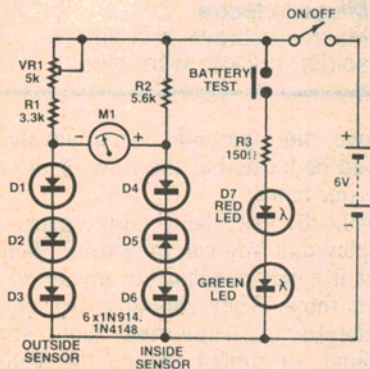


Temperature comparator

This temperature meter displays the difference between two temperature readings. For example, it can show



whether the temperature inside is warmer or cooler than outside.

Circuit operation is based on the change in voltage across a silicon diode by about -2.3mV per degree Celsius. Three diodes are used in series for each of the two sensors to provide about a 7mV change for every degree Celsius.

Meter M1 is a centre zero type with a sensitivity of $\pm 100\mu\text{A}$. A full scale reading to the right indicates that the temperature is about nine degrees Celsius warmer inside than out. Conversely, a full scale reading to the left on the meter indicates that the temperature is about nine degrees Celsius colder inside than out.

The battery test switch lights the green LED when the battery voltage is greater than about 4V. The red LED (D6) is only used to provide a 2V drop.

The unit is calibrated with both sen-

sors at the same temperature. Adjust VR1 to give a zero reading on the meter.

To provide weatherproofing, the outside sensor diodes can be sealed inside a small tube with long connecting leads.

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\$15

Low current power amplifier

The LM386 is a versatile IC amplifier which can operate at between 5 and 12V and provide typically 325mW into an 8-ohm loudspeaker with a 6V supply. Quiescent current is typically 4mA with the same supply voltage which makes it ideal for battery operation.

A volume control is provided at the

non-inverting input using a $10\text{k}\Omega$ logarithmic potentiometer. Power supply decoupling for the IC is via the $100\mu\text{F}$ capacitor at pin 7 and at the $220\mu\text{F}$ capacitor at the supply input, pin 6.

A Zobel network consisting of the 10Ω resistor and $0.047\mu\text{F}$ capacitor at the output of the amplifier helps prevent high frequency oscillation. The loudspeaker is AC-coupled from the output using a $220\mu\text{F}$ capacitor.

Gain of the amplifier is 20 as it stands and can be increased to 200 if a $10\mu\text{F}$ electrolytic capacitor is connected between pins 1 and 8. In this case, the positive side of the capacitor connects to pin 1. To vary the gain between 20 and 200, connect a resistor of between $1\text{k}\Omega$ and $15\text{k}\Omega$ in series with the $10\mu\text{F}$ capacitor.

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\$20

