Lot.No.
104146

8300R-01

300B SINGLE STEREO POWER AMPLIFIER - TU-LAB

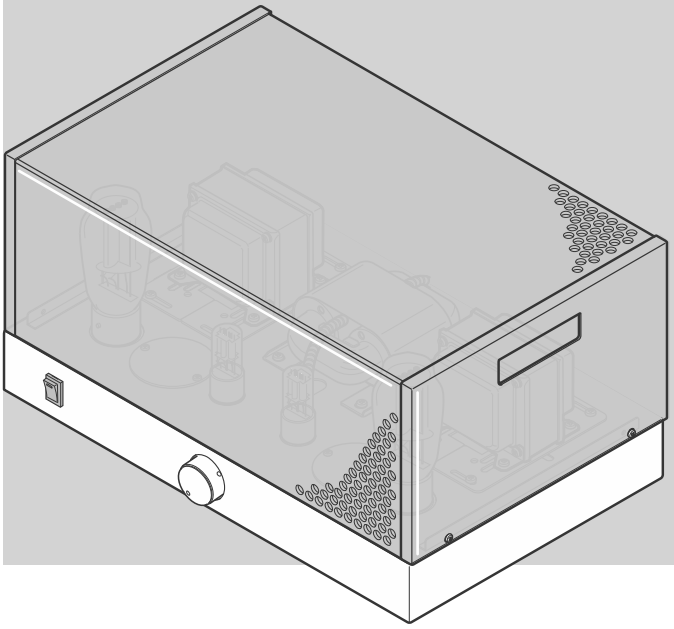
Model No.: TU-8300R

Assembly instruction manual

TU-LAB is a single stereo power amplifier with 300B tubes, the most popular tube of all times. However, not only 300B vacuum tubes are the attraction of this amplifier; there are many other appealing features.

<Triode connection of pentode>
Triode-connected pentode and beam tube have equal qualification and attraction as 300B. In this TU-LAB, 8-pin sockets are equipped, so enable triode connection of such tubes as KT88(6550), KT66, EL34(6CA7), 6L6GC, etc, without any modifications to the amplifier.
<Try different OPT and volume controls!>
A slide universal bracket has been developed for TU-LAB and installation of various kinds of OPTs is enabled without making modifications to the chassis.
<World-wide power transformer>
A multi power transformer that can be used under 4 different power voltage environments, such as 100V, 115V, 200V, and 230V is adopted (Select the setting location of the corresponding connector upon assembly.).

Experiment a combination of tubes, output transformers (OPT), volumes, etc, and find your favorite tone out of TU-LAB!



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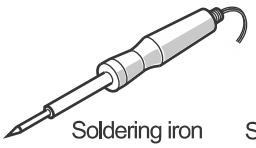
⚠ CAUTIONS

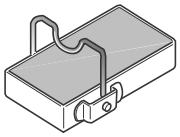
For your own safety, please read this "Assembly instruction manual" carefully before you begin assembling the amplifier. Please follow the instructions step by step for correct assembly and operation. Keep this manual always close by.

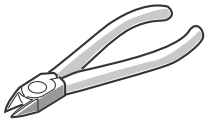
◆Do not work near any source of water or allow any components to get wet which may cause fire and electric shock.
◆Do not put containers with water on the work table such as vases, cups, cosmetics, and drugs. Spilling water on components will cause fire and electric shock.
◆Keep out of reach of small children during assembly, usage and storage. Please discard packing waste and any waste from assembling the kit according to social standard for safety and protection of the environment.
●Read the "Assembly instruction manual" carefully and be sure to fully understand them before assembly.
●Be careful when handling tools; diagonal cutters, pen knives, and other sharp tools in particular.
●Do not work near young children due to safety concerns. Children must not play with tools, plastic bags and electronic parts as they may cause harm.
●Some essential pieces in this kit include small and sharp objects that are made of glass or metal. Be extremely careful. If by any chance a child has swallowed any of these items, immediately consult a medical doctor.
●This product and its components may differ without notice.

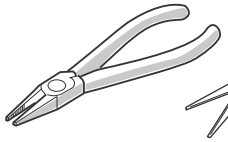
NECESSARY TOOLS


Soldering iron (15～30W)


Solder (for electronic parts) (φ0.8～1.2)

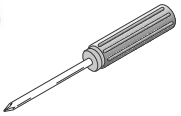

Solder stand


Diagonal cutter


Long-nose pliers

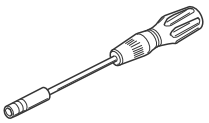

Scissors


Pen knife


⊕ screwdriver (For M3 or No.2)

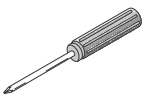

Hexagonal wrench (1.5mm)

Helpful tools


Nut driver (5.5mm)


File or sand paper

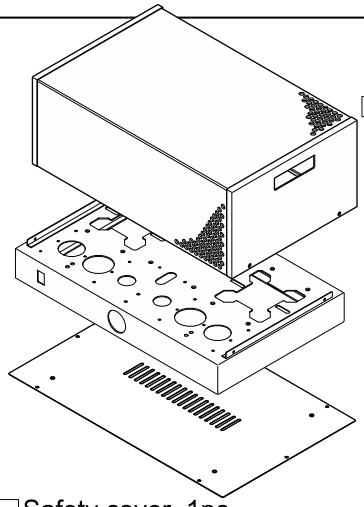

Multimeter
Optional voltage and connection check is suggested.


⊕ screwdriver (For M2 or No.1)

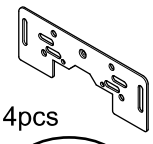
EK JAPAN CO.,LTD. Tofuro-minami 2-19-30, Dazaifu-shi, Fukuoka, 818-0105, Japan Phone: +81-92-923-8235
ELEKIT website: http://www.elekit.co.jp E-mail:info@elekit.co.jp

1. Part List

* Please check off the box in front of each item to ensure they have been included with the kit.

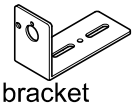


☐ Safety cover 1pc
☐ Main chassis 1pc
☐ Bottom panel 1pc

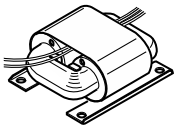


☐ OPT bracket 4pcs

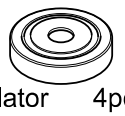
☐ Socket cover 2pcs



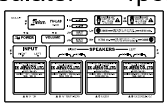
☐ Volume bracket 1pc



☐ Power transformer 1pc

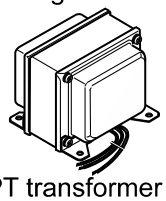


☐ Insulator 4pcs

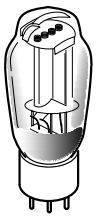


☐ Function label 1pc

☐ Warning label 1pc



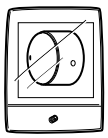
☐ OPT transformer 2pcs



☐ Tube 300B 2pcs

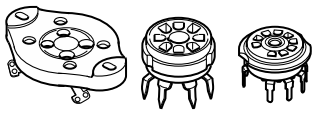
☐ Tube 12AT7(ECC81) 2pcs

* The vacuum tubes are made of glass. Please handle with care.
* 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.
* 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 varies in each tube.



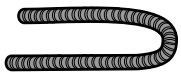
* A screw for knob is included in the same plastic bag as the knob. Make sure to take it out from the plastic bag.

☐ Knob 1pc
(A screw for knob is included.)



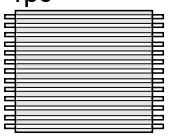
Vacuum tube socket
☐ 4-pin 2pcs ☐ 8-pin 2pcs
☐ 9-pin 2pcs

* Although there may be some rust in the plate spring of 4 pin socket, it is OK as long as it does not affect the power distribution.
* Please handle with care, as the base is made of porcelain. The 8 pin socket lead ends are sharp.

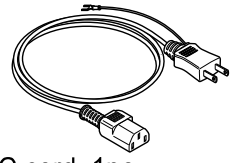


☐ Corrugated tube 1pc

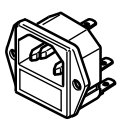
Wire
☐ Black 1pc ☐ Yellow 1pc
☐ Blue 1pc



☐ Parallel jumper cable 1pc

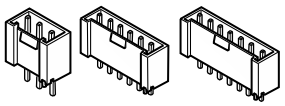


☐ AC cord 1pc

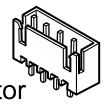


☐ AC inlet 1pc
(with fuse holder)

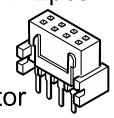
☐ Midget fuse 2pcs
(125V 4A by default)



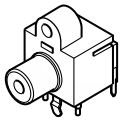
VH connector (male)
☐ 3-pin 2pcs
☐ 6-pin 1pc
☐ 7-pin 1pc



☐ XH connector
(male) 4-pin 2pcs

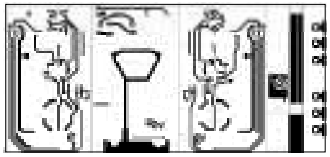


☐ JQ connector
(female) 4-pin 2pcs



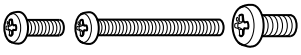
Pin jack
(RCA jack)
☐ White 1pc
☐ Red 1pc

Speaker terminal 1pc
☐ Red 4pcs
☐ Black 2pcs



☐ PCB TU-8300 1pc

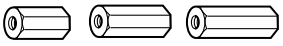
☐ Crow washer 5pcs



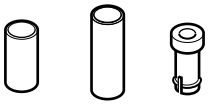
Binding screw
☐ M3 short(M3x8) 14pcs
☐ M3 long(M3x25) 12pcs
☐ M4 (M4x8) 30pcs

☐ Binding tapping screw
M3x10 2pcs

☐ M5 nut 6pcs



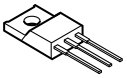
Threaded spacer (hex)
☐ Short M3x12 16pcs
☐ Medium M3x17 6pcs
☐ Long M3x20 2pcs



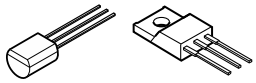
Plastic spacer
☐ Short (10.5mm) 1pc
☐ Long (15mm) 2pcs
☐ Temporary stopper 3pcs

☐ Snap-in spacer
(plastic, H7mm) 4pcs

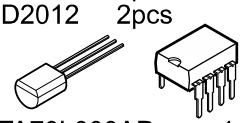
☐ LED spacer
(12mm, black) 2pcs



☐FET
K3947 or K2750 1pc



Transistor
☐ C5201 3pcs
☐ D2012 2pcs



IC
☐ TA78L008AP 1pc
☐ 12F629(8-pin) 1pc

☐ Diode (black) 3pcs

☐ Zener diode
(made of glass) 2pcs

☐ Bridge diode
(4-pin) 4pcs

☐ LED 2pcs

Resistor (1/2W)
☐ 470Ω (YEL-VIO-BRN-GLD) 7pcs
☐ 1.2kΩ (BRN-RED-RED-GLD) 7pcs
☐ 2kΩ (RED-BLK-RED-GLD) 3pcs
☐ 10kΩ (BRN-BLK-ORN-GLD) 3pcs
☐ 22kΩ (RED-RED-ORN-GLD) 9pcs
☐ 100kΩ (BRN-BLK-YEL-GLD) 14pcs
☐ 220kΩ (RED-RED-YEL-GLD) 4pcs
☐ 330kΩ (ORN-ORN-YEL-GLD) 4pcs
☐ 1MΩ (BRN-BLK-GRN-GLD) 6pcs
☐ 4.7MΩ (YEL-VIO-GRN-GLD) 2pcs

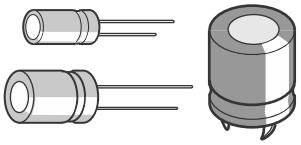
* BLK: black, BRN: brown, RED: red, ORN: orange YEL: yellow, GRN: green, VIO: violet, GLD:gold

Resistor (2W, 3W)
☐ 0.51Ω 2W 4pcs
(indicated as 0.51 or R51)
☐ 100Ω 2W 2pcs
(indicated as 100Ω or 101)
☐ 220Ω 3W 2pcs
(indicated as 220Ω or 221)

Multilayer ceramic capacitor
☐ 1μF (16V) 8pcs
(blue, indicated as 105)
☐ 47pF (1kV) 2pcs
(yellow, indicated as 47)

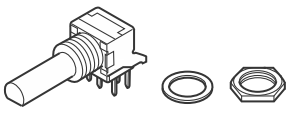
☐PP (polypropylene) film capacitor 0.047μF (400V, indicated as 473) 6pcs

☐Spark killer RE1201 1pc

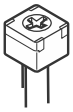


Electrolytic capacitor

- ☐ 2.2μF(100V) 4pcs
- ☐ 100μF(16V) 5pcs
- ☐ 220μF(50V) 2pcs
- ☐ 4.7μF(450V) 12pcs
- ☐ 180μF(450V) 1pc

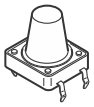


☐Volume control 1pc (with a nut and a washer)



☐Variable resistor (cermet trimmer) 1kΩ(indicated as 102) 4pcs

☐Power Switch (locker switch) 1pc



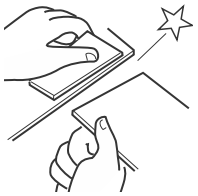
☐Push switch 2pcs

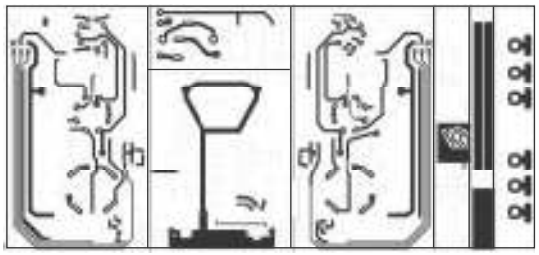
☐Base pin 37pcs

Before soldering

①Before soldering, follow the cut lines (grooved lines) at 5 locations to break the circuit board into 10 pieces. Use an edge of a desk to break the PCB easily. Tracing the lines with a penknife makes breaking easier.

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





* After breaking there are 10 pieces of PCBs, UNIT1 ~ Unit9. You may put the label plate at the front of the product with a both-sided adhesive tape.

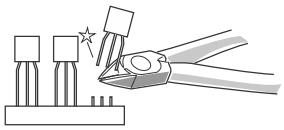
2.PCB Assembly

* Follow the instructions step-by-step.Check off the box after you have soldered each component.

