LED Digital Transmitter Circuit

These instructions will help you to construct the LED Digital Transmitter Circuit. The circuit is very simple and easy to construct.

5 components are required:
(a) 1x “LED Transmitter” PCB
(b) 1x Momentary Push button switch(12x12mm)
(c) 1x 9V PC mount battery holder
(d) 1x Resistor (390 Ohm)
(e) 1x High Brightness RED LED (has red cover)
You also need 3x Countersunk bolts and nuts (shown in Fig 3a, but not included in the kit**)

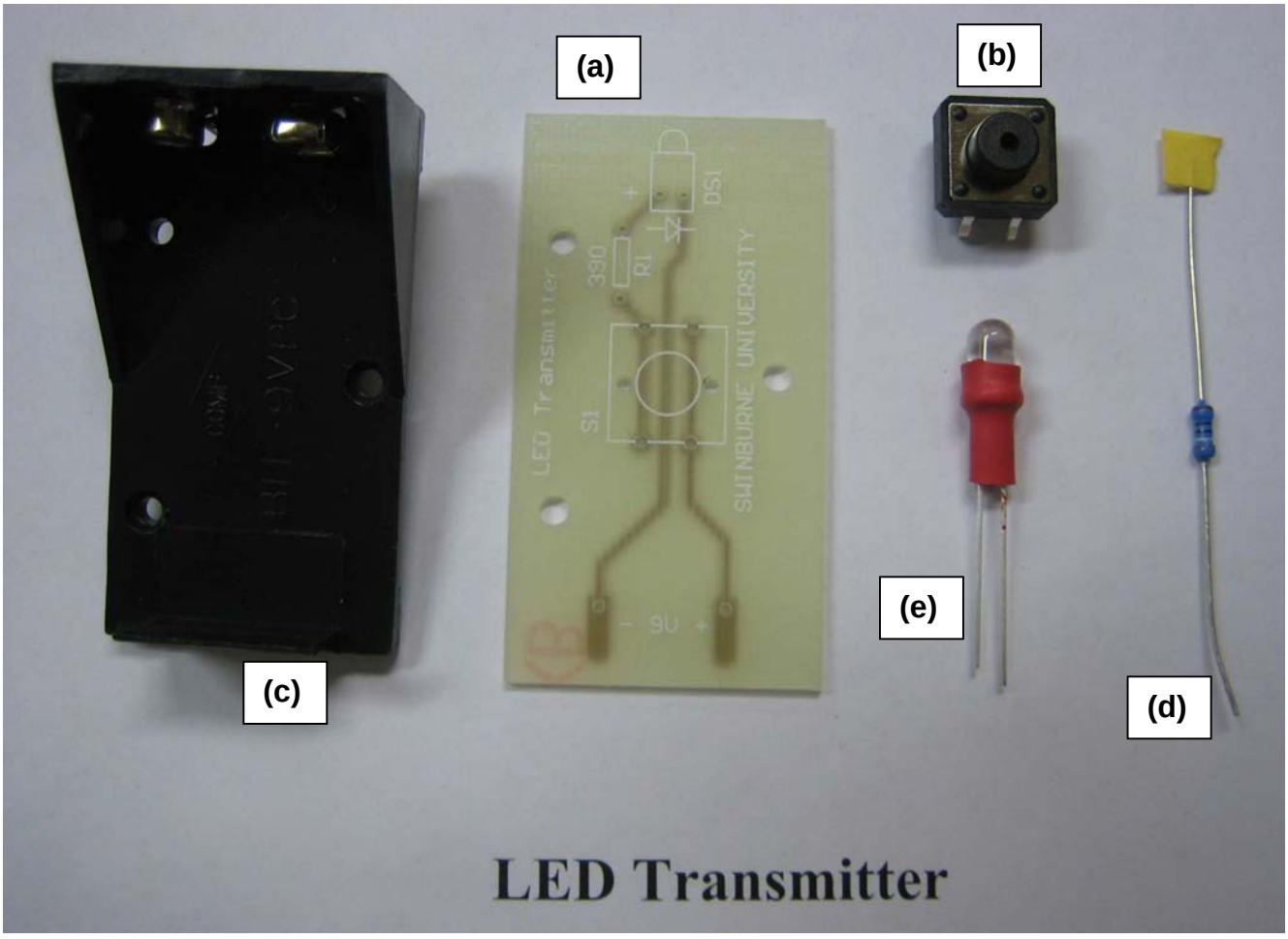


Fig 1

- Measure the resistance of the 390 Ω resistor with a multimeter to make sure it is approximately the correct value.
- Solder in the resistor and switch (it does not matter which way around they go as they are not polarised).
- Solder in the LED; the long lead (+ve) goes to the “+” side of the PCB.
- Bend the leads on the battery holder at 90^{o} (as shown in Fig 2) then attach to PCB with the countersunk nuts and bolts (as shown in Fig 3a).
- Solder the battery holder leads onto the two PCB pads and then cut off the unwanted parts of leads that stick out from the PCB.

