



# 300B SINGLE ENDED TUBE AMP KIT

## TU-8600S Assembly Instruction Manual



The TU-8600S is a single ended tube amp kit using 300B tubes. The features of the TU-8600S and the legendary sound quality 300B tubes create a pure audio synergy.

■ Minimized noise for headphone use

There has been an increase in demand for listening with high quality headphones or ear-buds with a 300B tube amplifier. The TU-8600S is designed to fill such a demand from audiophiles. The 300B tube is a directly heated tube that can generate hum and background noise. The TU-8600S design has gone to great lengths to reduce background noise to extremely low levels - levels so low that listeners cannot detect even with high efficiency speakers or headphones.

■ Extraordinary amplifier stability by cathode NFB via a third winding

For higher amplifier stability- the NFB loop is divided into the voltage amplifying stage and the output stage. For the output stage a third winding is used to the output transformer to apply NFB to the cathode. This reduces the overall NFB and makes the amp extraordinarily stable without phase compensation.

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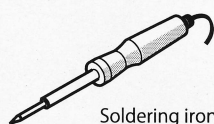
## 1. Assembly precaution



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 close at hand.

- ◆ 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 electric 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.

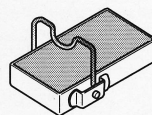
## 2. Necessary tools



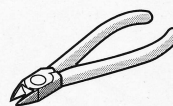
Soldering iron  
(Approx. 30W)



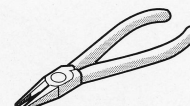
Solder (for electronic parts)  
(diameter  $\varnothing$ 0.8-1.2)



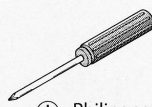
Soldering iron stand



Diagonal cutter



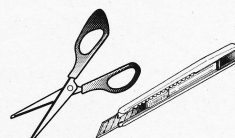
Long-nose pliers



⊕ Philips screwdriver  
(No.2)



(Hexagonal wrench  
1.5mm and 2.5mm)

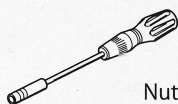


Scissors or pen knife



Adhesive

### Helpful tools



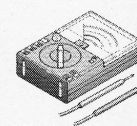
Nut driver  
(5.5mm and 7mm)



Tweezers  
(For labels)



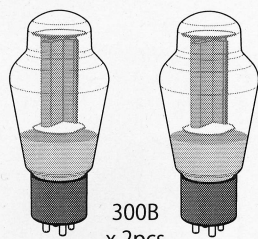
File  
or  
sand paper



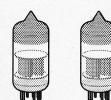
Multimeter  
Optional voltage  
and connection  
check is suggested.  
\* Both analog and  
digital are OK.

TU-8600S does not include tubes.

**PLEASE SUPPLY  
YOUR OWN TUBES.**



300B  
x 2pcs



12AU7  
(ECC82)  
x 2pcs



12AX7  
(ECC83)  
x 1pc

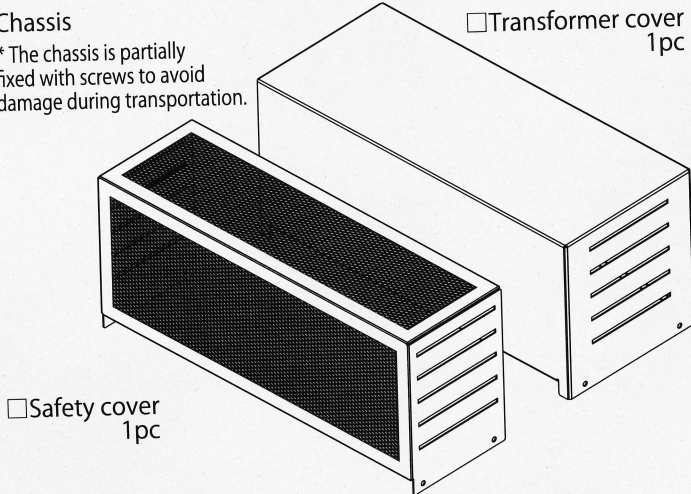


### 3. Parts list

Please use the check box next to each part to verify they have been included with the kit.  
 \* There may be more screws and nuts than indicated. Keep them as spare parts.

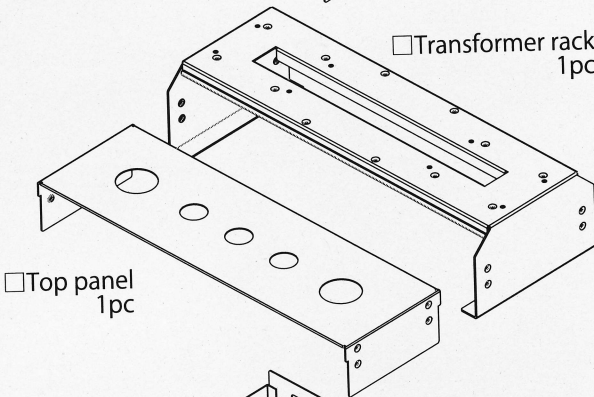
#### Chassis

\* The chassis is partially fixed with screws to avoid damage during transportation.



Safety cover 1pc

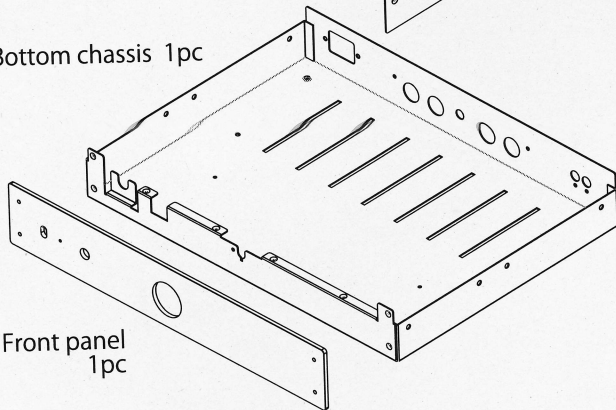
Transformer cover 1pc



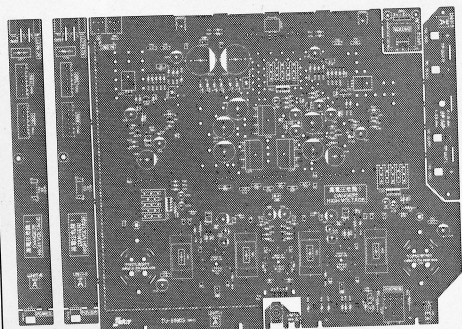
Transformer rack 1pc

Top panel 1pc

Bottom chassis 1pc

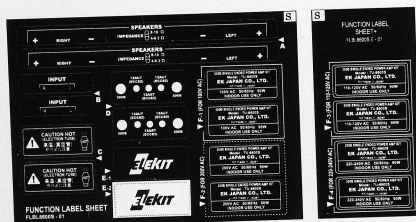
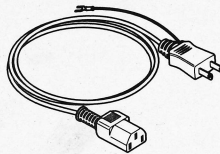


Front panel 1pc



PCB (UNIT-1-5) 1pc  
 PCB (UNIT-6) 1pc

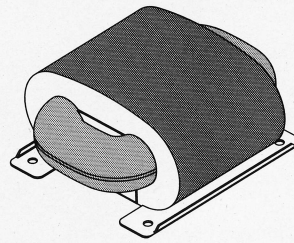
AC cord 1pc



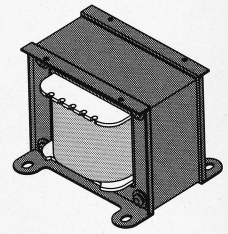
Function label (Large) 1pc  
 Function label (Small) 1pc



Warning label (yellow) 1pc

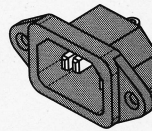


Power transformer 1pc



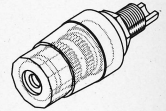
Output transformer 2pcs

AC inlet 1pc



Binding post (nut included)

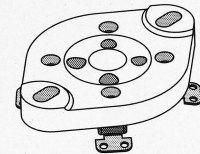
Red 2pcs  
 Black 2pcs



Tube socket

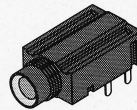


9-pin (Black) 3pcs



4-pin (White) 2pcs

3-pole phone jack 1pc  
 (A nut is not attached.)

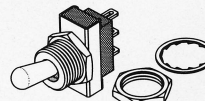


Pin jack (RCA jack)

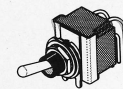
White 1pc  
 Red 1pc



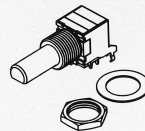
Toggle switch  
 (A nut and a washer are attached.)



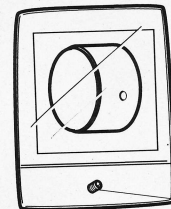
3-pin 1pc



6-pin 1pc  
 The pins may be bent. Adjust them to match PCB holes before mounting.



Volume knob 1pc  
 (Screw for knob)

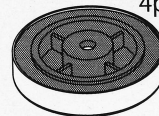


A set screw for knob is included in the same plastic bag as the knob. Make sure to take it out from the plastic bag.

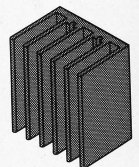
Screw for knob

Volume (dual) 1pc  
 (with a nut and a washer)

Insulator foot 4pcs



Heatsink 3pcs



Thermal pad (Gray) 5pcs



Masking felt (Black) 1pc



LED mask (Opaque white) 1pc





Parts list

<p><b>Connector</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Box type VH connector 3-pin 2pcs</li> <li><input type="checkbox"/> Box type VH connector 4-pin 1pc</li> <li><input type="checkbox"/> Box type VH connector 5-pin 2pcs</li> <li><input type="checkbox"/> Box type VH connector 7-pin 1pc</li> <li><input type="checkbox"/> Box type VH connector 8-pin 1pc</li> </ul>	<p><b>Threaded spacer (Hex)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Male-Female (M3 x 6) 2pcs</li> <li><input type="checkbox"/> Female - Female (M3 x 15) 2pcs</li> <li><input type="checkbox"/> Female - Female (M3 x 35) 2pcs</li> <li><input type="checkbox"/> Female - Female (M4 x 20) 1pc</li> <li>Resin <input type="checkbox"/> Female - Female (M4 x 7) 4pcs</li> </ul>	
<p><b>Jumper socket</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Single 3pcs</li> <li><input type="checkbox"/> Hex 1pc</li> </ul>	<p><b>Screws</b></p> <p>* There may be more screws than needed. Keep them as spare parts.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Binding screw Black M4 x 6 (with a claw washer) 38pcs</li> <li><input type="checkbox"/> Flat-head screw M4 x 12 4pcs</li> <li><input type="checkbox"/> Binding screw M3 x 6 15pcs</li> <li><input type="checkbox"/> Hex cap screw M3 x 6 4pcs</li> <li><input type="checkbox"/> Tapping screw 4 x 10 2pcs</li> <li><input type="checkbox"/> Tapping screw 3 x 10 7pcs</li> <li><input type="checkbox"/> Nylon washer (Black, for M4) 4pcs</li> </ul>	
<p><b>Pin header</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 2x2-pin 3pcs</li> <li><input type="checkbox"/> 1x6-pin 1pc</li> <li><input type="checkbox"/> 1x6-pin 2-stage 1pc</li> </ul>	<p><b>IC</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> MIC29302 3pcs</li> <li><input type="checkbox"/> LMV431 2pcs</li> <li><input type="checkbox"/> LR8 (SiLR8) 3pcs</li> <li><input type="checkbox"/> SCR (Thyristor) P0118MA 2pcs</li> <li><input type="checkbox"/> FET NDF02N60Z 2pcs</li> </ul> <p>NOTE: Below 3 parts, including SCR, look similar. Make sure not to mix them up. The part numbers are hard to read. It is recommended to not remove them from their plastic bags until they are ready to be mounted on the PCB.</p>	
<p><input type="checkbox"/> Midget fuse (5A 250V) 2pcs (incl. 1 spare)</p> <p><input type="checkbox"/> Fuse holder 2pcs</p>	<p><input type="checkbox"/> PCB terminal 2pcs</p> <p><input type="checkbox"/> Bridge diode (indicated as +, ~, -) 3pcs</p>	<p><b>Resistor</b></p> <p>1/2W resistor</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 2.2Ω (RED-RED-GLD-GLD) 2pcs</li> <li><input type="checkbox"/> 47Ω (YEL-VIO-BLK-GLD) 2pcs</li> <li><input type="checkbox"/> 120Ω (BRN-RED-BRN-GLD) 9pcs</li> <li><input type="checkbox"/> 430Ω (YEL-ORN-BRN-GLD) 6pcs</li> <li><input type="checkbox"/> 1kΩ (BRN-BLK-RED-GLD) 6pcs</li> <li><input type="checkbox"/> 2.2kΩ (RED-RED-RED-GLD) 10pcs</li> <li><input type="checkbox"/> 5.1kΩ (GRN-BRN-RED-GLD) 3pcs</li> <li><input type="checkbox"/> 33kΩ (ORN-ORN-ORN-GLD) 12pcs</li> <li><input type="checkbox"/> 100kΩ (BRN-BLK-YEL-GLD) 14pcs</li> <li><input type="checkbox"/> 180kΩ (BRN-GRY-YEL-GLD) 7pcs</li> <li><input type="checkbox"/> 220kΩ (RED-RED-YEL-GLD) 4pcs</li> <li><input type="checkbox"/> 620kΩ (BLU-RED-YEL-GLD) 6pcs</li> </ul> <p>2W resistor</p> <p>3W resistor</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 0.47Ω 2W 2pcs</li> <li><input type="checkbox"/> 47kΩ 2W 2pcs</li> <li><input type="checkbox"/> 15Ω 3W 2pcs</li> </ul>
<p><b>Electrolytic capacitor</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 100μF (450V) 2pcs</li> <li><input type="checkbox"/> 33μF (450V) 2pcs</li> <li><input type="checkbox"/> 10μF (450V) 11pcs</li> <li><input type="checkbox"/> 8200μF (16V) 5pcs</li> <li><input type="checkbox"/> 47μF (25V) 7pcs</li> <li><input type="checkbox"/> 1000μF (6.3V lowESR) 4pcs</li> <li><input type="checkbox"/> 100μF (16V lowESR) 2pcs</li> </ul>	<p><input type="checkbox"/> Diode (Black) 13pcs</p> <p><input type="checkbox"/> Zener diode (Made of glass) 4pcs</p> <p><input type="checkbox"/> TVS (Black) 1.5KE7.5 2pcs</p>	
<p><b>Film capacitor</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 0.1μF (450V) (Black, indicated as 104) 4pcs</li> <li><input type="checkbox"/> 0.33μF (63V) (Ivory, indicated as .33) 4pcs</li> </ul>	<p><input type="checkbox"/> LED 1pc</p> <p><input type="checkbox"/> Photo coupler (indicated as 851) 4pcs</p>	
<p><input type="checkbox"/> Spark killer (Black) RE1201 1pc</p>	<p><input type="checkbox"/> PTC (Mustard, indicated as UN600 200) 2pcs</p>	

# 4. PCB assembly

\* Follow the instruction step by step. Check off the box after each component has been soldered.

