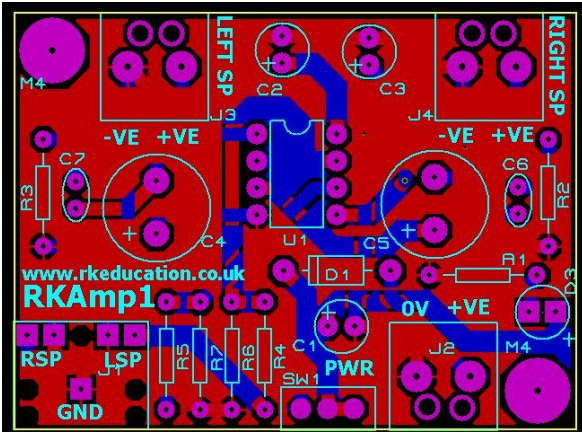
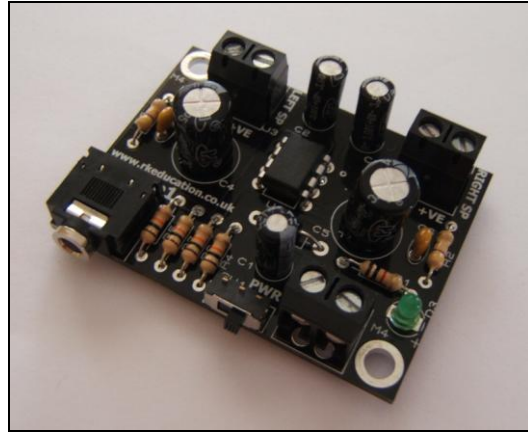