Fig 2

(a)

(b)

Fig 3

The finished circuit looks like the one shown in Figure 4

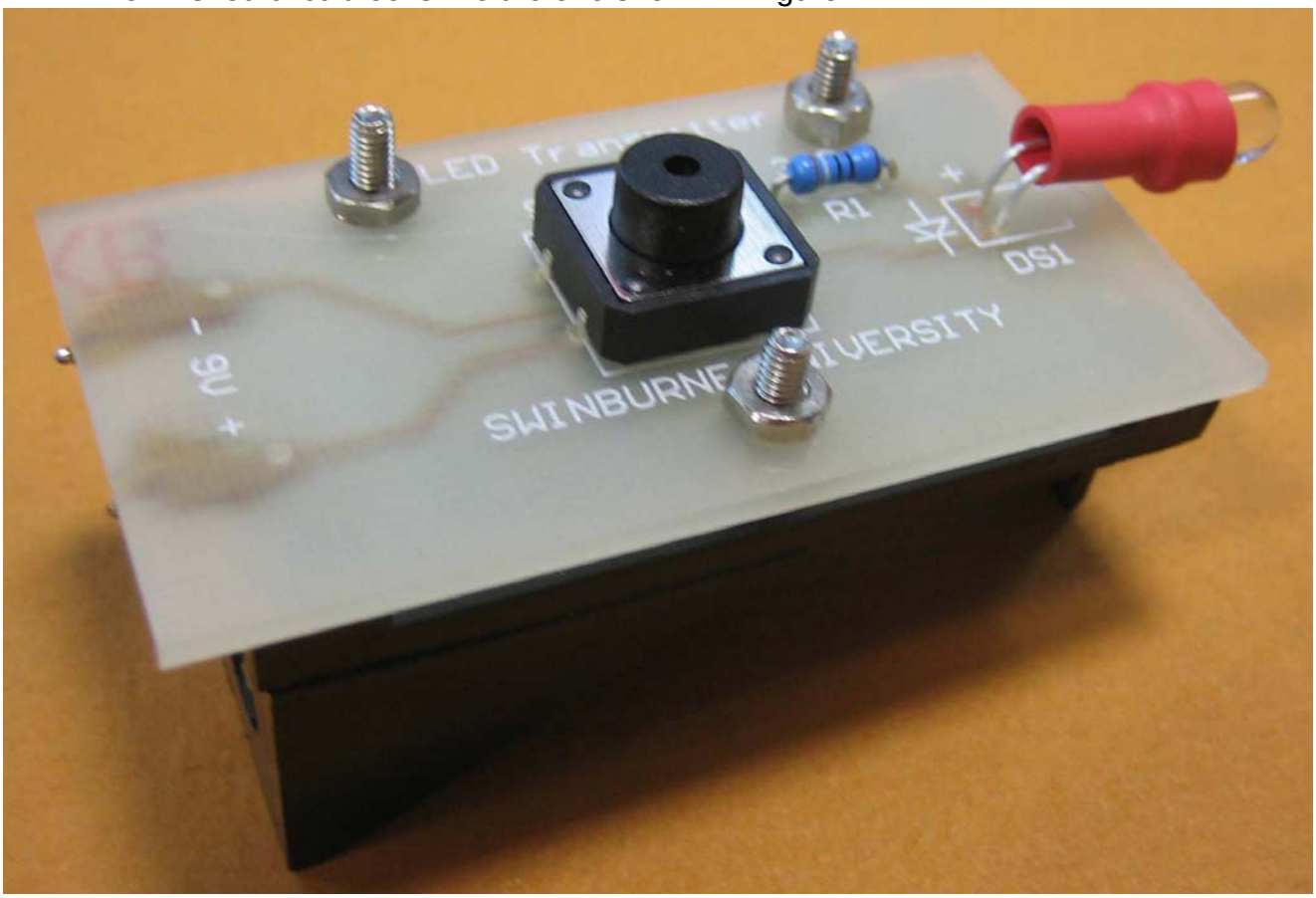
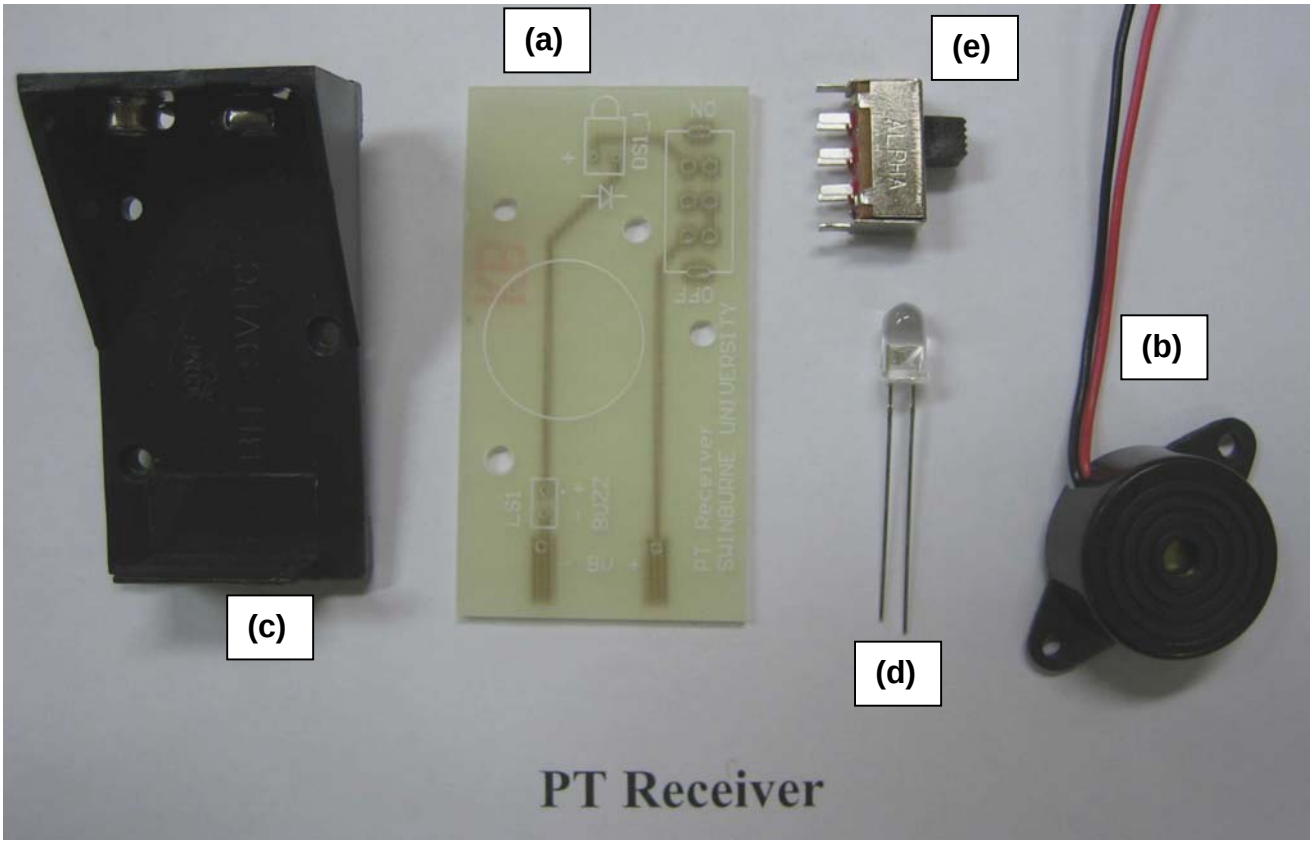


