

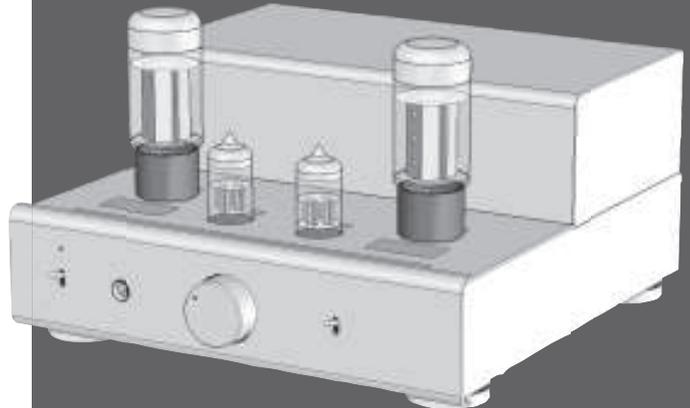


6L6GC Single Tube Amp Kit TU-8200

Assembly Instruction Manual

This is a single power amplifier using natural sounding and powerful 6L6GC tubes. Below are the features of this power amplifier.

- Most of the circuit components are mounted on the PCB and the PCB units are connected by cords with connectors so that even beginners can solder and assemble without difficulty.
- 3 types of amplifier modes, Ultra linear, Triode, and Pentode, can be selected simply by moving the jumper plugs on the PCB.
- Other than 6L6GC, it supports wide range of power tubes, such as KT88(=6550), KT90, KT66, EL34(6CA7), etc. A newly developed "Active automatic bias adjustment function" automatically adjusts the bias for the optimal condition for each tube.
- INPUT1/INPUT2 on the back panel, and a headphone jack on the front panel
- FET ripple filter on board for power B for both right and left channels.
- Overcurrent protection circuit on board
- World-wide power transformer to support 4 different voltage environments: 100V, 115V, 200V and 230V (select upon assembly).
- Fiberglass PCB with 70 μ m thick copper is used to increase electrical conductivity and dissipate heat.



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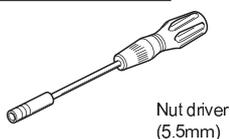
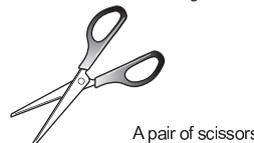
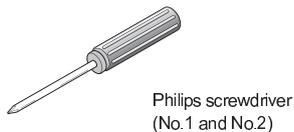
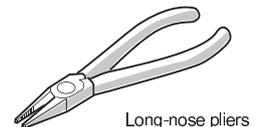
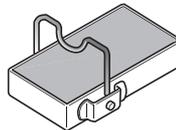
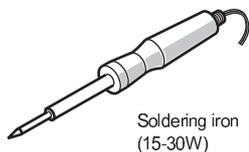


CAUTIONS UPON ASSEMBLY

For your own safety, please read this "Assembly Instruction Manual" carefully before you begin assembling the amplifier. Please follow the instructions step by step for correct assembly and operation. Keep this manual always close by.

- ◆ Do not work near any source of water or allow any components to get wet which may cause machine failure, fire and electric shock. Also, do not put containers with water on the work table such as vases, cups, cosmetics and drugs. Spilling water on components may cause fire and electrical shock.
- ◆ Be careful when handling tools, such as a soldering iron, diagonal cutter, pen knife, and other sharp tools in particular to prevent breakage and injury. Use a pair of gloves and protective glasses according to need.
- ◆ Some essential pieces in this kit include small and sharp objects that are made of glass or metal. Be extremely careful when handling.
- ◆ Please discard packing waste and any waste from assembling the kit according to local standards for safety and protection of the environment.
- ◆ Do not work, keep or place the product near young children due to safety concerns. Children must not play with tools, plastic bags, and electronic parts as they may cause harm. In case a child swallows a part, immediately consult with a doctor.
- ◆ The specifications, forms and contents of this product are subject to change for improvement without prior notice.

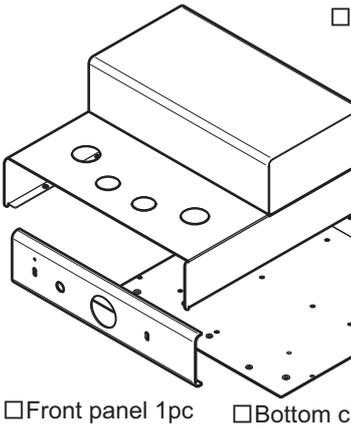
Necessary tools

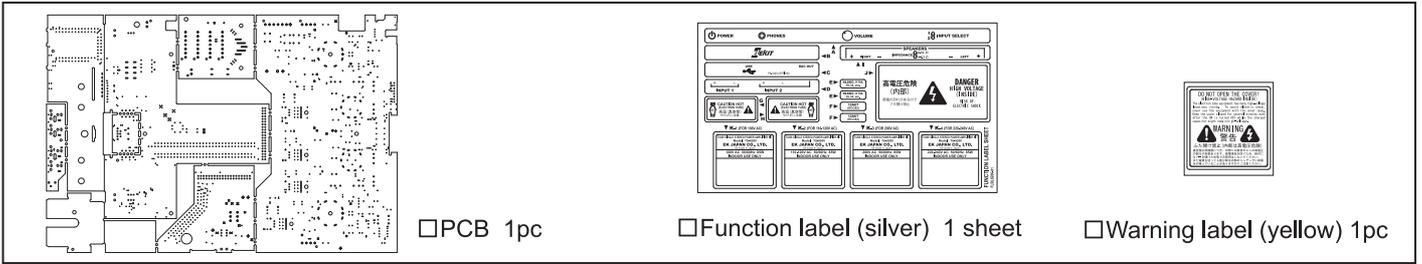


Helpful tool

1. Part list

* Please check off the box in front of each item to ensure they have been included with the kit.
 * There may be more screws and nuts than indicated. Keep them as spare parts.

 <p><input type="checkbox"/> Top chassis 1pc * The top and bottom chassis and the front panel are temporarily fixed with screws.</p> <p><input type="checkbox"/> Front panel 1pc</p> <p><input type="checkbox"/> Bottom chassis 1pc</p>	<p><input type="checkbox"/> Power transformer 1pc</p> <p><input type="checkbox"/> Insulator 4pcs</p> <p><input type="checkbox"/> Connector cord 1pc</p>	<p><input type="checkbox"/> Output transformer 2pcs</p> <p><input type="checkbox"/> AC power cord 1pc</p>	<p><input type="checkbox"/> Vacuum tube 6L6GC 2pcs</p> <p><input type="checkbox"/> Vacuum tube 12AU7 (ECC82) 2pcs</p> <p>* The getter, the metallic silver coating inside the tube, indicates it is a sealed vacuum tube. If this turns white, it means that the vacuum of the tube is broken and the tube can no longer be used.</p> <p>* All vacuum tubes have been examined to ensure quality. Some may have a minor scratch, stain, or rust-like object that does not affect the function of the tube. Also, the shape, heater brightness, or the printing direction vary in each tube.</p>
<p>A screw for knob is included in the same plastic bag as the knob. Make sure to take it out from the plastic bag.</p> <p>A screw for knob</p> <p><input type="checkbox"/> Knob 1pc (A screw for knob is included.)</p>	<p><input type="checkbox"/> 3-pole mini jack 1pc</p> <p>Pin jack (RCA jack)</p> <p><input type="checkbox"/> White 2pcs</p> <p><input type="checkbox"/> Red 2pcs</p> <p><input type="checkbox"/> 3-pole standard jack 1pc * No nut is attached.</p>	<p>Nut</p> <p><input type="checkbox"/> M3 nut 6pcs</p> <p><input type="checkbox"/> M4 flange nut 4pcs</p> <p><input type="checkbox"/> Claw washer (M3) 7pcs</p>	<p><input type="checkbox"/> Spark killer 1pc</p> <p><input type="checkbox"/> PTC (Mustard, indicated as X10) 1pc</p>
<p>Vacuum tube socket</p> <p><input type="checkbox"/> 8-pin (white) 2pcs</p> <p><input type="checkbox"/> 9-pin (black) 2pcs</p> <p>※8-pin socket lead ends are sharp. Please handle with care.</p>	<p>Speaker terminal (with 2pcs of M5 flange nut)</p> <p><input type="checkbox"/> Red 2pcs</p> <p><input type="checkbox"/> Black 2pcs</p>	<p><input type="checkbox"/> L shaped metal bracket 2pcs</p> <p><input type="checkbox"/> Masking felt (black) 3pcs</p>	<p>Electrolytic capacitor</p> <p><input type="checkbox"/> 1 μ F(50V) 3pcs</p> <p><input type="checkbox"/> 100 μ F(50V) 2pcs</p> <p><input type="checkbox"/> 220 μ F(16V) 9pcs</p> <p><input type="checkbox"/> 3300 μ F(10V) 2pcs</p> <p><input type="checkbox"/> 10 μ F(400V) 10pcs</p> <p><input type="checkbox"/> 180 μ F(420V) 1pc</p>
<p><input type="checkbox"/> AC inlet 1pc</p>	<p>Toggle switch (With a nut and a washer)</p> <p><input type="checkbox"/> 3-pin 1pc</p> <p><input type="checkbox"/> 6-pin 2pcs</p> <p>The pins may be bent. Adjust them to match PCB holes before mounting.</p>	<p><input type="checkbox"/> LED mask (opaque white) 1pc</p>	
<p><input type="checkbox"/> Jumper plug 3pcs</p>	<p><input type="checkbox"/> Volume (50k Ω A dual) 1pc (with a nut and a washer)</p>	<p>1/2W resistor</p> <p><input type="checkbox"/> 0.47 Ω (YEL-VIO-SIL-GLD) 1pc</p> <p><input type="checkbox"/> 12 Ω (BRN-RED-BLK-GLD)* 9pcs</p> <p><input type="checkbox"/> 180 Ω (BRN-GRY-BRN-GLD) 10pcs</p> <p><input type="checkbox"/> 1k Ω (BRN-BLK-RED-GLD)* 12pcs</p> <p><input type="checkbox"/> 10k Ω (BRN-BLK-ORN-GLD) 5pcs</p> <p><input type="checkbox"/> 22k Ω (RED-RED-ORN-GLD) 6pcs</p> <p><input type="checkbox"/> 100k Ω (BRN-BLK-YEL-GLD) 14pcs</p> <p><input type="checkbox"/> 330k Ω (ORN-ORN-YEL-GLD) 4pcs</p>	<p><input type="checkbox"/> Diode (black) 4pcs</p>
<p>Connector</p> <p><input type="checkbox"/> Box type VH connector 2-pin 2pcs</p> <p><input type="checkbox"/> Box type VH connector 4-pin 2pcs</p> <p><input type="checkbox"/> Box type VH connector 6-pins 1pc</p> <p><input type="checkbox"/> Box type VH connector 7-pin 1pc</p> <p><input type="checkbox"/> L shaped VH connector 3-pin 2pcs</p> <p><input type="checkbox"/> Pin header (male) 8-pin 1pc</p> <p><input type="checkbox"/> Pin socket (female) 8-pin 1pc</p> <p><input type="checkbox"/> L shaped pin header (male) 40-pin 1pc</p> <p><input type="checkbox"/> L shaped pin socket (female) 40-pin 1pc</p>	<p>Hex screw spacer</p> <p><input type="checkbox"/> Small (M3x18 male-female) 5pcs</p> <p><input type="checkbox"/> Medium (M3x22 female-female) 4pcs</p> <p><input type="checkbox"/> Large (M4x30 female-female) 4pcs</p>	<p>*ATTENTION: For 12 Ω and 1k Ω all same colors are used but in different order. Make sure not to mix them up!</p> <p>1W resistor</p> <p><input type="checkbox"/> 27k Ω (RED-VIO-ORN-GLD or indicated as 27k Ω or 273) 4pcs</p> <p>2W resistor</p> <p><input type="checkbox"/> 15 Ω (Indicated as 150 or 15 Ω, or BRN-GRN-BLK-GLD) 2pcs</p>	<p><input type="checkbox"/> Zener diode (made of glass) 4pcs</p> <p><input type="checkbox"/> Bridge diode (indicated as ~, +, -) 3pcs</p>
<p><input type="checkbox"/> Midget fuse (3A 250V) 1pc</p> <p><input type="checkbox"/> Fuse holder 2pcs</p>	<p>Binding screw</p> <p><input type="checkbox"/> Short(M3x6) 16pcs</p> <p><input type="checkbox"/> Long(M3x10) 6pcs</p> <p><input type="checkbox"/> Binding tapping screw (M3x10) 4pcs</p> <p><input type="checkbox"/> Low-head screw (M4x8) 16pcs</p> <p><input type="checkbox"/> Flat countersunk screw (M3x8) 1pc</p> <p><input type="checkbox"/> Pan-head screw (M2x5) 4pcs</p>	<p>Film capacitor</p> <p><input type="checkbox"/> 0.1 μ F(400V) (Brown, indicated as 104) 4pcs</p> <p><input type="checkbox"/> 3300pF(50V) (Yellow or white, indicated as 332) 2pcs</p> <p><input type="checkbox"/> 0.22 μ F(50V) (Yellow or white, indicated as 224) 2pcs</p>	<p><input type="checkbox"/> Photo coupler 817 2pcs</p> <p><input type="checkbox"/> IC 2904D 1pc</p> <p><input type="checkbox"/> Transistor A1266 or A1015 2pcs</p>



2. PCB assembly *Follow the instructions step by step. Put a check in the box after each component has been soldered.

Before soldering

① Before soldering, follow the cut lines (grooved lines) on the PCB to break it into 8 pieces.
Use an edge of a desk to break the PCB easily.

② Use a sandpaper or file to make the broken surface smooth to avoid injury.

* There will be 8pcs of PCBs, but only 7pcs (UNIT1-7) are used for the assembly.

IMPORTANT!

