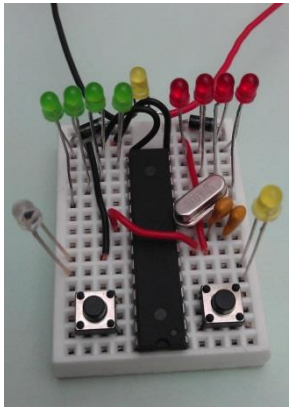
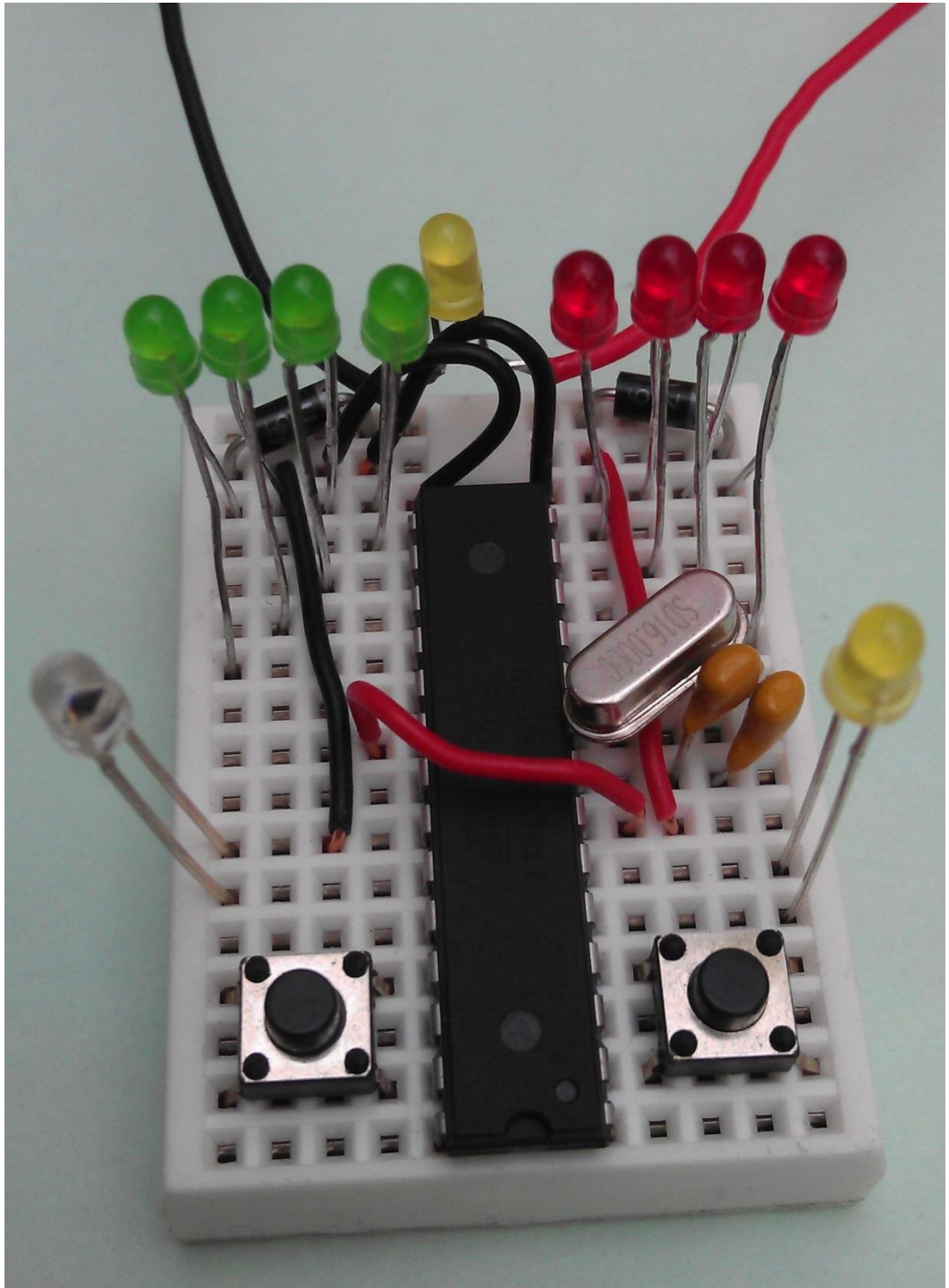
Microcontroller build steps

