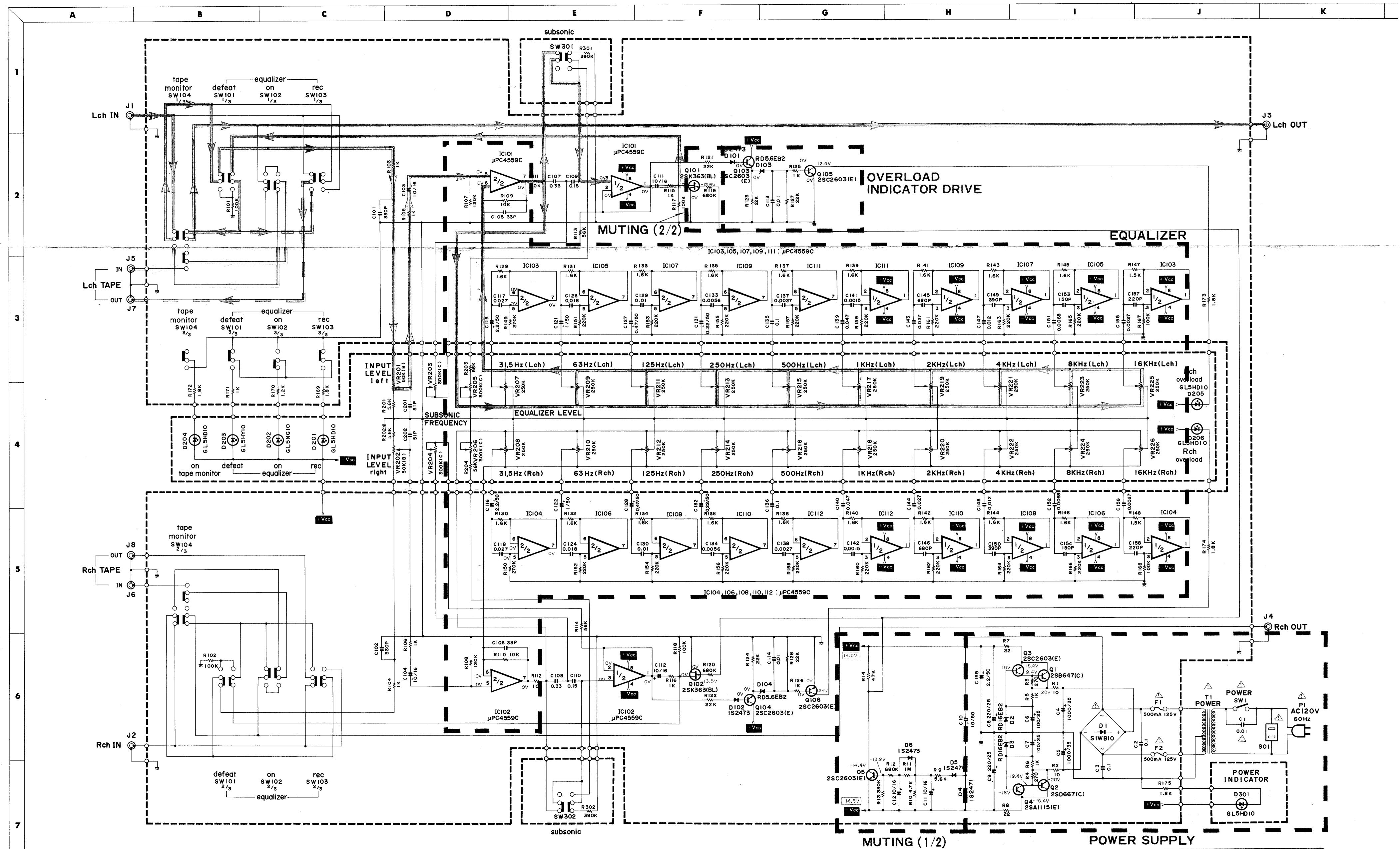
ELECTRICAL PARTS LIST

CHASSIS MISCELLANEOUS		
P1	4161-71147	Power Cord (U.S. & Canadian models)
"	4161-7256	Power Cord (General model)
T1	5584-701421	Power Transformer (U.S. & Canadian models)
"	5584-701422	Power Transformer (General model)
SW1	4431-A01056	Push Switch, Power
SW2	4411-104736	Rotary Switch, Voltage Selector (General model only)
SO1	4474-164	AC Outlet, Unswitched (U.S. & Canadian models only)
CO1	4443-712	Connector, Power Cord (General model only)
C1	5361-1030419	Capacitor, 0.01 μ F, +100%–0%, AC125V, Ceramic (U.S. & Canadian models)
"	5352-1030958	Capacitor, 0.01 μ F, $\pm$ 20%, AC250V, Metalized Polyester (General model)
LUG1, 2	4211-4	Lug Terminal
	4474-29	AC Plug Adaptor (General model only)
	4161-7185	Connection Cord (Accessory)

PCB-1 MAIN P.C. BOARD		
RESISTORS		
R1, 2	5102-1004715	10 Ω , $\pm$ 2%, 1/4W, Fuse
R7, 8	5102-2204715	22 Ω , $\pm$ 2%, 1/4W, Fuse
CAPACITORS		
C4, 5	5345-108E041	1000 μ F, $\pm$ 20%, 35V, Electrolytic
C6, 7	5345-107-25	100 μ F, +50%–10%, 25V, Electrolytic
C8, 9	5345-227D041	220 μ F, $\pm$ 20%, 25V, Electrolytic
C10	5345-106-50	10 μ F, +50%–10%, 50V, Electrolytic
C11, 12	5345-L106M16	10 μ F, $\pm$ 20%, 16V, Electrolytic
C101, 102	5359-3315851	330pF, $\pm$ 5%, 100V, Polypropylene
C103, 104, 111, 112	5345-L106M16	10 μ F, $\pm$ 20%, 16V, Electrolytic
C105, 106	5353-330534	33pF, $\pm$ 5%, 500V, Mica
C115, 116	5345-L225M50	2.2 μ F, $\pm$ 20%, 50V, Electrolytic