- Mount components on correct side of the PCB.
Mount the parts on SIDE-A when there is no indication about the side for mounting parts.
There are some parts that need to be mounted on SIDE-B, and they are indicated as [MOUNT ON SIDE B!].
- Mount components on correct direction
[No direction specific] No polarity, and the part can be mounted in either direction.
[Check the direction!] By the shape of the part allows you to mount it in either direction. However, the part has a polarity and you need to check it before mounting it on the PCB. Follow the direction, or the product may not function. For some parts, a dangerous situation could happen.
[Direction specific] There is a polarity but since the shape does not allow you to mount it in a wrong way, so no special attention is called.

UNIT-1 assembly **Tips**

In this kit, the components on the right and left channels are assigned even and odd numbers, respectively. For example, R1 and C1 are Left channel, and R2 and C2 are Right channel. Most of the components on UNIT-1 PCB are located symmetrically on the board for ease of locating and installing the components upon assembly.

1 Resistor [Non direction specific]

Color indication

***Attention:** For 12Ω and 1kΩ all same colors are used but in different order. Make sure not to mix them up.

1/2W resistor

<input type="checkbox"/> R17 180Ω (BRN-GRY-BRN-GLD)	<input type="checkbox"/> R27 10kΩ (BRN-BLK-ORN-GLD)	<input type="checkbox"/> R1 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R3 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R18 180Ω (BRN-GRY-BRN-GLD)	<input type="checkbox"/> R28 10kΩ (BRN-BLK-ORN-GLD)	<input type="checkbox"/> R2 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R4 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R65 180Ω (BRN-GRY-BRN-GLD)	<input type="checkbox"/> R31 10kΩ (BRN-BLK-ORN-GLD)	<input type="checkbox"/> R15 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R19 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R66 180Ω (BRN-GRY-BRN-GLD)	<input type="checkbox"/> R32 10kΩ (BRN-BLK-ORN-GLD)	<input type="checkbox"/> R16 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R20 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R25 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R62 10kΩ (BRN-BLK-ORN-GLD)	<input type="checkbox"/> R47 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R21 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R26 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R9 330kΩ (ORN-ORN-YEL-GLD)	<input type="checkbox"/> R48 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R22 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R29 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R10 330kΩ (ORN-ORN-YEL-GLD)	<input type="checkbox"/> R49 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R61 12Ω (BRN-RED-BLK-GLD)*
<input type="checkbox"/> R30 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R57 330kΩ (ORN-ORN-YEL-GLD)	<input type="checkbox"/> R50 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R5 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R33 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R58 330kΩ (ORN-ORN-YEL-GLD)	<input type="checkbox"/> R51 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R6 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R34 22kΩ (RED-RED-ORN-GLD)	<input type="checkbox"/> R64 0.47Ω (YEL-VIO-SIL-GLD)	<input type="checkbox"/> R52 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R11 1kΩ (BRN-BLK-RED-GLD)*
		<input type="checkbox"/> R55 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R12 1kΩ (BRN-BLK-RED-GLD)*
1W resistor		<input type="checkbox"/> R56 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R23 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R7 27kΩ (RED-VIO-ORN-GLD or indicated as 27kΩ or 273)		<input type="checkbox"/> R59 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R24 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R8 27kΩ (RED-VIO-ORN-GLD or indicated as 27kΩ or 273)		<input type="checkbox"/> R60 100kΩ (BRN-BLK-YEL-GLD)	<input type="checkbox"/> R53 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R13 27kΩ (RED-VIO-ORN-GLD or indicated as 27kΩ or 273)			<input type="checkbox"/> R54 1kΩ (BRN-BLK-RED-GLD)*
<input type="checkbox"/> R14 27kΩ (RED-VIO-ORN-GLD or indicated as 27kΩ or 273)			<input type="checkbox"/> R63 1kΩ (BRN-BLK-RED-GLD)*
			<input type="checkbox"/> R67 1kΩ (BRN-BLK-RED-GLD)*

Mark on PCB How to set

*** If unsure of a resistor value, it is recommended to use a multimeter to verify the correct resistor before soldering to the PCB.**

2 Zener diode

[Check the direction] **CAUTION!**

Glass body

The side with black line is K.

ZD1 ZD3
ZD2 ZD4

Mark on PCB How to set

3 Diode

[Check the direction] **CAUTION!**

Black

The side with line is K.

D1 D3
D2 D4

Mark on PCB How to set

4 Bridge Diode

[Check the direction] **CAUTION!**

~ , + , - marks

Check the marks for correct direction.

D5 D6 D7

Mark on PCB

How to set

5 Photo coupler

[Check the direction] **CAUTION!**

Indication

Match the marks.

PC1 817
PC2 817

How to set

6 IC

[Check the direction] **CAUTION!**

Indication

Match the marks.

IC 2904D

How to set

7 LED [Check the direction **CAUTION!**]

Mark on PCB

How to set

① The LED leads must be bent to 90-degree angle before mounting to the PCB. Place the LED on top of the LED BENDING TOOL marks on the PCB and carefully bend the leads with fingers to a right angle. Make sure to check each lead length and set the LED in the right direction. Adjust the lead angle with a long-nose plier if not bent correctly.

② Set the LED to the location indicated below. Make sure to insert the longest lead to the \bigcirc K hole on the PCB and solder.

Check the lead length and match the applying side.

Bend to the right angle.

8 Transistor [Check the direction **CAUTION!**]

Match the shape when mounting.

Indication

E C B

E C B

Mark on PCB

Q1 A1266 or A1015

Q2 A1266 or A1015

Mark on PCB

9 FET [Check the direction **CAUTION!**]

① Bend the leads here to the opposite direction to the indication on the FET at a right angle.

② Fix it with a binding screw long (M3x10) and M3 nut to the PCB.

Q3 02N60Z

Q4 02N60Z

Q5 02N60Z

Q6 02N60Z

③ Solder it.

Binding screw long (M3x10)

M3 nut

FET

Mark on PCB

* Make sure to screw it before soldering.

10 Vacuum tube socket [Set on SIDE B, and solder on SIDE A! **CAUTION!**]

Insert the socket from SIDE B and solder on SIDE A. Make sure the socket is fully seated and flat against the PCB before soldering.

Soldering tip: Just solder 1 pin first, check if the socket is set at correct position, and solder the remaining pins.

For 8-pin socket, check the setting direction as well. Check the hole shape at the center, and match it with the indication on the PCB.

[Check the direction] **CAUTION!**

V1 9-pin (black)

V2 9-pin (black)

V3 8-pin (white)

V4 8-pin (white)

Mark on PCB

How to set

Mark on PCB

How to set

SIDE A

SIDE B

SIDE A

SIDE B

11 PTC [Non direction specific]

PTC (Mustard, indicated as X10)

Mark on PCB

How to set

12 Film capacitor [Non direction specific]

Indication

C3 0.1 μ F(400V)(Brown, indicated as 104)

C4 0.1 μ F(400V)(Brown, indicated as 104)

C9 0.1 μ F(400V)(Brown, indicated as 104)

C10 0.1 μ F(400V)(Brown, indicated as 104)

Mark on PCB

How to set

There are 6 holes. Insert the leads to the 2 holes at the center and solder.

13 Electrolytic capacitor [Check the direction **CAUTION!**]

Indication

Indication

Longer leg is +.

The side with white line is -.

The side with white line is -.

C1 220 μ F(16V)

C2 220 μ F(16V)

C5 220 μ F(16V)

C6 220 μ F(16V)

C13 220 μ F(16V)

C14 220 μ F(16V)

C33 220 μ F(16V)

C34 220 μ F(16V)

C35 220 μ F(16V)

C15 1 μ F(50V)

C16 1 μ F(50V)

C21 1 μ F(50V)

C29 100 μ F(50V)

C30 100 μ F(50V)

C31 3300 μ F(10V)

C32 3300 μ F(10V)

Mark on PCB

How to set

C7 10 μ F(400V)

C8 10 μ F(400V)

C11 10 μ F(400V)

C12 10 μ F(400V)

C23 10 μ F(400V)

C24 10 μ F(400V)

C25 10 μ F(400V)

C26 10 μ F(400V)

C27 10 μ F(400V)

C28 10 μ F(400V)

C22 180 μ F(420V)

14 Connector Pin header (male) 8-pin [Non direction specific]

Insert the shorter side of pins to the PCB. Make sure that the pins are fully seated against the PCB before soldering.

CN1 Pin header (male) 8-pin

Mark on PCB

How to set

15 Connector Box type VH connector [Direction specific]

Insert the connector pins in the PCB and make sure they are fully seated against the PCB before soldering.

Set them so that the protrusion fits the hole.

CN7 4-pin

CN8 4-pin

CN9 6-pin

Mark on PCB

How to set

16 Jumper plug [Non direction specific] [Check the setting side **CAUTION!**]

Simply set the jumper plugs from SIDE B. (No soldering)

J1 Select the output tube operation mode with the jumper plug. "UL" is the most recommended mode. For detail, please see "8. Enjoy TU-8200 to the fullest". on Page17.

J2

J3 Select the power indication LED color from blue and green. Green is recommended as it is brighter than blue.

Mark on PCB

How to set

SIDE A

SIDE B

UNIT-2 assembly

1 Resistor [Non direction specific]

Color indication



1/2W resistor

- R35 1kΩ (BRN-BLK-RED-GLD)*
- R36 1kΩ (BRN-BLK-RED-GLD)*
- R37 180Ω (BRN-GRY-BRN-GLD)
- R38 180Ω (BRN-GRY-BRN-GLD)
- R39 180Ω (BRN-GRY-BRN-GLD)
- R40 180Ω (BRN-GRY-BRN-GLD)
- R41 180Ω (BRN-GRY-BRN-GLD)
- R42 180Ω (BRN-GRY-BRN-GLD)

2W resistor

- R43 15Ω } (indicated as 150 or 15Ω,
- R44 15Ω } or BRN-GRN-BLK-GLD)

Attention!
The same colors as 12Ω are used for 1kΩ but in different order. Make sure not to mix them up!

Mark on PCB



How to set



2 Film capacitor [Non direction specific]

Yellow or white



- C17 3300pF } (50V)
- C18 3300pF } (Indicated as 332)

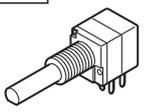
Mark on PCB



How to set



3 Volume [Check the direction CAUTION]



* The attached nut and washer will be used for assembly in Step 8. Do not discard.

Mark on PCB

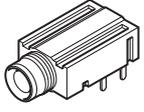


How to set

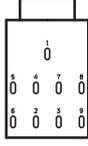


Set the volume so that the shaft faces outward.
Make sure the volume is fully seated against the PCB before soldering.

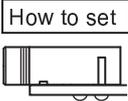
4 3-pole standard jack [Direction specific]



Mark on PCB

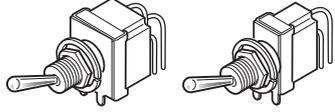


How to set



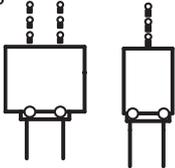
Make sure the jack is set closely and horizontally to the PCB upon soldering.

5 Toggle switch [Direction specific]

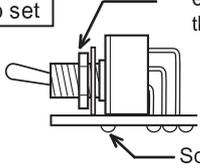


- SW1 6-pin
- SW3 3-pin

Mark on PCB



How to set



* The pins may be bent. Adjust them to match PCB holes before mounting.

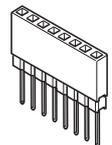
Make sure the switches are fully seated on the PCB before soldering.

* The attached nuts and washers are not used for SW1 and SW3. Please either remove or tighten them so that they do not get loose.

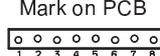
Solder the fixing pin as well.

6 Connector

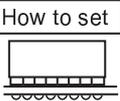
Pin socket (female) 8-pin [Non direction specific]



Mark on PCB



How to set



After soldering, cut the excess part of the leads.

Box type VH connector 2-pin [Direction specific]



Mark on PCB



How to set



7 L shaped metal bracket [Check the direction CAUTION]



Mark on PCB



How to set



Fix with a pan-head screw (M2x5). (No soldering).
Apply to the PCB matching to the printing on the PCB, and fix securely.

LB1 L shaped metal bracket

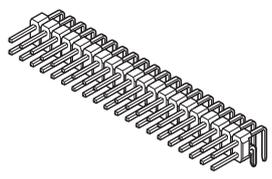
Pan-head screw M2x5

L shaped pin header (male) 40-pin [Check the setting side CAUTION]

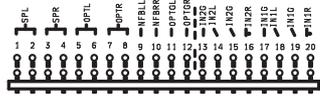
Set it on SIDE B of the PCB and solder on SIDE A.

[Check the direction CAUTION]

Insert the bent leads to the PCB so that the straight pins face outward.
Make sure that the header is set closely and horizontally to the PCB upon soldering. Mark on PCB



Mark on PCB



How to set

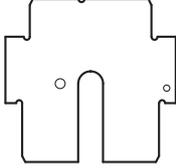
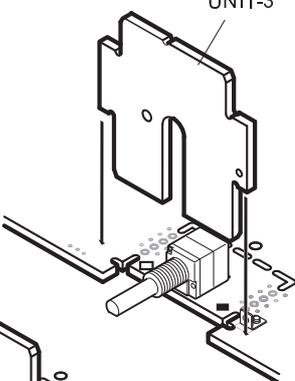


SIDE A

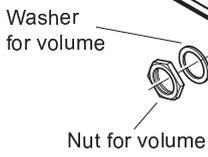
SIDE B

8 UNIT-3 (PCB) [Check the direction CAUTION]

① Insert UNIT-3 from above. Make sure that the marks, ◆ and ◇, on both PCB, are matching.

② Fix with a nut and a washer for volume.



Washer for volume

Nut for volume

Pan-head screw M2x5

③ Insert Pan-head screw M2x5 through UNIT-3 and L shaped metal bracket hole and tighten.

