

Laser Diode (LD) Audio Transmitter Circuit

These instructions will help you to construct the LD Audio Transmitter Circuit. The circuit is fairly complex to construct.

14 components are required:

- (a) 1x "Laser Transmitter" PCB
- (b) 1x Slide Switch PCB mount
- (c) 1x Quad AA battery holder with leads
- (d) 3x Resistor (1.8 Ω , 220 Ω , 240 Ω)
- (e) 1x 2-pin connector plug straight PCB mount
- (f) 1x 2-pin cable connector socket
- (g) 1x 2-socket lead connectors
- (h) 1x Voltage regulator (LM317T)
- (i) 1x Trimpot variable resistor PCB mount (200 Ohm)
- (j) 1x Capacitor (1uF) tantalum
- (k) 1x LD module
- (l) 1x Female PCB stereo audio 3.5mm socket

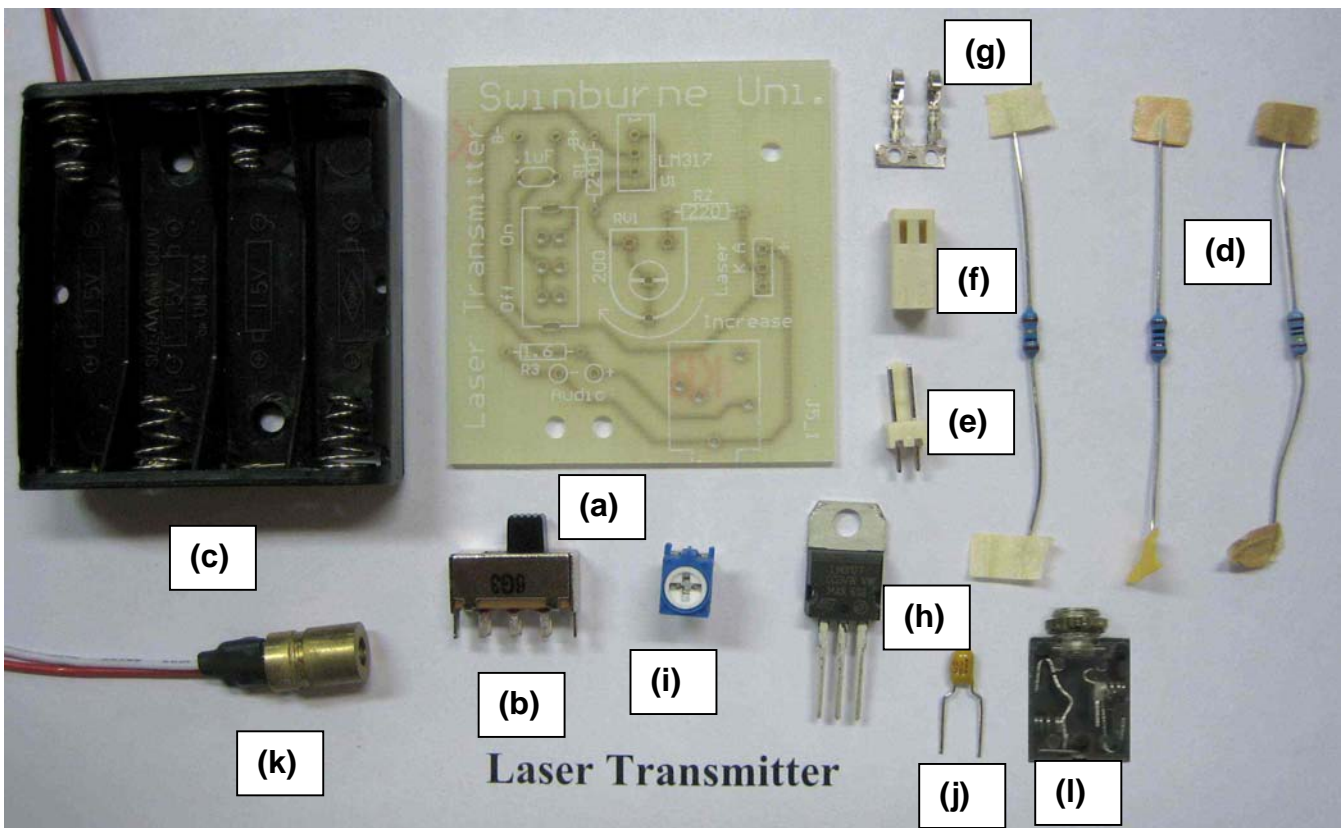
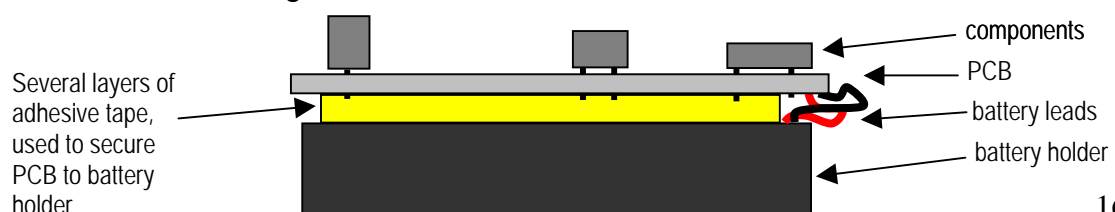


