Watchdog-reset catcher aids embedded-system debugging

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A simple "junk-box" circuit uses a 4013 CMOS flip-flop and a handful of passive components to determine whether random resets are the result of a blown stack or the result of the watchdog-reset circuit tripping (**Figure 1**). You can also use this circuit to "grab" and hold other logic level edges like memory or I/O accesses.

A logic-level rising edge at the clock input (Pin 3) of the 4013 clocks the flip-flop. Because the circuit holds the data input (Pin 5) high, the Q output (Pin 1) goes

high, which turns on the LED. Once the LED is on, the circuit ignores any further changes at the input.

R_1 and C_1 are the power-up reset for the flip-flop. At power-up, C_1 discharges, which holds the reset input (Pin 4) of the 4013 high, clears the Q output of the 4013, and turns off the LED. C_1 charges up to the supply voltage through R_1, taking the R input (Pin 4) low to deassert the 4013 reset time. D_1 discharges C_1 quickly on power-down. S_1 is an optional reset switch. C_2 is a power-supply bypass capacitor. Don't forget to ground all unused inputs on the 4013. To reset the circuit, either momentarily close S_1 or temporarily disconnect power.

You can solder all the parts onto a BNC, which makes it easy to connect a scope probe directly to the watchdog-reset catcher. You can use a clip lead for the power line and easily steal power from the device under test. You can then connect the output of the embedded system's watchdog-reset circuit through the scope probe to the clock input of the 4013.

None of the part values are critical, and many types of flip-flops can substitute for the 4013. A faster flip-flop may be necessary to watch fast signals. Adding an inverter to the input would allow you to catch falling edges, such as active-low reset signals. (DI #2293)

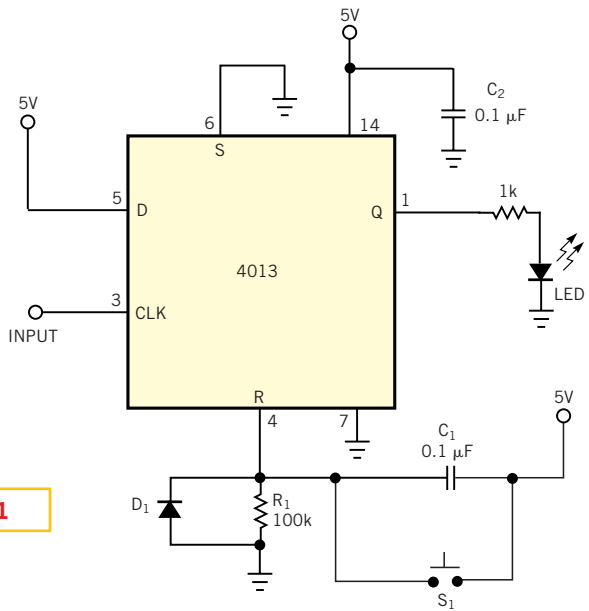

Figure 1

NOTES:
LED=HIGH-EFFICIENCY RED LED.
D_1=IN4001 OR ANY OTHER SMALL-SIGNAL DIODE.
S_1=OPTIONAL MOMENTARY PUSHBUTTON SWITCH.
TIE UNUSED INPUTS TO GROUND.

A 4013 CMOS flip-flop and a handful of passive components monitor the activity of an embedded system's watchdog reset.

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