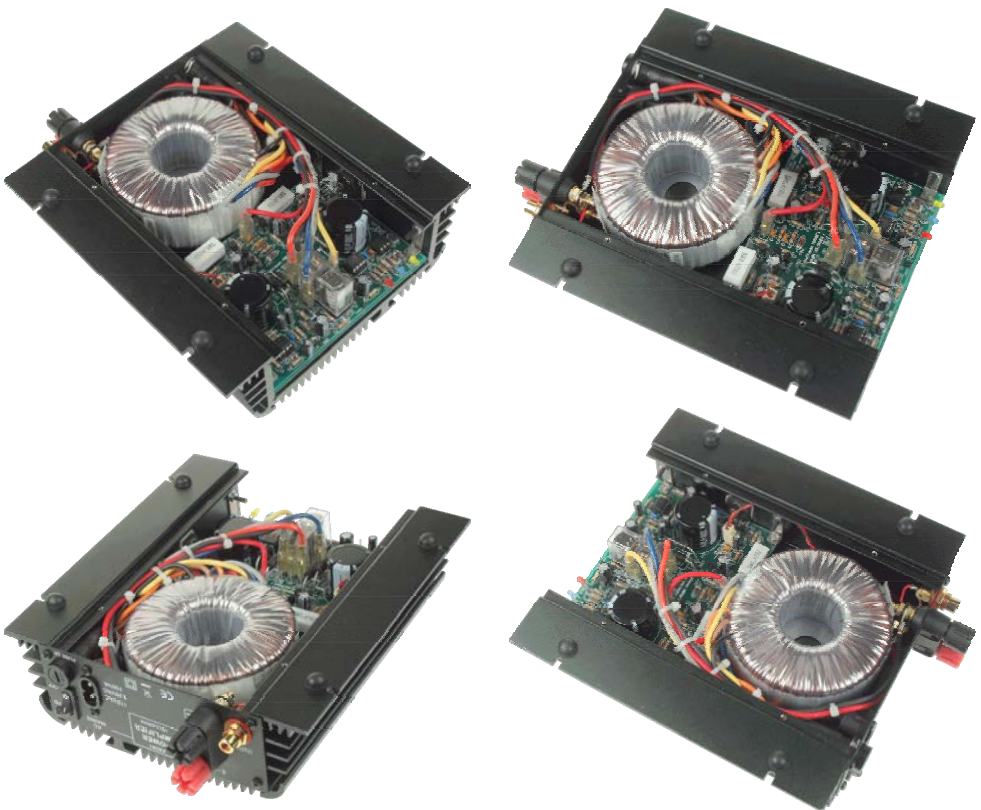


POWERBLOCK - POWER AMPLIFIER

This amplifier is an ideal set-up for active speaker use.

Total solder points: 383

Difficulty level: *beginner* 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ *advanced*



K8081



This power amplifier is an ideal set-up for active speaker use.

Build a high-quality system, using two (stereo) or more (surround) amplifiers.

Due to its auto switch-on, through input signal sensing, the unit can be installed at almost any place.

Comes complete with enclosure and transformer.

Features :

- ☑ fully discrete design using Epitaxial Darlington transistors
- ☑ includes all connectors, transformer and enclosure
- ☑ overload and short-circuit protection
- ☑ DC error protection with LED indication
- ☑ automatic switch-on upon input signal sensing (automatic switch-off)

Specifications

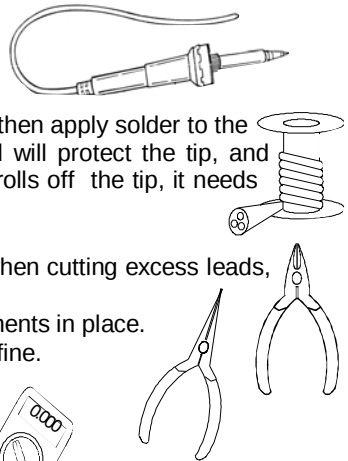
- 200W music power @ 4 ohm load
- 100W rms power @ 4 ohm load @ 10%THD
- distortion: 0.02% @ 1KHz/10W
- damping factor: >800
- frequency response: 3Hz to 200KHz (-3dB)
- sensitivity: 0.6V rms
- signal to noise ratio: 115dB
- power supply: 235 or 115 Vac
- Auto sensing on time : 15min.
- dimensions: 195 x 180 x 60mm (7.7" x 7" x 2.4")

1. Assembly (Skipping this can lead to troubles !)

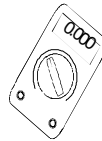
Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.

1.1 Make sure you have the right tools:

- A good quality soldering iron (25-40W) with a small tip.
- Wipe it often on a wet sponge or cloth, to keep it clean; then apply solder to the tip, to give it a wet look. This is called 'thinning' and will protect the tip, and enables you to make good connections. When solder rolls off the tip, it needs cleaning.
- Thin raisin-core solder. Do not use any flux or grease.
- A diagonal cutter to trim excess wires. To avoid injury when cutting excess leads, hold the lead so they cannot fly towards the eyes.
- Needle nose pliers, for bending leads, or to hold components in place.
- Small blade and Phillips screwdrivers. A basic range is fine.



For some projects, a basic multi-meter is required, or might be handy



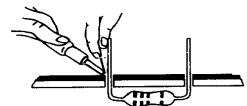
1.2 Assembly Hints :

- ⇒ Make sure the skill level matches your experience, to avoid disappointments.
- ⇒ Follow the instructions carefully. Read and understand the entire step before you perform each operation.
- ⇒ Perform the assembly in the correct order as stated in this manual
- ⇒ Position all parts on the PCB (Printed Circuit Board) as shown on the drawings.
- ⇒ Values on the circuit diagram are subject to changes.
- ⇒ Values in this assembly guide are correct*
- ⇒ Use the check-boxes to mark your progress.
- ⇒ Please read the included information on safety and customer service

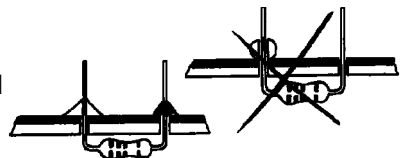
* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

1.3 Soldering Hints :

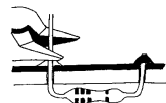
1- Mount the component against the PCB surface and carefully solder the leads



2- Make sure the solder joints are cone-shaped and shiny



3- Trim excess leads as close as possible to the solder joint



Included in
this kit

RESISTOR COLOUR CODE

100K OHM +/- 1% 100K OHM +/- 5%

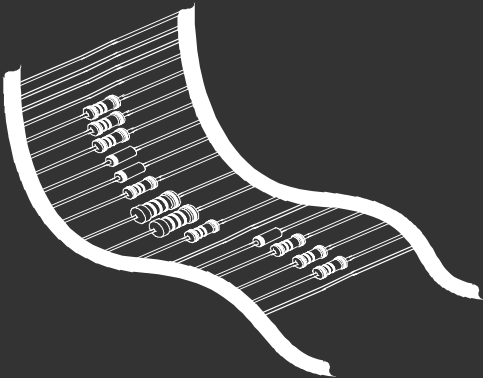
Vellemans Project Service Forum

VELLEMAN BV
7534 TONER STREET
Eindhoven, 5500 AB NL
www.velleman.nl

2. RESISTOR

☐ R1 : 120 (1 - 2 - 1 - B)

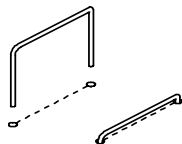
COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOLERANCE
	BLACK	0	0	0	x1	1%
	BROWN	1	1	1	x10	
	RED	2	2	2	x100	
	ORANGE	3	3	3	x1.000	
	YELLOW	4	4	4	x10.000	
	GREEN	5	5	5	x100.000	
	BLUE	6	6	6	x1.000.000	



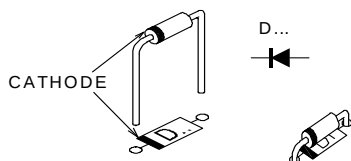
REMOVE THEM FROM THE TAPE ONE AT A TIME !

DO NOT BLINDLY FOLLOW THE ORDER OF THE COMPONENTS ONTO THE TAPE.
ALWAYS CHECK THEIR VALUE ON THE PARTS LIST!

