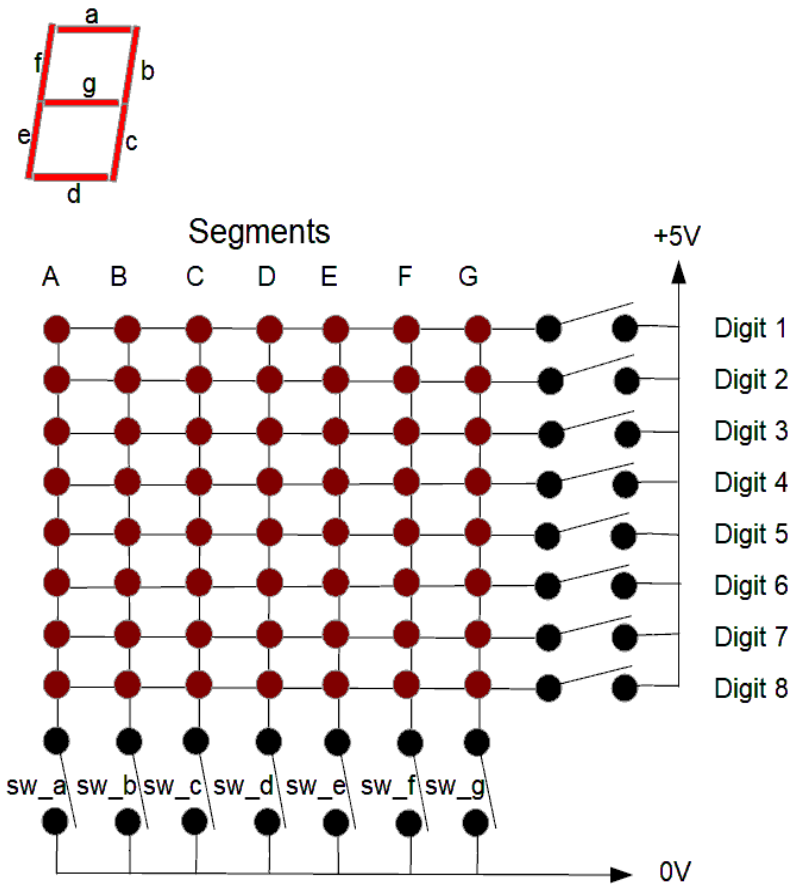
Operation of the 7 segment 8 digit multiplexer

The diagram below shows a single digit with segments 'a' to 'g'. It also shows the 56 segments that make up the complete display (each one is represented by a red dot). The switches are the outputs of the Atmega328 used to drive the display.



To illuminate segment 'a' of digit_1 both “sw_a” and “Digit_1” switches must be closed.
To make “Digit_1” display a “1” switches “sw_b”, “sw_c” and “Digit_1” are all closed

At any one time any combination of the “sw” switches can be closed but the “Digit” switches are only ever closed one at a time.

The “Digit” switches are continuously pulsed in sequence (i.e Digit_1 to 8). As each switch is closed the “sw” switches must also be operated so that each digit displays the correct integer (i.e. 0 to 9).

Only one digit is ever illuminated at any time. However each digit is continuously being refreshed. If it is refreshed every 16ms for a period of 2ms then a steady 8 digit number is displayed with little or no flicker evident.

Display intensity can be reduced by reducing the interval for which each digit is refreshed while maintaining the 16ms refresh rate.