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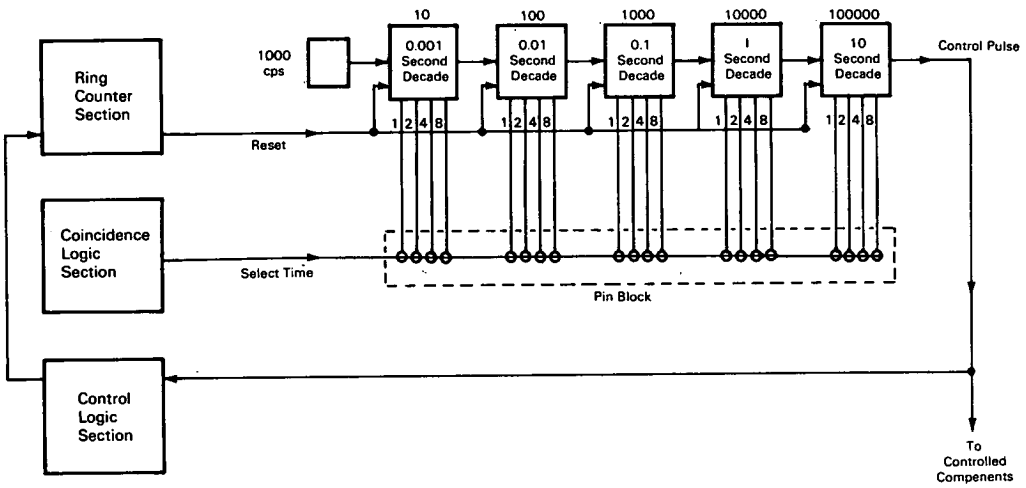
Brief 65-10399

NASA TECH BRIEF

Binary Counter Accumulates Time by Complementary Preset



The problem: To reduce the number of logic elements required to furnish electrical control functions for automatic sequential selection, rate, and operating period for any one or all of a given set of components. Previous methods have involved decade counters, coincident comparators, summing circuits, and *AND* gates to develop a control pulse.

The solution: A binary counter that is automatically preset to the complement of the desired time increment in milliseconds. An output pulse is produced each time the counter reaches its capacity.

How it's done: The basic unit consists of five standard decade counters connected in series. It is driven by a 1000 cps signal and is graduated in decade increments of 0.001, 0.01, 0.1, 1.0, and 10 seconds so that its accumulated counting capacity is 100 seconds or 100,000 milliseconds. A preset time input, consisting of the complement of the desired time increment in milliseconds, is generated by the coincidence logic section and fed to the counters via the pin board. Thus, if the desired time interval is 11 milliseconds, the counter would be preset to 99,989. When the counter counts to 100,000, the output from the final decade, a control pulse, is fed simultaneously to the control logic section and to the controlled components. The control logic section advances the ring counter to reset all decade counters to zero in preparation for the next preset time from the coincidence logic section. The control pulse to a controlled component closes a relay, snaps a solenoid, or performs other desired functions timed as to sequential selection, rate, and period as dictated by the coincidence logic input.

Notes:

1. This innovation should be useful in the operation of automated systems where a sequence of events must take place at different rates and for different time increments.

(continued overleaf)

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
P.O. Box 1537
Houston, Texas, 77001
Reference: B65-10399

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: Guy E. Marriner of
North American Aviation, Inc.,
under contract to
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