UNIT-4 assembly

1 Resistor [Non direction specific]

Color indication



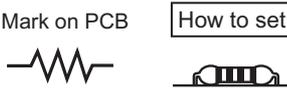
1/2W resistor

R45 12Ω (BRN-RED-BLK-GLD)*

R46 12Ω (BRN-RED-BLK-GLD)*

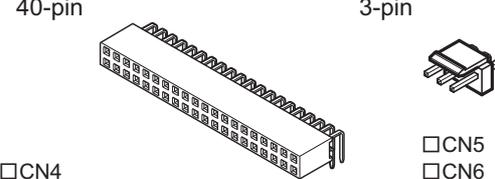
*** Attention:**
The same colors as 1kΩ are used for 12Ω but in different order. Make sure not mix them up.

Mark on PCB How to set



2 Connector [Check the direction CAUTION!]

L shaped pin socket (female) 40-pin L shaped VH connector 3-pin

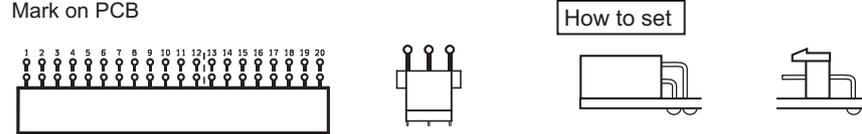


CN4 CN5
 CN6

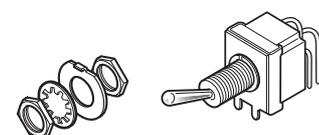
Set on the same side as the resistors.
Insert the pins on the PCB so that the slots face outward.

Make sure the connector is set closely and horizontally to the PCB upon soldering.

Mark on PCB How to set



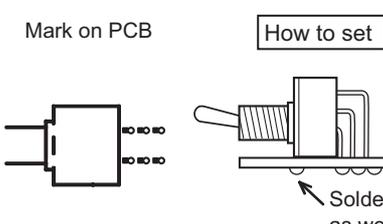
3 Toggle switch [Direction specific]



SW2 6-pin

*** Remove all the attached nuts and washers. Only 1 nut will be used for assembly later.**

Mark on PCB How to set



*** The pins may be bent. Adjust them to match the PCB holes before mounting.**

Make sure the switches are fully seated against the PCB before soldering.

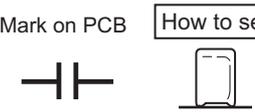
Solder the fixing pin as well.

4 Film capacitor [Non direction specific]

Yellow or white

C19 0.22 μF } (50V)
 C20 0.22 μF } (Indicated as 224)

Mark on PCB How to set



UNIT-6 assembly

1 3-pole mini jack [Check the direction CAUTION!]

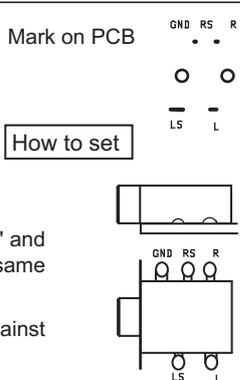


JACK5

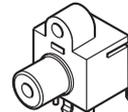
Set it to SIDE A so that the slot faces "GND" and "LS" side on the PCB, and solder it on the same side.

Make sure the mini jack is fully seated against the PCB before soldering.

Mark on PCB

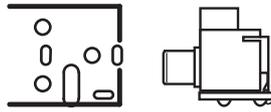


2 Pin jack (RCA jack) [Direction specific]



JACK1(WHITE) White
 JACK2(RED) Red
 JACK3(WHITE) White
 JACK4(RED) Red

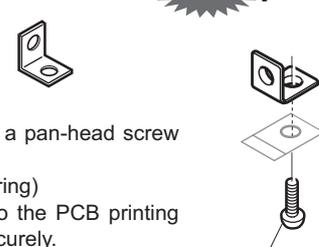
Mark on PCB How to set



Make sure that the jack is fully seated against the PCB before soldering.

UNIT-5 assembly

1 L shaped metal bracket [Check the direction CAUTION!]



Fix it with a pan-head screw M2x5. (No soldering)
Match it to the PCB printing and fix securely.

LB2 Pan-head screw M2x5

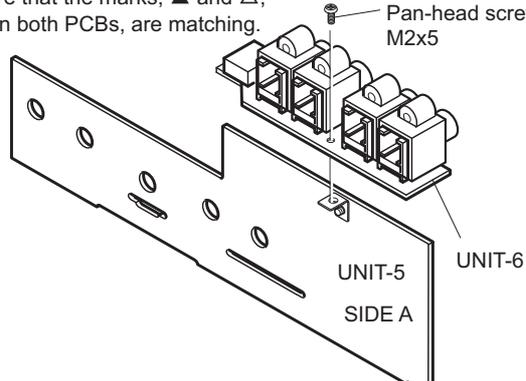
Mark on PCB How to set



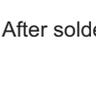
2 UNIT-6 [Direction specific]

① Attach the previously assembled UNIT-6 to UNIT-5 and fix with a pan-head screw M2x5 through L shaped metal bracket. (No soldering)
Make sure that the marks, ▲ and △, printed on both PCBs, are matching.

② Solder the 6 joints, "A" to "F", of the 2 PCBs



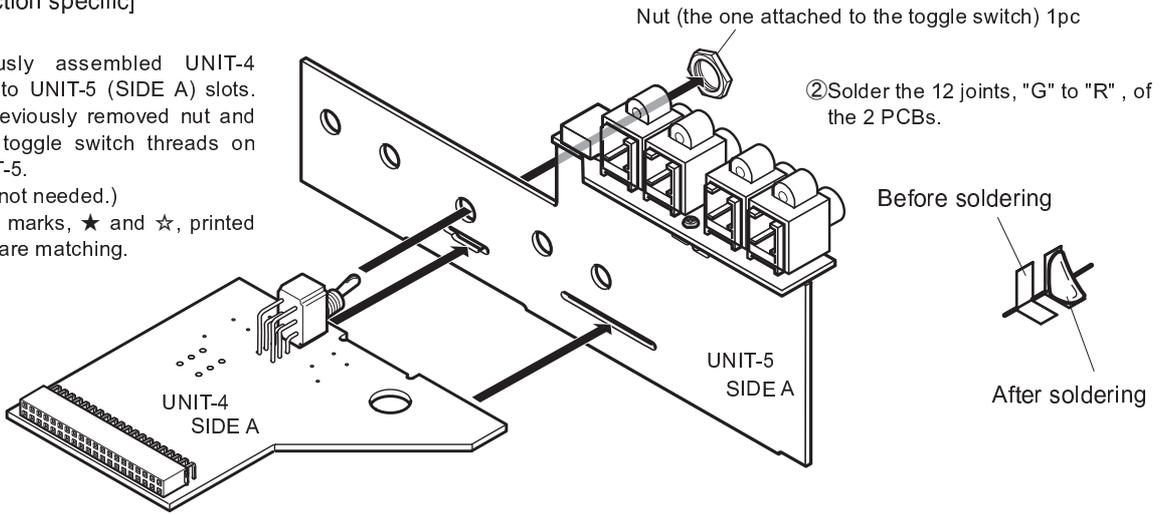
UNIT-5 SIDE A UNIT-6

Before soldering  After soldering 

UNIT-5 assembly

3 UNIT-4 [Direction specific]

- ① Insert previously assembled UNIT-4 (SIDE A up) into UNIT-5 (SIDE A) slots. Fix with the previously removed nut and secure to the toggle switch threads on SIDE B of UNIT-5. (The washer is not needed.) Make sure the marks, ★ and ☆, printed on both PCBs, are matching.

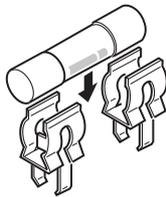


UNIT-7 assembly

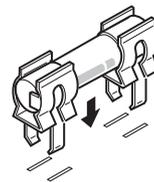
1 Midget fuse, fuse holder [Check the setting direction of the fuse holders CAUTION!]

How to set

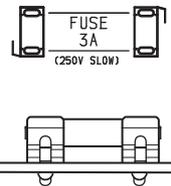
- ① Set the midget fuse to the fuse holders as shown. (No soldering)



- ② Set the fuse holders to the PCB and solder. For the midget fuse, no direction specific, but for the holder, make sure the setting direction.



Mark on PCB



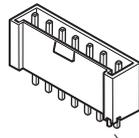
☐ FUSE

2 Connector Box type VH connector 7-pin [Direction specific]

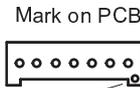
* Make sure to select the correct voltage for your region when installing this connector to the PCB. Verify before soldering. In Japan, set to CN12.

☐ CN12

In other countries...
 110 - 120V(USA, Canada, etc) ☐ CN13
 200V(Air conditioner in Japan, etc) ☐ CN14
 220 - 240V(Many other countries) ☐ CN15

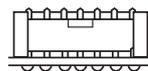


Make sure the connector is fully seated on the PCB before soldering.

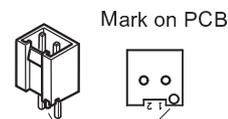


Set it so that the protrusion fits in the hole on the PC.

How to set



3 Connector Box type VH connector 2-pin [Direction specific]



Make sure the connector is fully seated on the PCB before soldering.

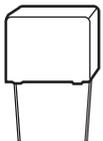
Set it so that the protrusion fits in the hole on the PC.

How to set



☐ CN11 1pc

4 Spark killer [Non direction specific]



☐ C36 RE1201 (Black)

Mark on PCB



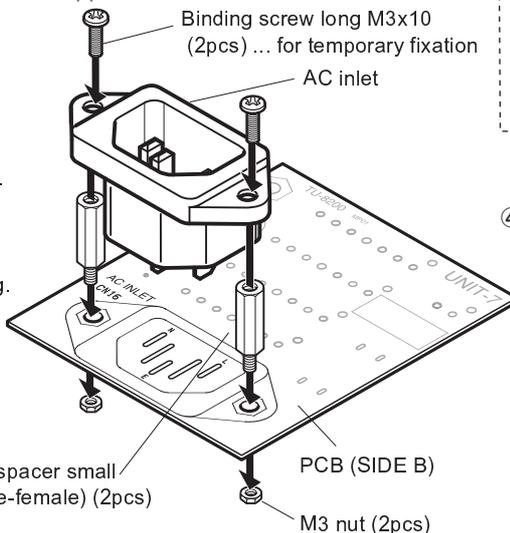
How to set



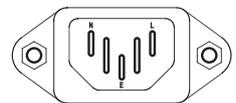
5 AC inlet [Check the setting side CAUTION!] [Check the direction CAUTION!]

How to set

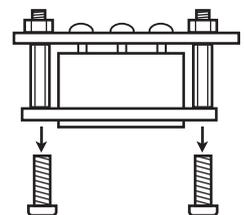
- ① Fix 2pcs of hex screw spacers small (male-female) on SIDE B of the PCB with 2pcs of M3 nuts.
- ② Set AC inlet to the spacers and fix it with 2pcs of M3x10 binding screws long.
- ③ Solder the 3 terminals of the AC inlet on SIDE A of the PCB.



Mark on PCB



- ④ Remove 2 binding screws used in ② for temporary fixation.