Fig 15

Note that with this circuit, it is best not to use the countersunk bolt and nut to secure the battery holder to the PCB after all components have been soldered in place. Instead it is best to use a few strips of double-sided adhesive tape, as shown below, and Fig 19.



- Measure the resistance of the three resistors with a multimeter to make sure you have correctly identified each one.
- Solder in components.
 - 1) Note that for the resistors and switch it does not matter which way around they go as these components are not polarized.
The other components are all polarized therefore it does matter which way round they are inserted.
 - 2) The positive lead of the 0.1 uF capacitor, which is the lead closest to the “+” (see Fig 8), goes to the side nearest R1 (240 Ω resistor).
 - 3) The wires from the Quad AAA battery holder should be cut to approx 2 cm long and the red lead should be connected to the B+ and the black lead to B-.
 - 4) The voltage regulator is positioned so that when it is bent horizontally the flat side is next to the PCB. Attach regulator to PCB using a short bolt and nut (as shown in Fig 3b).
 - 5) The 2-pin connector plug needs to be connected to the K and A soldering holes on the PCB. Make sure the plastic tab (the plastic extension opposite the two pins) is next to the “Laser KA” writing.
 - 6) The trimpot variable resistor can only fit one way in the PCB.
- With the Female PCB audio socket, you need to flatten the two leads (A & B) as shown in Fig 10. You then need to remove the nut (C) on the side (which is not needed). The three remaining leads on the socket need to be pushed firmly into the holes on the PCB before soldering.

The laser diode leads now need to be connected to the 2-socket lead connectors.

- Cut the leads to the same length, then strip back approximately 5mm of bare wire (see Fig 16a).
- Then crimp (or squash) the leads within the connectors (see white wire in Fig 16b) with a pair of pliers. After positioning the lead correctly, first fold over one side of the clip onto the lead’s plastic coating. Then fold over the other side and squash to tighten (X). Repeat the same procedure with the other part of the clip but this time tightening the clips over the bare wire (Y).
- After this remove the backing plate (Z) to separate the two connectorised wires (see Fig 16c).
- Finally push each connector firmly into the plastic socket holder (see Fig 16d and Fig 16e). Make sure the red lead is connected to the side labeled “1” on the plastic socket.