## Before soldering

- Before soldering, follow the cut lines (groove lines) on the PCB to break it into 5 pieces (Unit 1-5). Use an edge of a desk to break the PCB easily. UNIT-5 is for use in Japan. For overseas, use UNIT-6 instead.
- Use sandpaper or a file to smooth the rough edges of the PCB to avoid injury.



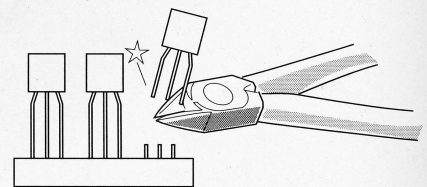
### Messages for correct PCB side mounting and orientation of parts

### Caution for taped parts



<b>Caution! Check the SIDE</b>	Mount the part with this mark on SIDE-B. If this is not indicated, mount the part on SIDE-A.
<b>Caution! Check the ORIENTATION</b>	The component has a polarity such as + and - and has a specific mounting orientation. Incorrect mounting may cause improper operation and component damage.
[Not orientation specific]	There is no polarity, such as + and -, and no specific orientation when mounting.
No indication	There is a polarity, such as + and -, but as the shapes of the parts and the PCB do not allow the parts to be mounted incorrectly, there is no need to mention the orientation.

Some electronic parts are fixed with tape. Cut the leads of these taped electronic parts with a diagonal cutter. The leads are attached to the tape securely. Do not pull the parts by hand forcibly from the tape - the parts may get damaged.



## UNIT-2 assembly

### 1 Volume

VR

The attached washer and the nut will be used in a later stage.

Mark on PCB

### 2 Pin header

1 x 6-pin 2 stages

**Caution! Check the ORIENTATION**  
(Top-bottom orientation)

CN301

Mark on PCB

How to set

### 3 Threaded spacer (Do not over-tighten!)

Female-Female M3x15 2pcs

Male-Female M3x6 2pcs

## UNIT-3 assembly

### 4 Binding post

Red TM4    Black TM3    Black TM2    Red TM1

\* The orientation of this U-shaped shaft does not matter.

## UNIT-4 assembly

### 5 Toggle switch 3-pin [Not orientation specific]

Toggle switch (3-pin)

\* The washer and the nut are to be used later.

Mark on PCB

Make sure the switch is fully seated and level on the PCB before soldering.

How to set




**UNIT-1 assembly**

**Tips**

Parts in this kit are numbered in "100, 200, or 300" series. "100" series parts are for Left Channel, "200" series are for Right Channel, and "300" series are common to both channels. Example - R101 and C101 are left channel, and R201 are right channel.

**6 Resistor [Not orientation specific]**

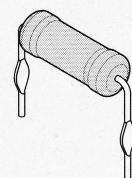
- Color indication
- 1/2W resistor 
- 2.2Ω (RED-RED-GLD-GLD) R132 R232
- 47Ω (YEL-VIO-BLK-GLD) R119 R219
- 1kΩ (BRN-BLK-RED-GLD) R104 R204  
R109 R209  
R117 R217
- 120Ω (BRN-RED-BRN-GLD) R102 R202  
R122 R222  
R127 R227  
R129 R229  
R303
- 430Ω (YEL-ORN-BRN-GLD) R103 R203  
R123 R223  
R128 R228

- 5.1kΩ (GRN-BRN-RED-GLD) R125 R225  
R307
- 2.2kΩ (RED-RED-RED-GLD) R110 R210  
R118 R218  
R131 R231  
R302 R304  
R305 R306
- 33kΩ (ORN-ORN-ORN-GLD) R120 R220  
R121 R221  
R133 R233  
R136 R236  
R138 R238

- 100kΩ (BRN-BLK-YEL-GLD) R107 R207  
R111 R211  
R114 R214  
R134 R234  
R135 R235  
R139 R239  
R140 R240
- 180kΩ (BRN-GRY-YEL-GLD) R113 R213  
R116 R216  
R137 R237  
R301

- 220kΩ (RED-RED-YEL-GLD) R101 R201  
R105 R205
- 620kΩ (BLU-RED-YEL-GLD) R106 R206  
R108 R208  
R130 R230

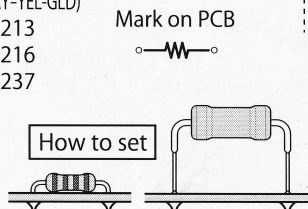
2W resistor  
3W resistor



0.47Ω 2W  
R124 R224

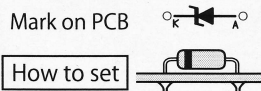
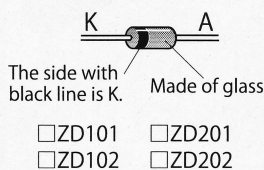
47kΩ 2W  
R112 R212

15Ω 3W  
R126 R226



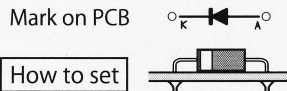
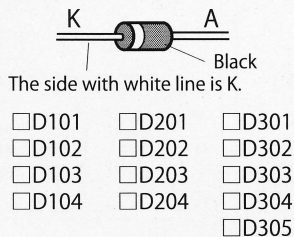
**7 Zener diode**

**Caution! Check the ORIENTATION**

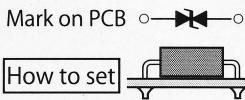
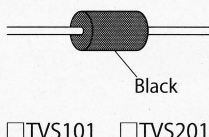


**8 Diode**

**Caution! Check the ORIENTATION**

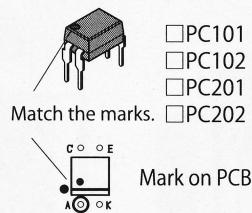


**9 TVS (1.5KE7.5)**  
[Not orientation specific]



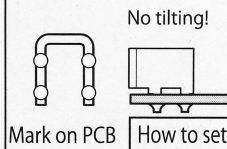
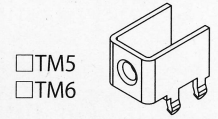
**10 Photo coupler EL851**

**Caution! Check the ORIENTATION**



**11 PCB terminal**

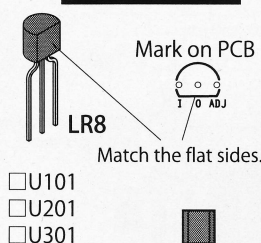
**Caution! Check the ORIENTATION**



These 3 parts look the same but different. See the model No. indication carefully to avoid a mistake.

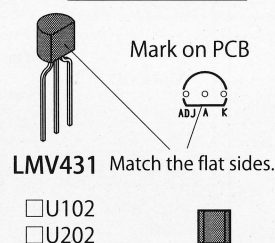
**12 IC LR8**

**Caution! Check the ORIENTATION**



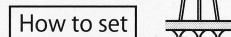
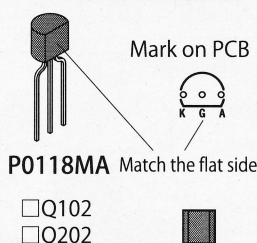
**13 IC LMV431**

**Caution! Check the ORIENTATION**



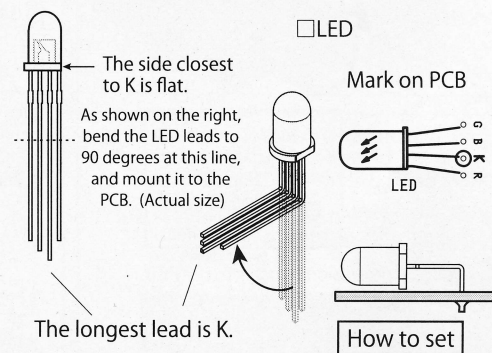
**14 SCR (Thyristor)**

**Caution! Check the ORIENTATION**



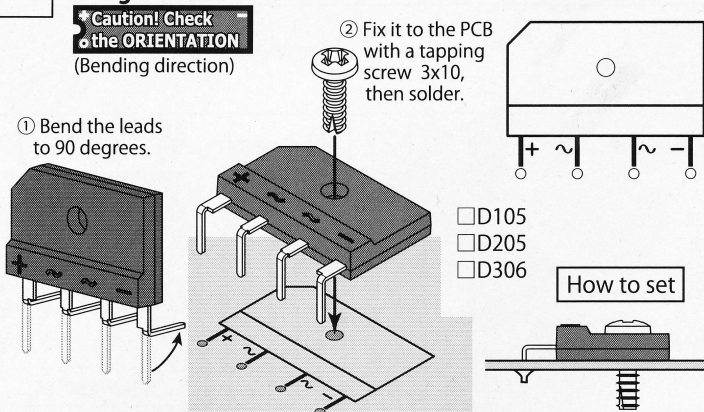
**15 LED**

**Caution! Check the ORIENTATION**



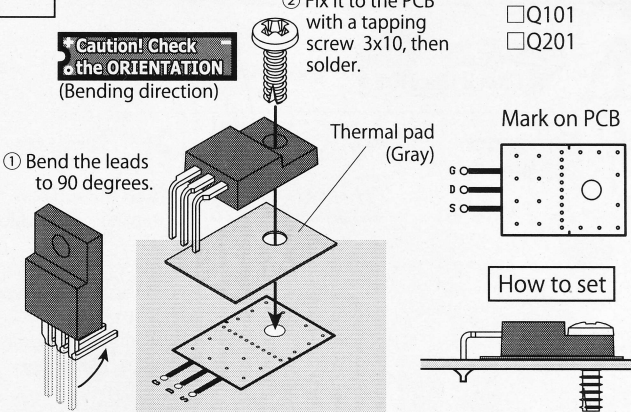
**16 Bridge diode**

**Caution! Check the ORIENTATION**  
(Bending direction)



**17 FET NDF02N60Z**

**Caution! Check the ORIENTATION**  
(Bending direction)



**UNIT-1 assembly**

**18 PTC UN600 200**  
[Not orientation specific]

Mark on PCB

How to set

PTC101  
 PTC201

**19 IC MIC29302**

Heat sink  
Thermal pad (Gray)  
Binding screw M3x6

① Spread out the leads a little for easier insertion to the PCB holes.  
② Fix it to the heat sink with the screw.

U103  
 U203  
 U302

Mark on PCB

How to set

Attach it closely to the PCB.  
Solder the pin of the heatsink as well.

**20 Electrolytic capacitor**

**\*Caution! Check the ORIENTATION**

The side with a mark is -.

The side with longer lead is +.

Mark on PCB

How to set

100 $\mu$ F (16V low ESR) <input type="checkbox"/> C102 <input type="checkbox"/> C202	10 $\mu$ F (450V) <input type="checkbox"/> C106 <input type="checkbox"/> C206 <input type="checkbox"/> C107 <input type="checkbox"/> C207 <input type="checkbox"/> C110 <input type="checkbox"/> C210 <input type="checkbox"/> C115 <input type="checkbox"/> C215 <input type="checkbox"/> C301 <input type="checkbox"/> C302 <input type="checkbox"/> C303
1000 $\mu$ F (6.3V low ESR) <input type="checkbox"/> C109 <input type="checkbox"/> C209 <input type="checkbox"/> C113 <input type="checkbox"/> C213	33 $\mu$ F (450V) <input type="checkbox"/> C108 <input type="checkbox"/> C208
47 $\mu$ F (25V) <input type="checkbox"/> C105 <input type="checkbox"/> C205 <input type="checkbox"/> C111 <input type="checkbox"/> C211 <input type="checkbox"/> C112 <input type="checkbox"/> C212 <input type="checkbox"/> C304	8200 $\mu$ F (16V) <input type="checkbox"/> C117 <input type="checkbox"/> C217 <input type="checkbox"/> C118 <input type="checkbox"/> C218 <input type="checkbox"/> C305
	100 $\mu$ F (450V) <input type="checkbox"/> C116 <input type="checkbox"/> C216

**21 Polypropylene film capacitor**  
[Not orientation specific]

0.33 $\mu$ F (63V) (Ivory, indicated as .33)  
 C101  C201  
 C114  C214

0.1 $\mu$ F (450V) (Black, indicated as 104)  
 C103  C203  
 C104  C204

Mark on PCB

How to set

**22 3-pole phone jack**

JACK3

Mark on PCB

Attach 4 protrusions closely to the PCB.

How to set

**23 Pin jack (RCA jack)**

JACK1 White  
 JACK2 Red

Mark on PCB

How to set

Attach it closely to the PCB.

**24 Toggle switch 6-pin**

The leads may be bent. Adjust them with long-nose pliers to match PCB holes before soldering.

SW301

Mark on PCB

How to set

Attach it closely to the PCB.

Solder this front pin as well.

The nut is to be used in a later stage.

**Caution! Check the SIDE** Mount **25 - 32** on **SIDE-B** of UNIT-1.

**25 Pin header 2x2-pin**

**\*Caution! Check the ORIENTATION**  
(Top-bottom orientation)

Either direction is OK.