1. Jump wires.

☐ J


2. Diodes (check the polarity)

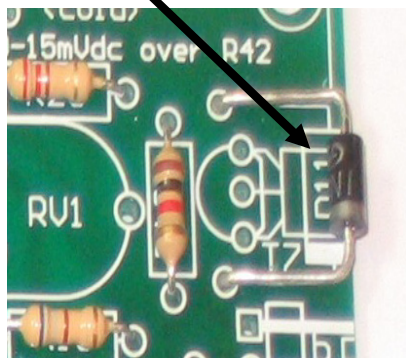


- ☐ D1 : 1N4148
- ☐ D2 : 1N4148
- ☐ D3 : 1N4148
- ☐ D4 : 1N4148
- ☐ D5 : 1N4148
- ☐ D6 : 1N4148
- ☐ D7 : 1N4148
- ☐ D8 : 1N4148
- ☐ D9 : 1N4007
- ☐ D10 : 1N4007

Mounting Diode D11 :

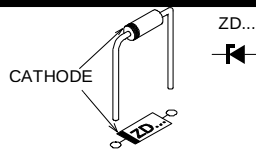
- ☐ D11 : 1N4007

- Mount D11.

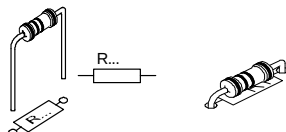


3. Zener diodes (check the polarity)

- ☐ ZD1 : 5V1
- ☐ ZD2 : 9V1



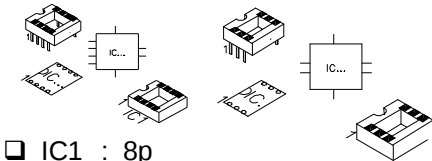
4. 1/4W resistors.



- ☐ R1 : 330 (3 - 3 - 1 - B)
- ☐ R2 : 220 (2 - 2 - 1 - B)
- ☐ R3 : 47 (4 - 7 - 0 - B)
- ☐ R4 : 3K3 (3 - 3 - 2 - B)
- ☐ R5 : 100 (1 - 0 - 1 - B)
- ☐ R6 : 22K (2 - 2 - 3 - B)
- ☐ R7 : 120 (1 - 2 - 1 - B)
- ☐ R8 : 2K2 (2 - 2 - 2 - B)
- ☐ R9 : 680 (6 - 8 - 1 - B)
- ☐ R10 : 3K3 (3 - 3 - 2 - B)
- ☐ R11 : 3K3 (3 - 3 - 2 - B)
- ☐ R12 : 10 (1 - 0 - 0 - B)
- ☐ R13 : 18K (1 - 8 - 3 - B - 9)
- ☐ R14 : 2K7 (2 - 7 - 2 - B - 9)
- ☐ R15 : 1K5 (1 - 5 - 2 - B)
- ☐ R16 : 47 (4 - 7 - 0 - B)
- ☐ R17 : 3K3 (3 - 3 - 2 - B)
- ☐ R18 : 680 (6 - 8 - 1 - B)
- ☐ R19 : 1K (1 - 0 - 2 - B)
- ☐ R20 : 220 (2 - 2 - 1 - B)
- ☐ R21 : 470 (4 - 7 - 1 - B)
- ☐ R22 : 470K (4 - 7 - 4 - B)
- ☐ R23 : 100K (1 - 0 - 4 - B)
- ☐ R24 : 1K (1 - 0 - 2 - B)
- ☐ R25 : 1M (1 - 0 - 5 - B)
- ☐ R26 : 470K (4 - 7 - 4 - B)
- ☐ R27 : 100 (1 - 0 - 1 - B)
- ☐ R28 : 15K (1 - 5 - 3 - B)
- ☐ R29 : 470K (4 - 7 - 4 - B)
- ☐ R30 : 100K (1 - 0 - 4 - B)
- ☐ R31 : 47K (4 - 7 - 3 - B)
- ☐ R32 : 2K7 (2 - 7 - 2 - B - 9)

- ☐ R33 : 3K3 (3 - 3 - 2 - B)
- ☐ R34 : 560 (5 - 6 - 1 - B - 9)
- ☐ R35 : 10K (1 - 0 - 3 - B)
- ☐ R36 : 47K (4 - 7 - 3 - B)
- ☐ R37 : 1K (1 - 0 - 2 - B)
- ☐ R38 : 10K (1 - 0 - 3 - B)
- ☐ R39 : 1K (1 - 0 - 2 - B)
- ☐ R40 : 2K2 (2 - 2 - 2 - B)
- ☐ R41 : 10K (1 - 0 - 3 - B)

5. IC sockets. Watch the position of the notch!

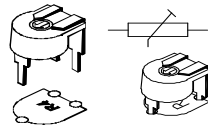


- ☐ IC1 : 8p
- ☐ IC2 : 8p
- ☐ IC3 : 6p

6. Trim potentiometer

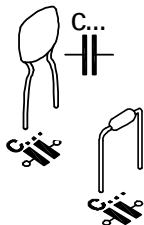
- ☐ RV1 : 1K

Bias adjustment



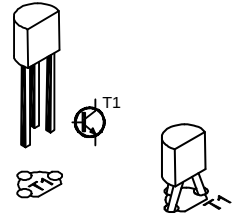
7. Capacitors

- ☐ C1 : 47pF (47)
- ☐ C2 : 47pF (47)
- ☐ C3 : 1nF (102)
- ☐ C4 : 680pF (680)
- ☐ C5 : 680pF (680)
- ☐ C6 : 10nF (103)
- ☐ C7 : 10nF (103)
- ☐ C8 : 47nF (473)
- ☐ C9 : 100nF (104)
- ☐ C10 : 100nF (104)
- ☐ C11 : 100nF (104)
- ☐ C12 : 100nF (104)

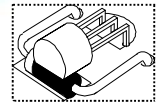
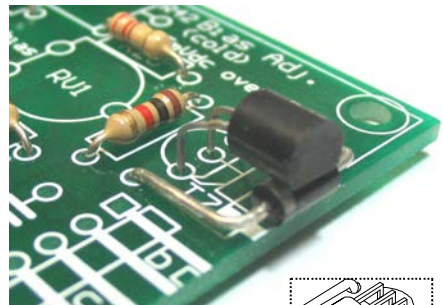


8. Transistors

- ☐ T1 : BC640
- ☐ T2 : BC640
- ☐ T3 : BC639
- ☐ T4 : BC547
- ☐ T5 : BC557
- ☐ T6 : BC547
- ☐ T7 : BC547

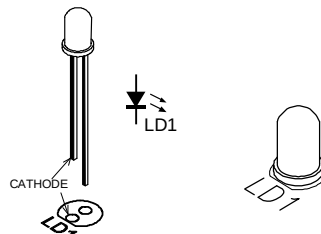


Make sure that transistor T7 is bent towards diode D11.

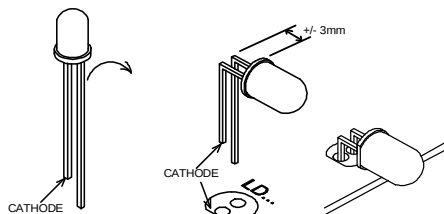
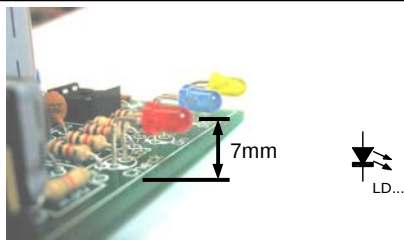


Make sure that the transistor and diode leads do not touch each other.

9. LEDs. Watch the polarity!



- ☐ LD4 : Power (red)

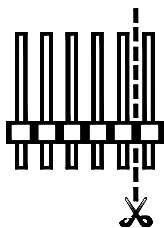


- ☐ LD1 : yellow (standby)
- ☐ LD2 : Blue (on)
- ☐ LD3 : red (check)

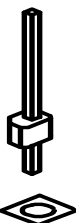
IMPORTANT

Mount these LED's exactly like in the drawing, otherwise some LED's will not fit correctly in the front panel.

