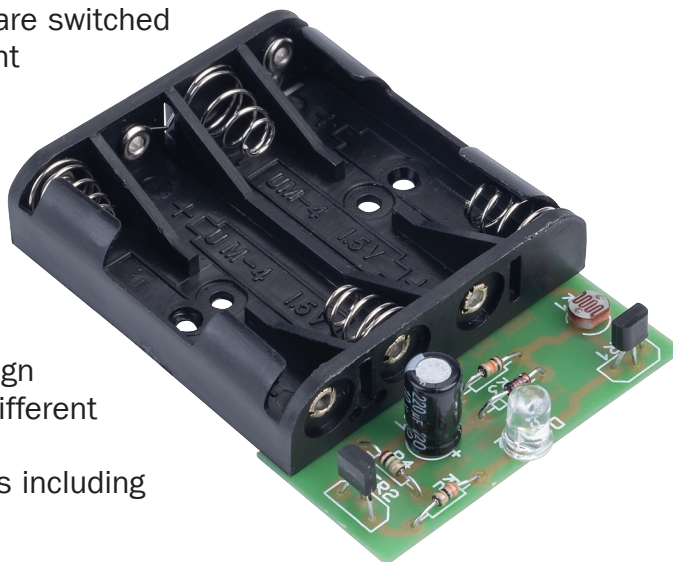


Nightlight assembly instructions

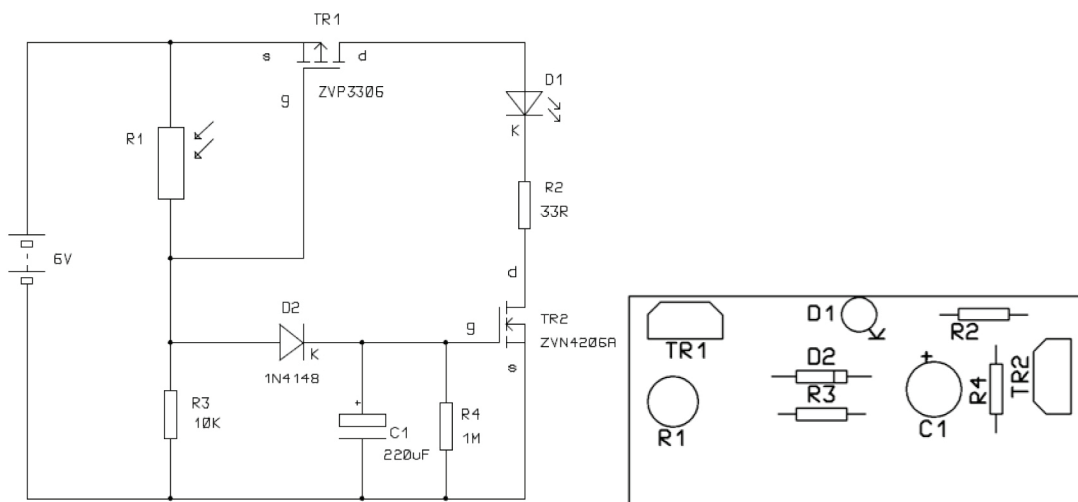
The nightlight project is a safe, battery powered, bedside light that automatically switches on when the room lights are switched off. After a time delay of about 5 minutes the light automatically switches off to conserve battery power.

- Light source is a high efficiency, high brightness white LED
- Suitable for illuminating different coloured translucent acrylic, coloured inkjet film or 'fun and fancy' acrylic paints
- An excellent platform for creative product design
- Can be used to explore timing circuits using different component values
- Component kits are supplied in packs of 5 kits including printed circuit boards



Parts list:

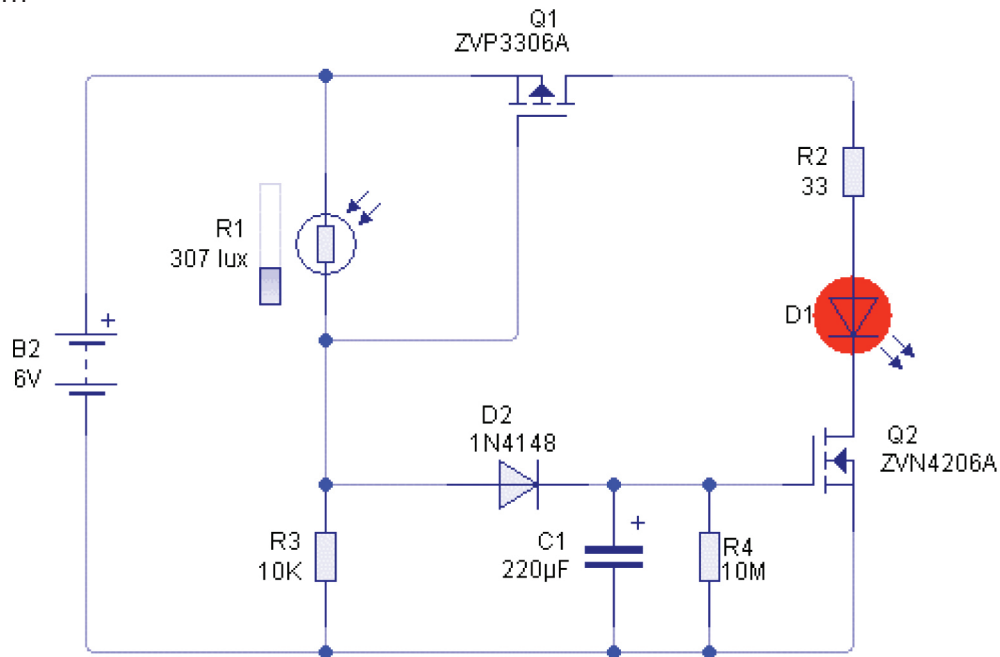
R1	Light dependent resistor	R2	33R	R3	10K
R4	1M or 10M	D1	White LED	D2	1N4148
C1	220µF	TR1	ZVP3306	TR2	ZVN4206A



Order of construction

- 1: R2, R3 and R4 (R4 can either be 1M or 10M depending on whether you require a short or long time delay)
- 2: D2 (note orientation, black band is marked on PCB graphic)
- 3: R1
- 4: D1 (note orientation, short lead is marked K on PCB graphic)
- 5: C1 (note orientation, long lead is marked + on PCB graphic)
- 6: TR1, TR2 (note orientation, avoid handling pins and leave standing proud of the PCB)
- 7: Battery pack (heat the pins first and check solder sticks to them before completing the joint)

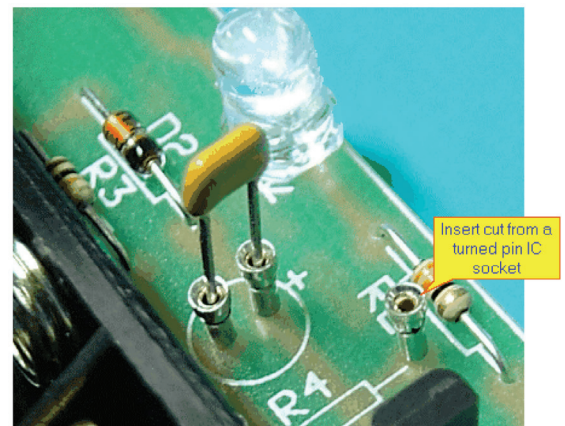
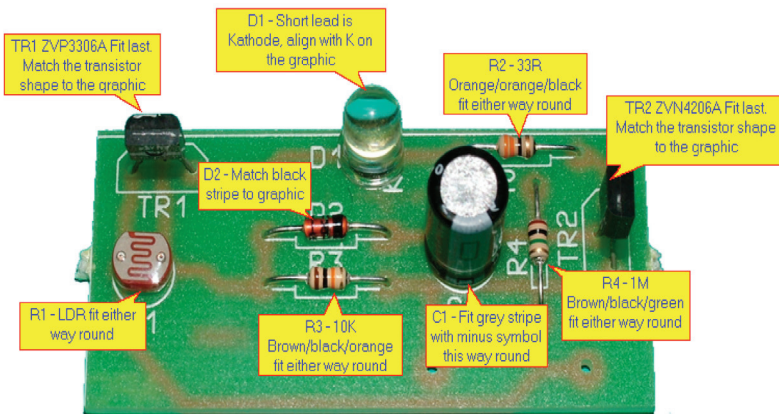
Circuit diagram



Nightlight circuit – the values of C1 and R4 set the time delay

PCB assembly

Exploring the time delay



Suggestion for practical work

- A useful way to explore different timing component values is to fit tuned pin sockets instead of C1 and R4. This provides a means of 'plugging in' different values for C and R. Suitable part from Rapid is 22-1750 20-pin SIL connector
- A set of nightlights equipped with tuned pin sockets can provide the basis for a useful collaborative class investigation. Each group contributes timing data
- Collected data can be pooled and put into a table for subsequent use in designing for required timings
- Use of different values for C1 and R4 can lead to a valuable discussion about multipliers and how to interpret them