How to set

Mark on PCB

JP101  
 JP201  
 JP301

**26 Jumper socket Single**

Insert the socket to the pin header attached in Step 25. (No soldering)

Select the headphone volume level and pilot LED according to your preference.  
[JP101, 201] Headphone volume level (4 levels) Set to "2" for now.  
[JP301] Pilot LED color (Blue or Green)

How to set

JP101  
 JP201  
 JP301

**27 Pin header 1x6-pin**

**\*Caution! Check the ORIENTATION**  
(Top-bottom orientation)

How to set

Mark on PCB

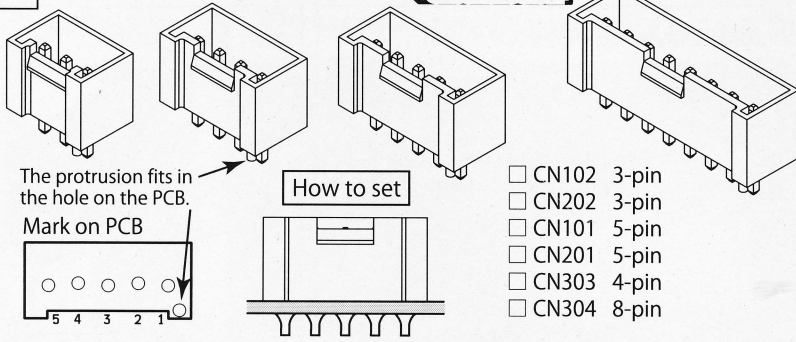
CN302

Make sure it is fully seated and level on the PCB before soldering.



**28 Connector (Box type VH connector)**

**Caution!**  
Check the SIDE



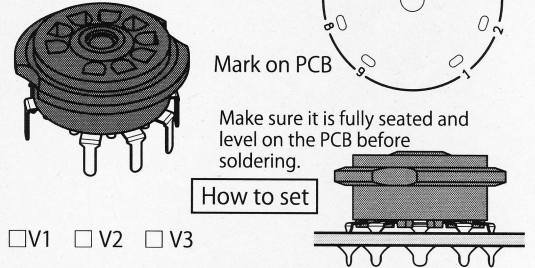
The protrusion fits in the hole on the PCB.  
Mark on PCB

How to set

- CN102 3-pin
- CN202 3-pin
- CN101 5-pin
- CN201 5-pin
- CN303 4-pin
- CN304 8-pin

**29 Tube socket 9-pin (Black)**

**Caution!**  
Check the SIDE



Mark on PCB

Make sure it is fully seated and level on the PCB before soldering.

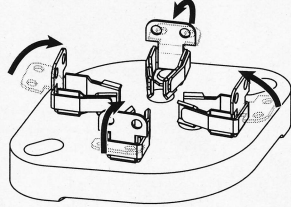
How to set

- V1
- V2
- V3

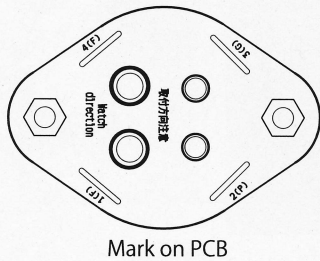
**30 Tube socket 4-pin (White)**

- V4
- V5

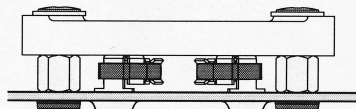
① Bend the 4 terminals of the socket upward as shown below.



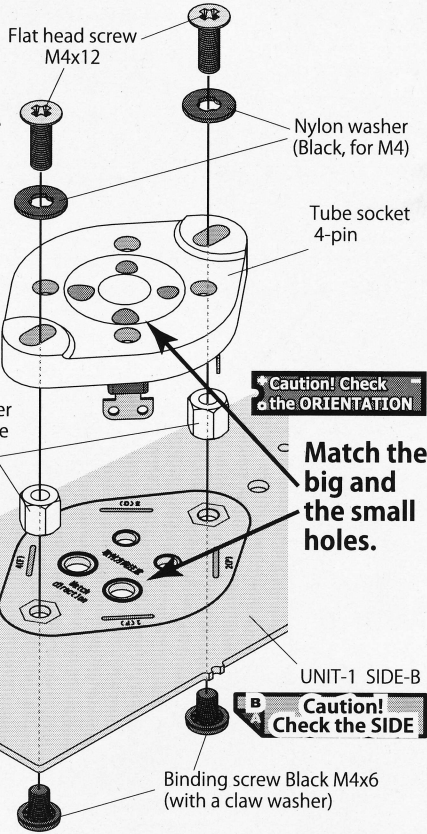
② Fix the socket to the PCB with the screws, then solder the 4 terminals.



Mark on PCB



How to set



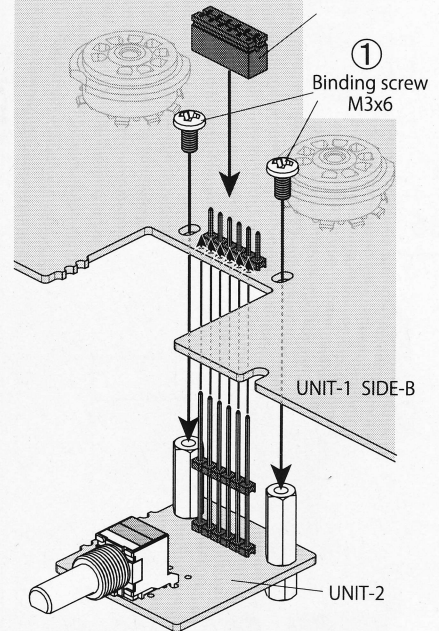
**Caution! Check the ORIENTATION.**  
Match the big and the small holes.

**Caution! Check the SIDE**

**31 UNIT-2 assembly**

②

Jumper socket Hex



①

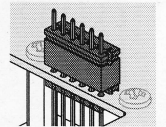
Binding screw M3x6

UNIT-1 SIDE-B

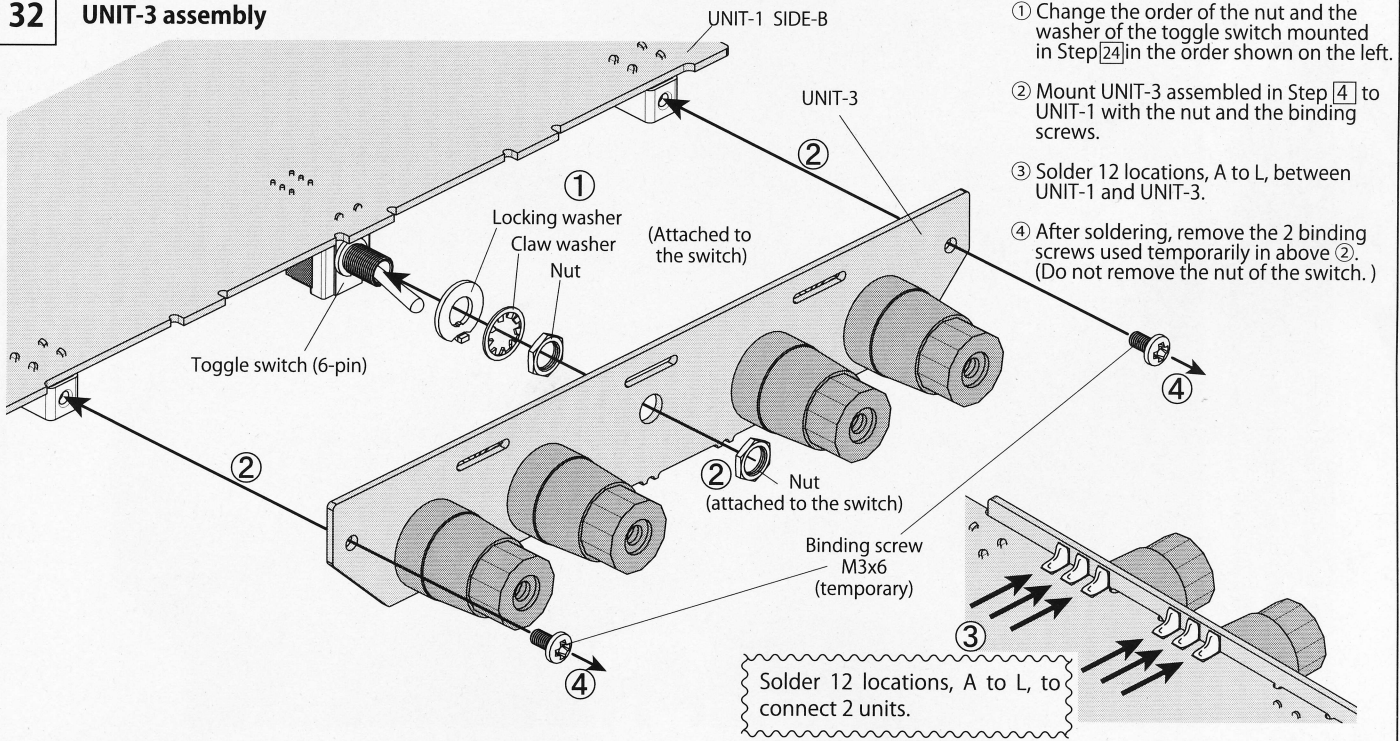
UNIT-2

① Fix UNIT-2 assembled in Step 1-3 with screws.

② Insert the jumper socket hex to the 12 pins of the pin header. Then it will look as shown on the right.



**32 UNIT-3 assembly**



① Change the order of the nut and the washer of the toggle switch mounted in Step 24 in the order shown on the left.

② Mount UNIT-3 assembled in Step 4 to UNIT-1 with the nut and the binding screws.

③ Solder 12 locations, A to L, between UNIT-1 and UNIT-3.

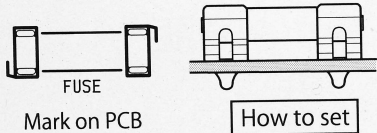
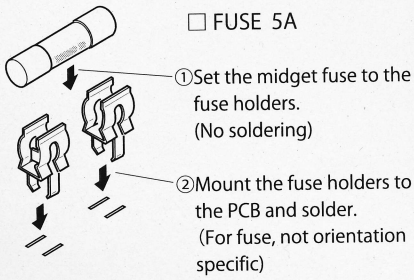
④ After soldering, remove the 2 binding screws used temporarily in above ②. (Do not remove the nut of the switch.)

Solder 12 locations, A to L, to connect 2 units.

**33 Midget fuse Fuse holder**

**Caution! Check the ORIENTATION**  
(Fuse holder only)

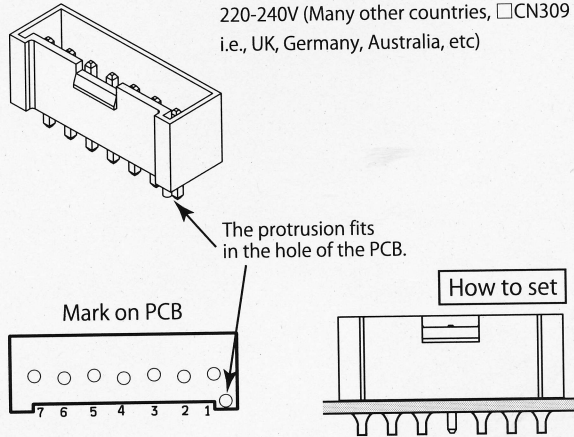
FUSE 5A



**34 Connector (Box type VH connector 7-pin)**

110-120V (USA, Canada, etc)  CN308

220-240V (Many other countries,  CN309 i.e., UK, Germany, Australia, etc)



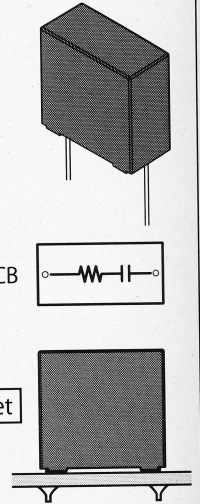
**35 Spark killer**

[Not orientation specific]

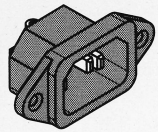
C307 RE1201

Mark on PCB

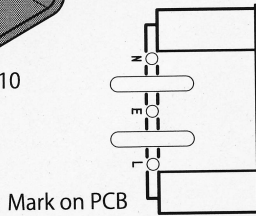
How to set



**36 AC inlet**

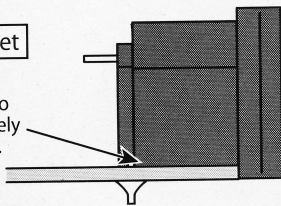


CN310



How to set

Make sure to attach it closely to the PCB.

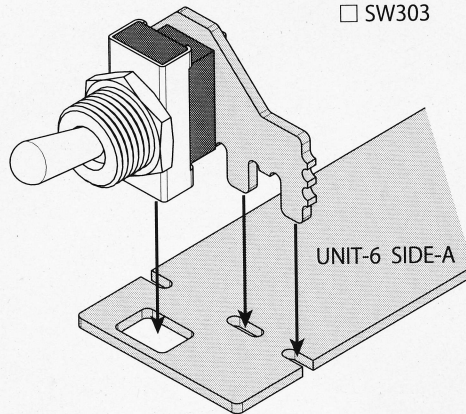


**37 UNIT-4 (Toggle switch 3-pin)**

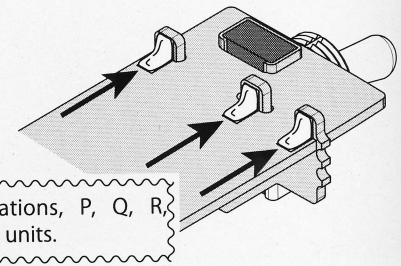
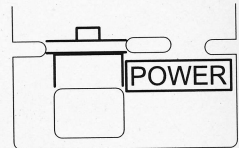
SW303

① Insert UNIT-4 assembled in Step 5 into UNIT-6.

② Solder 3 locations, P, Q, R, to connect UNIT-4 and UNIT-6.



Mark on PCB



All the soldering is now finished.

