LUXKIT

ASSEMBLY MANUAL

STEREOPHONIC POWER AMPLIFIER
MODEL A3500

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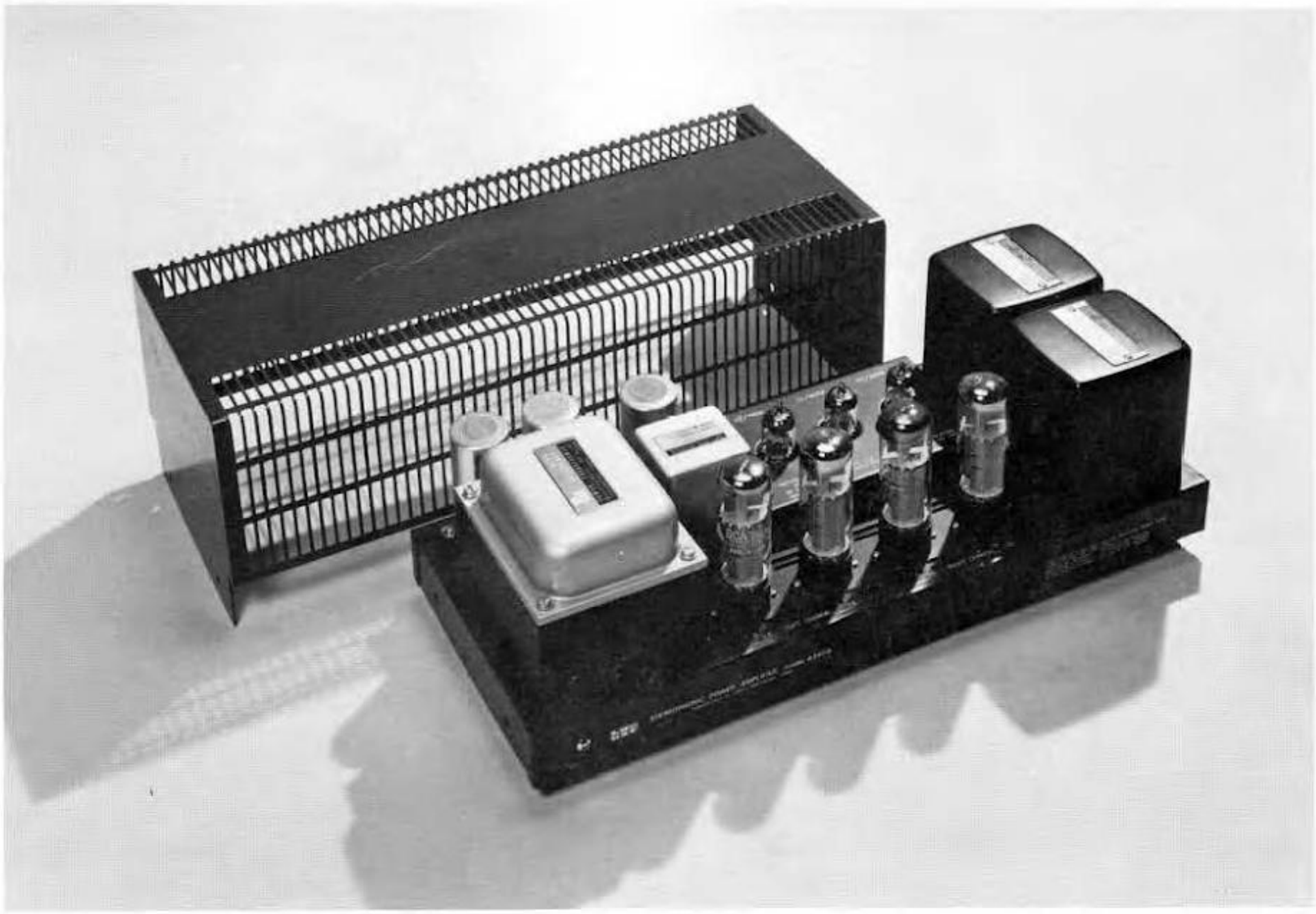


The A3500 is a stereo main amplifier kit that combines the well-established OY15 type output transformer with a stable Mullard type driver circuit that provides sufficient gain. The output circuit is standard with a 6CA77 push-type UL (ultra-linear) connection, but it is also designed to be freely changeable to a triode or pentode connection, using 6L6GC50CA10 or other output tubes. Each is explained in detail in this assembly manual.

The standard output circuit provides a continuous output of 40W/40W with ease. The design policy, including the driver stage, prioritizes bare characteristics, ensuring excellent characteristics without applying strong negative feedback. The phase correction of the negative feedback circuit is carefully considered to keep distortion low across the entire audible range. It also provides perfect stability for various loads.

I am considering changing the output tubes, and looking for a large-sized power transformer. This unit has a connector for supplying power to the preamp kit A3300. In other words, when using this unit in combination with the A3300, the A33 power supply for the A3300 is not necessary.

§1 Before assembly

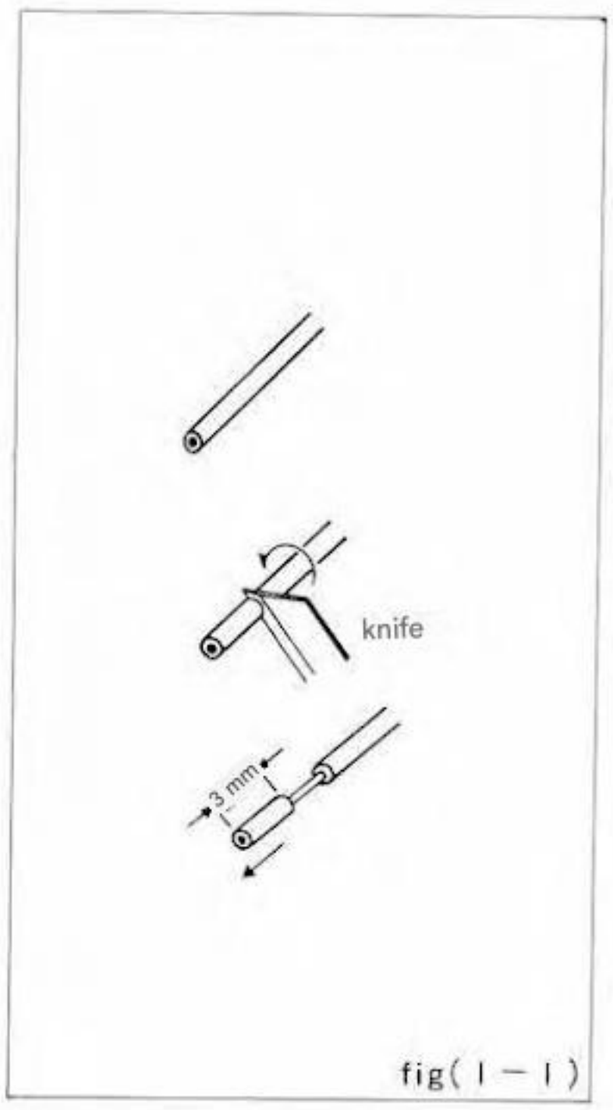
In order to get the most out of this unit, please follow the instructions in this section and solder and wire the parts properly. In this manual, each step is numbered, so you can check off each step with a pencil ☐ after you complete it to prevent overlooking anything.

Tools required for assembly

The tools required for assembly are a knife, tweezers, a screwdriver, a screwdriver, needle-nose pliers, wire cutters, and a soldering iron (40 ~ 60W). Other tools that are useful include pliers, a nut driver, and a screwdriver (large and small).

Wire processing

Unless otherwise specified, both ends of the wire should be treated as shown in the diagram.

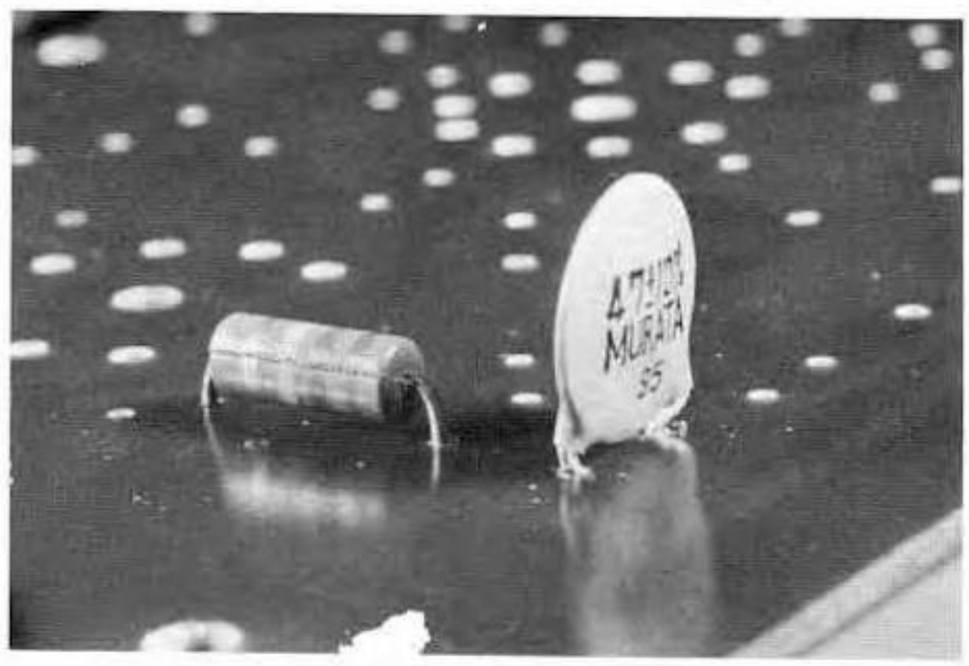


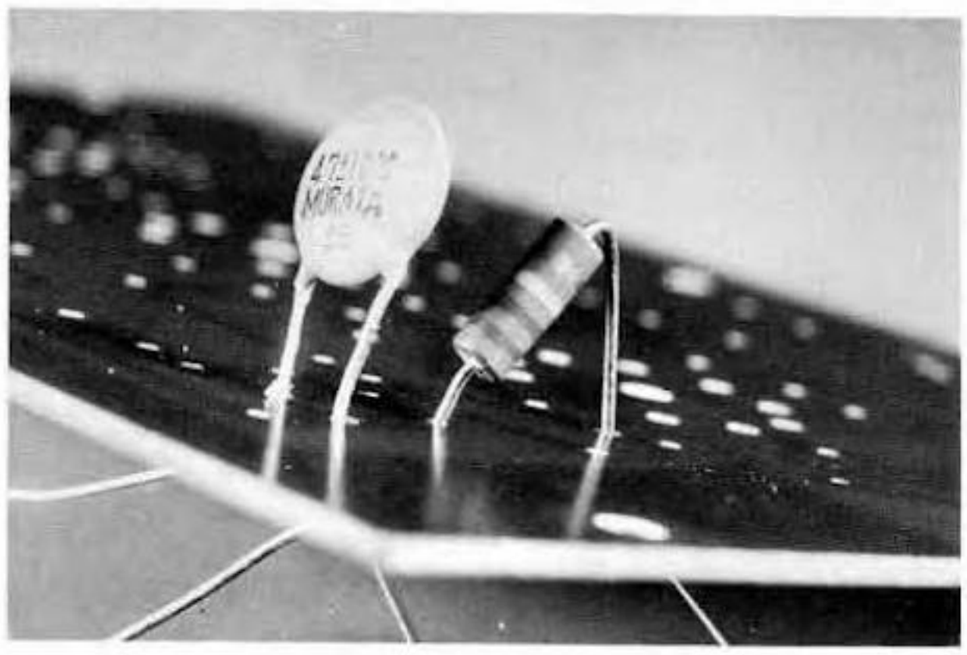
fig(1 − 1)

Attaching parts to the board

When mounting a component on a printed circuit board, insert the component's lead wire all the way into the corresponding hole in the printed circuit board, and bend it along the pattern to the extent that the component will not fall off when the printed circuit board is turned over. (Photo above)

If the leads are sticking out unnecessarily from the board, it can make it difficult to install other components, or the leads can come into contact with each other, causing problems. It also looks bad. (See photo below)

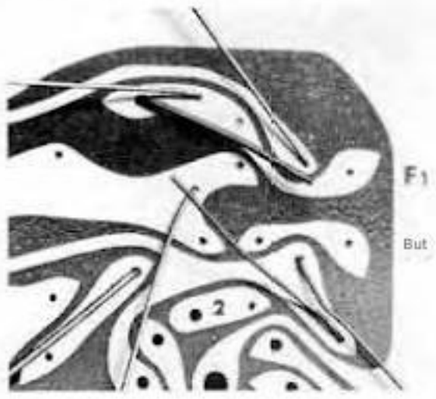




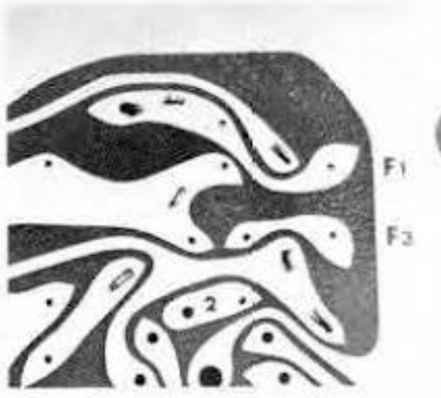
About soldering

Soldering is one of the most important tasks. Many problems with kits are caused by insecure soldering. Before soldering, it is important to remove any oil or dirt from the surfaces of the terminals and leads, and to always keep the tip of the soldering iron clean. This product comes with high-quality solder, so do not use paste. It may corrode over time.

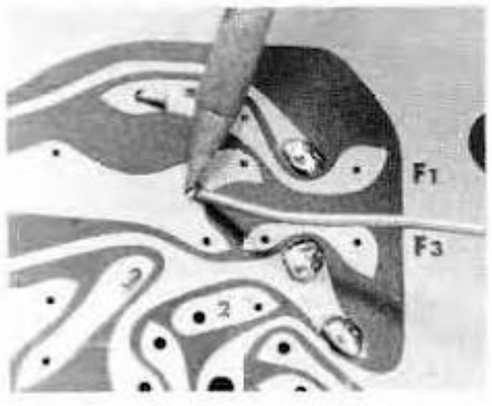
Soldering to the board



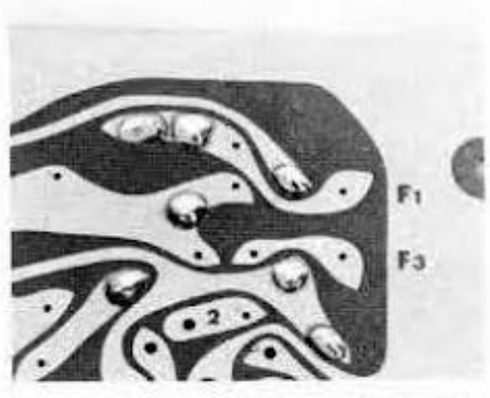
1. Insert the lead wire into the hole in the printed circuit board and bend it along the pattern.



2. Use pliers to cut off 1.5-2.5mm from the bent part.

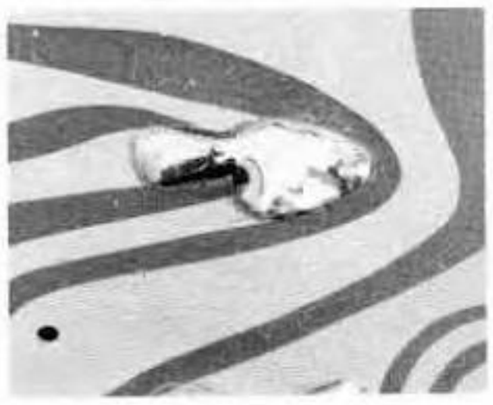


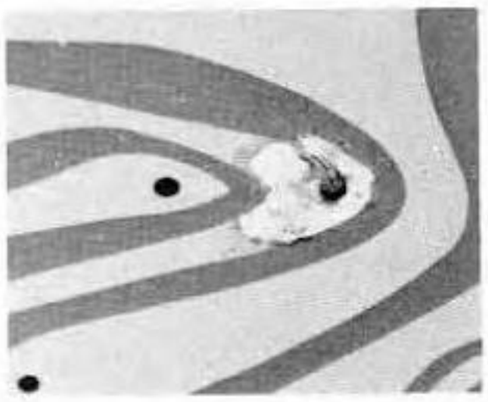
3. Place the solder and soldering iron on the contact point between the pattern and the lead wire. When the solder melts and begins to flow into the joint, remove the solder and soldering iron.



4. Check to make sure the solder joints are tight. A good solder joint will be smooth and shiny.

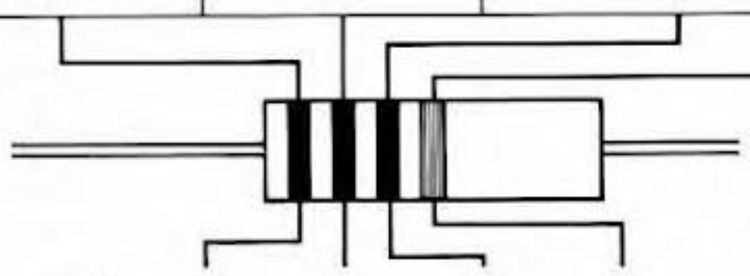
Note: If you apply too much solder, it may connect to the adjacent patterns and cause a "bridge" (see photo on the left), and if the lead wire is dirty with oil, it may be difficult to apply solder (see photo on the right). It is important to work quickly to avoid overheating the joints.





