



## Flashing LED counter

This interesting project came up in mid December 2001 with someone wanting to have a real time readout of their electricity consumption. They had a modern meter with a flashing LED to indicate the rate of usage. The plan was to trigger an input in [Comfort](#) with every pulse of the LED. After a little thought it was decided that this would be rather intensive for [Comfort](#) and the same result could be achieved by telling comfort when 10 pulses (or any other number) had passed. The maths could then be done and a display produced. Under normal loading the LED flashed about twice a second.

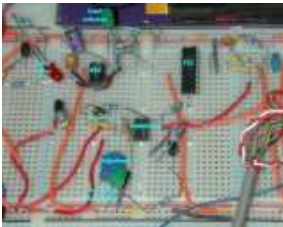
We looked round the electronic catalogues for available kit and some form of light detector was the best solution to detect the pulses. After that a BCD (Binary Coded Decimal) counter chip was our next choice to scale the input down.

At the moment the plan is to use a PIC 16F84 to read the pulses and scale down the output. We can also output several divisions e.g. 10, 50, 100 or whatever is most useful.

### Update 1

I rigged up the photodiode from RS and some other bits like a transistor and LED's and guess what. I made a light sensor. It behaved in a way I did not expect as well. Using the current through the sensor to power the base of a transistor I made a dimming/brightening indicator of the light falling on the sensor. I was surprised having dealt with only digital stuff before, you know, ON or OFF and never the twain shall meet.

### Update 2



Click the image for a better picture (116k)

Here is the working prototype with a small oscillating 555 circuit to imitate the electric meter flashing LED. There is a photodiode and comparator that gives 0 or 5 volts depending on whether the LED is on or off. Finally there is a PIC 16F84a that counts the pulses from the comparator, divides it by ten and outputs another digital pulse. The green LED at the top of the board represents this output to the monitoring device. The whole device uses very little power and even works under dull lighting.

Testing with a real electric meter is next (I only have the spinning wheel variety) and if all goes to plan make a PCB. This will be designed to fit into the [Comfort](#) enclosure and use power from there and an input port to count the pulses from the PIC.

### Update 3

I am pleased to say that the LED counter project now works on the real thing (an electric meter). Still some PC based maths oddities to sort but we are getting there. Steve is doing the building, PC programming and maths, I designed the circuit and supplied the programmed PIC. Once it is sorted we will build a PCB, get it all assembled and then produce some piccys and a story. Should be a good story too with tales of small explosions and component bits embedded in the ceiling

## In brief

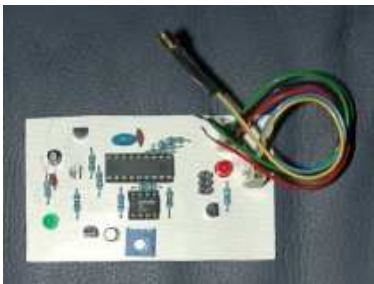
As I understand it my circuit produces a signal which is read by Comfort. Comfort then passes this onto the PC where some maths is done and a real time readout (within reason) is produced. I am sure Steve will provide a better explanation in due course.

## A short note from Steve B for whom this circuit was built.....

Ian sent me a kit of parts apart from the vero board as I had a piece. I constructed the circuit onto a piece of vero the same size as we wanted the final pcb. I finished the construction leaving out a few final links so that I could test in stages to minimize component damage should I have made a mistake. Me never! First testing the voltage regulator section, then detector stage followed by the PIC. Finally I linked in the output driver stage and powered up. BANG and a flash. I disconnected the power and surveyed the damage. One leg of the transistor had blown clean out of the plastic casing along with a piece of the case. Is this how to make a diode? I had omitted to make a necessary break on the board. Eventually the tranny was replaced with a substitute and the 'project' functioned as Ian had designed it. I snail mailed it back to Ian but unfortunately the post office destroyed it without DC power.....

## Update 4 - the final version

Well, here it is at last, the final version of the PCB. The only additions to the prototype circuit are a power LED (green) and three jumpers for future configuration of the PIC 16F84a. Here is a picky of the final unit...



[Click for a better 115k image](#)

Here is the schematic

[Flashing LED Counter Schematic.pdf](#)

And finally the trackside of the PCB. Note this is a pdf and does not print in its true proportions. Adobe always gets it a little small.

[Flashing LED Counter Layout.pdf](#)

This page last updated on 26<sup>th</sup> April 2002