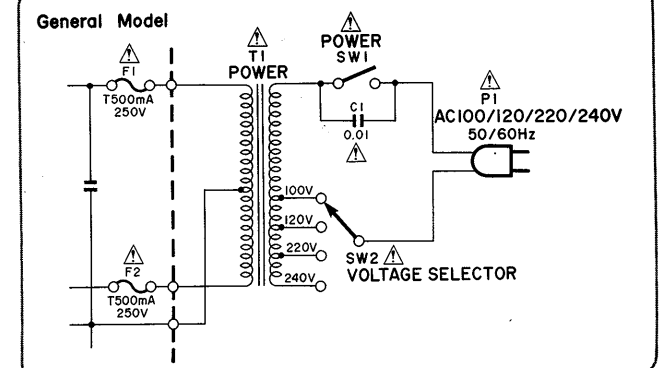
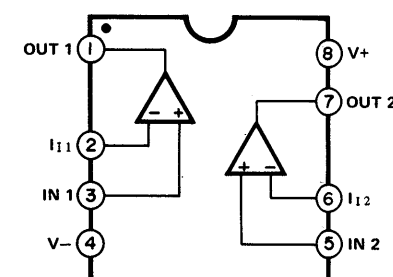
Ref. No.	Part No.	Description
C121, 122	5345-L105M50	1 μ F, $\pm$ 20%, 50V, Electrolytic
C127, 128	5345-L474M50	0.47 μ F, $\pm$ 20%, 50V, Electrolytic
C131, 132	5345-L224M50	0.22 μ F, $\pm$ 20%, 50V, Electrolytic
C145, 146	5359-6815851	680pF, $\pm$ 5%, 100V, Polypropylene
C149, 150	5359-3915851	390pF, $\pm$ 5%, 100V, Polypropylene
C153, 154	5359-1515851	150pF, $\pm$ 5%, 100V, Polypropylene
C157, 158	5359-2215851	220pF, $\pm$ 5%, 100V, Polypropylene
C159	5345-225-50	2.2 μ F, +75%—10%, 50V, Electrolytic
INTEGRATED CIRCUITS		
IC101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112	5652- μ PC4559C	μ PC4559C
TRANSISTORS		
Q1	5612-647(C)	2SB647(C)
Q2	5614-667(C)	2SD667(C)
Q3, 5, 103, 104, 105, 106	5613-2603(E)	2SC2603(E)
Q4	5611-1115(E)	2SA1115(E)
Q101, 102	5616-2SK363BL	F.E.T., 2SK363(BL)
DIODES		
D1	5685-S1WB10	Bridge Silicon, S1WB10
D2, 3	5635-RD16EB2	Zener, RD16EB2
D4, 5	5636-1S2471	1S2471
D6, 101, 102	5631-1S2473	1S2473
D103, 104	5635-RD5R6EB2	Zener, RD5.6EB2
MISCELLANEOUS		
F1, 2	5732-501031	Fuse, 500mA, 125V (U.S. & Canadian models)
"	5732-50102	Fuse, T500mA, 250V (General model)
SW101/102/103/104	4431-04267360	Push Switch, Equalizer Selector, Tape Monitor
P101	4443-070185	Connector, 7-Pin
P102, 104	4443-080185	Connector, 8-Pin
P103, 105	4443-100185	Connector, 10-Pin
	4472-0131	Fuse Holder (x 4)
	2132-7048	Spacer, D2 & D3
PCB-2 CONTROL P.C. BOARD		
CONTROLS		
VR201, 202	5113-5037196	50k Ω B, Input Level
VR203/205, 204/206	5222-3047125	300k Ω C, Subsonic Frequency
VR207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226	5223-2547111	250k Ω , Equalizer Level (31.5Hz — 16kHz)
CAPACITORS		
C201, 203	5353-510534	51pF, $\pm$ 5%, 500V, Mica
DIODES		
D201, 204, 205, 206	5637-GL5HD10	L.E.D., GL5HD10, Red, Equalizer Rec., Tape Monitor, Overload
D202	5637-GL5NG10	L.E.D., GL5NG10, Green, Equalizer On
D203	5637-GL5HY10	L.E.D., GL5HY10, Amber, Equalizer Defeat
PCB-3 INPUT/OUTPUT JACKS P.C. BOARD		
J1/2/3/4	4484-27	4-Pin Jack, Line Input, Line Output
PCB-4 TAPE JACKS P.C. BOARD		
J5/6/7/8	4484-27	4-Pin Jack, Tape Input, Tape Output
PCB-5 Rch SUBSONIC SWITCH P.C. BOARD		
SW302	4431-A02717	Push Switch, Subsonic
PCB-6 Lch SUBSONIC SWITCH P.C. BOARD		
SW301	4431-A02717	Push Switch, Subsonic
PCB-7 POWER INDICATOR P.C. BOARD		
D301	5637-GL5HD10	L.E.D., GL5HD10, Red, Power