How to read resistance value

color / 帯	first number	second number	multiplier	error range
black	0	0	× 1	–
brown	1	1	× 10	–
red	2	2	× 100	–
orange	3	3	× 1,000	–
yellow	4	4	× 10,000	–
green	5	5	× 100,000	–
green	6	6	× 1,000,000	–
purple	7	7	× 10,000,000	–
Ash	8	8	–	–
white	9	9	–	–
gold	–	–	× 0.1	5 %
silver	–	–	× 0.01	10 %
Plain color	–	–	–	20 %



(example)	yellow	purple	red	gold	4700Ω	5 %
	4	7	×100	5 %	(i.e. 4.7MB	5 %)

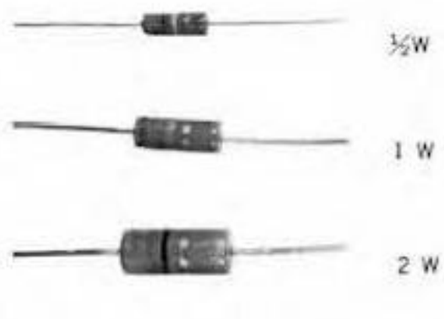
§2 Parts list

LIST—A			
number	name	summary	quantity
A- 1	printed circuit board	(CB—A3500)	1

A - 1

LIST—B			
number	name	summary	quantity
B-1 Miniature Socket		9P	3
B- 2	——	390 Ω W (Orange-White-Tea)	2
B- 3	——	1800 W (brown-gray-red)	2
B- 4	——	10KΩ W (brown-black-orange)	2
B- 5	——	12KΩ ½W (Tea-Red-Orange)	2
B-6 Resistance		27KΩ 12W (red-purple-orange)	2
B- 7	——	220KΩ 1W (red red yellow)	2
B- 8	——	1MΩ ½W (brown-black-green)	2
B-9 Resistance		17 KO 1W (Brown-Purple-Orange)	2
B-10	——	33 KO 1W (orange-orange-orange)	4
B-11	——	22 Ω 2 W (Red-Red-Black)	2
B-12	ceramic capacitor	5pF (5 D) 1 KWV	2
B-13	ceramic capacitor	47pF (47 K)500WV	4
B-14	mylar capacitor	0. 22μF (224 K)50WV	2
B-15 MP capacitor		0. 47μF 350WV	2

B - 1



½W

1 W

2 W

7W type resistance

E - 1 4 B - 1 2 B - 1 3

B - 1 4

LIST—C			
number	Product name	Number of	abstracts
C- 1	block capacitor	47μF× 2 500WV	2
C- 2	block capacitor	100μF× 2 315WV	1

C - 1

C - 2

LIST—D			
number	Product name	summary	quantity
D- 1	Volume mounting bracket A		1
D- 2	Volume mounting bracket B		2
D- 3	fuse holder		1
D- 4	input terminal board	2P	1
D- 5	octal socket		5
D- 6	octal plug		1
D- 7	power switch		1
D- 8	volume	24 φ 250K Ω (A)	2
D-9 Volume	—	16φ 50KΩ (B)	2
D-10	Borim ユ —	166 5KΩ (B)	2
D-11	speaker terminal board	4P	2
D-12	neon pilot		1
D-13	rug board	1 L 4 P	1
D-14	rug board	1 L 1 P	1
D-15 Rug board		1L2P(small)	1

D - 1

D - 2

D - 3

D - 4

D - 6

D - 5

D - 1 2

LIST—D

number	Product name	summary	quantity
D-16	feet		4
D-17	Rubber foot cover -		4
D-18	Cordist Tupa		1

LIST—E

number	name	summary	quantity
E- 1	silicon diode	(SD—1B)	4
E- 2	silicon diode	(S1RB—40)	1
E- 3	silicon diode	(1S-1850) or (1S-1906)	1
E- 4	-----	100 Ω 32W (Brown-Black-Brown)	4
E- 5	-----	4700 Ω 12W (yellow-purple-red)	4
E- 6	-----	33 KO ½ W (Orange-Orange)	4
E- 7	-----	100 KW 32W (brown-black-yellow)	5
E- 8	-----	150 KO 32W (brown-green-yellow)	1
E- 9	-----	10 KO 1 W (brown-black-orange)	1
E-10	-----	----------	1
E-11	-----	2200 Ω 2 W (Red-Red-Red)	1
E-12	-----	5600 Ω 2 W (Green-Blue-Red)	1
E-13	-----	200 Ω 7 W (coil type)	1
E-14	ceramic capacitor	10pF (10F) 1KWV	2
E-15	oil tubular capacitor	0.047 m. E 630WV	4
E-16	electrolytic tubular capacitor	47 m F 100WV	2
E-17	electrolytic tubular capacitor	2200μF 10WV	1
E-18	fuse	5 A	2
E-19	setting knob		3

LIST—F

number	name	summary	quantity
F- 1	Wiring covered wire	20-core black 250cm	1
F- 2	Wiring covered wire	20 cores colorless 260cm.	1
F- 3	Wiring covered wire	20 cores Grey 200cm	1
F- 4	Wiring covered wire	single core Red 240cm	1
F- 5	Wiring covered wire	single core Orange 70cm	1
F- 6	Wiring covered wire	single core Yellow 90cm	1
F- 7	Wiring covered wire	single core green 70cm	1
F- 8	Wiring covered wire	single core Cyan 70cm	1
F- 9	Wiring covered wire	Single core purple 100cm	1
F-10	Wiring covered wire	single core Brown 140cm	1
F-11	Wiring covered wire	Single core white 230cm	1
F-12	Tin lead wire for wiring	40cm	1
F-13	glass tube	30cm	1
F-14	thread solder	1m roll	3
F-15	AC code —		1
F-16	vinyl tube	for binding 300 cm	1


D-15


D-14

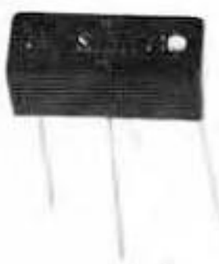

D-13


D-16


D-18


D-17


E-1


E-2


E-3


E-15


E-16,17


E-19


B-15


D-9,10


D-8


D-7

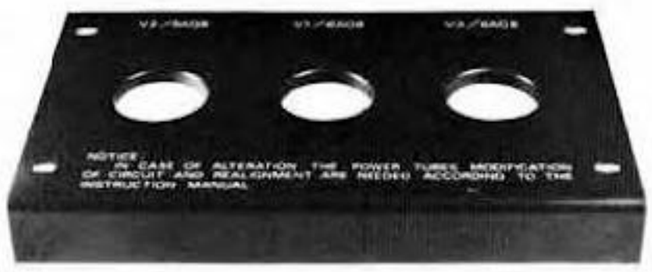

D-11

LIST—G

number	Product name	pick want	quantity
G- 1	bis	3 φ — 6 φ mm	3
G- 2	bis	3 φ — 8 mm	25
G- 3	B vinegar	3 φ — 12mm	5
G- 4	to Lasbis	34 — 6mm (Bronze)	8
G- 5	rock washer	3 φ	21
G- 6	rock washer	8 φ	2
G- 7	flat washer Ya	7 φ	8
	ワ Flat ッ シ —	8 φ	2
	ワ ッ シ Washer	9 φ	2
G-10	Natsuto	3 φ	20
G-11	Natsuto	7 φ	4
G-12	Natsuto	8 φ	2
G-13	Na tsu to	9 φ	1
G-14	Asunaj —	3 φ	1

LIST—O

number	品 name	pick want	quantity
O- 1	palm —	(S-1757, C-1744, OU 15-5×2)	1
O- 2	bonnet		1
O- 3	end plate		1
O- 4	board cover		1
O- 5	tube case	(6AQ8×3, 6CA7×4)	1
O- 6	plastic washer	4 φ	4
O- 7	Truss screw	44-8mm (Bronze)	4



O-4

§3 Wiring of printed circuit board

The printed circuit board contains the voltage amplification stage (first stage tube) and phase inversion stage of this unit. The 6AQ8 in the center is the voltage amplification stage for both channels, and the 6AQ8 on the left and right are the phase inversion stages for the left and right channels, respectively. The circuit diagram of this board is shown in fig. 3-4, and the pattern on the back of the board is shown in fig. 3-3.

To wire this printed circuit board, use the parts shown in LIST-A and LIST-B. Install and solder these parts in the correct order according to the part installation diagrams in fig. 3-1 and fig. 3-2.

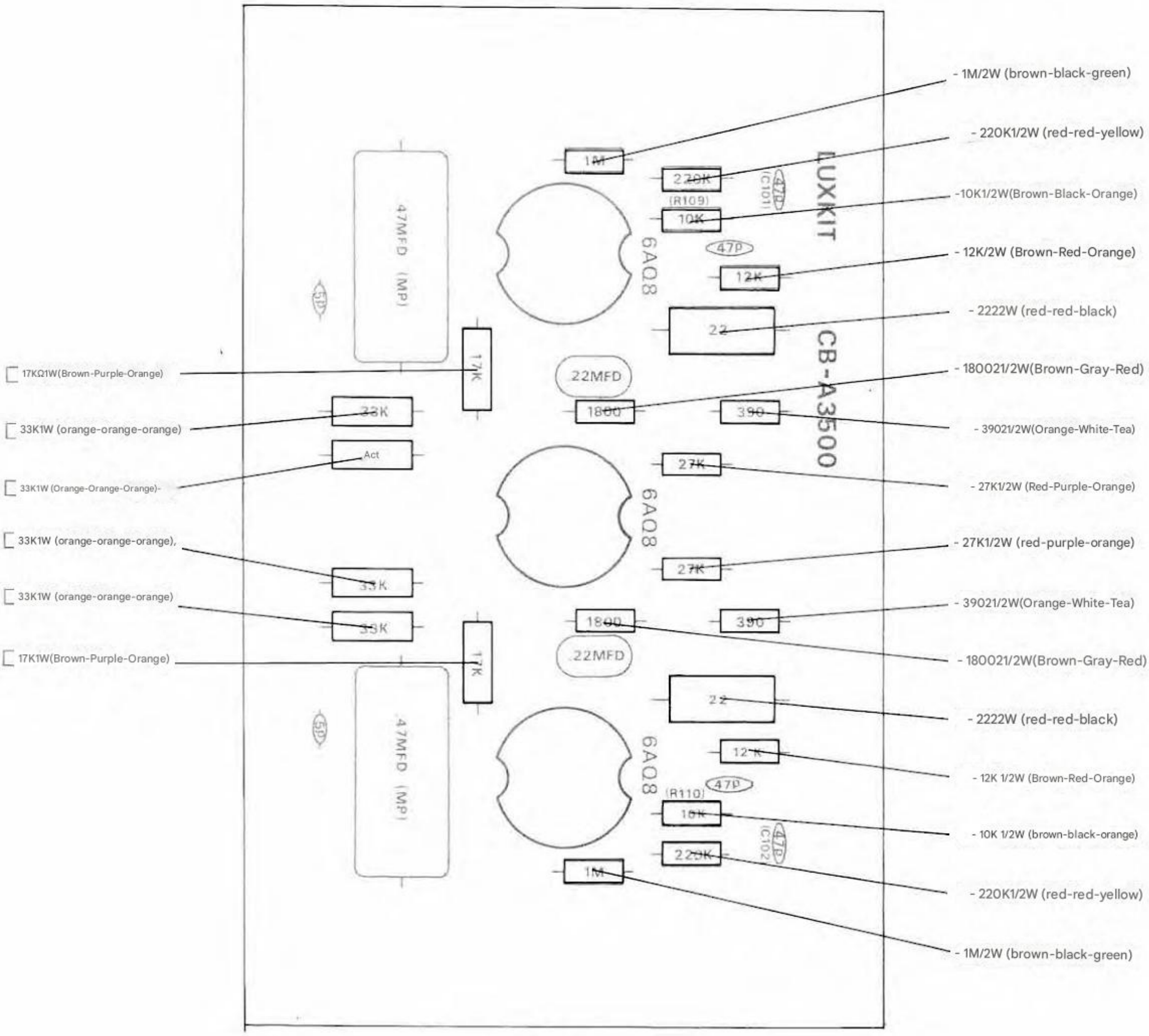


fig. 3-1

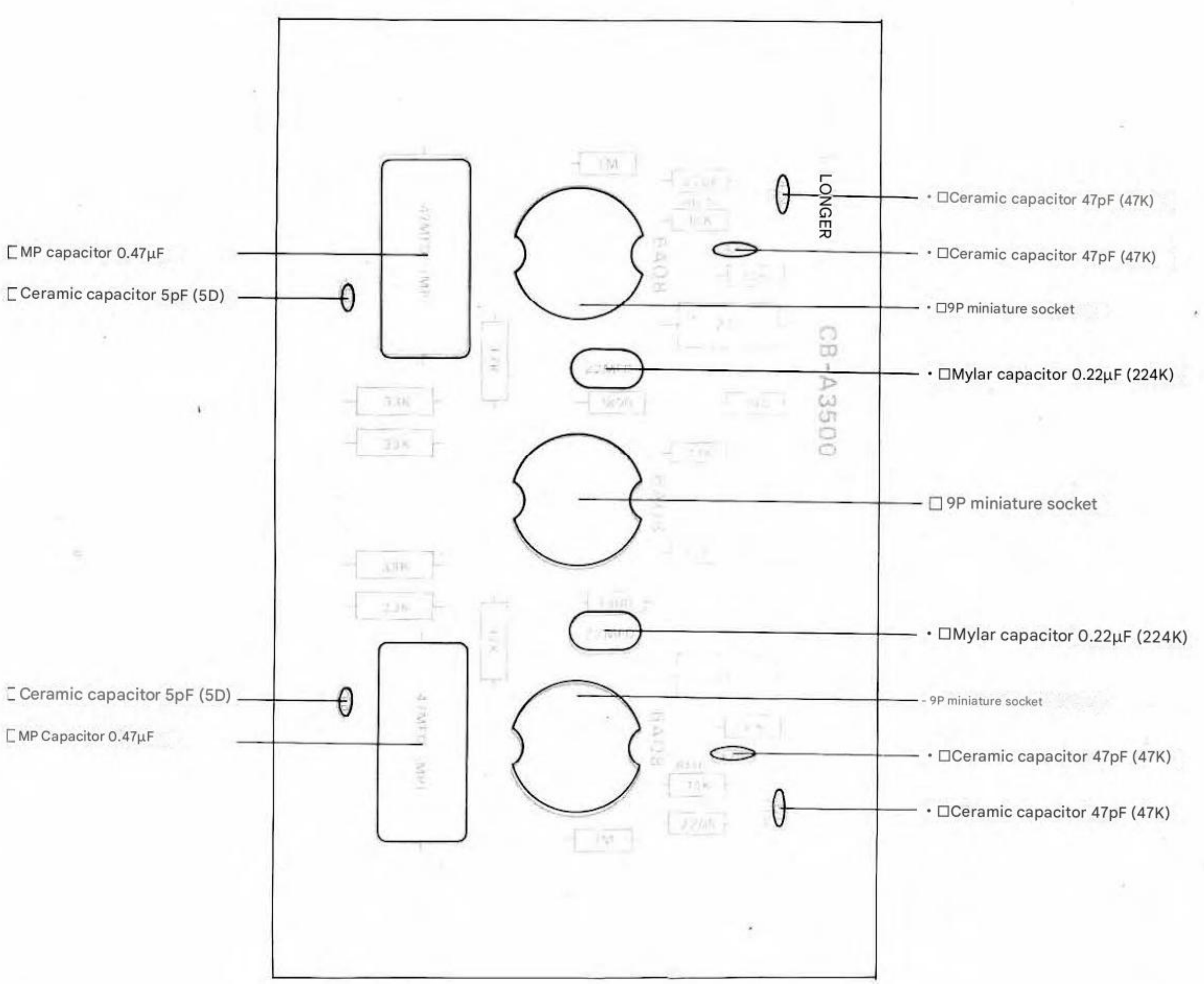

LONGER
• □Ceramic capacitor 47pF (47K)
• □Ceramic capacitor 47pF (47K)
• □9P miniature socket
• □Mylar capacitor 0.22μF (224K)
□ 9P miniature socket
• □Mylar capacitor 0.22μF (224K)
- 9P miniature socket
• □Ceramic capacitor 47pF (47K)
• □Ceramic capacitor 47pF (47K)
□ MP capacitor 0.47μF
□ Ceramic capacitor 5pF (5D)
□ Ceramic capacitor 5pF (5D)
□ MP Capacitor 0.47μF
CB-A3500

fig. 3-2

Printed circuit board pattern diagram

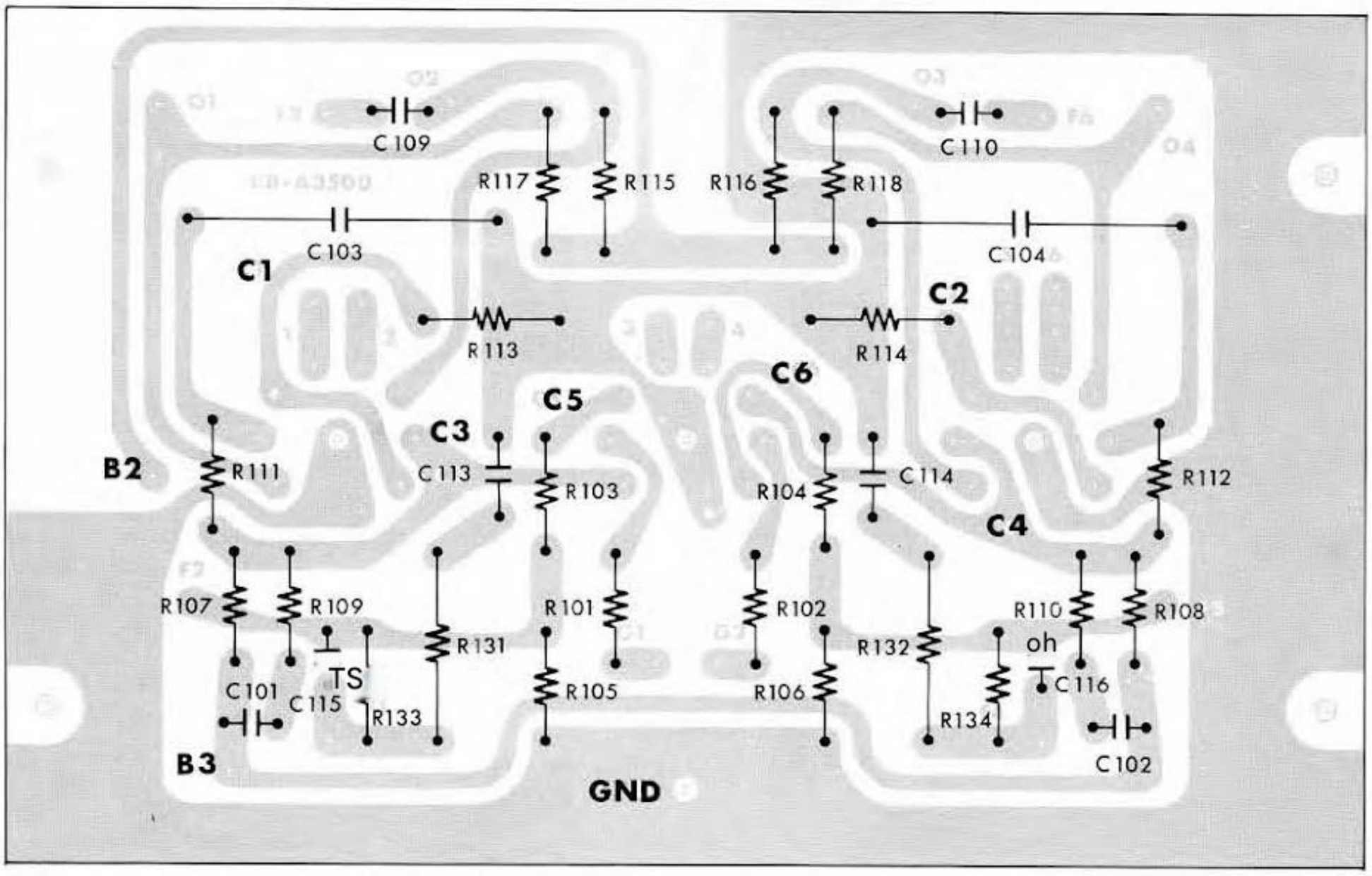


fig. 3-3

Printed circuit board circuit diagram

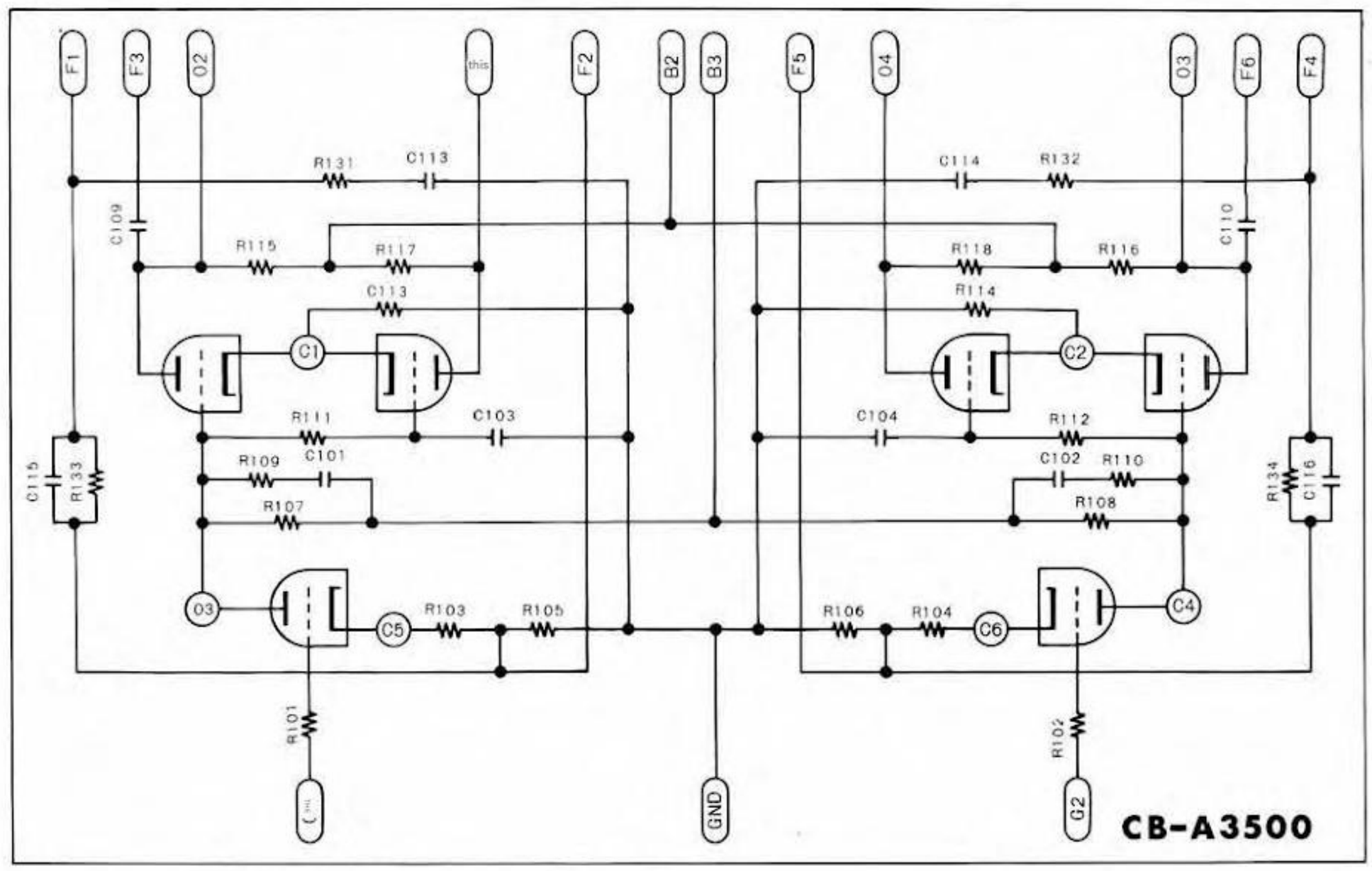


fig. 3-4

§4 Installation of parts

Attach two bias adjustment volumes (50K) to the volume mounting bracket A using nuts (7) and flat washers.