Fig 4

Phototransistor (PT) Digital Receiver Circuit

These instructions will help you to construct the PT Digital Receiver Circuit. The circuit is very simple and easy to construct.

5 components are required:
(a) 1x “PT Receiver” PCB
(b) 1x Buzzer (3-16V)
(c) 1x 9V PC mount battery holder
(d) 1x Phototransistor (PT) 5mm clear
(e) 1x Slide Switch PCB mount
You also need 3x contersunk bolts and nuts (Fig 3a) & 1x normal bolt and nut (Fig 3b) not included in kit**.



- Solder in the switch (It does not matter which way around it goes as it is not polarised).
- Solder in the Phototransistor (PT); the short lead (+ve) goes to the “+” side of the PCB.
- Cut the red and black leads of the buzzer to ≈3 cm in length (black lead should be a little longer than the red one) and solder to PCB (red lead goes to “+” side of the PCB). Attached buzzer to PCB using short bolt and nut (as shown in Fig 3b). Connect to hole closest to the PT.
- Bend the leads on the battery holder at 90^{o} (as shown in Fig 2) then attach to PCB with the countersunk nuts and bolts (as shown in Fig 3a). Make sure that the nut and bolt closest to LS1 is used to attach the battery holder *and* the buzzer to the PCB.
- Solder the battery holder leads onto the two PCB pads and then cut off the unwanted parts of leads that stick out from the PCB.

