

Total solder points: 136

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

200W MONO / STEREO AMPLIFIER



K4004B

Universal, robust and compact are
the words to describe this
amplifier

Features:

- ☑ Universal, robust and compact are the words to describe this amplifier.
- ☑ A stereo or a mono amplifier.
- ☑ Three selectable input sensitivities.
- ☑ Overload and short-circuit protection.
- ☑ Protection against incorrect power supply polarity.
- ☑ Thermally protected.
- ☑ Speaker transient suppression.

Specifications:

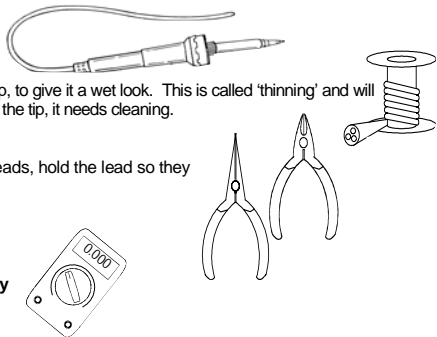
- Rms output power: 2 x 50W / 4ohm ; 2 x 40W / 8ohm
- Rms mono-bridged power: 100W / 8ohm
- Total music output: 200W
- Harmonic distortion: 0.01% at 1kHz
- Signal-to-noise ratio: 102dB (A weighted)
- Stereo channel separation: 85dB
- Damping factor (at 100Hz): > 1000
- Input impedance: 22Kohm
- Input sensitivity: 300mV, 550mV or 1V switchable
- Thermal protection: max. 1h
- Short-circuit and overload protection: max. 10 sec.
- Power supply: + 28VDC and - 28VDC max.
- Consumption (2 x 4ohm or mono-bridge 8ohm): 4A max.
- Consumption (2 x 8ohm): 2.5A max.
- Dimensions: 210 x 85 x 64mm (8.3" x 3.4" x 2.5")

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

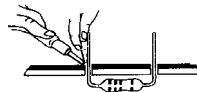
1.2 Assembly Hints :

- ⇒ 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

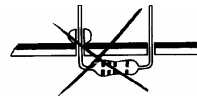
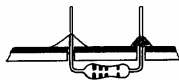
* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

1.3 Soldering Hints :

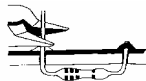
1- Mount the component against the PCB surface and carefully solder the leads



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

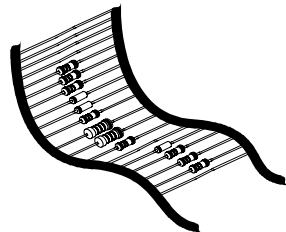


3- Trim excess leads as close as possible to the solder joint



REMOVE THEM FROM THE TAPE ONE AT A TIME !

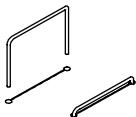
**AXIAL COMPONENTS ARE TAPED IN THE
CORRECT MOUNTING SEQUENCE !**



You will find the colour code for the resistances and the LEDs in the HALG (general manual) and on our website: <http://www.velleman.be/common/service.aspx>

1. Jumpers

J : 4X



Choice between different input sensitivities:

- Mount the jumpers JH for a sensitivity of **1V**.
- Mount the jumpers JM for a sensitivity of **550mV**.
- Leave both jumper connections OPEN for a sensitivity of **330mV**.

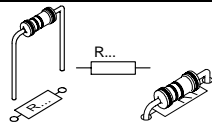


Choice between stereo or mono:

- Mount the jumpers JS for a **stereo amplifier**.
- Mount the jumpers JB for a **mono-bridged amplifier**.