Engineer’s training guide V1.1



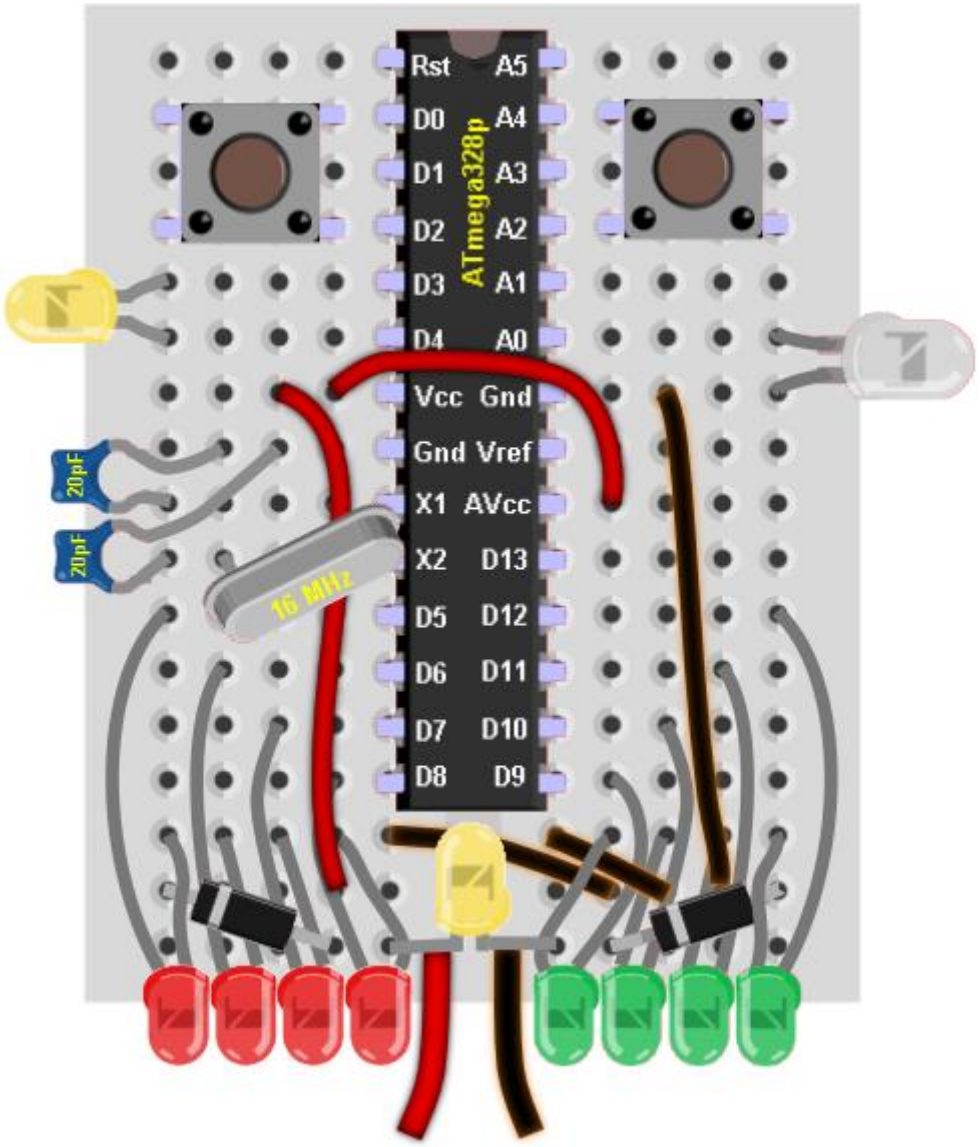
bcs
The Chartered Institute for IT

Atmel

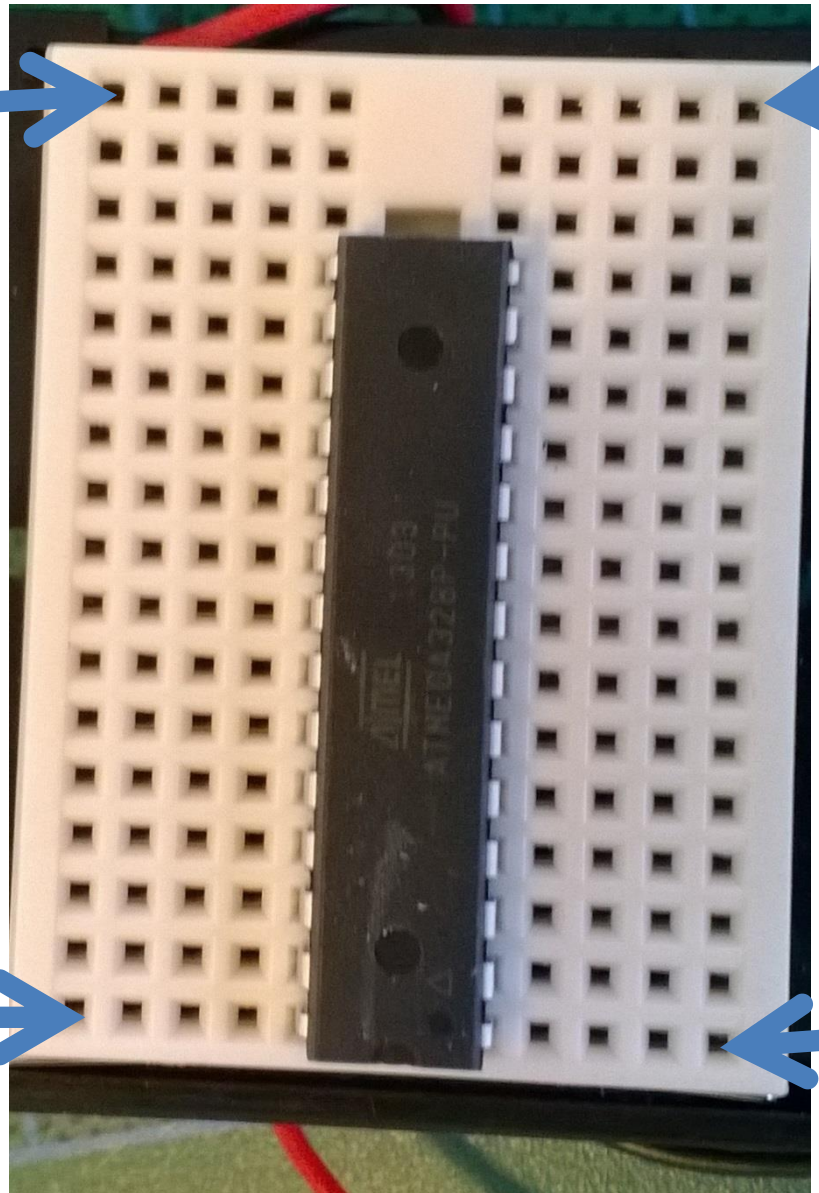


University of Hertfordshire UH

Noble Touch


Rst A5
D0 A4
D1 A3
D2 A2
D3 A1
D4 A0
Vcc Gnd
Gnd Vref
X1 AVcc
X2 D13
D5 D12
D6 D11
D7 D10
D8 D9
ATmega328p
20pF
20pF
16 MHz