* Most of the electronic parts are set on Side-A, the white print side, and soldered on Side-B, the yellow print side, while some are set and soldered from opposite sides. Make sure the sides before soldering.

* Attention

Some parts are fixed to a paper tape. Do not try to pull a part off the tape by force, otherwise the part may be damaged as it is taped very securely. Make sure to use a diagonal cutter to cut the part legs to remove the part.



UNIT-1 and UNIT-2 Assembly

* The electronic parts of UNIT-1 and UNIT-2 are basically located symmetry, therefore it is efficient to install the parts of the two units alternately. The numbers of UNIT-1 parts are in the 100's, and those of UNIT-2 are in the 200's. (EX: 220kΩ for R101 and R201.)

1 Base pin 16pcs

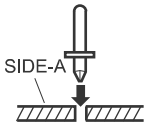
Set from SIDE-A, solder from SIDE-B

UNIT-1
- ☐OPT-PRI-L B+ (3pcs)
- ☐OPT-PRI-L PLATE (3pcs)
- ☐(SEC NFB IN-L) NFB
- ☐(SEC NFB IN-L) GND

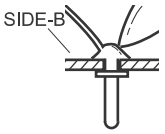
UNIT-2
- ☐OPT-PRI-R B+ (3pcs)
- ☐OPT-PRI-R PLATE (3pcs)
- ☐(SEC NFB IN-R) NFB
- ☐(SEC NFB IN-R) GND

How to set

①Insert vertically till the end from SIDE-A



②Solder from SIDE-B.



* Put a piece of cardboard underneath and push down the pin with long-nose pliers.

Marked on PCB

2 Base pin 6pcs

Set from SIDE-B, solder from SIDE-A

ATTENTION!

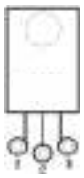
How to set

Refer to 1, only the setting and soldering sides are different.

UNIT-1
- ☐TR101 E
- ☐TR101 C
- ☐TR101 B

UNIT-2
- ☐TR201 E
- ☐TR201 C
- ☐TR201 B

Marked on PCB



3 1/2W resistor (non direction specific)

Set from SIDE-A, solder from SIDE-B

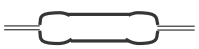
UNIT-1	UNIT-2	
☐R101	☐R201	220kΩ(RED-RED-YEL-GLD)
☐R102	☐R202	1.2kΩ(BRN-RED-RED-GLD)
☐R103	☐R203	100kΩ(BRN-BLK-YEL-GLD)
☐R104	☐R204	100kΩ(BRN-BLK-YEL-GLD)
☐R105	☐R205	1MΩ(BRN-BLK-GRN-GLD)
☐R106	☐R206	470Ω(YEL-VIO-BRN-GLD)
☐R107	☐R207	100kΩ(BRN-BLK-YEL-GLD)
☐R108	☐R208	22kΩ(RED-RED-ORN-GLD)
☐R109	☐R209	22kΩ(RED-RED-ORN-GLD)
☐R110	☐R210	330kΩ(ORN-ORN-YEL-GLD)
☐R111	☐R211	330kΩ(ORN-ORN-YEL-GLD)
☐R116	☐R216	2kΩ(RED-BLK-RED-GLD)
☐R117	☐R217	470Ω(YEL-VIO-BRN-GLD)
☐R119	☐R219	1.2kΩ(BRN-RED-RED-GLD)
☐R120	☐R220	22kΩ(RED-RED-ORN-GLD)
☐R121	☐R221	10kΩ(BRN-BLK-ORN-GLD)
☐R122	☐R222	22kΩ(RED-RED-ORN-GLD)
☐R123	☐R223	100kΩ(BRN-BLK-YEL-GLD)
☐R124	☐R224	220kΩ(RED-RED-YEL-GLD)
☐R125	☐R225	100kΩ(BRN-BLK-YEL-GLD)

How to set

Marked on PCB

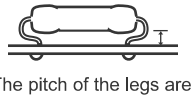
4 2W, 3W resistor (non direction specific)

Set from SIDE-A, solder from SIDE-B



UNIT-1	UNIT-2	
☐R113	☐R213	0.51Ω 2W(indicated as 0.51Ω or R51)
☐R114	☐R214	0.51Ω 2W(indicated as 0.51Ω or R51)
☐R118	☐R218	100Ω 2W(indicated as 100Ω or 101)
☐R115	☐R215	220Ω 3W(indicated as 220Ω or 221)

How to set



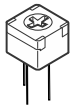
2W、3W resistors become hot. Install them with a little clearance from the PCB.

* The pitch of the legs are smaller so that the part can be easily installed with clearance from PCB.

UNIT-1 and UNIT-2 Assembly (continue from Page 3)

5 Variable resistor (Cermet trimmer)

Set from SIDE-A, solder from SIDE-B.



UNIT-1 UNIT-2
☐VR101 ☐VR201
☐VR102 ☐VR202

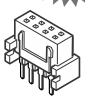
Marked on PCB

How to set

6 JQ connector (female) 4-pin (direction specific)

Set from SIDE-A, solder from SIDE-B.

Attention!



UNIT-2 only
(Not for UNIT-1)
☐CN202

Marked on PCB

Make sure the setting direction by matching the part shape to the print on the PCB.

How to set

Make sure the part is set horizontally right and not tilted upon soldering.

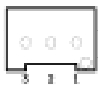
7 VH connector (male) 3-pin (direction specific)

Set from SIDE-A, solder from SIDE-B.

Attention!

UNIT-1 UNIT-2
☐CN101 ☐CN201

Marked on PCB



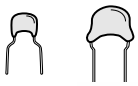
Make sure the setting direction by matching the part shape to the print on the PCB.

How to set

Make sure the part is set horizontally right and not tilted upon soldering.

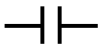
8 Multilayer ceramic capacitor (non direction specific)

Set from SIDE-A, solder from SIDE-B.

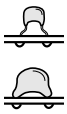


UNIT-1 UNIT-2
☐C108 ☐C208 1μF (16V)
(blue, indicated as 105)
☐C103 ☐C203 47pF (1kV)
(yellow, indicated as 47)

Marked on PCB

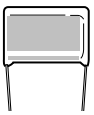


How to set



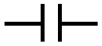
9 PP (Polypropylene) film capcaitor 0.047μF 400V (indicated as 473) (non directio specific)

Set from SIDE-A, solder from SIDE-B.



UNIT-1 UNIT-2
☐C102 ☐C202
☐C104 ☐C204
☐C105 ☐C205

Marked on PCB

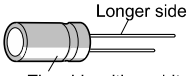


How to set

10 Electrolytic capacitor (direction specific)

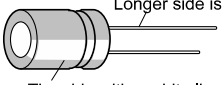
Attention!

Set from SIDE-A, solder from SIDE-B.



Longer side is +.

The side with a white line is -.



Longer side is +.

The side with a white line is -.

Marked on PCB

How to set

UNIT-1 UNIT-2
☐C106 ☐C206 2.2μF (100V)
☐C113 ☐C213 2.2μF (100V)
☐C101 ☐C201 100μF (16V)
☐C107 ☐C207 220μF (50V)
☐C109 ☐C209 4.7μF (450V)
☐C110 ☐C210 4.7μF (450V)
☐C111 ☐C211 4.7μF (450V)
☐C112 ☐C212 4.7μF (450V)

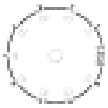
↓ Set from SIDE-B, solder from SIDE-A.

Attention!

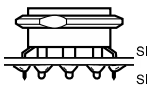
11 Vacuum tube socket 9-pin

UNIT-1 UNIT-2
☐V101 ☐V201

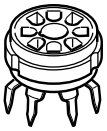
Marked on PCB



How to set



12 Vacuum tube socket 8-pin (Attention! direction specific)

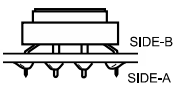


UNIT-1 UNIT-2
☐V103 ☐V203

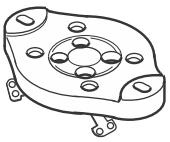
Marked on PCB

Make sure the setting direction by matching the shape of the hole at the center of the socket to the print on the PCB.

How to set

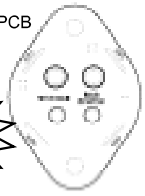


13 Vacuum tube socket 4-pin (Attention! direction specific)



UNIT-1 UNIT-2
☐V102 ☐V202

Marked on PCB



Check on the size of the holes!

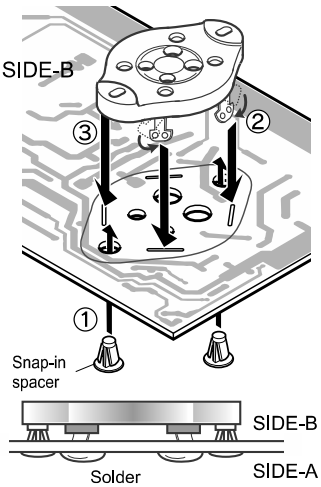
How to set

① Insert 2 snap-in spacers (made of plastic, H7mm)from SIDE-A. Push down until the round head gets a little dent to lock.

② Get the 4 legs of the socket that are bent outward direct upright using long-nose pliers.

③ Check on the size of the 4 holes, and make sure the setting direction. Insert the socket to the PCB from SIDE-B until it hits the snap-in spacers.

④ Make sure the socket is not tilted, and solder the pins from SIDE-A. Use plenty of solder to prevent defective soldering.

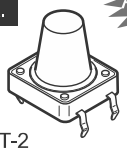


UNIT-1 and UNIT-2 Assembly (continue from Page 4)

14 Push switch (non direction specific)

Set from SIDE-B, solder from SIDE-A.

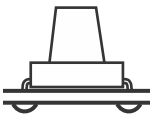
Attention!



UNIT-1 ☐SW101
UNIT-2 ☐SW201

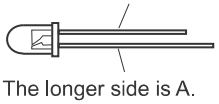
Marked on PCB

How to set



15 LED (direction specific (anode, cathode))

Set from SIDE-B, solder from SIDE-A.



UNIT-1 ☐LED101
UNIT-2 ☐LED201

Marked on PCB

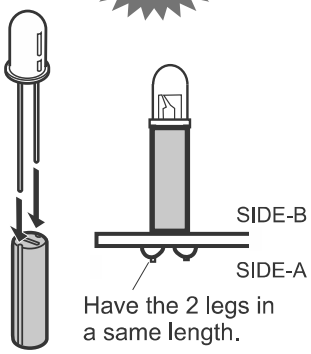
How to set

①Set LED spacer (black) to the LED legs.

②Insert the legs to the PCB from SIDE-B. Make sure the LED spacer attaches to the PCB closely.

③Solder just one leg first, make sure the LED is not tilted, and solder the other leg.

Attention!

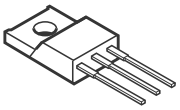


Have the 2 legs in a same length.

16 Transistor D2012 (direction specific)

Set from SIDE-B, solder from SIDE-B.

Attention!



UNIT-1
☐TR101 D2012
UNIT-2
☐TR201 D2012
(Make sure the indication. Do not mix up with FET.)

How to set

①Bend the transistor legs at the point where the leg sizes have changed as shown in the right diagram.

②Set the plastic spacer long (15mm)) to the PCB with a temporary stopper (The plastic spacer on SIDE-B, and the stopper on SIDE-A.). This is only a temporary fixation and it is OK to be unstable.

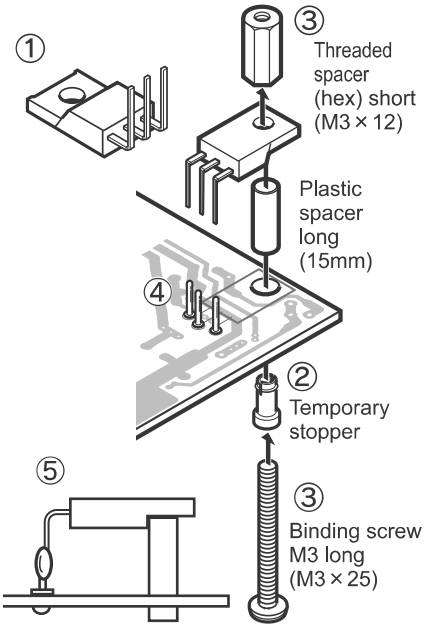
③Fix the transistor to the plastic spacer using a binding screw M3 long (M3×25) and a threaded spacer (hex) short. Make sure that the transistor indication faces the PCB.)

④Adjust the positions of 3 transistor legs so that they attach to 3 base pins already attached to the PCB.

⑤Solder the transistor legs and the base pins together at 3 locations.

⑥After soldering, make sure to remove the threaded spacers (hex) and the binding screws. (Leave the plastic spacers.)

Marked on PCB



17 Parallel jumper cable (no direction specific)

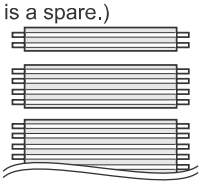
Set from SIDE-A, solder from SIDE-B.

Attention!

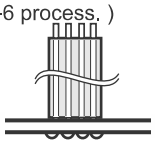
UNIT-1 ☐JP101 (2-line)
UNIT-2 ☐JP201 (4-line)

How to set

①Cut the parallel jumper cable with scissors to make one each of 2-line and 4-line cables. (The remaining portion is a spare.)



②Solder only one side.
(The other sides will be soldered later in UNIT-6 process.)



Marked on PCB

Now that the assembly of UNIT-1 and UNIT-2 is finished. (R130, C114, R230, and C214 are options. No need to set any parts to these locations at this stage. Please go on to the assembly of UNIT-3.)

UNIT-3 Assembly

* The part numbers are in 300s.

1 Base pin 12pcs

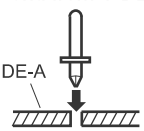
Set from SIDE-A, solder from SIDE-B.

UNIT-3, lower right
☐TEST
☐SENS-L
☐+8.5V
☐GND
☐C-
☐B+

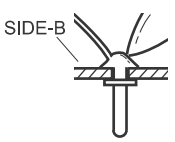
UNIT-3, lower left
☐TEST
☐SENS-R
☐+8.5V
☐GND
☐C-
☐B+

How to set

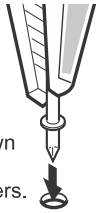
①Insert vertically till the end from SIDE-A.



