

## Page 1. OVERVIEW

This software is designed to translate the serial Scan Codes generated by a PC style keyboard and output an equivalent parallel 7-bit ASCII code.

This allows the use of a good quality keyboard, (which can be obtained relatively cheaply), to be used with an older 8-bit computer system. It could additionally be used to communicate with more modern micro-controllers.

This software can be used to operate either:

- 1) An AT type keyboard, these seem to generate a clock signal of typically 10kHz
- 2) A PS/2 keyboard, these generate a clock signal of typically 13kHz and have a smaller connector plug than the AT type.

To keep the code compact the PC keyboard LED's are not used nor any commands which require writing data to the keyboard.

Because every ASCII code in the set of 127 codes is used (00 to 7F) it is not possible to cater for the function keys or any of the special PC keys.

The software code is the minimum required for ASCII conversion. In other words it provides a basic ASCII keyboard but with the addition of a number pad and Up, Down, Left, Right arrow keys – which are translated as 8, 2, 4 and 6 (same as the number pad).

The Caps Lock functions correctly i.e. provides capital letters, numbers and the colon without shifting the number keys - the shift key will shift any keyboard key when held down (as normal).

The Escape key translates as ASCII escape code which is 'Control [' when using an ASCII keyboard.

The Tab key translates as ASCII 'Control I'. 'Control I' can also be used to Tab if preferred.

The Control key when used with the appropriate letter provides ASCII code for Control A to Control Z.

Any character will repeat at the preset PC keyboard typematic rate (default 10 c.p.s.).

It is assumed that the computer keyboard port accepts 7-bit ASCII with bit 8 pulsed low as a strobe when data is applied. (bit 8 here refers to data bit 7 of the port). Most 8-bit ASCII keyboards seem to work this way.

If your computer or micro-controller requires a high strobe it may be easiest to use an inverter gate in the data bit 7 line.

**Page 2. HARDWARE CONNECTIONS**

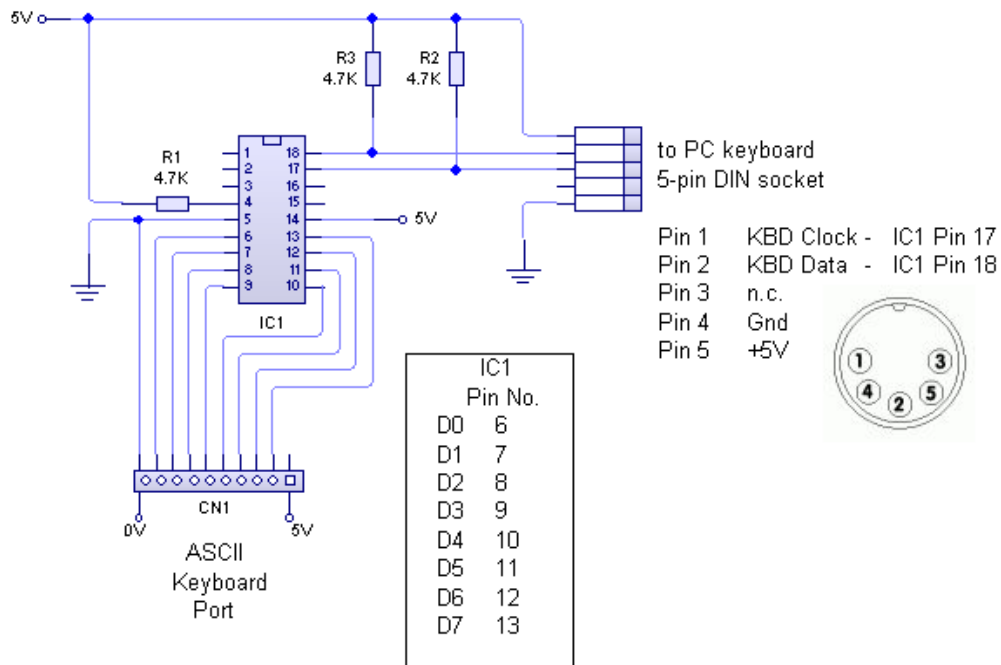
1. Using a PIC 16F84 or 16F84A  
Program this PIC with file 84PC\_ASCII.HEX

2. Using a PIC 16F628A or 16F648A  
Program this PIC with file 648PC\_ASCII.HEX

Both versions work fine but the 16F84 requires an external 4MHz crystal. The 16F628A or 648A have an internal oscillator circuit and do not require a crystal – this simplifies the circuit. The 16F648A is pin compatible and cheaper than the 16F84 but I have provided the two options, as many people will already have a spare 16F84 because they were very popular.

The only difference between the two HEX files is that the 648 file has a few extra lines of code which set the internal oscillator to 4MHz and also initialise Port A as a digital port (it defaults to analogue).

This circuit shows the 16F648A wiring. Power is obtained from the computer ASCII keyboard port. IC1 should have a 0.1uF capacitor on pins 5 and 14.



If a 16F84 is used the circuit is exactly the same but with the addition of a 4MHz crystal cct. or ceramic resonator connected to Pins 15 + 16 (and ground).