Convention used



L17

R17

LEFT

L

Right

R

L1

R1

Red Jump wires

RED R7 – L9

RED R7 – R16

Red = +ve Vcc

Black = -ve GND

Black Jump wires

BLACK L7 – L16

BLACK L15 – L16

BLACK R15 – L16

Red = +ve Vcc

Black = -ve GND

Momentary Switches

This is tricky

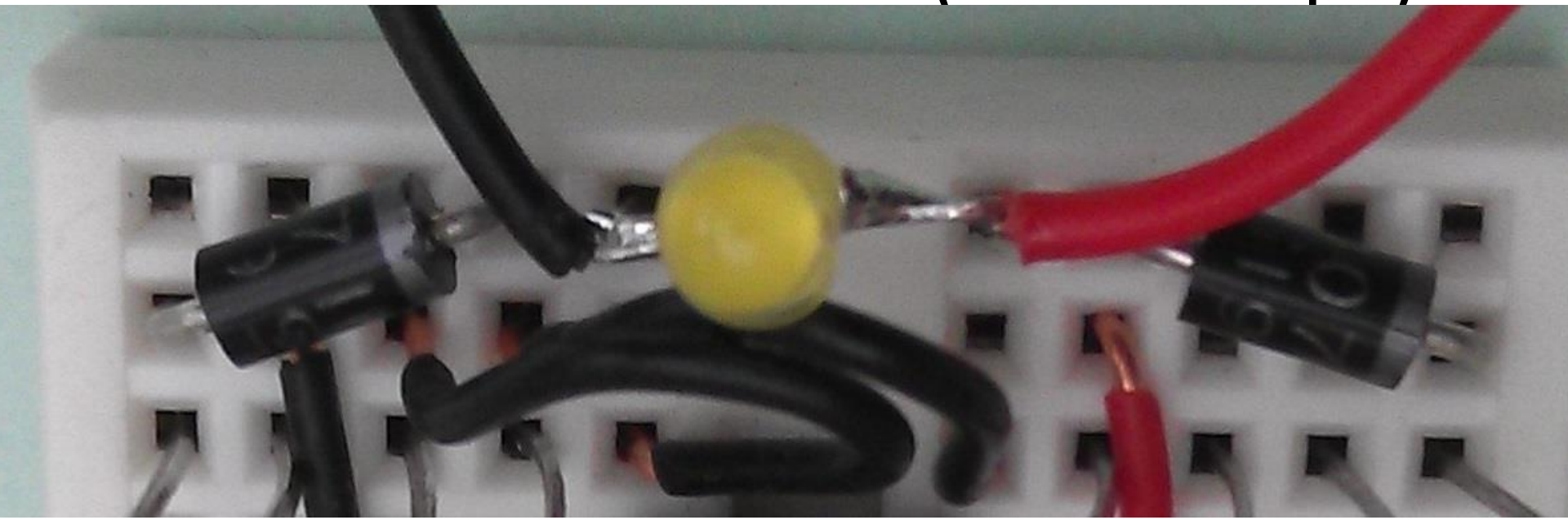
Switch 1
R2 – R4

Switch 2
L2 – L4

Diodes - Note the stripe

Diode1 L16 – L17 (White stripe)

Diode2 R17 – R16 (White stripe)