fig.(4—1)

□— ② Attach two DC balance adjustment volumes (5K2) to the volume mounting bracket B using 74 nuts and flat washers. fig.(4-2)

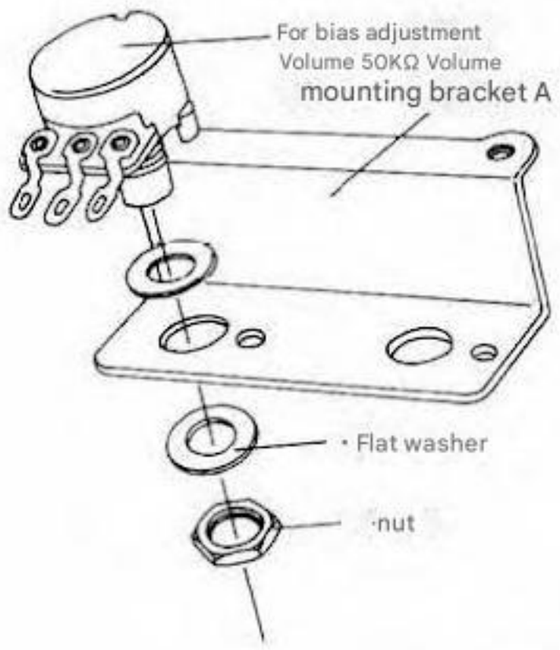


fig. 4-1

Please refer to fig. (4-3) for steps ③ to ⑤.

□— ③ Attach the octal socket together with the volume mounting bracket B using a 34-8mm screw. This volume mounting bracket B is installed between V4 and V5, and V6 and V_2. Also, attach the lug plate 1L4P to the other side of the socket, and the lug plate 1L1P to V_2 using a 34-8mm screw and a lock washer.

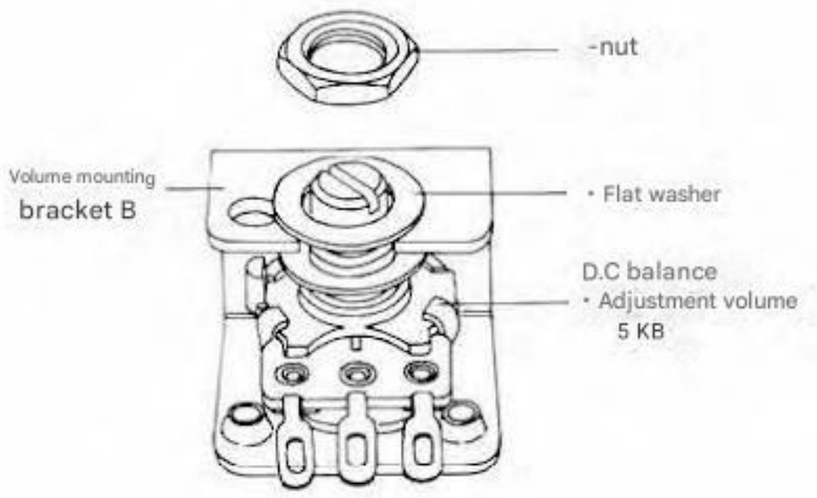


fig. 4-2

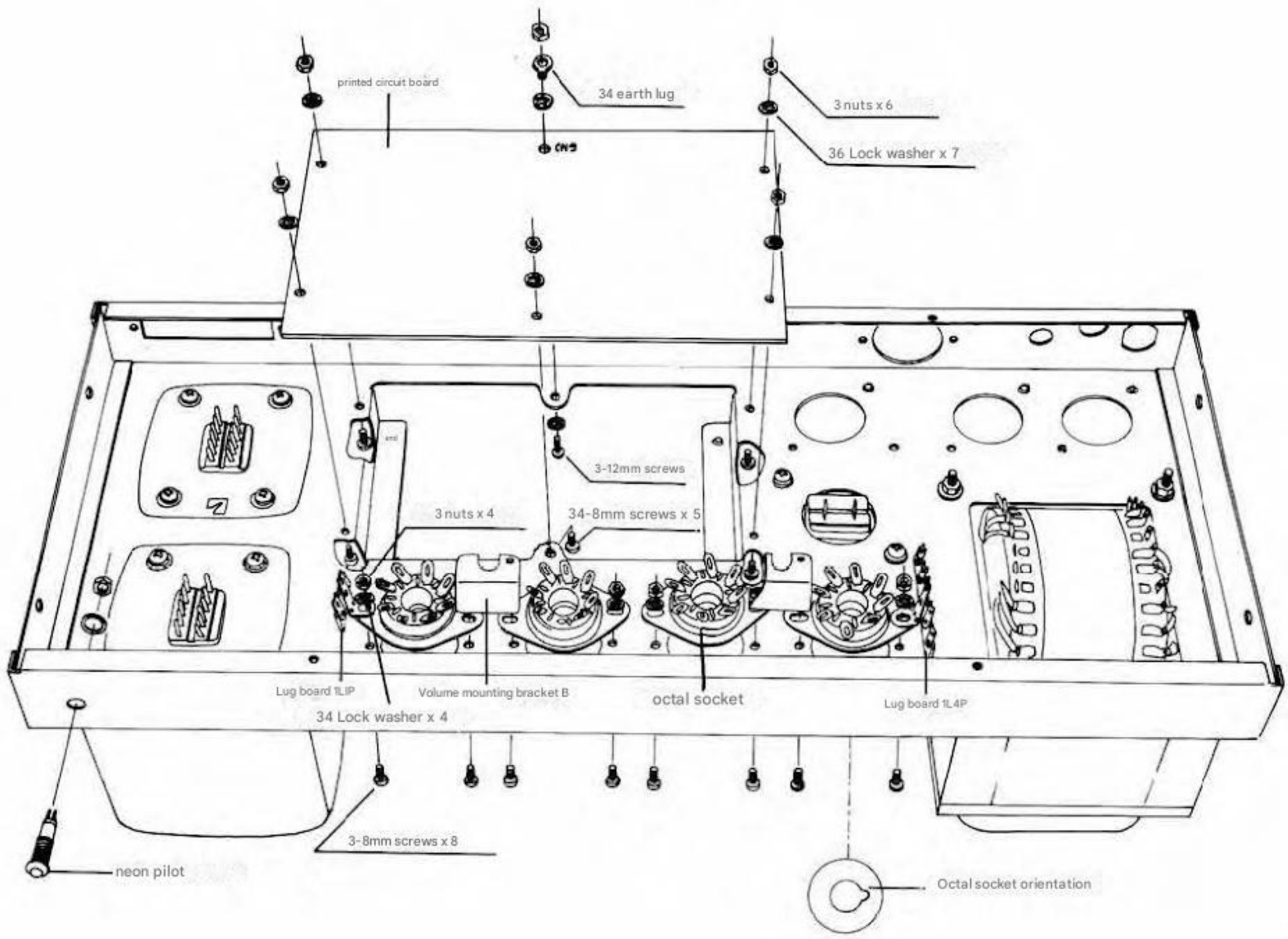


fig4-3

□– ① Install the printed circuit board. For the earth (GND) terminal, use a 34-12mm screw, 2 lock washers, and 3 nuts. Place the lock washers on both the inside and outside of the earth terminal.

□– ⑤ Attach the neon pilot with the included washer and nut.

□– ⑥ Install the block capacitors 47F×2,500WV and 100μF×2,315WV. Use 346mm, 38mm screws, and 3 nuts to install the capacitors while referring to the diagram (fig(4-7)) on page 12.

fig.(4—4)

⑦ Attach the volume mounting bracket A, which was used to attach the volume in step ①, using the 34-8 mm screws. **fig.(4—4)**

Please refer to fig. (4-5) for steps ⑧ to ③.

□- ⑧ Attach the speaker terminal board with 34-8mm screws, 3 lock washers and 36 nuts.

Attach two level set volumes (250K) using No. 8 nuts, No. 84 lock washers, and No. 8 flat washers.

□ 1. Attach the input terminal board with 34-8mm screws, 3 lock washers, and 34 nuts.

□— ① Attach the octal socket and 1L2P lug plate with 34-8mm screws, 3 lock washers, ϕ and 3 nuts. Be careful of the orientation of the octal socket.

⑫ Install the power switch with 9 nuts and 9 flat washers.

□– 13 Install the fuse holder with the included washer and nut.

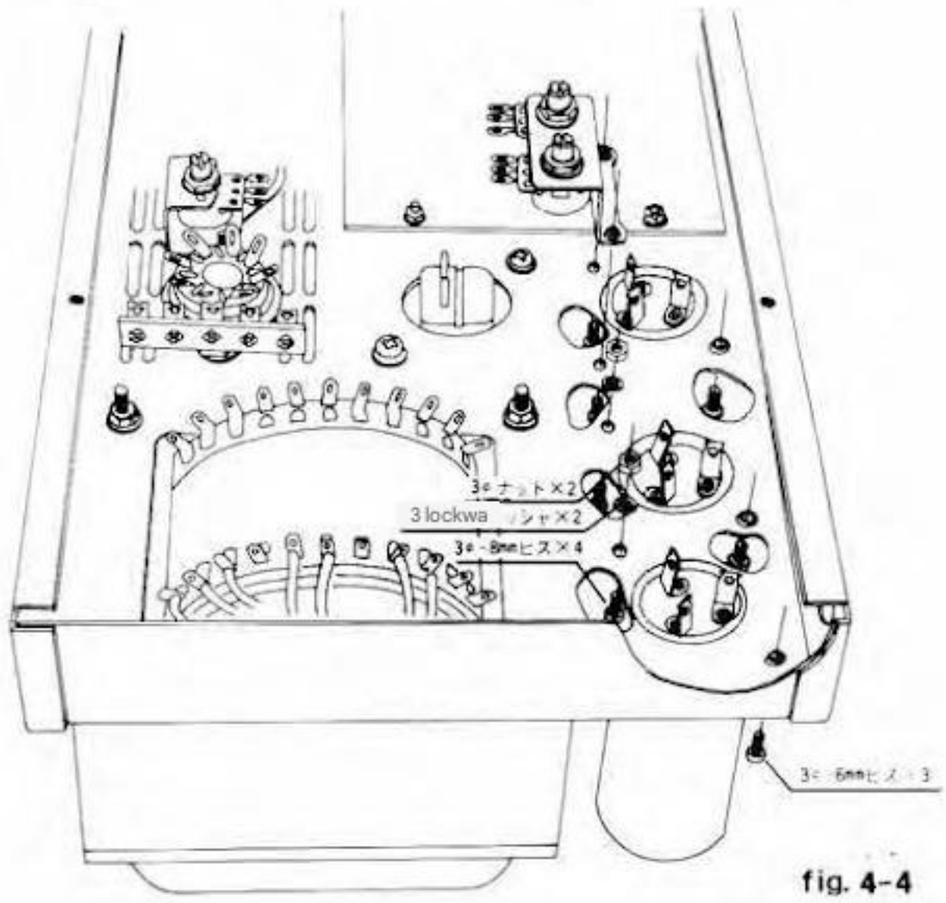


fig. 4-4

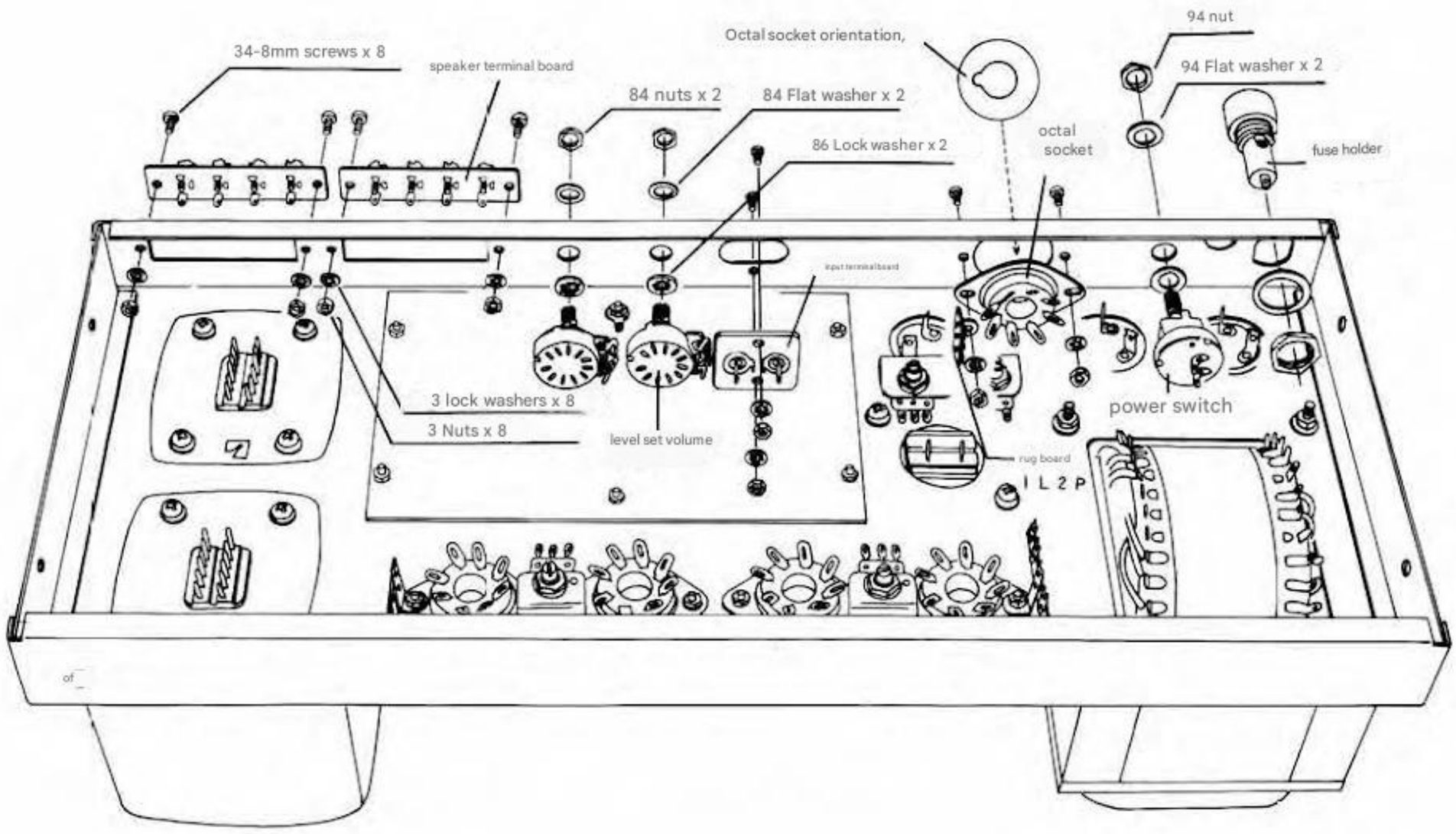


fig. 4-5

⑤ Attaching the AC cord

As shown in fig. 4-6, attach the cord stopper to the chassis about 12~13cm from the end without a plug.

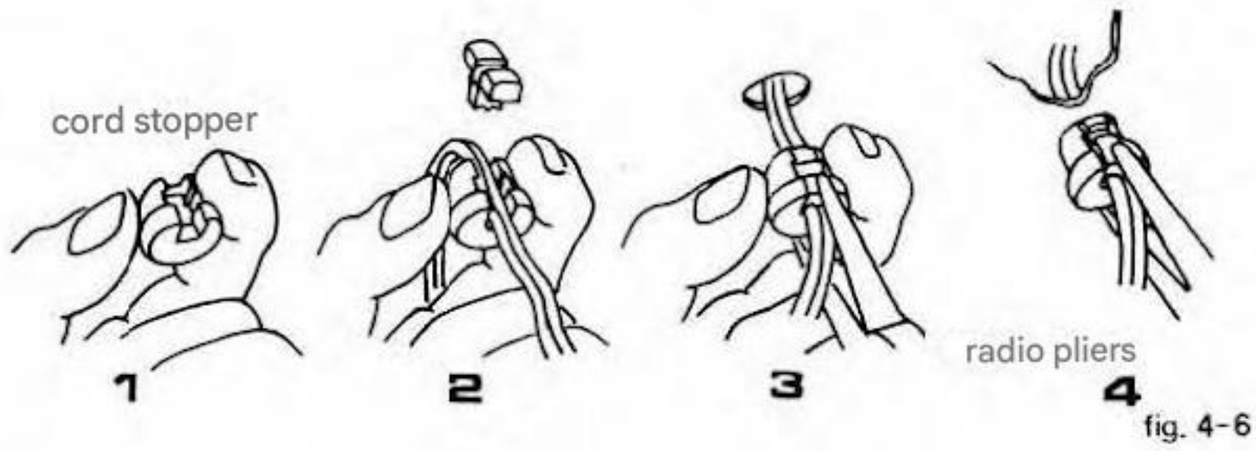


fig. 4-6

⑥ Complete installation of parts

Fig. 4-7 shows the finished assembly. The names of each part are written on it.