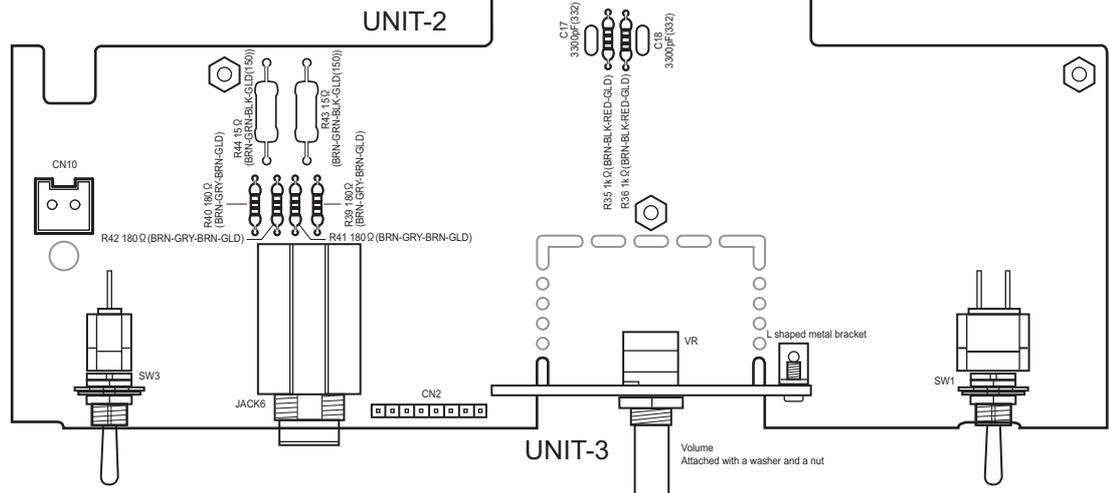
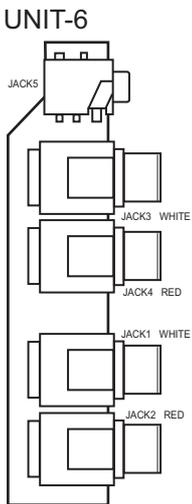
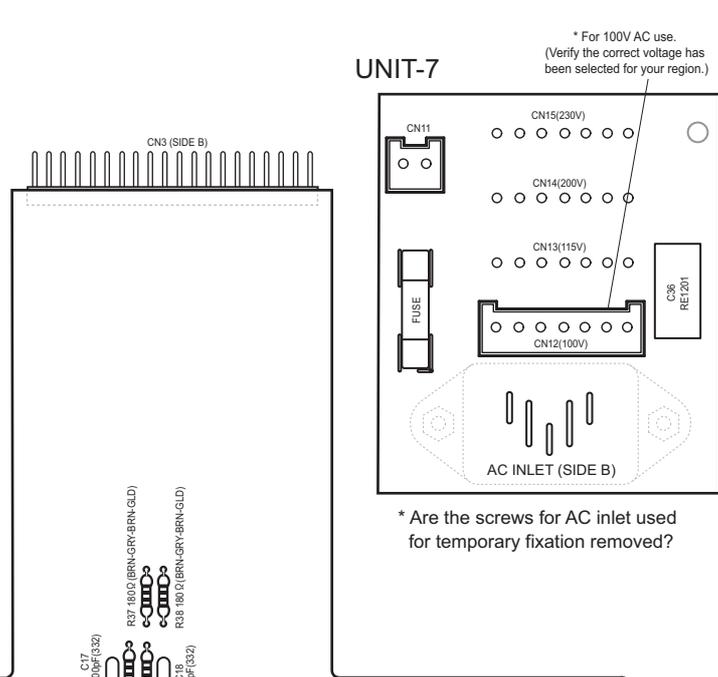
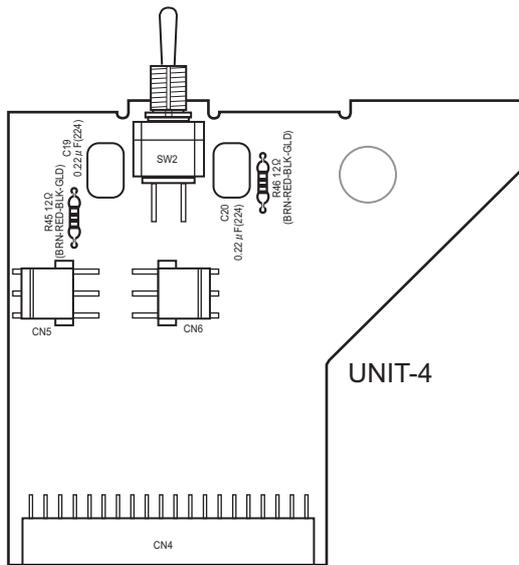
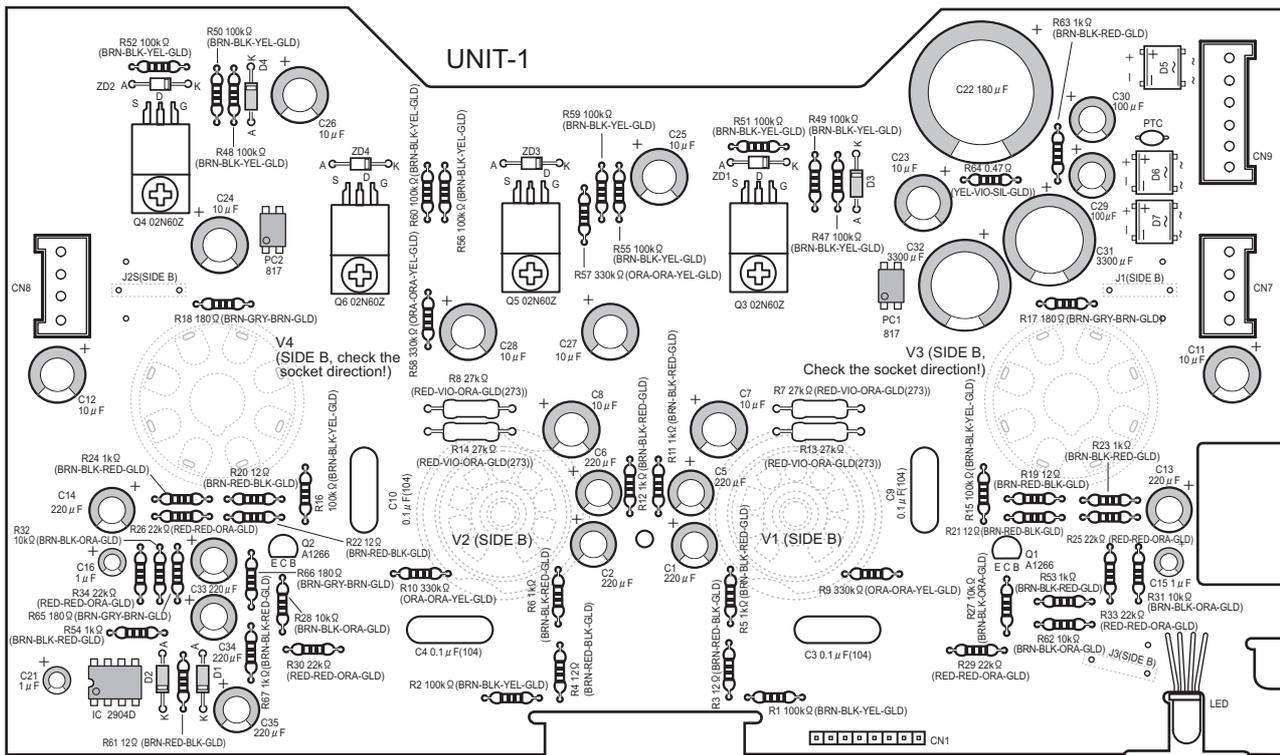
☐ AC INLET

● Completed PCB

* Compare your PCB with below drawing and verify that the components are installed in the correct locations and the correct direction.

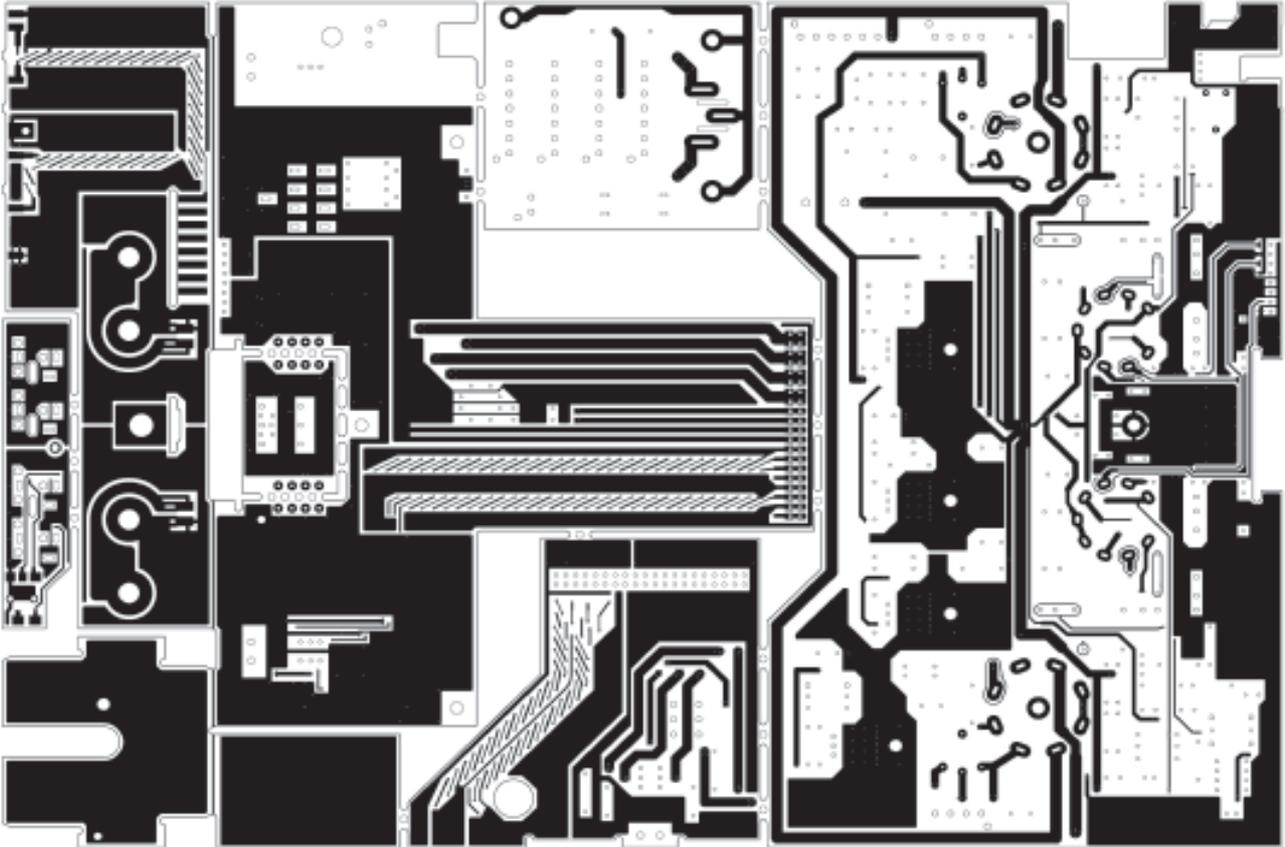
Note: Double check for correct direction of the electrolytic capacitors, diodes, photo coupler, IC, transistor, and vacuum tube sockets (8-pin).

Check the PCB for missing parts, unsoldered leads or pins, and bridged solder joints between components.

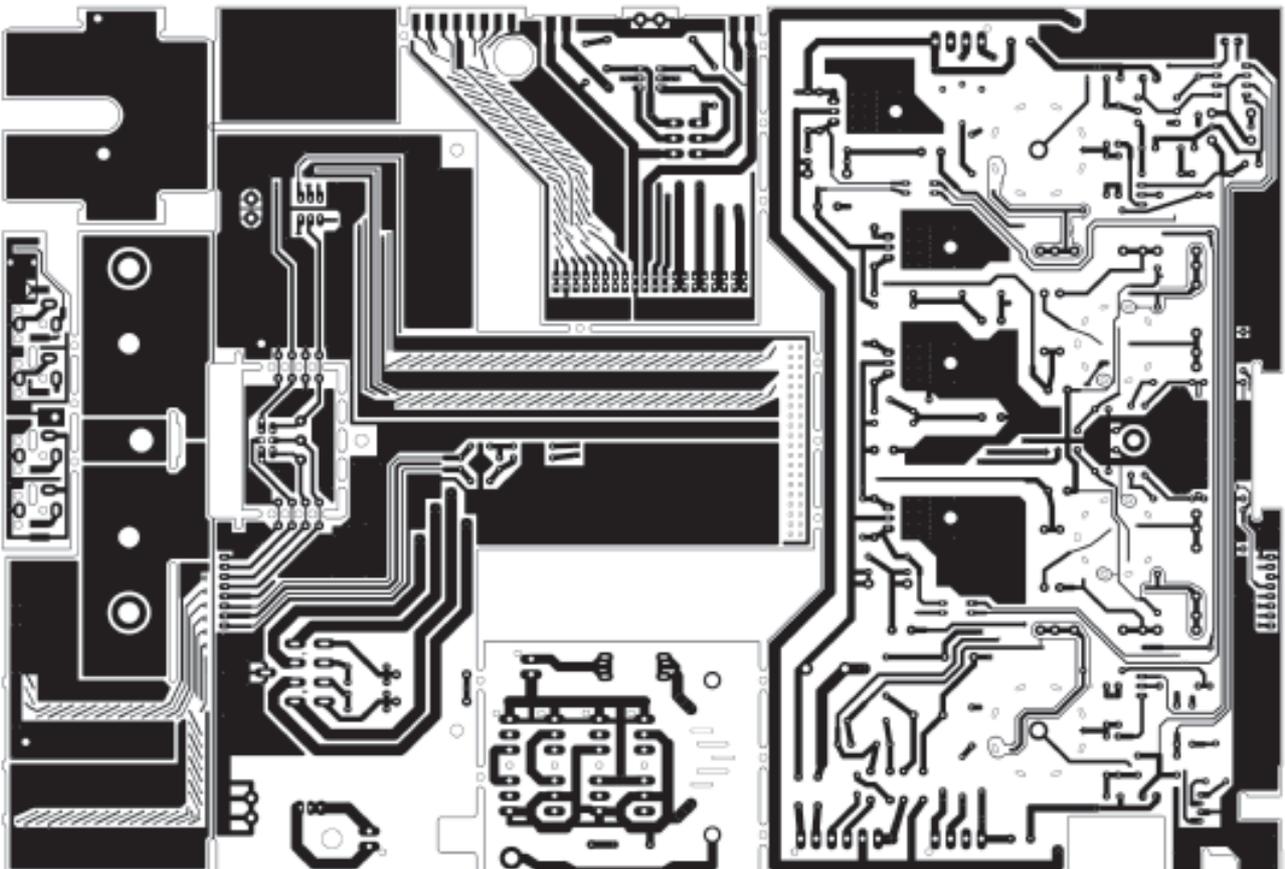


●PCB pattern * Compare your PCB with the PCB image below. Check for any unsoldered leads or pins, or an components with insufficient solder, or bridged solder joints between leads/pins or components.

SIDE A



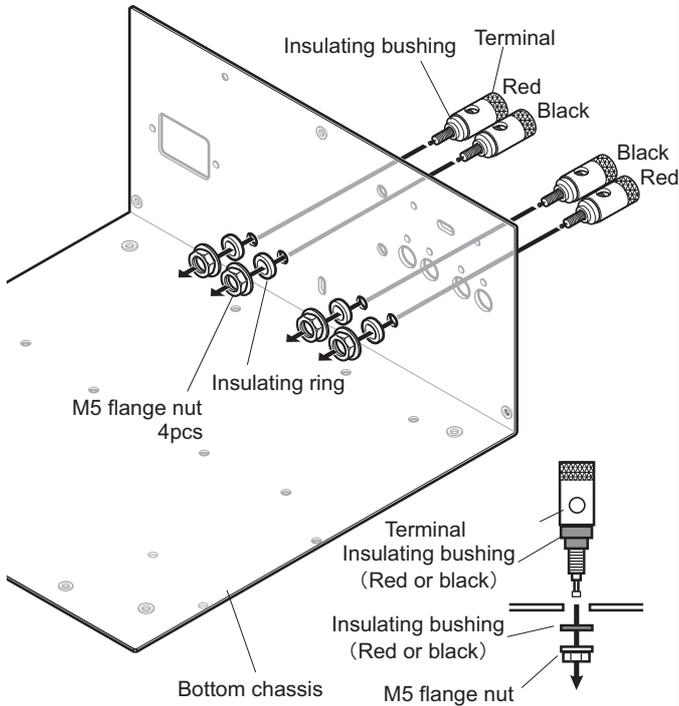
SIDE B



3. Body assembly

- 1** Insert 4 speaker terminals to the holes from the back side of the bottom chassis in the order of RED-BLACK-BLACK-RED.

