Dropout alarm frees engineers' time

Monitor a voltage and get an audible alarm when the voltage drops.

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When testing a power supply or running a thermal test on a component or system, you often need to monitor a voltage and take action should that voltage drop below a specified level. If all you have is a basic handheld DMM (digital multimeter) to measure the voltage and your meter doesn't have a digital output, you can build a circuit that monitors a test voltage and triggers an audible alarm if the voltage dips too low or shuts off. The circuit keeps the buzzer on until you reset the circuit with a pushbutton, even if the test voltage recovers.

The circuit in **Figure 1** uses an LM393 comparator with a 2.5-V programmable voltage reference (TL431) on the noninverting input (pin 3). The LM393 compares a reference voltage (V_{REF}) to the output of a power supply divided through potentiometer R1 and resistor R5. R1 lets you adjust the voltage from the DUT (device under test). If the test voltage drops below the reference voltage, the comparator's output goes from low to high, which triggers the 2N5060 SCR (silicon-controlled rectifier). The SCR will then conduct, sounding the buzzer, and will keep the buzzer on until you press the momentary pushbutton switch. Resistor R6 is in parallel with the buzzer, which guarantees that the latching current through the SCR keeps the buzzer on even if the comparator's output resets and goes low. **Figure 2** shows the circuit's operation as a function of time.

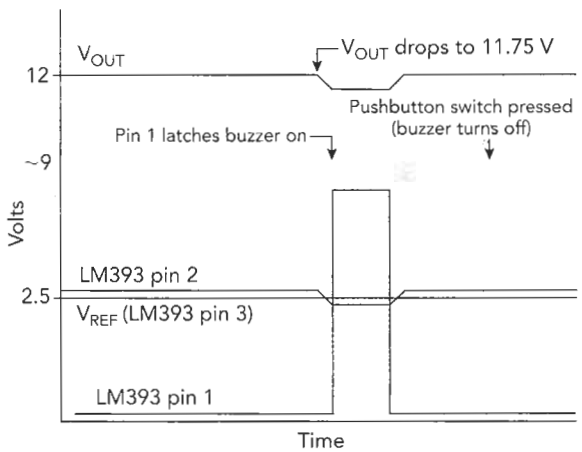

Figure 2 The SCR continues to conduct until the pushbutton switch is pressed, which turns the buzzer off.

You can operate the circuit from a 9-V battery or from an external power source. Once the DUT is running, use the DMM to measure the voltage across R5 until it reaches the desired level above V_{REF}. You can then connect the DMM in parallel with the test voltage to get a visual display. If the test voltage drops below the reference voltage, the alarm will sound. T&MW

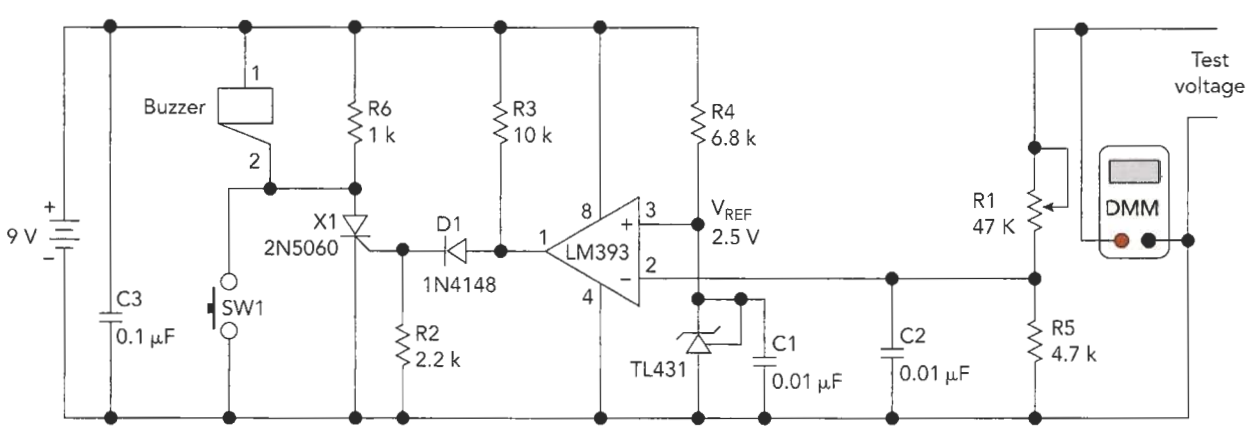

Figure 1 An LM393 comparator triggers the 2N5060 SCR, which turns on a buzzer when the test voltage drops too low.