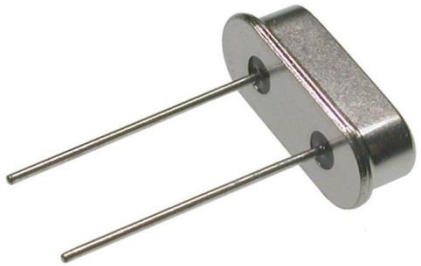


Fresh alkaline AAA = 2 Diodes

Rechargeable = 1 or zero Diodes

16MHz Crystal Oscillator

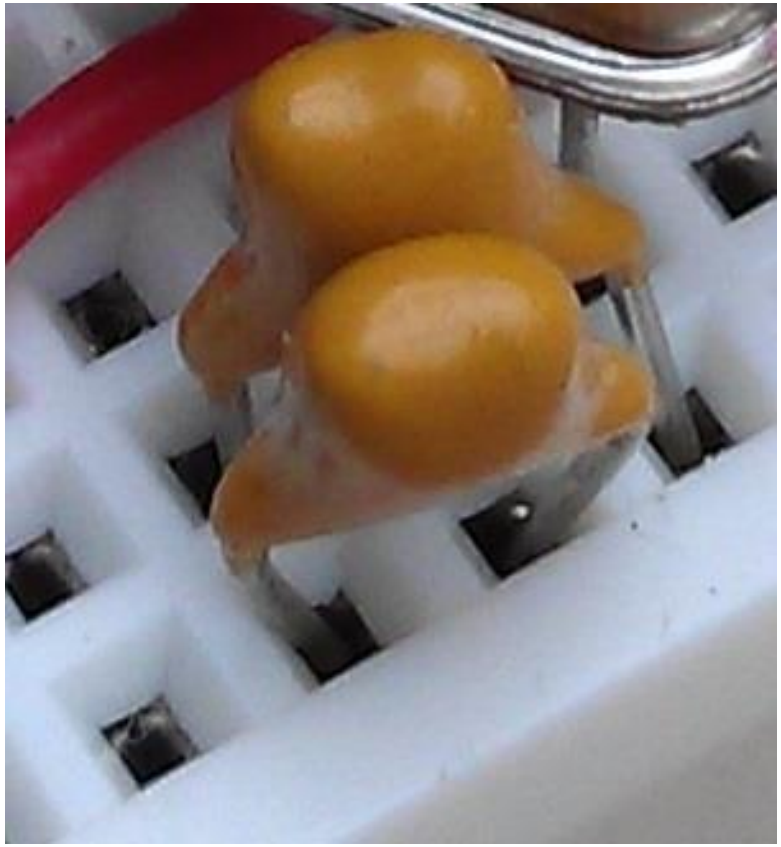
XTAL R9 – R10