②Solder from SIDE-B.



* Put a piece of cardboard underneath and push down the pin with long-nose pliers.



Marked on PCB

2 Base pin 3pcs

Set from SIDE-B, solder from SIDE-A.

☐FET301 S
☐FET301 D
☐FET301 G

Attention!

How to set

Refer to 1, only the setting and soldering sides are different.

Marked on PCB

UNIT-3 Assembly (continue from Page 5)

3 Resistor (1/2W) (non direction specific)

Set from SIDE-A, solder from SIDE-B.

How to set

Marked on PCB

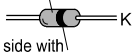
☐R301 4.7MΩ(YEL-VIO-GRN-GLD)
☐R302 4.7MΩ(YEL-VIO-GRN-GLD)
☐R303 10kΩ(BRN-BLK-ORN-GLD)
☐R304 100kΩ(BRN-BLK-YEL-GLD)
☐R305 100kΩ(BRN-BLK-YEL-GLD)
☐R306 100kΩ(BRN-BLK-YEL-GLD)
☐R307 1MΩ(BRN-BLK-GRN-GLD)
☐R308 1MΩ(BRN-BLK-GRN-GLD)
☐R309 1MΩ(BRN-BLK-GRN-GLD)
☐R310 1MΩ(BRN-BLK-GRN-GLD)
☐R311 1.2kΩ(BRN-RED-RED-GLD)
☐R312 1.2kΩ(BRN-RED-RED-GLD)
☐R313 470Ω(YEL-VIO-BRN-GLD)
☐R314 1.2kΩ(BRN-RED-RED-GLD)
☐R315 2kΩ(RED-BLK-RED-GLD)
☐R316 100kΩ(BRN-BLK-YEL-GLD)
☐R317 22kΩ(RED-RED-ORN-GLD)

4 Zener diode (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.

Made of glass



The side with black line is cathode.

☐ZD301
☐ZD302

How to set

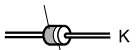
Marked on PCB

5 Diode (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.

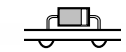
Black



The side with silver line is cathode.

☐D301
☐D302
☐D303

How to set



Marked on PCB

6 Bridge diode (direction specific)

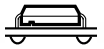
Attention!

Set from SIDE-A, solder from SIDE-B.

~, +, - indications

☐D304
☐D305
☐D306

How to set



Marked on PCB

7 Multilayer ceramic capacitor (non direction specific)

Set from SIDE-A, solder from SIDE-B.

1μF(16V) 6pcs
(blue, indicated as 105)
☐C304 ☐C307
☐C305 ☐C308
☐C306 ☐C309

How to set

Marked on PCB

8 IC (direction specific)

Attention!

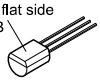
Set from SIDE-A, solder from SIDE-B.

16F629
(8-pin)

Match the concave to the PCB marking.

TA78L008AP
(3-pin)
Make sure the indication and do not mix up with the same shape of transistor.

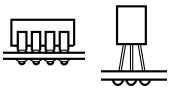
Match the flat side to the PCB marking.



☐IC301 12F629
☐IC302 TA78L008AP

Marked on PCB

How to set



Match the shape to the PCB marking.

9 Transistor C5201 (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.

(Make sure the indication and do not mix up with the same shape of IC (TA78L008AP).

Match the flat side to the PCB marking

☐TR301 C5201
☐TR302 C5201
☐TR303 C5201

Marked on PCB

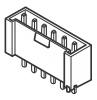
Match the shape to the PCB marking.

How to set

10 VH connector (male) 6-pin (direction specific)

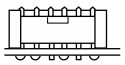
Attention!

Set from SIDE-A, solder from SIDE-B.



☐CN301

How to set



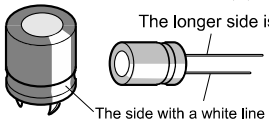
Marked on PCB

Match the shape to the PCB marking.

11 Electrolytic capacitor (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.



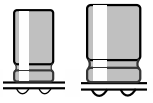
The longer side is +.

The side with a white line is -.

☐C310 100μF(16V)
☐C311 100μF(16V)
☐C301 4.7μF(450V)
☐C302 4.7μF(450V)
☐C312 4.7μF(450V)
☐C313 4.7μF(450V)
☐C303 180μF(450V)

Marked on PCB

How to set

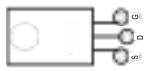


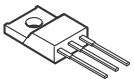
12 FET (direction specific)

Attention!

Set from SIDE-B, solder from SIDE-B.

Marked on PCB





☐FET301 K3947
(or K2750)
(Make sure the indications. Do not mix up with the same shape of transistor D2012.)

How to set

①Bend the FET legs at the point where the thickness of the legs changes.

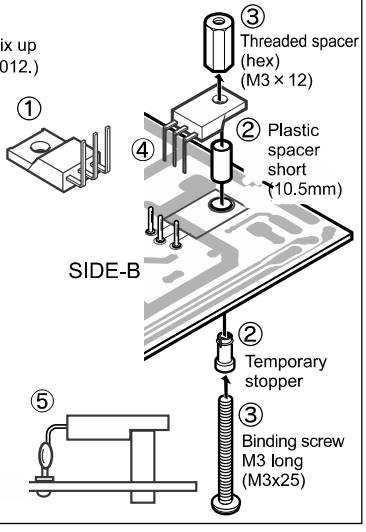
②Set the plastic spacer short (10.5mm) to the PCB with the temporary stopper (Plastic spacer on SIDE-B, stopper on SIDE-A). It is just a temporary installation and it is no problem if it is not fixed securely.)

③Fix the FET to the plastic spacer using the binding screw M3 long (M3x25) and the threaded spacer (hex) (FET front should face PCB).

④Adjust the 3 legs of FET so that they attach to the 3 base pins already installed to the PCB.

⑤Solder the FET legs and the base pins together.

⑥After soldering, make sure to remove the threaded spacer (hex) and the binding screw. (Make sure not to remove the set spacer.)



UNIT-4 Assembly

* The part numbers are in 400s.

1 Resistor (1/2W) (non direction specific)

Set from SIDE-A, solder from SIDE-B.

☐R401 470Ω (YEL-VIO-BRN-GLD)
☐R402 470Ω (YEL-VIO-BRN-GLD)

Marked on PCB

How to set

2 Bridge diode (direction specific (~,+,-))

Set from SIDE-A, solder from SIDE-B.

Attention!

~,+,- indication

☐D401

Marked on PCB

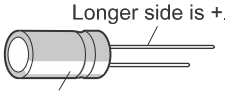
How to set

3 Electrolytic capacitor (direction specific (+,-))

Set from SIDE-A, solder from SIDE-B.

Attention!

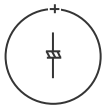
Longer side is +.



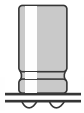
The side with white line is -.

☐C401 100μF(16V)

Marked on PCB



How to set



For C401, make sure there is no clearance between the PCB and the part.

* Do not install any part to SW401 at this stage.

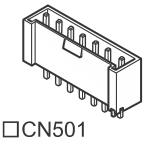
UNIT-5 Assembly

* The part numbers are in 500s.

1 VH connector (male) 7-pin (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.



☐CN501

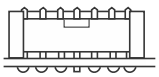
* The installing location of this part varies depending on the power voltage of the country where the amplifier is used.

* 100V (Japan)	☐CN501
110~120V (USA, CANADA, etc)	☐CN502
200V (For air conditioner in Japan, etc)	☐CN503
220~240V (Hong Kong, UK, etc)	☐CN504

Marked on PCB

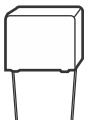
Match the shape to the PCB marking.

How to set



2 Spark killer RE1201 (non direction specific)

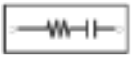
Set from SIDE-A, solder from SIDE-B.



☐C501

How to set

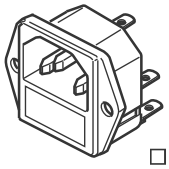
Marked on PCB



3 AC inlet

Set from SIDE-B, solder from SIDE-A

Attention!



☐CN505

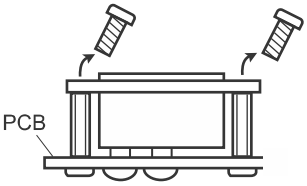
How to set

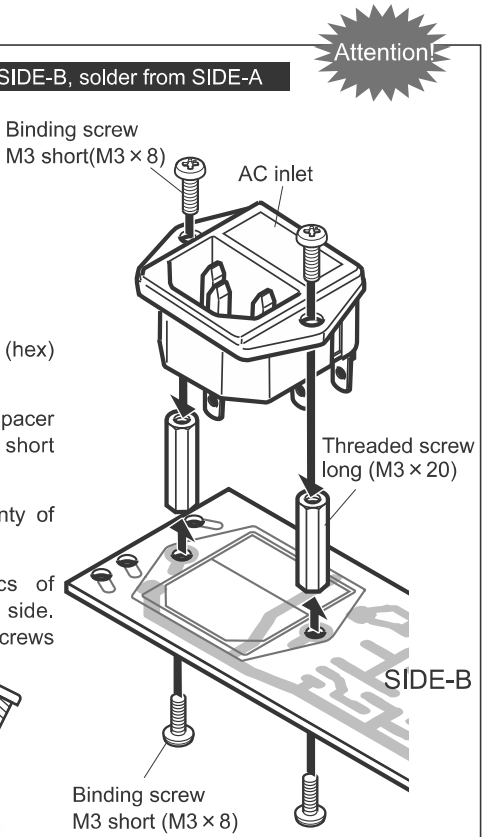
①Set 2pcs of threaded spacer (hex) long (M3x20) to SIDE-B.

②Temporarily fix AC inlet to the spacer with the binding screws M3 short (M3x8).

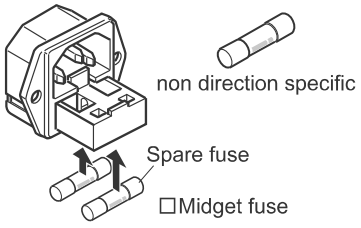
③Solder from SIDE-A. (Use plenty of solder.)

④After soldering, remove 2pcs of binding screws on the inlet side. (Make sure not to remove the screws on the PCB side.)



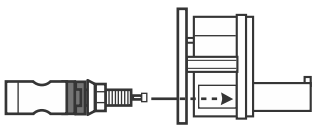


4 Midget fuse (125V 4A by default)



How to set

The AC inlet has a pullout fuse holder, where you can put in 2 fuses, including a spare fuse, from the bottom side. Put the fuse to be used in the inner space, and the spare in the outer space.
After putting in the fuses, push back the holder (it might require a little force.).

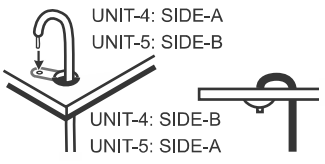


* The metal part of the fuse holder inside the inlet is attached to the holder very tightly so that it might be very hard to pull out the holder after setting the fuses. Pull back and forth for a few times first for smoother open-close movement.
  - If it is too hard to open, insert a speaker terminal into the hole at the back side of the AC inlet (PCB side) and thrust.
  - In this way, open and close for a few times and make sure you can open the holder from the front and take out the fuse by using long-nose pliers as a lever.
* The fuse 125V 4A enclosed in the product can be used under 100~120V environment.
  In the case the product is used in 200~240V environment, make sure to use 250V 2A (midget type, slow-blow) type.

Wiring between UNIT 4 and 5

Connect Unit-4 and Unit-5 with each wire indicated below.

UNIT-4	UNIT-5	
☐BLK	☐BLK	Black wire
☐YEL	☐YEL	Yellow wire
☐BLU	☐BLU	Blue wire



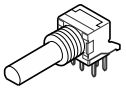
①Put the wire through the bigger hole from each corresponding side.
②Put the wire through the smaller hole.
③Solder the end of the wire to the PCB pad.
④Pull back the wire from the soldered side lightly.

UNIT-6 Assembly

* The part numbers are in 600s.

Volume control

Set from SIDE-A, solder from SIDE-B.



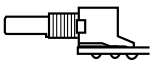
(The nut and washer attached are to be used in later step.)

☐VR601

Marked on PCB

Set it to "9mm type" location.

How to set



UNIT-7 Assembly

* The part numbers are in 700s.

1 JQ connector (female) 4-pin (direction specific)

Attention!

Set from SIDE-A, solder from SIDE-B.

☐CN703

How to set

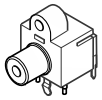
Marked on PCB

Match the shape to the PCB marking.

Make sure the part is set horizontally right and not tilted upon soldering.

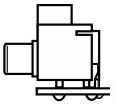
2 Pin jack (RCA jack)

Set from SIDE-A, solder from SIDE-B.

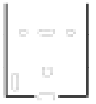


☐CN701 White
☐CN702 Red

How to set



Marked on PCB



Make sure the part is set horizontally right and not tilted upon soldering.

UNIT-8 Assembly

* The part numbers are in 800s.

XH connector (male) 4-pin (direction specific)

Set from SIDE-A, solder from SIDE-B.

Attention!

☐CN801
☐CN802

How to set

Make sure the part is set horizontally right and not tilted upon soldering.

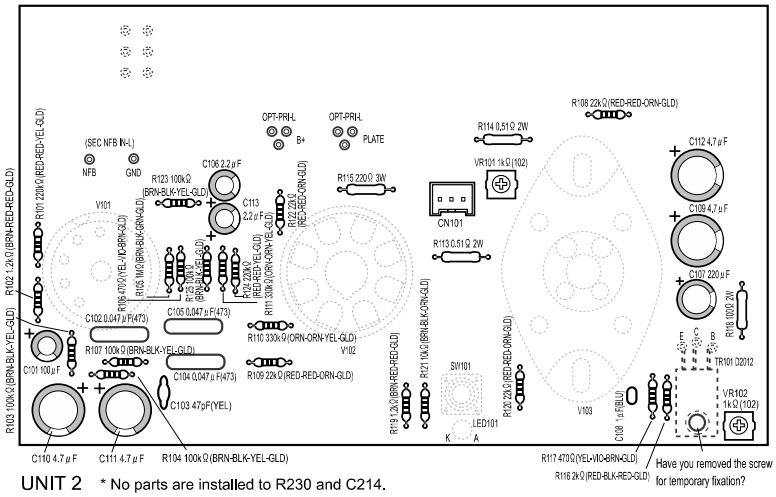
Marked on PCB

Match the shape to the PCB marking.