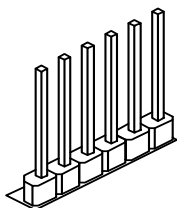
10. Pinheaders



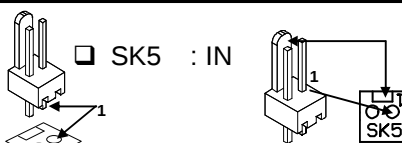
- ☐ GND : 1 pin
- ☐ TEST : 1 pin
- ☐ +40V : 1 pin



- ☐ T8 : 6 pins
- ☐ T9 : 6 pins

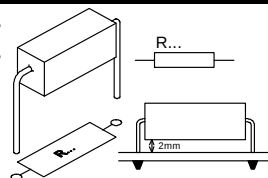


11. Male board wire connector



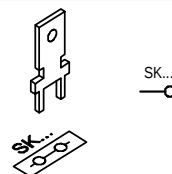
12. 5W resistors

- ☐ R42 : 0,47
- ☐ R43 : 0,47

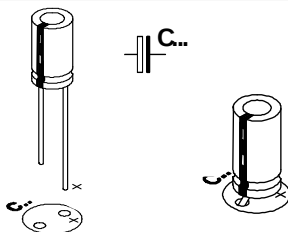


13. Flat receptacles

- ☐ LS+
- ☐ LS-
- ☐ AC RED
- ☐ AC GREY
- ☐ AC YELLOW
- ☐ AC BLUE

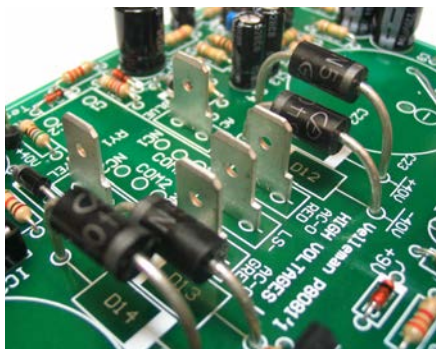
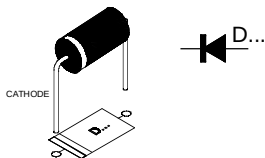


14. Electrolytic capacitors. Watch the polarity !



- ☐ C13 : 10μF
- ☐ C14 : 10μF
- ☐ C15 : 10μF
- ☐ C16 : 47μF / 16V
- ☐ C17 : 100μF / 50V
- ☐ C18 : 100μF / 50V
- ☐ C19 : 220μF / 16V
- ☐ C20 : 220μF / 16V
- ☐ C21 : 220μF / 16V
- ☐ C22 : 470μF / 16V

15. Power diodes (check the polarity)



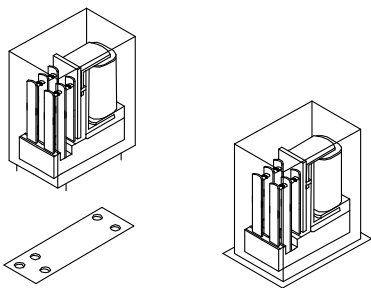
**Mount following diodes 15mm
above the PCB :**

- ☐ D14 : 1N5404
- ☐ D15 : 1N5404

**Mount following diodes 10mm
above the PCB :**

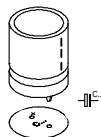
- ☐ D12 : 1N5404
- ☐ D13 : 1N5404

16. Relay



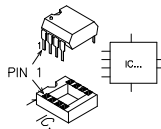
- ☐ RY1 : VR5V242C
(24VDC - 5A - 2C)

17. Electrolytic capacitors. Watch the polarity !



- ☐ C23 : 3300 μ F / 50V
- ☐ C24 : 3300 μ F / 50V

18. IC's. Watch the position of the notch!



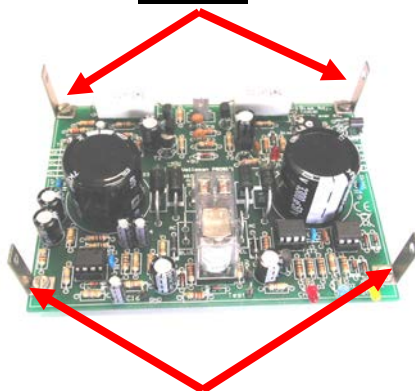
- ☐ IC1 : LM258P
- ☐ IC2 : VK8081 (programmed PIC10F200-I/PG)
- ☐ IC3 : TIL111 or 4N27

19.Brackets



Mount all 4 brackets,
fasten them using 6mm
M3 bolt + M3 nut

brackets

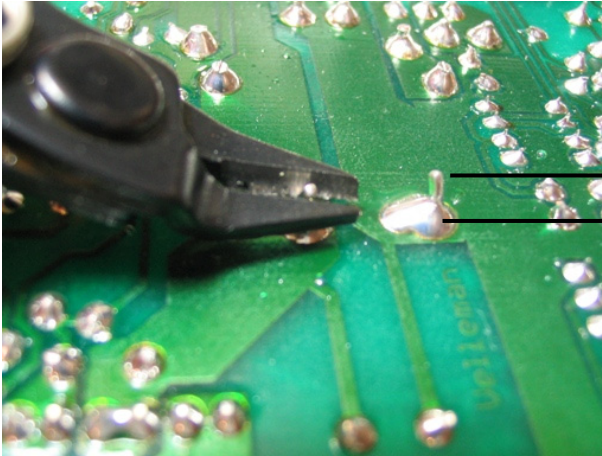


brackets

Use the colour pictures on packaging as guideline

20. ASSEMBLY OF THE UNIT

1

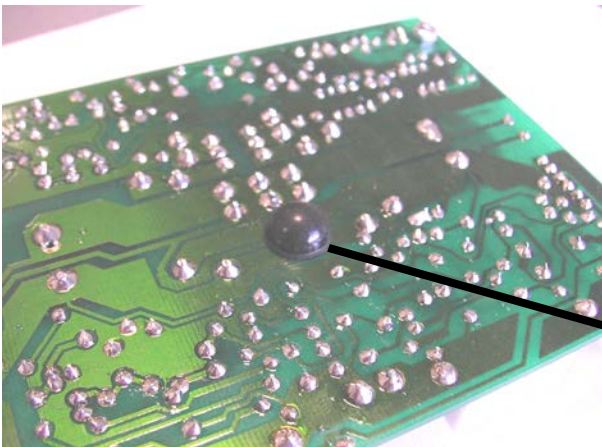


Max. 1.5mm

- cut all connections to 1.5mm

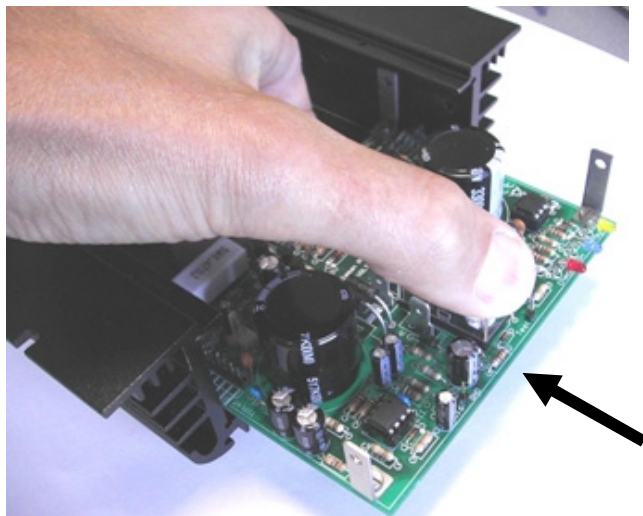
👉 Make sure that the solder connections don't touch the housing.