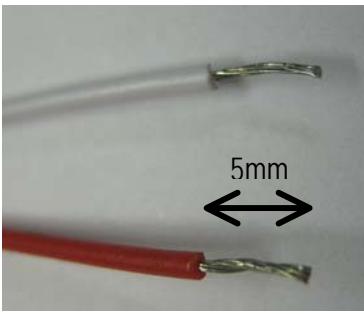


Fig 16a

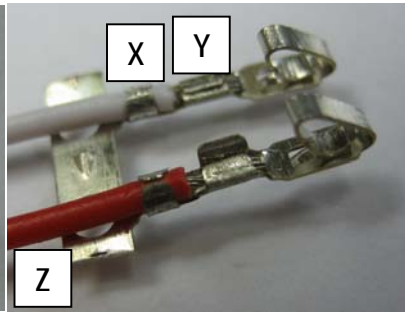


Fig 16b

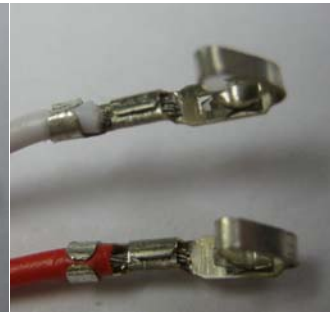


Fig 16c

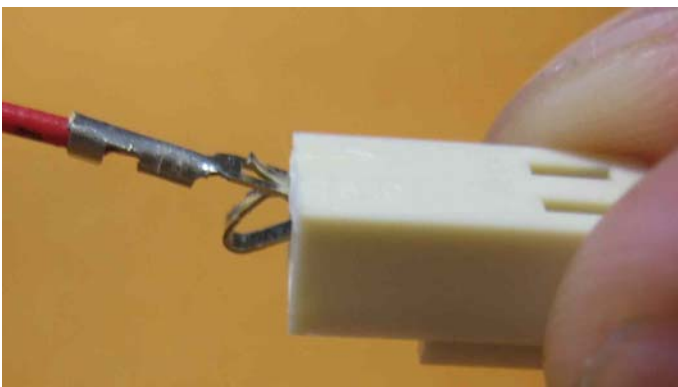


Fig 16d

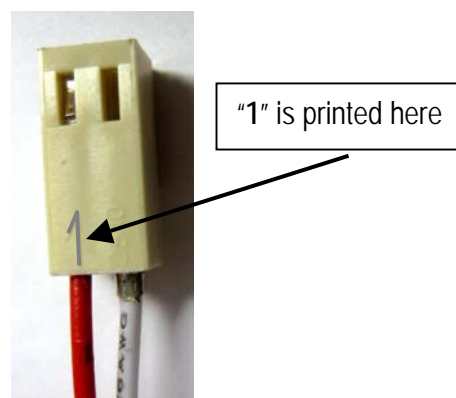


Fig 16e

When completed, the connectorised laser diode should look like the one shown in Fig 17

Note that with an alternate model laser diode the leads are red and blue (instead of red and white).

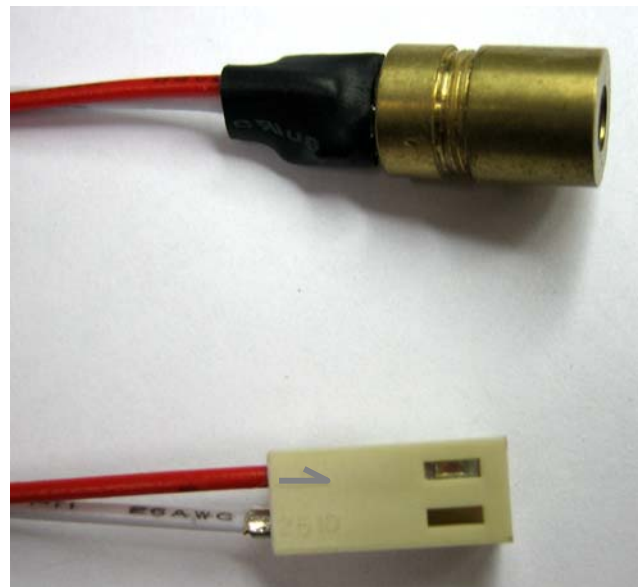


Fig 17

If all is done correctly, when the socket is pushed onto the pins, the red lead of the laser diode will be connected to the "A" pin on the PCB.

