Keywords: smoke detectors, remote output, comparators, battery operation

APPLICATION NOTE 4403

Provide Remote Alarm for Smoke Detector

By: Kevin Bilke, Applications Engineer
Jun 03, 2009

Abstract: The application note presents a simple circuit that senses a supply-current increase triggered by activation of a smoke detector's internal alarm. The circuit then sends a remote output to the main dwelling or central security system so an alarm can sound. The MAX921 comparator is featured in the design.

This design idea appeared on the Planet Analog website on May 15, 2006.

Ionization-based smoke detectors are inexpensive and efficient, so they are often installed in the garage, other outbuildings, and the house. Locations separate from a house need to transmit the alarm signals back into the house or central home-security system.

The circuit of **Figure 1** provides a remote output for smoke detectors by sensing the supply-current increase associated with activation of the detector's internal sounder. Typical current values are 50µA during monitor mode, and greater than 3mA when the sounder is active. The circuit is powered by the smoke detector's battery, which has minimal impact on the detector itself.

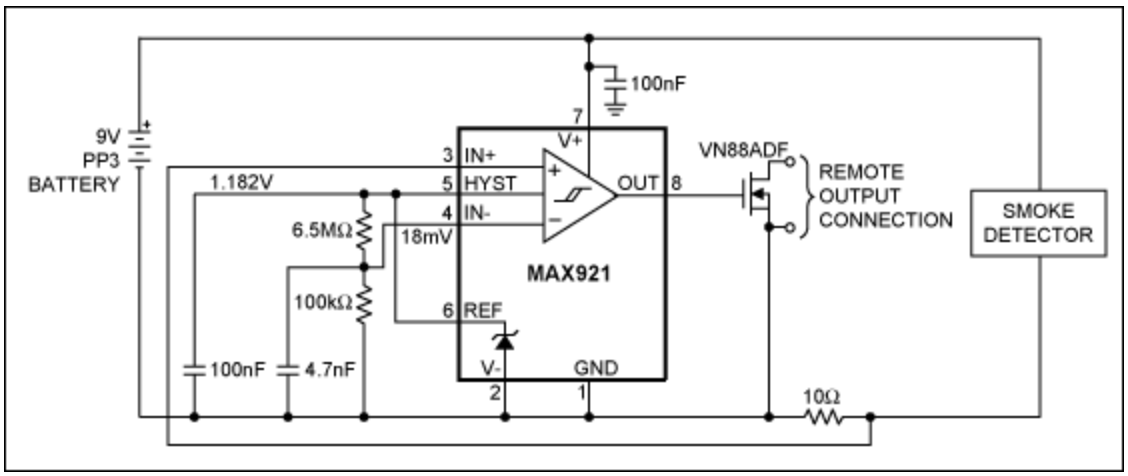

Figure 1. By sensing an increase in battery current when the smoke detector's sounder activates, this circuit produces an open-drain remote output for the detector.

The MAX921 comparator shown is chosen for its wide supply-voltage range, low supply current, and internal voltage reference. Typical devices draw less than 3µA of quiescent supply current. The circuit output is an open-drain FET that can drive the home-security system or trigger an RF module that

communicates back to the residence. The FET is a robust power device (VN88ADF) that supports continuous load currents greater than 1A. The complete circuit draws about 3.1µA.

Voltage across the sense resistor is greater than 30mV when the alarm is active, so the circuit trip point is set at 18mV. Because the threshold between active and inactive operation is so great, the hysteresis pin is connected for minimum hysteresis in the comparator. The capacitors prevent false triggers by reducing noise and the sensitivity to RF noise. (The 4.7nF capacitor at the 18mV trip point should have a low-leakage dielectric such as polyester.)

If the smoke detector connects to the home security system, note that a nearly discharged battery, which intermittently activates the sounder, will also activate the remote output.

Related Parts		
MAX921	Ultra Low-Power, Single/Dual-Supply Comparators	Free Samples

More Information
For Technical Support: http://www.maximintegrated.com/support
For Samples: http://www.maximintegrated.com/samples
Other Questions and Comments: http://www.maximintegrated.com/contact

Application Note 4403: http://www.maximintegrated.com/an4403
APPLICATION NOTE 4403, AN4403, AN 4403, APP4403, Appnote4403, Appnote 4403