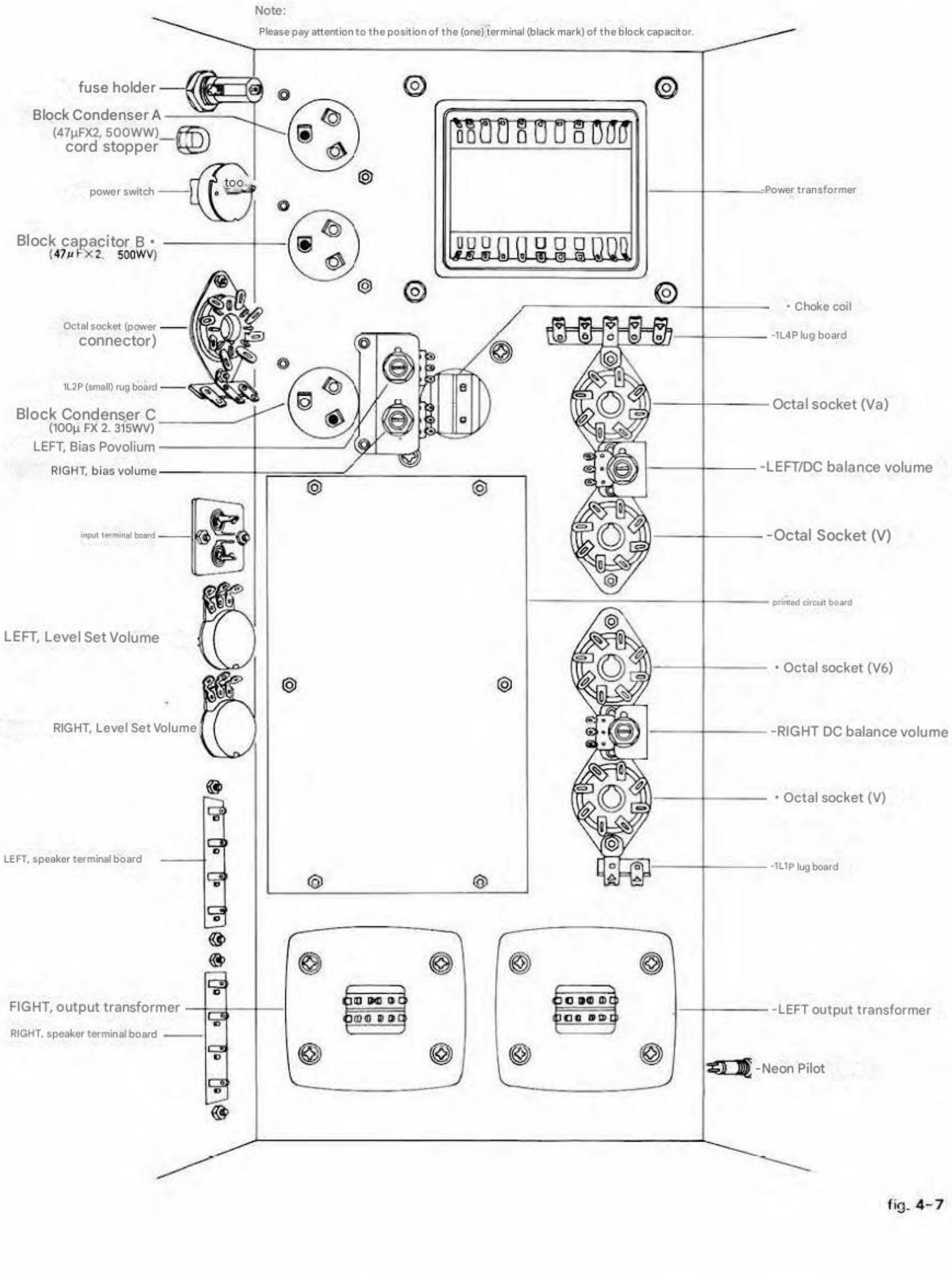


fig. 4-7

§5 Wiring Engineering

Before starting wiring...

Now that the parts have been installed, it's time to start wiring, but keep the tsuza in mind. Taking wiring step ① in the actual wiring diagram (1) as an example, the mark on the far left is for marking when the wiring is complete, so that you can check later whether the wiring is complete. The next number is the wiring step number. Follow this number to proceed with the work. Further to the right of this are the names of the parts, such as wire, resistors, capacitors, and diodes. These parts are used for wiring. Going down one line, there are letters connected with a → sign, and the left side indicates the start of the wiring, and the right side indicates the end of the wiring. In short, this indicates that the parts should be soldered between these → signs.

Actual wiring diagram (1)

The standard circuit of this unit is 6CA7 UL (Ultra Linear) connection, and the wiring process is centered around this. Here, blue, green, and gray coated wires and tinned wire are used for wiring, and the blue and green coated wires indicate wiring related to the screen grid of the output tube. If you are using 6CA7 triode connection or 6L6GC beam tube connection, please read the section "About triode and beam tube connections" carefully before starting from wiring process ⑤.

□— ① Cyan covered cable 29cm
V SCREEN GRID LEFT (PIN4) → OUTPUT TRANSFORMER PIN2

□— ② Blue covered wire 22cm
V, SCREEN GRID RIGHT OUTPUT TRANSFORMER PIN2 (PIN4)

□— ③ Green covered wire 24cm
V SCREEN GRID LEFT OUTPUT TRANSFORMER PIN5 (PIN4)

□— ④ Green covered wire 28cm
V. Screen Grid RIGHT OUTPUT (PIN4) TRANSFORMER PIN5

□— ⑤ Tin lead 11.5cm
Block Capacitor Terminal 3 of Block Capacitor C Terminal 1 of
Thread it through terminal 3 of block capacitor B and connect it to the block. A glass tube is placed between the wires of the A and B capacitors.
4cm, put a 6cm glass tube between the wires of Block capacitors B and C, and put the end of Block capacitor B
Solder also to child 3

□ ⑥ Tin lead 5cm
Power transformer terminal 18 → Power transformer terminal -22
[Cover with 4cm glass tube]

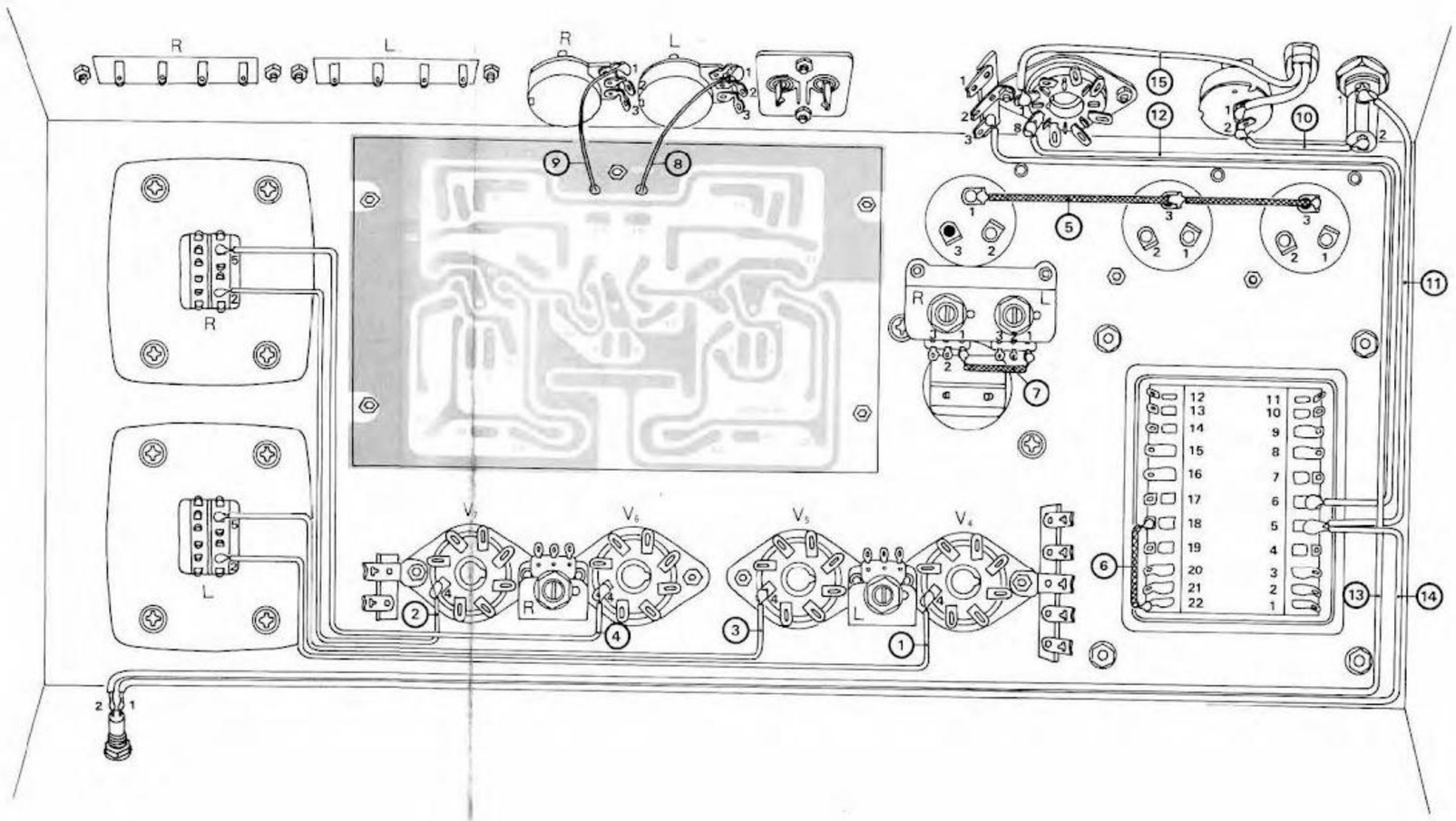


fig. 5-1

□ ⑦ Tin lead 3.5cm
LEFT bias adjustment button Rhum terminal 1 Rhum → RIGHT bias adjustment button terminal 1
[Cover with a 2.5cm glass tube]

□ ⑧ Tin lead 4cm
LEFT level set
Volume terminal 1 → PCB — GND.

□ ⑨ Tin lead 3.5cm
RIGHT level set PCB GND, volume end 1

□ -10 Gray coated wire 10cm
Power switch terminal 2 → fuse holder terminal 2 ① Gray coated

□— wire 19cm
Terminal 1 of fuse holder → Terminal 5 of power transformer ② Gray

□— coated wire 28cm
PIN 8 of power connector Terminal 6 of power transformer

□— 3 Gray coated wire 76cm
1L2P (small) Terminal 3 of lug board → Terminal 2 of Neon Pilot

□ Gray coated wire 53cm
Power transformer terminal 5 → Neon Pilot terminal 1

□— ⑲ Connect the AC cord to the stopper (12 cm from the tip).
Tear one end into pieces (where the stopper is) and cut one end so that it is 4cm from the stopper. Leave the other end as it is.
12cm side of AC cord → PIN1 of power connector
4cm end of AC cord → Power switch terminal 1

Actual wiring diagram (2)

Here, we will wire black, brown, and purple coated wires. The black coated wire is for earth wiring, the brown coated wire is for the NF circuit and 160 output wiring, and the purple coated wire is for the MLF circuit and 40 output wiring.

□– ① Black covered wire 18cm
Terminal 3 of block capacitor A → Terminal 13 of power transformer

□– ② Black covered wire 16cm
Terminal 3 of block capacitor B → Terminal 1 of 1L4P lug board
[Do not solder the 1L4P side, just pass it through the hole in the lug board)

□– ③ Black covered wire 7cm
Terminal 21 of the power transformer → Terminal 1 of the 1L4P lug board (Do not solder the 1L4P side, just pass it through the hole in the lug board)

□– ④ Black covered wire 22cm
Terminal 2 of the power transformer → Terminal 1 of the 1L4P lug board
[Terminal 1 of the 1L4P lug board is the 3 wires that are connected together. Add a mark.]

□ ⑤ Black covered wire 26cm
Block Capacitor B V4 Cathode (PIN1, PIN3, PIN8) →
[For the "V" cathode side, strip about 1.5 cm of the coating and solder it to PIN1 and PIN8.]

□ ⑥ Black covered wire 13cm
V_1 cathode (PIN1) → V_{II} cathode (PIN1, PIN8)
[For the V cathode side, strip about 1.5 cm of the coating and solder it to PIN 1 and PIN 8.]

□– ⑦ Black covered wire 13cm
V cathode (PIN1) → V cathode (PIN1, PIN 8) For the V cathode side, remove about 1.5 cm of the coating and solder it to PIN1 and PIN8.]

□ ⑧ Black covered wire 13cm
V cathode (PIN1) → V_2 cathode (PIN1, PIN8)
[On the cathode side of the V-type battery, remove about 1.5 cm of the insulation and connect PIN1. And solder to PIN8.]

□ ⑨ Black covered wire 11cm
Block capacitor C → PIN3 of power connector terminal 1

□— ⑩ Black covered wire 15cm
capacitor C PCB earth terminal 1 → Lug (GND.) Block

□— Black coated wire 14cm
Earth lug on printed circuit board (GND.) → COM. end on LEFT speaker board 00

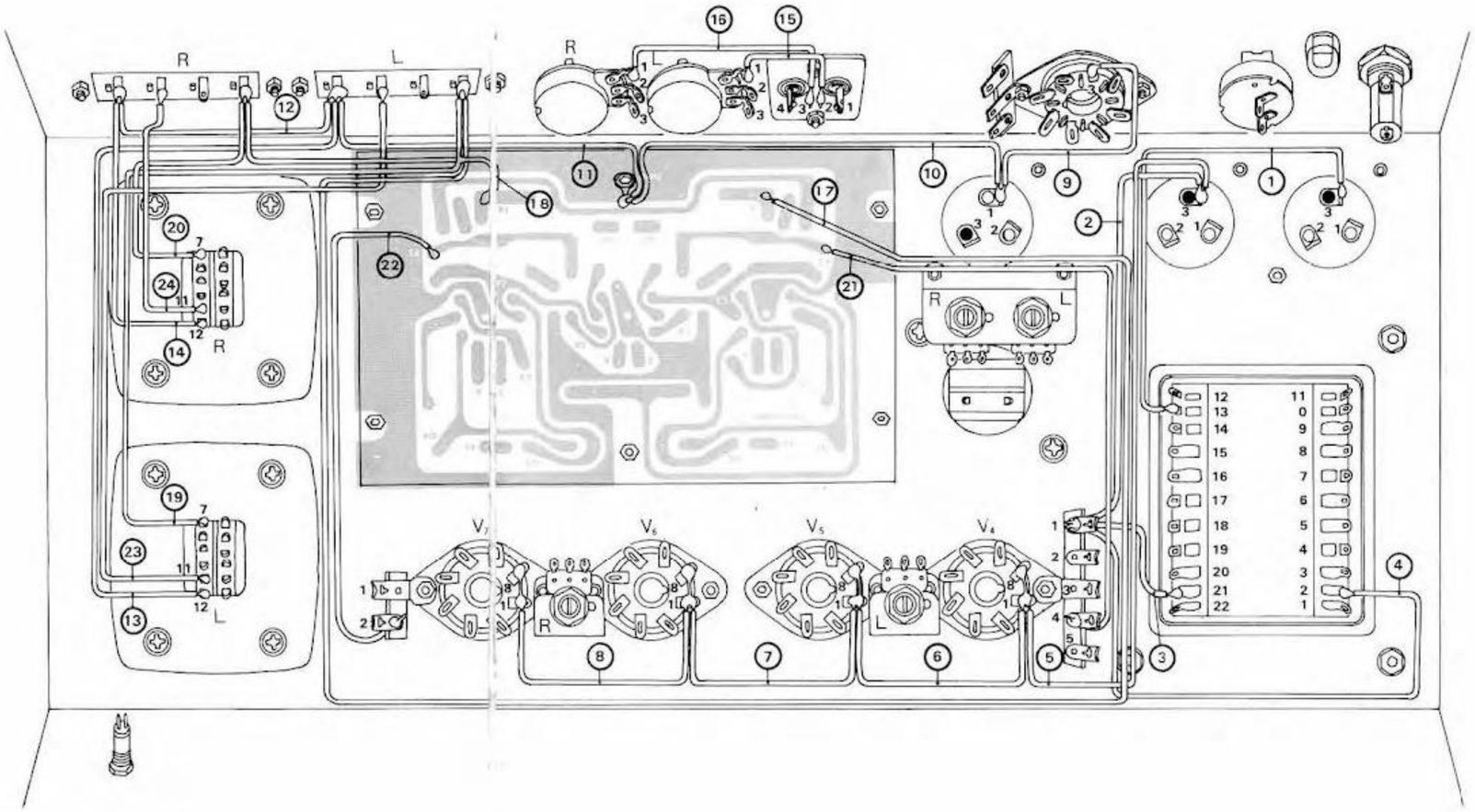


fig. 5-2

□– ② Black covered wire 12cm
COM terminal on the LEFT speaker terminal board → COM terminal on the RIGHT speaker terminal board

□ One black covered wire 27cm
COM. terminal of LEFT speaker terminal board PIN12 of → LEFT output transformer

□– 14 Black covered wire 11cm
COM. terminal of RIGHT speaker terminal board PIN 12 of → RIGHT output transformer

□ -15 Black covered wire 5cm
Terminal 2 of the input → terminal board Terminal 1 of the LEFT level set volume

□ -16 Black covered wire 8cm
Terminal 3 of the input (terminal board RIGHT level set → terminal 1) of the volume

□ Brown coated wire 73cm
LEFT speaker terminal → F1 on (160 terminals on the board) the printed circuit board

□– 18 Brown coated wire 13cm
RIGHT speaker terminal → F4 on (162 terminals on the board) the printed circuit board

□ -19 Brown coated wire 27cm
speaker terminal LEFT output (160 terminals on the board) → Transformer PIN 7 LEFT

□– 20 Brown coated wire 11cm
RIGHT SPEAKER TERMINAL RIGHT (160 terminals on the board) → OUTPUT TRANSFORMER PIN 7

□– ② Purple covered wire 24cm
Terminal 4 on 1L4P lug board → F2 on printed circuit board ②

□– Purple coated wire 19cm
Terminal 2 on 1L1P lug board → F5 on printed circuit board

□– 23 Purple covered wire 27cm
LEFT speaker terminal LEFT output terminal 42 on board PIN 11 on → transformer

□ -24 Purple covered wire 11cm
40 terminal of RIGHT speaker terminal board → PIN11 of RIGHT output transformer

Actual wiring diagram (3)

Here, we will use clear and white coated wires for wiring. The clear coated wires are for the heater wiring, and the white coated wires are for the bias, input related wiring, and 80 output wiring.