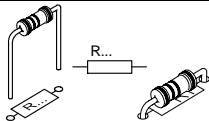


2. 1/4W Resistors



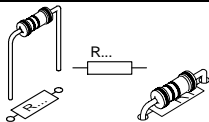
- R1 : 22K (2 - 2 - 3 - B)
- R2 : 22K (2 - 2 - 3 - B)
- R3 : 680 (6 - 8 - 1 - B)
- R4 : 680 (6 - 8 - 1 - B)
- R5 : 470K (4 - 7 - 4 - B)
- R6 : 470K (4 - 7 - 4 - B)
- R7 : 33K (3 - 3 - 3 - B)
- R8 : 33K (3 - 3 - 3 - B)
- R9 : 39K (3 - 9 - 3 - B)
- R10 : 39K (3 - 9 - 3 - B)
- R11 : 15K (1 - 5 - 3 - B)
- R12 : 15K (1 - 5 - 3 - B)
- R13 : 3,3 (3 - 3 - B)
- R14 : 3,3 (3 - 3 - B)
- R15 : 100 (1 - 0 - 1 - B)

3. 1/2W Resistors



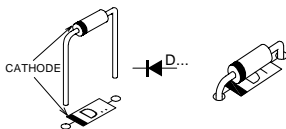
- R16 : 2K7 (2-7-2-B-9)
- R17 : 2K7 (2-7-2-B-9)

4. 1W Resistors



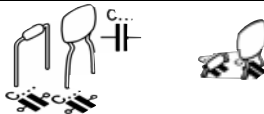
- R18 : 1K (1-0-2-B)
- R19 : 1K (1-0-2-B)

5. Diodes. Watch the polarity!



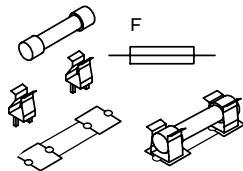
- D1 : 1N5404
- D2 : 1N5404

6. Capacitors



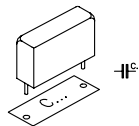
- C1 : 220pF (221)
- C2 : 220pF (221)
- C3 : 2,2nF (222)
- C4 : 22nF (223)
- C5 : 22nF (223)

7. Fuseholder + fuse



- F1 : 5A (slow)
- F2 : 5A (slow)

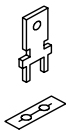
8. Capacitors



- C6 : 1μF (105)
- C7 : 1μF (105)

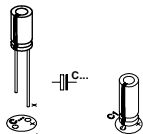
9. PCB mounting tabs

- +V
- V
- GND
- LS } right
- +LS } right
- LS } left
- LS } left



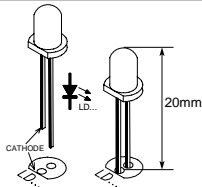
10. Electrolytic Capacitors

- C8 : 1 μ F
- C9 : 1 μ F
- C10 : 1 μ F
- C11 : 1 μ F
- C12 : 1 μ F
- C13 : 1 μ F
- C14 : 47 μ F
- C15 : 47 μ F
- C16 : 47 μ F
- C17 : 47 μ F



Watch the polarity!

11. LEDs

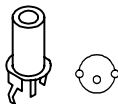


- LD1 : 5mm red
- LD2 : 5mm red

12. Cinch connector

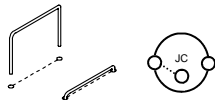
Stereo :

- Left input
- Right input



Mono :

For mono, only mount a CINCH connector for the right input and mount the JC jumper for the left input.



- Right input

If one has used switches instead of jumpers for to select between mono and stereo, then both CINCH connectors can be mounted. In this case one must short-circuit the left channel's input signal when using the mono mode.

13. Mounting the power supply IC's

👉 **INSPECT ALL MOUNTED COMPONENTS THOROUGHLY!**

- ❑ Mount both IC's on the PCB, the metal back pointed towards the PCB's edge. Take care to use the entire length of the connectors, this avoids making it necessary to shorten the connectors (fig. 1.0).
- ❑ Next, bend the IC's as shown in fig. 2.0 and then as in fig. 3.0. Watch the distance between the lower surfaces of the PCB and the IC.

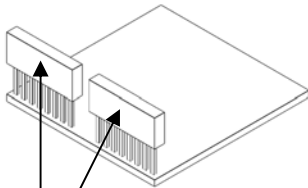


Fig 1.0

metal back

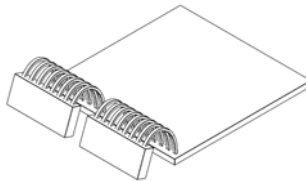


Fig 2.0

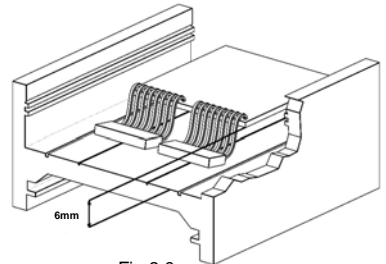


Fig 3.0

- ❑ Slide the PCB into the largest slot of the heatsink and position it as shown in figure 4.0. Slide an insulation mica, provided with a drop of heat-conducting paste on both sides, under both IC's, see fig 5.0
- ❑ Press the IC's against the heatsink.

