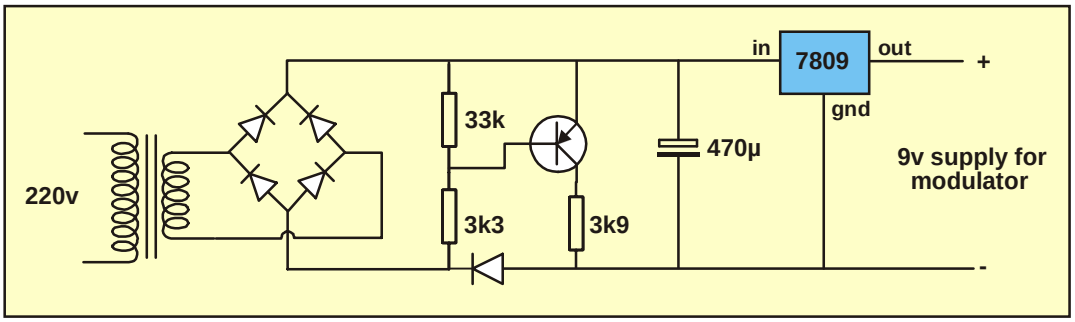
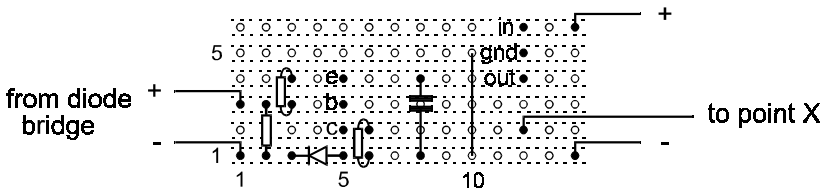
Sound to Light

Zero-crossing detector

Transistor: general purpose **pnp**
This circuit gives out a short pulse each time the 220v supply passes through zero.

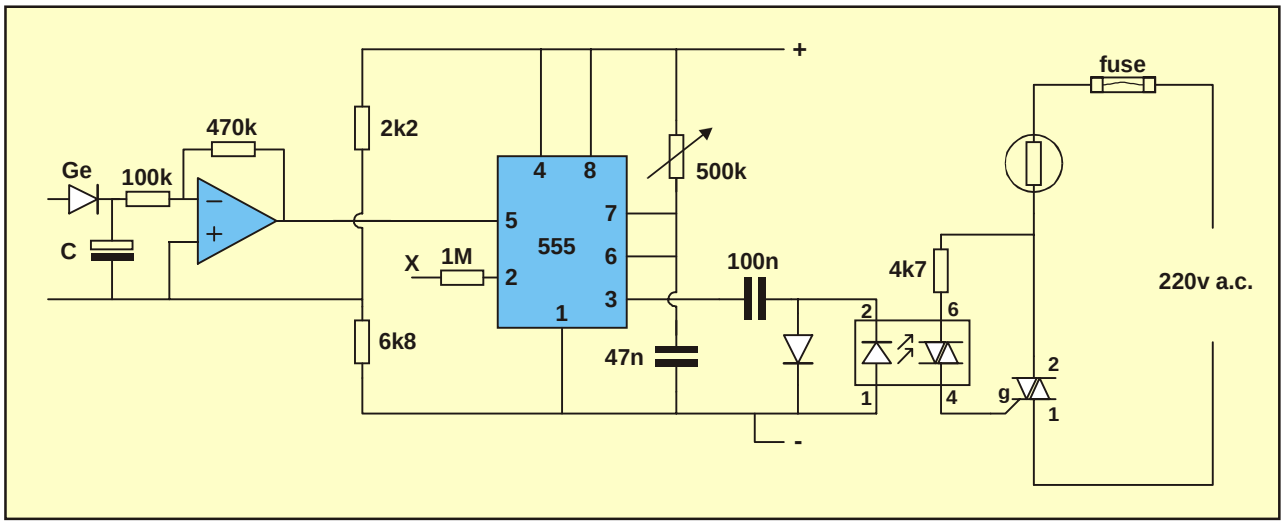




N.B. There is *only one cut* on the copper side of this board; you should be able to see where it must be!

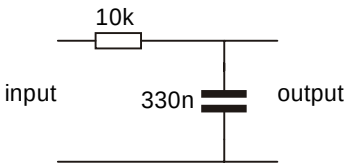
Modulator

The pulses are used to set (start) a monostable (made using a CMOS 555 timer). When the timed period is finished, the monostable resets and gives a pulse which causes the triac to start conducting. The time period of the monostable is varied using a rectified and smoothed voltage taken from the music source. Opto-isolator: MOC3020 or similar. Op-amp: 081.