SCHEMATIC DIAGRAM

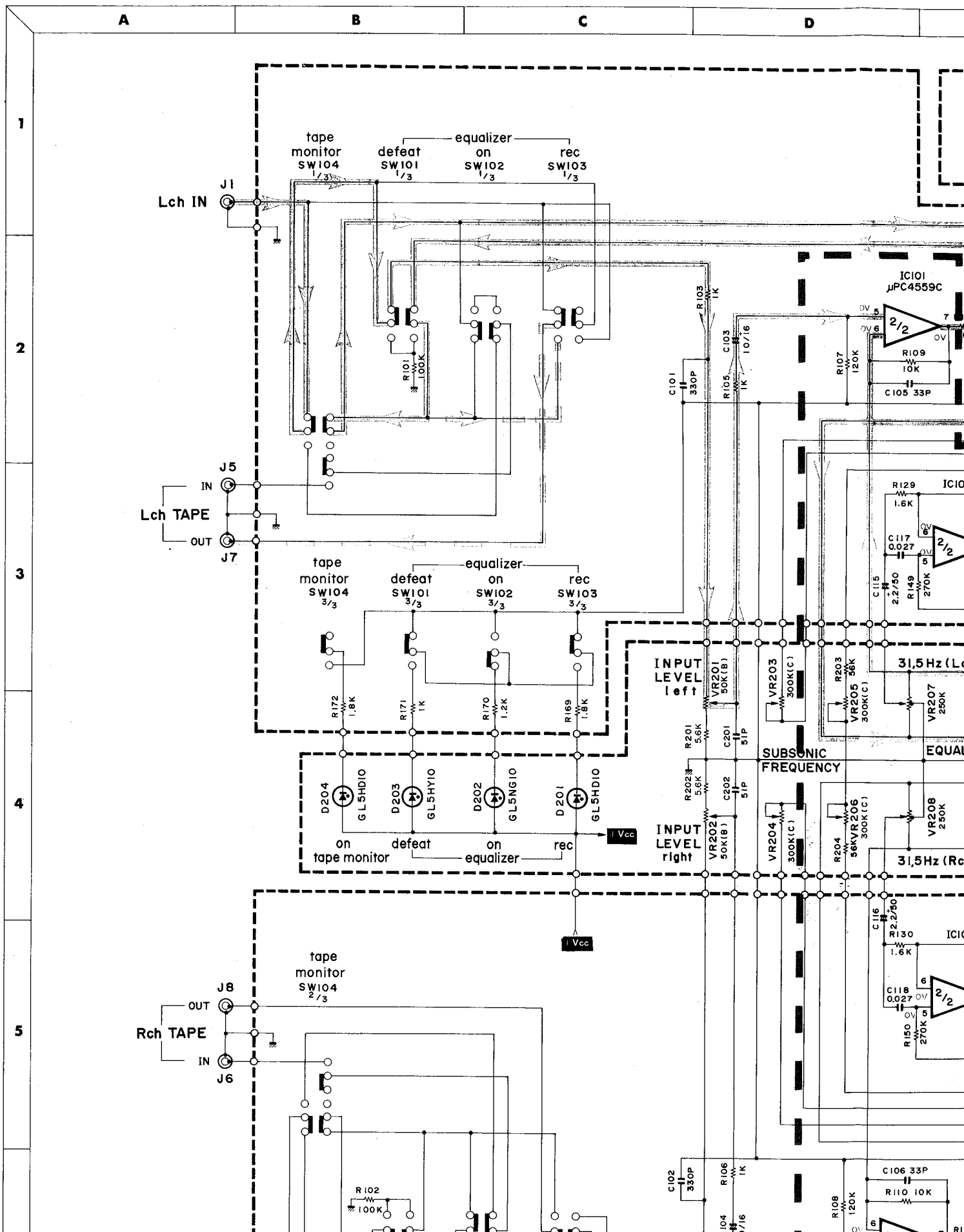


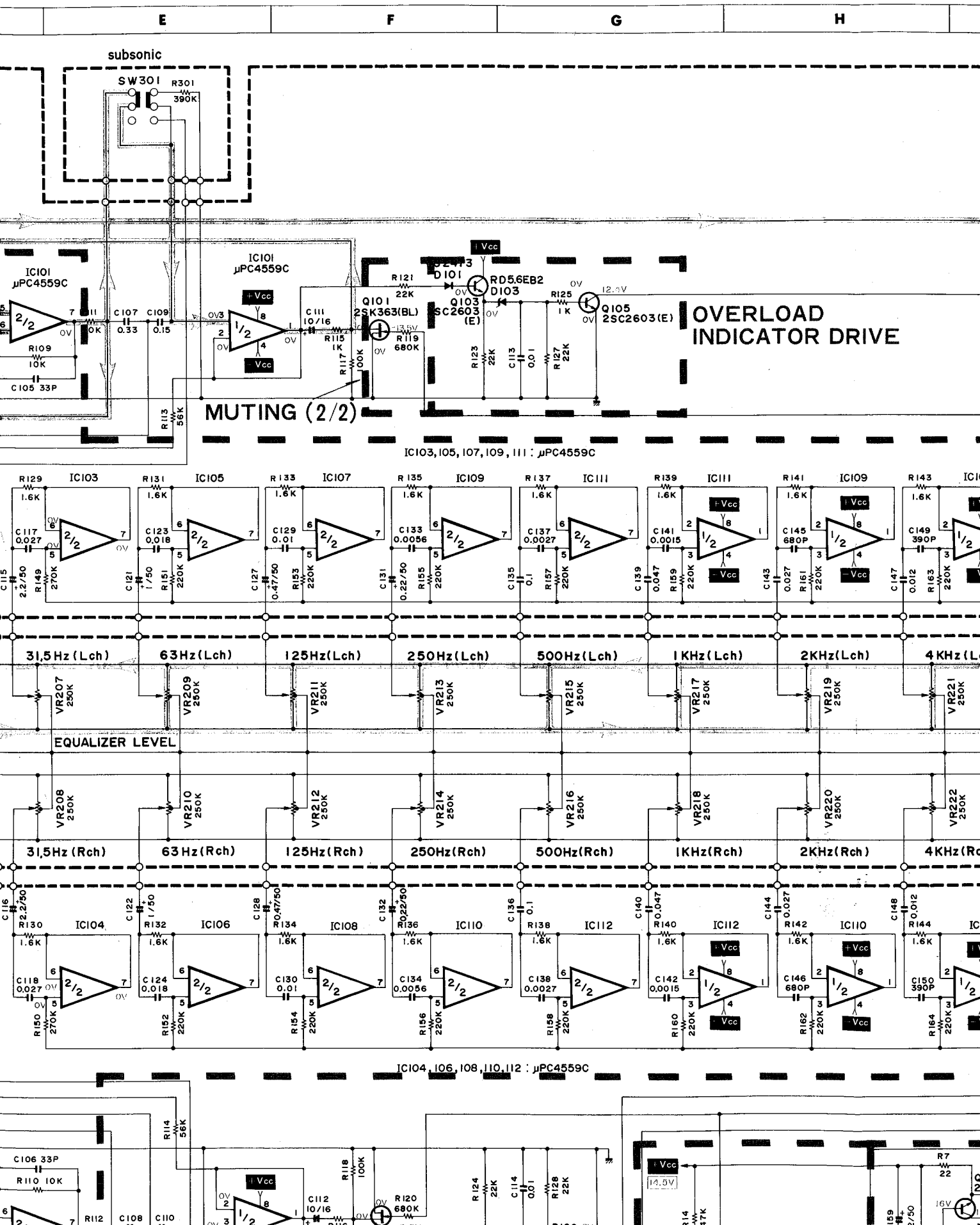
- EQUALIZER
 RECORDING OUTPUT SIGNAL
 TAPE PLAYBACK SIGNAL

1. ALL RESISTANCE 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 CAPACITANCE VALUES ARE IN μF UNLESS OTHERWISE NOTED. $P=\mu F$
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.