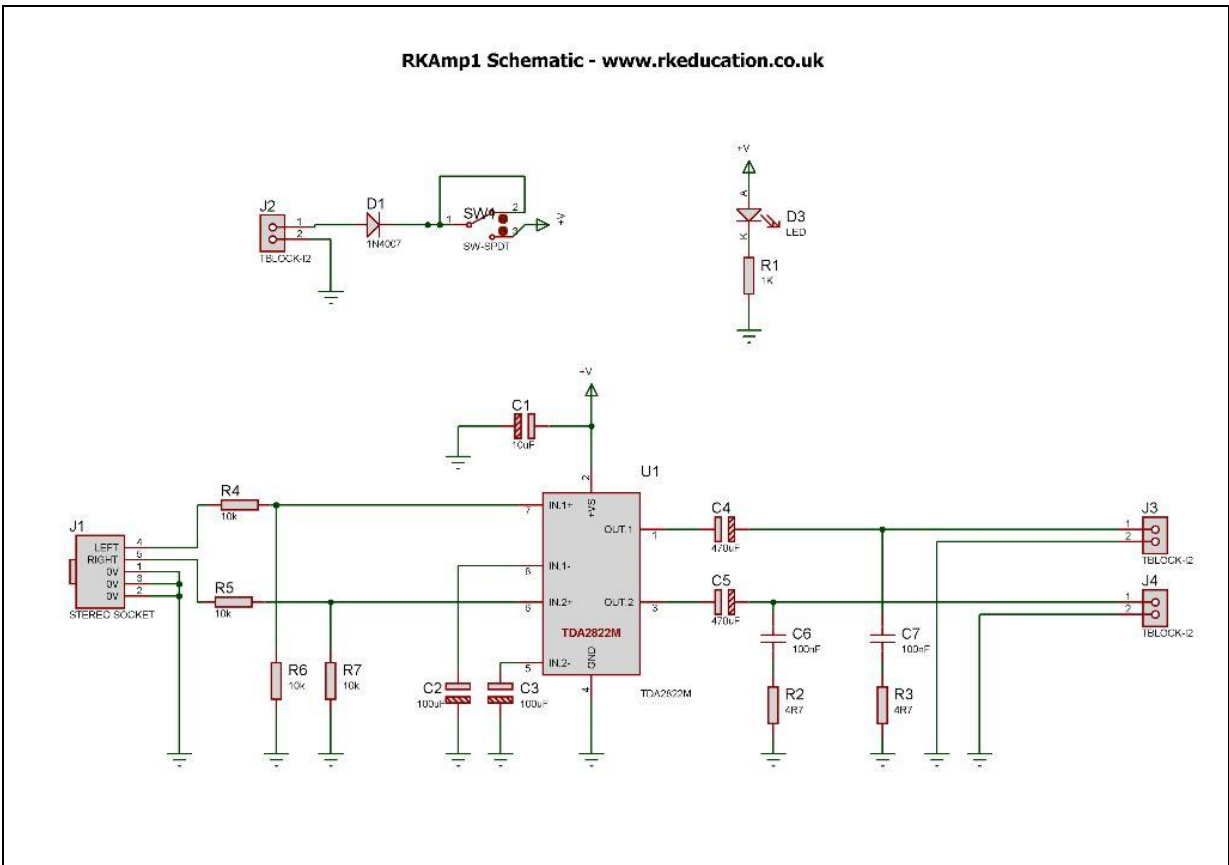
RKAmp1 Component List and Instructions



PCB layout



Constructed PCB



Schematic



Description

The RKamp1 stereo amplifier PCB has been designed around the 2 x 1watt stereo amplifier I.C. TDA2822M

- The sound signal is inputted into the circuit via a 3.5mm stereo socket
- The amplifier has 2 channels of up to 1 watt per channel
- Produces a high quality sound output
- The PCB includes a power switch
- The PCB includes a power LED
- The PCB uses terminal blocks
- Battery powered between 4.5V and 12V
- Power is inputted to the PCB via a terminal block
- Compact design
- Low cost
- The PCB is a high quality double sided black PCB
- The PCB has a large ground plane that is used to dissipate heat

Component List

C1 – 10uF 16VDC electrolytic radial capacitor
C2, C3 – 100uF 16VDC electrolytic radial capacitor
C4, C5 – 470uF 16VDC electrolytic radial capacitor
C6, C7 – 100nF multilayer ceramic capacitor
D1 – 1N4007
D3 – LED, green 3mm
IC1 – TDA2822M stereo amplifier I.C.
J1 – PCB mount 3.5mm stereo connector
J2 ~ J4 – 2 way 5mm terminal blocks
R1 – 1k brown black red
R2, R3 – 4R7 yellow violet
R4, R5 – 1k brown black red
R6, R7 – 10k brown black orange
SW1 – ultra miniature slide switch

Instructions

For a data sheet on the TDA2822M please visit the manufacturer's website

Construction of circuit

You will need to collect the following equipment before you start soldering your circuit:

- Soldering iron and stand
- Damp sponge
- Solder wire
- Side cutters
- Pliers

Procedure for construction

1. Solder the resistors into your PCB, take care to insert the correct resistor into the correct place, if in doubt seek advice. When soldering be sure to heat the area sufficiently but not too much as it will damage the PCB.
2. Solder your power switch in place
3. Solder the stereo socket in place
4. Solder the TDA2822M in place, be careful as the legs are close together, be sure not to connect the legs together with solder bridges as this will stop the circuit working. When inserting be careful not to bend the legs. An I.C. socket is not used as the PCB acts as a heat sink. If you are using a clip on heat sink this should be added when soldering the TDA2822M to the PCB
5. Solder the small multi layer ceramic capacitors in place
6. Solder your LED in place
7. Solder the terminal blocks in place, ensure the holes for the wires face outward
8. Solder the larger capacitors in place, be careful to ensure the longer legs are inserted into +ve

Connecting Power

The power is connected using the terminal block marked J2, the 0V input, usually black is put in the left hand terminal and the +VE, usually red, is put in the right hand terminal. It is recommended that high capacity AA batteries are used with an appropriate battery pack with leads or battery pack with a battery clip. A power switch has been added to the PCB and is marked PWR, if a switch is not needed short the appropriate PCB pads. When the PCB is powered the green, 3mm LED will light up and turn off when power is removed. The PCB can be powered from 4.5VDC to 12VDC. When powered at a lower voltage the output power will be reduced and the sound may become distorted. If a high power is not needed then it is recommended that 4.5 to 6VDC is used. At higher voltages and output powers more current is needed so the batteries will use power faster and the amplifier I.C. will also generate more heat which will need to be dissipated. In order to get a high quality sound with longer battery life it is recommended that the PCB be powered at 6VDC at a lower volume. It is possible to power the PCB from a DC PSU, this should only be attempted by experienced and appropriately qualified users.

