PREAMBLE

If one wants to make time-lapse movies, then one really needs a device which regularly tells the camera to take a picture. Despite its active role, such things are called intervalometers. You can buy them ready made, and the Internet is awash with designs for DIY versions. However, I designed and built my own.

Desiderata and the broad design

I decided that the following were important to me:

- long battery life;
- easy, repeatable setting;
- good accuracy;

but that I didn’t worry too much about:

- precision;
- fancy status displays;
- non-temporal triggers.

Perhaps the key decision was the high-accuracy, low-precision trade-off. By this I mean that I want to be able to easily specify e.g. a 1 minute interval between frames, but I don’t need the ability to specify 1 minute and 3 seconds. However, when I say one minute I really do mean one minute.

This naturally led me to a digital UI, rather than e.g. a potentiometer and some sort of display. In fact, I used a couple of 4 way switches: one specifies 1,3,10 or 30, the other seconds, minutes, hours or days. One can simply look at the positions of the switches to see how the device is configured: we don’t need a fancy LCD display.

To actually generate the pulses there are a few choices. One might distinguish between analogue solutions like the ubiquitous 555 timer, and digital ones which are effectively a quartz-oscillator and a programmable divider. The latter seem to offer better long-term stability, so that’s what I used.

For no better reason than I had some to hand, I based the device on a PIC 16F690. To keep the power consumption down, it's clocked with a 32kHz quartz crystal. The whole thing is easy to power from a couple of AA batteries, but this isn't critical. For example a 5V supply could be used instead if that were more convenient.

Finally one has to decide what to do when the time comes to take a photo. I want the intervalometer to drive a Canon 400D DSLR, which has separate focus and trigger inputs. It seems sensible to drive both of them independently, giving the camera a few seconds to focus before taking the photo. That way any variation in the time the camera takes to focus won't affect the time at which the photo is taken.

On top of this, I wanted an extra output so that, for example, I could break the power to the camera when it wasn't needed (the 400D draws about 40mA when 'resting').

In total then, then are three outputs which all all opto-isolated. I'm not sure whether this was necessary, or indeed desirable, for the camera, but still.

Finally, as you'd expect, there's also a status LED on the front panel. Normally this is off, but it flashes when the camera's being asked to focus then glows steadily when the shutter's triggered.

Abstracting, our device takes a 5-bit input configuration (4 numbers × 4 units × 2 power modes) and generates a sequence of 4-bit outputs. Simples!

Source: http://www.mjoldfield.com/atelier/2011/08/intervalometer.html