

Stepper resolves motor's angular position to 0.1°

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One-chip digital comparators and counters simplify the design of this controller, which resolves the position of a stepping motor to 0.1°. Using complementary-MOS circuitry, the unit is low in cost and power consumption is minimal.

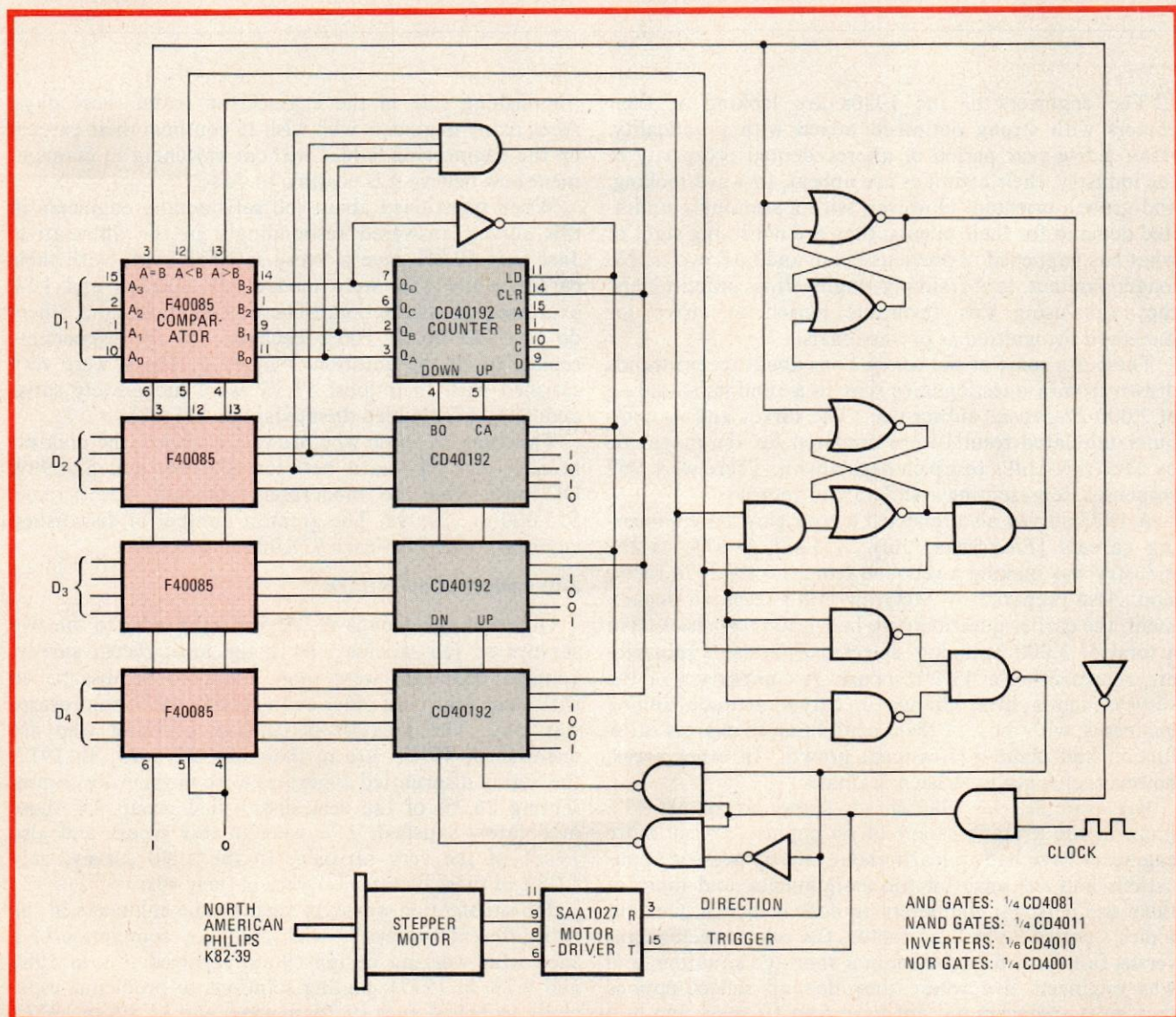
The set of four binary-coded decimal numbers, D_1 to D_4 , introduced to the cascaded 40085 4-bit comparators, are the command signals that order the motor to the desired bearing expressed in hundreds, tens, units, or tenths of a degree, respectively. The range of the input set is thus 0000 to 3600. With the aid of the comparators

and sequential logic, the 40192 up/down counters track the position of the stepper at every instant, updating its count and thus rotating the motor until its contents match the setting of D_1 - D_4 .

As can be seen, the sequential logic circuitry determines the direction of rotation of the stepper and counter by monitoring the $A = B$, $A > B$, and $A < B$ outputs of the output comparator. The logic is designed to rotate the stepper from its current position to the desired position in the minimum number of steps. Thus, if the motor's present position is at 5° and the intended position is 300°, the stepper will automatically be rotated in a counterclockwise direction.

The circuit can be easily modified for applications where the input data is available for only a very short time. In such cases, it is only necessary to add input latches to capture the data. □

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Move a bit. Stepping motor is rotated into desired position with comparators and sequential logic that minimizes the difference between the 4-bit command set D_1 - D_4 , and the output of the up/down position-tracking counter. Angular position is resolved to 0.1°.