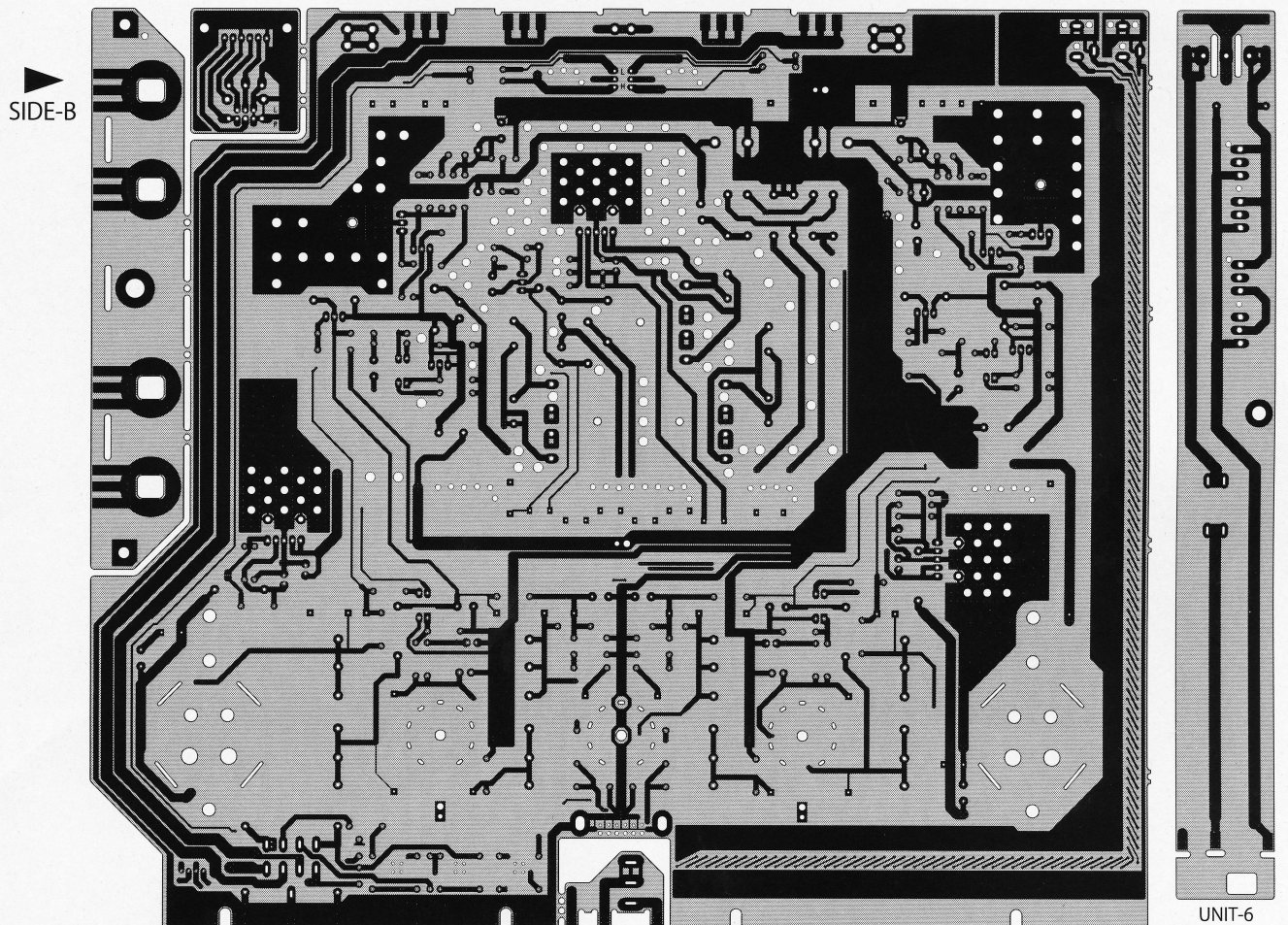
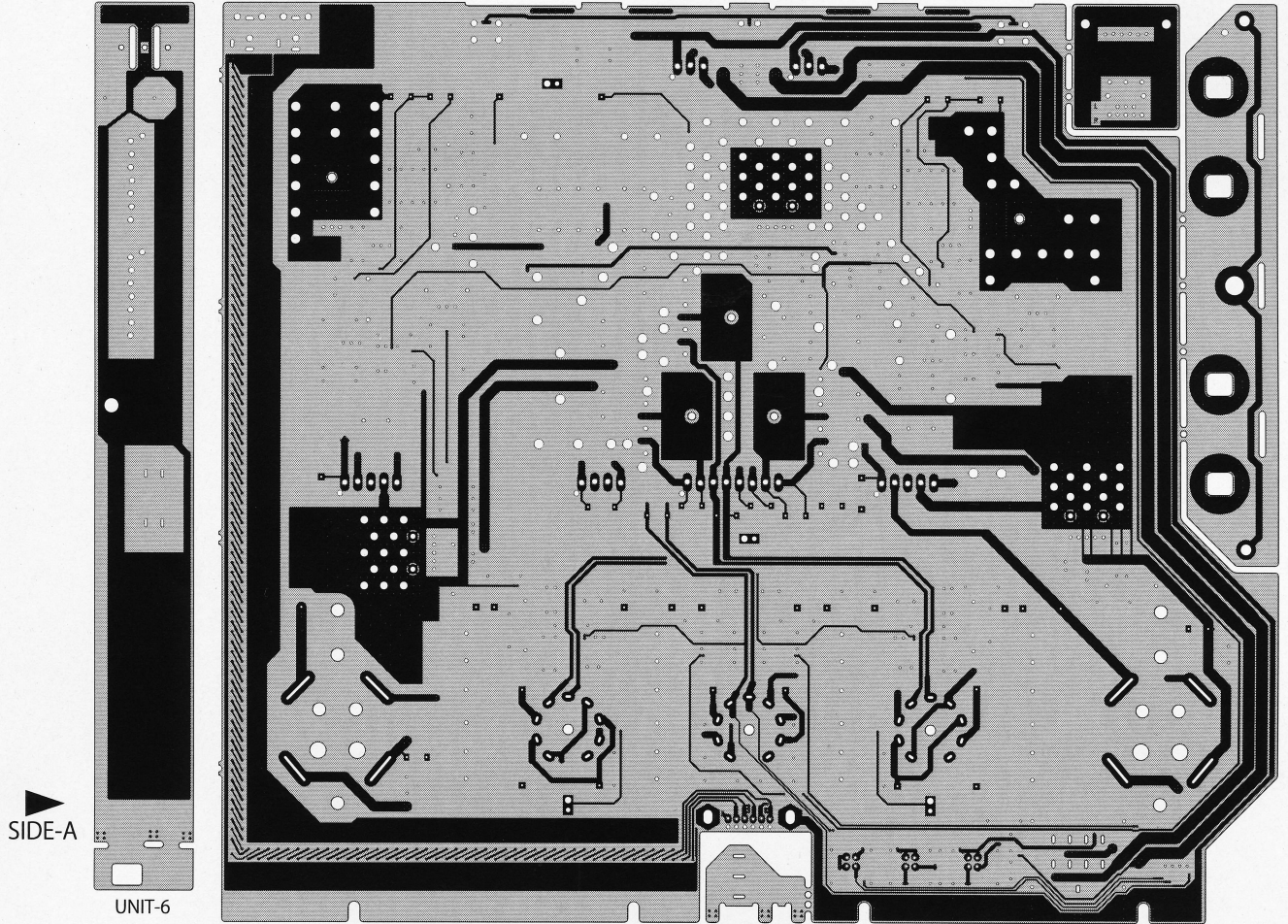
Before moving on to the chassis assembly, make sure all the electronic parts are correctly mounted, referring to the complete PCB drawing on Page 12-13. Please check the number and orientation of each part as well.

In addition, check the soldering of each electronic part. Re-solder any parts if there is a bad solder joint, or if you are unsure of the condition. This is very important to avoid any problems in later stages.



●PCB Layout

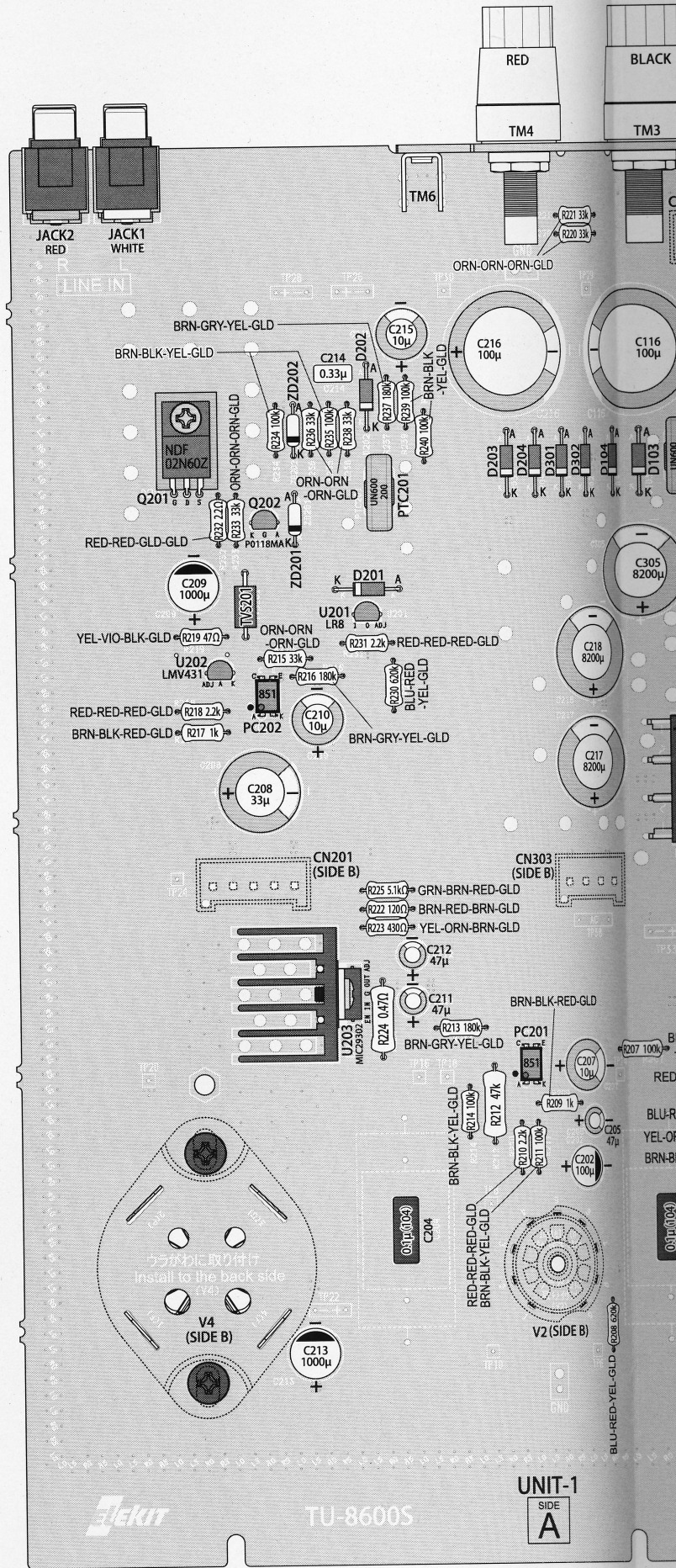
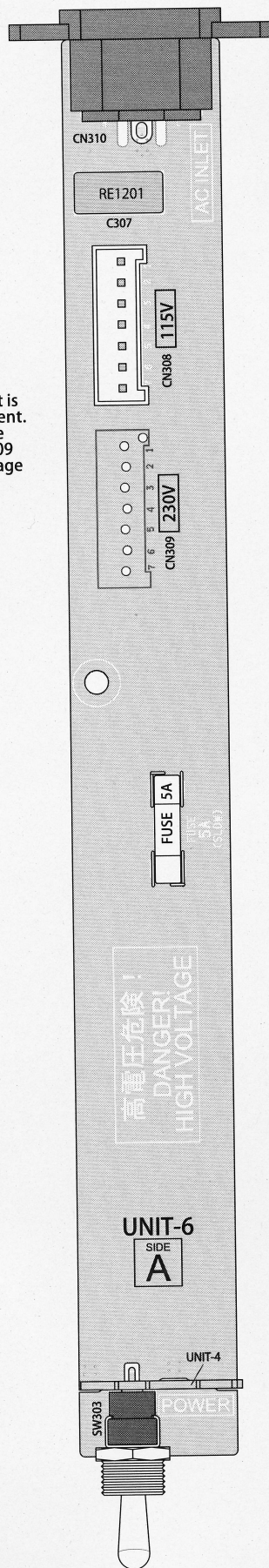
\* Please refer to the diagrams below to check the PCB condition.





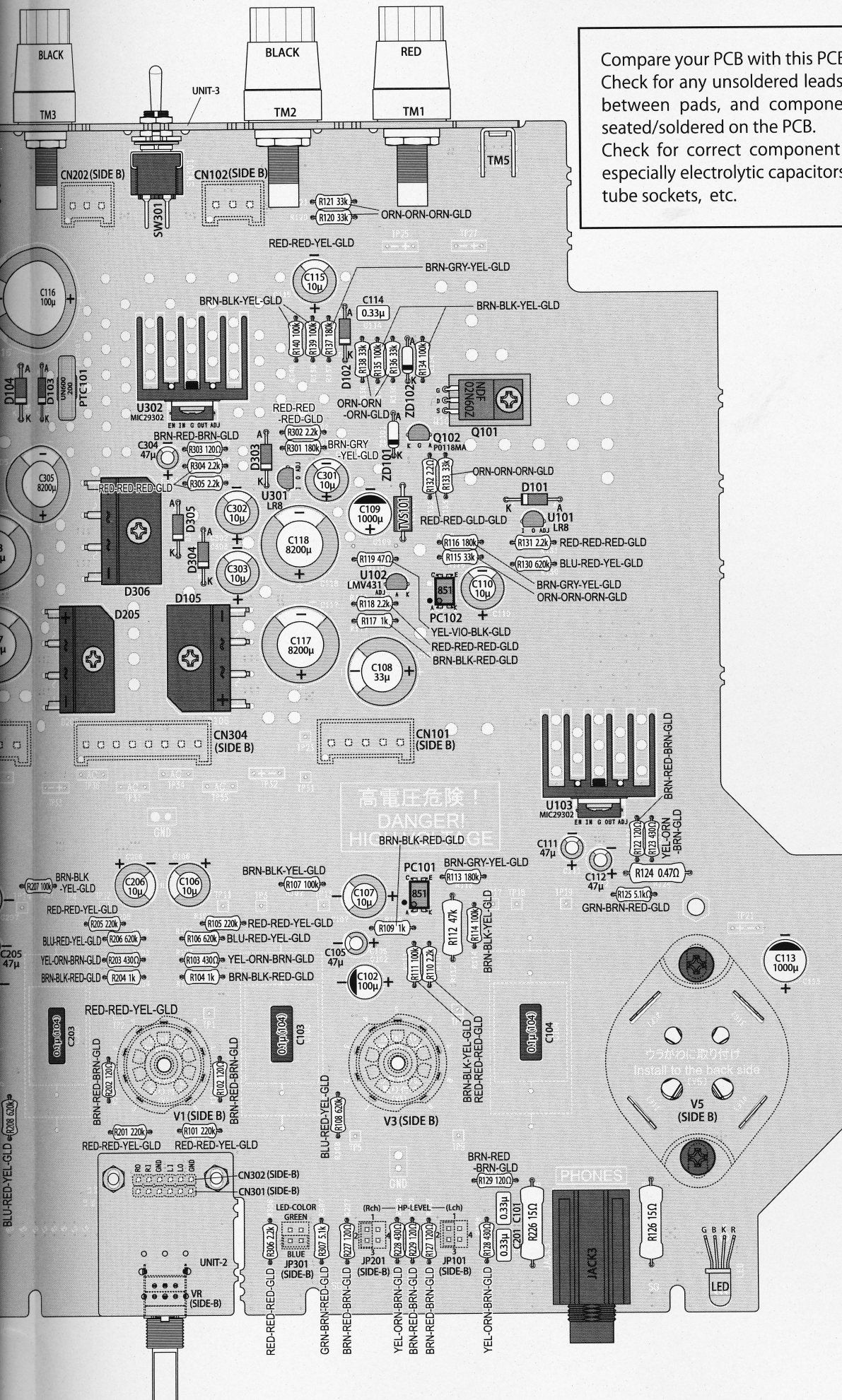
● Complete PCB

\* This is when the product is used in 115V environment. The connector should be set to either CN308 or 309 depending on your voltage environment.