The finished circuit looks like the one shown in Figure 18

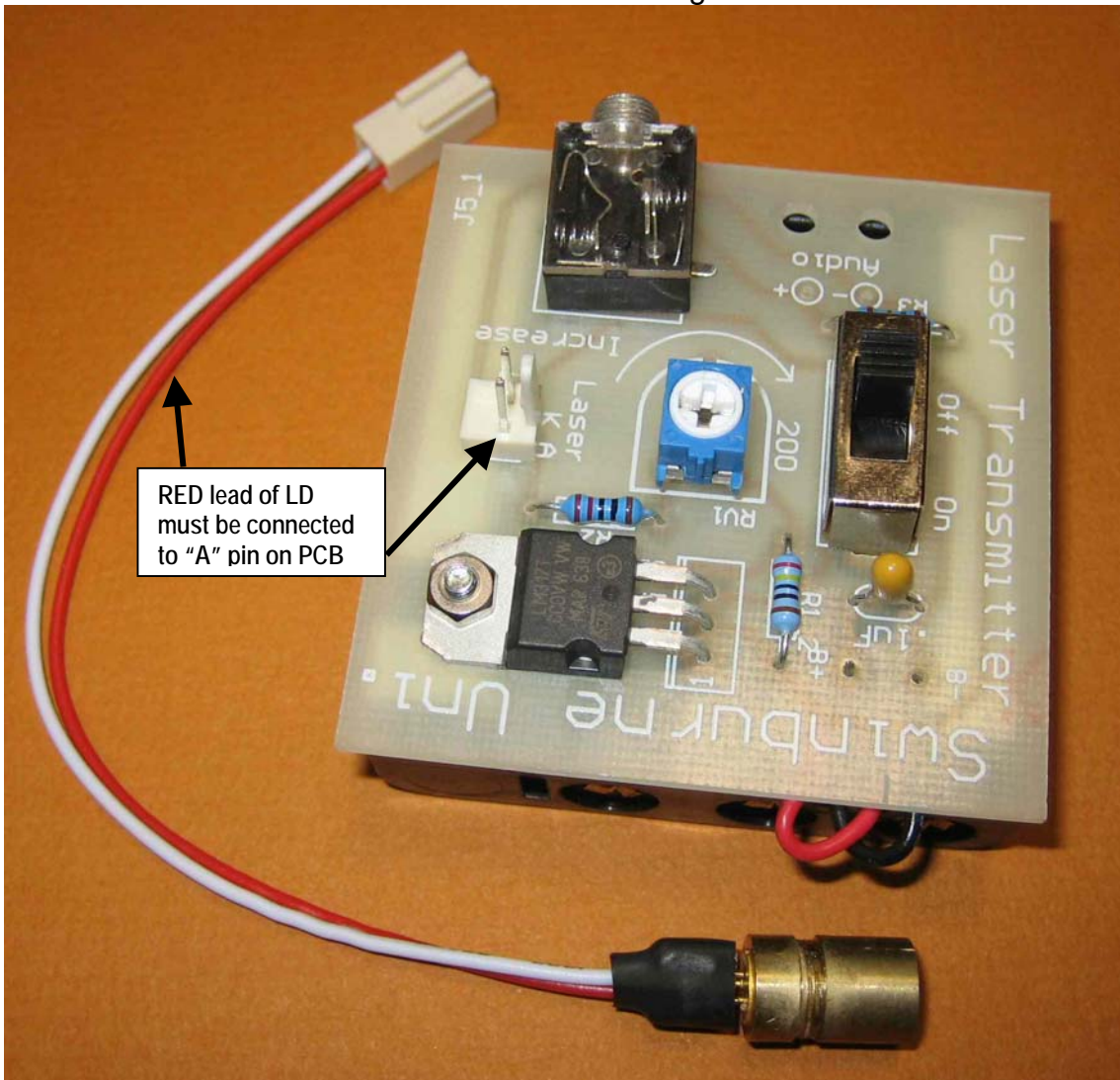


Figure 18

Fig. 19 shows the battery holder and PCB with the adhesive tape prior to joining. The PCB is then gently pushed onto the battery holder to securely hold them together.