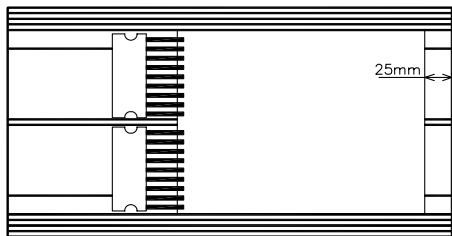


Fig 4.0

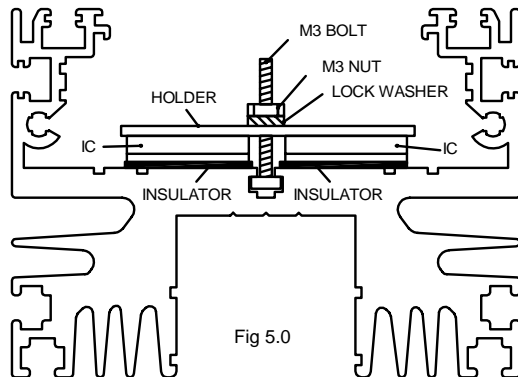


Fig 5.0

- ❑ Slide the hexagonal bolt into the heatsink's slot and secure everything with the metal plate, lock washer and nut. Verify once again whether the distance between the PCB's edge and the heatsink's edge is 25mm (again, see figure 4.0).



NOTE: Take care that IC's leads DO NOT TOUCH the metal plate!

14. Test

Connect a symmetrical supply (K4006 or a transfo 2 x 18VAC / 225VA) with + and - 28 VDC maximum to the GND (0V), -V and +V points. See figure 6.0.

👉 IMPORTANT: Never switch on the supply voltage and then connect to the amplifier!

Switch on the supply voltage. Under normal circumstances both LED's on the amplification PCB should light up, meaning that the supply is all right.

Make the following measurement:

No more than 1VDC should be measured between the terminals normally connected to the loudspeakers (see fig. 6.0).

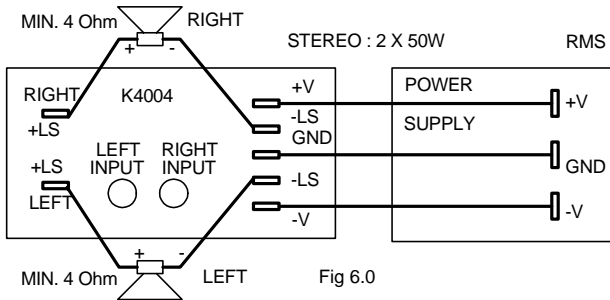


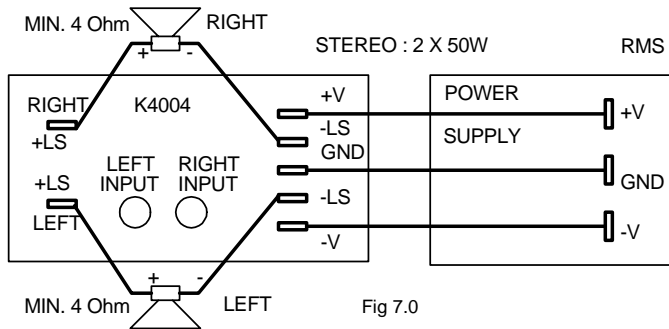
Fig 6.0

15. Use & connection

NOTE : Carry out all connections by means of 1.5mm wire and the supplied flat connector bushes. Solder the wire to the connector bushes and slide the insulation over them.

As a stereo amplifier:

See Fig. 7.0 for the connection of the power supply and the speakers. Watch the polarity of the speakers!



As a mono-bridged amplifier:

See Fig. 8.0 for the connection of the power supply and the speaker. Make sure that the impedance of the connected speaker is not less than 8 ohms.