Capacitors

CAP1 R8 – R9

CAP2 R8 – R10



RED LEDs

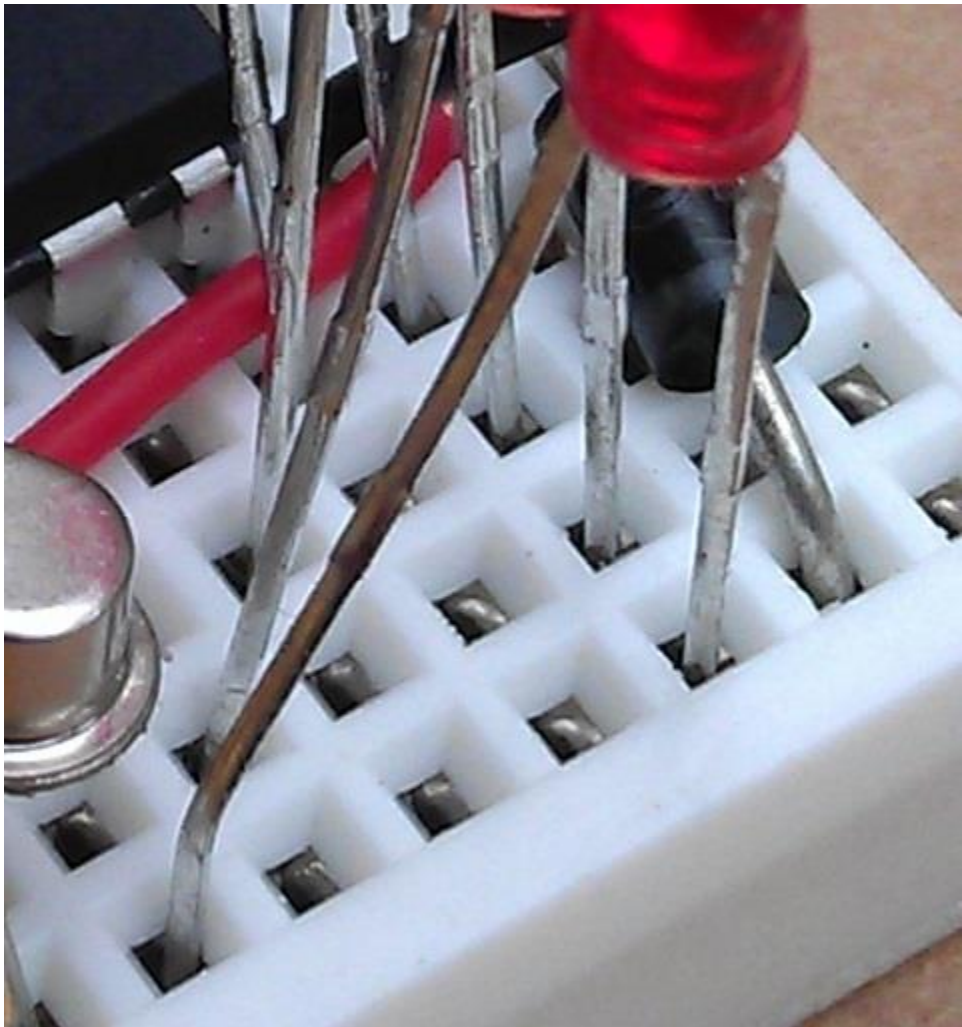
NOTE: All SHORT LEGS – 15R

LED R14 – R15

LED R13 – R15

LED R12 – R15

LED R11 – R15