2



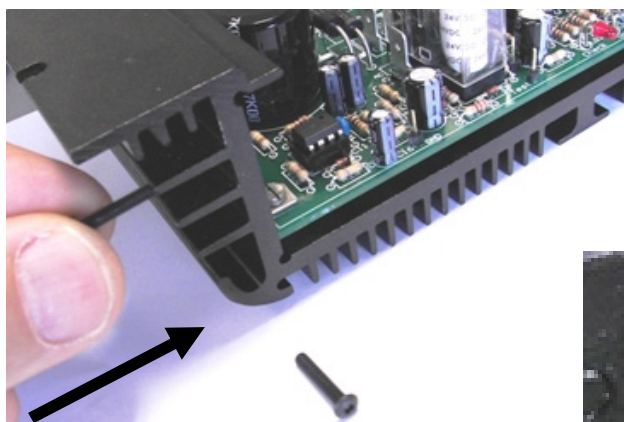
- fix rubber foot in center of PCB

3

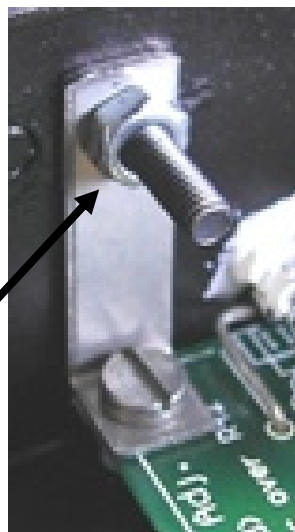


- slide the PCB into the heatsink

4

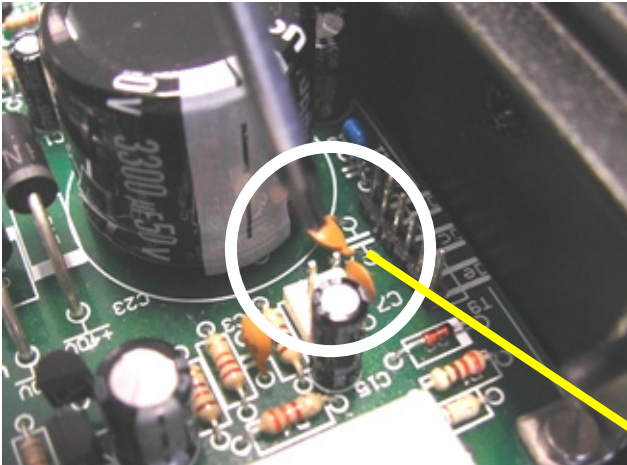


- fix the PCB using 4 bolts + nut

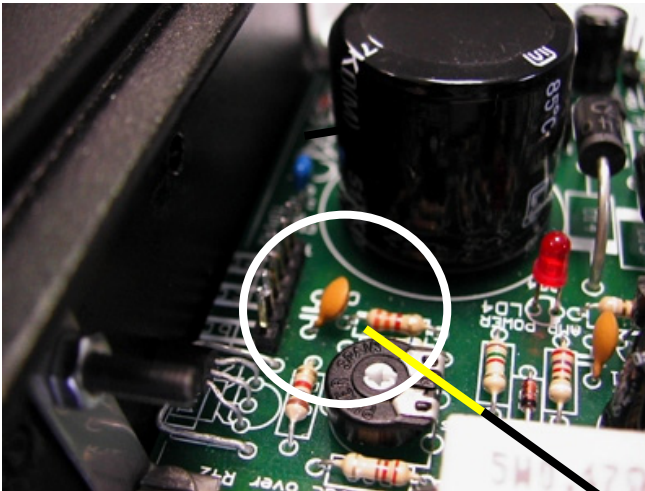
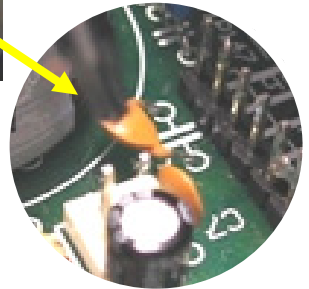


- fix the 4 nuts inside

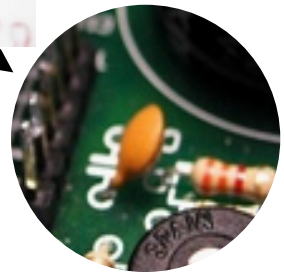
5



- bend C4 away from T9



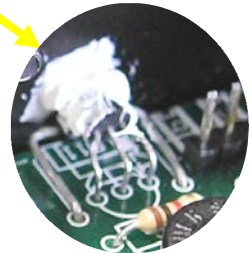
- bend C5 away from T8



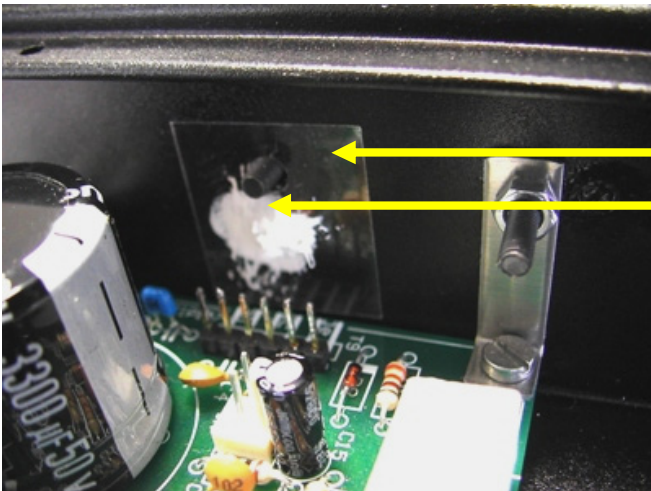
6



- apply some heat conductive silicone grease to transistor and diode.



7



isolator

M3 bolt

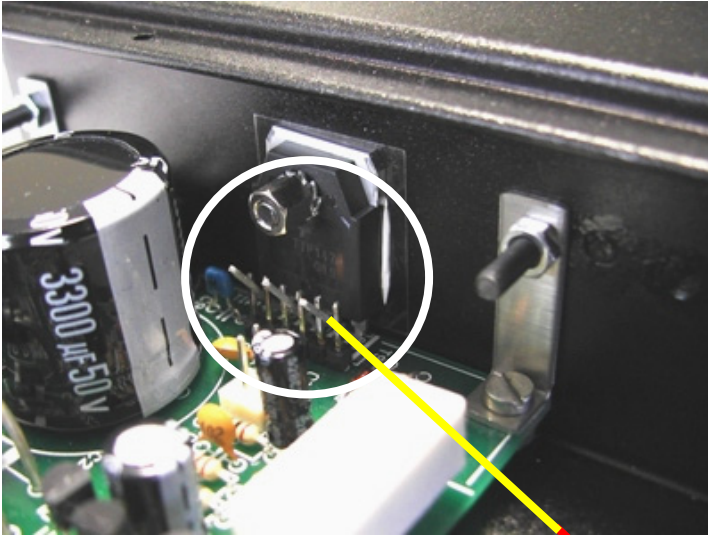
- place the M3 bolt for T8 and T9
- mount the isolator to heatsink, apply grease to both sides

8



- bend the leads for T8 (*TIP142*) and T9 (*TIP147*) like in the photograph.

9



- position the transistors T8 (*TIP142*) and T9 (*TIP147*) and fix using lock washer and 6mm M3 nut.



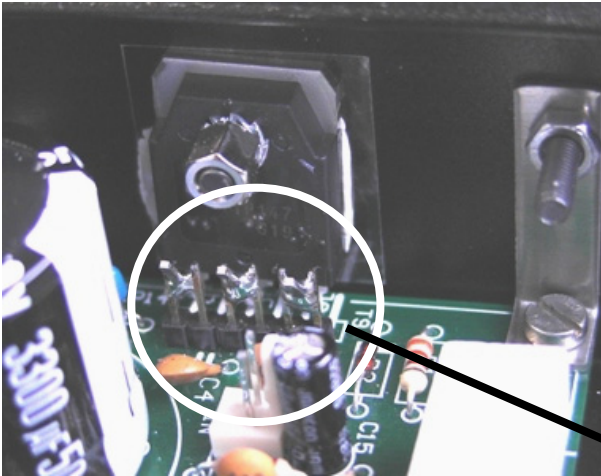
lock washer



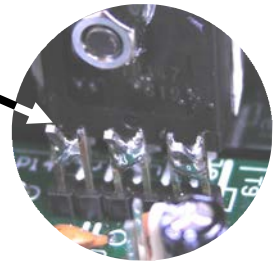
6mm M3 nut



10



- solder the connections carefully, check by trying to move the leads after soldering



11



- Remove the isolation

- prepare the speaker output cables (red & black), one side with terminal + cover, other side with eyelet connector