IC101 ~ 112: $\mu PC4559C$ 

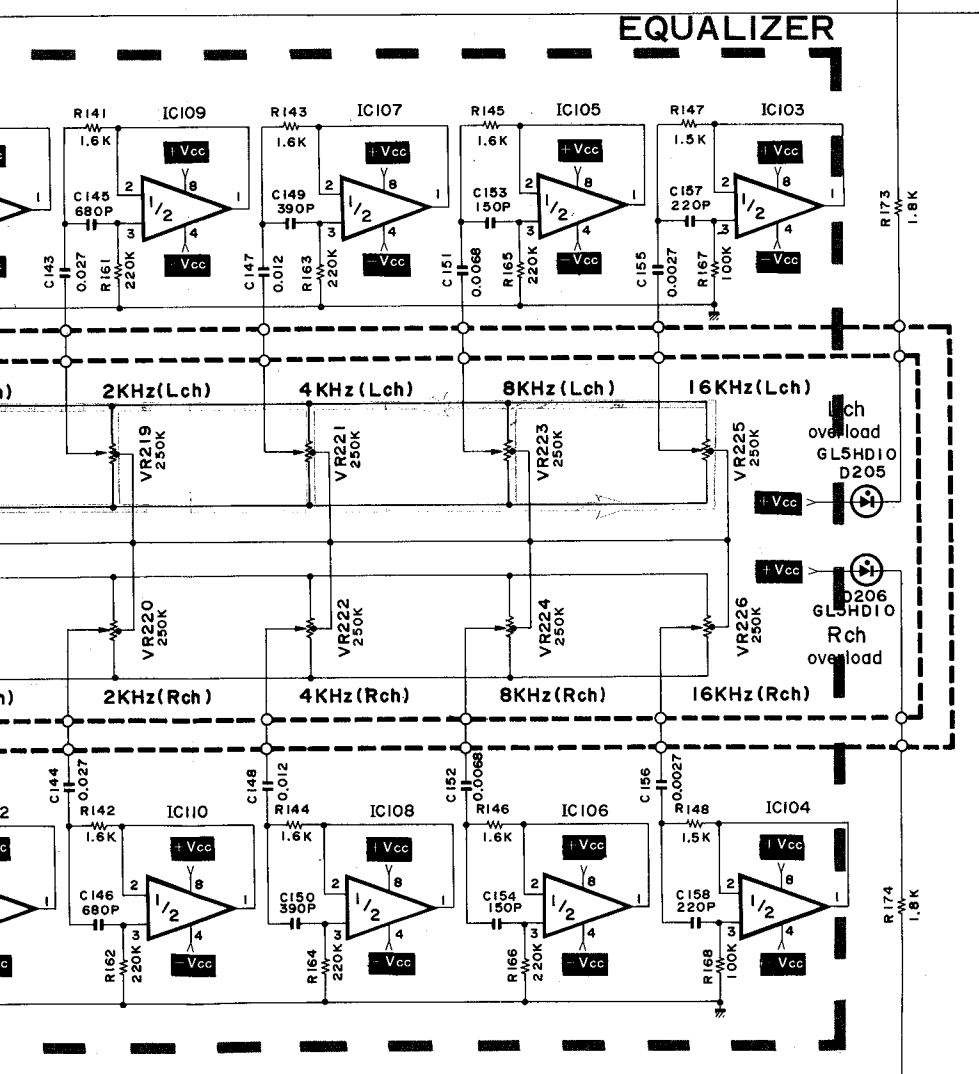
SCHEMATIC DIAGRAM





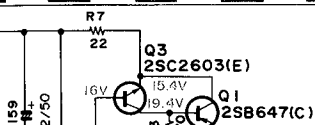
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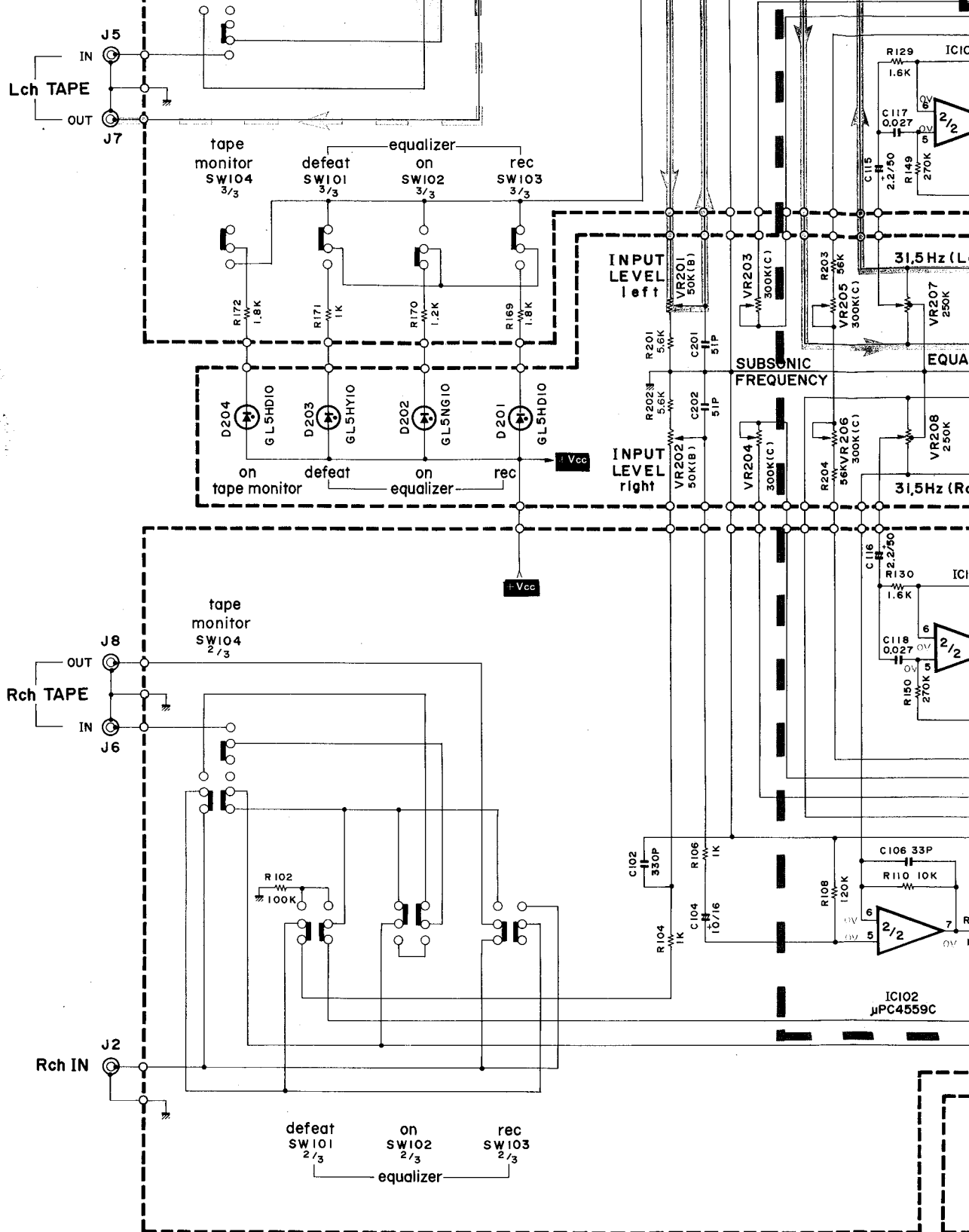
OVERLOAD
INDICATOR DRIVE



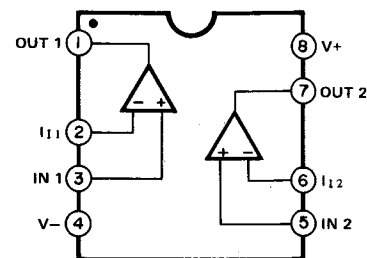
J3
Lch OUT

J4
Rch OUT





IC101 ~ 112: μ PC4559C



..... EQUALIZER

..... RECORDING OUTPUT SIGNAL

..... TAPE PLAYBACK SIGNAL

1. ALL RESISTANCES VALUES ARE IN Ω .

K Ω =1000 Ω , M Ω =1000K Ω .

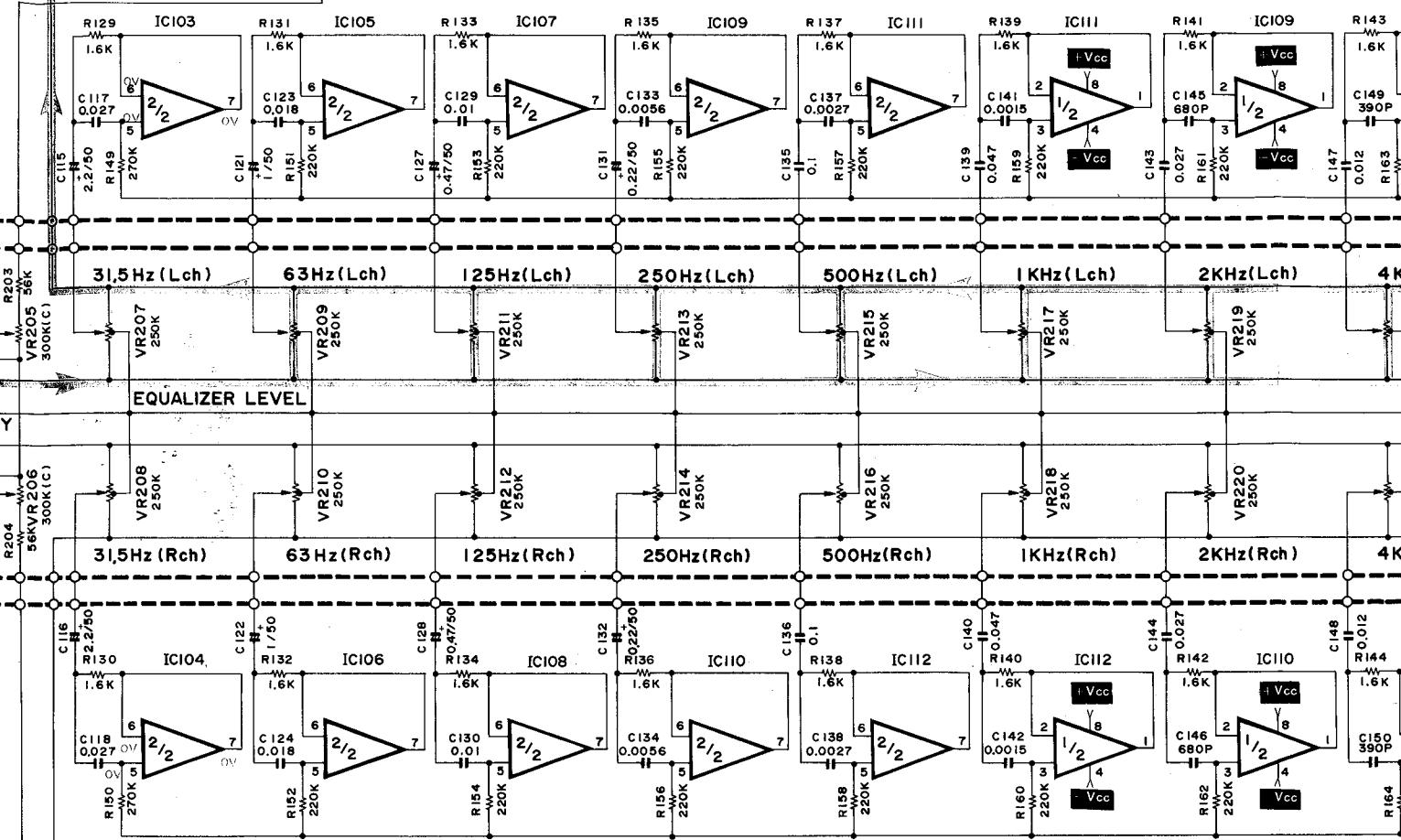
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.

