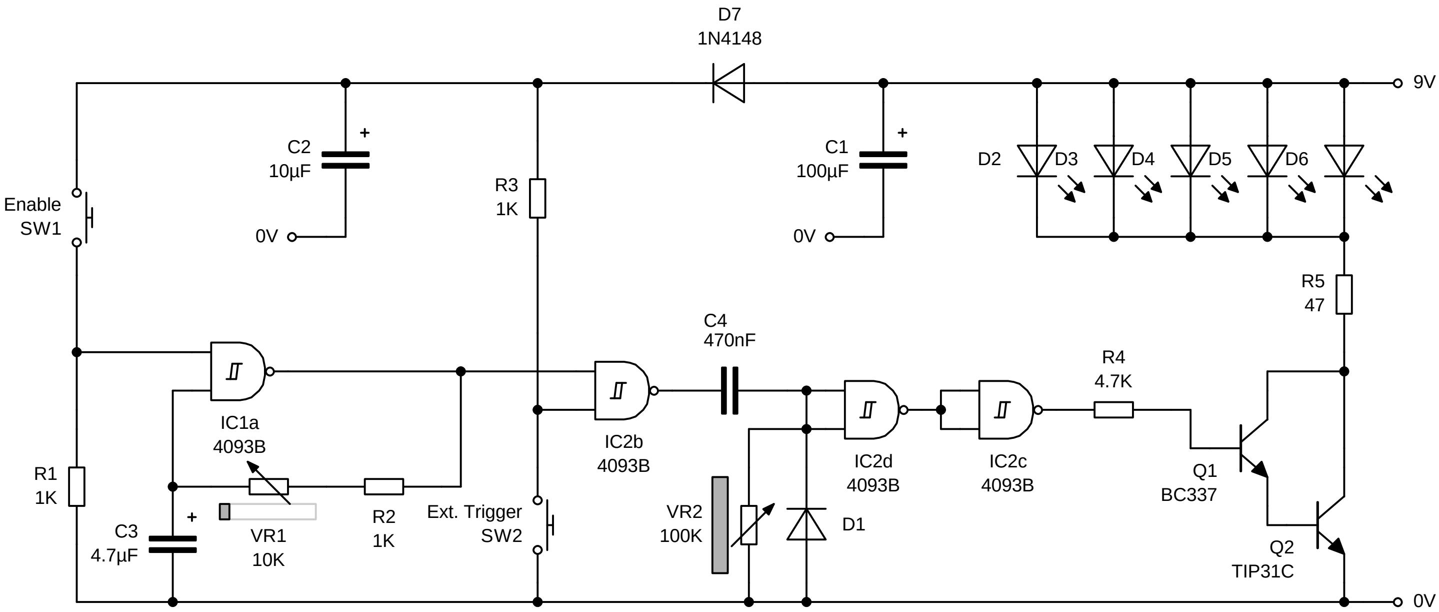
LED STROBE

Design by Phil Townshend 2003

This is a basic astable driving a monostable then a Darlington driver to power the LED's. The astable is formed using a Schmitt trigger IC1a, C3 and VR1+R2. When SW1 is pressed, the astable produces square wave pulses of about 50/50 ratio. These are fed to a spike generator C4, VR4, D1. This shortens the pulse to enable good resolution when measuring and can be adjust by VR2. The out put is fed to the Darlington pair to provide the current drive. Using the transistor shown about 3A of current is available, potentially around 100 LED's.
SW2 provides an alternative trigger for the strobe, but be careful the input does not exceed 9 volts.

For calculations, see below.



For the maths buffs...

The datasheet holds the Vpth = 6.9volts and Vnth as 3.9 volts - although about 20 values are given these seem to be about right.
So...

To calculate the maximum flash rate, $C = 4.7\times10^{-6}$ and $R = 1\times10^{3}$
Using $t = \tau \ln (Vo/V)$ the time it takes for C3 to reach the positive threshold voltage will be:

$t = 4.7\times10^{-6} \times 1\times10^{3} \times \ln ((9 - 3.9 / (9 - 6.9))$
$t = 4.17\times10^{-3}$ seconds, or 4.17ms

This is the time for a half cyle so
$f = 1 / (2 \times 4.17 \times 10^{-3})$
f = 119.89 Hz or **120Hz**

The minimum flash rate using R as 11×10^{3}
$t = 4.7\times10^{-6} \times 11\times10^{3} \times \ln (9 - 3.9 / 9 - 6.9)$
t = 10.899Hz or **11Hz**

The flash time should be as low as possible without losing too much brightness.
Assuming VR2 is halfway then
$t = 100\times10^{3} \times 470\times10^{-9} \times \ln ((9 / 3.9)$
t = **0.108 seconds**