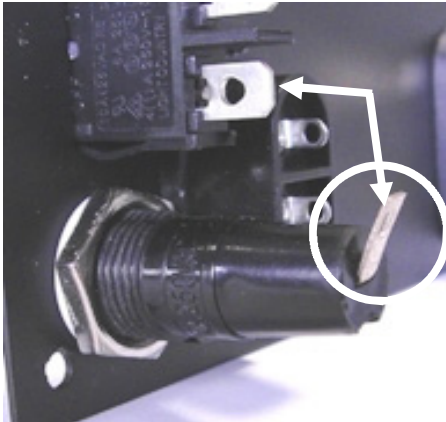
speaker output connection set

12

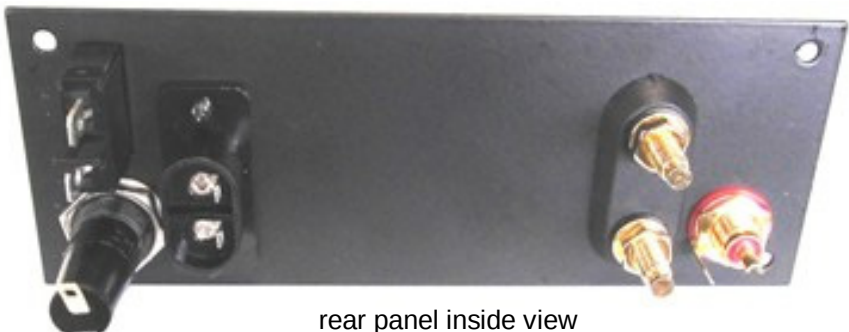


- mount all connectors and fuse, check position of speaker connector and switch holder to the rear panel

13



- position the fuse holder exactly like in the picture



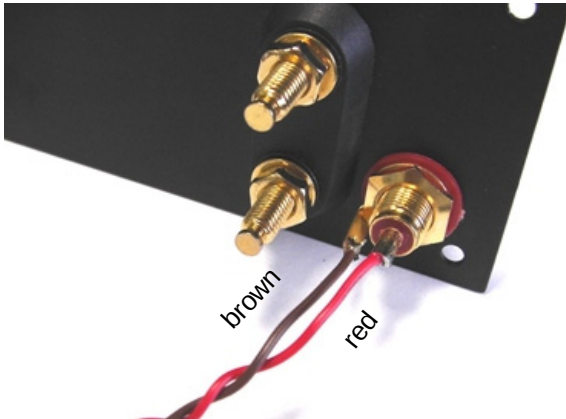
rear panel inside view

14



- align the RCA mounting nut

15



- solder the 2 wire connector cable to the RCA, brown = signal ground & red = signal.



Twist the connector wire

16



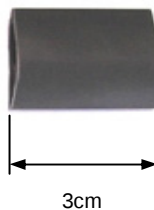
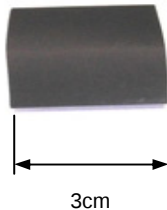
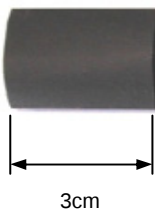
- connect the speaker wires exactly like in the picture (+ = red wire)

17



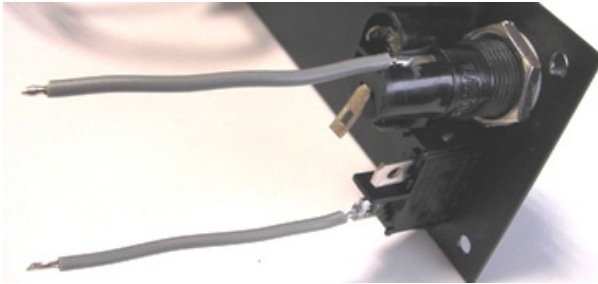
- insert 2 A slow blow fuse

18



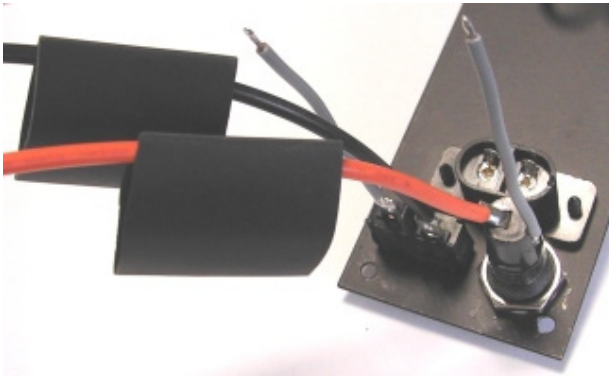
- cut 3 pcs. of 3cm from the shrink tube

19



- solder one 8cm brown wire to the switch and one to the fuse holder

20



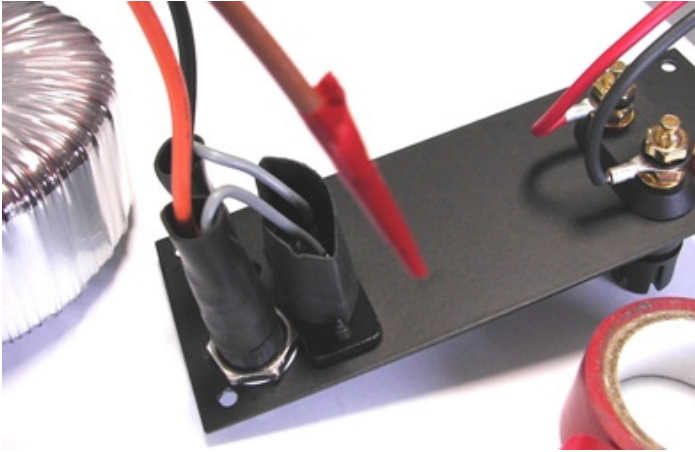
- slide a piece of shrink tube over the transformer mains connections :
 - ✓ black wire
 - ✓ brown wire (100-120VAC) or the orange wire (220-245VAC)
- connect the black wire to the power switch
- connect the orange (~230VAC) or brown (~115VAC) wire with the center connector of the fuseholder.

21



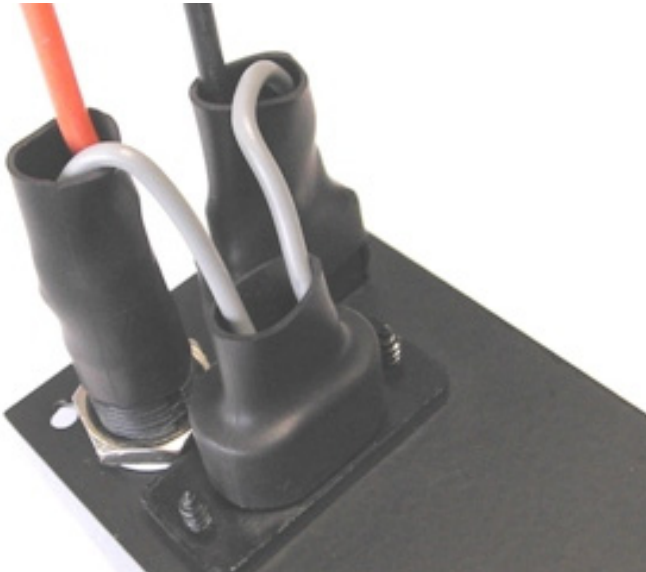
- slide the shrinking tube over the switch and fuse holder

22



- isolate the not used transformer wire using a piece of tape.

23



- shrink the tube using heater or hair dryer.

24



- apply glue to the transformer protector

25



- position the protector like in the drawing

26



- solder terminal + cover to the 4 transformer wires

27

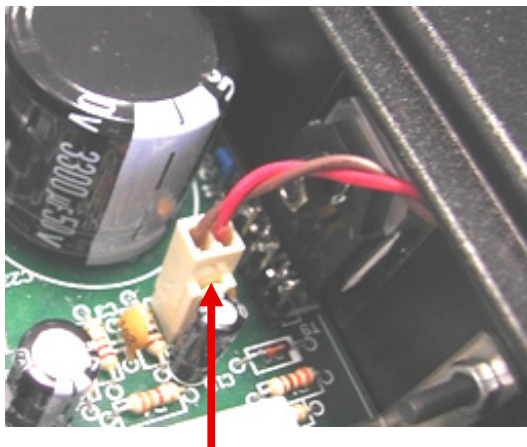


- position the rear panel and the transformer



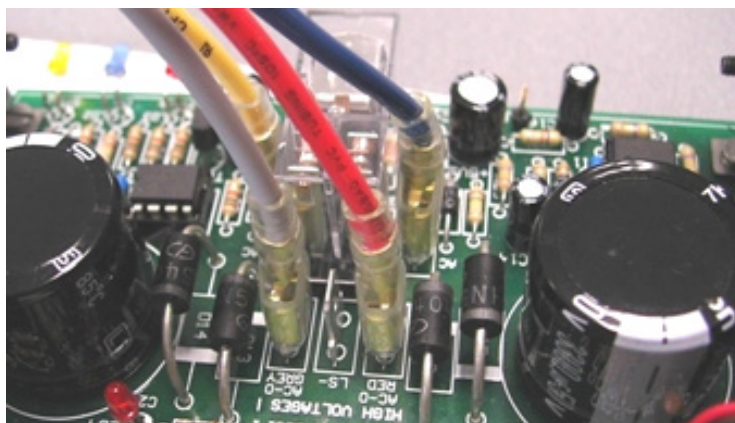
- fix the rear panel, use 4 self tapping screws.