Green LEDs

NOTE: All SHORT LEGS – L15

LED L14 – L15

LED L13 – L15

LED L12 – L15

LED L11 – L15

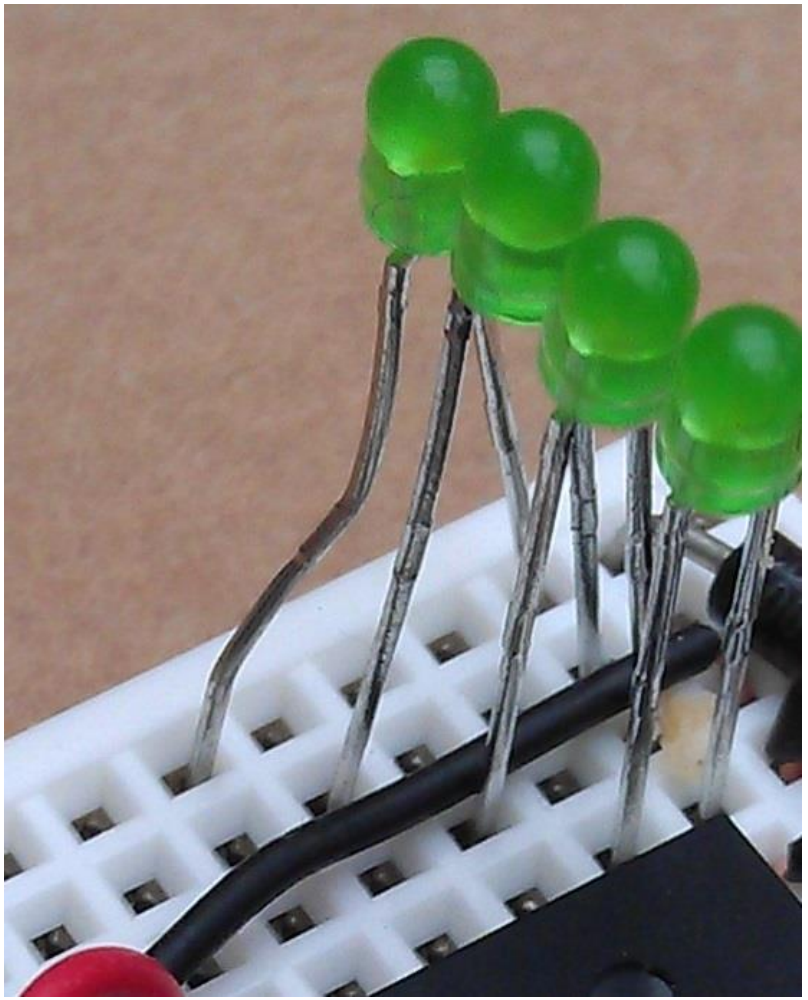
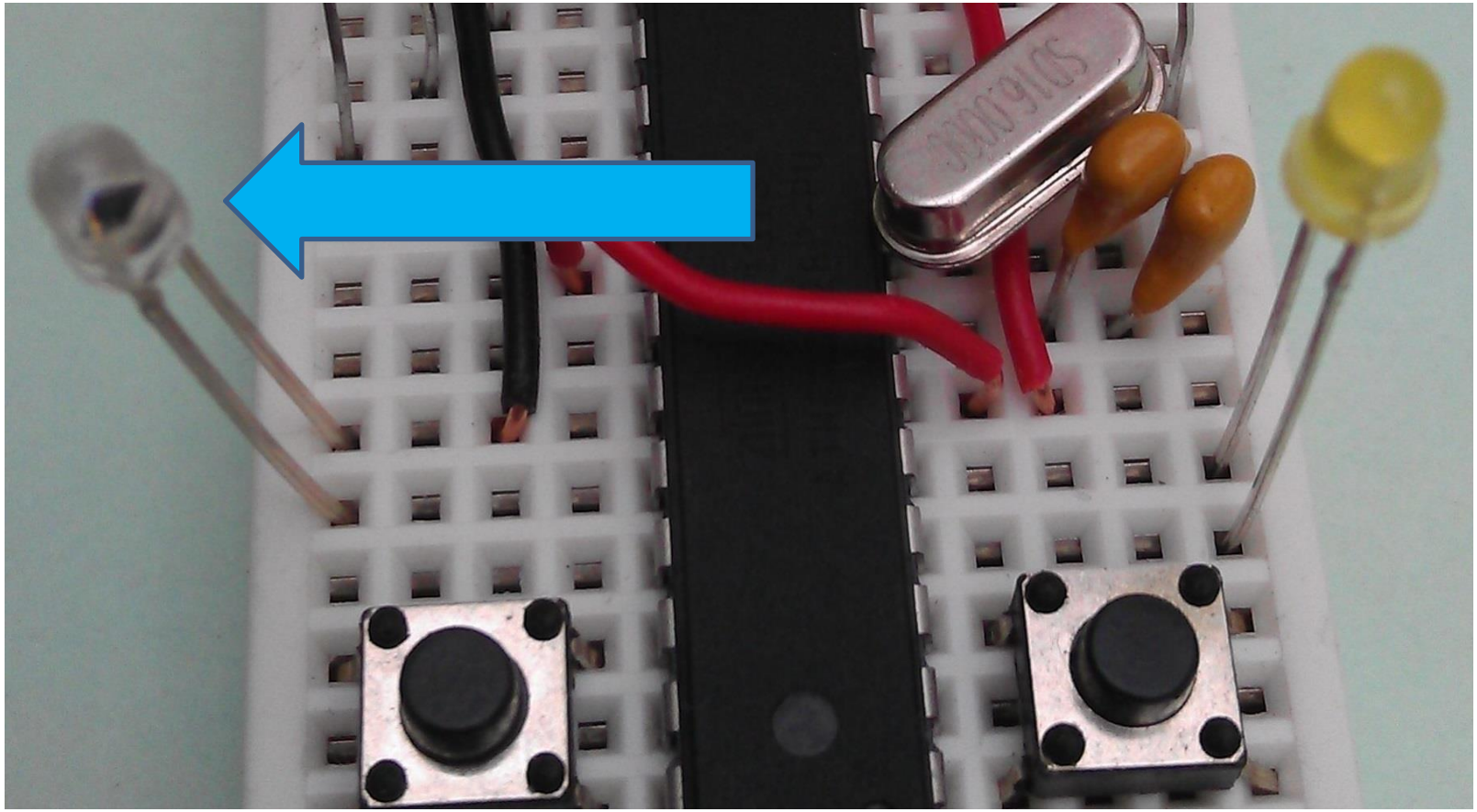