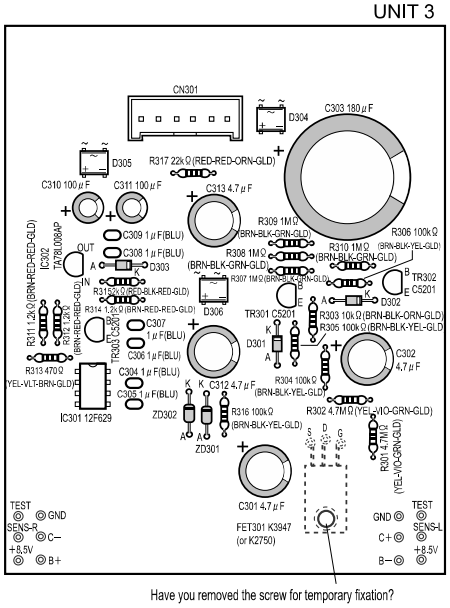
●Complete PCB

* Compare your PCB with below drawing and check if the parts are installed at correct locations and in correct directions. Check the installing direction of diodes, electrolytic capacitors, and tube sockets with special attention.

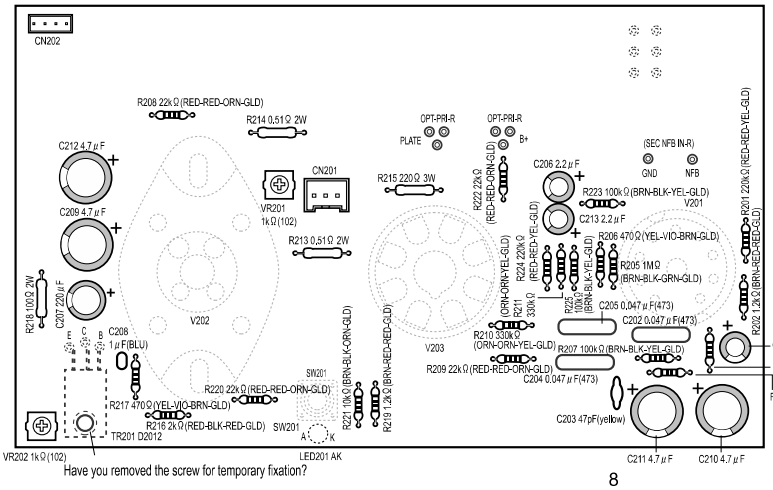
UNIT 1 * No parts are installed to R130 and C114.



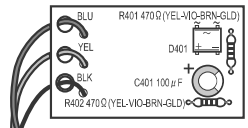
UNIT 3



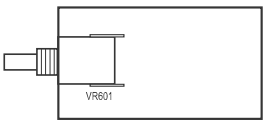
UNIT 2 * No parts are installed to R230 and C214.



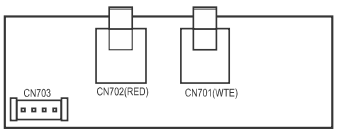
* UNIT-4-8 are shown in the following page.



UNIT 4

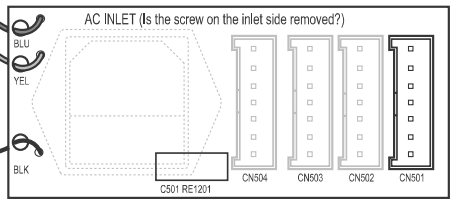


UNIT 6



UNIT 7

Make sure the parts are not tilted.



UNIT 5

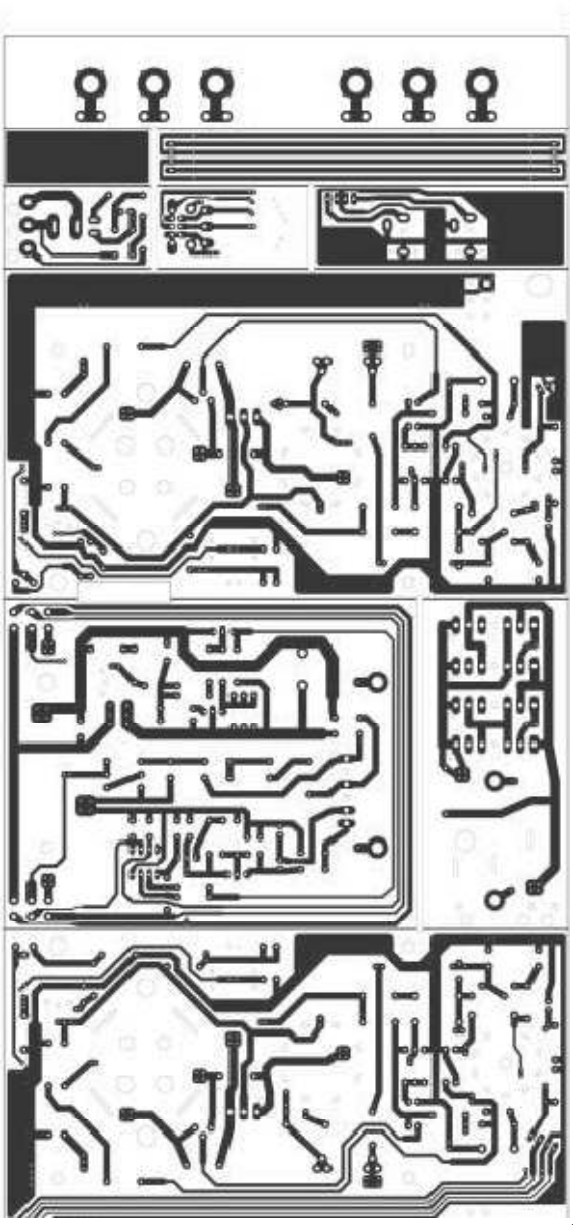
CN501 is for 100V use.
Select a correct location according to the use environment.

UNIT 8

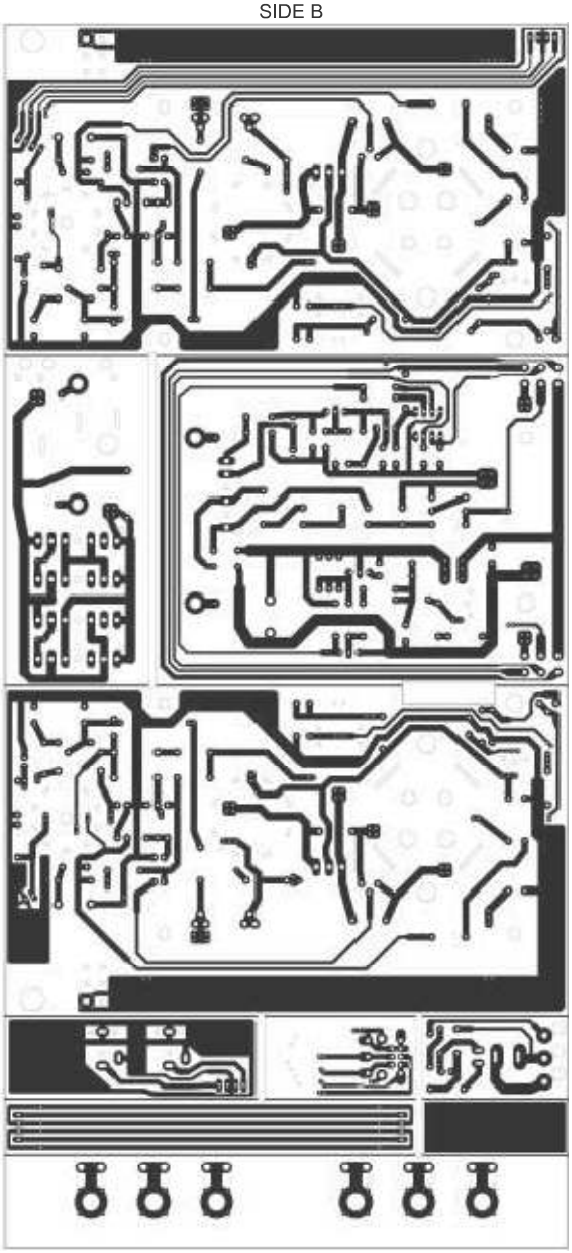
Make sure the parts are not tilted.

●PCB pattern Compare your PCB with below PCB patterns and check the disconnection of the copper plate and soldering conditions.

SIDE A



SIDE B



3. Wiring and Assembly

⚠ CAUTION

◆Electronic components in a vacuum tube amplifier exceed several hundred volts. When operating under a direct current to test the device, do not touch the terminal, exposed metal of the components, or exposed metal of the testing device, with your bare hands. It is hazardous and may cause electric shock and fire. Find a safe place away from others who may come into contact with the device while testing. If by accident you touched the inner components, immediately unplug the device from the outlet and wait at least 10 minutes.

◆Wear rubber gloves when testing the device. It is dangerous to operate with bare hands since this may cause electric shock.

◆Before connecting to an electrical source, check to see that the placement and wiring of the components are correct. It is extremely dangerous if they are incorrectly placed while being turned on. This may result in fire, electric shock, and additionally cause damage to the device. Pay special attention to the installing direction of the bridge rectifiers and capacitors; if by any chance they are set in the opposite direction, they could explode. In addition, do not have your face close to the amplifier just in case of accident.

◆Do not use the amplifier under an electric environment other than the preset power supply voltages. Failure to do so may cause fire. Do not connect to DC power supply which may cause fire.

◆When connecting and disconnecting the amplifier with other devices, be sure to turn off and remove the plug from the outlet. Ensure the other devices are turned off and disconnected from electrical outlets. Operating without complete disconnection from electricity may damage the device, cause electric shock and other fire-related accidents.

◆When connecting to audio devices such as speakers, be sure to read the instruction booklets and know how to disconnect the power source. Use the specified AC cord when connecting. Using another AC cord or adding an extension to the cord can cause overheating, resulting in possible injuries.

◆Before turning on, turn the volume control dial to minimum (fully counter-clockwise) in order to prevent sudden bursts of high volume that may cause hearing loss.

◆During operation, the vacuum tubes will become very hot (approx. 100 degrees Celsius). Do not touch the tubes with bare hands to avoid burn injury.

◆If water or any unwanted substance gets into the main body of the amplifier, immediately turn off and unplug the amplifier. Wait at least 10 minutes and remove the unwanted objects and then consult with a dealer in your region. In case of water or any liquid, wipe dry with a clean cloth. Failing to consult with the dealer may cause fire or electric shock.

◆Hold onto the AC plug when unplugging the machine. Do not unplug by yanking the AV cord, as it may cause potential injuries, fire or electric shock.

◆Do not put heavy items on or under the AC cord. Doing so may damage the AC cord, cause fire or electric shock.

◆Do not put the AC cord near radiating heat. It may melt and the insulated wires may be exposed causing fire or electric shock.

◆Do not plug or unplug the electric AC cord with wet hands. Doing so will result in electric shock.

◆In case you find something strange while assembling the components or performing a check on the amplifier, immediately turn off the switch and unplug from the outlet, and consult a dealer in your region.

◆After performing a check, be sure to unplug the amplifier for your own safety. Failure to do so may cause fire.

◆The edges of the panels may be sharp. Handle with care to avoid cuts or injuries.

◆Keep out of direct sun, extreme hot or cold, humid or dusty areas as they may cause accidents or damage.

◆Do not place the amplifier near the kitchen, humidifier, nor places with oil or smoke accumulation. Doing so may cause fire or accidents.

◆Use the amplifier in a stable surface. Do not allow gas or corrosive substances to come into contact with the machine. Failure to do so may cause damage or hazard.

◆Place the amplifier at least 10cm away from the walls, as the amplifier will radiate heat. Place other equipment at least 10cm away. Placing this amplifier too close with other equipment will cause fire. Place the amplifier upright and never on its side, inverted or upside down. Do not put into 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.

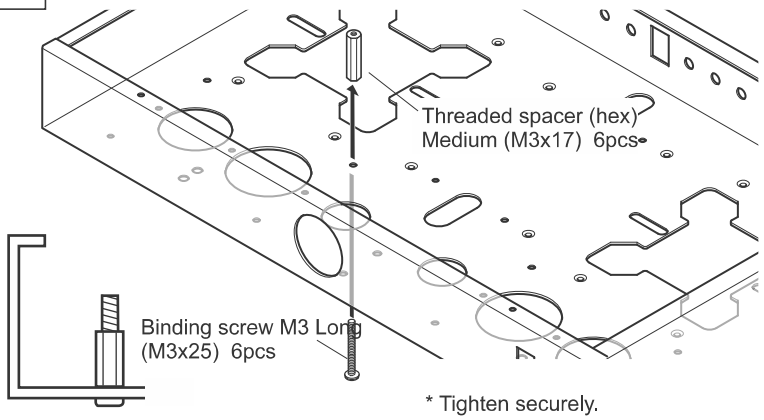
◆Clean the amplifier regularly. If dust accumulates on the circuit board, it may cause fire or other hazards. It is wise to clean the amplifier before humid or rainy seasons.

◆Discard the amplifier according to the rules and standards in your region. Failure to do so will cause damages to the environment and others.

●Wiring and Assembly

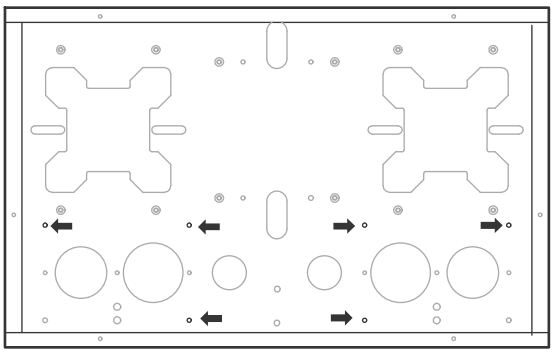
* Now let's install the PCBs to the main chassis. It is recommended to put a towel or the like under the component parts before beginning in order to avoid damages to the chassis.