28



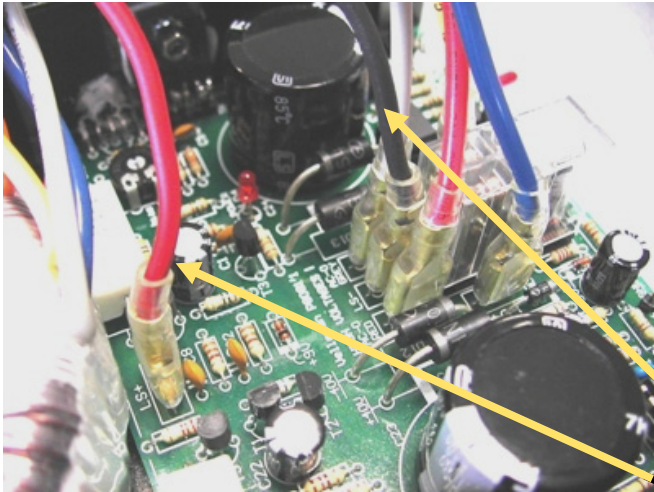
- connect the input signal connector

29



- connect the AC connectors RED, BLUE, GREY and YELLOW

30



-LS (black)

+LS (red)

- connect the speaker +LS red and -LS black wires

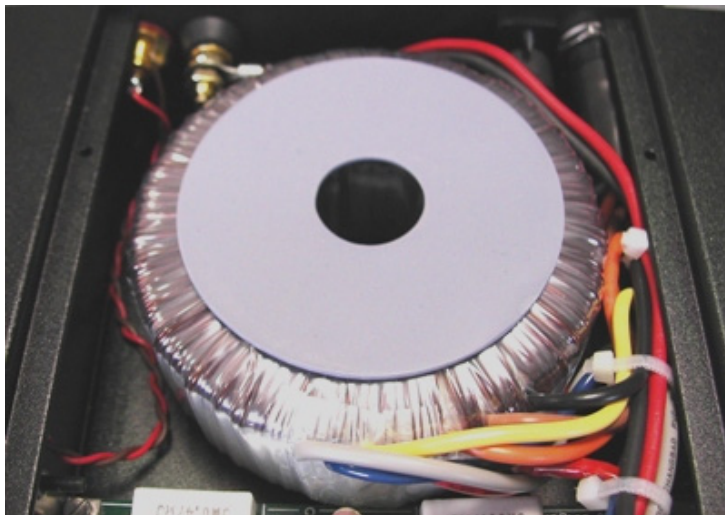
31



- check the wire styling and apply straps

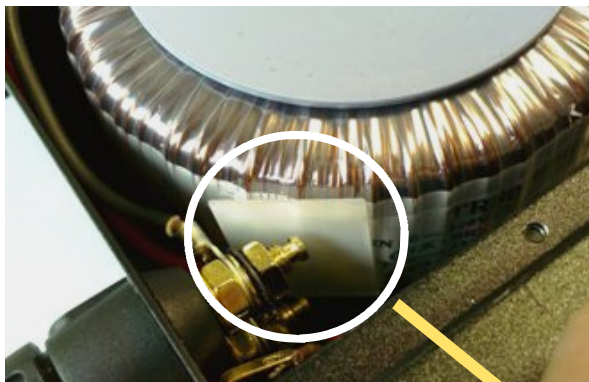


32

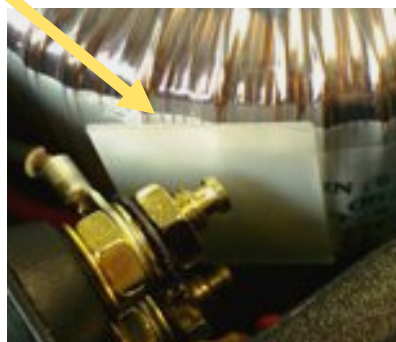


- position the transformer insulation rubber

33



- stick the isolator foil to the transformer



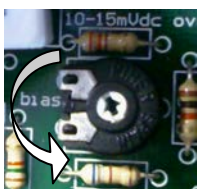
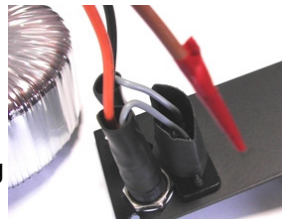
21. TESTING THE DC PROTECTION CIRCUIT :

1 Preliminary test:

Recheck carefully if the selection of primary AC voltage, complies to your mains voltage.

- ❑ **120Vac:** black / brown.
- ❑ **230Vac:** black /orange.

👉 **IMPORTANT:** Insulate the wire that is not being used.



Verify that the amplifier is turned off (switch at rear panel)

Turn the RV1 bias adjust trimmer fully counter clockwise (turn left)

👉 **For first time testing, insert a 60W light bulb in series with the AC power line.**

- Connect the power cord (it is possible that the supplied cord or connector must be replaced to comply with the requirements of your country)
- Turn ON the amplifier using the switch at the rear panel

👉 **If the light bulb lights up continuously, disconnect the mains voltage and check all your wiring and assembly.**

- The power LED LD4 should lit.
- If the 60W lamp remains off or lights up briefly, then everything is OK,
- Remove the light bulb from the circuit.

2 Setting the bias:

- Connect a multimeter (lowest DC voltage range 1V or lower) over the leads of R42 or R43.
- Turn on the power.
- Check the multimeter, it should read 0V, adjust RV1 carefully to about 10-15mV (0.010V-0.015V) Wait a few minutes until the meter reading remains stable.

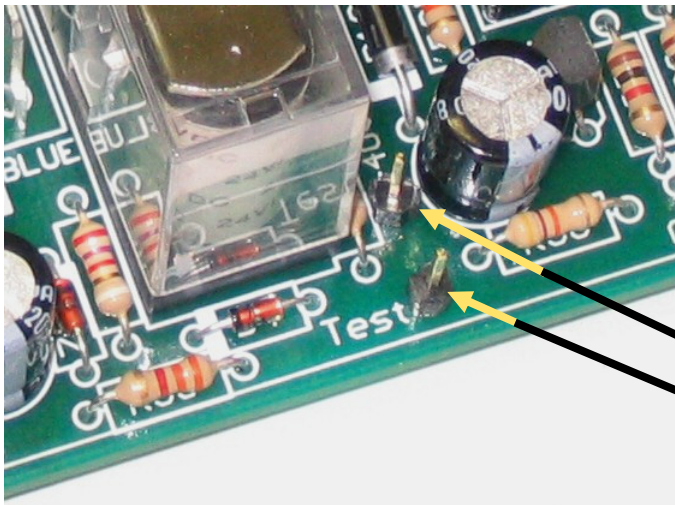


👉 **Note: the amplifier will turn itself off after about 15 minutes.**

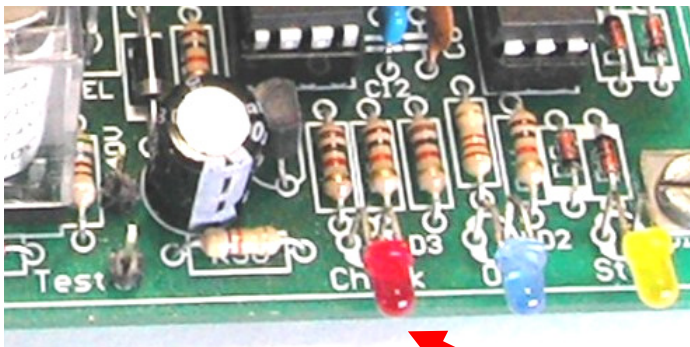
- Remove the multimeter

3

DC error detection test:



- Briefly connect the +40V test point with the TEST pin. The RED check LED should BLINK and the relay should switch off.