The finished circuit looks like the one shown in Figure 6

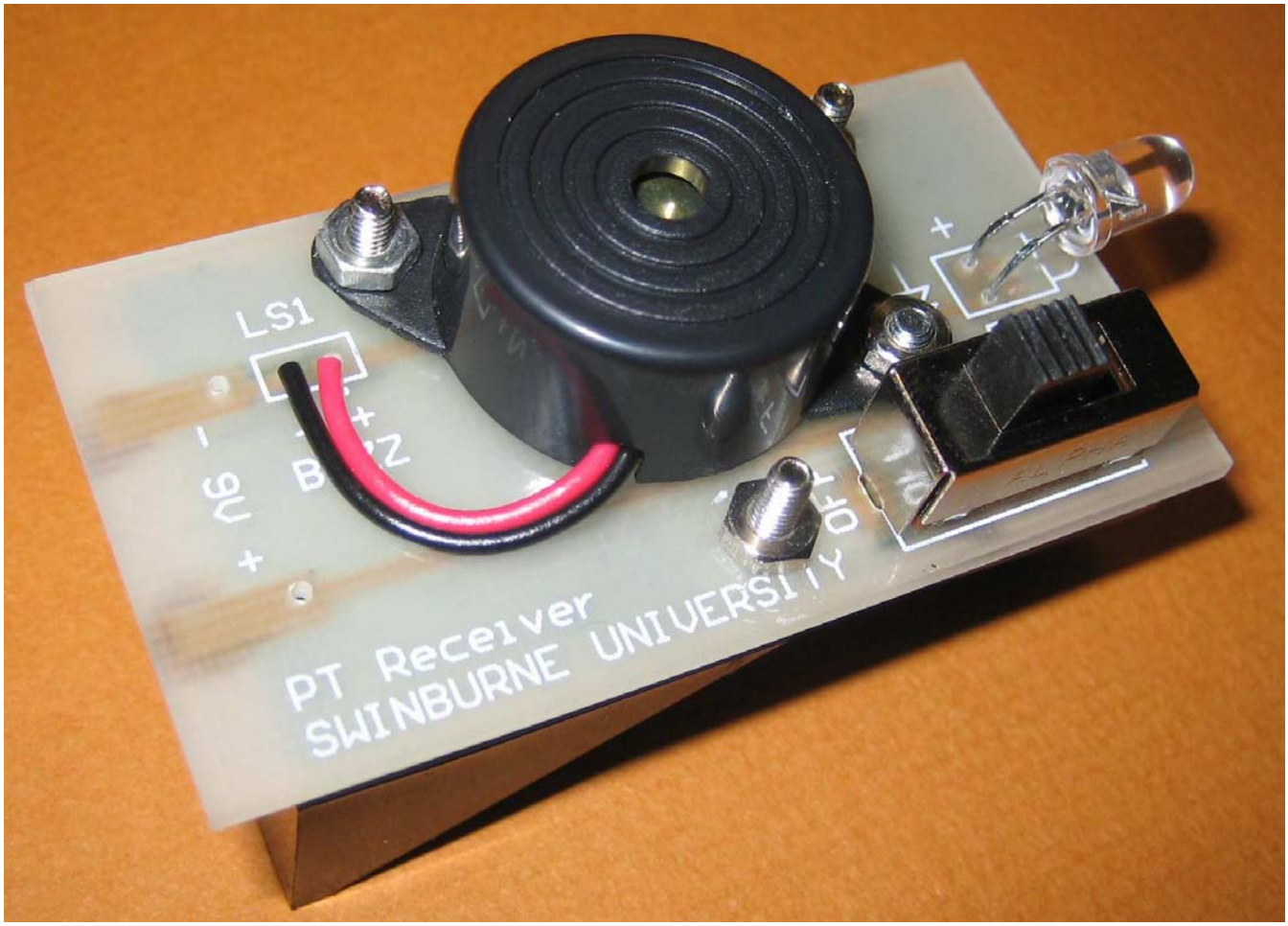


Fig 6

Phototransistor (PT) Analog Receiver Circuit

These instructions will help you to construct the PT Analog Receiver Circuit. The circuit is fairly simple and relatively easy to construct.

11 components are required:
(a) 1x Dual PT receiver PCB
(b) 2x Female PCB stereo audio 3.5mm socket
(c) 1x 9V PC mount battery holder
(d) 2x Phototransistor (PT) 5mm clear
(e) 1x Capacitor (1uF) tantalum
(f) 1x Capacitor (100nF) tantalum
(g) 1x Resistor (1 kOhm)
(h) 1x Audio transformer
(i) 1x Slide Switch PCB mount
You also need 1x contersunk bolt and nut (Fig 3a, but not included in the kit**)

