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1-IC design monitors ajar doors

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If someone in your family has the habit of not completely closing a drawer—or perhaps the food freezer's door—you'll appreciate this design. It senses an ajar door and, if the situation isn't corrected within 20 sec, sounds a beeping alarm.

The circuit, shown in **Figure 1**, is controlled by a magnetic reed switch that mounts within the cabinet (food freezer in this case) and the magnet on the door. So long as the door remains closed, the switch is closed and the alarm is disarmed.

Opening the door in turn opens the switch, and C_1 starts charging up through R_1. Approximately 20 sec later—the delay allows for authorized usage—the voltage at pin 9 is high enough to turn on the oscillator formed from C, D, R_2, R_3, and C_2. This oscillator, operating at approximately 1 Hz and a 50% duty cycle, in turn pulses the piezoelectric transducer's 3-kHz oscillator.

Closing the door allows C_1 to discharge through R_6, an action that disables the low-frequency oscillator and, therefore, the transducer's oscillator. You can override the alarm via S_1 when the door must remain open.

Editor's Note: You might want to consider using other values for R_1 and C_1. The values shown for R_1 and R_6 result in a continuous 27-µA battery load when the door switch is closed. This drain is approximately 10 times greater than what the rest of the circuit consumes in standby. Changing R_1 to, say, 66 MΩ (3×22 MΩ) and C_1 to a 1-µF Mylar capacitor preserves the 20-sec delay and reduces the resistor's loading to approximately 0.1 µA. Additionally, by using the 1-µF Mylar unit rather than a 60-µF capacitor, you considerably reduce the possibility of the 60-µF device's leakage current adversely affecting the timing. EDN

IF YOU DON'T CLOSE A DOOR THAT'S POLICED BY THIS CIRCUIT, YOU'LL HEAR ABOUT IT 20 SEC LATER. YOU CAN OVERRIDE THE ALARM WHEN THE DOOR MUST REMAIN OPEN.

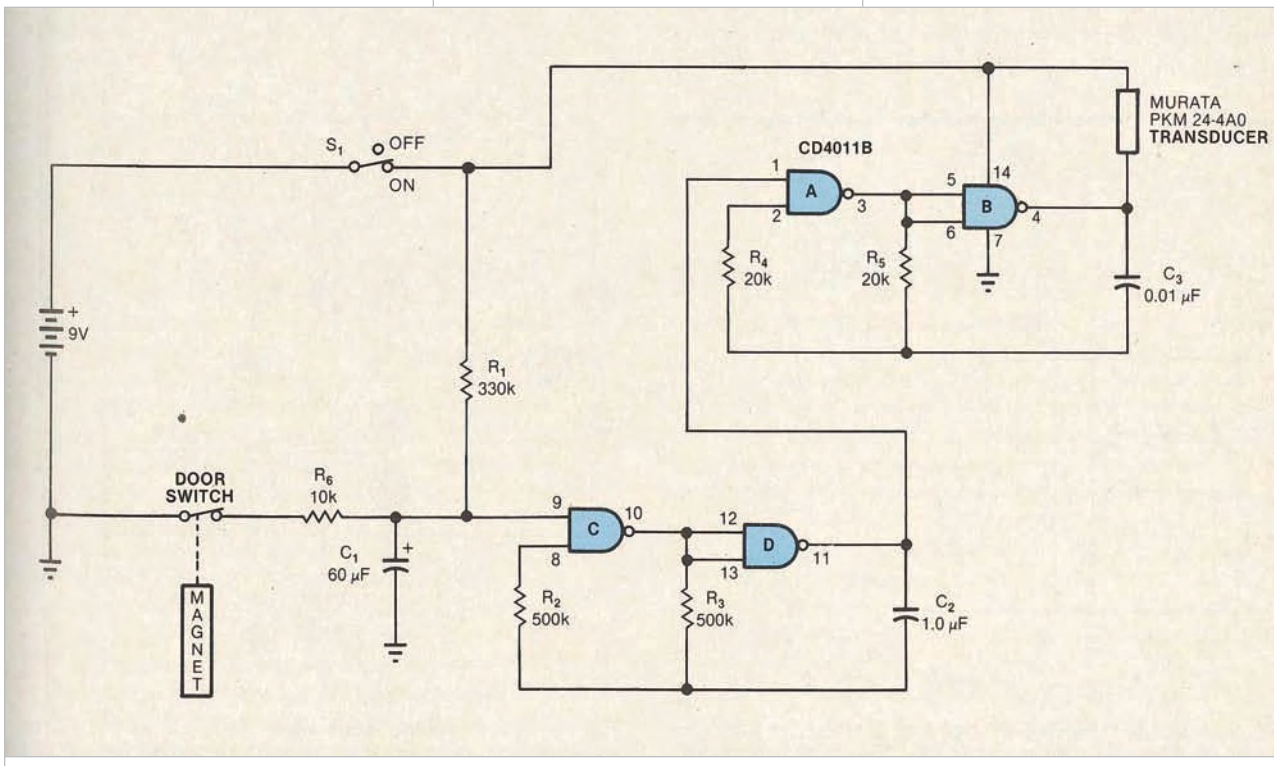

Figure 1 If the door and its switch are open, the low-frequency oscillator (C and D) pulses the transducer's 3-kHz driver ON and OFF.