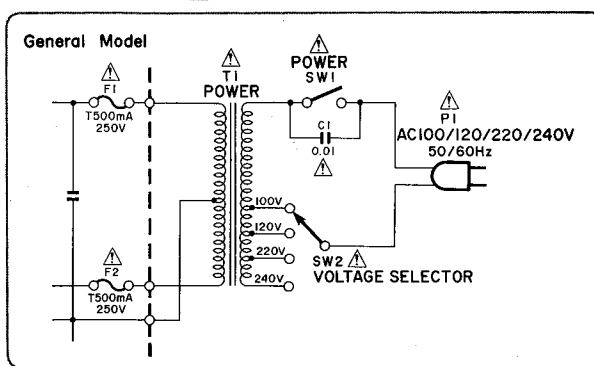
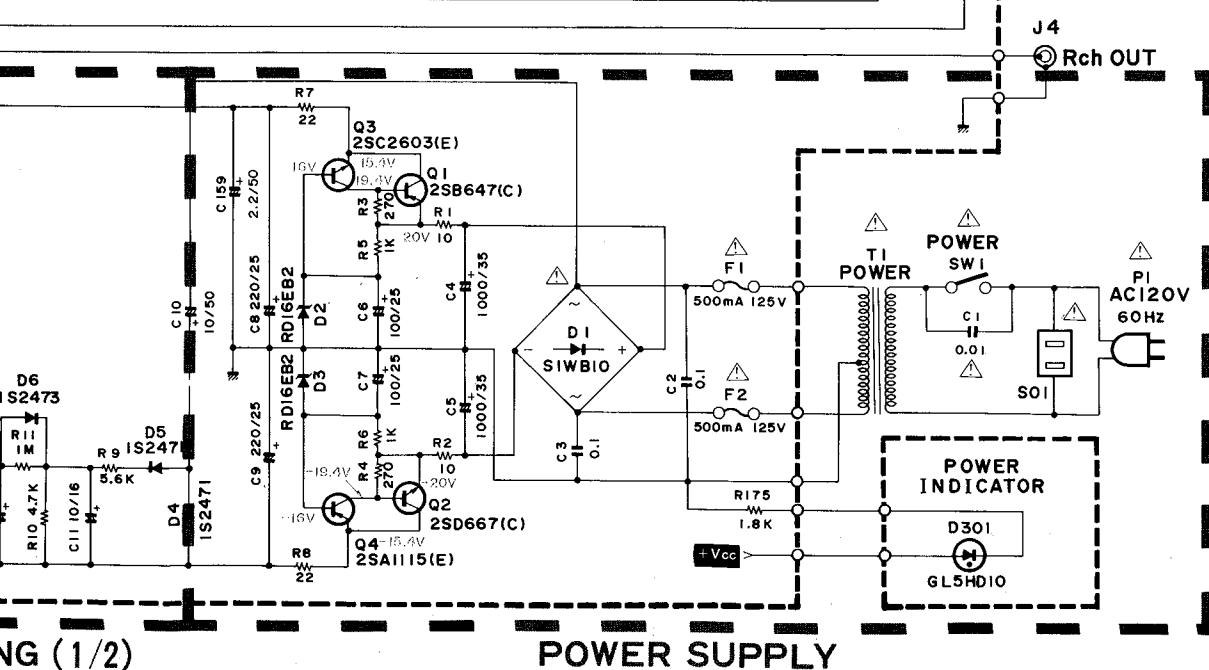
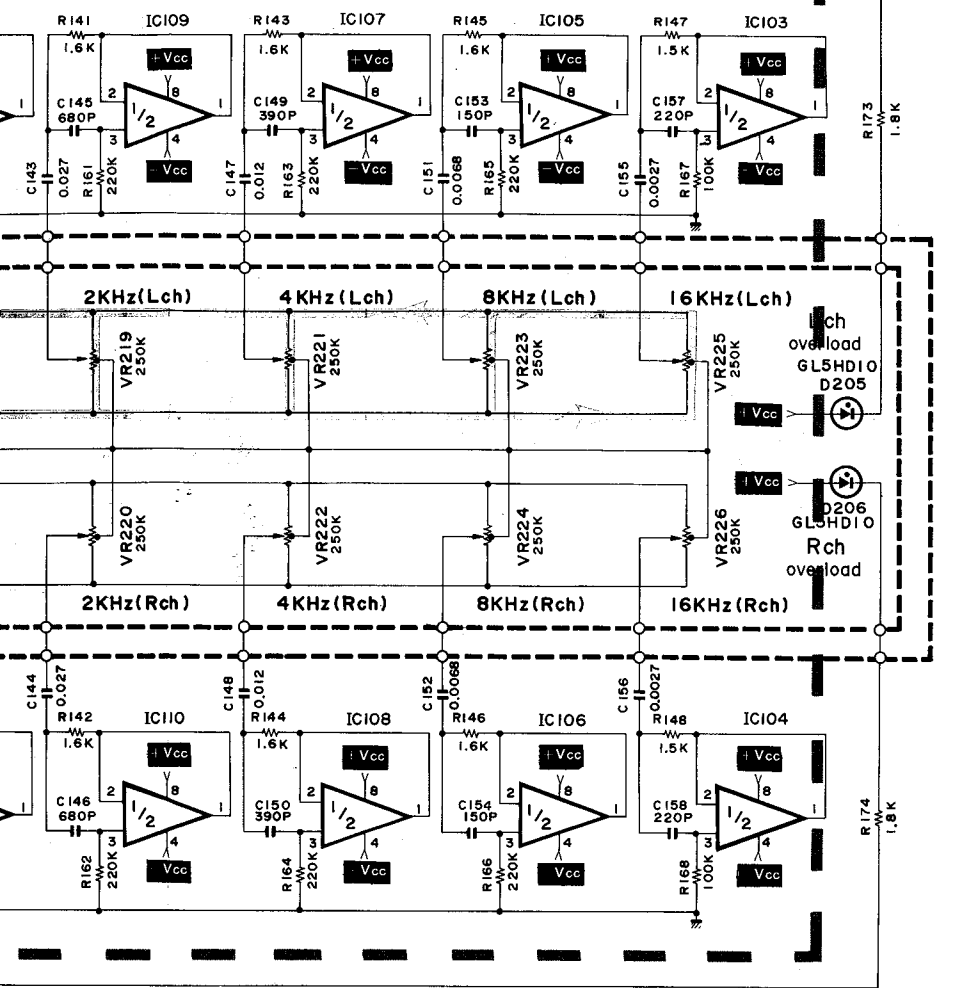
3. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P= μ F

