

14 Bit BCD to 4 digit 7 segment LED driver

This little circuit will convert a 14 bit binary code, and display the result over 4 x 7 segment LED's. It has been handy for monitoring address or data lines whilst single clocking.

At the heart of the circuit is a 27C040 or 27C4001 (4 Mb) EPROM. The idea behind it is that the code is sent into the first 14 address lines of the EPROM, and the drive signals for each display is sent into the last 4 address inputs. The first 4 data output D0, D1, D3 and D4 from the EPROM, drive the 4511 (7 segment decoder).

The digit drive signals are derived from a 4022 (1 of 8 counter), its clock fed from a 4047 (configured as an oscillator. A reset to the counter is taken from Q4 (output 4), so that the counter continually counts 0-1-2-3-0-1-2-3...and so on.

The digits are then driven by a ULN2003 (7 channel driver). To do this conversion with separate logic elements would be quite complicated, and to do it with 74185's would take 10 x 74185's, 4 x 7447's, (or CD4511's) a complicated PCB and quite a bit of power (about 600mA or so) without the displays. (Sorry you TTL guys!!!).

The programming of the EPROM was quite complex because the blocks of data for each display are stored at so many different locations within the EPROM. The only way I could think of programming it, was to write the software into a PIC16F877 to simulate the selection of the digits, count through the addresses and apply the program pulses at each step.

The software was written in about 2 hours. The EPROM code here is a standard Motorola S2F file. Most programmers should accept this format.

I used an ART, EPP2 to copy the program from the EPROM one the PIC had done the first one.

I hope that all my hard work will be of use to some of you, but please I ask that you do not use this for financial gain, or reproduce it for commercial reasons.

Happy counting...

Daniel.