

A technique for display applications

In conventional displays associated with microcomputer based systems, binary data is either converted to BCD format and input to 7-segment converter chips, or it is directly converted to 7-segment format. In the former case, 16 lines will be used for a 4 digit number, whilst in the latter case, 28 lines will be used. In both cases, the number of lines used is large and frees the port lines available for other tasks. Oswald and Dessai (1981, private communication) had circumvented the usage of a large number of parallel lines by utilising random logic to output pulses to a serial input — 7 segment output device. This has been extended in later work, briefly mentioned here, to the case of a microcomputer as well.

The circuit described in figure 1, replaces the numerous input lines and associated interface devices, or BCD to 7-segment devices by two lines from a microcomputer to a single CMOS Counter/Display Driver. This allows the remaining output lines to be used for other system applications.

The circuit of figure 1 represents a typical display system in a data acquisition and display configuration. The processed data is temporarily stored in RAM locations, and counted down to output the data via a single line as shown in figure 2. The assembly language program for the flowchart of figure 2 was developed as a sub-routine. The display time could be set by appropriate delay routines.

It is seen that this implementation is simpler than conventional binary to BCD, or binary to 7-segment conversion and requires a smaller software overhead. Voltage pulses equal to the binary value of the data are transmitted serially to the Display/Driver Component. Each pulse is generated by taking the port line from low

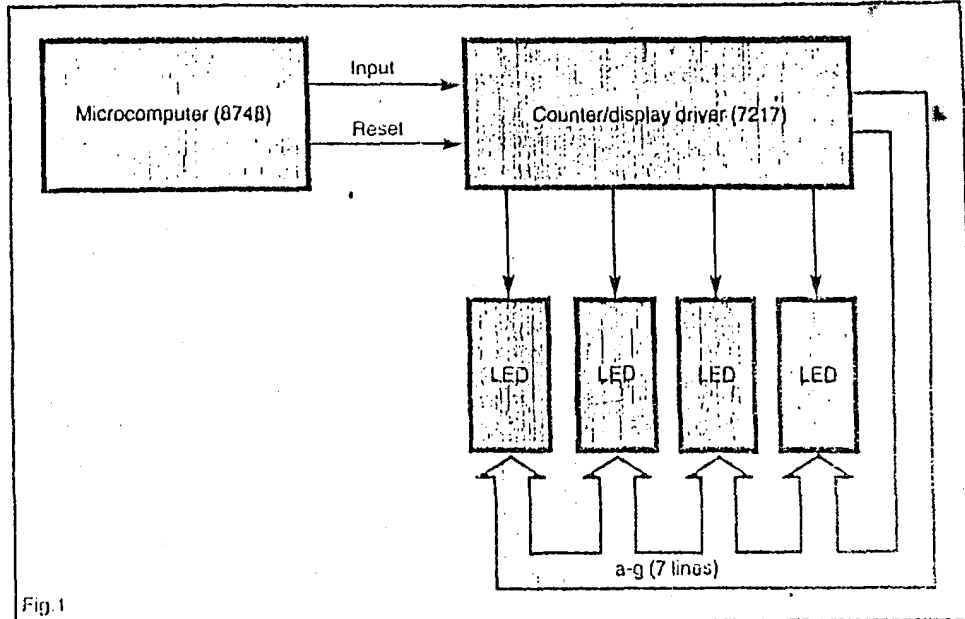


Fig. 1

to high. As this is rapidly executed the user only sees the last count displayed. If the number to be displayed is zero, the binary equivalent of 10,000 (for a four digit display) is transmitted. This results in a displayed value of 0000. (When a low frequency crystal is used for the microcomputer, a 'glow' may be observed during count-up prior to final display. This glow can be suppressed by inhibiting the display until the last count. (Datel Intersil Instruments and Systems Handbook.))

This technique is a useful departure from the conventional methods used for display, and has been successfully used in a Direct Reading Current Meter based on Intel's 8748. The availability of BCD outputs from the 7217 is an additional advantage when a printer is to be interfaced with the system. If data greater than 9999 is to be displayed or printed, another 7217 may be cascaded to the first counter. Similarly, more than one display can be activated by running 7217's in parallel.

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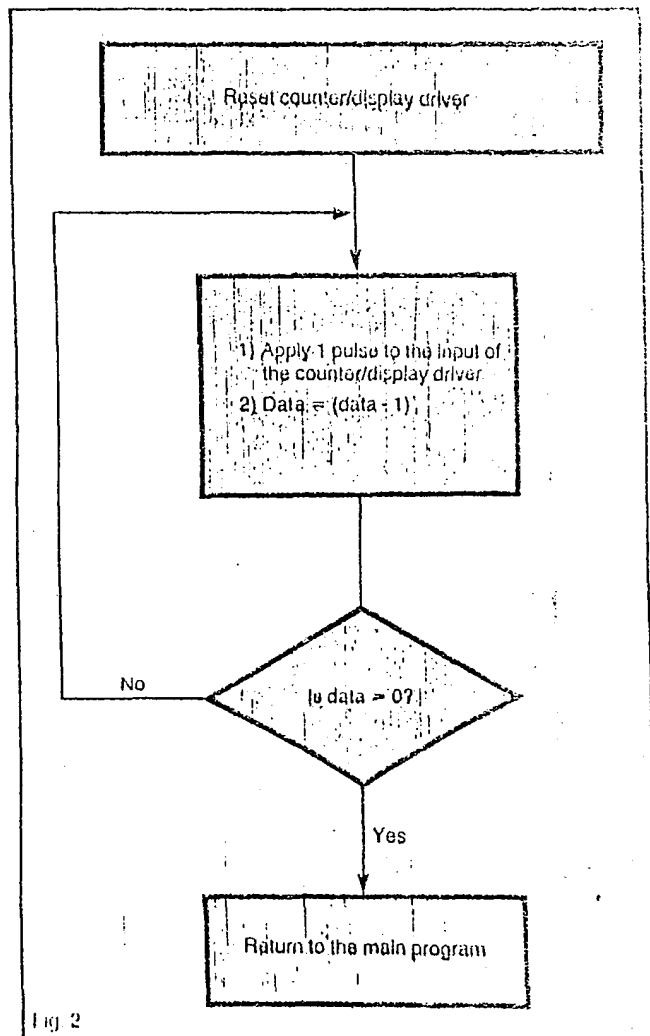


Fig. 2