4. V: DC VOLTAGE AT NO SIGNAL

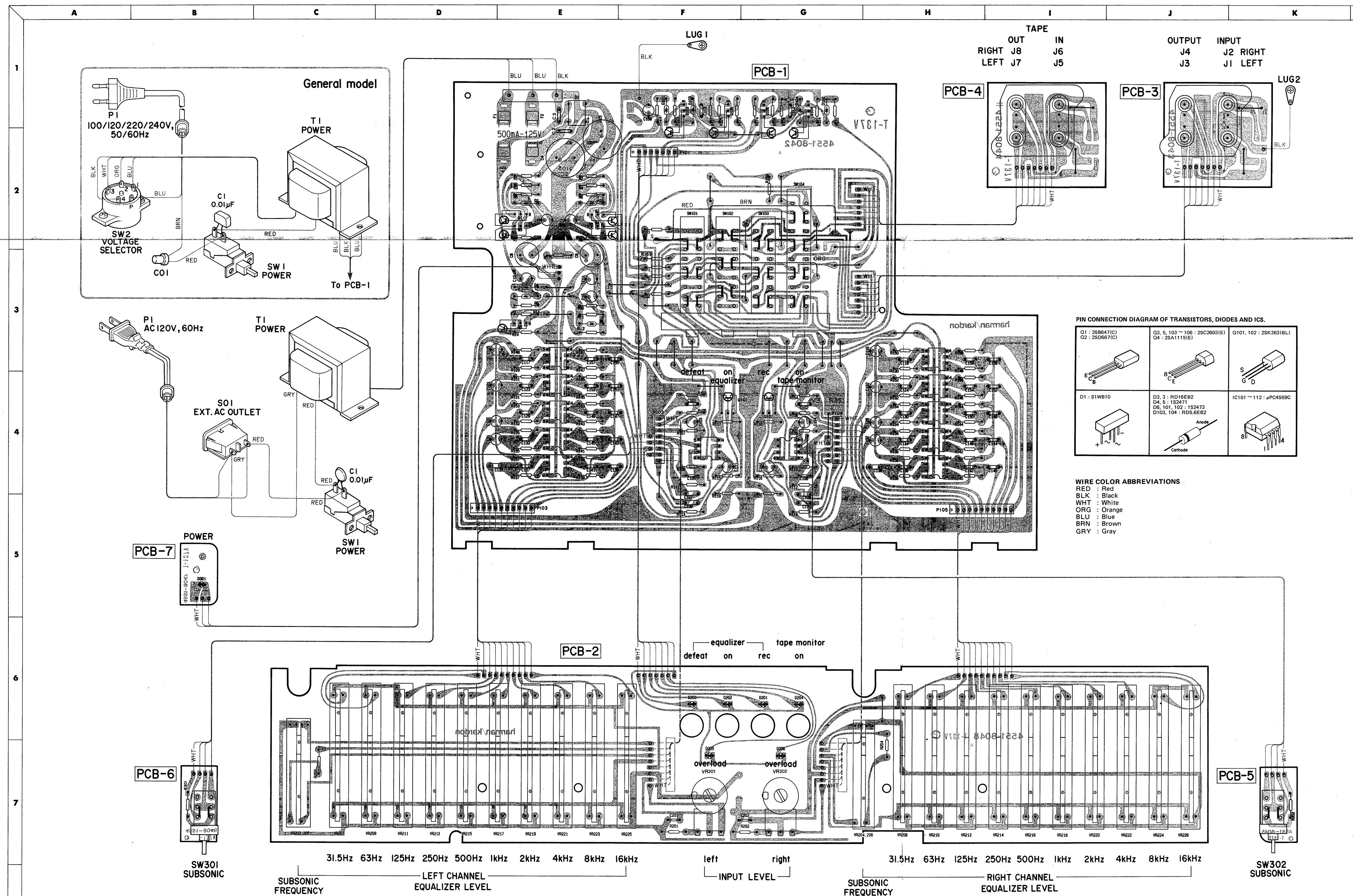
5. Δ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

IC103,105,107,109,111 : μ PC4559C

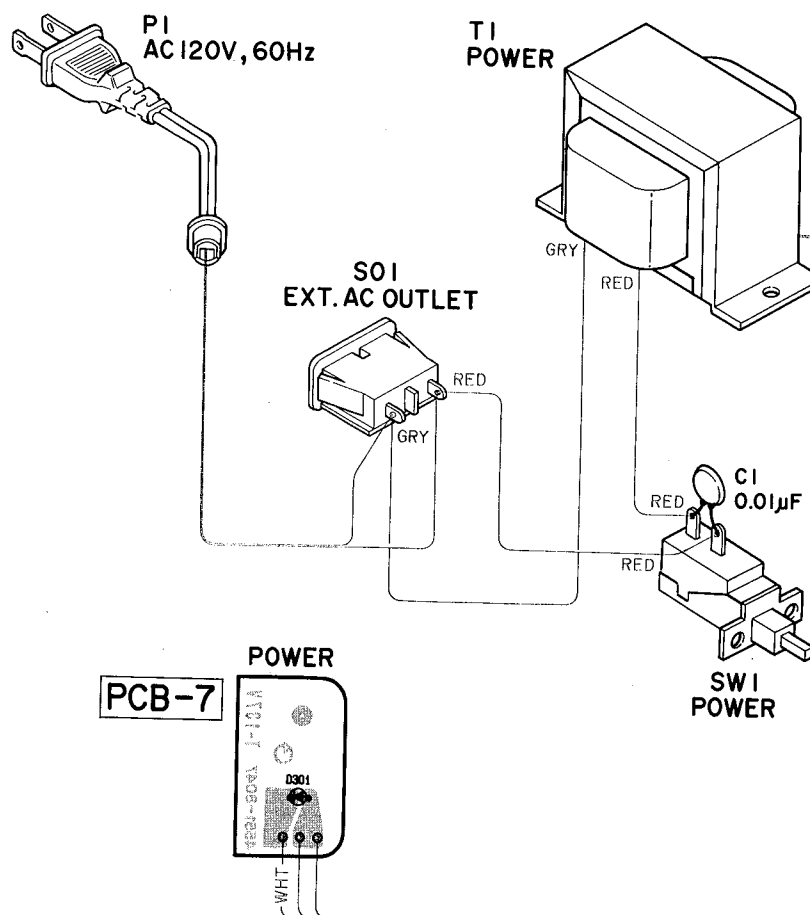
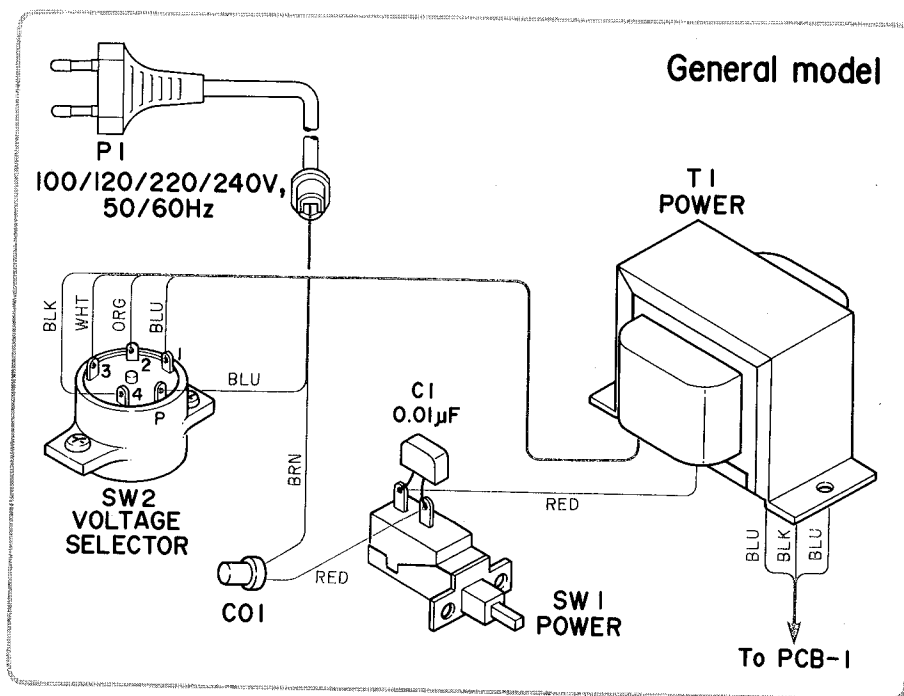