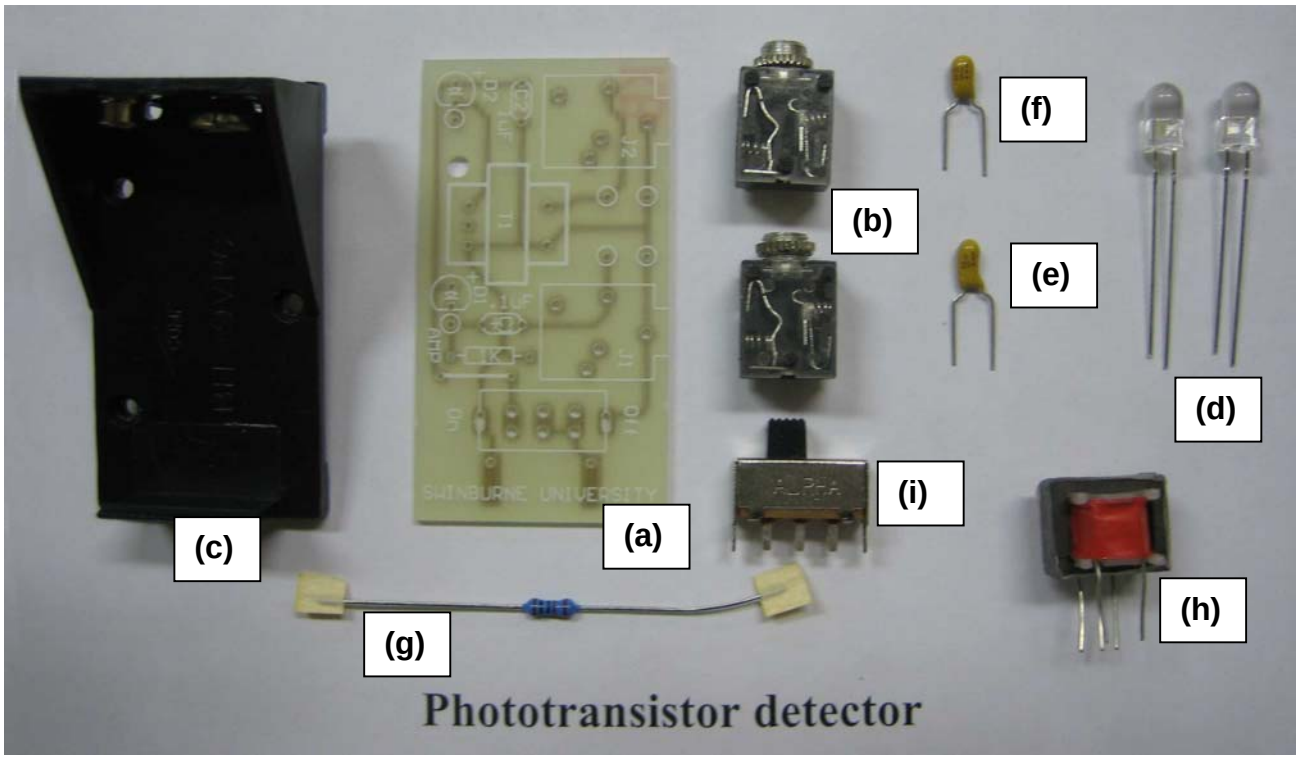


Fig 7

- Measure the resistance of the 1 kΩ resistor with a multimeter to make sure it is approximately the correct value.
- Solder in components.
    1) Note that for the resistor and switch it does not matter which way around they go as these components are not polarized.

    The other components are all <u>polarized</u> therefore it <u>*does*</u> matter which way round they are inserted.
    2) With the PT; the short lead (+ve) goes to the "+" side of the PCB.
    3) The positive lead of the 0.1 uF capacitor, which is the lead closest to the "+" sign (see Fig 8) goes to the side closest to the PT.

4) The positive lead of the 1.0 uF capacitor, which is the lead closest to the “+” sign (see Fig 9) goes to the side closest to the edge of the PCB.
5) With the audio transformer, the three lead side goes closest to PCB edge.

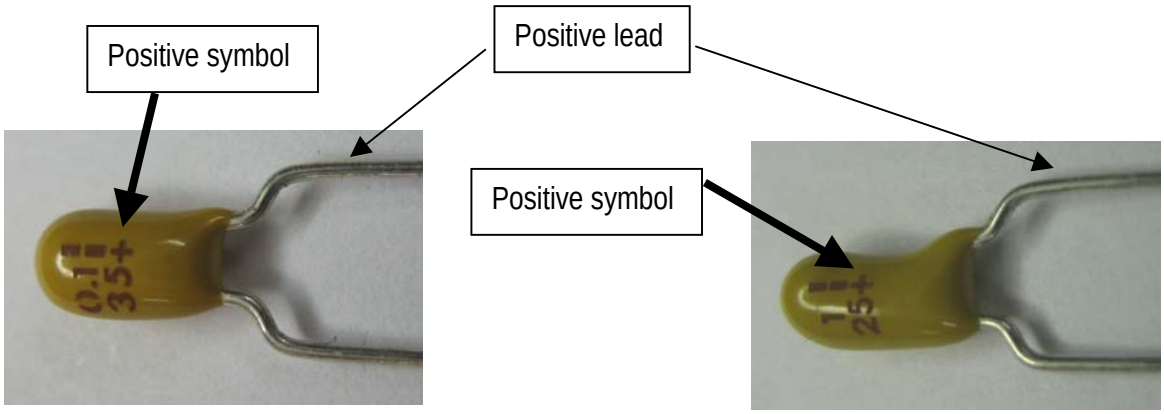


Fig 8 Fig 9

- 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.