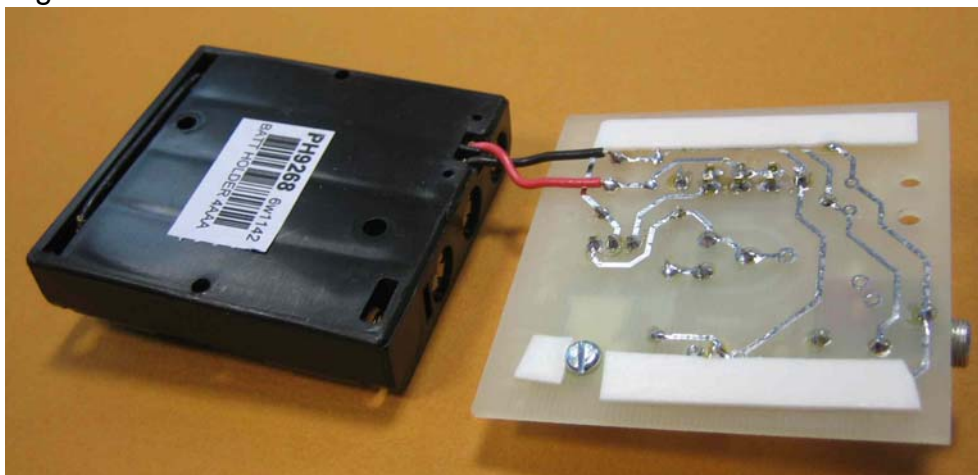


Fig 19

Modulation of the Laser beam

The audio signal normally used to drive headphones from any music source (tape player, MP3 player, CD player etc.) can be used to modulate the light intensity of the laser beam. You simply need to wire two male audio 3.5mm plugs together with suitable wires, then plug one end into the audio source and the other into the female audio 3.5mm socket on the Laser Transmitter circuit (see Fig. 20).

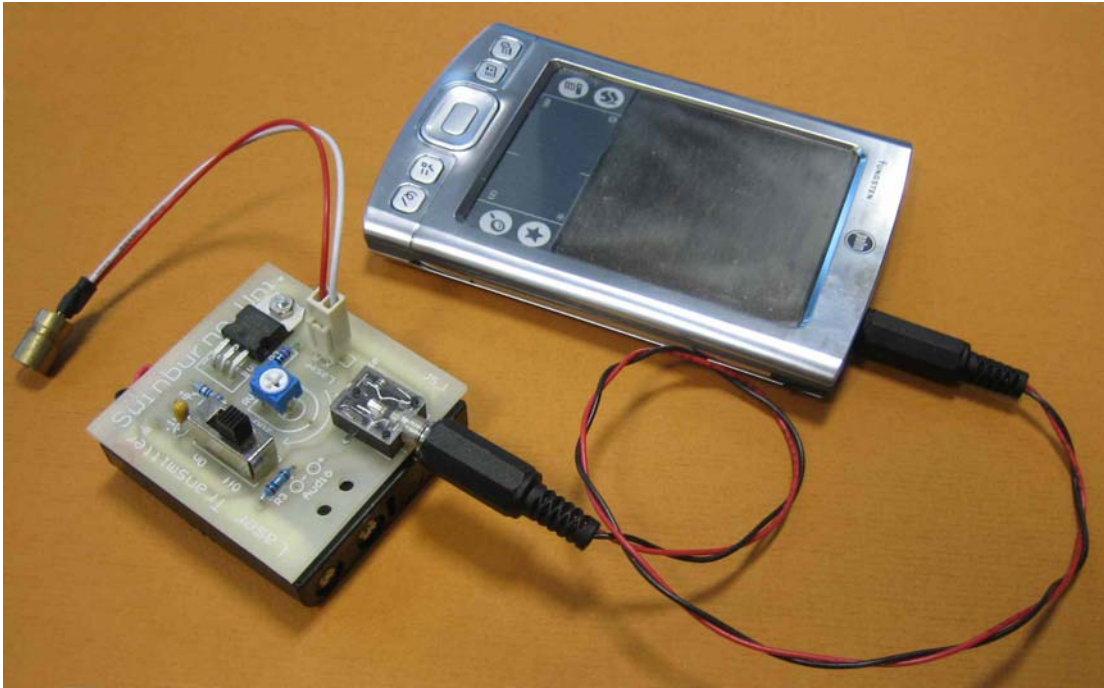


Fig. 20

NOTE: Before switching the laser transmitter on, you need to adjust the trimpot variable resistor to give minimum voltage to the laser diode. To do this turn the adjustment knob fully counter-clockwise (ie in the opposite direction of the “increase arrow”). Then switch on and adjust the trimpot to produce the minimum intensity laser light to generate a suitable signal. A very bright laser beam will shorten the life of the laser diode.