- ① Colorless coated wire 11cm
  Power transformer terminal 21 → V heater (PIN2)
- ② Colorless coated wire 14cm
  Power transformer terminal 22 → V heater (PIN7)
- ③ Colorless coated wire 11cm
  V heater (PIN2) → VS heater (PIN 2)
- ④ Colorless coated wire 19cm
  V heater (PIN7) V heater (PIN7)
- 1.⑤ Colorless coated wire 33cm
  Power transformer terminal 3V heater (PIN 2)
- 1.⑥ Colorless coated wire 35cm
  Power transformer terminal 1 → V heater (PIN 7)
- 1.7 Colorless coated wire 11cm
  V heater (PIN 2) V_3 heater (PIN2)
- 1.8 Colorless coated wire 19cm
  V. Heater (PIN7) → V_2 Heater (PIN7)
- ⑨ Colorless coated wire 23cm
  V_1 Heater (PIN2) → PCB 6
- -10 Colorless coated wire 28cm
  V, heater (PIN 7) → 5 of the printed circuit board
- ⑪ Colorless coated wire 7cm
  PCB 6 → PCB 4 - Colorless coated wire 7cm
- Printed circuit board 5 → Printed circuit board 3
- -13 Colorless coated wire 11cm
  PCB 6 → PCB 2
- -14 Colorless coated wire 11cm
  PCB 5 → PCB 1
- 1 White covered wire 24cm
  Block capacitor C Terminal 2 of power transformer terminal 7
- ⑯ White covered wire 22cm
  Power transformer terminal 11 → Block capacitor C terminal 3
- ⑰ White covered wire 14cm
  Block capacitor C → power connector pin 4 terminal 3
- 8 White covered wire 12cm
  Power transformer terminal 12 → Power connector pin 5
- 19 White covered wire 12cm
  POWER CONNECTOR PIN5 LEFT VANOS ADJUSTMENT VOLUME TERMINAL 1

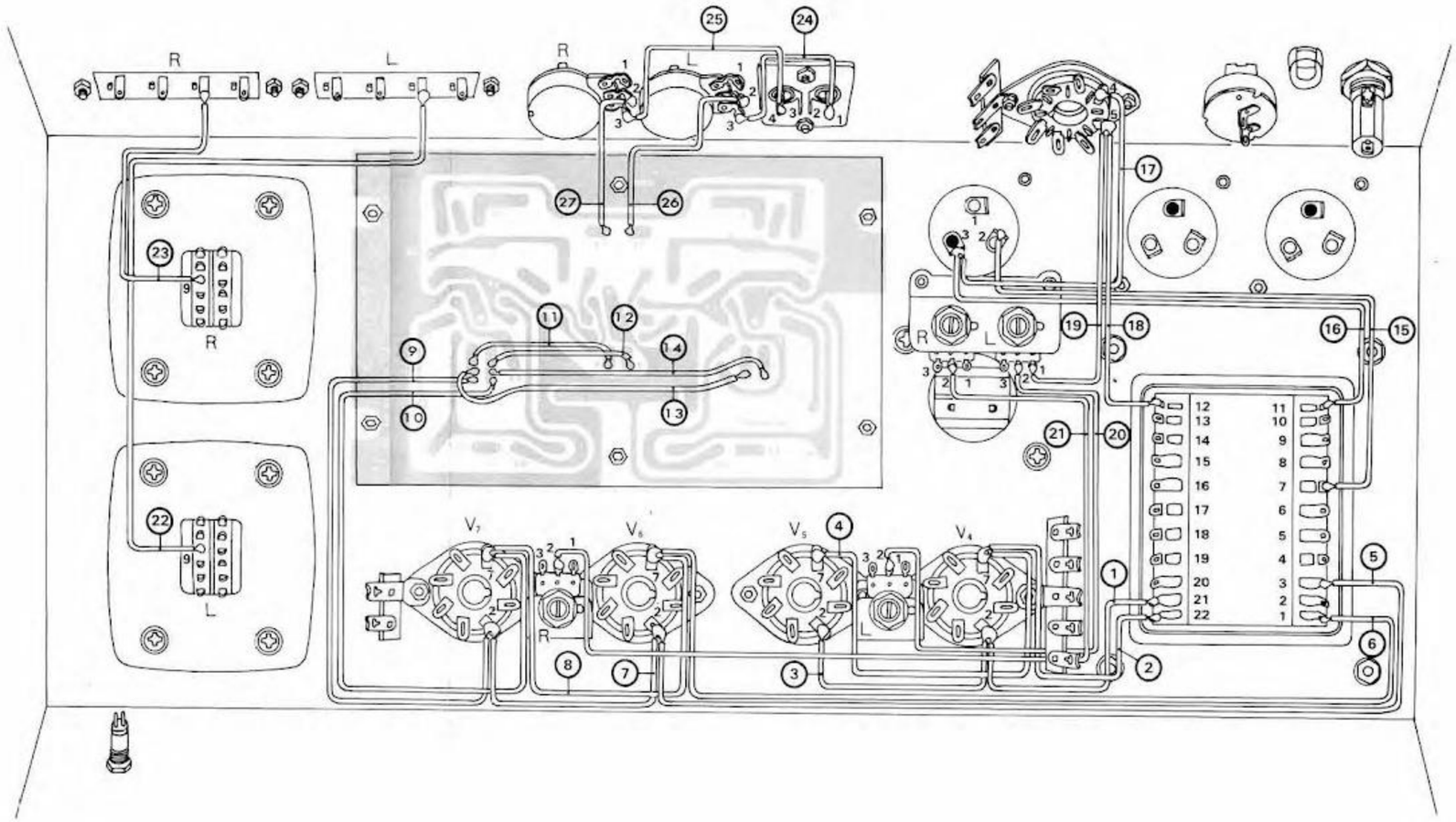
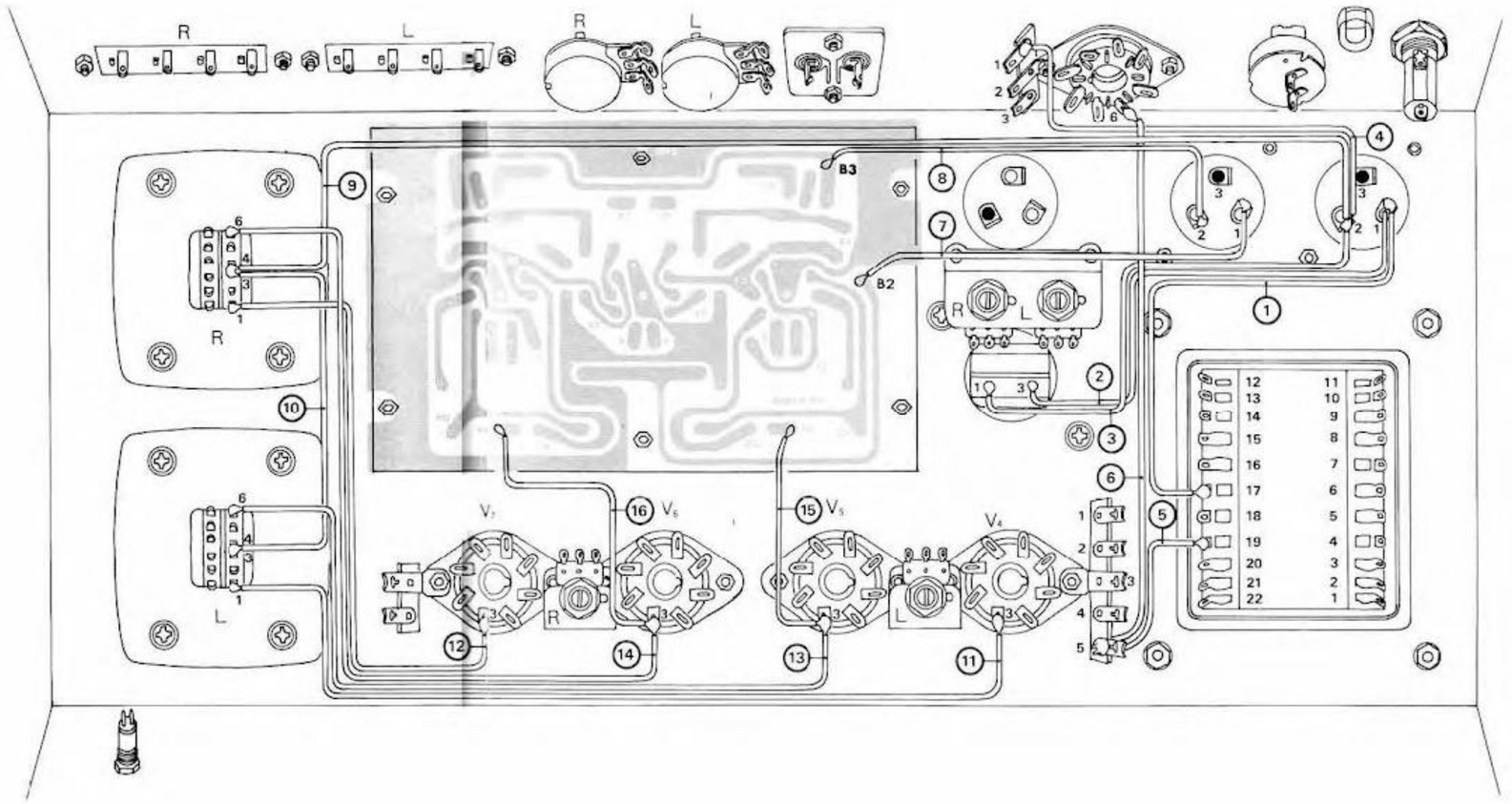


fig. 5-3

- 20 White covered wire 23cm
  LEFT bias adjustment button Lum terminal 2 → LEFT DC balance volume terminal 2
- ㉑ White covered wire 36cm
  RIGHT bias adjustment button Lum terminal 2 → RIGHT DC balance volume terminal 2
- ②White covered wire 27cm
  80 terminal on the left speaker terminal board → LEFT OUTPUT TRANSFORMER PIN 9
- -23 White covered wire 11cm
  80 terminal on the RIGHT speaker terminal → board PIN 9 on the RIGHT output transformer
- 24 White covered wire 8cm.
  Input terminal board terminal 1 → LEFT Level Set Volume Terminal 3
- ㉕ White covered wire 10cm
  Terminal 4 of the input → terminal board RIGHT level set volume terminal 3
- 26 White covered wire 7cm
  Terminal 2 of LEFT level set volume G1 of printed circuit → board
- 27 White covered wire 5cm
  Terminal 2 of RIGHT level set volume G2 of printed circuit → board



Actual wiring diagram (4)

fig. 5-4

Here, we will use red, orange, and yellow coated wires.

The red coated wire indicates the B voltage wiring, and the orange and yellow coated wires indicate the plate wiring of the output tube.

□— ① Red coated wire 19cm
Terminal 1 of Power Transformer Terminal 17 → Block capacitor A

□— ② Red coated wire 17cm
Block capacitor A Terminal 1 → of PIN3 of the choke coil

□— ③ Red coated wire 17cm
Terminal 2 of block capacitor A → PIN1 of choke coil

□— ④ Red coated wire 15cm
Block capacitor A terminal 2 → 1L2P (small) lug board terminal 1

□— ⑤ Red coated wire 8cm
Power transformer terminal 19 → 1L4P lug board terminal 5

□— ⑥ Red coated wire 20cm
1L4P lug board terminal 5 → IN 6 Power connector P

□— ⑦ Red coated wire 15cm
Block capacitor B B2 on the printed circuit board terminal 1

□— 1.8 Red coated wire 16cm
Terminal 2 of block capacitor B B3 on → printed circuit board

□— ⑨ Red coated wire 43cm
Block capacitor A terminal 2 → RIGHT Output transformer PIN3,4
[Bend pins 3 and 4 inward and solder both terminals]

□— ⑩ Red coated wire 16cm
RIGHT OUTPUT LEFT Transformer pins 3 and 4 → OUTPUT TRANSFORMER PIN3,4

□— ① Orange covered cable 29cm
V1 Plate (PIN 3) → LEFT OUTPUT TRANSFORMER PIN 1

□— ② Orange covered wire 22cm
V-PLATE (PIN 3) RIGHT → OUTPUT TRANSFORMER PIN 1

□ -13 Yellow coated wire 25cm
Vs Plate (PIN3) PIN 6 of → LEFT Output Transformer

□— ⑭ Yellow coated wire 29cm
RIGHT OUTPUT V. PLATE (PIN3) → PIN 6 of transformer

□ 1 Yellow coated wire 9cm
V" plate (PIN3) → F3 on the printed circuit board - Yellow

□ coated wire 12cm
V. Plate (PIN3) → F6 on the printed circuit board

Actual wiring diagram (5)

Here we will wire the CR components. Be careful not to mix up the polarity when soldering.

□—① Solder the SD-1B (silicon diode) side to terminal 13 of the power transformer, and the SD-1B side to terminal 16 of the power transformer.

□—② Solder the SD-1B (silicon diode) side to terminal 16 of the power transformer, and the SD-1B side to terminal 17 of the power transformer.

□—③ Solder the SD-1B (silicon diode) side to terminal 13 of the power transformer, and the SD-1B side to terminal 15 of the power transformer.

□—④ Solder the SD-1B (silicon diode) side to terminal 15 of the power transformer, and the SD-1B side to terminal 17 of the power transformer.

□—⑤ Solder one side of the S1RB-40 (silicon diode) to terminal 10 of the power transformer, one side to terminal 7 of the power transformer, and two sides to terminals 8 and 9 of the power transformer respectively.

□— Solder the 61S-1850 (silicon diode) side to terminal 19 of the power transformer, and the two other diodes to terminals 18 and 20 of the power transformer respectively.

□ 17 resistance 10K21W (tea, black and orange)
Terminal 12 of the power transformer Terminal 10 and terminal 11 of the
power transformer [Terminal 11 is bent and soldered together with terminal

□ 10] 18 Resistor 2000 7W (wire wound type)
Power transformer terminal 7 → Power transformer terminal 2 - ⑨

□ Resistor 22002W (red red red)
Block Capacitor A Terminal 1 Terminal 2 of Block Capacitor B

□—⑩ Resistor 150K 1W (brown, green, yellow)
Terminal 1 of Block Capacitor B → Block Capacitor B
Terminal 2 of

□ One resistor 560002W (green-blue-red)
Power connector 1L2P (small)
lug plate terminal 1-PIN2 ② Resistor

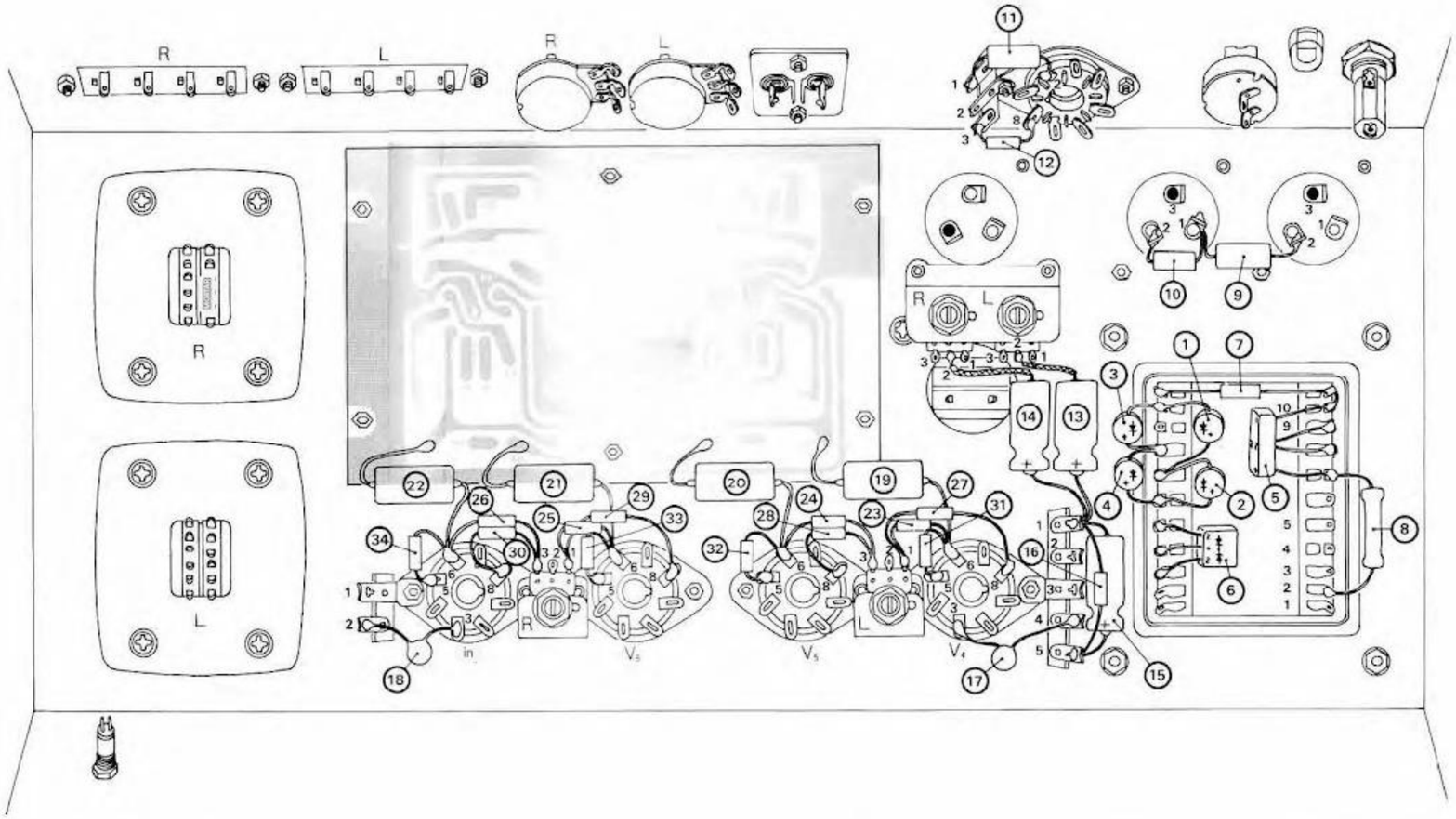
□— 100KW (brown, black, yellow)
Power connector 1L2P (small)
lug plate terminal 3 → PIN8

□ Solder one side of the -13 electrolytic tubular capacitor (47μF, 100V) to terminal 1 of the 1L4P lug board, and the other side to terminal 2 of the LEFT bias adjustment volume through a 3cm glass tube.

□—⑭ Solder one side of the electrolytic tubular capacitor (47μF, 100V) to terminal 1 of the 1L4P lug board, and the other side to terminal 2 of the RIGHT bias adjustment volume through a 3cm glass tube.

□ Solder one side of the electrolytic tubular capacitor (2200μF, 10V) to terminal 5 of the 1L4P lug board, and the other side to terminal 1 of the 1L4P lug board.

□— 6 Resistance 150K Ω ½W (tea green yellow)
1L4P lug plate terminal 5- 1L4P lug plate terminal 1



Low Ceramic Capacitor 10pF (10F)
1L4P lug board terminal 4 → V, plate (PIN3) 18

□— Ceramic capacitor 10pF (10F)
1L1P lug plate terminal 2V, plate (PIN 3) Oil tubular

□—⑲ capacitor (0.047μF) V socket PIN 6 → PCB 01

□ -20 Oil tubular capacitor (0.047μF) PIN 6 of V socket → O2 of PCB

□ -20 Oil tubular capacitor (0.047μF) Pin 6 of Vonket → 03 of the printed circuit board

Low oil tubular capacitor (0.047μF) V socket pin 6 → PCB pin 04

□— 23 Resistor 100KW (brown, black, yellow) LEFT balance adjustment volume V, socket PIN 6-, terminal 1 of the

□ -24 resistance 100KW (tea one black one yellow)

Vs socket PIN6 LEFT → balance adjustment volume terminal 3

□— 25 Resistor 100KW (brown, black, yellow)
PIN6 of V-type terminal 1 of RIGHT balance adjustment volume

□ -26 Resistor 100KW (brown, black, yellow)
V: Socket PIN 6 RIGHT Balance Adjustment Volume Terminal 3

□— 27 Resistance 33KQ3W (orange-orange-orange)
V. Socket PIN 8 LEFT Balance Adjustment Volume Terminal 1

□— 28 Resistor 33KW (Orange-Orange-Orange)
Vonket PIN8 LEFT Balance Adjustment Volume Terminal 3

□ -29 resistance 33K0W (orange one orange one orange)
V. SOCKET PIN 8 → RIGHT BALANCE ADJUSTMENT VOLUME TERMINAL 1

□ One resistor 33KW (orange one orange one orange) Vinket PIN8 → RIGHT balance adjustment volume terminal 3

□— ③ Resistor 47002/W (yellow-purple-red)
Vinquette PIN 6 V control grid → - (PIN 5)

□— ② Resistor 47000/W (yellow, purple, red)
Vs socket pin 6 Vs control → grid (pin 5)

□ 47000/W (yellow-purple-red) V. PIN 6 of socket (PIN 5) → V. Control grid - resistor

□—㉞ Resistor 47000/W (yellow, purple, red) V socket pin 6 V → control grid (pin 5)

This completes the wiring for the main unit. Bind the wires that have been completed with vinyl tubing every 5~10cm.

In addition, four 1002W resistors (one brown, one black, one brown) will be left over, which will be used when changing the unit to a triode connection.

Octal plug wiring

Wire the octal plug as shown in fig. 5-6, and insert this plug into the power connector. This is because the power connector supplies power to the preamp A3300, and in conjunction with the preamp's power switch, it disconnects part of the AC line internally to turn the power of this unit on and off.