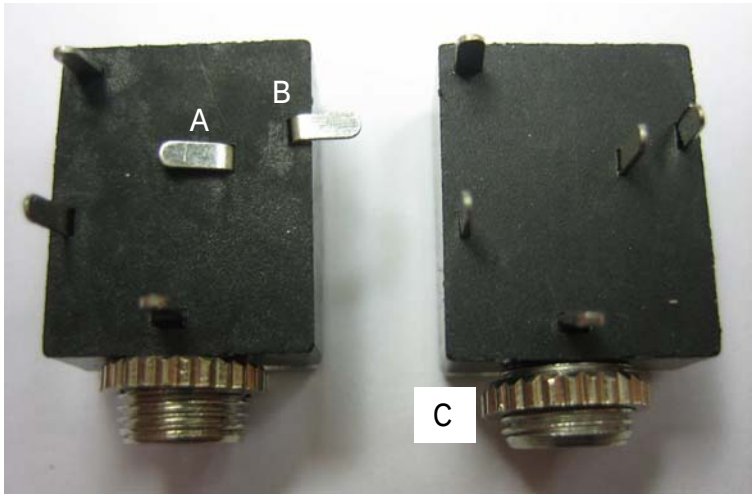


Fig 10

- Bend the leads on the battery holder at 90^{o} (as shown in Fig 2) then attach to PCB with the countersunk nut and bolt (as shown in Fig 3a). Solder the battery holder leads onto the two PCB pads and then cut off the unwanted parts of leads that stick out from the PCB.

The finished circuit looks like the one shown in Figure 11

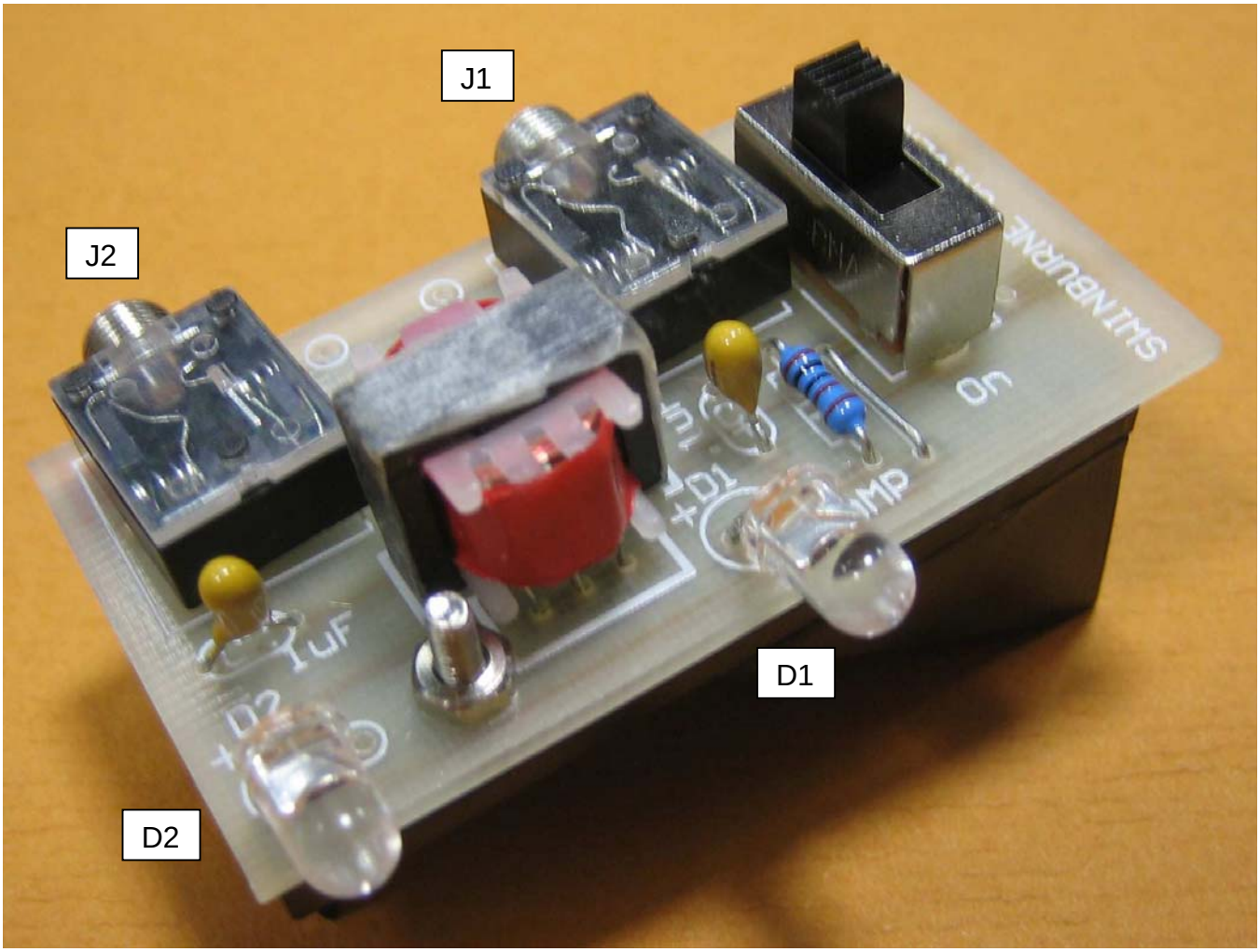


Fig 11

The Phototransistor (PT) Analog Receiver Circuit can be used in either of two ways.