Check LED

**Turn off the AC power.
The amplifier is now ready for use.**

4



- mount the front panel
- fix the front panel, use 4 self tapping screws.

5



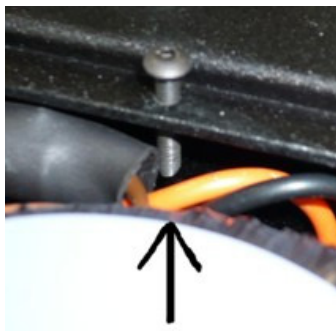
- check the position of the LEDs

6



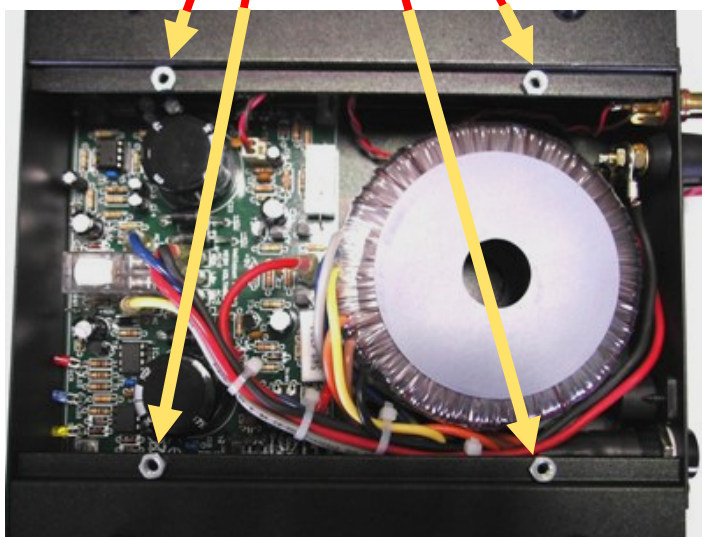
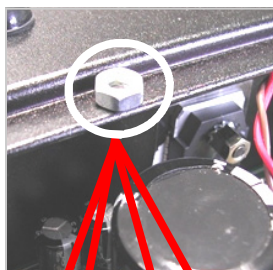
- mount the transformer positioning plate

7

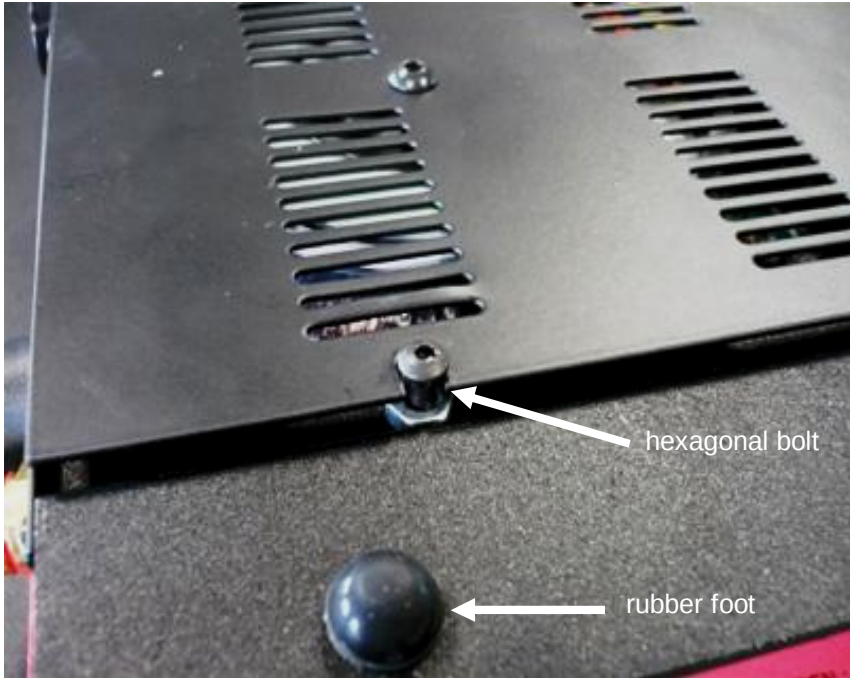


☞ Check that the fixation bolt does not make contact with the wires!

- position 4 spacer nuts



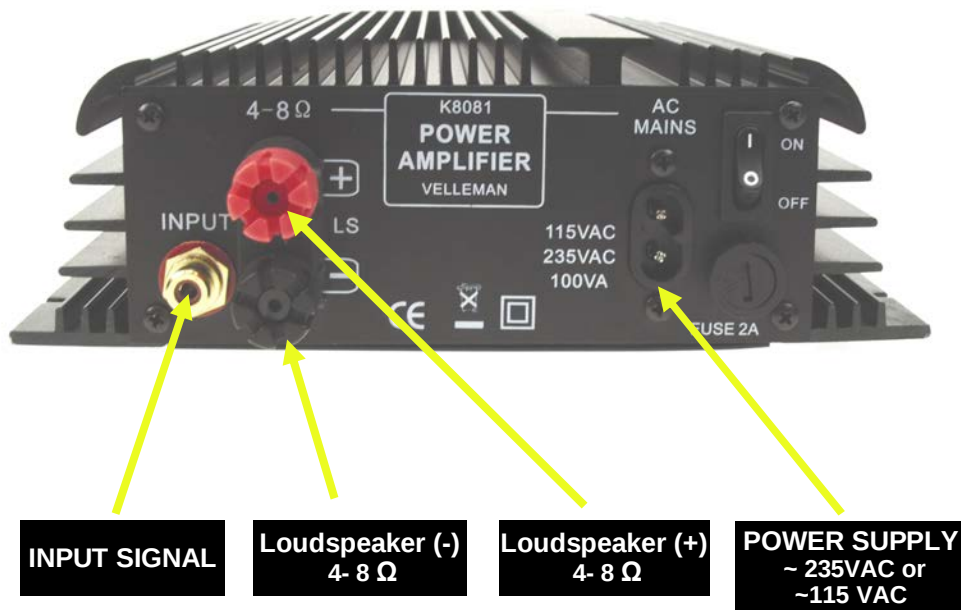
8



- mount the bottom panel using 4 hexagonal bolts and fix in each corner a rubber foot

22. Connection

Rear panel connections:

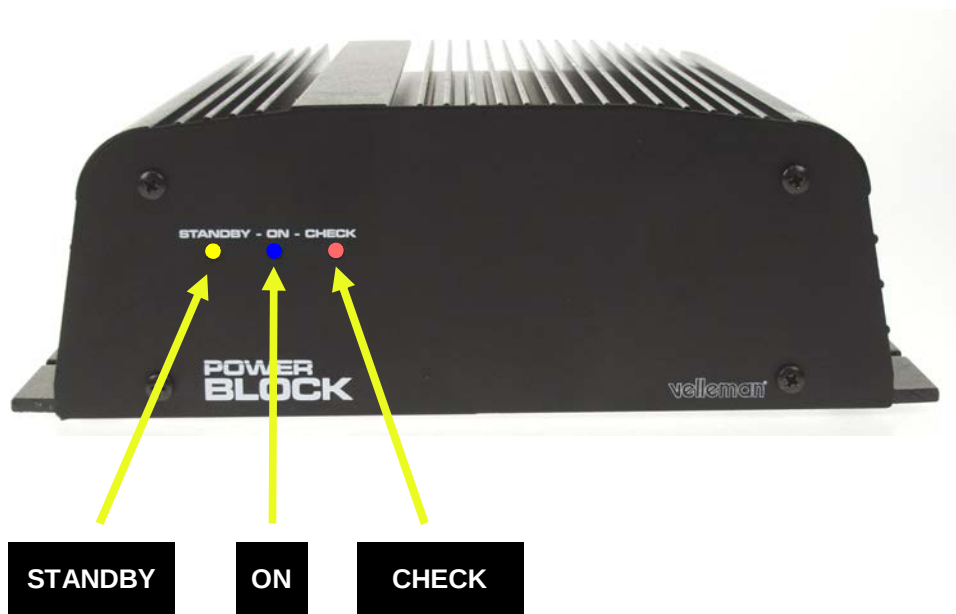


- Connect the input signal, coming from a pre amplifier, volume and tone control (ex K8084), mixing panel..
- Connect speakers, it is advised to use 4 ohm speakers for maximum output power.
- Connect mains voltage

Turning ON

- Turn on the amplifier using the mains switch
- The amplifier will stay on for about 15 minutes (ON LED is LIT)
- If the input senses no signal during this time, the amplifier will turn off automatically.