Compare your PCB with this PCB image.  
 Check for any unsoldered leads or pins, solder bridges between pads, and components that are not fully seated/soldered on the PCB.  
 Check for correct component mounting orientation—especially electrolytic capacitors, diodes, ICs, FETs, SCRs, tube sockets, etc.

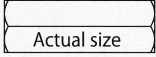




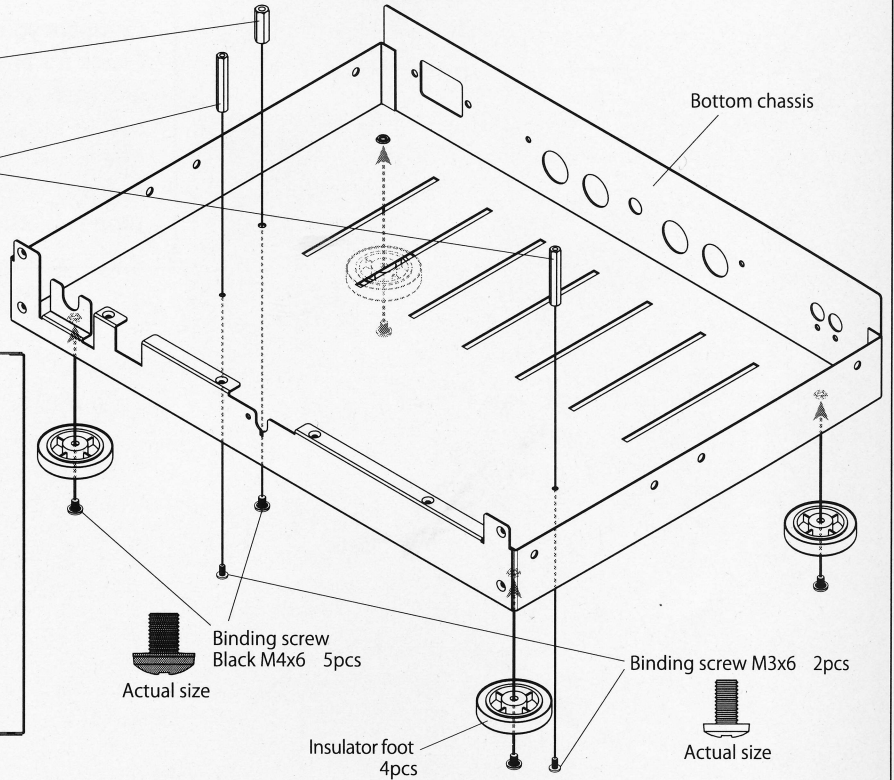
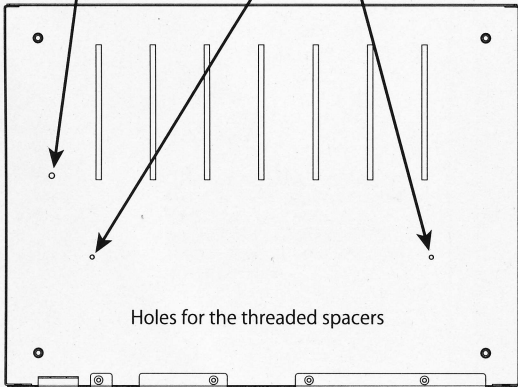
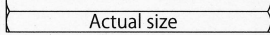
# 5. Chassis assembly

## 1 Threaded spacers and insulators

Threaded spacer  
Female-Female (M4x20) 1pc



Threaded spacer  
Female-Female (M3x35) 2pcs



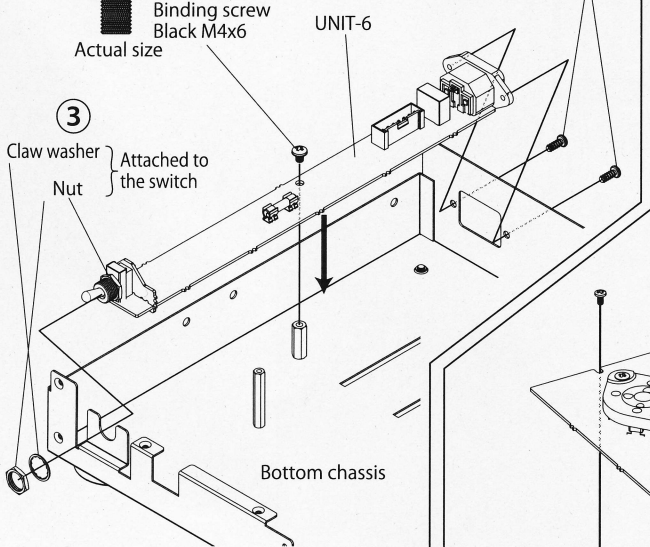
## 2 UNIT-6 assembly

Fix in the order of ①, ②, and ③.

② Binding screw  
Black M4x6  
Actual size

① Tapping screw  
4x10 2pcs  
Actual size

③ Claw washer  
Nut  
Attached to the switch

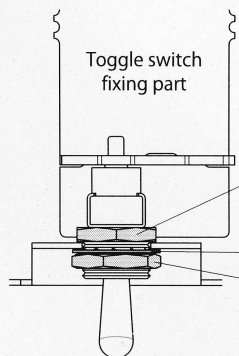


Toggle switch  
fixing part

Nut  
\*Adjust the position  
appropriately.

Claw washer

Nut



## 3 UNIT-1 assembly

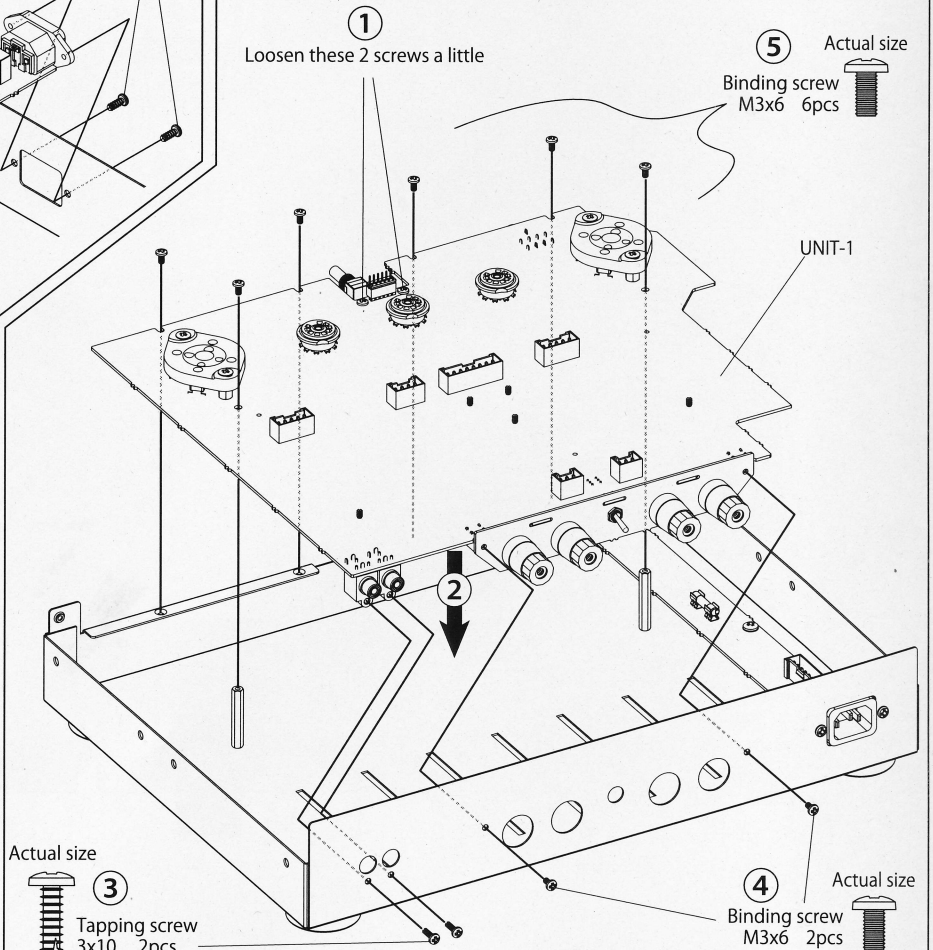
Fix in the order of ①, ②, ③, ④, and ⑤.

① Loosen these 2 screws a little

⑤ Binding screw  
M3x6 6pcs  
Actual size

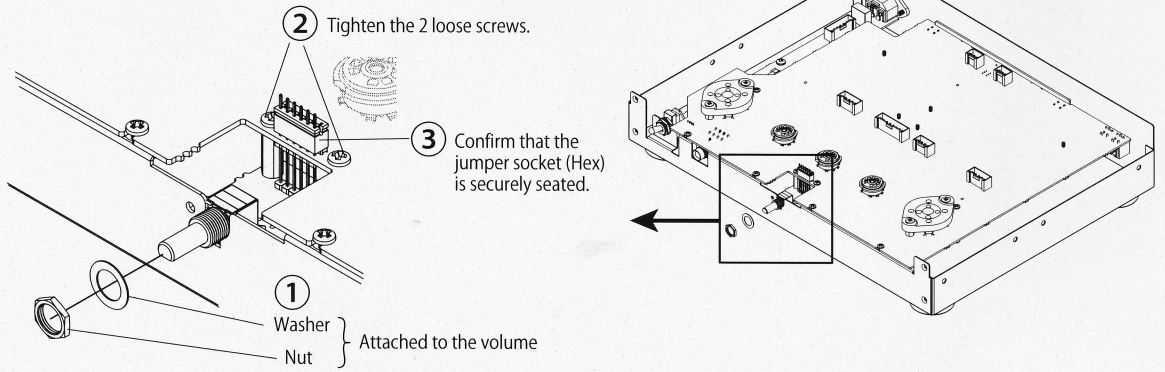
③ Tapping screw  
3x10 2pcs  
Actual size