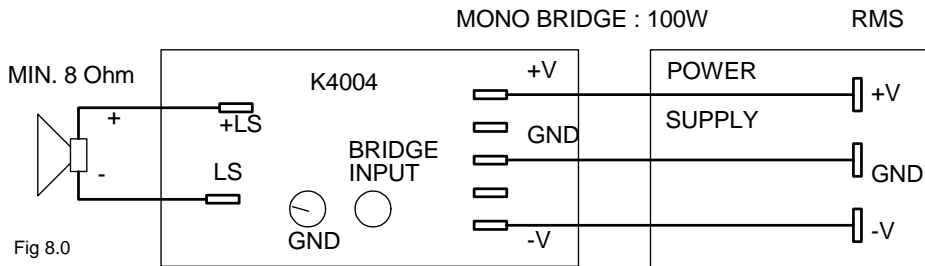
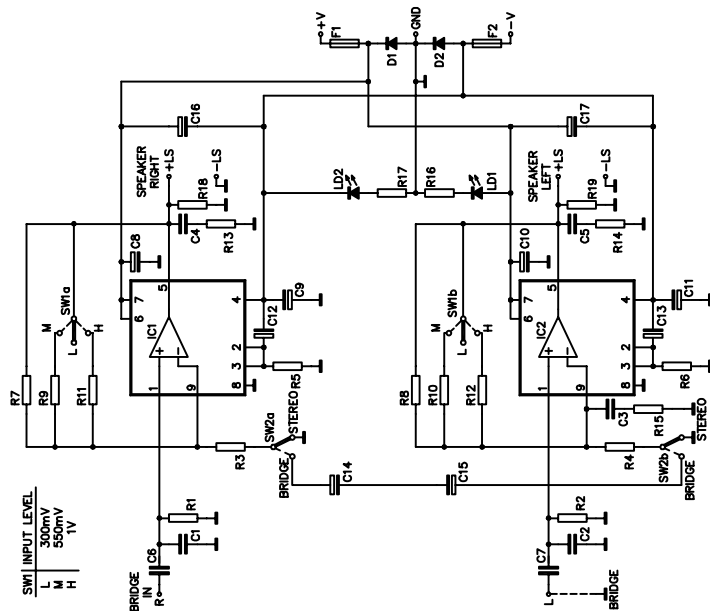


Fig 8.0

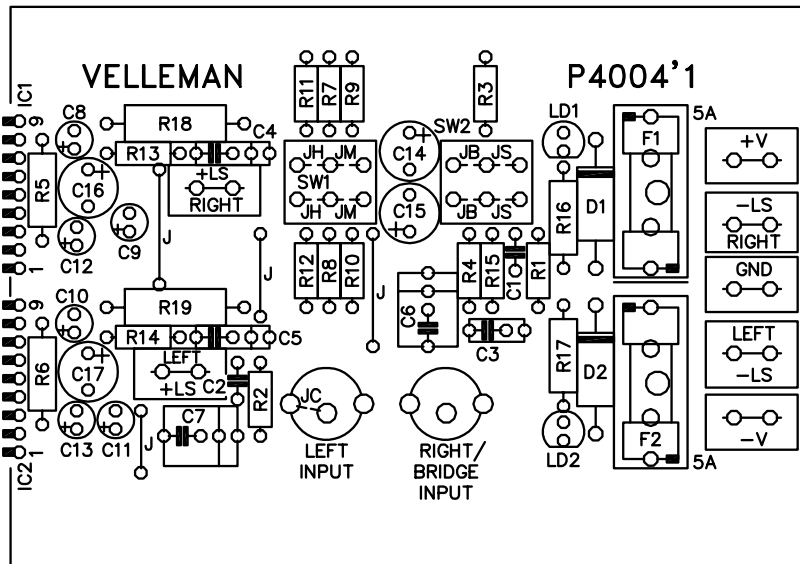
IMPORTANT: Always connect the outputs first, before the power supply is switched on.

If the amplifier is to be used as a free-standing unit, it may be attached by means of M4 hexagonal bolts and the corresponding slots in the heat sink.

16. Schematic diagram.



17. PCB





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