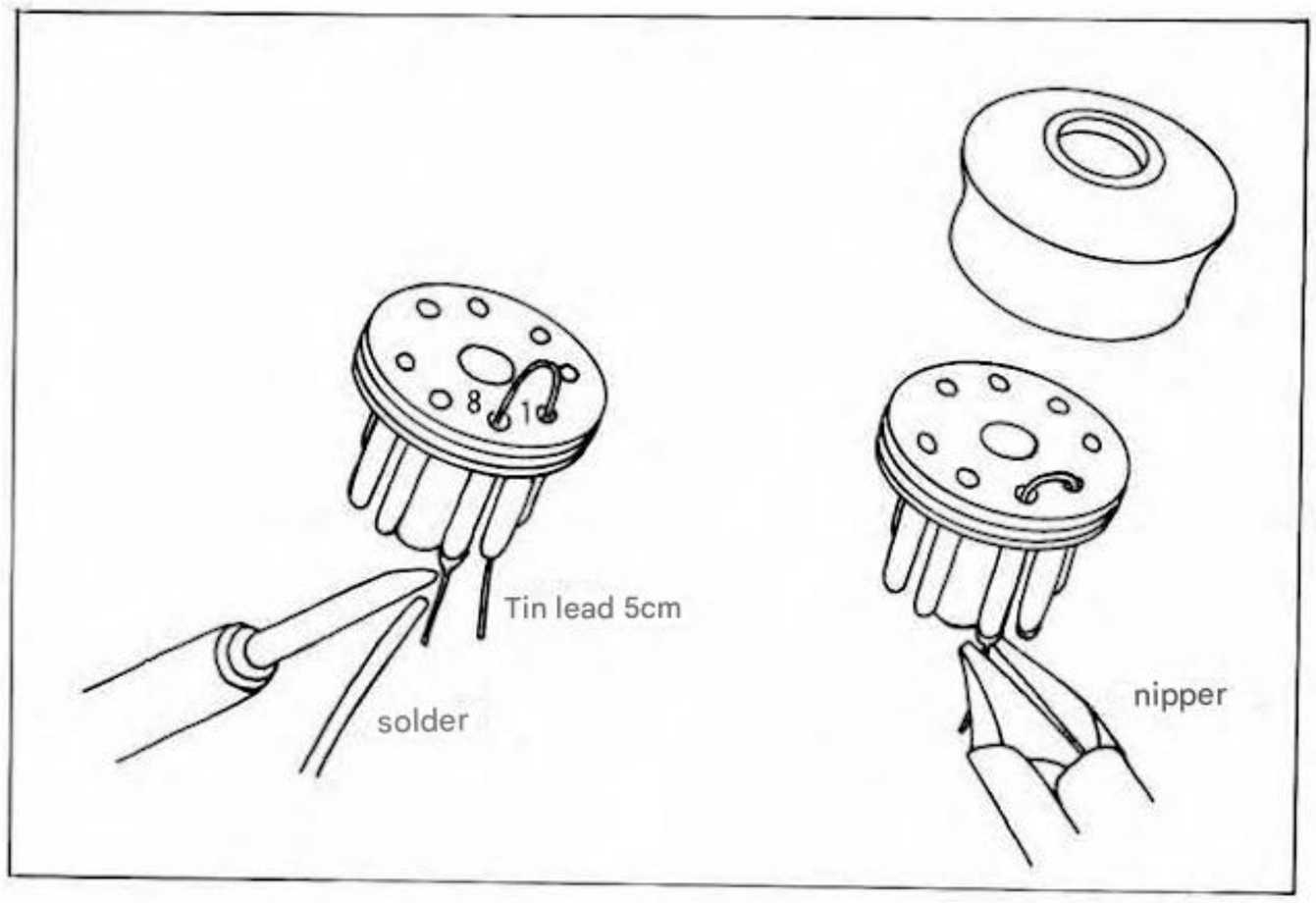


fig. 5-6

Printed circuit board pattern diagram

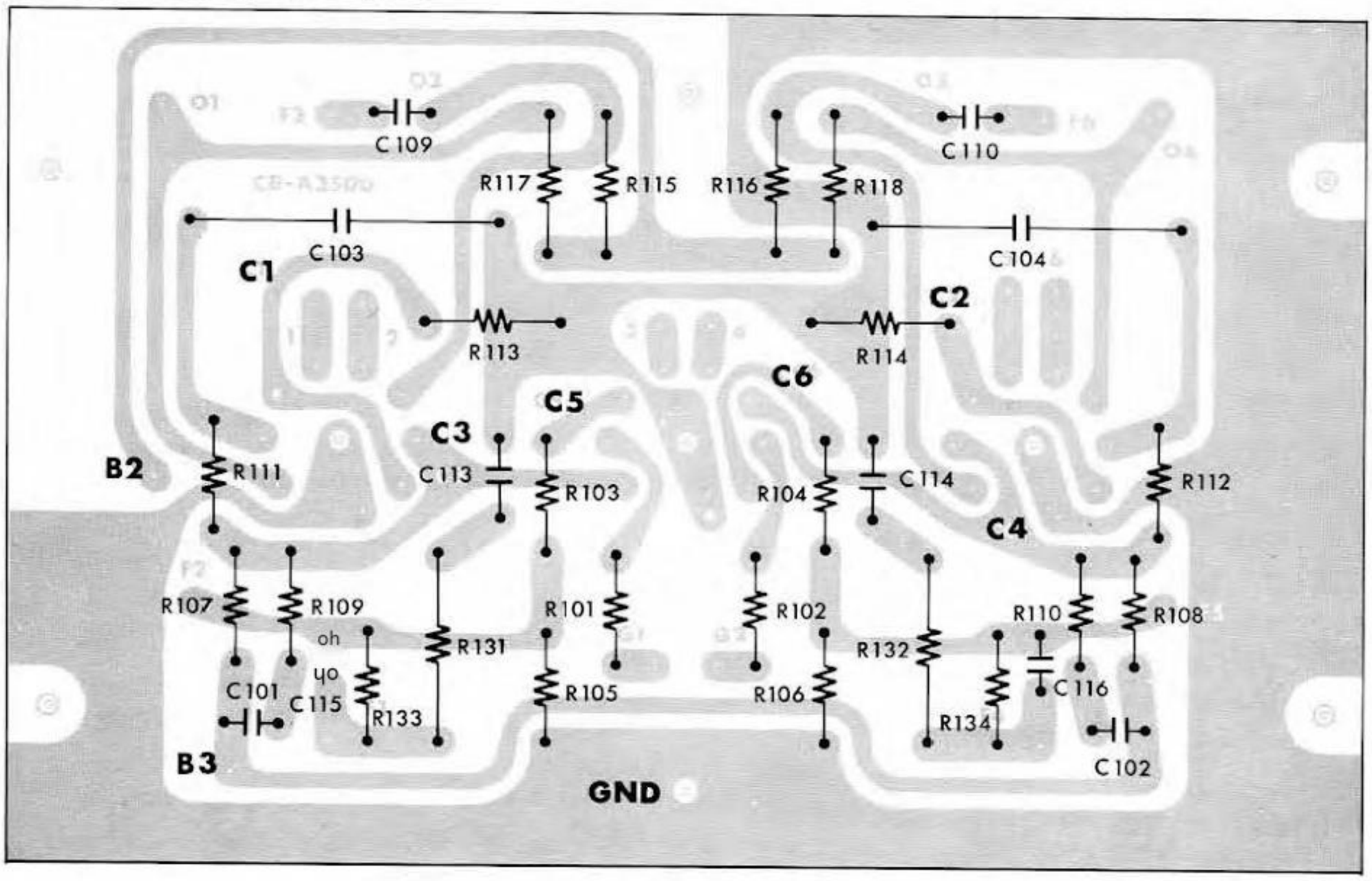


fig. 3-3

§6 Adjustment and Check

Now it is time to begin the adjustment process, but please do so quickly to prevent damage to expensive parts. If during the adjustment you notice any abnormalities such as the vacuum tubes becoming red hot or any parts emitting smoke, immediately turn off the power switch and unplug the AC cord from the outlet.

☐ Do the above steps and proceed only if it works properly. If there is something wrong, check the check points. Now insert the vacuum tube into the designated place and start adjusting it.

(1) Unplug the AC plug from the outlet.

- Make sure the power switch is in the OFF position.
- Make sure the octal plug is inserted into the power connector, if the octal plug is removed the power will not come on.
- Make sure the fuse holder contains a 5A fuse.
- Turn the bias adjustment volumes of both channels all the way to the right (clockwise).
- Set the DC balance volume of both channels to the center position.

(2) Insert the AC plug into the outlet.

(3) Turn the power switch ON. Set the tester to the DC100V to 150V range, connect the terminal to the GND (7 base) of the printed circuit board, and connect the terminal to the control grid (PIN5) of V1 to V2 in order.

○ If the fuse is blown or the pilot light doesn't light, check the power circuit.

○ The heater of the vacuum tube does not light up. In this case, Peter Check the road.

○ The output tube glows red. The bias voltage is 0V. In this case, check the bias circuit.

○ The bias voltage does not reach approximately -50 V. In this case, check the bias circuit and B power supply circuit.

○ It is normal if the bias voltage is around -50V one minute after turning on the power.

(4) ●Disconnect both terminals of the tester, set it to the 10~15V range, connect one terminal to terminal 2 of block capacitor A (47μF x 2), connect the other terminal to the plate (PIN3) of V4, Vs, and gradually turn the LEFT bias adjustment volume to adjust it to 8V (7.8V~8.2V). In other words, you are looking at the voltage drop between B and P. Adjust the voltage imbalance of V4 and Vs with the LEFT DC balance volume.

(5) In the same way as (4), adjust V6 and V2 using the RIGHT bias adjustment volume and the RIGHT DC balance volume so that they are each 8V.

(6) Repeat steps (4) and (5) two or three times to make adjustments.

(7) Disconnect both terminals of the tester and check the voltage of each part. This is the voltage relative to the earth (GND of the printed circuit board), so where a negative voltage is displayed, switch the terminals of the tester and read the indicated value. The voltages listed below are standard values (with an error of ±10%) measured by a valve (vacuum tube voltmeter) when the power supply voltage is 100V, so the tester may indicate low values, especially for the control grid of the output tube.

- Block capacitor terminal 2 (B1) 460V 880
- Board pattern B2 440V ·····
- Board pattern B3...230V
- PIN4 of the power connector..... ·— 110V
- Power Connector PI N570V
- Power Connector PIN 6 8.5V
- Output tube plate (PIN3) ····· 450V
- Output tube control grid (PIN5) ··34V
- Phase inversion tube plate (printed circuit board 01-04) 350V ·····
- Phase inversion tube cathode (PCB C1~C2) 80V ·····
- Plate of the first stage tube (PCB C3, C_4) ·····75V
- First stage tube cathode (PCB C5, C6)..... 1.5V

○ If the voltage error is more than ±10%, check the power supply circuit and printed circuit board.

○ The voltage value is normal if the error is within ±10%.

(8) Re-adjust the bias voltage in steps (4) and (5).

(9) ● Turn the power switch OFF and check that the wiring of the level set and volume terminals is correct.

(10) ● Turn the level set volumes of both channels fully to the left (counterclockwise), connect speakers to the speaker terminals of both channels, and turn on the power switches.

(11) Input an audio signal (tuner, tape recorder, etc.) to the LEFT input terminal, and gradually turn the LEFT level set volume to the right.

⊂ No sound. Sound comes from the RIGHT speaker. In this case, check the input terminals and speaker terminals. If the signal input to the

⊂ LEFT input terminal comes out of the LEFT speaker, then everything is normal.

(12) ● As in (11), input an audio signal to the RIGHT input terminal and gradually turn the RIGHT level set volume.

⊂ No sound comes from the RIGHT speaker. In this case, Check the speaker terminals.

○ If sound comes out of the RIGHT speaker, everything is working properly.

□ To use the A3500 as a power supply for adjusting the A3300...

In this case, remove the output tubes in the correct order, and use the power supply as a power source for adjusting the A3300. After you have finished adjusting the A3300, reinsert the output tubes you removed earlier, and check the bias voltage just to be sure. It is fine as long as the bias voltage is such that the voltage drop between B and P is within the range of 7.8V to 8.2V. If it is not within this range, for example because the output tubes are inserted in the wrong order, you will have to adjust the bias again.

● Installing the board cover

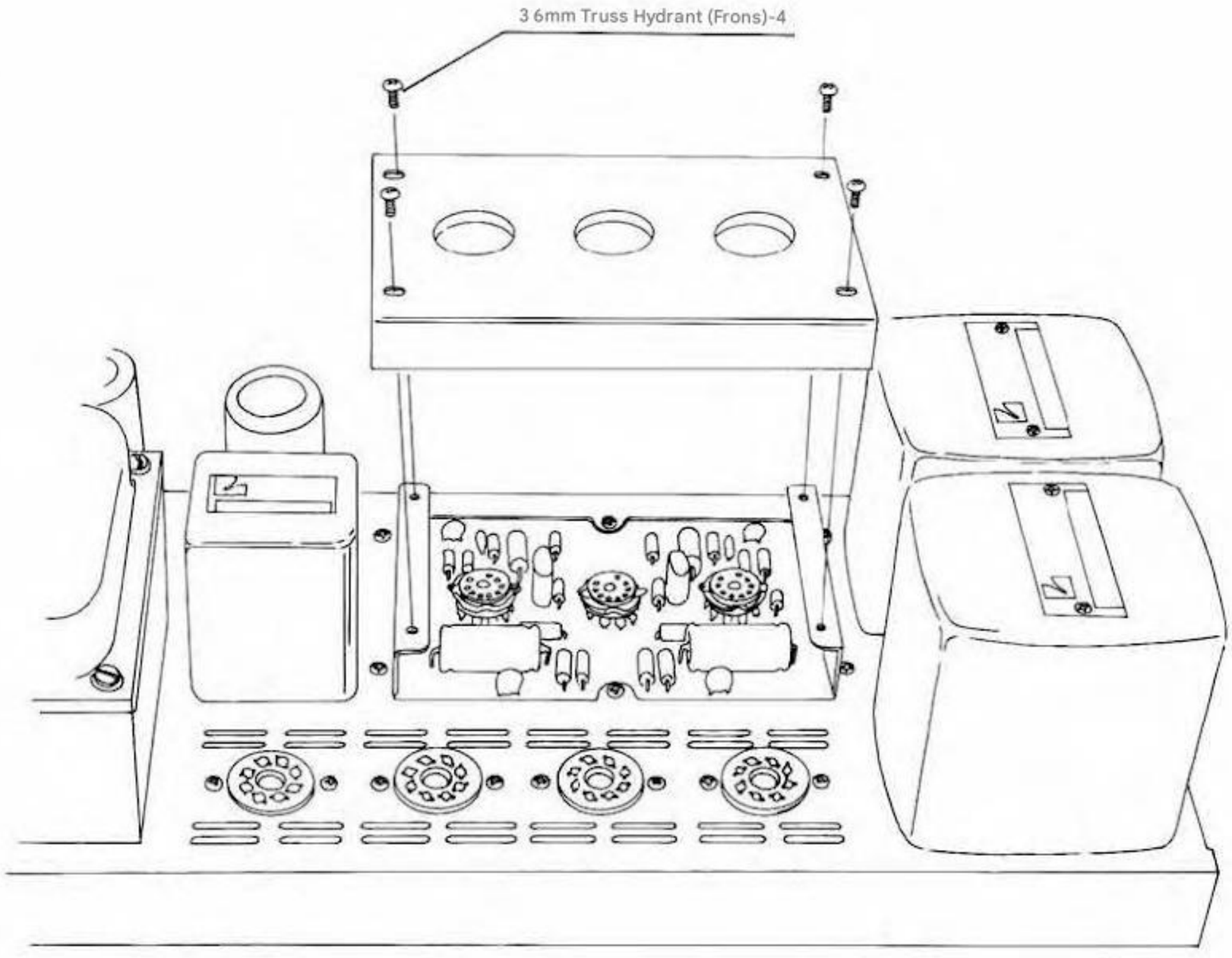


fig. 7-1

● Installation of the bottom plate and bonnet

Before attaching the base plate, attach the rubber feet first. The bonnet can only be installed after the base plate is attached.

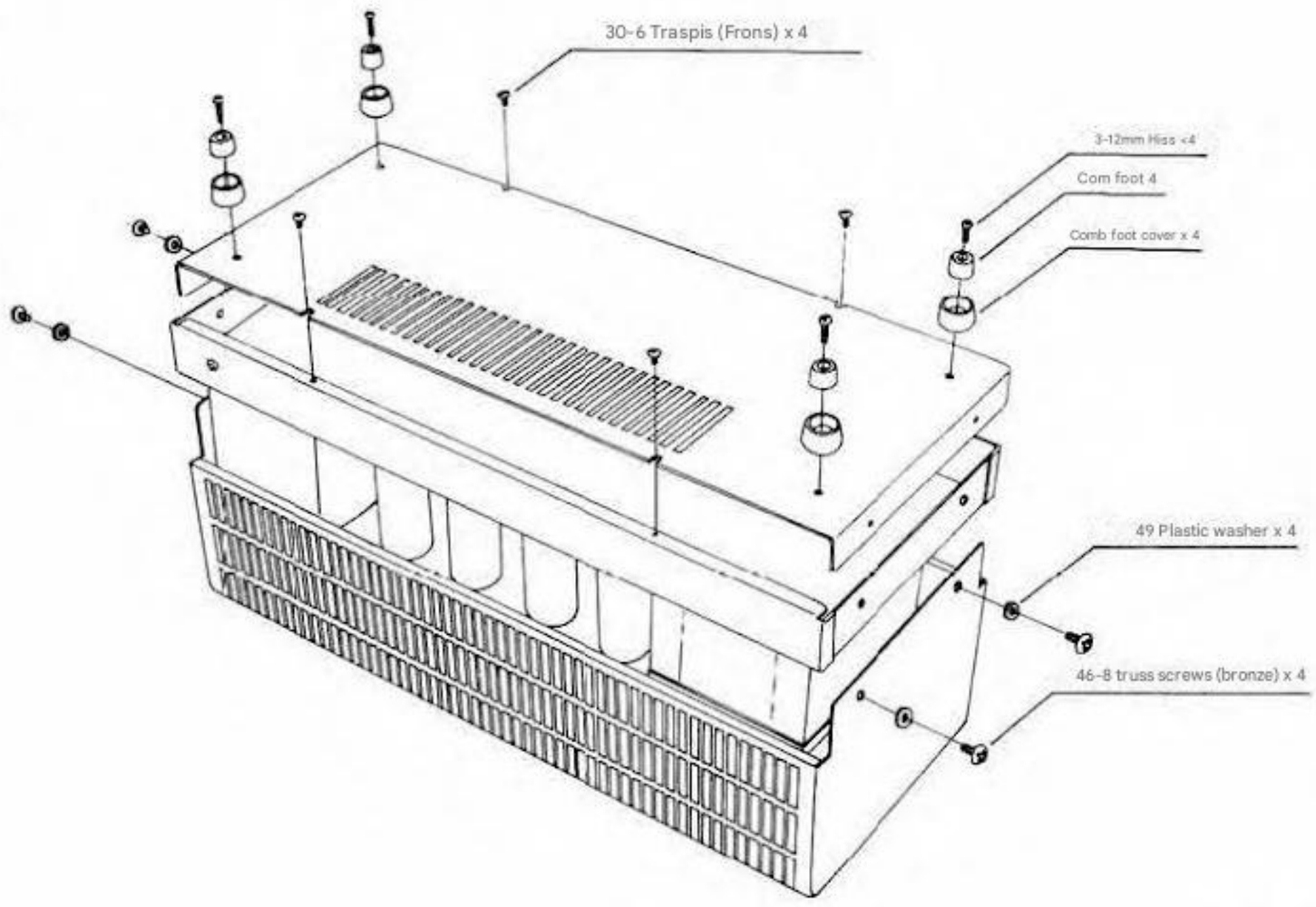
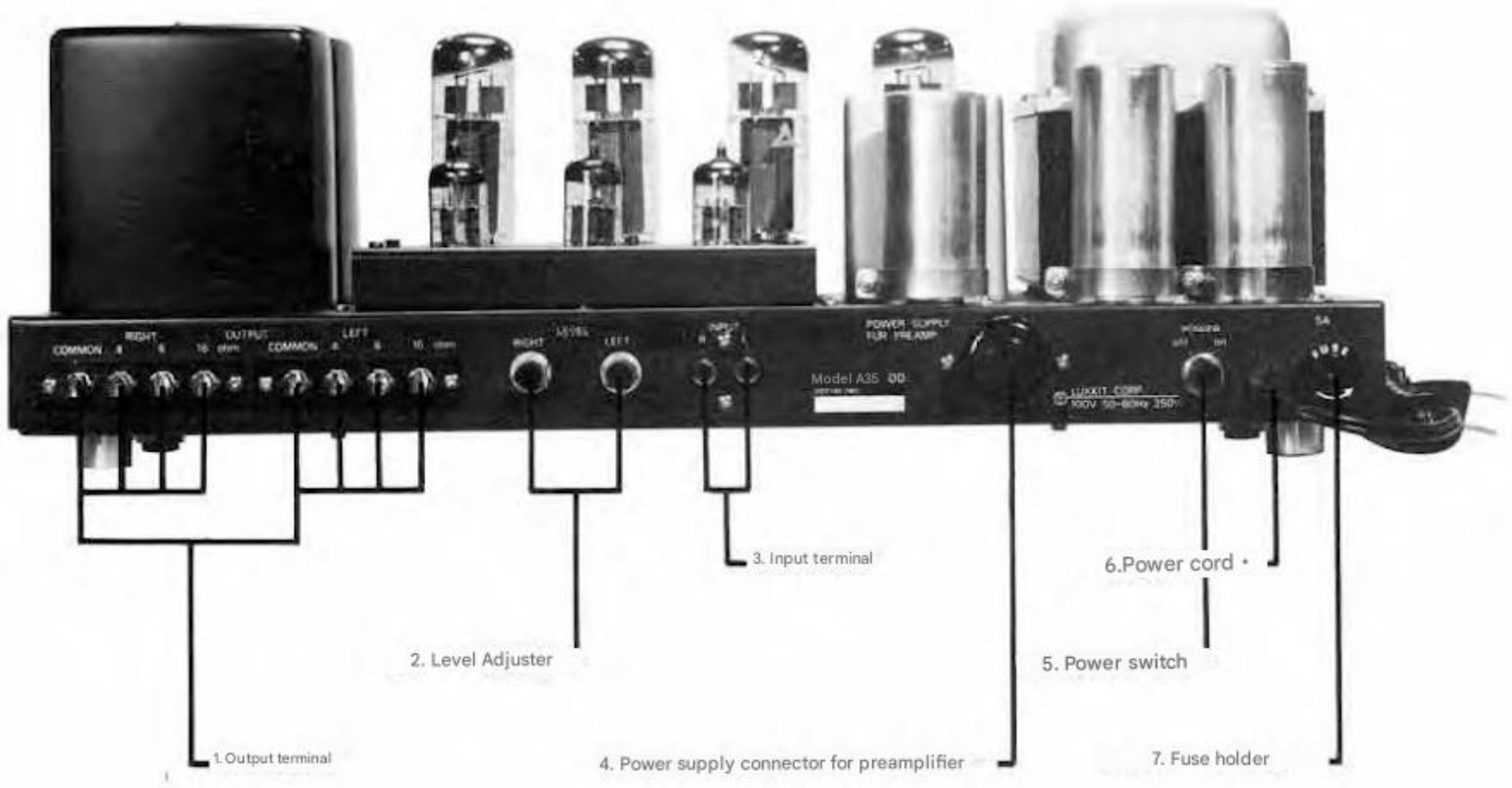