If your amplifier I.C. is generating heat a heat sink will need to be used

Speakers

The PCB has been designed to power **2 full range speakers**. Speaker choice is very important and this can be complicated by the large number of speakers available.

When selecting speakers it is recommended that 4Ω to 8Ω impedance speakers are used, higher impedances will reduce the output power. When choosing a speaker the power rating is also important, this PCB outputs up to 1 watt so speakers above 1 watt are needed, speakers that have a larger cone will produce a better sound. It is advisable to select speakers that can be mounted to a panel. For a range of speakers visit,

www.rapidonline.com

The speakers used in the picture above are Visaton FRS7. They are not the cheapest speaker and they produce an excellent quality sound, they are rated at 8watts and are available from Rapid.

If you need help selecting speakers please contact us, we have speakers available.

Connecting Speaker Outputs

Connecting the speakers to the PCB is a straightforward process, the main thing to be careful with is the polarity of the speaker cables. As with speakers there is a wide range of speaker cable available. It is possible to use wire but it is recommended that at the least a basic speaker cable should be used.

First cut the speaker cable to the desired length and carefully separate the ends of the cable. Strip around 0.5cm of the insulation from the cable and twist the exposed copper wire together. Then apply some solder to the end of the cable to stop the ends fraying or short circuiting. One end of the cable will need soldering to the

speaker and the other end will need screwing into the speaker terminal blocks marked **RIGHT SP** and **LEFT SP**. It is important that the polarities of the speakers are observed and the cables are attached to the PCB correctly. The polarity of the speaker terminal blocks on the PCB are clearly labelled and speakers normally have a + and - where the cable is attached, speaker cables always have something that identifies the 2 different wires.

Connecting the PCB to a Music Device

This PCB has been designed for use with music players such as MP3 players, mobile phones with music players and ipods. The unit is connected to a music player via a 3.5mm stereo lead with one end inserted into the music player and the other end inserted into the PCBs 3.5mm stereo socket below the label RKAmpl1. Some music players do not come with a 3.5mm stereo socket, if this is the case then an adapter will need to be used, these are available from outlets such as Maplin.

Testing the Amplifier

When the PCB has been constructed, the speakers have been attached, a music player has been connected and power has been applied the unit is ready to be tested.

PLEASE ONLY TEST THE UNIT WHEN YOU ARE SURE THE PCB IS FULLY FUNCTIONAL. CAREFULLY CHECK IT HAS BEEN CONSTRUCTED CORRECTLY. WE WILL NOT ACCEPT ANY RESPONSIBILITY FOR ANY DAMAGE TO YOUR EQUIPMENT.

Ensure the LED power indicator is lit and turn the volume of your music player to its lowest level and press play, gradually increase the volume until it can be heard. The volume is not controlled by the PCB, the volume level will be controlled by the music player itself.

Building a Suitable Case

In order to finish this project and to achieve a high quality sound it will be necessary to case the PCB and speakers. There are many different ways this can be achieved and how this is done will depend on many things. The picture above is a suitable design and is a simple method of producing a high quality and effective speaker.

It was constructed using a laser cut panel to hold the speakers, these are available from us. The main body of the speaker was constructed using pieces of pine which were then varnished. There are more steps to this and to help there is a more detailed data sheet on how to produce this speaker on our website. If you have pictures of your own speakers please send them to us so we can add them to our website.

Budget Version

It is also possible to build a budget PCB by not using terminal blocks and the stereo socket. This is aimed at schools wishing to reduce costs and involves soldering the speaker wires and stereo lead directly to the PCB, please contact us if you need more guidance with this.

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Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk

Please see below



RKAmp1 Schematic - www.rkeducation.co.uk

