Microcontroller timer

This circuit was designed to provide the functions of a timer. While it would possibly be cheaper to provide the same function with discrete logic circuitry, this circuit has been designed to offer programming experience with the 68HC705K1 microcontroller. It contains all the software to drive a buzzer and a 2-digit 7-segment LED display. As an example of its flexibility, it could be programmed to start at 60 seconds, beep every eight seconds and then give a different beep

for the last four seconds and then restart again. It can all be done with the two programming switches, A and B.

The power supply for the circuit is based on the LM2936 which is an ultra-low quiescent current 5V regulator. It works in essentially the same way as a conventional 3-terminal regulator but it draws less current and has a lower dropout voltage. Since the total current drain of the circuit is so low, there is no hardware off/on switch. The current drain of the circuit is around 25µA when the K1 is in STOP mode and around 19mA when

running. The off/on switch is in the software.

Four port lines from the microcontroller drive IC2, a 4511 BCD to 7-segment decoder. Two additional ports drive transistors Q1 and Q2 to provide the multiplexed 2-digit display.

The buzzer is driven by Q3 which is controlled by port PB0.

The processor runs at 262kHz as set by the components at pins 2, 15 and 16. Thus, the time counts in nominal 1-second steps. If more accuracy was required, a crystal could be connected between pin 15 and 16 and then appropriate changes would be required to the software.

A complete kit for this timer including the PC board, K1 programmed microcontroller and a floppy disc with software, is available from Alpine Technologies, PO Box 934, Mt Waverley, Vic 3149. The cost is $37.25, including postage and packing.