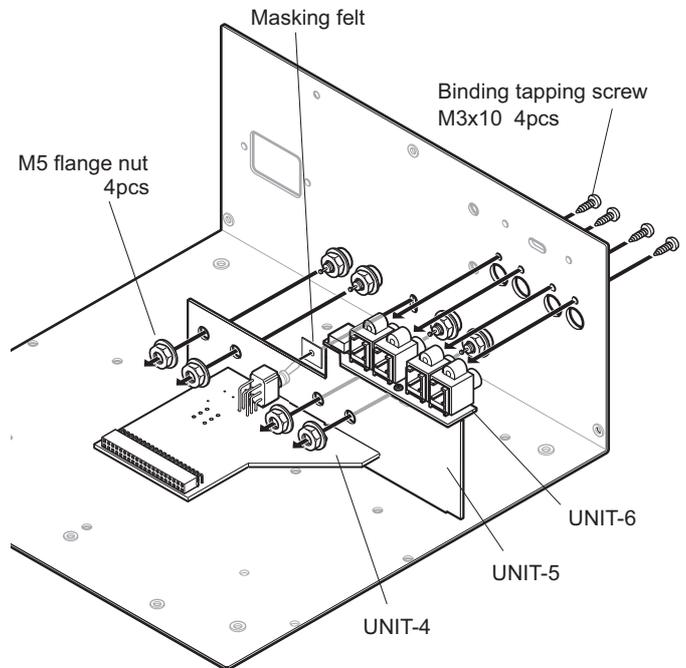
* There are 2 M5 flange nuts attached to each terminal. In this stage only 1 of them is used. The remaining ones will be used in later step.



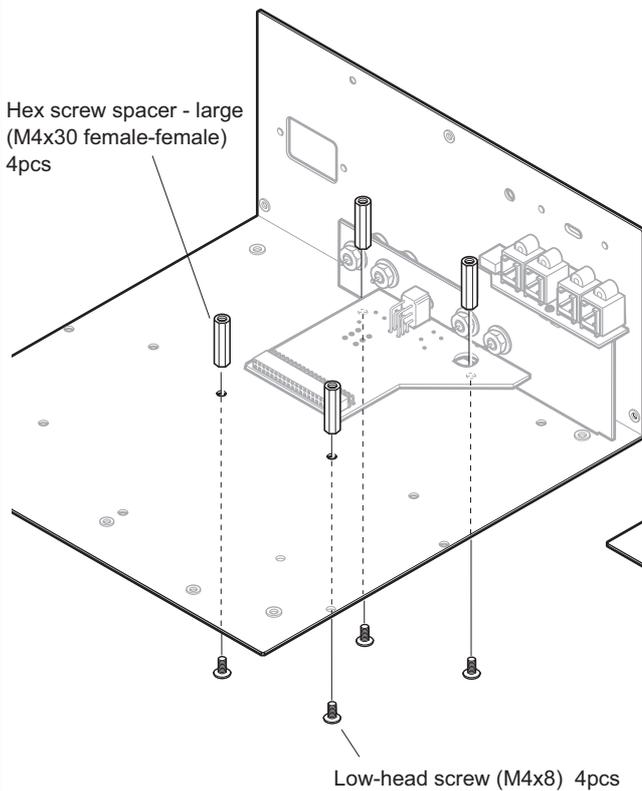
* Align the terminal holes so that the speaker wires can be connected easily after assembly is complete.

- 2** Assemble UNIT-5 (with UNIT-4 and 6).

- ① Place a masking felt (black) on the front of the toggle switch so it is sandwiched between the switch and the hole in the chassis.
- ② Set UNIT-5 to the bottom chassis so that the speaker terminals fit through the holes of UNIT-5, and fix with 4pcs of binding tapping screws at the pin jacks.
- ③ Fix UNIT-5 with the flange nuts at the speaker terminal screws.

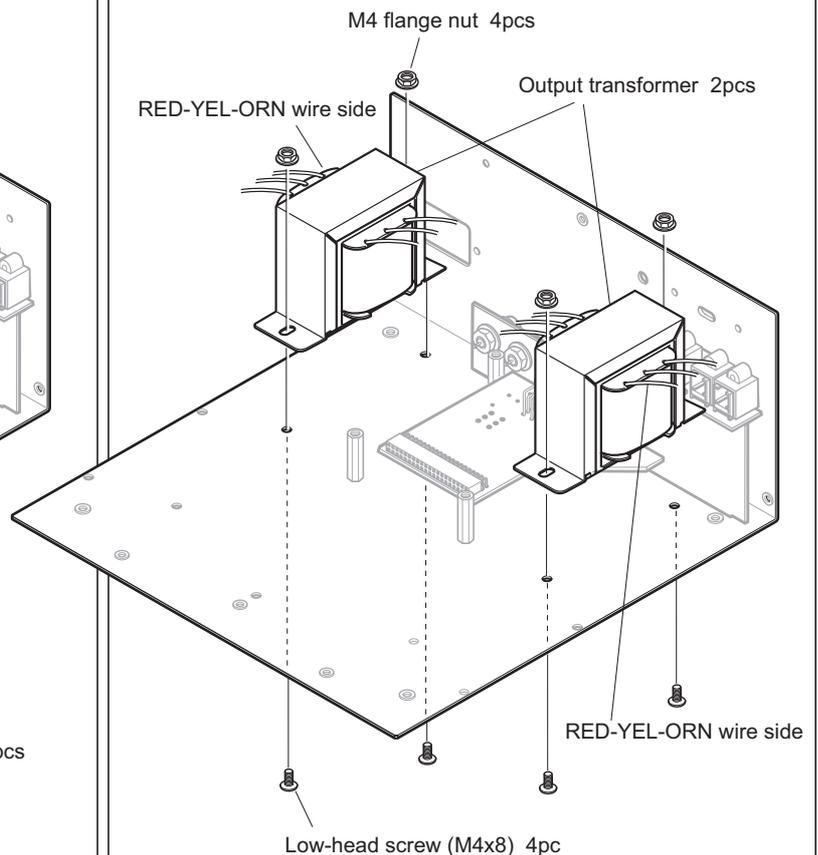


- 3** Attach hex screw spacers - large.



- 4** Attach output transformers.

[Check the setting direction (wire color) ]



5 Attach the insulators.

Insulator 4pcs
Low-head screw (M4x8) 4pcs

6 Set UNIT-7.

Claw washer (M3) 2pcs
*Do not forget!
Flat countersunk screw (M3x8) 1pc
Binding screw short (M3x6) 1pc
UNIT-7
Binding screw long (M3x10) 2pcs
Hex screw spacer medium (M3x22 female-female) 1pc

7 Insert and connect screw hex spacers small and medium to UNIT-2.

Hex screw spacer - medium (M3x22 female-female) 3pcs
Hex screw spacer - small (M3x18 male-female) 3pcs

8 Attach UNIT-2 to the bottom chassis.

UNIT-2
CN3
CN4
Claw washer (M3) 3pcs
* Do not forget!
Binding screw - short (M3x6) 3pcs
Set in the order ①-②.

① Insert UNIT-2 connector (CN3) to UNIT-4 connector (CN4).
② Attach UNIT-2 to the bottom chassis and fix with binding screw - short.

9 Connect 3-pin connector of the output terminals (BLK-GRN-GRY wire) to CN5 and CN6 of UNIT-4.

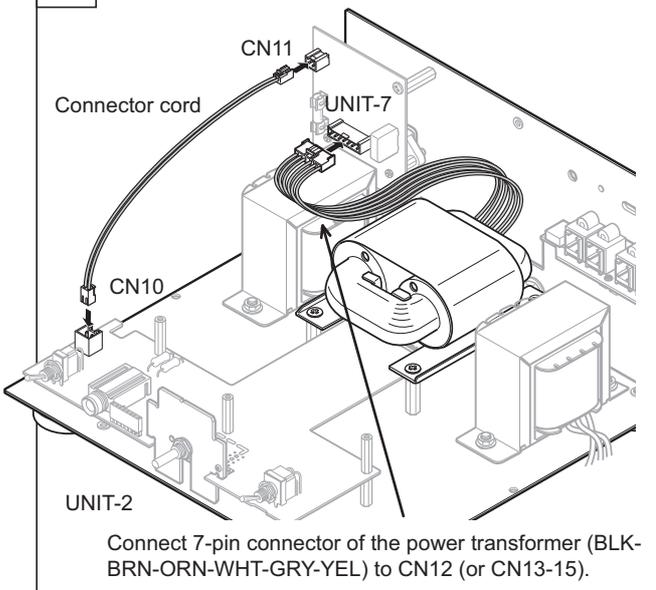
BLK-GRN-GRY wire

Connect the left side wires to the left side of connector, and the right side of wires to the right side of connector.

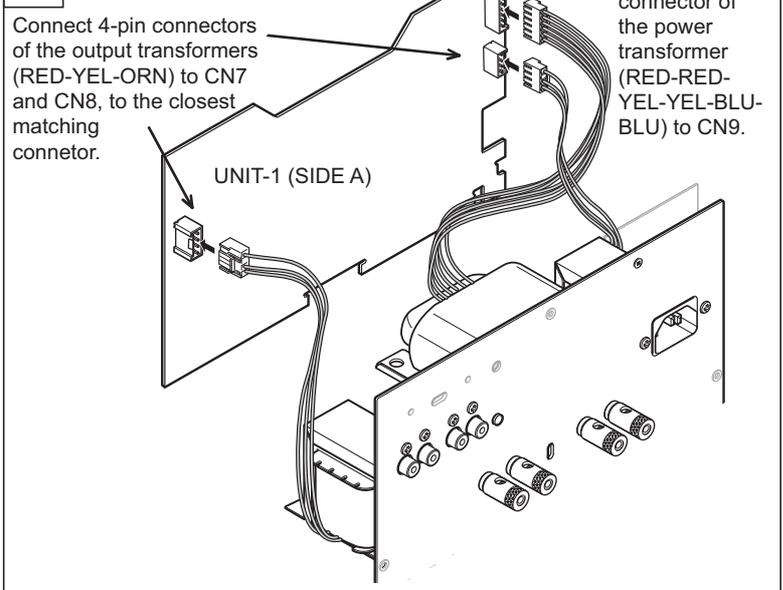
10 Attach the power transformer to the hex screw spacers set in Step3 and fix with 4 low-head screws. [Check the setting direction (wire color) CAUTION!]

Power transformer
Low-head screw (M4x8) 4pcs
RED-RED-YEL -YEL-BLU-BLU wire side
BLK-BRN-ORN -WHT-GRY-YEL wire side

11 Connect UNIT-7 and UNIT-2 with cords.

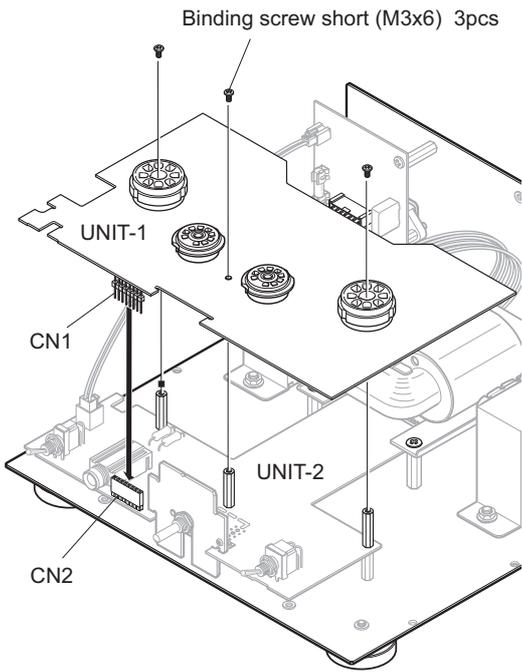


12 Connect cords to UNIT-1.

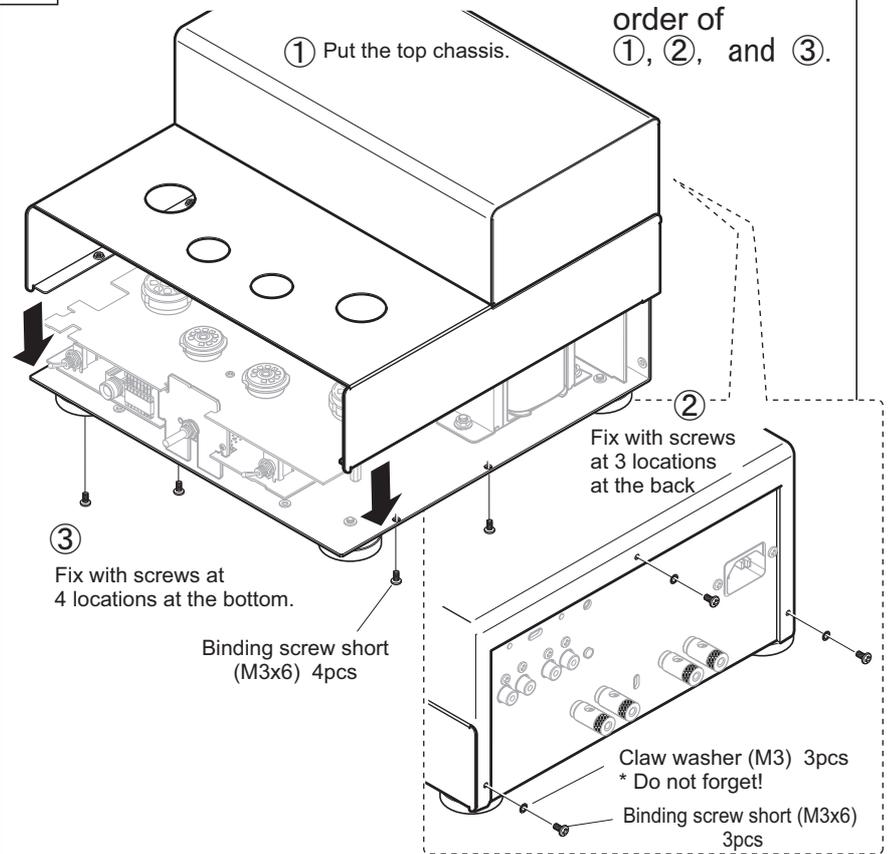


13 Attach UNIT-1.

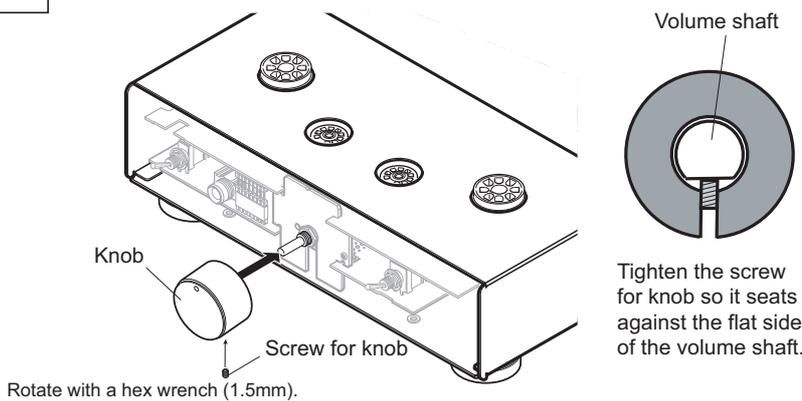
- ① Connect UNIT-1 to UNIT-2. Make sure that CN1 pins are lined up correctly with the CN2 connector pin holes.
- ② Fix UNIT-1 with binding screws.