1 Install binding screw M3 Long (M3x25) and threaded spacer (hex) Medium M3x17) to the main chassis. (6 locations)



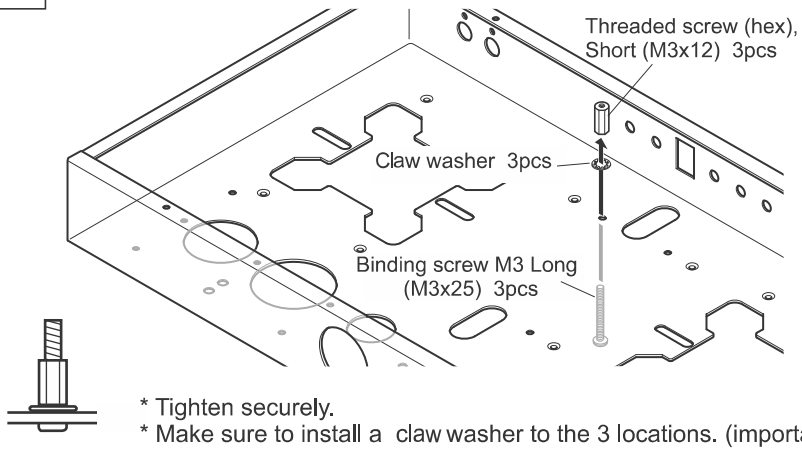
* Tighten securely.

Inside the chassis

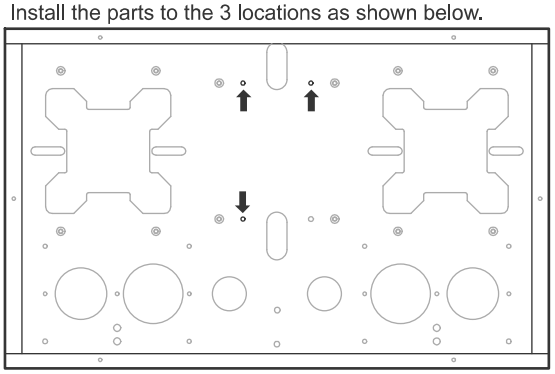


Install the parts to the 6 locations as shown below.

2 Install binding screw M3 Long (M3x25), claw washer, threaded spacer (hex) Short (M3x12). (3 locations)

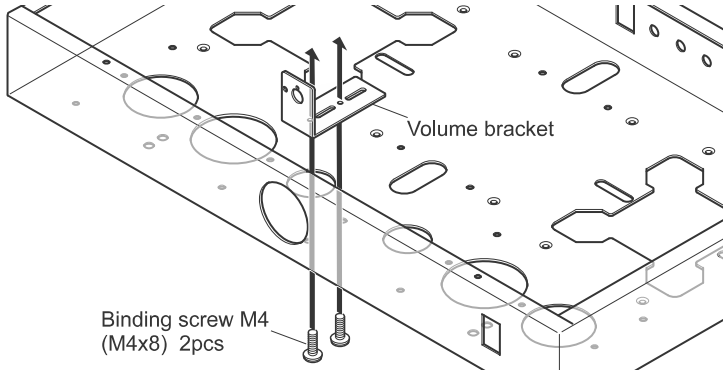


Inside the chassis
Install the parts to the 3 locations as shown below.

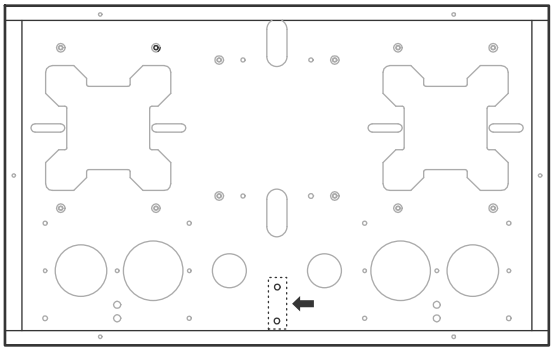


* Tighten securely.
* Make sure to install a claw washer to the 3 locations. (important to ground the chassis)

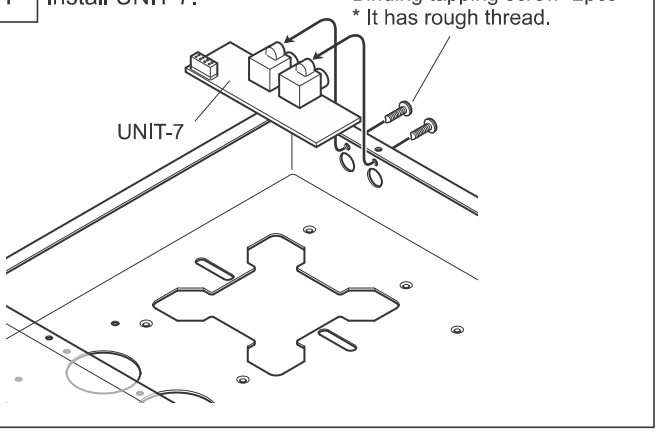
3 Install the volume bracket.



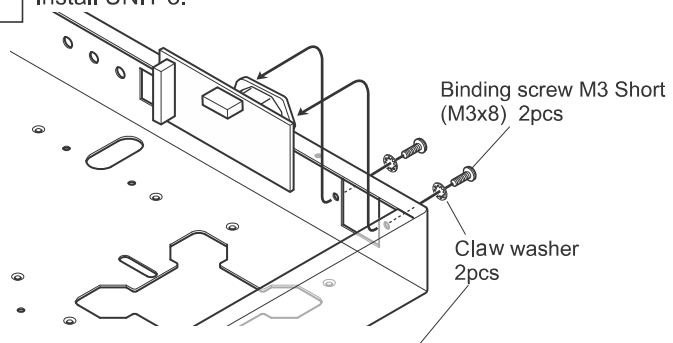
Inside the chassis



4 Install UNIT-7.

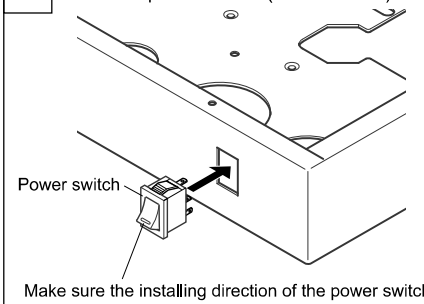


5 Install UNIT-5.



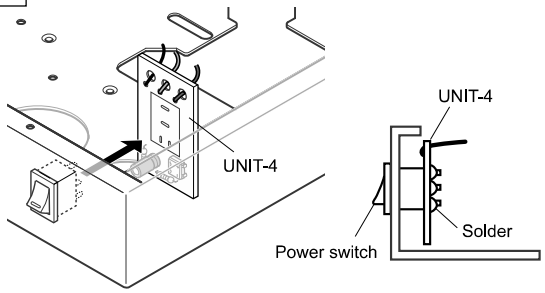
* Tighten securely.
* Make sure to install a claw washer to the 2 locations. (important to ground the chassis)

6 Install the power switch (locker switch).



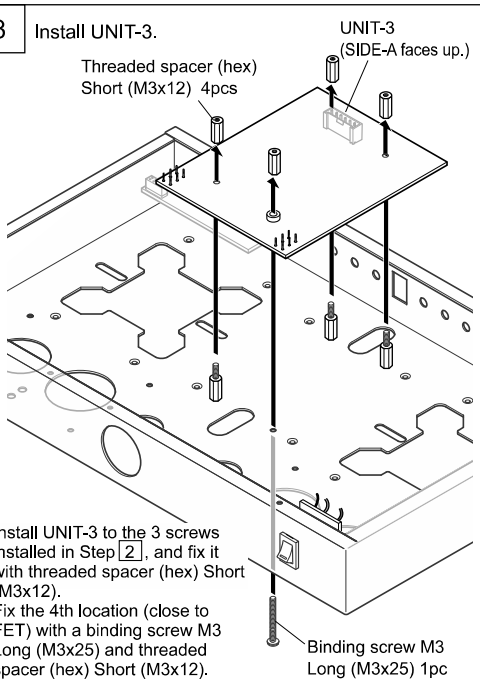
Make sure the installing direction of the power switch.
* Do not install it upside down. The power indicator lamp must come to the upper side of the chassis. Push in the switch to fix.

7 Install UNIT-4.

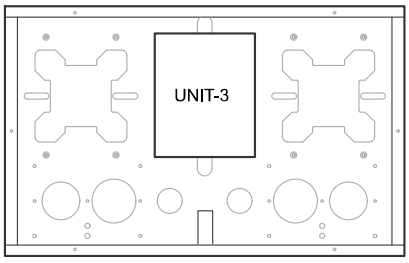


Install UNIT-4 to the power switch terminals, and solder at 4 locations.
* Attach the power switch to the PCB closely and solder.
* Wire the 3 wires along the chassis side panel.

8 Install UNIT-3.

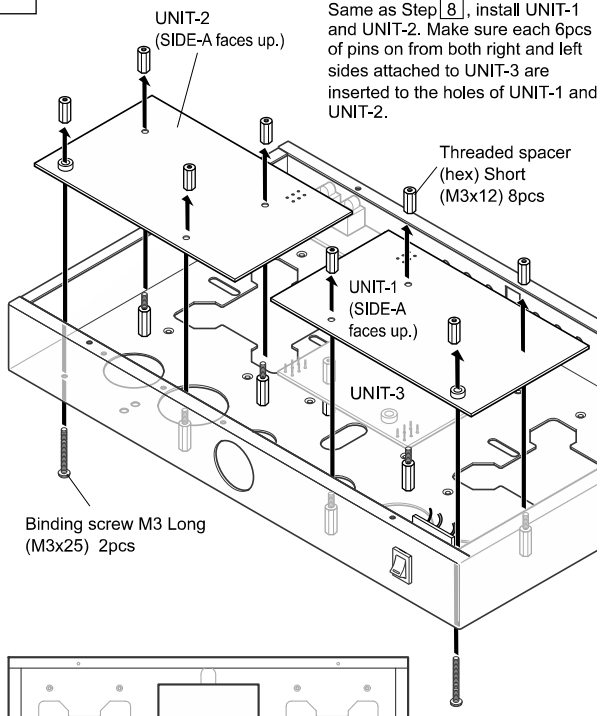


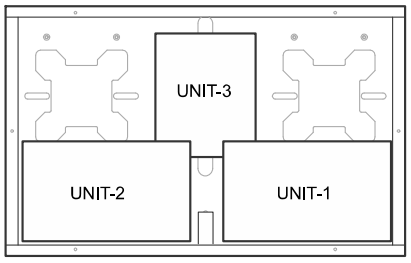
Install UNIT-3 to the 3 screws installed in Step 2, and fix it with threaded spacer (hex) Short (M3x12).
Fix the 4th location (close to FET) with a binding screw M3 Long (M3x25) and threaded spacer (hex) Short (M3x12).



9 Install UNIT-1 and UNIT-2.

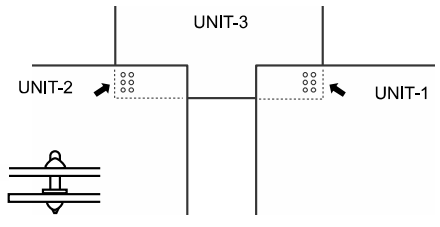
Same as Step 8, install UNIT-1 and UNIT-2. Make sure each 6pcs of pins on from both right and left sides attached to UNIT-3 are inserted to the holes of UNIT-1 and UNIT-2.



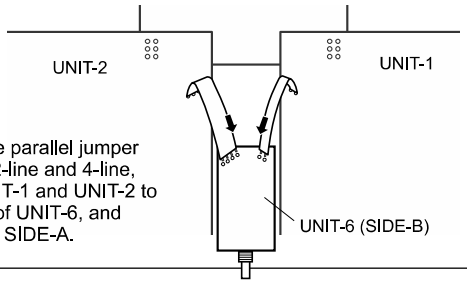


10 Solder 12 pcs of pins.

Solder the 12 pcs of pins inserted in Step 9.



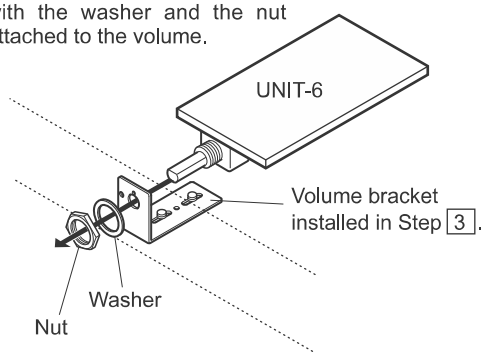
11 Wiring to UNIT-6 (PCB with the volume)



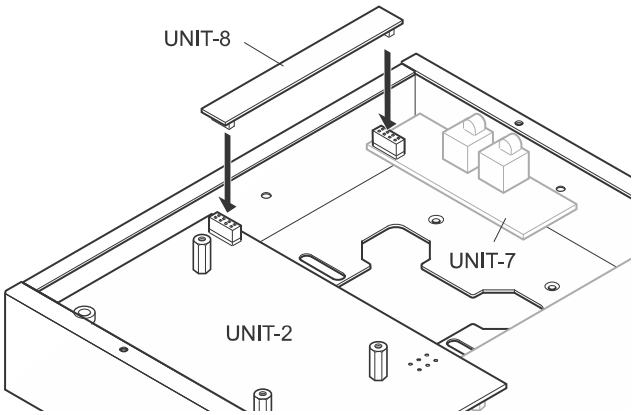
Insert the parallel jumper cables, 2-line and 4-line, from UNIT-1 and UNIT-2 to SIDE-B of UNIT-6, and solder at SIDE-A.

12 Fix UNIT-6.

Fix the volume bracket securely with the washer and the nut attached to the volume.