fig. 7-2

§8 Names and uses of each part



1. Output terminal

Connect the speaker system to this terminal. Connect the left speaker system to the LEFT output terminal, and the right speaker system to the RIGHT output terminal.

The output terminals for each channel are COMMON, 4ohm, 8ohm, and 16ohm terminals. Be sure to connect one terminal of your speaker system firmly to the COMMON terminal of this unit's output terminals, and the other terminal to a terminal that matches the impedance of your speaker system (for example, if you have a speaker system with an impedance of 8Ω, connect it to the 8ohm terminal of the output terminal).

2. Level Adjuster

This level volume adjusts the input sensitivity. Set it to an appropriate position according to the output voltage of the preamp.

3. Input terminal

Connect the output of the preamp to this input terminal. For this connection, use a so-called pin plug cord with pin plugs on both ends. The length of this pin plug cord is limited by the output impedance of the preamp. For preamps with high output impedance, the length of the pin plug cord should be as short as possible, but for those with low output impedance such as the preamp kit A3300, it is no problem to use this pin plug cord a little longer.

4 Preamp power supply connector

This connector can be used to supply power to a preamplifier such as the A3300. When supplying power through this connector, it is wired so that the power to the main amplifier can also be turned on and off using the power switch of the preamplifier. For this reason, when using the main amplifier alone, the wiring of the power cord is shorted inside this connector so that the power can be turned on. Conversely, if you unplug the connector, the power will not turn on even if you turn the power switch on.

5. Power switch

When you turn this power switch ON, current flows through the amplifier and it becomes operational after about 20 seconds.

6. Power cord

Insert the plug at the end of this power cord into an AC 100V outlet.

7. Fuse holder

This fuse holder contains a 5A fuse. If the fuse blows, carefully check the cause and then replace it.

§9 About circuits

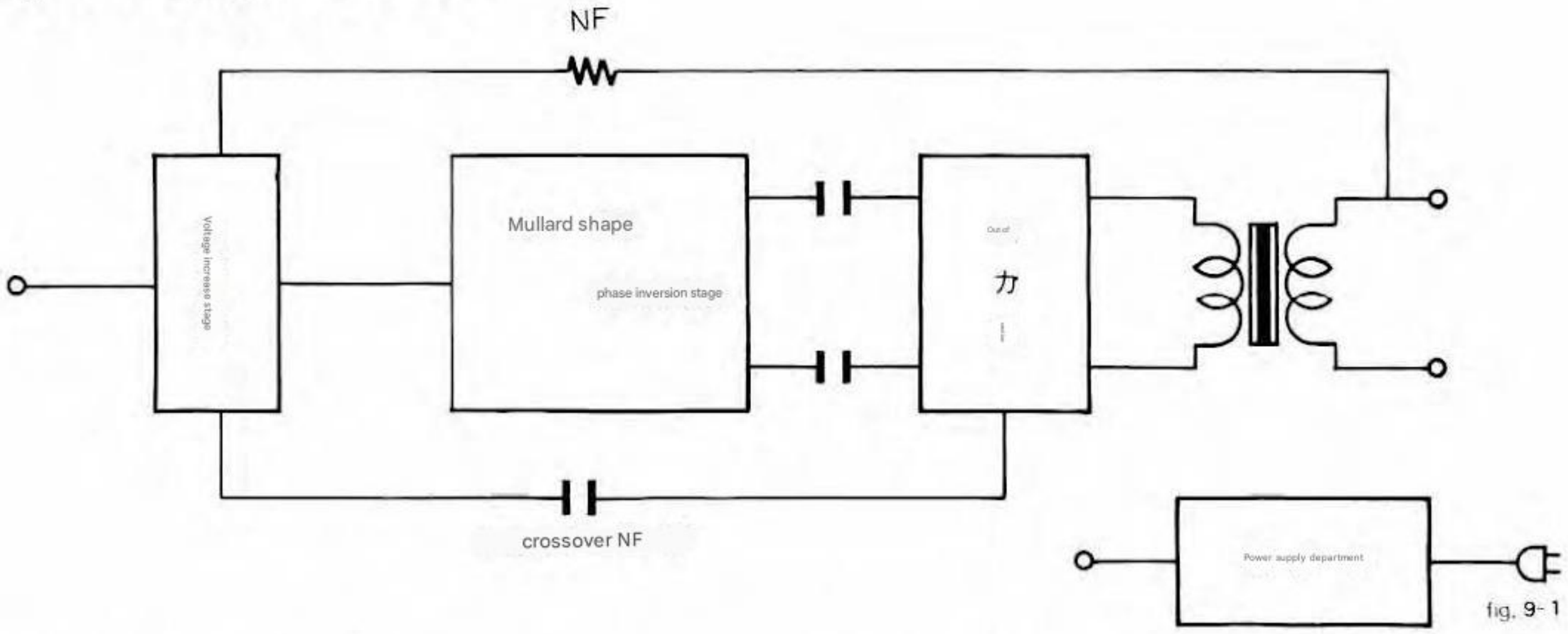


fig. 9-1

Drive circuit (Leak-Mullard type)

Among the phase inversion circuits, the P-K split circuit known as the Altic type and the cathode-coupled circuit known as the Leaky-Mullard type are commonly used. The Altic type has a simple circuit and good balance between the top and bottom, but since there is a limit to the gain that can be obtained, the Leaky-Mullard type is generally used in high-output amplifiers. This phase inversion circuit has a large gain, but has the disadvantage that it is prone to creating an imbalance in the top and bottom gain. One way to eliminate this imbalance is to appropriately change the top and bottom plate resistance, but this is not suitable for kits due to the need for measuring equipment and the difficulty of adjustment. The imbalance m

$$m=\frac{rp+R}{(1+\mu)\cdot Rk}$$

rp: Drive plate internal resistance
R: Combined resistance of drive plate resistance and next stage grid leak resistance
Rk: Drive tube cathode resistance

From this formula, we can see that the larger I and Rk are, the more the imbalance can be reduced. In this unit, 6AQ8 with high end resistance is used, and even if the plate resistance is the same on the top and bottom, m is within 5%. This level of imbalance is negligible compared to the range of variation in vacuum tubes and resistance values.

Bias method for output tubes

There are two types of biasing methods: self-bias and fixed-bias, each with its own advantages and disadvantages. The advantage of self-bias is that it does not require a bias power supply, can use part of the B power supply, and acts as a kind of current feedback for the plate current of the output tube, so the plate current is stable. However, in large amplifiers, power loss is large and the increase in plate current during operation is suppressed, so there are restrictions on maximum output and distortion. Since this unit places emphasis on electrical characteristics, we adopted the fixed-bias method, despite the disadvantage of having to prepare a separate bias power supply.

About the MLF circuit (Multiple Loop Feedback)

The effects of negative feedback are well known, but its drawbacks include (1) a decrease in amplification and (2) the risk of oscillation and deterioration of transient characteristics. Problem (1) is easy to address, since it is sufficient to increase the amplification level before feedback by the amount of negative feedback, but problem (2) has the potential to become a fatal flaw in the amplifier, so adequate measures must be taken. For low frequencies, deterioration of characteristics can be prevented by staggering (giving a ratio to the time constants between each stage), but for the high frequencies of amplifiers with output transformers, it seems difficult to solve the problem with simple compensation alone.

This amplifier uses a unique MLF (Multiple Loop Feedback) method. Crossover negative feedback is one example of this method, but this feedback replaces the feedback components from the secondary side with the primary side components, which have less phase shift, in the high frequency range, to avoid poor transient response at the high end of the amplifier's passband. This maintains good stability and distortion, except for ringing and other issues that are usually observed.

About the output transformer OY 15 type

This output transformer is known as a world-famous masterpiece, and its excellent performance has been proven by its use in Lux's SQ38F D. MQ 60, amateur home-made amplifiers, etc. In our pursuit of amplifier performance, we came to the conclusion that this output transformer, OY15 type, was the only option.

About the power supply section

The power supply is quite good, as it is used in conjunction with the A 3300 preamplifier. It can also supply power to a homemade preamplifier. The choke coil was also designed for this unit, and is effective in removing ripples.

UL connection circuit and triode connection circuit

Connecting the screen grid of a multi-pole output tube to a tap placed at the center of the primary winding of the output transformer is called UL connection (ultra-linear connection). The operating characteristics of the output tube change significantly depending on the position of the screen tap placed at the center of the output transformer. Fig. 9-2 is a diagram of a pentode output tube, showing the pattern of the change in maximum output, amplification, and internal plate resistance with respect to the position of the screen tap. As the screen tap approaches the plate terminal of the output transformer, the decrease in maximum output and amplification is relatively gradual, even though the internal resistance drops sharply.

In general, in multi-electrode tube operation, the AC voltage of the screen grid is supposed to be equal to the cathode potential, but in UL connection, the phase of the screen grid voltage is opposite to that of the control grid voltage, so it acts as negative feedback to the output tube. For this reason, the amplification level is somewhat lower than in multi-electrode connection, although it varies slightly depending on the operating conditions. However, the lowering of the internal resistance of the output tube plate is an extremely desirable condition, and good low-frequency characteristics can be expected. In other words, it becomes a stable NF amplifier. In this way, UL connection helps improve stability even at the expense of a slight decrease in output.

The triode connection is a 100% negative feedback to the screen grid of the UL connection. The internal resistance of the plate of the output tube is lower than that of the UL connection, but the output drop is also larger. This is the disadvantage.

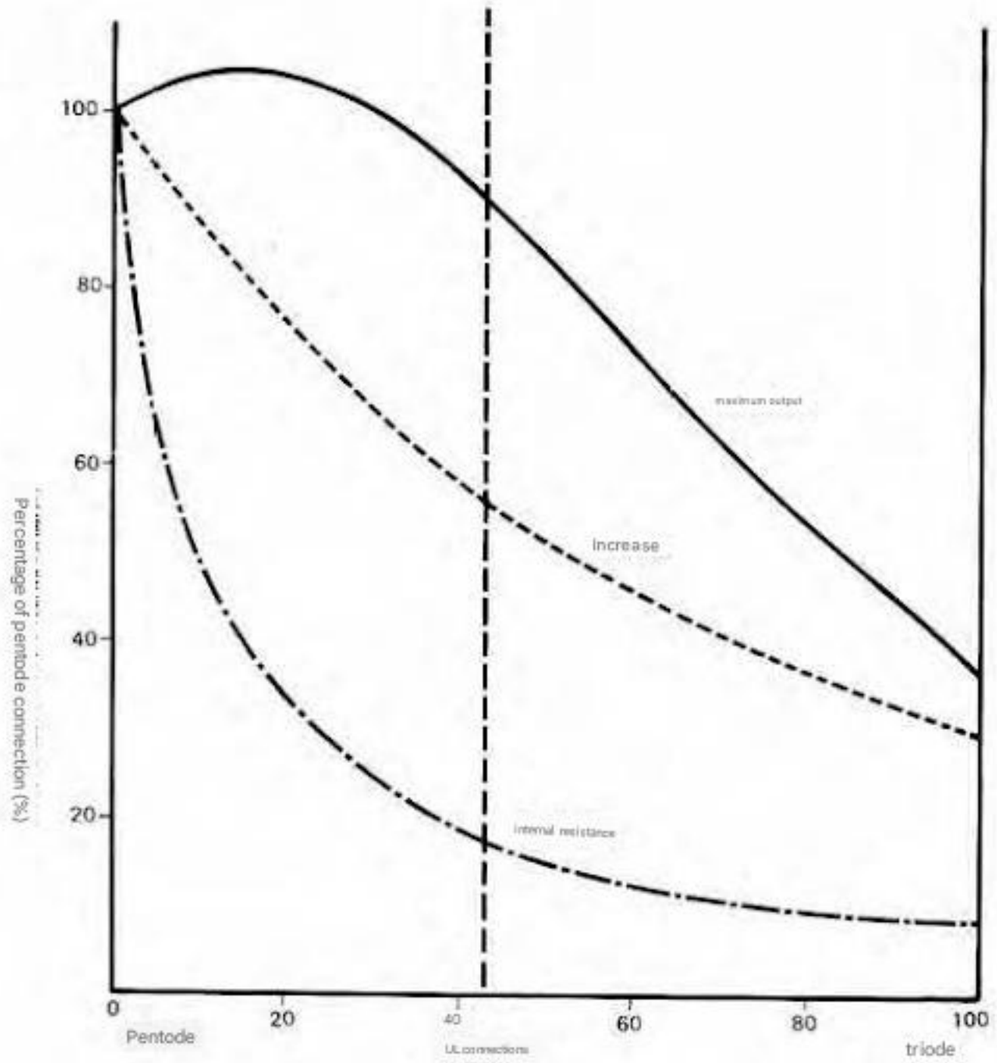


fig. 9-2

§10 Triode and Beam Tube Connections

This chapter is intended for those who wish to use a 6CA7 triode or a 6L6GC beam tube.

Regardless of which connection method you use, please remove the wiring (blue and green coated wires) from wiring steps ① to ④ in the actual wiring diagram (1).

● In case of 6CA7 triode connection

Wire four 1002/W resistors as shown in the actual wiring diagram in fig. 10-1, and follow the adjustment method described in the "Adjustment Method" section. However, change the B-P voltage drop of 8V in adjustment items (4) and (5) to 7V (6.5V to 7V). At this time, the voltage between the output tube's control grid (PIN5) and ground will be about -38V when checking the voltage in (7).

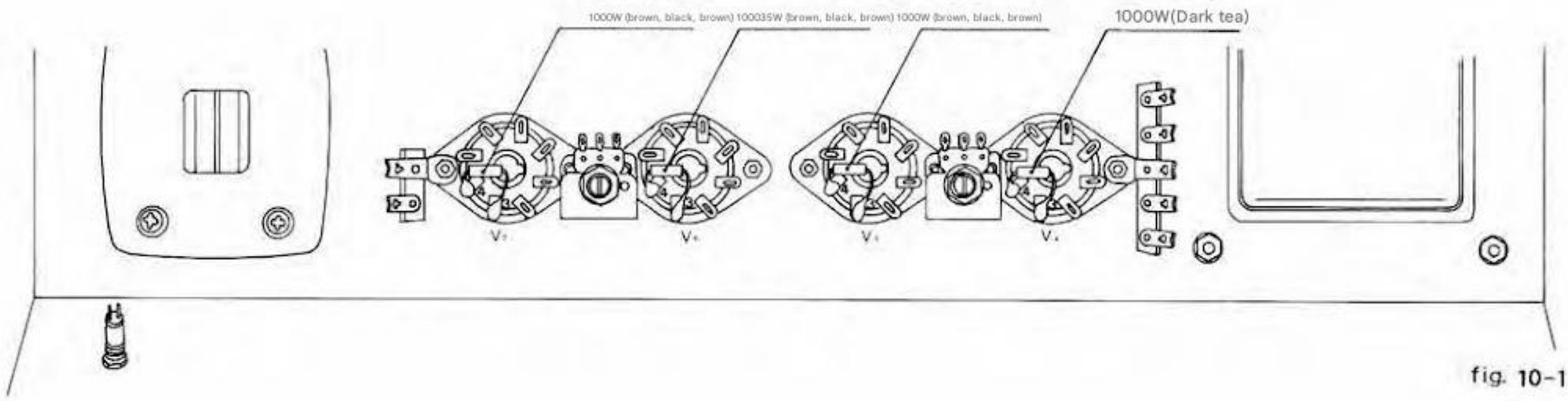


fig. 10-1

● In case of 6L6GC beam tube connection

Add wiring steps ① to ④ as shown in the actual wiring diagram in fig. 10-2.

□— ①Red coated wire 14cm

LEFT output ·

Transformer PIN3 & 4 V, Screen

_ Grid (PIN 4)

□— ②Red coated wire 9cm

V screen grid

(PIN 4)

→V Screen Grid (PIN 4)

□— ③Red coated wire 9cm

V. screen grid

(PIN 4)

_ V5 Screen Grid (PIN 4)

□— ④ Red coated wire 9cm

V Screen Grid (PIN 4)

_ V-Screen Grid (PIN 4)

This completes the wiring for the beam tube connection, and we can now begin the adjustments. It is generally the same as the "Adjustment Procedure." However, in the voltage check in item (7) of the adjustments, the voltage between PIN 5, of the output tube's control grid and ground is about -55V.