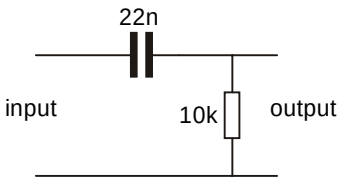


The capacitor C determines the speed of response of the system; try about 1µF.

If a low pass filter is connected to the input, the light will be modulated by the bass notes in the music. With a high pass filter, the light will respond the treble notes.

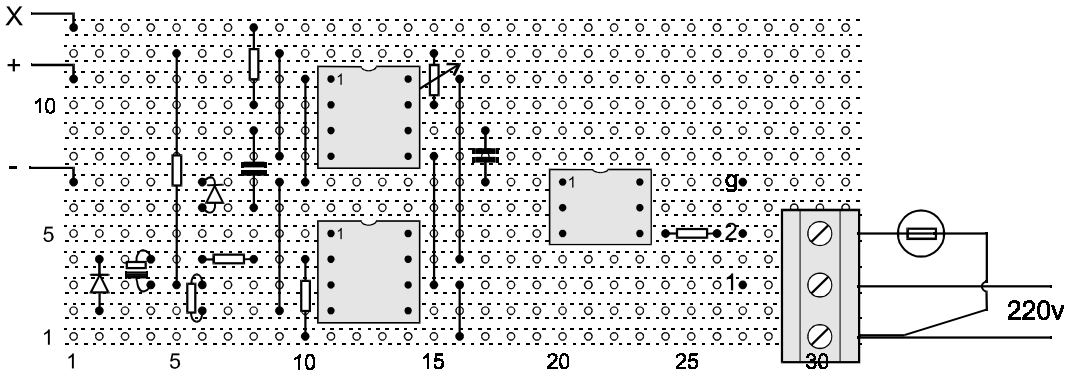


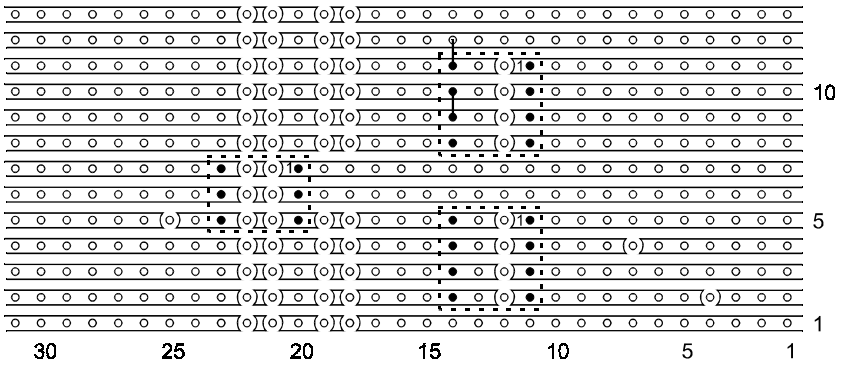
Low pass filter



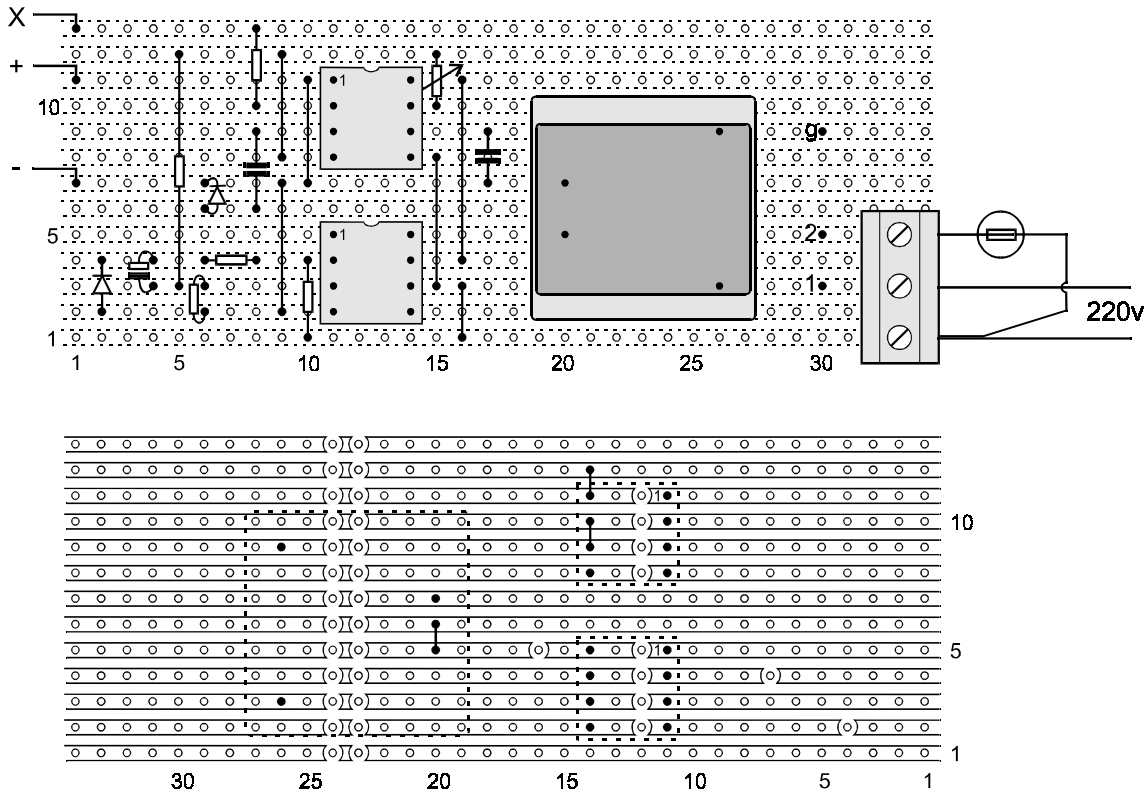
High pass filter

Vero board for circuit using an opto-isolator (as shown in the circuit diagram).

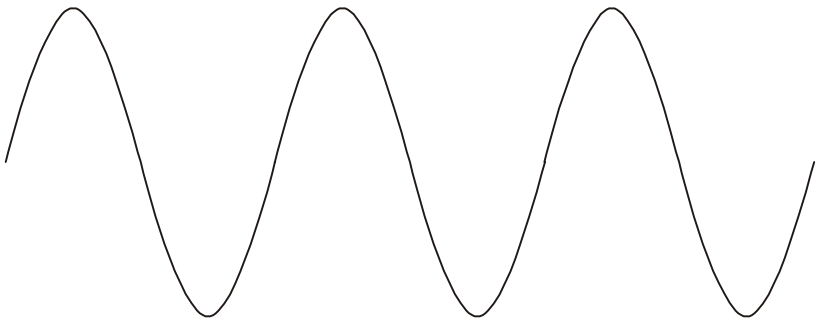




If you use an *isolating transformer* instead of an opto-isolator, the vero board will be as shown below.

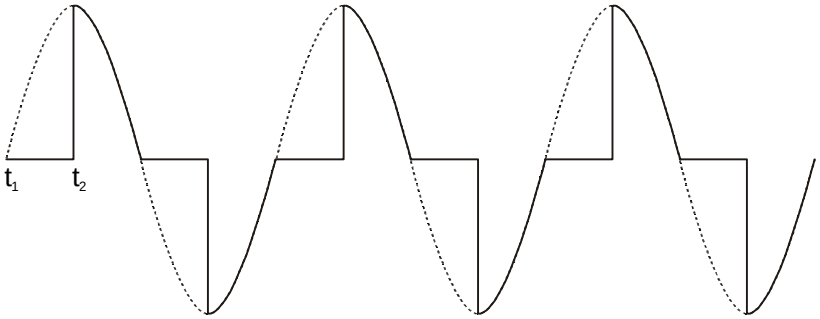