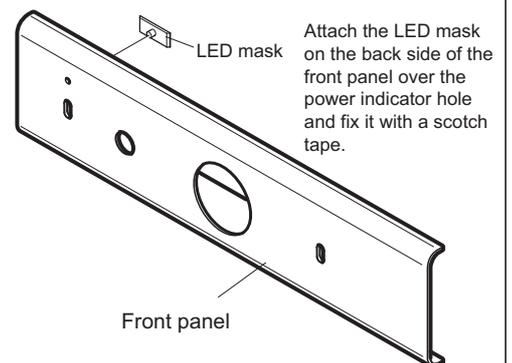
14 Set top chassis.



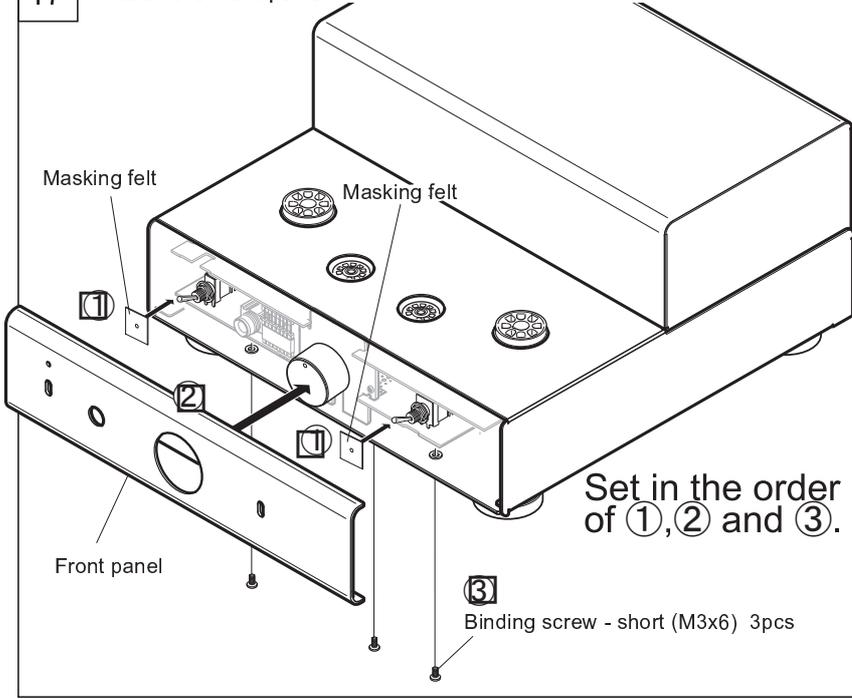
15 Install the knob onto the volume shaft.



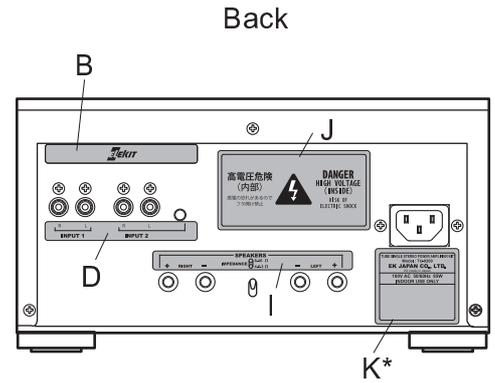
16 Place the LED mask on the back side of the front panel.



17 Attach the front panel.



18 Apply the labels.

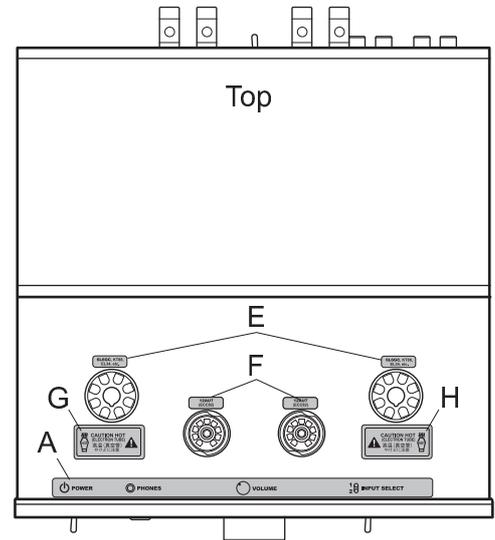
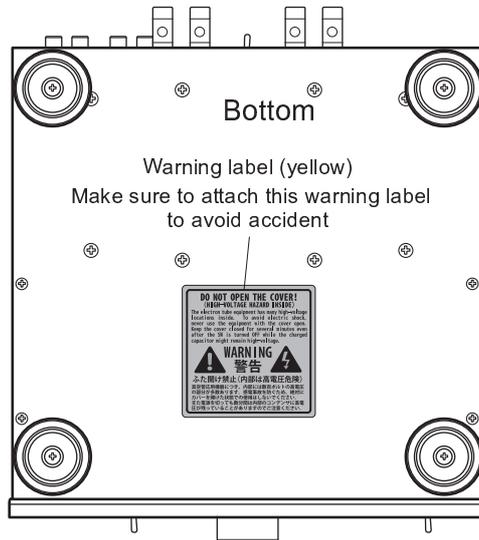


* Select an appropriate label from K-1 to K-4 according to the voltage setting you selected in UNIT-7 assembly.

- 100V → K-1
- 110 to 120V → K-2
- 200V → K-3
- 220 to 240V → K-4

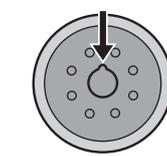
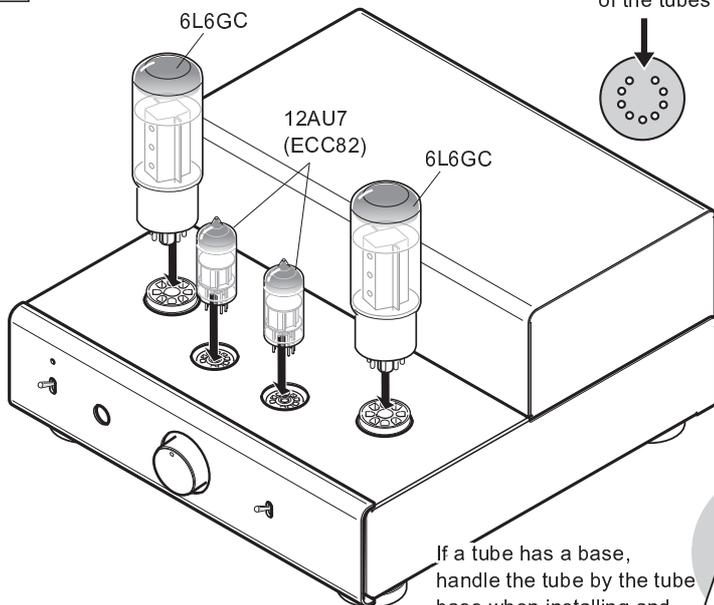
【Tips】

- ① Cut each label with a pair of scissors
- ② Peel a small portion of the label backing off and cut with scissors so that the small portion of the label adhesive back is exposed.
- ③ Place the label in the desired location and attach it with the exposed adhesive.
- ④ Once the label is in the appropriate location, slowly remove the rest of the label backing to expose the rest of the adhesive.



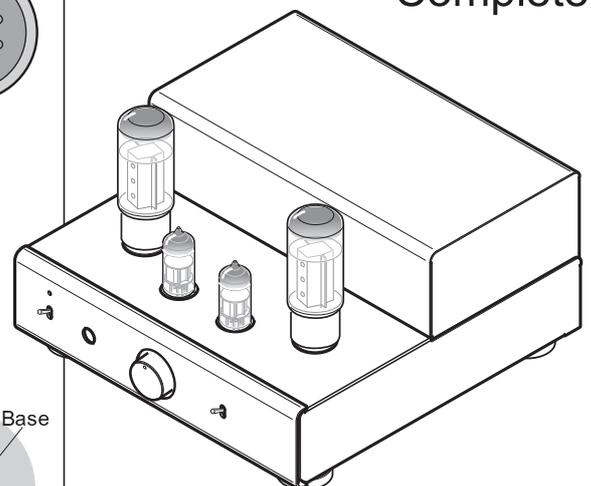
19 Insert the tubes into the sockets.

Check the setting direction of the tubes to the sockets.



If a tube has a base, handle the tube by the tube base when installing and removing.

Complete!



4. Safety precautions and safety check before and after powering up the amplifier (Be sure to read for safety use)

Incorrect use or handling of the product may cause electric shock, bodily harm, and damaged to the product and other connected components. Please read the cautions below to avoid accidents.



CAUTION

- ◆ Before closing the chassis after assembly or repair, make sure to verify that all the parts are installed correctly, there are no mistakes in wiring and soldering before turning ON the power.
- ◆ Electronic components in a vacuum tube amplifier exceed several hundred volts. To prevent electric shock, do not remove the top chassis when powered ON.
- ◆ When operating the amplifier under a direct current (DC) by necessity (as to test the device), do not touch the parts, terminals, and metal parts with bare hands. Make sure to wear a pair of gloves. Find a safe place away from others who may come into contact with the amplifier while testing. Even when the power plug is pulled out, there is electricity remaining in the capacitors. Make sure to wait at least 10 minutes after the power plug has been disconnected before touching any components inside the amplifier.
- ◆ If you find anything unusual while using the amplifier, immediately turn OFF the power and unplug the power plug from the outlet, and refer to "Troubleshooting" on page 15. If you cannot solve the problem, consult your local dealer or EK JAPAN.
- ◆ Do not use the amplifier under an electric environment other than the preset power supply voltages. Normal household current is Alternating Current (AC). Do not connect to a DC power supply.
- ◆ When connecting and disconnecting the amplifier with other devices, be sure to turn OFF the power and unplug the power cord plug from the power outlet. Read the instruction manuals of the connected devices carefully and follow their instructions.
- ◆ When connecting or disconnecting the amplifier to/from other devices, make sure to have the power of all the devices turned OFF. Failing to do so may cause damage to the amplifier and connected devices.
- ◆ Before turning ON, switching inputs, or plug/unplug the headphone terminal, turn the volume control to minimum in order to prevent sudden bursts of high volume that may cause auditory disorder or speaker and headphone damage.
- ◆ Adjust the sound volume slowly to an appropriate level, especially with headphones, to prevent sudden burst of high volume that may cause ear injury and auditory disorder.
- ◆ During operation, the vacuum tubes become very hot (over 100 degreeC). Do not touch them with bare hands to avoid burn injury. Even after the power is OFF, it takes several minutes for the vacuum tubes to cool down. Make sure not to place the amplifier where children can reach it.
- ◆ If water or any unwanted substance gets into the main body of the amplifier, immediately turn OFF the power and unplug the AC power cord. Wait for at least 10 minutes, open the chassis and remove/wipe off the substance, and consult with your local dealer or EK JAPAN. Failing to do so may cause failure, fire, or electric shock.
- ◆ Hold onto the AC plug or connectors when unplugging. Do not unplug by yanking the AC power cord, as it may cause potential injury, fire, or electric shock.
- ◆ Do not put heavy items on or under the AC power cord. Do not place the amplifier near any source of heat, such as a heater. Doing so may damage the AC power cord and cause fire or electric shock. Do not use damaged AC power cord.
- ◆ Do not plug/unplug AC power cord with wet hands. Doing so may result in electric shock.
- ◆ Handle the amplifier gently, especially the vacuum tubes as they are made of glass.
- ◆ Place the amplifier on a stable surface to avoid a falling hazard. Place the amplifier in a location where nothing could fall onto the amplifier.
- ◆ Keep out of direct sun, extreme hot and cold, humid or dusty areas as they may cause accidents and damage. Do not allow gas or corrosive substances to come into contact with the amplifier. Failing to do so may cause damage or hazard.
- ◆ Make sure the amplifier is placed at least 10cm away from walls, and has at least 10cm of space above it as well, as the amplifier will radiate heat. Placing the amplifier too close with other equipment may cause a fire. Do not place the amplifier on a thick carpet, or in an enclosed space such as a drawer, or a box that will obstruct ventilation. Do not cover the amplifier with table cloths, towels, pillows or anything that may cause fire.
- ◆ Clean the amplifier regularly. If dust accumulates on the circuit board, it may cause fire or other hazards. It is recommended to clean the amplifier before the start of humid or rainy seasons.
- ◆ The amplifier is designed for home use. Do not use it in environments that it would push the amplifier beyond its limitations.
- ◆ Discard the amplifier according to the rules and standards in your region. Failing to do so may cause damage to the environment and others.