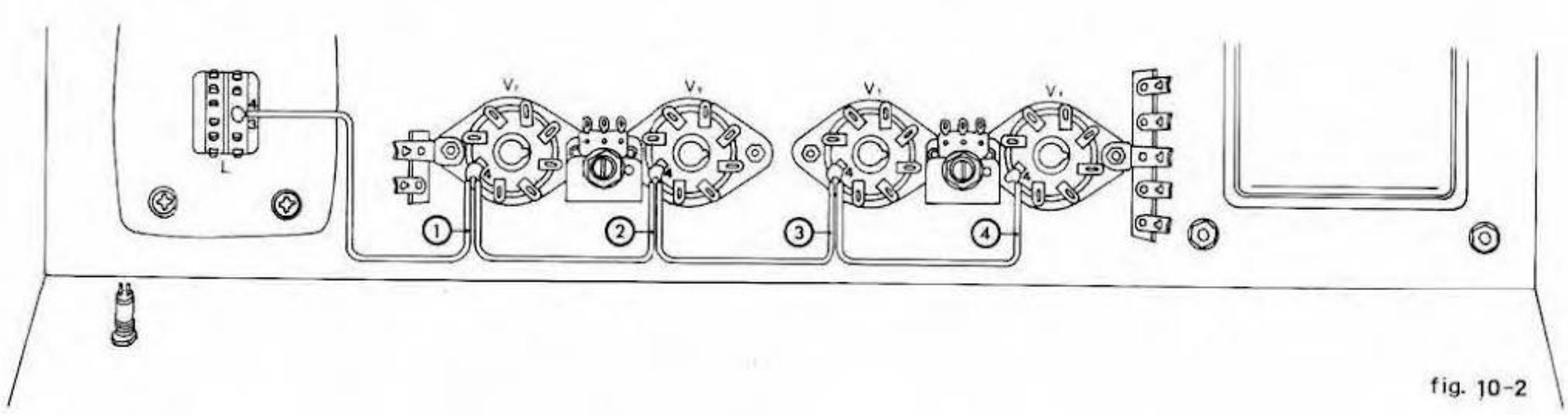


fig. 10-2

Specification

Effective output 40W/40W (6CA7 ultra-linear connection)

20W/20W (6CA7 triode connection)

40W/40W (6L6GC beam tube connection

Total harmonic distortion: 0.5% or less (IKHz)

1% or less (55Hz, 10KHz)

Frequency response: 20Hz~20KHz (within -1dB)

Input sensitivity: approx. 900mV (UL connection), approx. 700mV (triode connection),

approx. 700mV (6L6GC Beam)

Input impedance 250K2

Residual noise: 1mV or less

Use vacuum tube 6AQ8(3) 6CA7(4)

Diodes used: SD-IB (4) SIRB-40 IS-1850 (IS-1906)

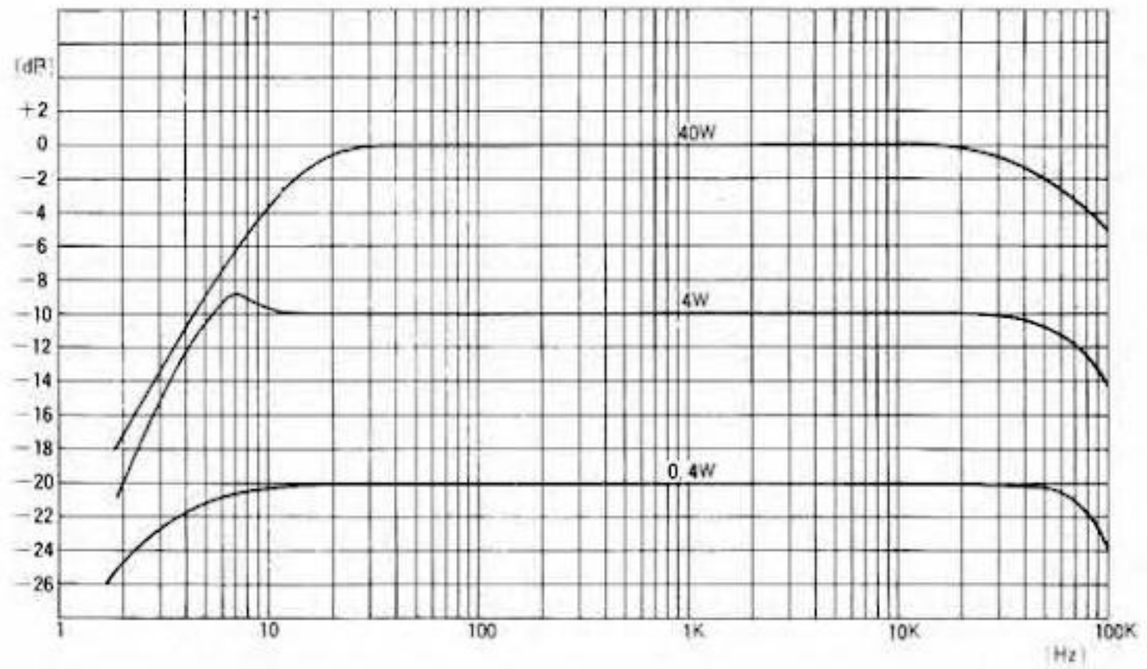
Power consumption: 250W (both channels operating simultaneously)

External dimensions: 465 (width) x 206 (depth) x 168 (height) mm

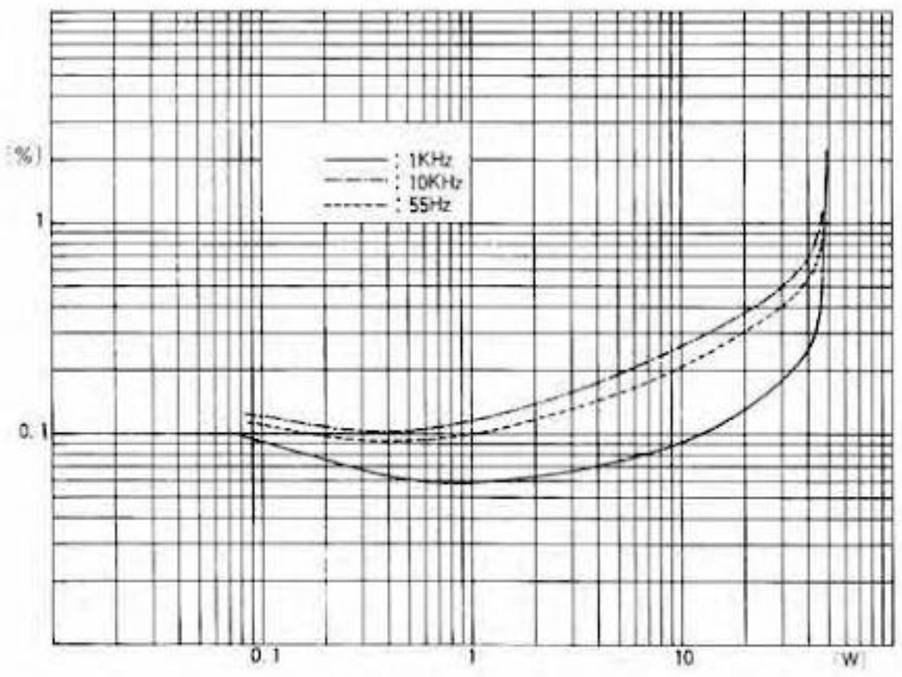
Weight 16kg

Characteristic diagram

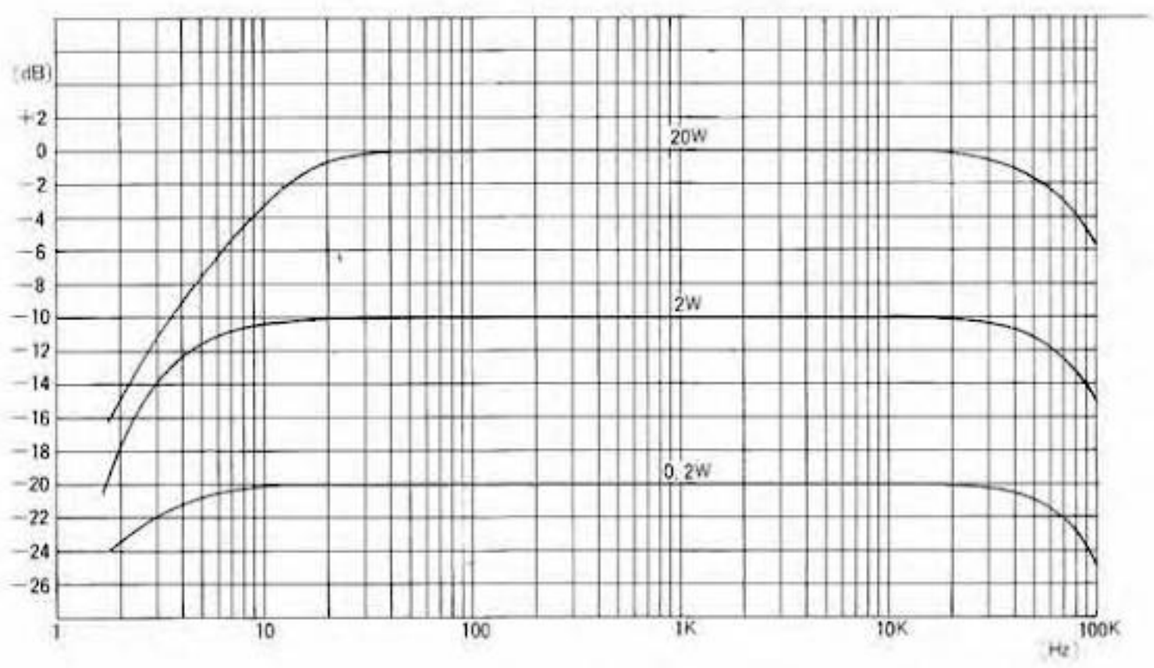
6CA7 (UL connection) frequency characteristics



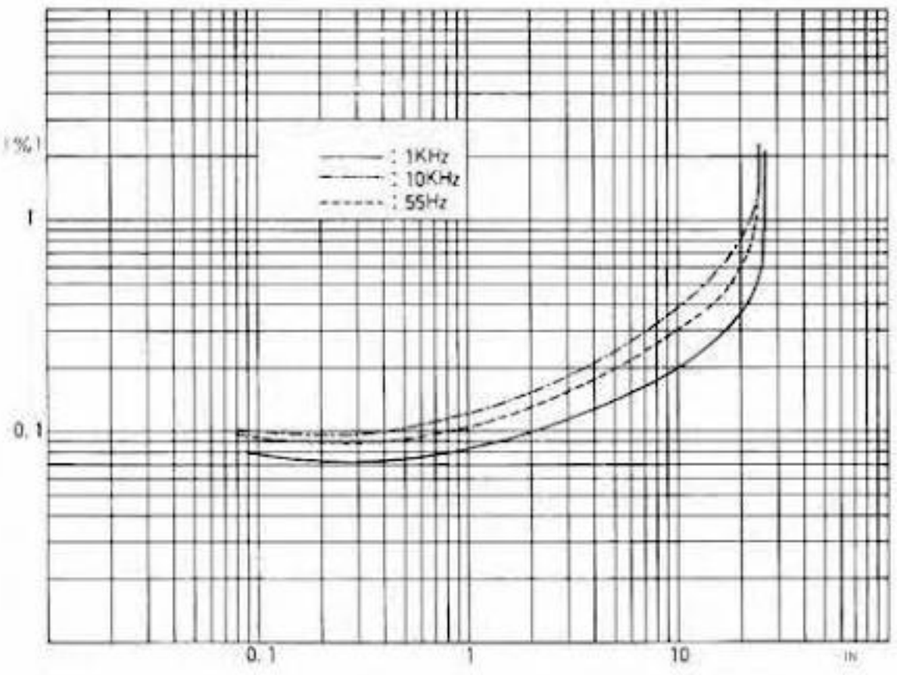
6CA7 (UL connection) distortion characteristics



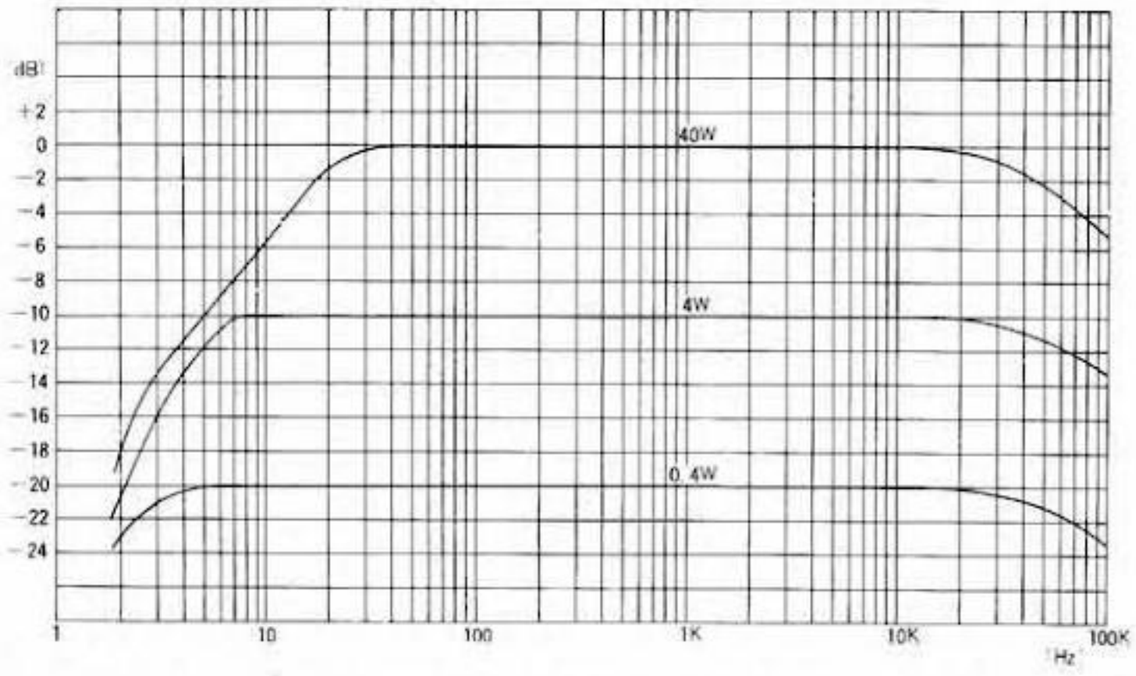
6CA7 (triode connection) frequency response



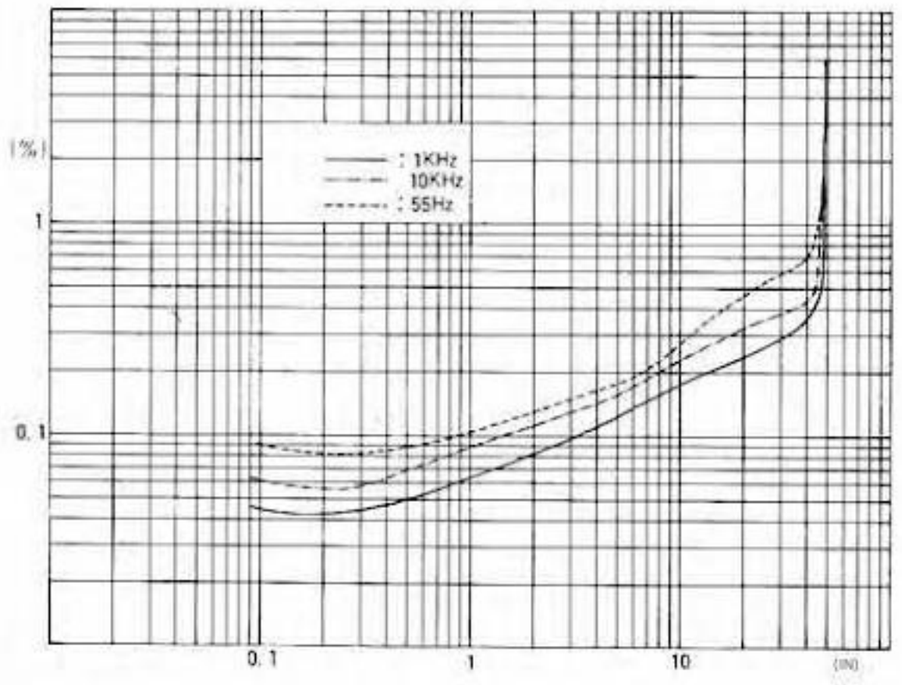
6CA7 (triode connection) distortion characteristics

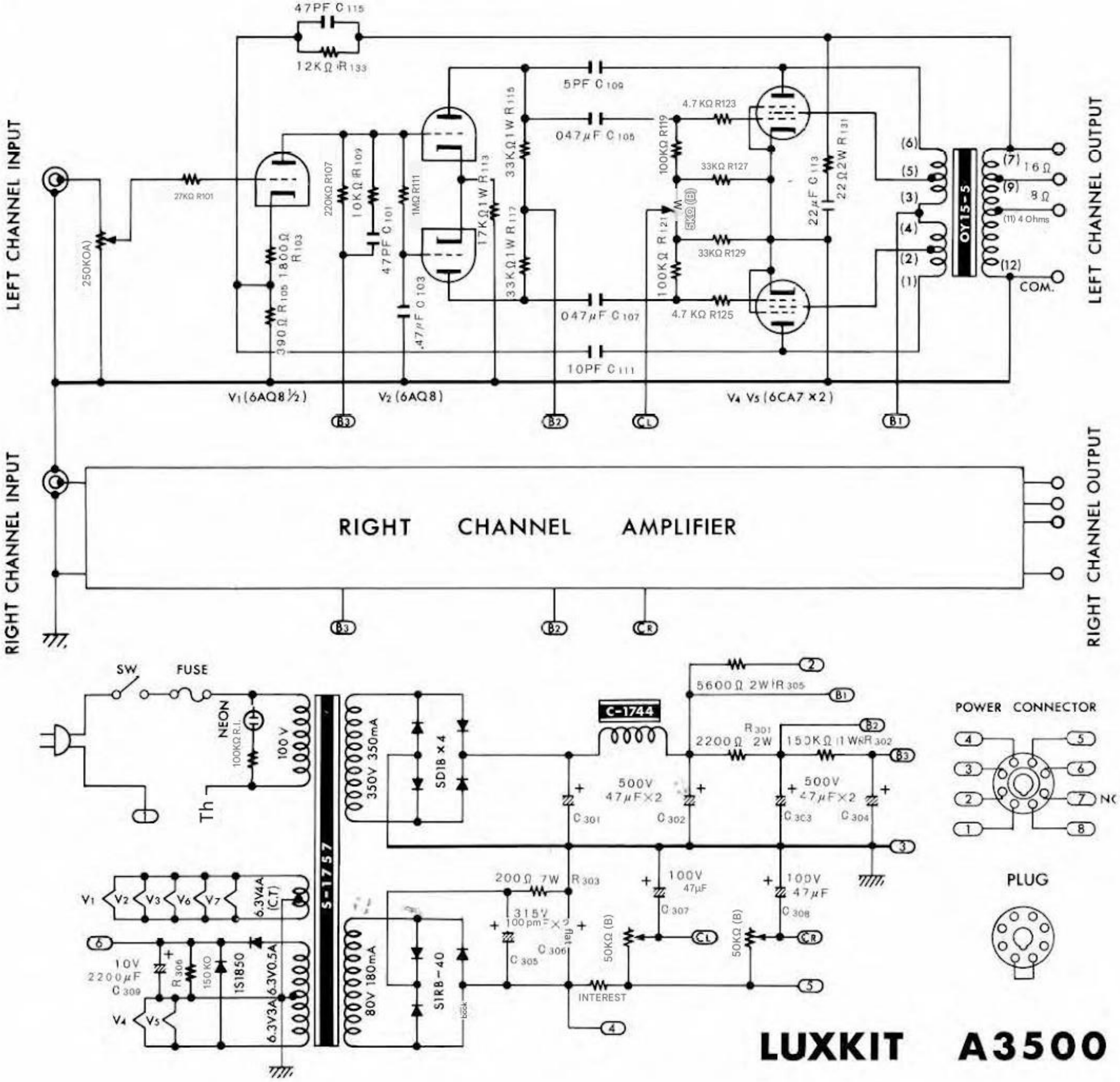


6L6GC (beam tube connection) Frequency characteristics



6L6GC (Beam tube connection) Distortion characteristics





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