The diagrams below are to illustrate how the triac is used to vary the brightness of the light bulb. The first diagram represents a graph of voltage against time for the 220v supply.

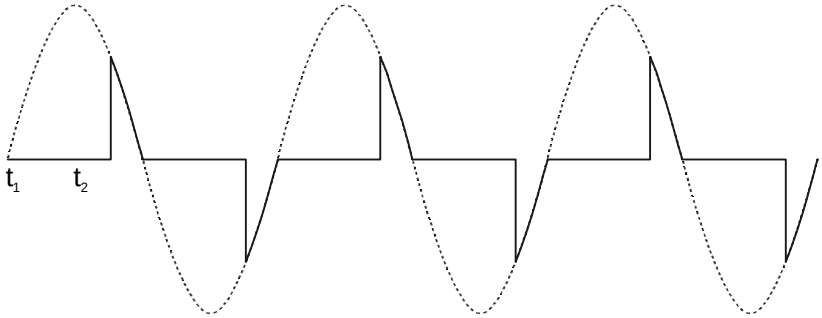


The next two diagrams represent graphs of current flowing through the triac (and light bulb) against time. In these diagrams, t1 is the time at which the monostable is triggered and t2 is the time (a few milli-seconds later) when it reaches the end of its timed period and gives a pulse to start the triac conducting.

N.B. when the current through a triac falls to zero, it returns to its non-conducting state until it receives another pulse into its gate.



Light at about half power



Light at less than half power