④ Binding screw  
M3x6 2pcs  
Actual size

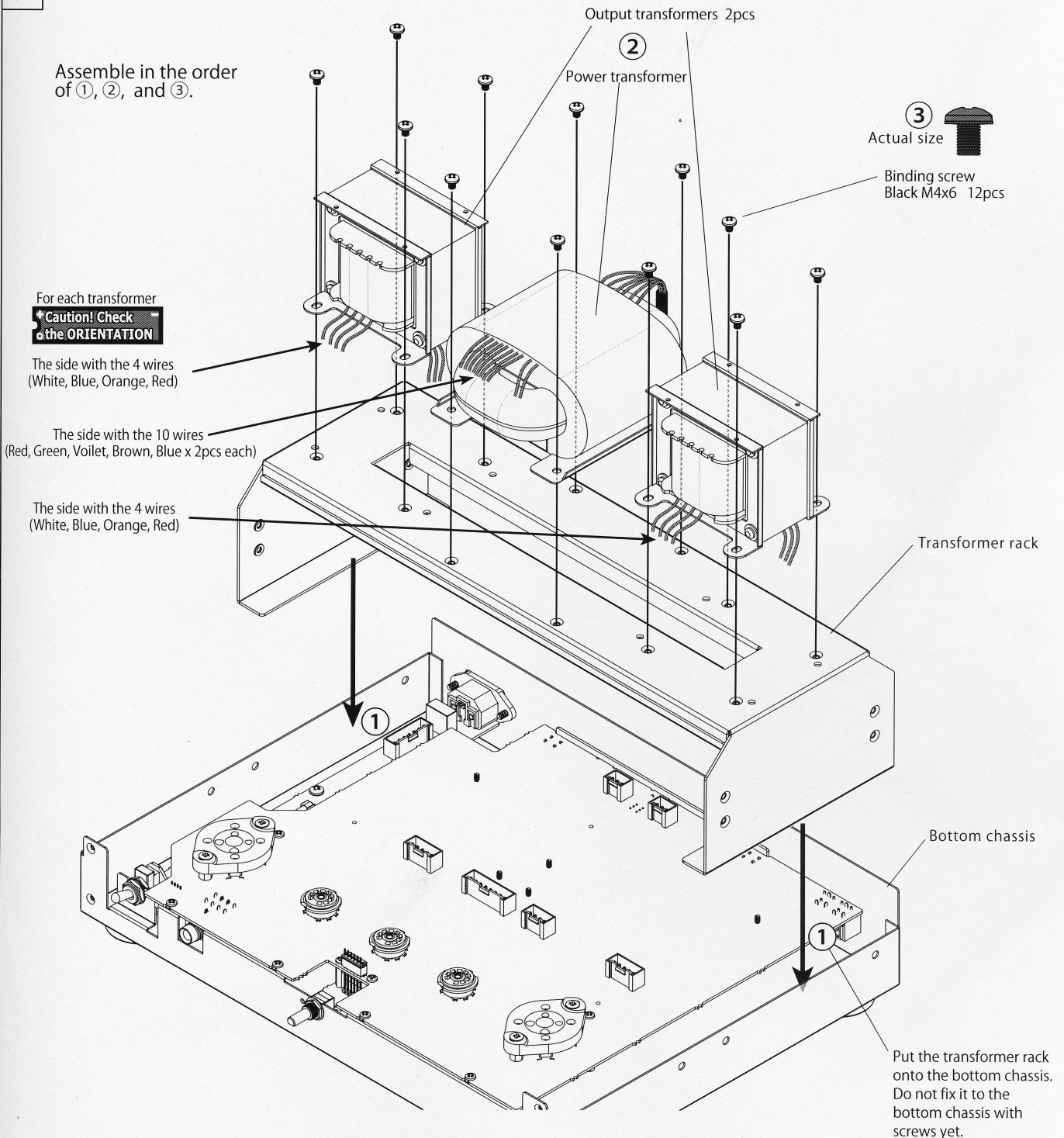




**4 Volume**



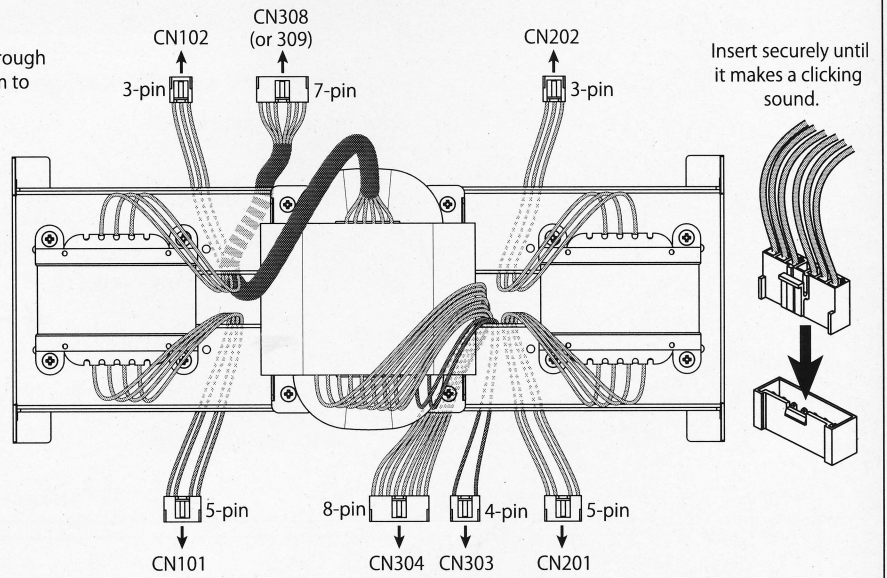
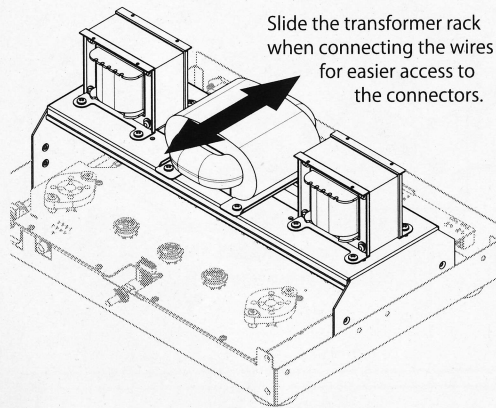
**5 Transformers**



## 6

### Transformer wiring

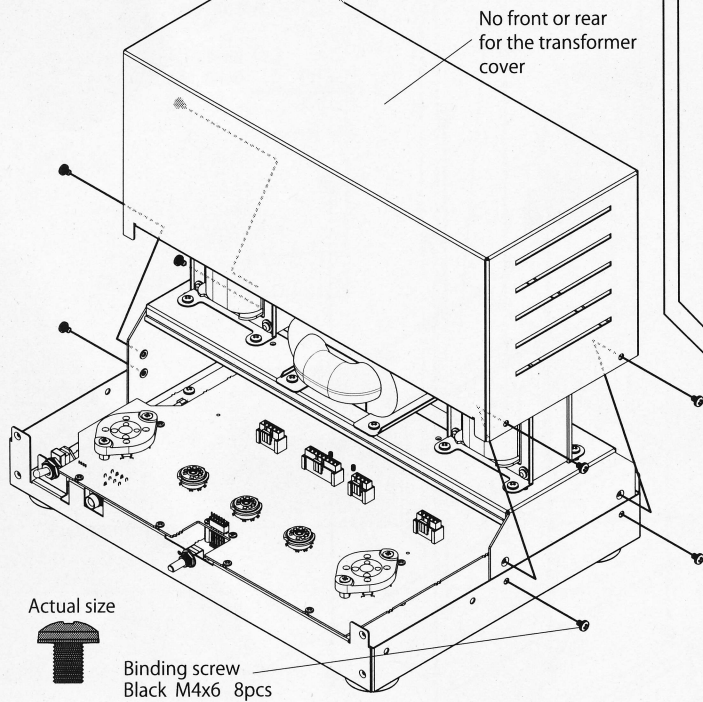
Put the connector wires from each transformer through the holes as shown on the right, and connect them to the connectors on the PCB.



## 7

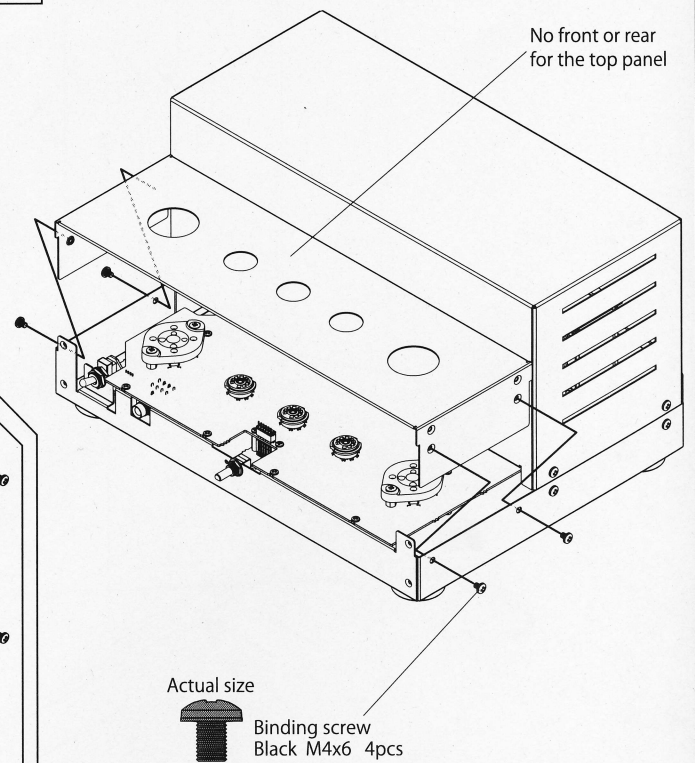
### Fix the transformer rack and the cover

- Align the rear side of the transformer rack and the bottom chassis, and fix with screws.
- Put the transformer cover over the rack and fix with screws.



## 8

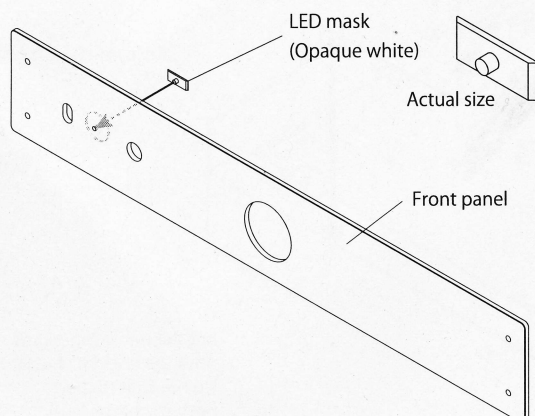
### Fix the top panel



## 9

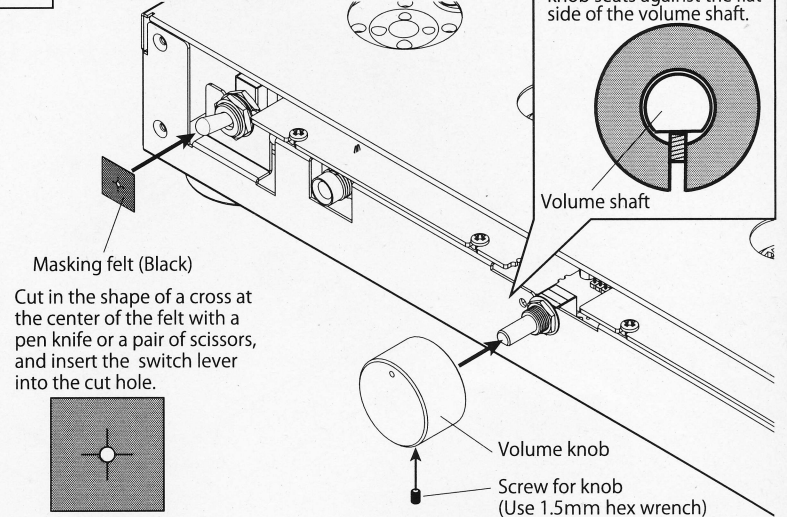
### LED mask

Attach the LED mask at the back side of the front panel and fix it with the adhesive.



## 10

### Volume knob, etc





**11 Labeling** MAKE SURE TO ATTACH THE LABELS FOR SAFETY USE.

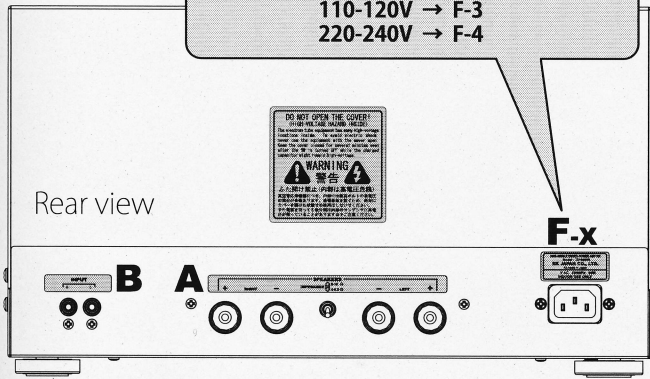
Use tweezers for labeling.

The labels in the function label are 2pcs each. Please keep 1 each label as a spare.

Use E-1 and E-2 labels according to need.

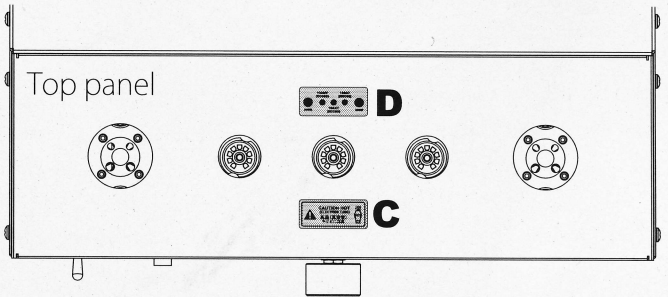
Select appropriate label from F-3 and F-4 according to the voltage setting you selected in UNIT-6.

110-120V → F-3  
220-240V → F-4

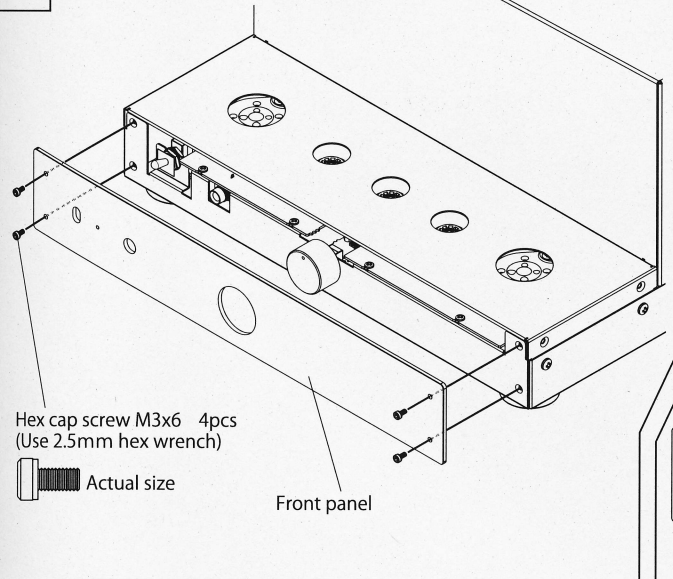


**[Tips]**

- 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.



**12 Front panel assembly**



Hex cap screw M3x6 4pcs  
(Use 2.5mm hex wrench)

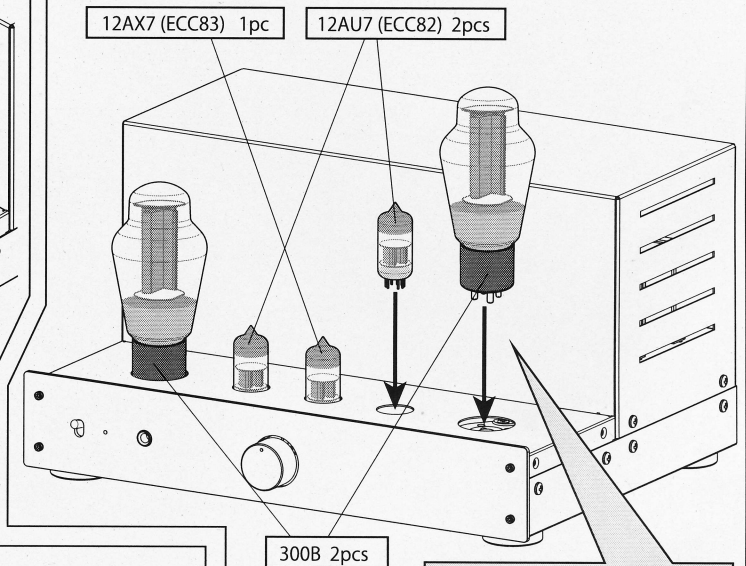


Actual size

Front panel

**13 Tube installation**

**Caution! Check the ORIENTATION**



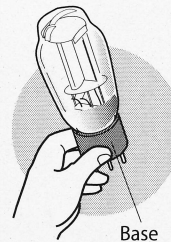
12AX7 (ECC83) 1pc

12AU7 (ECC82) 2pcs

300B 2pcs

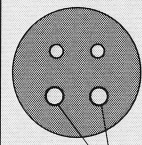
**PAY ATTENTION TO THE INSERTING ORIENTATION!**  
It is possible to insert 300B tubes into the sockets by force even if the orientation is wrong. Make sure the thickness of each pin and insert the tube in a correct orientation.