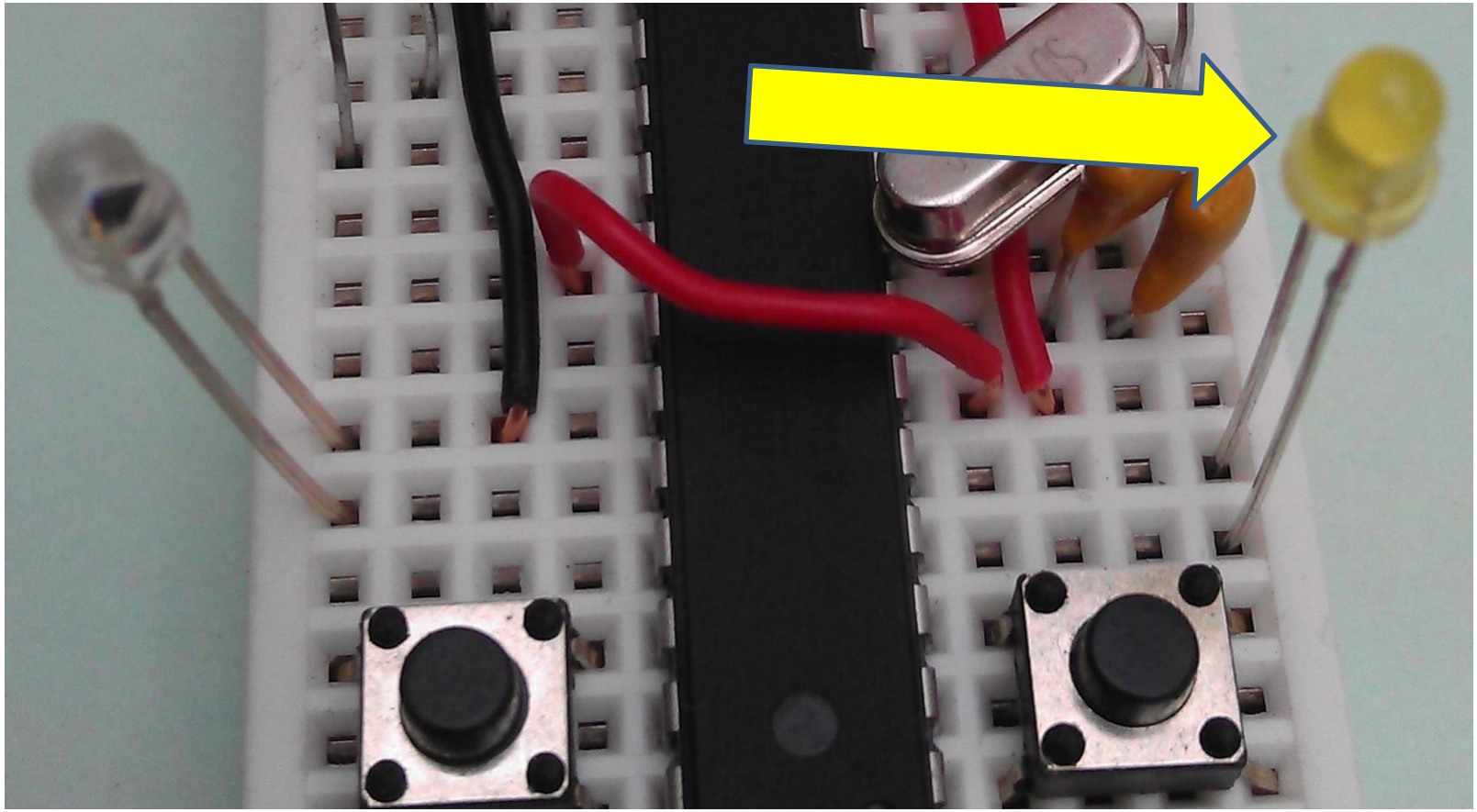
Photo Transistor

L6 – L7 (Short leg)