(a) If a light signal of varying intensity (audio modulation) illuminates the PT ("D2") <u>furthest</u> from the switch, then an audio electrical signal is generated at the socket "J2". If a male audio 3.5mm plug, which is connected via wires to the speaker (see Fig 12), is then inserted into the socket "J2", then audio sound can be heard from the speaker.

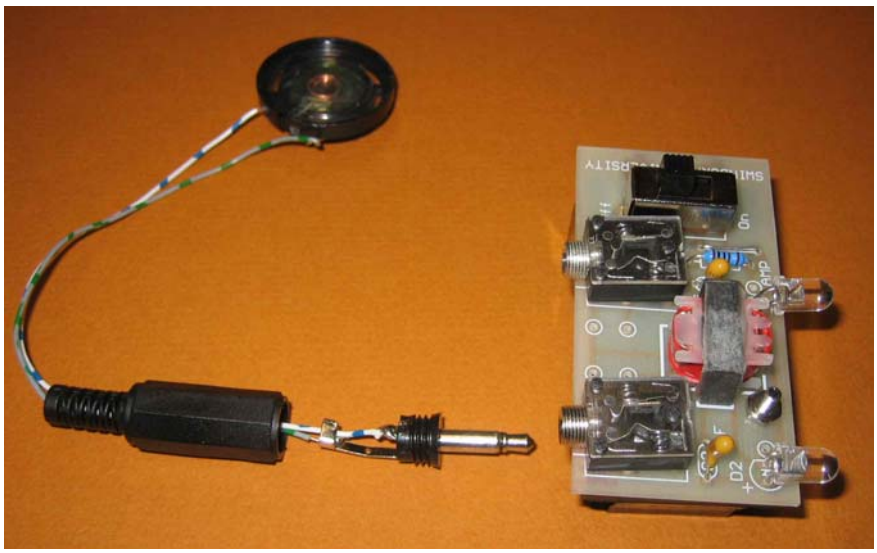


Fig 12

(b) If a light signal of varying intensity (audio modulation) illuminates the PT ("D1") closest to the switch, then an audio electrical signal is generated at the socket "J1". If a male audio 3.5mm plug, which is connected via wires to the audio amplifier circuit*, which itself is connected to the speaker (see Fig 13), is then inserted into the socket "J1", then an amplified audio sound can be heard from the speaker.