If there is a base of the tube, hold the base for exchange.

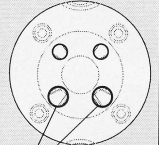


Base

300B bottom

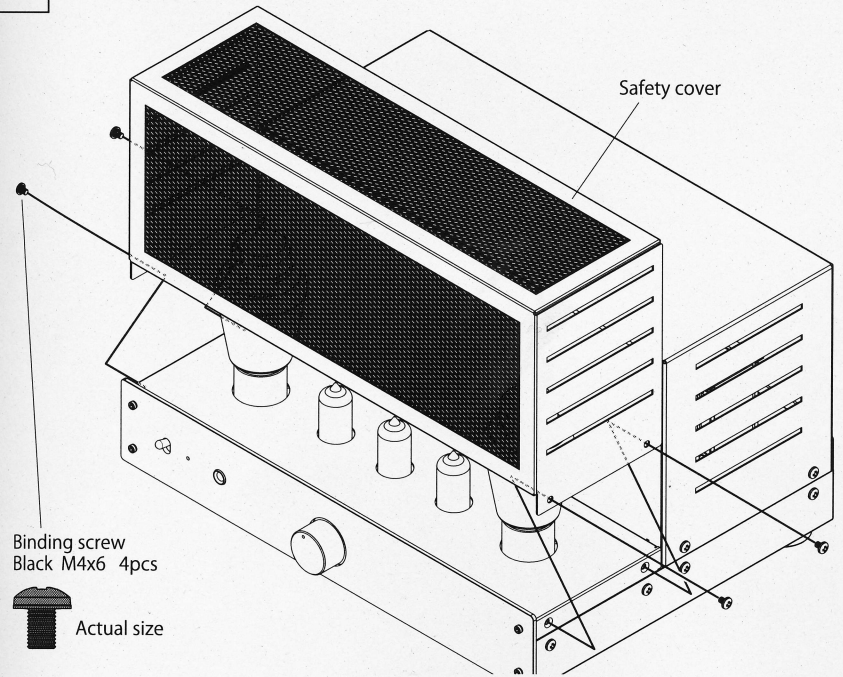


Socket



For thicker pins

**14 Safety cover**



Binding screw Black M4x6 4pcs



Actual size

**Complete!**





## 6. Safety precautions and safety check

(Be sure to read for safety use)

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



### CAUTION

- ◆ Before closing the chassis after assembly or repair, verify that all parts are installed correctly, wiring is correct, and there are no solder bridges, missing solder, etc BEFORE turning ON 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 with the power ON 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 disconnected, 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 experience 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 19. 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 to/from other devices, make sure to turn the amp OFF 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.
- ◆ Make sure to turn OFF the power when installing/removing vacuum tubes. Not doing so may cause an audio burst that could damage the amplifier or speakers.
- ◆ Before turning ON or switching ON inputs, verify the volume control is turned all the way down to prevent hearing damage, or speaker 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). To avoid burns, do not touch tubes with bare hands. 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 power 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.
- ◆ Do not modify or convert the amplifier in any way that falls outside the descriptions on Page 21 of this instruction. Such modification or conversion could cause a trouble or failure of the amplifier.
- ◆ 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.



## 7. 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 (switch down) and have the volume knob turned all the way down (turn counter-clockwise until it stops)
- ② Refer to 9. Connections on Page 20 and connect the audio source, speakers, and AC power cord.
- ③ Turn On the power (switch up) and confirm that the pilot LED turns ON (blue or green) and the tubes (the heaters of 12AX7(ECC83) and 12AU7(ECC82) and the filaments of 300B) start to glow orange. (Verify that 5 tubes glow. The difference in brightness of the heaters and filaments does not affect the operation.)
- ④ If everything is OK- test an audio signal from a connected audio source and slowly turn up the volume. Confirm that the audio output is normal.
- ⑤ Confirm that the audio output from both channels and from speakers and headphones/earphones.

When all are OK, the operation check is complete.

To further confirm the safe operation of the amp, it is recommended to check the voltage of each point with a multimeter. Refer to the Voltage check chart on Page 22.

## 8. Troubleshooting

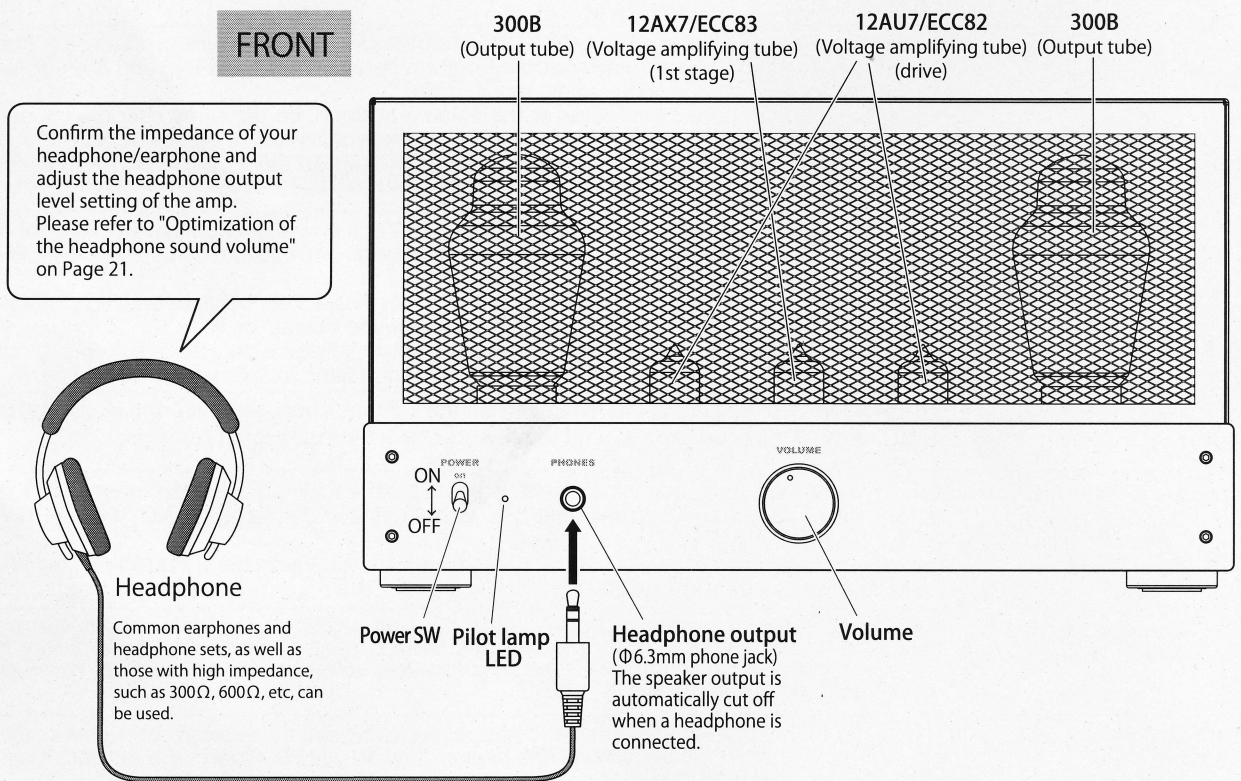
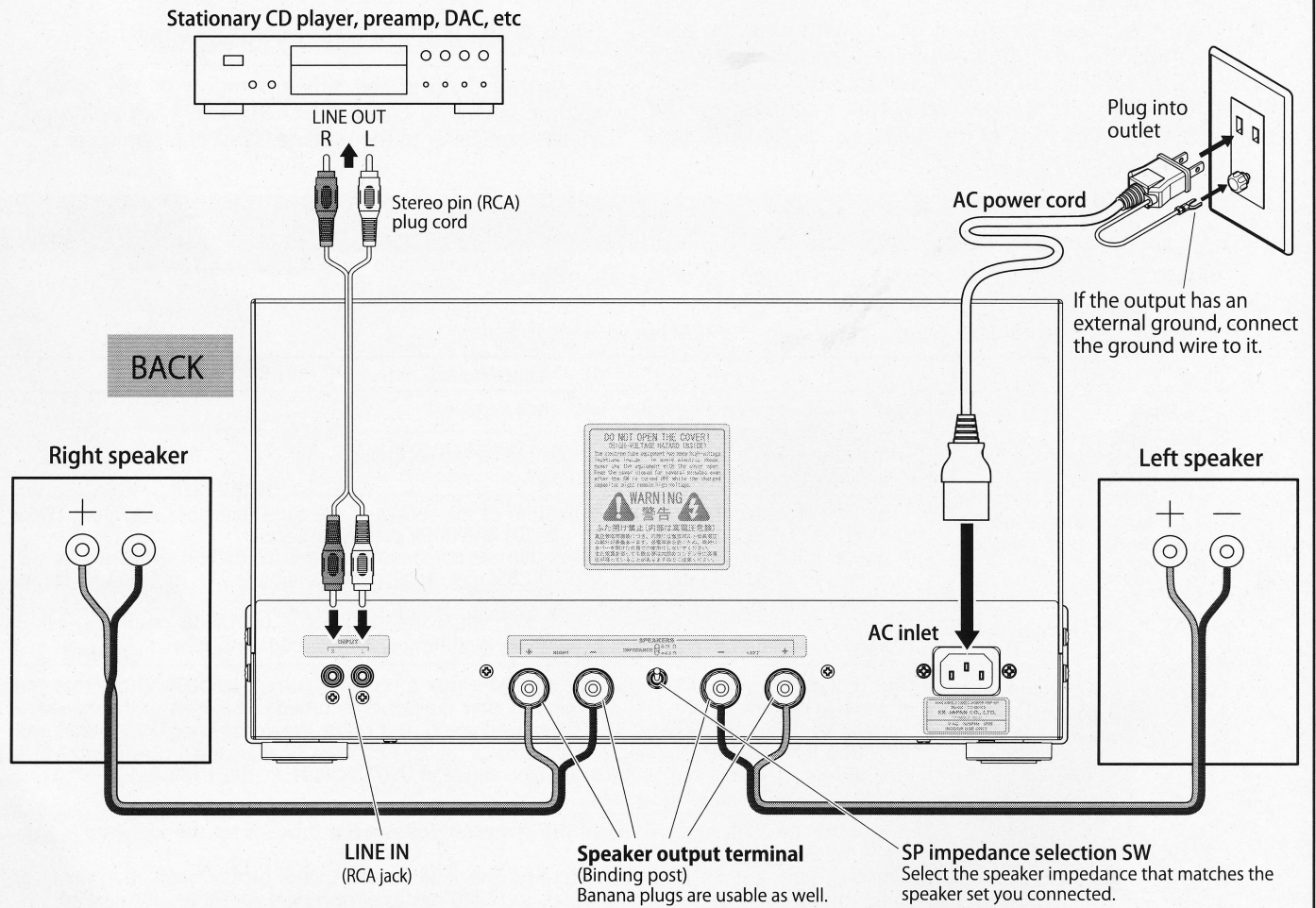
- Please refer to the below troubleshooting steps during use or operation check.
- Please also refer to the voltage check chart on page 22.
- If you cannot solve the problem, please consult with EK JAPAN or your local dealer.

Symptom	Check points
① Will not turn ON (Pilot LED OFF, the tube heaters/filaments do not glow).	<ul style="list-style-type: none"> <li>• Is the AC power cord plugged on both ends securely?</li> <li>• Is the AC power cord damaged?</li> <li>• Is the connection of the connector inside connected securely?</li> <li>• Are the parts on UNIT-6 soldered securely?</li> </ul>
② The pilot LED is ON, but one/some of the tube heater/filament does not glow.	<ul style="list-style-type: none"> <li>• Check the installation and solder condition of the socket of the tube that does not glow, D105, D205, D306, U103, U203, U302, PC101, PC201 and other peripheral parts.</li> <li>• Make sure that you are not using tubes that are not specified in this instruction, especially for the locations of 12AU7(ECC82) and 12AX7(ECC83). For detail, please see page 21, [10. Enjoy TU-8600S to the fullest].</li> <li>• When the tube heater /filament goes OFF while the amplifier is operating normal, check if TU-8600S is used in an environment with very high temperature or bad ventilation.</li> </ul>
③ The sound output is stopped while TU-8600S is operating normal.	<ul style="list-style-type: none"> <li>• The protective circuit could possibly be active due to excess current to 300B. (Note that the protective mode is released several minutes after the power is turned OFF.) Refer to the reference voltage figures in the Schematic diagram on Page 22 and check the voltages of TP25(L-side) and TP26(R-side) when the sound output is normal. If the figure is over 3V, there is a problem in the bias. Check the parts installation and soldering condition of Ux02, PCx101, PC102, Cx09, Rx13~x19 (For x, L-side:1, R-side:2) and 300B sockets.</li> </ul>
④ Either right or left channel has a problem.	<ul style="list-style-type: none"> <li>• Swap right and left tubes to see if the symptom follows the tube. If so, the problem is with the tube and not the circuitry.</li> <li>• When there is a problem in the circuitry, check all circuits in the problematic channel. "100" series of numbers are for Left Channel, and "200" series of numbers are for Right Channel.</li> <li>• Are the cables, such as audio input and speaker output connected securely? Check the cables for broken or torn sheathing.</li> </ul>
⑤ Difference in volume between the right and the left channels.	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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 installation and soldering.</li> </ul>
⑥ A loud hum can be heard through speakers/headphones at the lowest volume setting.	<ul style="list-style-type: none"> <li>• It is possible there is a problem in the ripple filter circuit in B-power or in the power circuit for the 300B filament. Check the soldering and installing condition of Q101-202, U103, U203 and peripheral parts.</li> <li>• If the hum cannot be heard from speakers, but it can be heard from headphones/earphones just slightly, please refer to "Optimization of the headphone sound volume" on Page 21.</li> <li>• Hum noise could occur, only occasionally, when the power voltage is constantly low. In such case, short-circuit JP102 and JS202 on SIDE-B of UNIT-1 by putting some solder there to improve the noise.</li> </ul>
⑦ A noise can be heard when the sound volume is high.	<ul style="list-style-type: none"> <li>• The problem could be in the input, rather than the volume. Check the soldering of VR, JP301, JP302, JACK1, JACK2 and parts around them. Also, check the input cord breakage as well.</li> </ul>
⑧ Tube/tubes become very hot.	<ul style="list-style-type: none"> <li>• Tubes work when its heater or filament is heated. When they are heated, especially the output tubes, they could become very hot, as high as 200 degreeC. DO NOT TOUCH THE TUBES WHEN THEY ARE HOT.</li> <li>* However, it is abnormal if the plate of the 300B tube (outermost electrode) starts glowing red hot. Turn OFF the amp power immediately.</li> </ul>
⑨ When a tube is tapped, the tap is amplified and heard through the speakers.	<ul style="list-style-type: none"> <li>• The noise is called "microphonic noise" inherent in tube amps. Microphonic noise occurs by the electrode of the tube picking up oscillations. Since oscillation affects the sound quality, it is recommended to place a tube amp in a location where it will not pick up external oscillations (away from speakers).</li> </ul>
⑩ Big difference in the brightness of the heaters of the tubes.	<ul style="list-style-type: none"> <li>• 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.</li> </ul>

# 9. Connections

\* Cables to connect speakers or any audio source are not included.