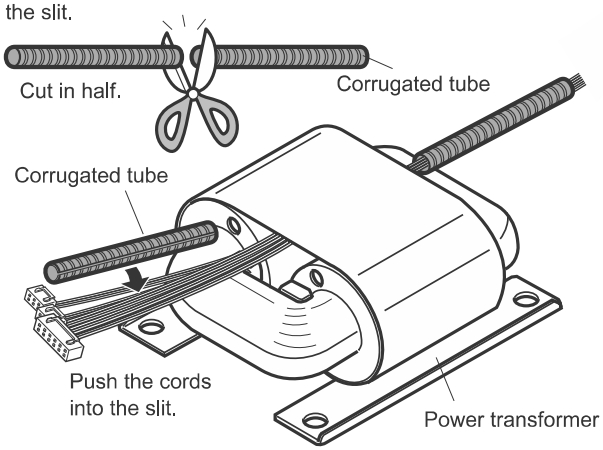


13 Install UNIT-8. (non direction specific)



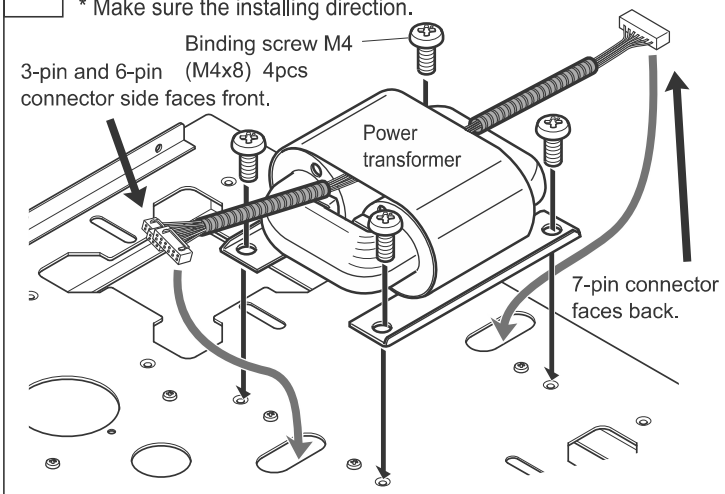
14 Cover the cords of the power transformer with the corrugated tubes.

Cut the corrugated tube in half, approx. 12-13cm each, with scissors and cover the cords coming out of the power transformer from 2 sides with the cut tubes. Put the cords into the tube through the slit.



15 Fix the power transformer to the chassis.

* Make sure the installing direction.

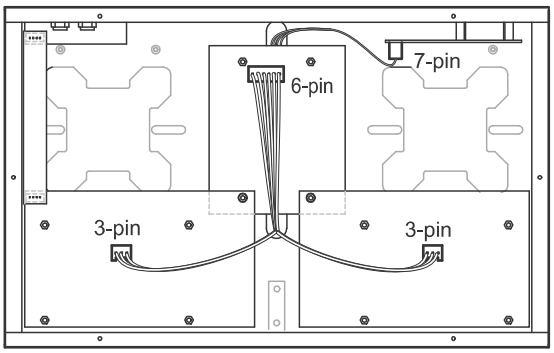


Put the cords through each long oval openings on the chassis.
After fixing, pull the tubes upwards.

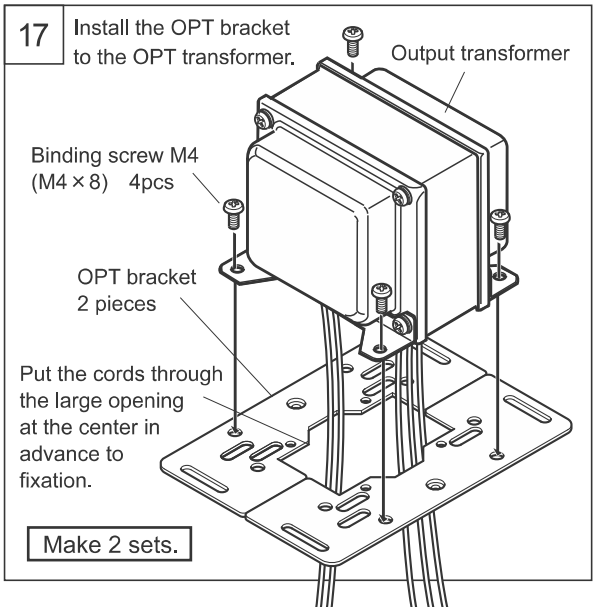
16 Wiring of the power transformer

7-pin connector	→ UNIT-5
6-pin connector	→ UNIT-3
3-pin connector (GRY/GRN/GRY)	→ UNIT-1
3-pin connector (BRN/BLU/BRN)	→ UNIT-2

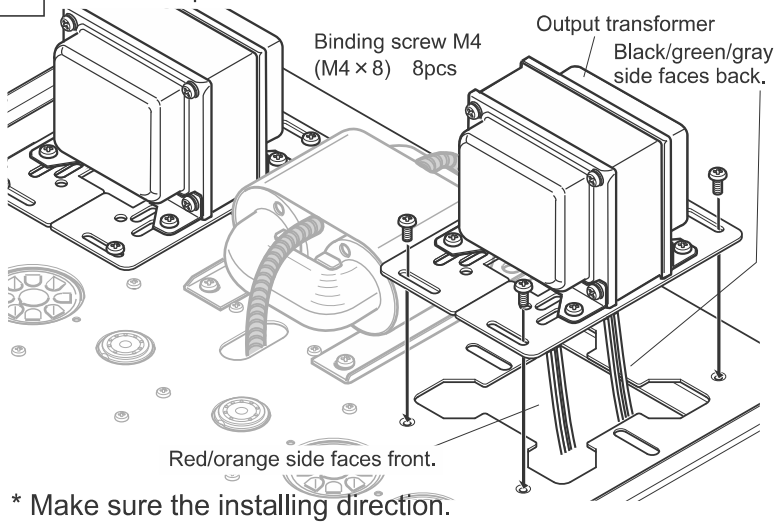
(* There is no big problem if 3-pin connector is installed in the opposite direction.)



17 Install the OPT bracket to the OPT transformer.

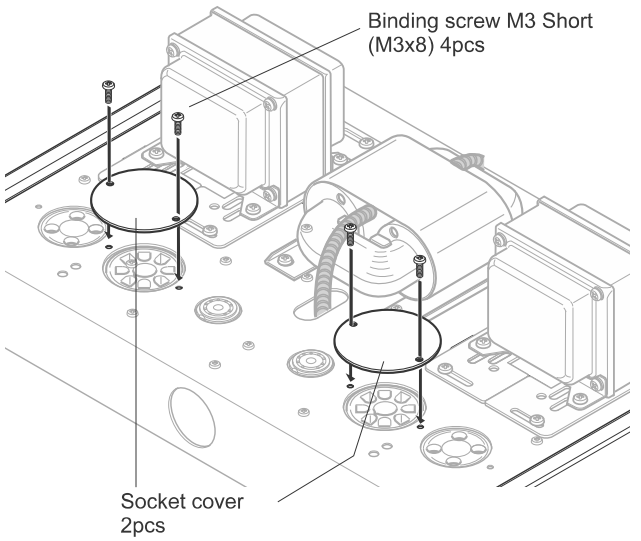


18 Install the output transformer to the chassis.

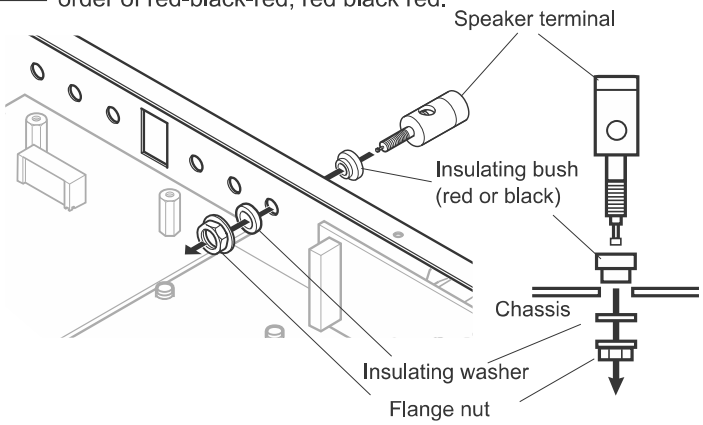


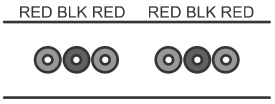
* Make sure the installing direction.

19 Install 2 socket covers to the 8-pin socket locations.



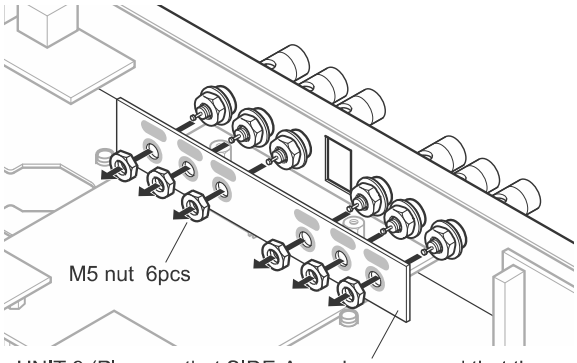
20 Install 6pcs of speaker terminals to the chassis in the order of red-black-red, red black red.





* Align the openings at the sides of the speaker terminals so that the wires from a speaker can be easily connected.

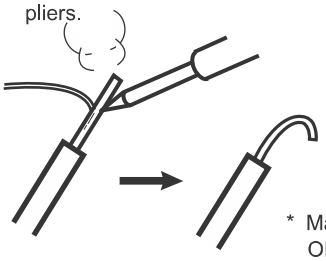
21 Install UNIT-9 to the speaker terminals (Attention! Direction specific!)



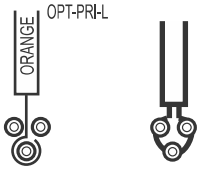
UNIT-9 (Place so that SIDE-A can be seen, and that the letters on the PCB is in the same direction as UNIT-5.)

22 Wiring of the primary side of the OPT transformer

(1) Solder-plate the tips of the red and orange wires of the OPT transformers and bend them as shown below with a long-nose pliers.



(2) Solder each wires to "OPT-PRI-L" of UNIT-1 and "OPT-PRI-R" of UNIT-2,

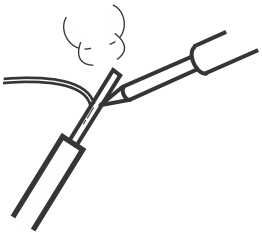


* Make sure to connect the orange wire to ORANGE, and red wire to RED. Use plenty of solder to cover all the 3 pins.

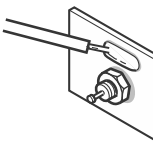
23 Wiring of the secondary side of OPT transformer

(1)Melt plenty of solder to the oval pattern of UNIT-9. (6 locations)

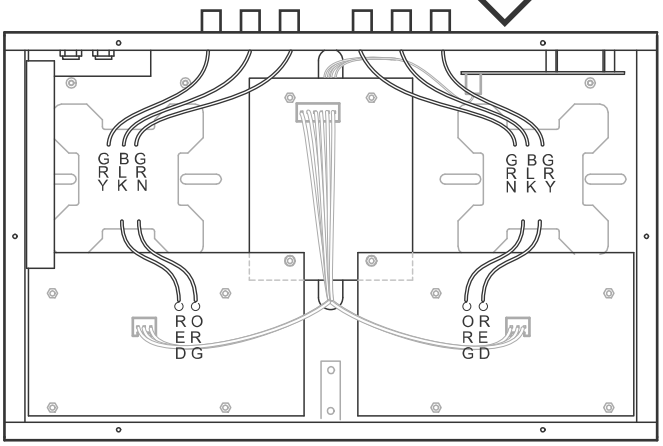
(2)Solder-plate each end of the wire of OPT transformer.



(3) Solder to UNIT-9 from the side, in the order of GRY-BLK-GRN, GRN-BLK-GRY.

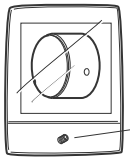


For ref.

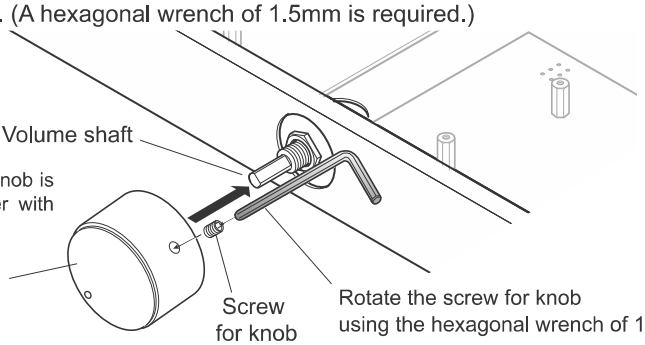


* If you have a soldering iron of 40~60W, you may solder directly to the end of the terminal.

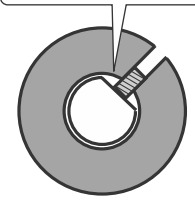
24 Install the volume knob. (A hexagonal wrench of 1.5mm is required.)



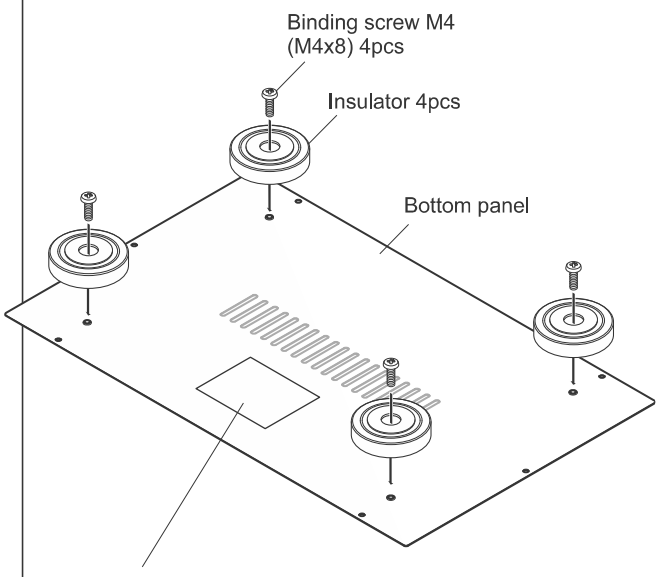
The screw for knob is packed together with the knob.



Insert the screw all the way until it is attached to the flat end.

