

Keywords: watchdog timers, latched watchdog timers, microprocessor supervisors

APPLICATION NOTE 4558

Simple Latching Watchdog Timer

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Jan 05, 2011

Abstract: Based on a μ P-supervisor/watchdog IC (MAX6749), this circuit provides a latched failure indication in response to a loss of the input pulse stream. The circuit can monitor a fan (based on the fan's tachometer output), an oscillator, or the software execution of a microprocessor.

A similar version of this article appeared in the April 2007 issue of *Power Electronics Technology* magazine.

Most watchdog-timer ICs produce a single, limited-duration output pulse when the watchdog timeout expires. That works fine for triggering resets or interrupts in a microprocessor, but some applications require the output (failure indicator) to latch. A simple circuit (**Figure 1**) provides a latched failure indication in response to a loss of the input pulse stream. Based on a μ P-supervisor/watchdog IC (**MAX6749**), this circuit is suitable for monitoring a fan (based on the fan's tachometer output), an oscillator, or the software execution of a microprocessor.

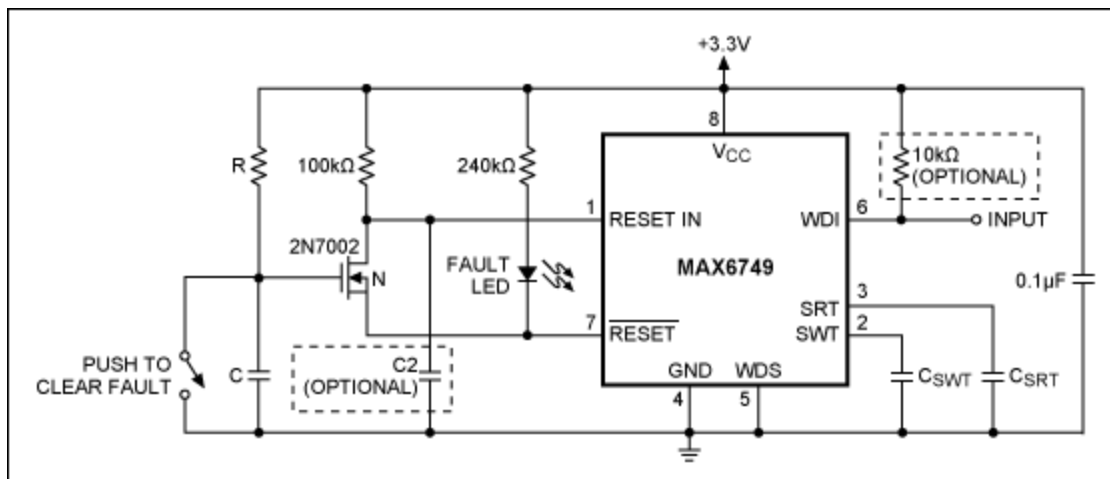


Figure 1. This circuit produces a latched failure indication in response to a loss of input pulses.

During power-up, active-low RESET remains low until V_{CC} stabilizes and the reset timeout delay expires. Capacitor C charges through R until the FET's gate voltage reaches its threshold (V_{TH}), which turns on the FET and enables the latching capability. To prevent false triggers, you should set the delay of RC much longer than the reset timeout.

The WDI input (pin 6) must toggle at a minimum rate set by the capacitor C_{SWT} . If that fails to happen, active-low RESET goes low, turns on the LED, and pulls the RESET IN connection low, thereby latching active-low RESET. The circuit remains in this condition until you cycle V_{CC} or push the switch. Either action turns off the FET and allows RESET IN to go high.

To monitor the open-drain tachometer signal of a fan, connect a 10k Ω pullup resistor from WDI to V_{CC} (pin 8), and connect WDI to the fan's tachometer output. Because the fan requires some time to spin up, the watchdog circuit needs to be deactivated for a short delay interval. You can create this delay by placing a capacitor (C2) from RESET IN to ground. Notice that this delay must be shorter than the RC delay mentioned above, or active-low RESET will latch prematurely.

For a fan monitor, the value of C_{SWT} sets the maximum tachometer pulse period according to the formula $t_{WD} = 5.06 \times 106 \times C_{SWT}$, where t_{WD} is in seconds and C_{SWT} is in farads. If the fan speed drops below this threshold, the active-low RESET output asserts low and latches.

Related Parts

MAX6749

μ P Reset Circuits with Capacitor-Adjustable Reset/Watchdog Timeout Delay

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