👉 **REMARK:** Strike out the NOT used mains voltage indication at the back of the housing !!
e.g. cross out with a permanent black marker.

Front panel indications:

STANDBY: LIT when mains power is ON (Fuse OK)

ON: LIT when amplifier is ON (input signal is amplified)

CHECK: has 2 functions

1– Blinks short if no signal is sensed during ON

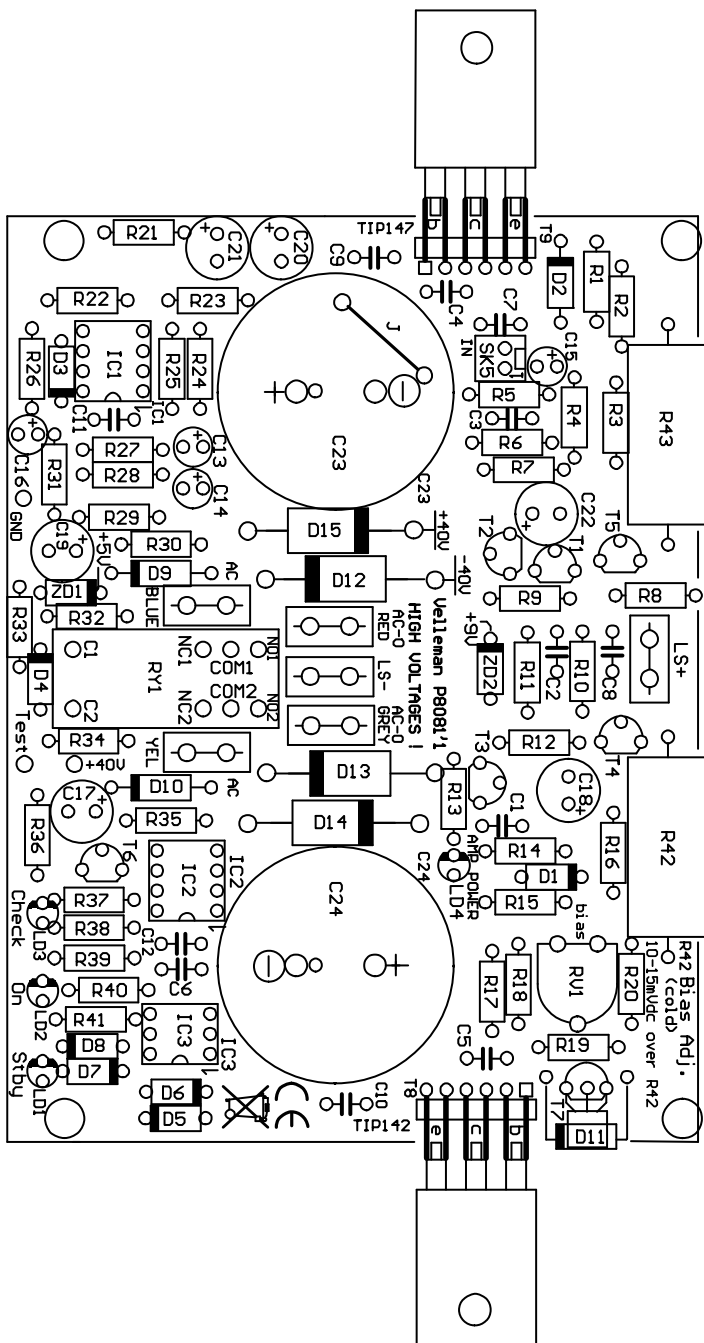
2– Blinks fast if error detected, the amplifier is turned OFF

If an amplifier error is detected, this can be due to extreme loud sound or due to an amplifier error.

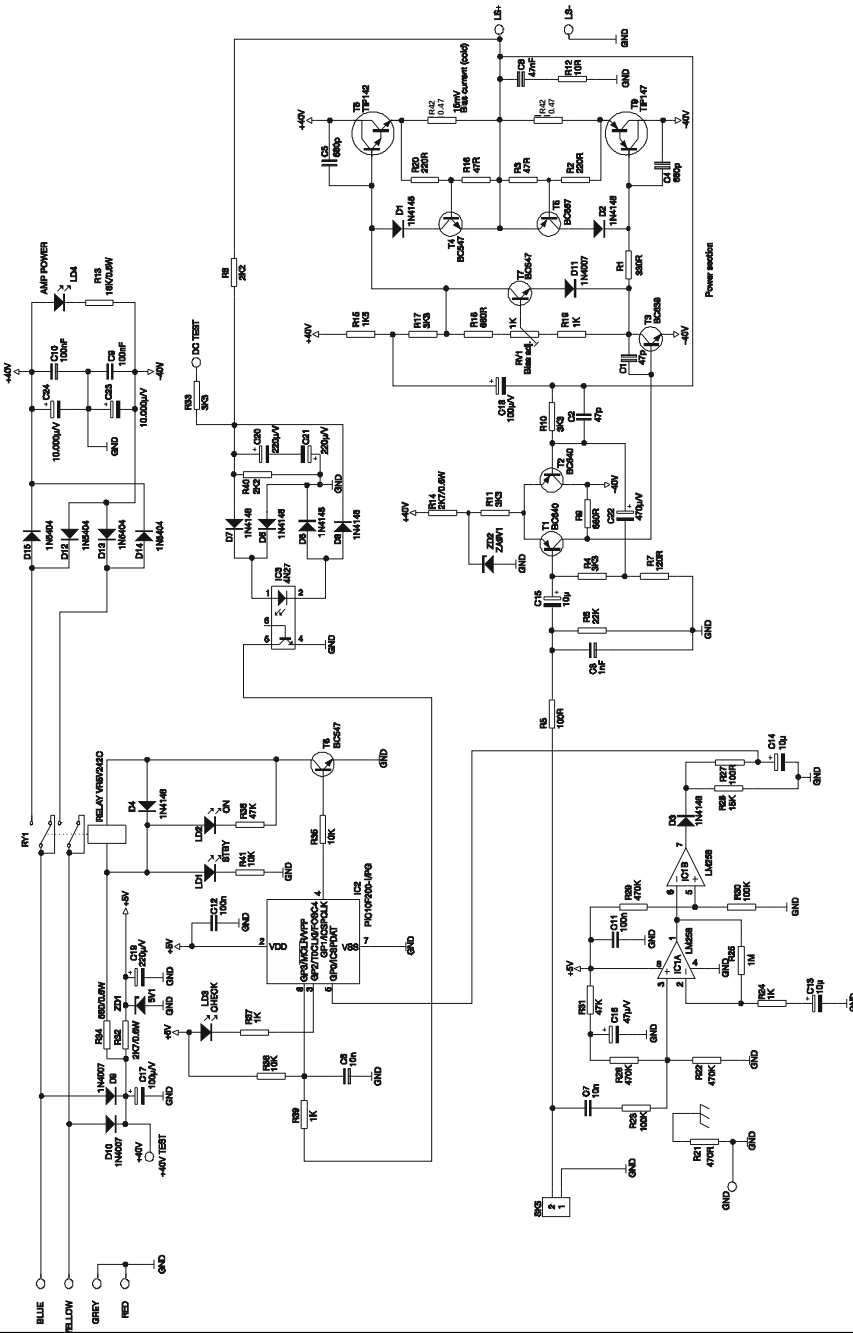
Reset the amplifier by turning the amplifier off, wait 10 sec, then turn ON.

👉 **In case of unrecoverable error, please check the amplifier circuit.**

23. PCB



24. Schematic diagram



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