WIRING DIAGRAM



WIRING DIAGRAM



BLK

PCB-1

BLU	BLU	BLK
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500mA-125V

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 4. *Discussion*
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2408-1554

100

RED

BRN

11

MANUSCRIPT

defeat on rec on
equalizer tape monitor

P102

24

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

P105

PCB-2

```

graph LR
    equalizer --- defeat
    equalizer --- on
    equalizer --- rec
    tape_monitor[tape monitor] --- on

```

H

I

J

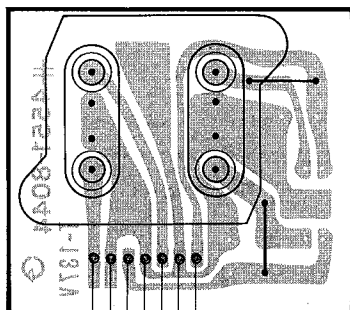
K

TAPE

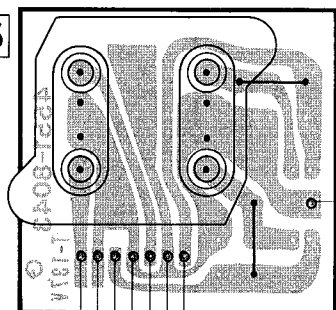
	OUT	IN
RIGHT	J8	J6
LEFT	J7	J5

OUTPUT	INPUT
J4	J2 RIGHT
J3	J1 LEFT

PCB-4

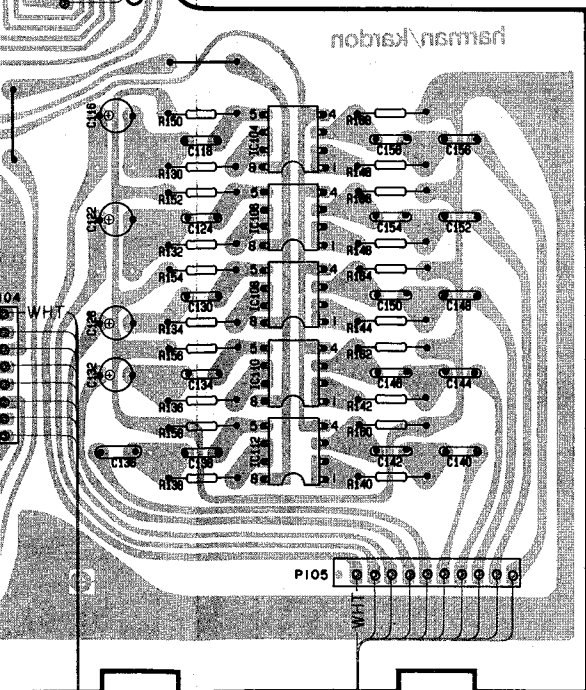
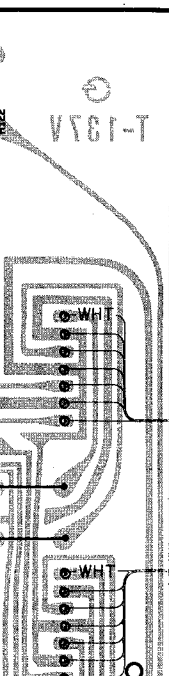


PCB-3

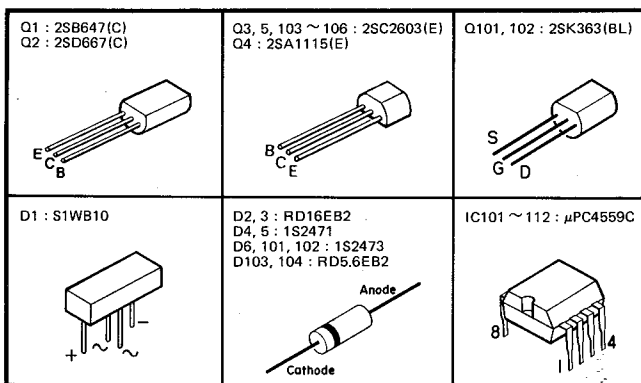


LUG2

BLK



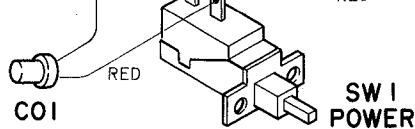
PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.



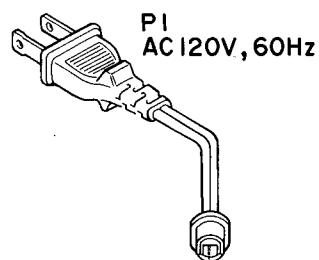
WIRE COLOR ABBREVIATIONS

RED : Red
BLK : Black
WHT : White
ORG : Orange
BLU : Blue
BRN : Brown
GRY : Gray

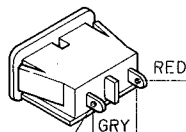
VOLTAGE
SELECTOR



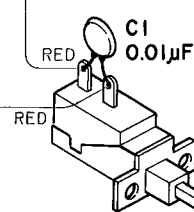
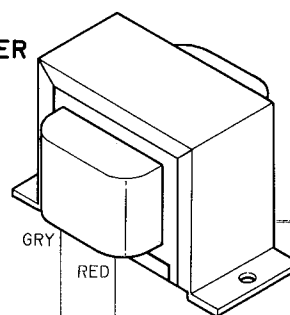
BLU
BLK
BLU
To PCB-1