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





## 10. Enjoy TU-8600S to the fullest

### ① Try other output tubes

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. Some tubes have additional letters at the end of the model number. They basically have the same specifications as those with original model numbers, or some of them are improved version, i.e., less noise or smaller chance for breakage. So it is no problem to use them as a substitute of the tubes with original model numbers.

Also, tubes have different model numbers in the USA and Europe. However, following tubes are the same or equivalent tubes. Regarding 300B, they are called the same in both USA and Europe.

12AU7 = ECC82 = ECC802 (Reliable tube)

12AX7 = ECC83 = ECC803 (Reliable tube)

\* There are some "equivalent" tubes with different model numbers than the 12AU7 and 12AX7. These tubes may have much higher heater current and could activate the protective circuit of the TU-8600S, turning off audio output. In this case, remove the "equivalent" tubes and replace with 12AU7 and 12AX7 tubes. The amp should return to normal function.

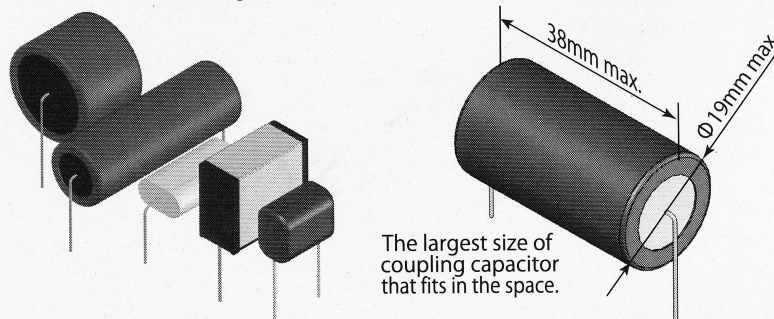
\* TU-8600S is a single-ended amplifier, so that the tubes do not need to be paired.

\* Make sure to turn OFF the power before installing/removing tubes.

### ② 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.

Coupling capacitors largely affect the sound. In this amplifier, C103, C104, C203, and C204 are the ones. The PCB is designed with some extra space around the location of the coupling caps so that larger or particular size of capacitors in the market can be mounted. 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 0.1  $\mu$ F, and the rated voltage should be higher than 400V. In addition, the size should be within the maximum figures as indicated below.



Exchanging the cathode bypass capacitors with conductive polymer aluminum solid electrolytic capacitors with a low ESR can be very effective. The lower the ESR the better the audio output will be. The TU-8600S uses super low ESR conductive polymer aluminum electrolytic capacitors. Exchanging these capacitors randomly may degrade audio quality.

\* 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.

\* Troubles, such as short-circuit, due to contacts between large electronic parts, like resistors and so on are occasionally reported. Make sure not to use any larger parts than indicated above.

### Optimization of the headphone sound volume

Various headphones and earphones vary greatly in efficiency. Low efficiency headphones may result in low volume levels, while high efficiency headphones may have an audible hum when used at the same volume setting. TU-8600S offers 4 settings for adjusting headset audio volume for matching headphone efficiency. The volume settings can be changed by moving the jumpers on JP101 and JP201. The 4 positions will increase volume (volume will get louder moving the jumpers from positions 1 through 4).

\* You need to remove the top panel to do this volume level adjustment. There are many high voltage locations inside the amp. Make sure to pull out the plug and wait for at least 10 minutes before the adjustment.

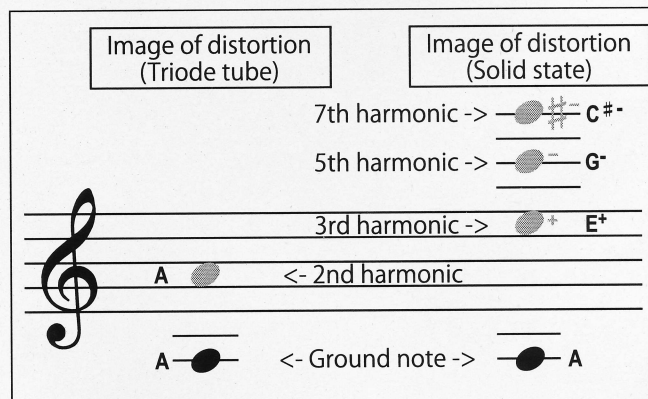
\* When you hear obvious hum noise even from the speakers, it is a sign of some kind of trouble. Please refer to the troubleshooting on Page 19.

## 11. Why do vacuum tubes attract audiophiles?

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 has 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 still attracts many audiophiles.



## 12. Technical data

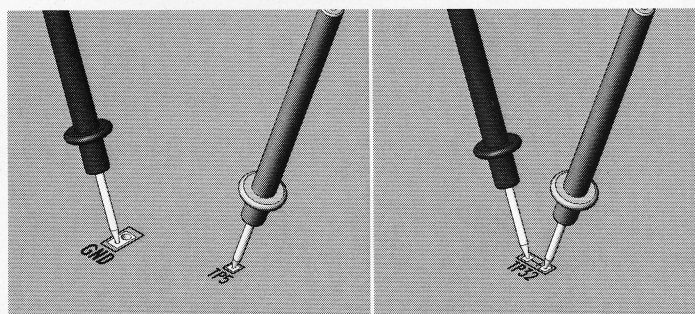
Specifications	
Model No.	TU-8600S
Tubes	2 x 300B, 1 x 12AX7(ECC83), 2 x 12AU7(ECC82)
Circuit configuration, etc	Vacuum tube stereo power amplifier
Output stage	300B A-class single, active automatic bias adjustment
Voltage amplification stage	12AX7(ECC83) 1 stage + 12AU7(ECC82) parallel drive
Heater, filament power	DC-power (LDO used)
B-power	MOSFET + ripple filter (for L and R separately)
Maximum output (8Ω load, THD10%)	9.2W + 9.2W
Rated input	270mV rms
Frequency response (-3dB)	15 - 40,000Hz
Residual noise (IHF-A, 8Ω loaded)	36μV rms
Input terminal	RCA jack stereo
Output terminal	Binding terminal (Banana plug usable) Headphone output : 3-pole phone (Φ6.3mm) jack
Speaker impedance	4 - 16Ω
Headphone impedance	8 - 600Ω (corresponds to high-impedance headphones as well), unbalanced
Power voltage	110V-120V AC or 220-240V AC, 50/60Hz (selectable upon assembly) IEC standard 3P inlet
Power consumption	90W
Dimensions	W 385 x H 217 x D 325 mm (incl. projections)
Weight	Approx. 12.8kg (incl. tubes, excl. power cord)

### Voltage check points and voltage references

Please note that the below TP values are for your reference when there is no signal and the amp is operating normally. Actual values may vary depending on the specifications of individual tubes and measuring conditions. Please also refer to the circuit diagram on Page 23.

How to use the tester probes (See the illustration on the right.)

- Single "TP" tap is measured in DC range with respect to the GND.
- Paired "TP" tap is between 2 points. Those indicated with + or - are in DC range, and Those with AC are in AC range.



TP1	0.8 V
TP2	0.8 V
TP3	110 V
TP4	110 V
TP5	0 V
TP6	0 V
TP7	8.7 V
TP8	8.7 V
TP9	175 V
TP10	175 V

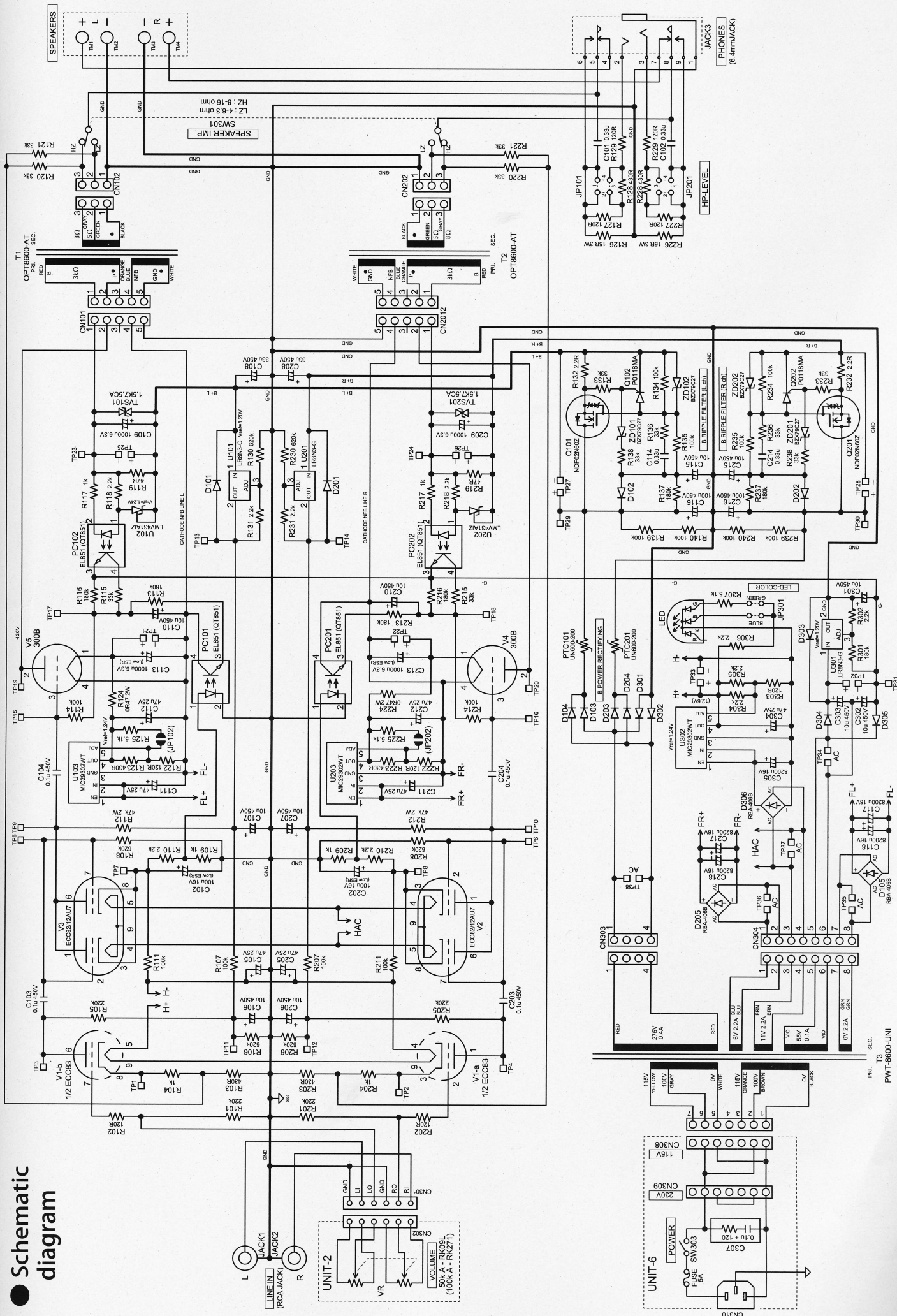
TP11	235 V
TP12	235 V
TP13	330 V
TP14	330 V
TP15	-70 V
TP16	-70 V
TP17	-70 V
TP18	-70 V
TP19	360 V
TP20	360 V

TP21	5 V
TP22	5 V
TP23	365 V
TP24	365 V
TP25	2.7 V
TP26	2.7 V
TP27	16-22 V
TP28	16-22 V
TP29	385 V
TP30	385 V

TP31	-98 V
TP32	160 V
TP33	12.6 V
TP34	60 V AC
TP35	6.5 V AC
TP36	6.5 V AC
TP37	12.6 V AC
TP38	300 V AC



# Schematic diagram



## 13. 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 which 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 19 before consulting with your dealer or EK JAPAN.

### Contact information

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**ATTENTION!**

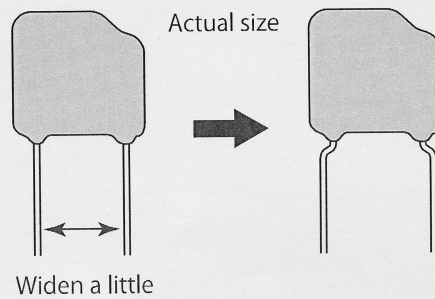
TU-RE1201E

### REPLACEMENT PART OF THE SPARK KILLER RE1201

A replacement part for the spark killer RE1201 is included in the kit. Although the shape and appearance are different, the electronic specifications and the performance are equal to RE1201.

Upon assembly, please make sure to widen the pitch of the part leads so that they match the pitch of the holes on the PCB.

Although the part shape is asymmetry, it does not have a polarity and is not orientation specific.



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