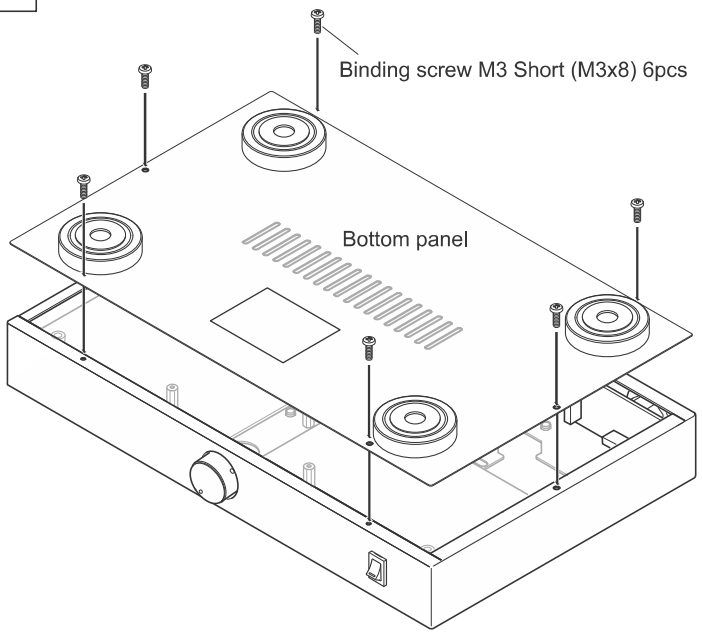


25 Install the insulators to the bottom panel.

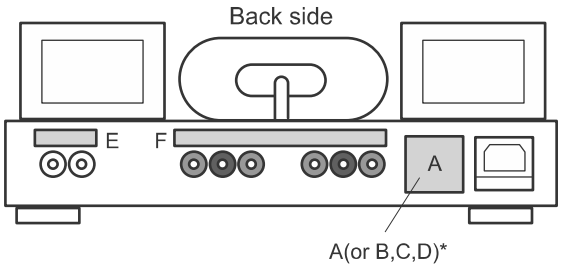


Warning label (yellow label)
* Make sure to attach this label to avoid accidents.

26 Install the bottom panel to the main chassis.



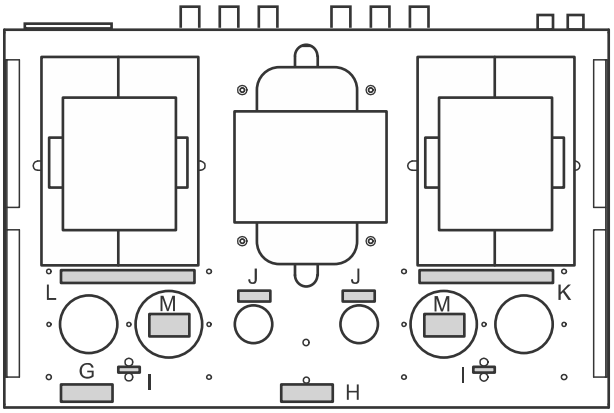
27 Attach the function label to the top and the back side of the main chassis.



* Make sure to select the label of corresponding voltage that you selected upon UNIT-5 assembly.
(To be sure, check the position of the connector of UNIT-5.)

Please attach the label "N" whenever you would like to.

Top view



Now let's check the operation!

4. Operation Check

DANGER!

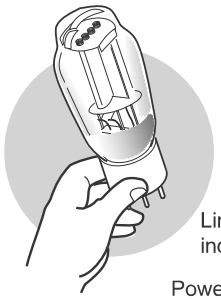
While the power is being distributed and for 10 minutes after the power is turned off, do not touch inside the amplifier. There are many components with very high voltages. Even if the power is turned off, electricity may remain in capacitors and could take more than 5 minutes to discharge. Therefore, it is very dangerous to touch inside the amplifier and may cause electric shock.

ATTENTION!

* For safety, turn of the power immediately and plug off if following symptoms are seen upon operation check.
  - The operation check does not go as in the instruction manual.
  - Strange odor or smoke comes is emitted.
  - Strange sound comes out of the amplifier or a speaker. (Sometimes you hear a cracking sound from a vacuum tube when it is being warmed up. This is due to the thermal expansion of the electrode and there is no problem.)
  - Something unusual
* 300B vacuum tubes become very hot, as hot as it could cause burn injury, within a few minutes after power distribution. Be extremely careful.
* As 300B vacuum tubes are directly-heated tubes, it could get damaged if a power is distributed when the tubes are horizontally placed. Make sure to place the amplifier vertically to the ground when the power is distributed.

Operation check
(continue from Page 15)

* For a vacuum tube with the base, such as 300B, do not hold the glass part, instead, hold the base to install.



(1)As shown above, install the vacuum tubes. Make sure that the protrusion of the base of 300B vacuum tube faces front. (A 4-pin vacuum tube, such as 300B, could be installed to the socket in wrong direction, so please be careful for the installing direction.) In addition, when installing and removing the 300B tubes, make sure to hold the base, but the glass part, otherwise the attachment between the glass part and the base might become weak and the glass becomes shaky.

(2)Have the power off (the side without the indicator lamp is pressed), and connect the power cable to the amplifier and the power outlet.

(3)Turn on the power switch, and make sure that the switch lamp turns orange and the 2 LEDs at the top side of the chassis start blinking (at the speed once per second) concurrently.

(4)Make sure the 2 LEDs blink for 25 times (for 25 seconds after the power is turned on) and turn off.

(5)If everything is as indicated above so far, press the left switch for limiter testing, locating inside the opening close to the left LED. Then make sure that the left LED only turn ON.

(6)Turn off the power switch once, and after 5 seconds, turn on the power switch again. Execute the above (2) and (3) again.

(7)Press the right switch for limiter testing, and make sure the right LED only turns ON.

(8)Turn off the power once, connect 2 speakers and a sound source, such as a CD player, as shown at the upper left of this page, and have it play a music. (As this is an operation test, do not mind the speaker impedance and connect as shown above.)

(9)Turn the volume of the amplifier to the minimum (counter-clockwise), and turn on the power switch again. Then make sure that the LEDs blink as in the above (3) and (4), and the heater and the filament at the center of the tubes turn vague orange.

(10) After the LEDs stop blinking, slowly turn up the volume and make sure a clear sound come out of both right and left speakers.

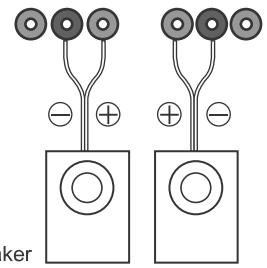
(11) While a music being played, press the left testing switch as in the above (5). Then, make sure that there is no sound from both right and left speakers and the left LED only is ON as before.

(12) Turn on the power switch again, and make sure that there is no sound while the LEDs are blinking.

(13) When sound starts coming out, do the same for the right side testing switch. Make sure that immediately after the switch is pressed, the sound from both speakers stop coming out and the right LED only is ON.

(14) Turn off the power again, and change the connection of the speakers as shown on the left diagram, and turn on the power again. Make sure that a clear sound comes out from both right and left speakers.
(The sound quality is different more or less from the previous connection.)

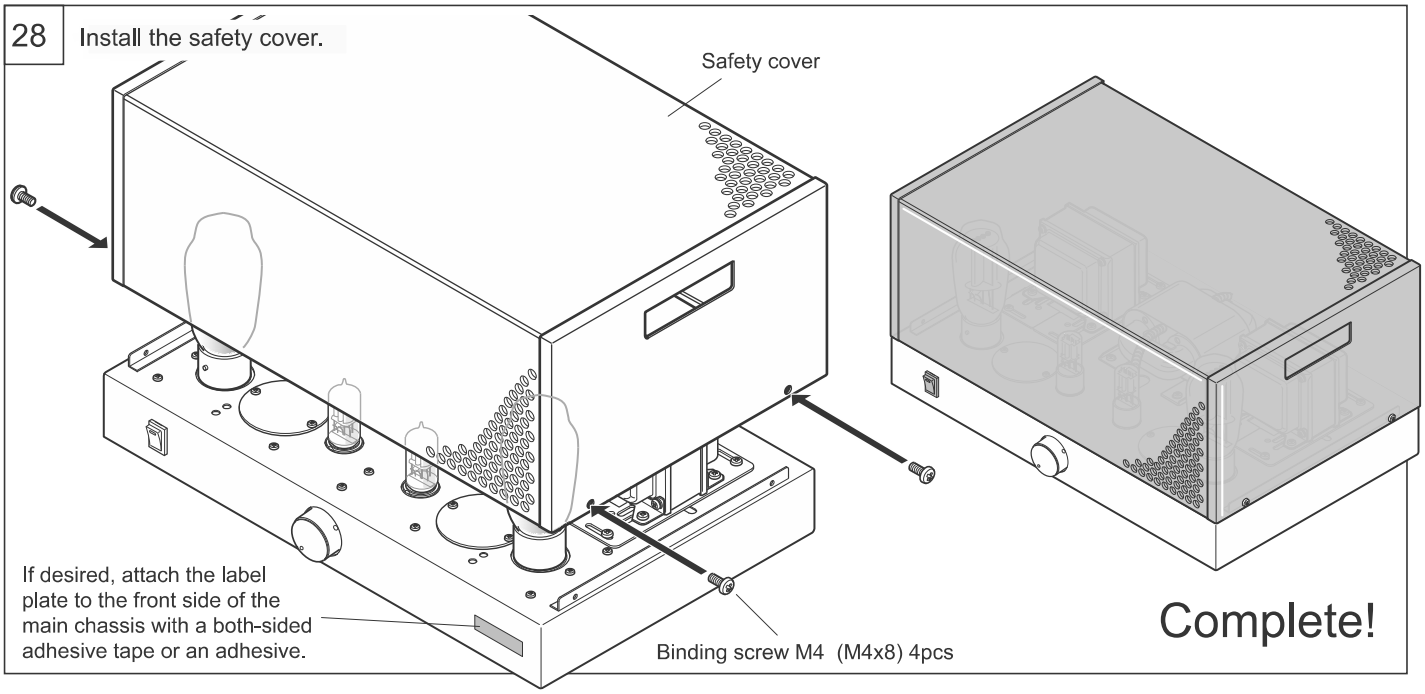
Connect as shown on the right in (14).



When all of the above checks go without a problem, it is regarded that the basic operation of the output vacuum tubes, including the limiter function, is OK.
If there is something abnormal, read Troubleshooting on Page18.

5. Safety Cover Installation

28 Install the safety cover.



6. How to Use

Attention! For safety use, please read "3.Wiring and Assembly" on Page 10 carefully.
Make sure to use the safety cover when the amplifier is used where a child can reach it in order to avoid burn injury and electric shock, and also an explosion due to inserting foreign objects inside the amplifier.

●Connection (Please refer to the diagram on Page 16.)
As for the basic connection of speakers and a sound source, such as a CD player, please see the diagram at the upper left of Page 16. When the impedance of your speaker is 8Ω to 16Ω, see the diagram at the upper left of Page 16, and if it is below 8Ω, see the diagram at the lower right of Page 16.
* A speaker cord up to 5mm in diameter can be connected. A banana plug can also be used.
* When you use a preamplifier, connect it between the amplifier and a sound source such as a CD player.

●Warming-up timer and the limiter (emergency supervisory function)
For a vacuum tube amplifier circuit, it is said to be ideal that the power (Power-A) of the heater (filament) should be turned ON first, and after it is warmed up, the high voltage power for amplification (Power-B) should be turned ON, in order to lessen the load on the vacuum tubes. Among vacuum tube amplifier fans, rectifying tubes are often used in order to delay the B-power start-up. However, as a rectifying tube consumes a lot of electricity and generates much heat, and in addition, the efficiency is not high either. For TU-8300, a warming-up timer function that delays the Power-B start-up by controlling a well-established FET ripple filter by a microcontroller.
Moreover, the microcomputer watches if abnormal level of electricity is running in the power stage, and if there is, Power-B is shut down - limiter function. it also indicates which channel, either right or left channel, is abnormal by the LEDs. (The cause of the problem can be either in the vacuum tube itself or in the circuit.) When the limiter is activated, no sound is output from both speakers. To reset the limiter function, turn off the power.

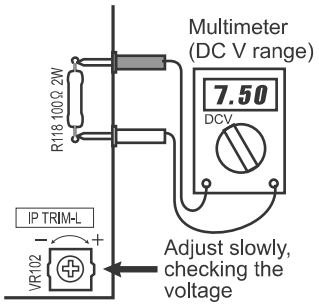
●Adjustment for the use in better condition
This amplifier can be operated without any adjustment, however, for optimal use condition, following adjustment is useful.

Warning! Following adjustment requires removing the bottom panel and turning the variable resistor on the PCB with a screwdriver. As there is a danger of electric shock, be extremely careful not to touch any other parts except for the variable capacitor. Moreover, to adjust the variable resistor, use a Philips screwdriver of No.1 or as small minus driver. A screwdriver might fall off of your hand if the size of the screwdriver does not match the variable resistor. Therefore make sure the size of the screwdriver in advance.

Attention! As 300B is a directly-heated tube, it may be damaged if the power is distributed when the tube is horizontally place. Make sure to install a safety cover to the amplifier and have it upside down when making adjustment.

(1) Hum balancer ("HUM-BAL", left channel is VR101, right channel is VR201.)
As 300B vacuum tubes are directly-heated tubes, the filament for heating functions as cathode (negative electrode). Therefore, depending on the individual difference of 300B, a small amount of alternate current component for heating flows together with the sound signal, and as a result, a hum noise could be heard. A hum balancer is used to adjust such hum noise to be minimum, in accordance with the individual difference of the tubes.
Adjust the hum balancer so that the buzzing hum noise from the speaker becomes minimal when the sound volume is set to minimal. Usually the hum noise is minimal when the hum balancer is at the center (the location when no adjustment is made). Please note that the hum noise does not completely disappear.
(For most of the cases, a large variable resistor is used as a hum balancer as it generates heat. However, for TU-LAB, a special circuit design enabled the use of a small sized variable resistor without a concern about heat generation.)

