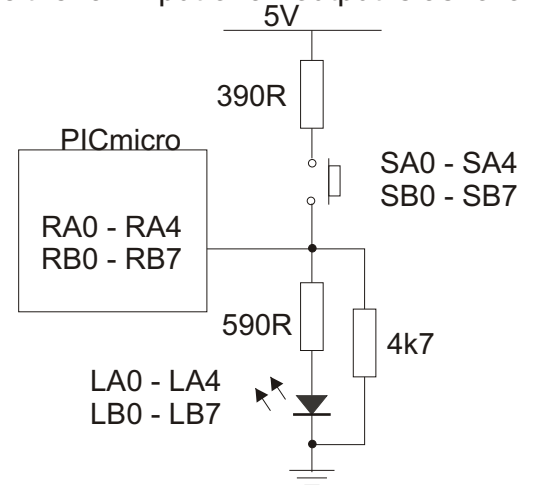


# 12 Circuits

## Switches and LED's

Port A [A0 - A4] and Port B [B0 - B7] on the PIC can be directly used for I/O on the PICmicro board, using onboard switches and LED's. The basic circuit which allows the same PICmicro connector I/O pin to be used as either an input or an output is as follows:

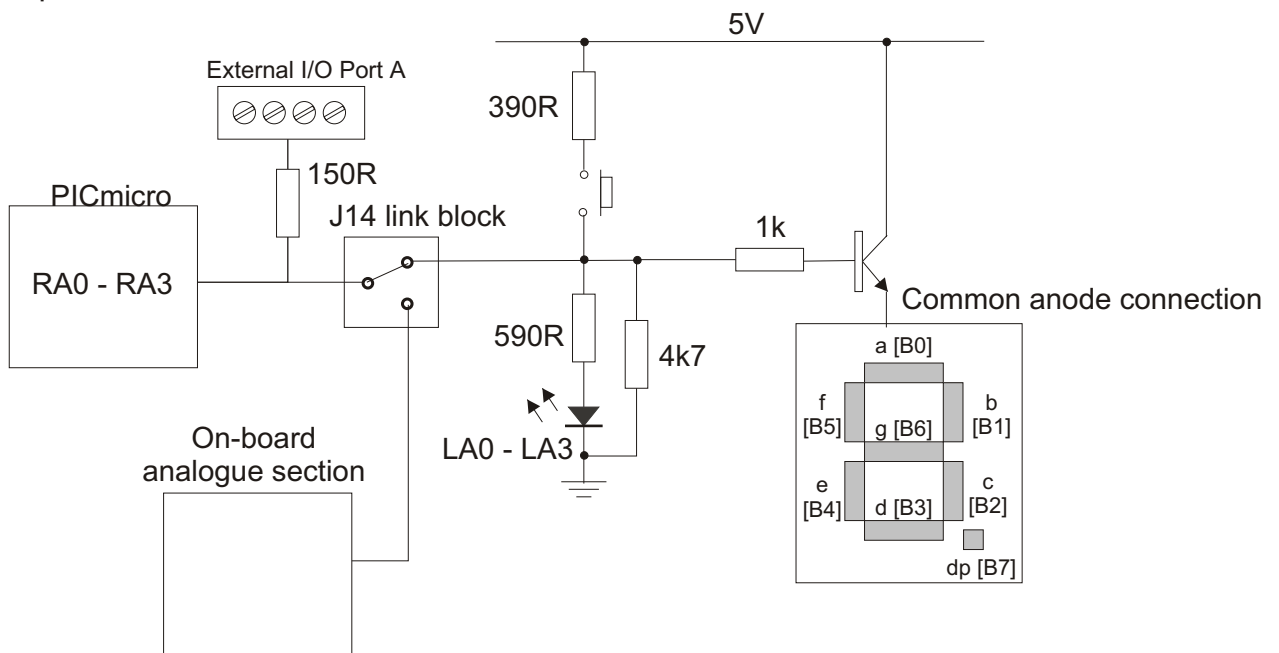


### Multiple connections

The development board allows several variations on this basic circuit by the inclusion of switches and links on the board. There are a number of variations of this as follows:

### RA0 to RA3

RA0 to RA3 are used to select which 7-segment display is used, are used for analogue inputs and are also connected to the screw terminals. The actual circuit used here is:



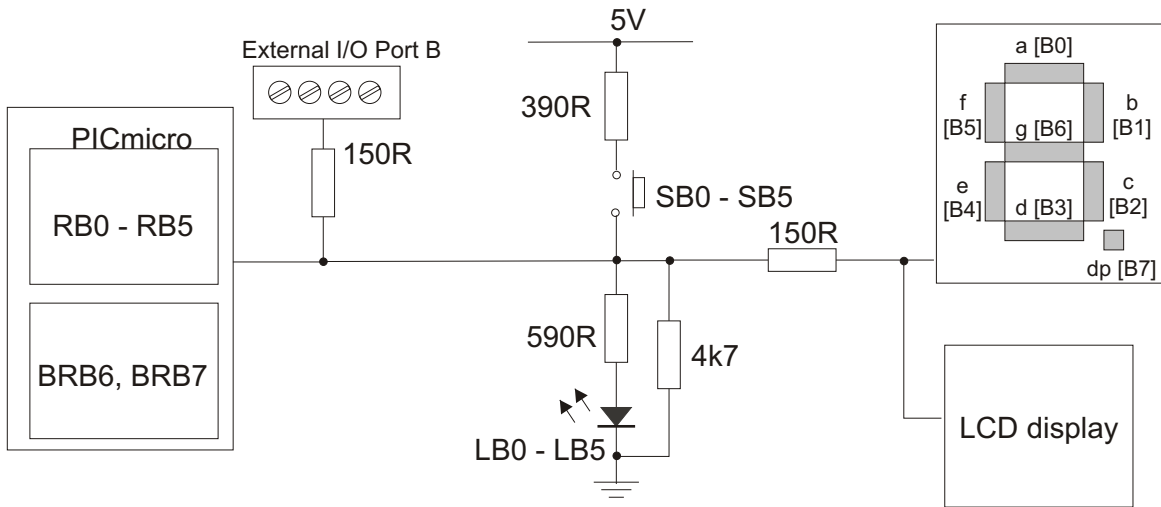
J14 allows students to effectively switch RA0 to RA3 to analogue or digital circuitry. Removing the link altogether will connect RA0 to RA3 only to the Port A screw terminal connectors via 150 ohm protection resistors. Note that the on-board analogue section consists of a potential divider provided by a light sensor, a potentiometer or an external sensor that provides a voltage between 0 and 5V. Under normal operation the links on J14 should be put into the 'digital' position.

### RA4

RA4 is not switched by jumper link on J14. It is not connected to the 7-segment displays or the analogue section. RA4 is used for the external Vernier digital sensor.

## RB0 to RB5

RB0 to RB5 are all connected to the switches and LEDs as well as to the I/O screw terminals, via 150 ohm protection resistor, and to the LCD and the cathodes of the 7-segment displays.



## RB6 and RB7

RB6 and 7 have the same circuit as above but are connected to the PICmicro via an analogue switch - Buffered RB6 and Buffered RB7. This circuit is shown in the core PICmicro circuit below.

## Quad 7-segment display

To use the quad 7-segment displays S3 must be in the 'on' position. Port A [A0 (left)- A3(right)] is used to select which of the four 7-segment display digits is active and the voltages on Port B [B0 - B7] dictate which segment is lit. To display data on all four 7-segment displays simultaneously a multiplexing program is required.

