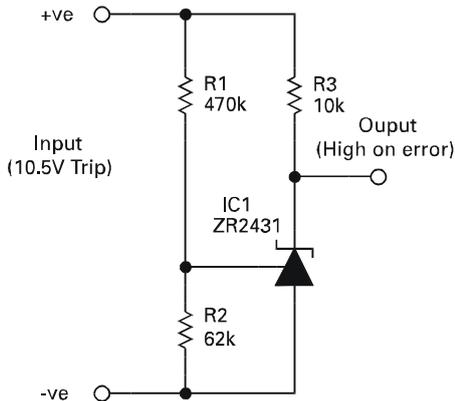


## The ZR2431 Programmable Supply Monitor

Whilst there are many fixed voltage supply monitors available in the marketplace, user programmable types are rare and generally expensive. The low reference and operating voltage of the ZR2431 allows the device to be used in this role for many applications with the minimum of external components. The circuit shown in Figure 1 demonstrates how the ZR2431 may be used. This circuit was designed to provide a low-supply warning flag for a system powered from a 15V battery.



**Figure 1**  
ZR2431 configured as a supply monitor.

Resistors R1 and R2 apply a set fraction of the input supply to the reference pin of the ZR2431. While the supply is above the intended trip voltage (10.5V for the values of R1 and R2 shown), the IC switches on and pulls the output shown down to a voltage of around 0.9V. If the input drops below the trip level, the ZR2431 will turn off, passing only a small quiescent current, allowing resistor R3 to pull the output of the circuit high. The circuit can be modified to trip at any voltage in the range of 1.5 to 15V by adjusting the value of R1. The trip voltage is given by:-

$$V_{\text{trip}} = V_{\text{ref}} \frac{(R1 \cdot R2)}{R2}$$

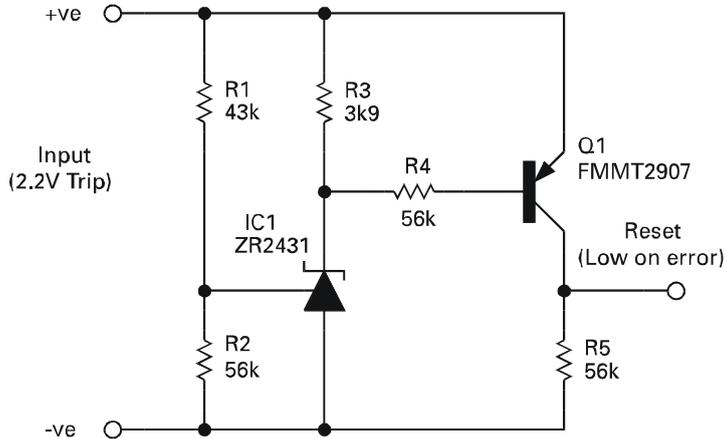
Where  $V_{\text{ref}}$  is the reference voltage of the ZR2431.

The ZR2431 is ideal for this circuit in a number of respects. Its reference input current is very low, typically only 100nA, allowing high values to be used for R1 and R2. Its quiescent current is also low, typically only 50uA, allowing R3 to be large too. These factors minimise the power drain put on the supply by the reset circuit. Also, the low reference voltage of the ZR2431 ensures that the output of the circuit swings within 1V of either supply rail.

If a low-on-error output is required or if it is essential that the output swings rail-to-rail, the circuit shown in Fig.2 may be used.

Here, transistor Q1 has been added to invert the phase of the output. A useful side-effect of this is that the output now

swings from rail-to-rail which can be advantageous if the supply monitor is to drive directly the base of a grounded emitter bipolar transistor or a similar low threshold input circuit.



**Figure 2**  
**Supply monitor configuration for reset low.**