Yellow LED

LED R5 – R6 (Short leg)

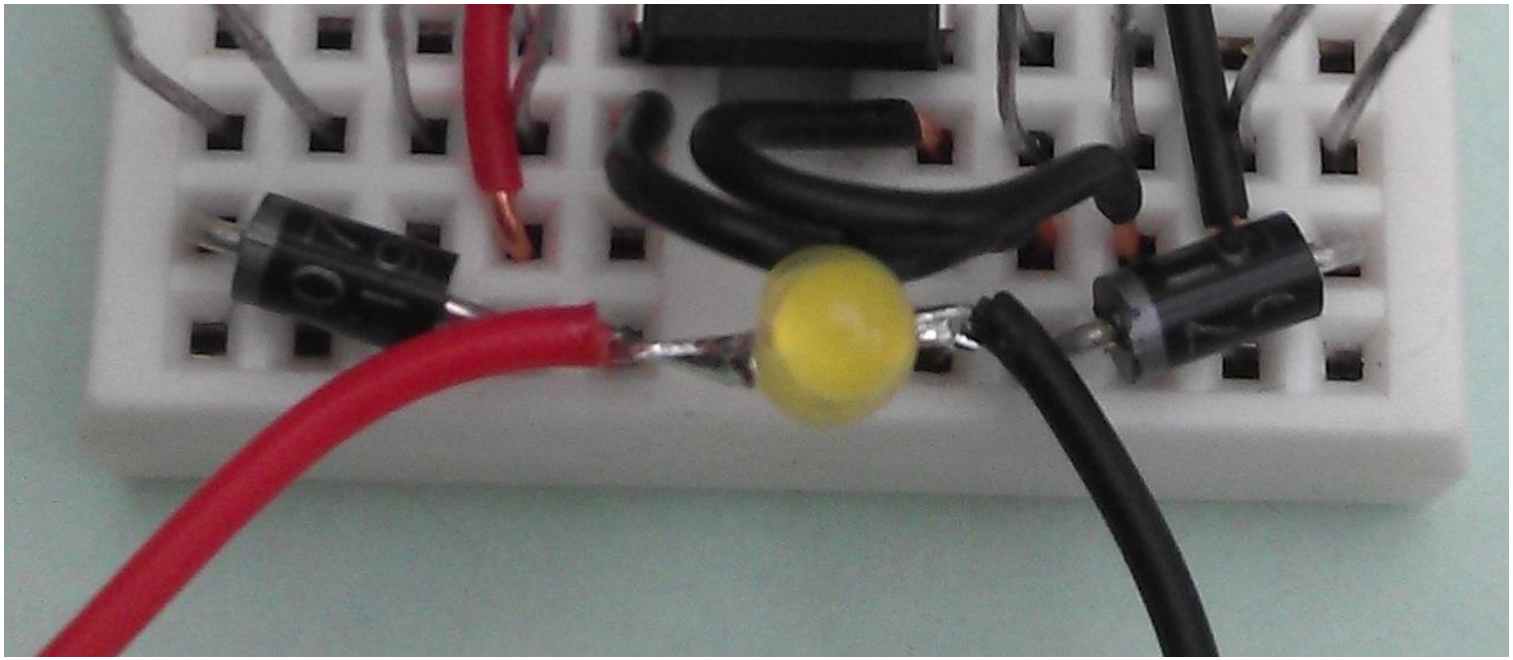


Power UP

Connect the battery box

Red wire – R17

Black wire – L17



Modes

1) Random Flashing lights
2) LED Count 1
3) LED Count 2
4) LED Click count
    - Left button adds one to the click count
5) Light level with PWM
    - Left button used to calibrate level
6) Temperature mode
    - Left button used to calibrate level

Feedback

Feedback from a recent test build

1. The wires are quite stiff. Grip the plastic sheath of the wire and push from there. Because the wires are hard to push in there is a temptation to push the other end of the wire. Do not to do this as the cut end of the wire is sharp and it hurts!
2. The diodes are extra hard to push in, and need a good push at both ends and then check they are both the right way round.
3. The switches are a bit fiddly but if you apply a thumbnail to each side and press down then they go in quite easily.
4. Components, like LEDs, with one short led and one long leg must have the short led towards the diodes end of the board.