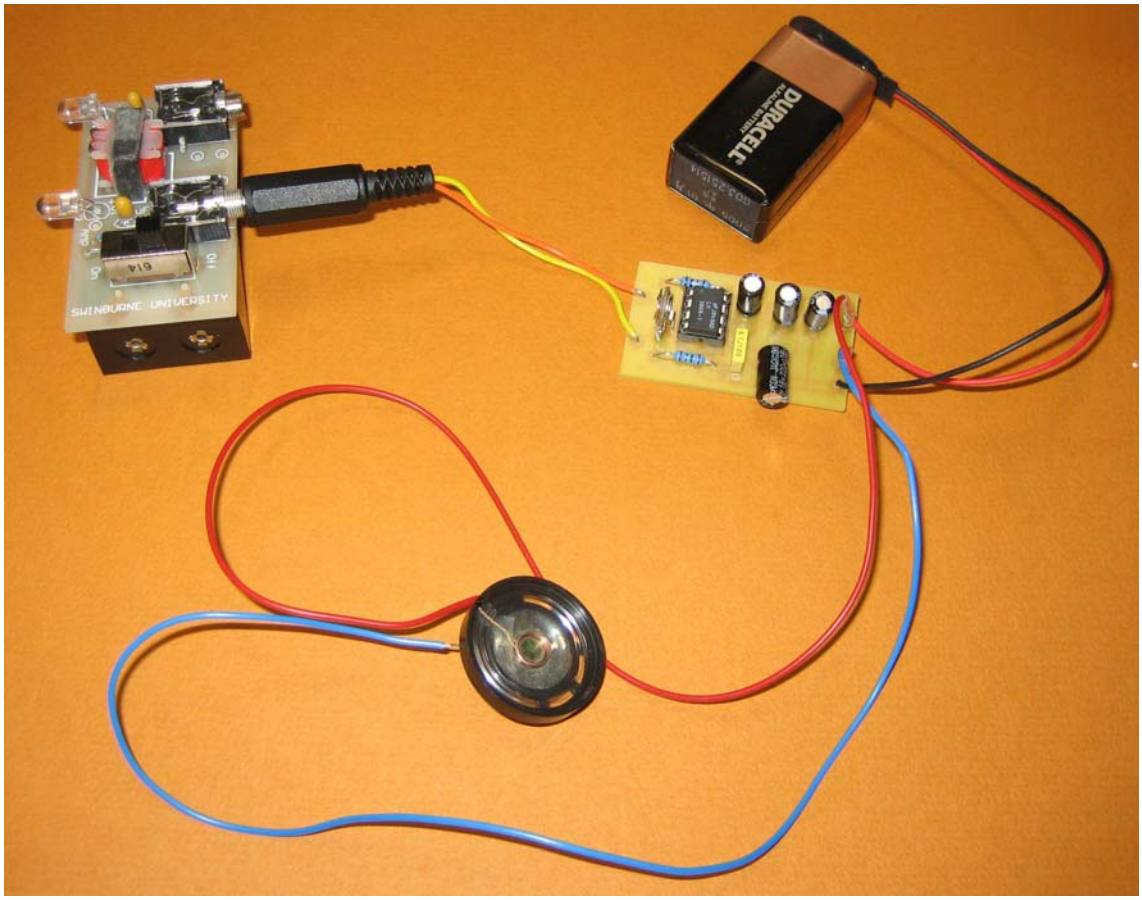


Fig 13

* The audio amplifier is a commercial kit that is included in this equipment package.

**If you have difficulty finding the correct size countersunk and normal bolts and nuts you can simply use a few layers of double sided adhesive tape.

This optical transmission equipment package also includes these additional items:
(a) 3x male 3.5mm audio plugs,
(b) 1x mini speaker,
(c) 1x set of 9V battery leads,
(d) 1x audio amplifier kit.

The audio amplifier components and the finished circuit are shown in Figure 14a and b respectively.

Fig 14(a)

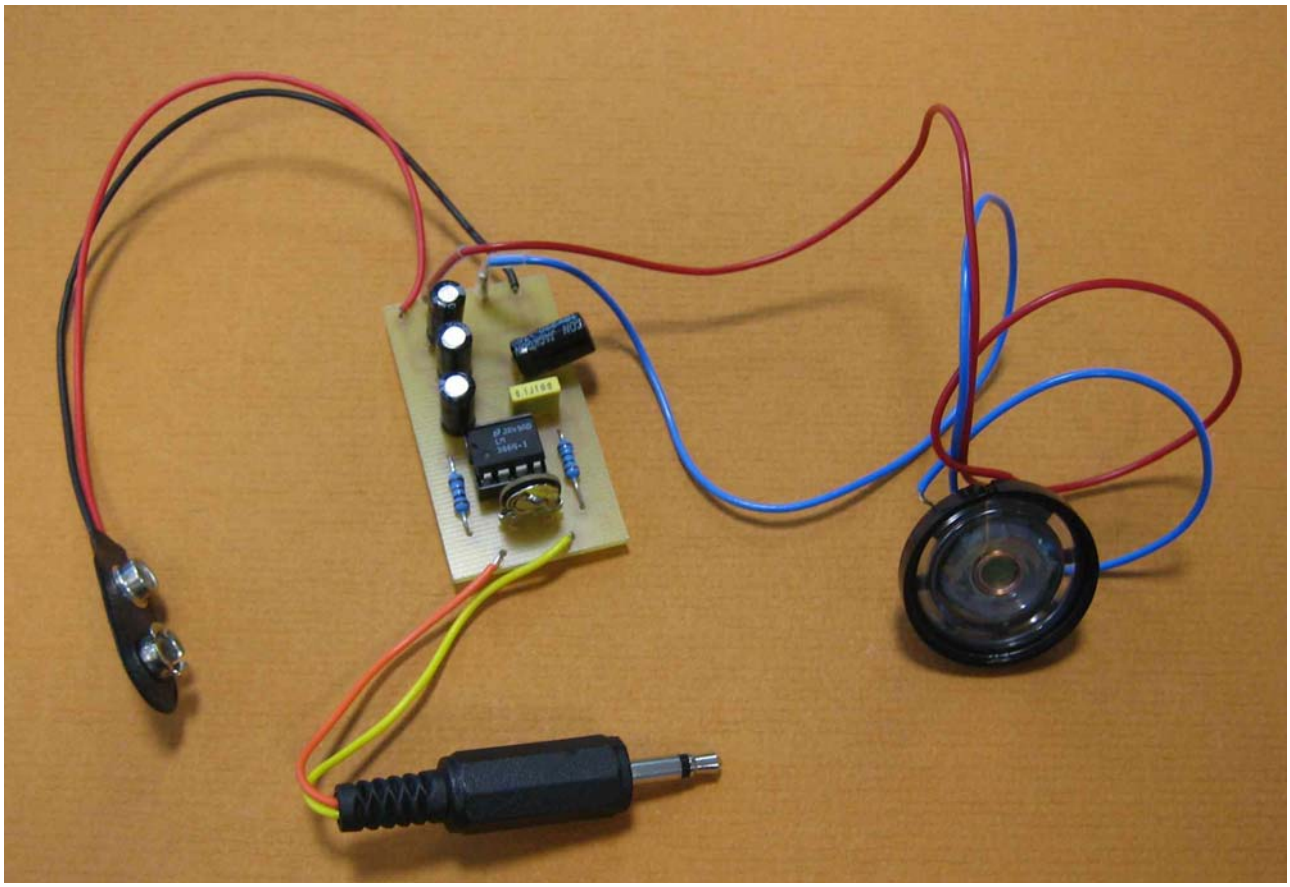


Fig 14(b)