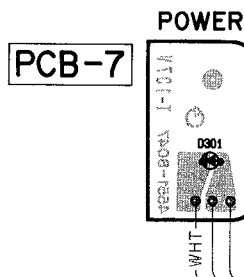
S01
EXT. AC OUTLET



T1
POWER

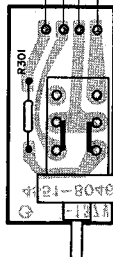


SW 1
POWER

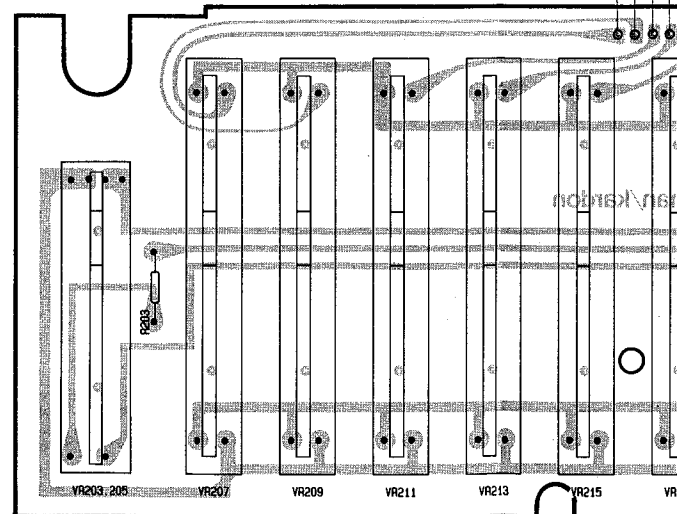


POWER

PCB-6



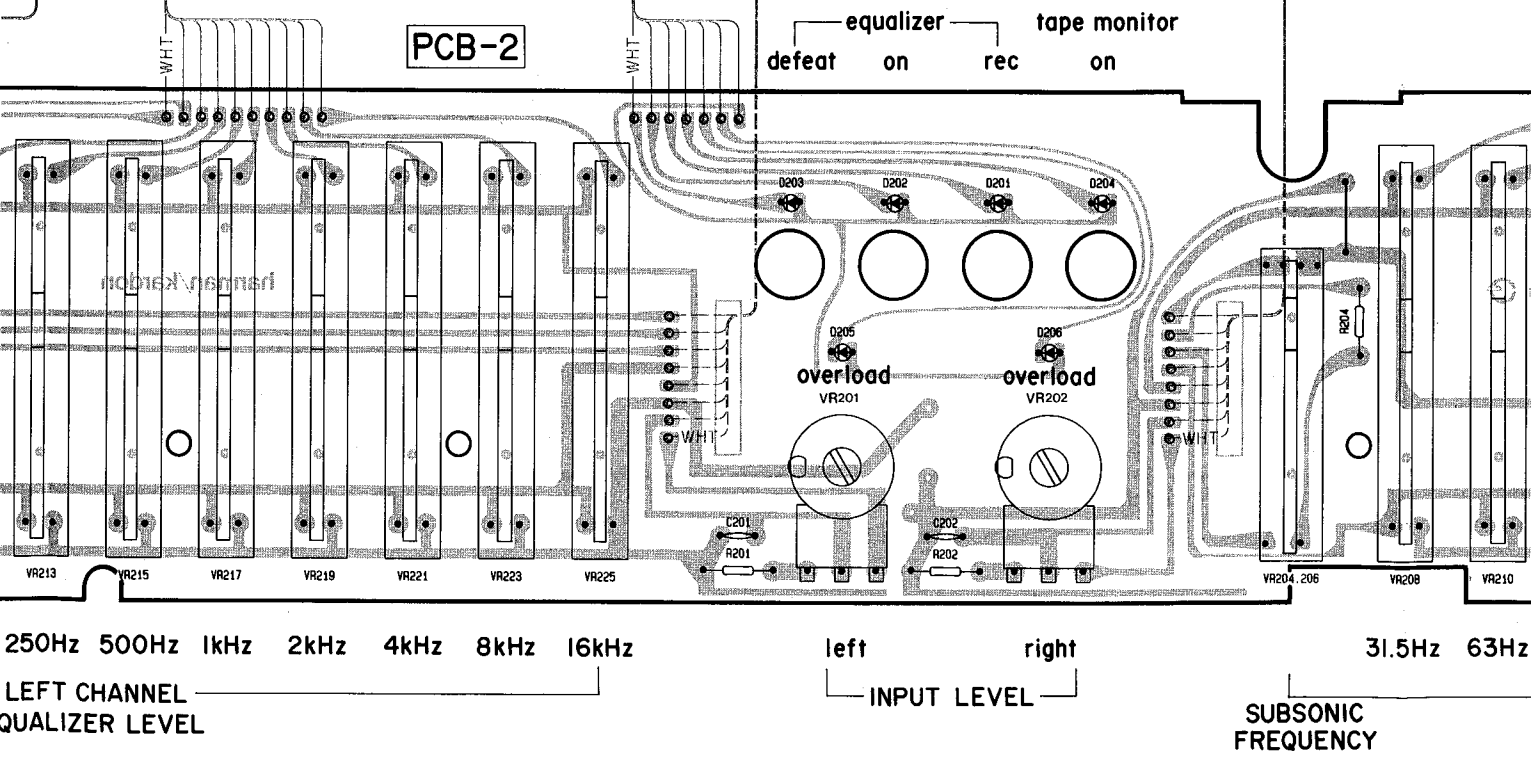
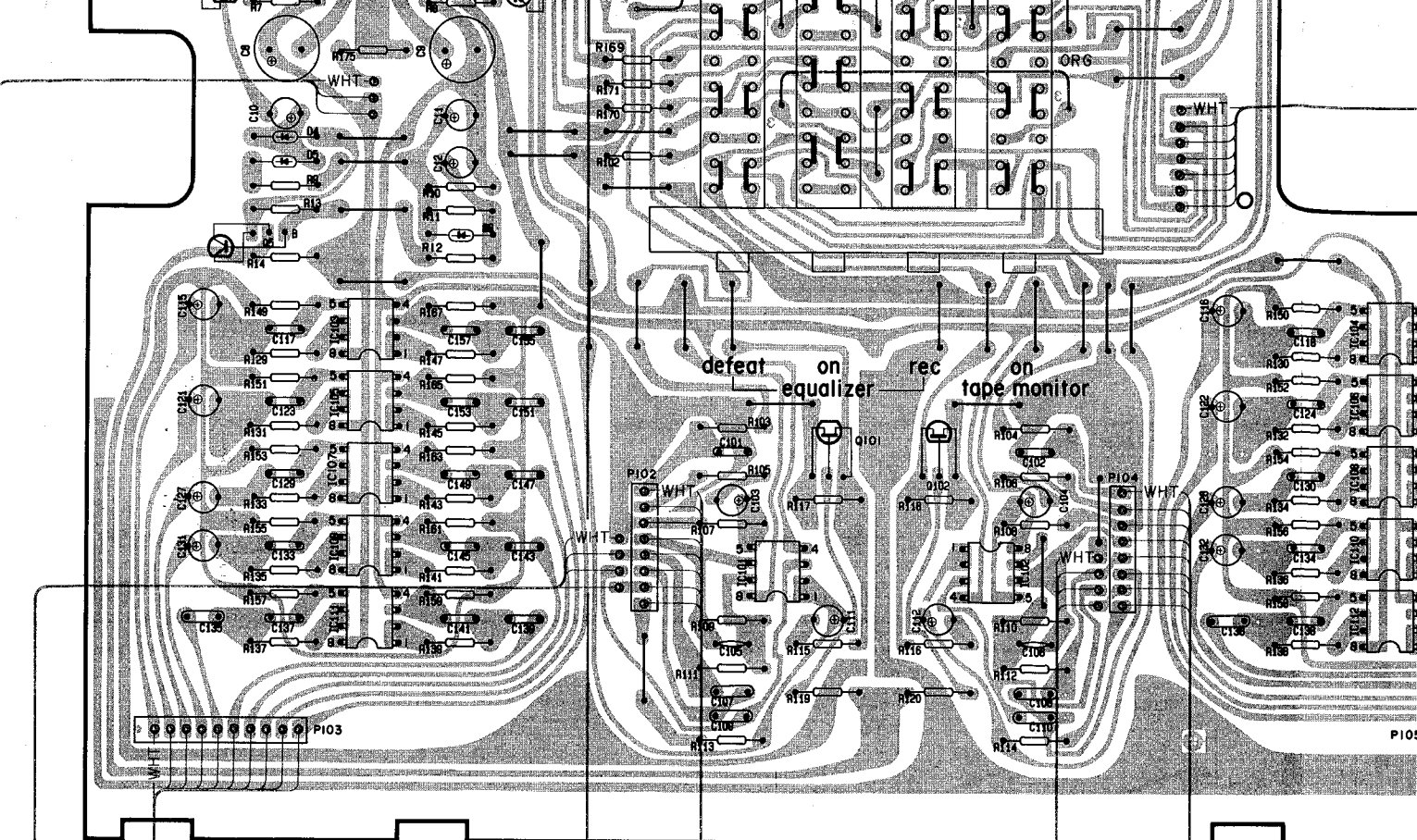
SW301
SUBSONIC



31.5Hz 63Hz 125Hz 250Hz 500Hz 1k

SUBSONIC
FREQUENCY

LEFT CHANNEL
EQUALIZER LEVEL



250Hz 500Hz 1kHz 2kHz 4kHz 8kHz 16kHz

LEFT CHANNEL
EQUALIZER LEVEL

left right

INPUT LEVEL

31.5Hz 63Hz

SUBSONIC
FREQUENCY