5. Operation check

*Check the amplifier in the following order.

Turn the amplifier OFF immediately if there is anything not in order during the operation check.

- ① Turn OFF the power (lever down) and have the sound volume to the minimum (fully to the counter-clockwise direction).
- ② Refer to "7.Connection" on page16 and connect the sound source, speakers, and AC power cord. Connect a sound source to INPUT 2 and push the input selection switch lever down. Make sure the correct speaker impedance is selected on the back of the amplifier to match the speakers being connected.
- ③ Turn ON the power (lever up) and make sure that the pilot lamp right under the power switch turns green (or blue according to your setting).
- ④ Make sure that the heaters inside all the 4 tubes slowly turn orange.
- ⑤ Wait for 30 minutes, and if everything is OK, play a music from the connected sound source and slowly turn up the volume (to clockwise direction).
- ⑥ Confirm that the sound is output normal from both right and left speakers.
- ⑦ Turn the volume down (turn the knob to the counter-clockwise direction), connect a pair of headphones, and turn up the volume. Make sure that the sound output is only from the headphones and no sound is heard from the speakers.
- ⑧ Turn OFF the power, unplug the headphones, connect a sound source to INPUT 1, push the input selection lever up, and do the above steps 3 to 7 again. (If you do not have a patch cord to connect to INPUT 1, skip.)
- ⑨ If all of the above operation checks are OK without any problem, operate the amplifier for 30 minutes at low/no volume to confirm the proper operation. During this period, be aware of any burning odors, unexpected noises (hums, popping, static, etc). When you face a problem, unplug immediately and use the below troubleshooting steps to resolve.

6. Troubleshooting

Please refer to the below troubleshooting steps upon use or during operation check.

If you cannot solve the problem, please consult with your local dealer or EK JAPAN.

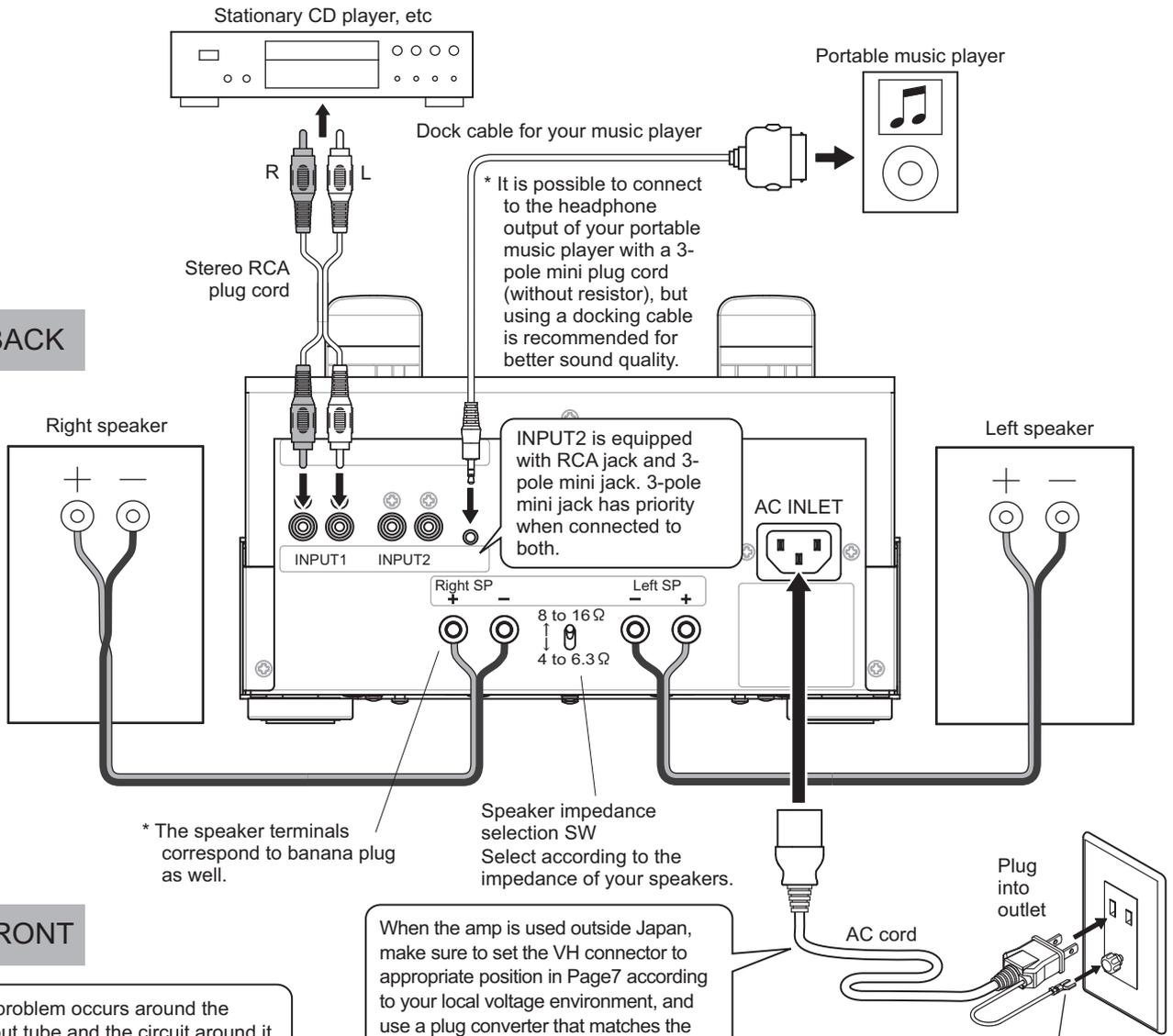
Symptom	Check point
① Will not turn ON when the power SW is turned ON (The LED pilot lamp and the tube heaters will not turn ON either.).	<ul style="list-style-type: none"> • Is the AC power cord plugged on both ends securely? • Is the AC power cord damaged? • Is the connection of the connector inside, especially CN9 to 15, secure? • Is the soldering of SW3, CN10, and inside UNIT-7 secure? • Is the midget fuse blown?
② The LED pilot lamp turns ON but a/some tube heater/s are not glowing.	<ul style="list-style-type: none"> • Check the soldering condition of the socket of the tube that does not turn ON. Also check the soldering and setting of R64, C31 to 32, D6, and CN9.
③ The operation is normal but the pilot lamp does not turn ON (or turns ON in a color other than green or blue.).	<ul style="list-style-type: none"> • There is a problem in the circuit just around the LED. Check for the correct orientation of the LED, whether J3 is set (P4), or the soldering condition of LED and R62.
④ Either right or left channel has a problem.	<ul style="list-style-type: none"> • Swap right and left tubes and see if the symptom follows the tube. If so, it is attributed to tube itself. If not, the problem is in the circuitry. • When there is a problem in the circuitry, check all circuits in the problematic channel, except for UNIT-7. Odd number components are assigned to the left channel, and even numbers for right channel. • Are the cords, such as input and speaker output, connected securely? Check the cord for broken or torn sheathing. * If the pilot lamp is red, orange, or any reddish color when there is no sound, the problem detection circuit of the output tubes is active. Follow the same checks listed above.
⑤ Difference in volume between the right and left channels.	<ul style="list-style-type: none"> • If this occurs at low volume levels, (when the volume knob is at 7-8 o'clock position), it is due to the specification of the volume control (deviation between right and left) and it is normal. Try decreasing the volume on the audio input source. • When the problem occurs regardless of the volume position, do the same checks as above step ④. If there is a problem in the circuitry, the smaller volume channel may be normal and louder volume channel may be abnormal. Check the components of both channels for correct placement and soldering.
⑥ A loud hum can be heard through speakers/headphones at the lowset volume setting.	<ul style="list-style-type: none"> • When using very high-efficiency headphone, you may hear a hum that cannot be heard through speakers. Removing R39 and R40 may improve hum. • If the hum is heard through the speakers or there is a big hum difference between the right and left channel, there may be a problem in the ripple filter circuit of power B. Check the PCB, focusing on Q3 to Q6, ZD1 to 4, D1 to 2, PC1 to 2, R47 to 60, and C22 to 28.
⑦ A hum is heard when the volume is turned up.	<ul style="list-style-type: none"> • A problem is not with the volume control. Check the soldering condition of SW1, CN1 to 4, JACK1 to 5, and UNIT-4,5,6. Also, check the AC power cord for damage and torn sheathing.
⑧ The vacuum tubes become very hot.	<ul style="list-style-type: none"> • Tubes work when heated, and when it is heated, especially the output tubes, 6L6GC in this device, it becomes very hot, over 100 degreeC, as it deals with high electric power. So DO NOT TOUCH THE TUBES WHEN THEY ARE HOT. * However, it is abnormal when the tube plate, the outmost electrode, start glowing red and hot. Immediately turn OFF the power.
⑨ When a tube is tapped, the tap is amplified and heard through the speakers.	<ul style="list-style-type: none"> • The noise is called "microphonic noise" inherent in tube amps. Microphonic noise occurs by the electrode of the tube picking up oscillations. Oscillation affects the sound quality, so it is recommended to place a tube amp in a location where it will not pick up external oscillations (away from speakers).
⑩ Difference in the brightness of the heaters of the right and left tubes,	<ul style="list-style-type: none"> • The heater of the tube is to heat up the cathode electrode, and the excess heat is seen as the glow of the heater. The brightness of the heater glowing will vary from tube to tube. It has nothing to do with tube quality.
⑪ In low light condition luminous blue glow can be seen inside the output tubes (6L6GC) .	<ul style="list-style-type: none"> • This is called "blue fluorescence" that occurs when the electrons hit the glass surface and illuminate. Blue fluorescence will vary from tube to tube. In some tubes blue fluorescence will occur but fade over time, and others may never exhibit it. It has nothing to do with tube quality.

7. Connection

* Cords and cables to connect speakers and any sound source device is not included.
Please use your own cords and cables for attaching to the amplifier.

CAUTION! Make sure to turn OFF the power of all the devices before connecting/disconnecting cords.

BACK

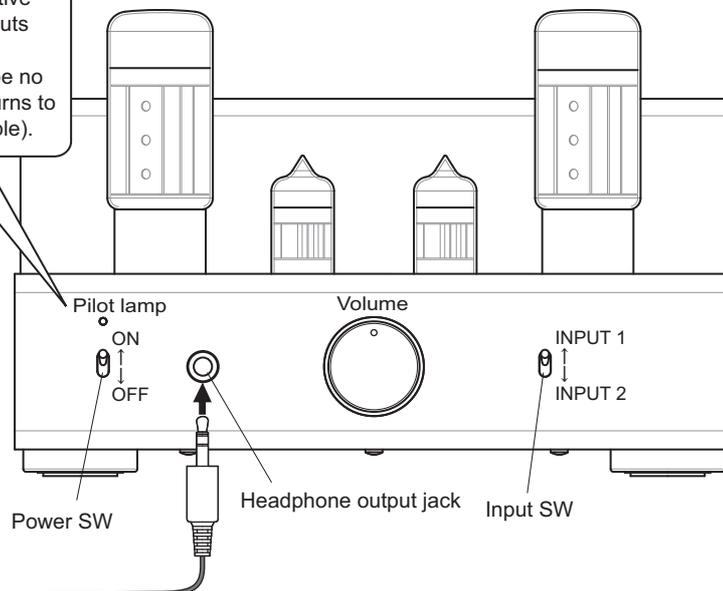


FRONT

* If a problem occurs around the output tube and the circuit around it while the power is ON, and overcurrent occurs, the protective circuit becomes active, and shuts down the B power of the problematic circuit (there will be no sound.). Then the pilot lamp turns to reddish color (orange-red-purple).



Headphone
Approx. 8 Ω to 1k Ω
can be used.



8. Enjoy TU-8200 to the fullest

① Enjoy the difference in sound by changing the operation modes of the output tube

Triode and pentode are 2 most common configurations in audio vacuum tube amplifiers. The difference in triode and pentode modes offer the audio enthusiast 2 very different listening experiences.

Pentode mode provides high efficiency and power, but some audio enthusiasts believe triode mode surpasses pentode mode in sound quality. The TU-8200 has a jumper that can easily change the amplifier's mode from triode to pentode. In addition, an intermediate mode called "Ultra Linear" can be selected. In this UL mode, you may obtain high efficiency similar to pentode mode and sound quality of triode mode.

In this amplifier, you can select from the 3 modes, Pentode, UL, and Triode, simply by changing the jumper plug J1 and J2 on SIDE B of UNIT-1.

* The circuit around the jumper plug has high voltage and it is dangerous to touch the PCB without caution. Make sure to turn OFF the power and unplug the AC power cord, then wait for at least 10 minutes before changing the jumper connection. Also, changing the connection while the power is ON could damage the tubes and the output transformers. Therefore please refrain from modifying the amplifier, such as adding a switch to change the connection.

② Try different brands tubes that are the same model number (tube rolling)

Various vacuum tubes manufacturers make the same model or equivalent of a tube. You can find different brands of same model tubes from various tube vendors. Although the model numbers are the same, tubes from different manufacturers will have variations in the way they sound. The ability to experience different sounds by changing tubes is one of the real thrills of tube amplifiers.

When changing the 6L6GC power tubes, make sure the replacement 6L6GC version is the equivalent of the 6L6GC. Some 6L6 variants will not have the "GC" designation and have lower power ratings. These cannot be used in the TU-8200.

For 12AU7, it is possible to use those with additional letters at the end, such as 12AU7 or 12AU7WA. ECC82 is the European model number for 12AU7, so it can be used as 12AU7. (Please note that 12AX7(ECC83) and 12AT7(ECC81) have larger property and cannot be used for TU-8200.)

