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A Digital Pulse and Frequency Counter With Stopwatch

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A DIGITAL PULSE AND FREQUENCY
COUNTER WITH STOPWATCH

by
Steven J. Beck

Submitted to the Electrical Technology
Department at Purdue University at Fort Wayne
on April 22, 1977

ABSTRACT

The "Digital Pulse and Frequency Counter with Stopwatch" has three separate functions. It can count pulses of nearly any shape which occur at a rate of up to 10 MHz. This function is desirable for a wide range of scientific applications. The instrument can count frequencies up to 10 MHz by enabling the pulse counter for exactly 1 second and then holding for another second for a display period before resetting the counter. By changing the counter enable and display periods to 10 seconds, frequencies down to about 0.2 Hz can be measured. A range selector tells to multiply the display number by 10^{-1} , 10^0 , 10^1 , 10^2 or 10^3 . By adding one additional component the pulse and frequency counter was made to be a 0.1 to 999.9 second stopwatch which uses the same two reset and clock enable switches that control the pulse counter.

All IC components are COS/MOS which were selected because of their noise immunity. Accuracy of the instrument is determined by a crystal controlled oscillator which is used to time the sampling period of the frequency counter and to time the stopwatch. Accuracy for this instrument is ± 1 of the least significant digit on the display. The four digit display consists of four seven segment light emitting diodes.

This project was designed to incorporate three important functions on one instrument at a fraction of the cost of commercial units.

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