(2) ip (plate current) adjustment (("IP TRIM", left channel is VR102, right channel is VR202.)
With ip adjustment, the current into the output tube (300B) can be fine-adjusted by controlling the constant current circuit in the cathode of output tube. When no adjustment is made, it is around 62mA, and the variable range is approx. 50mA(negative side) - 80mA(posotive side). When the current is lowered, the maximum output becomes smaller, which saves energy and lessens the load applied to the tubes, as a consequence, the tube life is extended. Therefore, the adjustment is recommended for those who does not need a megavolume (nevertheless it still keeps the level of 6W+6W). When the current is highered, the maximum output becomes bigger. However, in this case, even though the current is higher than 75mA, the output does not increase so much as the increase of the load applied to the tubes. Therefore, it is recommended to have the current to be 70-75mA. Then the maximum output is around 8W+8W.
To make ip adjustment, turn "IP-TRIM-x" (left channel is VR102, right channel is VR202), measuring the voltages of both sides of 100Ω (left channel is R118, right channel is R218) with a multimeter. As it is 100Ω, the relation is very easy to understand; if the multimeter indicates 6V, ip=0.06A=60mA, and if it indicates 7.5V, ip=0.075A=75mA.



Example of left channel adjustment (UNIT-1)

* Just in case if the voltage does not change even "IP-TRIM-x" is adjusted, or if it is far from the range of 5-8V, it is possible that there is a trouble at the periphery in the circuit. Plug off and check.

●Vacuum tubes other than 300B

300B is a 4-pin and directly-heated triode output tube, originally manufactured by Western Electric of the united states. Although it is designed long time ago, the efficiency is low, and in addition it requires some troublesome settings upon its use, as the sound output from 300B is extremely high, it still attracts many audiophiles. Nowadays several vacuum tube makers are producing 300B tubes. Many audiophiles enjoy the different sounds from various tubes by exchanging tubes with similar characteristics and rating. However, there is no tubes that can substitute 300B tubes at present. Most of the currently available output tubes are petrode (or beam tube), especially there are several exchangeable tubes for 8-pin GT tubes. In fact, petrode tubes can be easily used as triode tubes by triode connection. To enable triode connection, this amplifier is equipped with 8-pin sockets. While pentode tubes have high gain, triode tubes are characterized by a particular quadratic curve, called "triode characteristics", which makes singing voice and sound of instruments mellow. This must be the reason why this "triode characteristics" is loved by audiophiles so much. You will enjoy your petrode tubes with different sound by having it triode-connected. The sound might be as good as that of 300B.
For reference, EK JAPAN confirms the safe use of KT88(6550), KT66, 6CA7(EL34), and 6L6GC with TU-LAB.

●Use of the amplifier in other voltage environment than 100V

This amplifier can be used in other voltage environment than 100V by changing the installing location of pin connector of UNIT-5. For the use in 200V or 230V environment, make sure to use a fuse of 250V2A. Also, make sure to attach a correct power indication label to the back side of the amplifier. As for the detail, please read Step1 of Page7 and Step27 of Page15. Also, as the shape of the power outlet is different from country to country, make sure to use a power cable of IEC320 standard.

7. Troubleshooting

Please refer to the following troubleshooting when there is a problem.
If you still cannot solve the problem, please contact the dealer in your region, the store from which you purchased the amplifier.

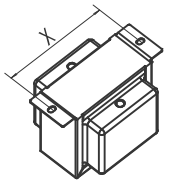
Problem	Check here (Possible reasons for malfunctioning)
(1) It does not turn on.	・Is the amplifier plugged into an outlet properly? ・Did you forget to install a fuse? or is the fuse burned out? Check the installation of all components, wiring, and soldering, especially in UNIT-5 or UNIIT-3.
(2) The heater (filament) of the vacuum tubes do not turn on.	・When the heaters of all the vacuum tubes do not turn on, there is a possibility of bad soldering in UNIT-5. ・When 2 vacuum tubes on the left side do not turn on, check the soldering of CN101, and when those on the right side do not, check the soldering of CN201. ・If only 1 LED does not blink, check the soldering of the corresponding vacuum tube socket.
(3) The vacuum tubes light up but the LEDs do not blink when the power is turned on.	・When both LEDs do not blink, check the circuit and electronic parts around IC1 and IC2 of UNIT-3. ・If only one LED does not blink, check the soldering and installing direction of the corresponding LED.
(4) No sound from both speakers even after LEDs stop blinking.	・It is possible that there is a problem in B power supply. Check UNIT-3.
(5) No sound from one speaker, or a noise, or strange sound, or the remitter is activated repeatedly.	・Before all, switch right and left vacuum tubes and see if the symptom is also switched. If so, it is possible that one of the vacuum tube is a defective. if not, there is a problem in the amplifier itself. Check UNIT-1 or UNIT-2.
(6) Regardless of the volume position, a certain level of buzzing hum noise can be heard.	・When the hum noise level is different from right to left, use hum balancer for adjustment, referring to Page 17. If this does not help, it is possible there is a bad soldering in the hum balancer circuit. ・When the level of the hum noise from right and left speakers are the same, check UNIT-3, especially around FET301.

8. Commercially available OPT installation

OPT, output transformer, is one of the factor that affects the sound quality of vacuum tube amplifier. It is not a matter of "good" or "bad", but each OPT has different characteristics. Many audiophiles desire to try different kinds of OPTs. However, as there are all sorts of OPTs in different shapes and dimensions, it requires modification to the chassis to use different type of OPT, which is not easy to do. TU-LAB is equipped with a slide universal bracket that allows many different types of OPTs for commercially available 300B single amplifiers to be installed without such modification. We confirm that the OPTs shown below can be installed. Please make sure to set the impedance of primary side to 2.5kΩ-3.5kΩ.

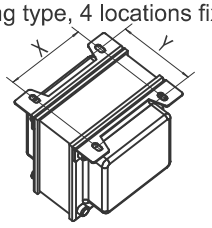
OPTs that can be installed to TU-LAB using the slide universal bracket and the dimension (bottom view)

Standing type, 2 locations fixed



X =
74-109 mm

Standing type, 4 locations fixed

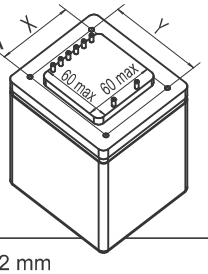


X = 46-81 mm
Y = 53-81 mm

OR

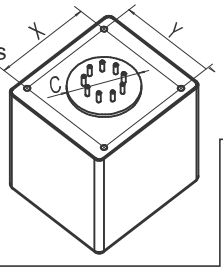
X = 62-82 mm
Y = 67.5-81.5 mm

Box type
by TAMURA



X = 64-71 mm
Y = 79 mm

Box type
by various
makers



[For C = Φ50 mm]
X = 73-82 mm
Y = 67.5-81.5 mm

[For C ≦ Φ43 mm]
X = 46-81 mm
Y = 53-67 mm

OR

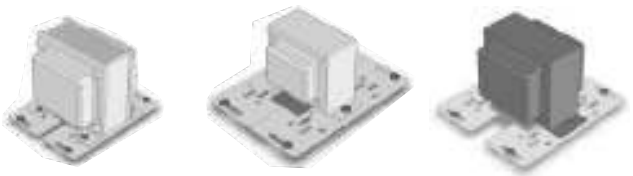
X = 62-82 mm
Y = 67.5-81.5 mm

OR

X = 40-75 mm
Y = 40 mm

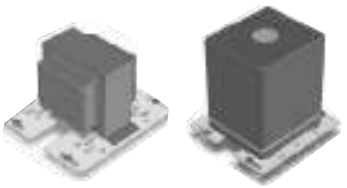
※ * Some OPTS by HASHIMOTO electric, M3 screws used

- Acceptable max.size = width(X-direction): 120mm, depth(Y-direction): 110mm, height (from chassis): 140mm
- Screw (nut) size = M4 or M5 (the size specified by each OPT)



●NFB (negative feedback)

For TU-LAB, NFB is provided to the primary side of OPT (the plate of the output tube) so that the operation is kept stable even output tubes or OPTs are exchanged. However, "SEC NFB IN" terminal is provided to UNIT-1 and UNIT-2 so that NFB can be taken from the secondary side of OPT according to need. Although it is possible to take NFB from the secondary side, there is a possibility of oscillation if a wrong value of resistor is used. Therefore please do such modification at your own risk, and for those who do not understand NFB theory and do not have a measuring device for adjustment, please refrain from making such modification.



●Installation of a higher-grade volume control

The volume control of TU-LAB is separate from the other PCBs so that the user can exchange the volume control with a higher-grade one (variable resistor). It also allows wiring. Please select a volume control which width is smaller than 33mm. For the volume bracket, use M3 screw and nut so that it can be installed flexibly in an anteroposterior direction.

9. Warranty

Since this is a electronic product that is assembled by the user, we cannot provide a warranty like those for regular electronic products. Instead, we can provide a counseling service. If there is a problem in the product, please contact an ELEKIT dealer in your region, the store you purchased the product for further assistance. If you do not know where to contact, please send us an e-mail describing the problem you are facing to below e-mail address. However, throughout the instruction manual, there are many check points, and we kindly ask you to make sure to pay attention to those check points, as most of the time your problem can be solved if you follow these points closely.

<CONTACT INFORMATION>

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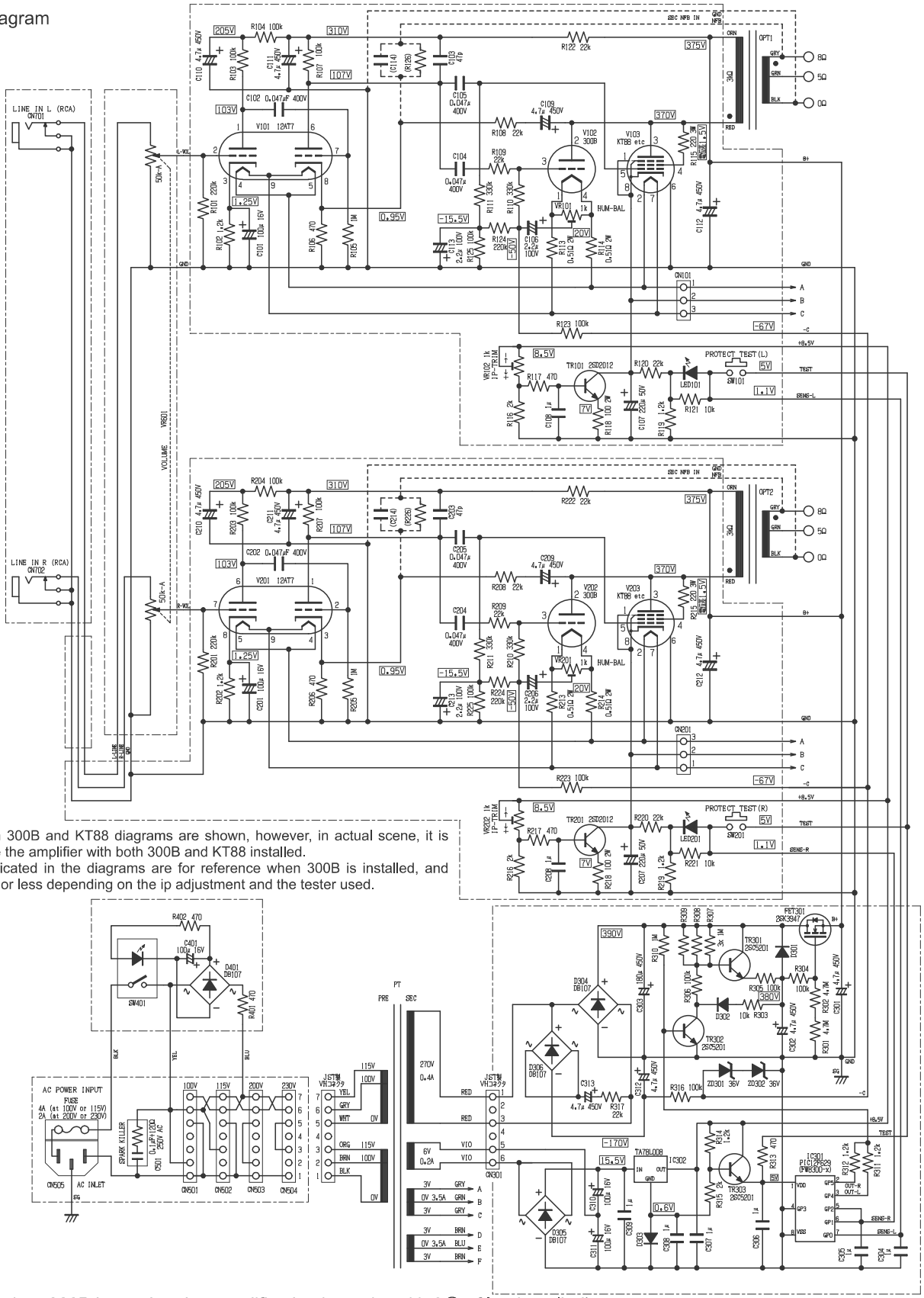
Phone: +81-92-923-8235
Fax: +81-92-923-8237
Website: http://www.elekit.co.jp
E-mail: info@elekit.co.jp

10. Technical Data

●Schematic diagram



Attention

- In this page both 300B and KT88 diagrams are shown, however, in actual scene, it is impossible to use the amplifier with both 300B and KT88 installed.
- The voltages indicated in the diagrams are for reference when 300B is installed, and could differ more or less depending on the ip adjustment and the tester used.

●Specifications (when 300B is used and no modification is made, with 8Ω of load applied)

- Vacuum tube : 300Bx2, 12AT7x2
- Maximum output : 8W+8W
- Frequency response(-3dB) : 15Hz-40kHz
- Residual noise (IEC filtering) : 0.5mV (0.1mV when KT88)
- Input sensitivity : 200mV
- DF : 6.3
- Corresponding speakers : 4-16Ω
- Output terminal : Gold-plated, binding post
  (bare wires up to Φ5mm can be inserted, and banana plug can also be used.)
- Input terminal : Gold-plated RCA jack
  Single stereo line (at the back)
- Power input : 3P inlet (IEC320)
- Power voltage : 100V AC 50/60Hz
  (115V, 200V, and 230V are also available. Change the soldering location of the connector for power transformer.)
- Power consumption : 80W by standard (70W-95W as ip is adjustable.)
- Dimension : W400×H213×D250 m
  (Chassis with the punched metal cover, protrusion not included.)
- Weight : 10.8kg (Fully assembled, excl. power cord)
- ip adjustment range : Approx. 50-80mA (L,R independently adjusted)
- Warming up timer (delay in B power supply)
- Cathode voltage monitoring, automatic shut down of B power supply upon malfunction
- Hum balancer function