③ Try other output tubes

There are many output tubes that have similar properties and pin layouts to 6L6GC. These other output tubes all have unique and different sound qualities compared to 6L6GC in the above ②.

Traditionally, when other variations of output tubes are used, it is usually desirable to modify the circuits. However, with TU-8200, a new function "Active automatic Bias" is adopted so that the bias is automatically adjusted when the tubes are switched. You can enjoy the best performance of various tubes, such as KT88, KT66, KT90, 6550 and EL34(=6CA7), without any adjustment to the amp. (Please note that 6V6 family is unusable with TU-8200.)

General attributes of output tubes;

- 6L6GC and equivalent: Very balanced, with clear highs
- KT88 and equivalent: Powerful bass, and strong midrange with clear highs
- EL34 and equivalent: Delicate, beautiful, and brilliant highs

④ Change the capacitors in search of your favorite sound

In some instances, switching some of the components with higher grade components may improve the sound.

Capacitors are one of those that affect the sound. However, switching to whatever capacitors randomly may not improve the sound, or may even cause problems. Here are some guidelines for exchanging the capacitors for better sound quality.

1. Exchanging the cathode bypass capacitors with conductive polymer aluminum solid electrolytic capacitors with low ESR is very effective. In this amplifier, the 4 capacitors of C1, C2, C5, and C6 are used as cathode bypass capacitors. By default they are 220 μ F 16V aluminum electrolytic capacitors. If you exchange, make sure the value is between 150 to 220 μ F, and the rated voltage is 10V.

2. Coupling capacitors affect the sound as well. In this amplifier, the PCB is designed with some extra space around C3, C4, C9, and C10 so that users can exchange those coupling capacitors with different ones of larger size. However, those originally included are non-inductive polypropylene film capacitors that can cover high frequency. Therefore you may not hear the effect even after they are exchanged.

If replacing these capacitors, the value shall be higher than 0.1 μ F, and the rated voltage should be minimum of 400V. Please make sure to select one which can fit in the provided space on the PCB without interference with other parts.

* We are not liable or responsible for any problems/failures caused by component exchange or modifications, and kindly ask you to conduct such component exchange and modification at your own risk and responsibility.

* We do not provide the capacitors and tubes for exchange. Please purchase them from reputable electronic or vacuum tube vendors.

⑤ Mount USB-DAC in TU-8200

For audiophiles who want to enjoy digital sound source, we recommend our USB-DAC module PS-3249R which can be easily mounted to TU-8200 by mounting it inside the amp and fixing it with 2 x M3 screws at the two holes at the back side of the amp. Use a mini stereo cord to connect between the DAC output jack and INPUT2 of TU-8200. Make sure to use Function Label C when PS-3249R is mounted.

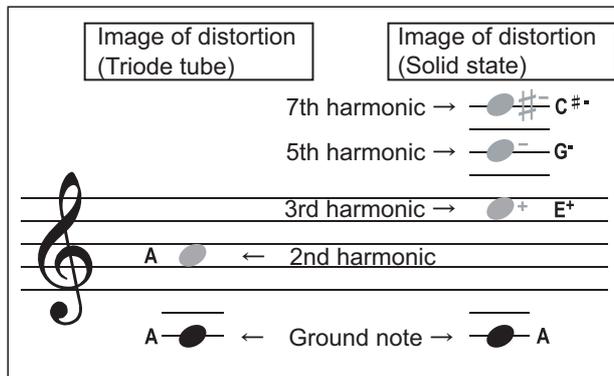
9. What attracts people about vacuum tubes?

In former times, vacuum tube used to be adopted for every electronic circuit found in radios, TVs, communication broadcasting devices, sound amplification and computers. However, rise of semiconductors almost wiped them out in a moment. Although vacuum tubes are no longer found in most electronic devices, they have a strong following and are popular amongst audiophiles in sound amplification. A solid state amplifier shows almost ideal measured values whereas a vacuum tube amplifier have high level of noise and distortion. From a viewpoint of measured values, a vacuum tube amplifier must be obviously inferior to a solid state amplifier. So why is it said to have a better sound quality?

The biggest factor is that the vacuum tube characteristics curve is quadratic function by which a vacuum tube produces a distortion so called second harmonic. The second harmonic is a frequency double the original sound, and an overtone factor which are abundantly produced by various musical instruments and gives depth and richness to the sound.

On the other hand, the distortion produced by a solid state amplifier is mostly the multiples of odd numbers, such as tertiary and quintic. Therefore a sound different from the original sound is produced, which is unpleasant to listeners. This is why there are various countermeasures taken for a solid state amplifier to lessen the distortion to have it close to zero as much as possible.

Although a vacuum tube amplifier may not match a solid state amplifier in terms of measured audio specifications, the quality of the sound produced by its distortion is superior to that of a solid state amplifier and attracts many audiophiles.



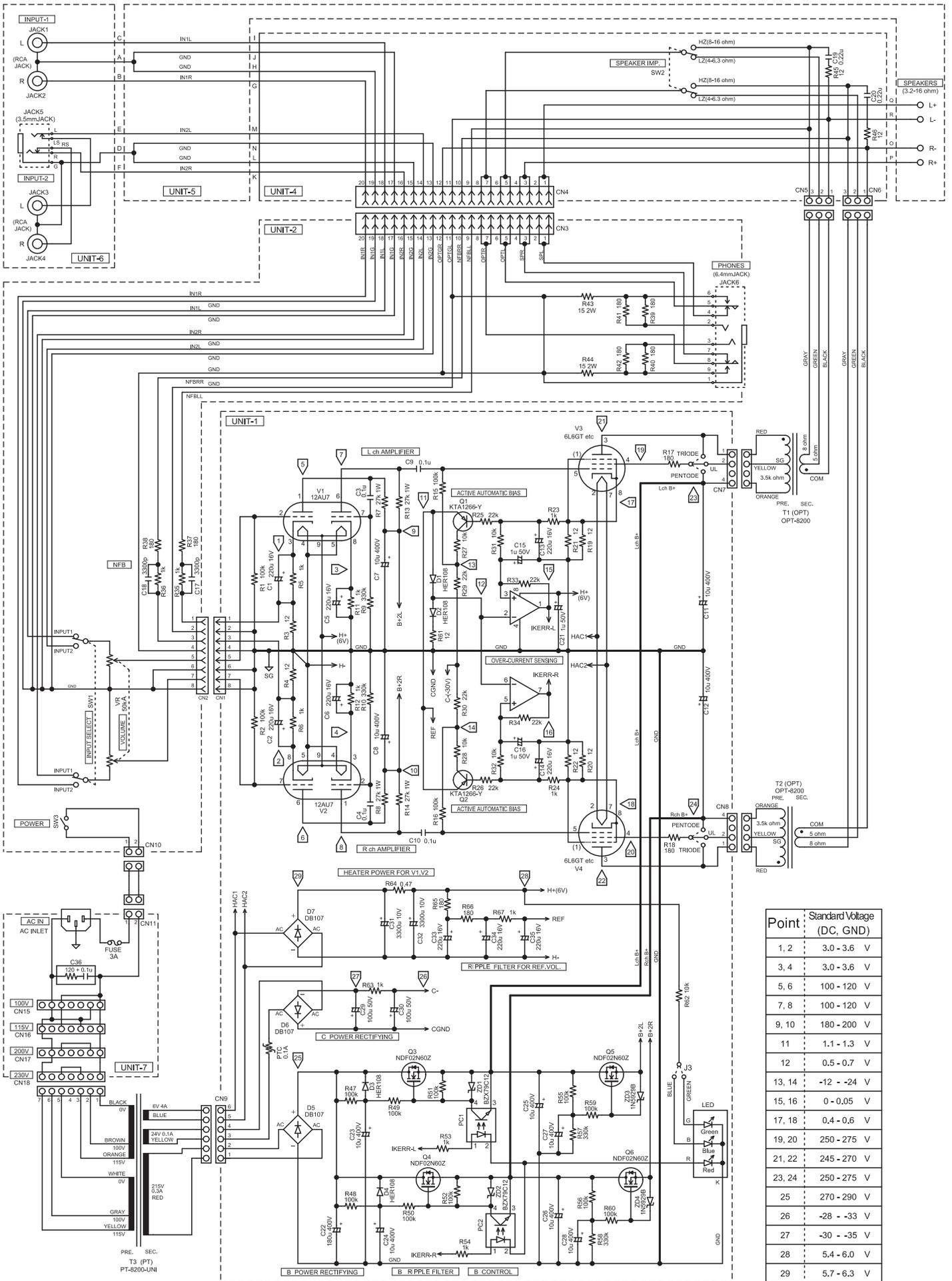
10. Technical data

● Specifications

Product & Model No.	: 6L6GC Single Tube Amp Kit, TU-8200
Circuit configuration	: Tube single operated stereo power amplifier All tube practice amplifier for signal related Output operation mode can be selected by changing the jumper plug location: Ultra Linear connection, Pentode connection, Triode connection Active automatic bias adjustment circuit on board MOSFET B power ripple filter on board (right and left separately) Output tube overcurrent protection circuit on board (right and left separately)
Stock tube	: [Output tube] 6L6GC x 2, [Voltage amplifying tube] 12AU7(ECC82) x2 (For output tubes, EL34(6CA7), KT88 and equivalent can be used.)
Rated output	: 8W + 8W (6L6GC, UL connection) 8.2W + 8.2W (6L6GC, pentode connection) } 8Ω loaded 4W + 4W (6L6GC, triode connection)
Rated input	: 340mV (6L6GC, UL connection)
Residual noise	: 90 μV (IEC WEIGHTING)
Frequency response	: 12 to 50,000Hz(−3dB)
Speaker impedance	: 4 to 16Ω (switching either 4 to 6.3Ω or 8 to 16Ω range)
Headphone impedance	: 8 to 1kΩ (corresponds to high impedance speakers), unbalance
Output terminal	: Speaker output: Gold-plated binding terminal (banana plug is also usable) Headphone output: 3-pole standard jack (φ 6.4mm)
LINE-IN terminal	: RCA jack stereo 2 lines (INPUT 1, INPUT 2) 3-pole mini jack (φ 3.5mm) 1 line (INPUT 2 side, 3-pole mini jack has priority.)
Power	: 100VAC, 50/60Hz (select from 100V, 115V, 200V, and 230V upon assembly) IEC standard 3P inlet type
Power consumption	: 60W (6L6GC) 85W (KT88)
Dimensions	: W252 × H156 × D285 mm (when stock tubes are mounted, including projections)
Weight	: Approx. 6.6kg (assembled, excluding AC cord)

The specifications, forms and contents of this product are subject to change for improvement without prior notice.

● Circuit diagram



Point	Standard Voltage (DC, V)
1, 2	3.0 - 3.6 V
3, 4	3.0 - 3.6 V
5, 6	100 - 120 V
7, 8	100 - 120 V
9, 10	180 - 200 V
11	1.1 - 1.3 V
12	0.5 - 0.7 V
13, 14	-12 - -24 V
15, 16	0 - 0.05 V
17, 18	0.4 - 0.6 V
19, 20	250 - 275 V
21, 22	245 - 270 V
23, 24	250 - 275 V
25	270 - 290 V
26	-28 - -33 V
27	-30 - -35 V
28	5.4 - 6.0 V
29	5.7 - 6.3 V

11. Warranty

Since this is an electronic product assembled by a user, EK JAPAN cannot provide a standard warranty like those found with a regular electronic product. Instead, EK JAPAN can provide help to resolve your problems via troubleshooting support from your local EK JAPAN dealer or you can e-mail EK JAPAN directly.

If you experience problems with the assembled product, please contact an EK JAPAN dealer in your region or the store from where you purchased the product for further assistance.

If you do not know who to contact, please send us an e-mail describing the problem you are facing to the e-mail address below. Throughout the instruction manual, there are many check points, and in many instances the problem can be solved if you review these points closely, and use the troubleshooting on Page 15 before consulting to your dealer or EK JAPAN.

Contact information

EK JAPAN CO.,LTD.

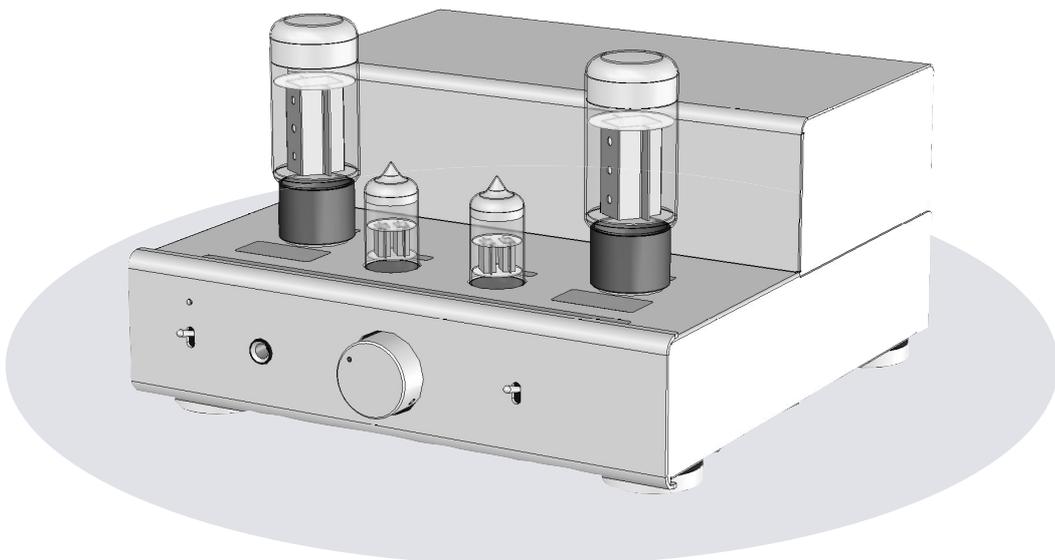
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