# Accelerometer output gives temperature info

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The adxl202 dual-axis micromachined accelerometer from Analog Devices (Norwood, MA) is appropriate for high-resolution applications. In these applications, you sometimes need to know the ambient temperature for control purposes or for circuit-drift compensation. The scheme in **Figure 1** offers a novel way to convey temperature information to the system µC without the need for an A/D converter or any additional I/O pins. The ADXL202 delivers two PWM signals that are proportional to the acceleration in its X and Y axes. Current in the $R_{SET}$ resistor sets the period of the PWM signals.

You can use a thermistor in series with or instead of the $R_{SET}$ resistor to vary the PWM period with temperature. However, because of the grossly nonlinear response of thermistors, the PWM period is also grossly nonlinear with temperature. In addition, the thermistor's poor sensitivity at high temperatures may be unacceptable. Although $R_{SET}$ normally connects to ground, you can connect it to any noise-free voltage source ranging from 0 to approximately 1.2V (at which voltage the internal current source runs out of compliance). By connecting $R_{SET}$ to the $V_{OUT}$ pin of a TMP36 temperature sensor, the PWM-period set current varies fairly linearly (within ±5°C) with temperature from –20 to +40°C. Therefore, the PWM period varies linearly with temperature. You can easily extract temperature information from the PWM signal, because you normally measure the period to determine duty cycle. (DI #2271).

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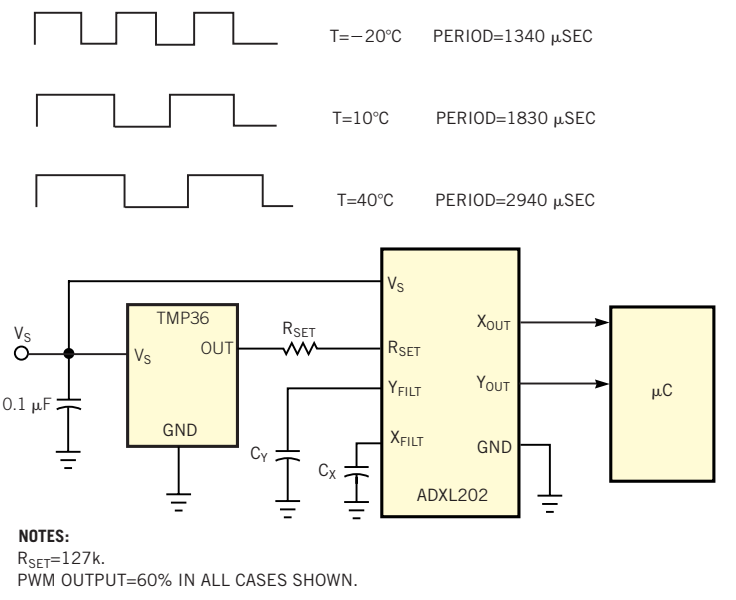


**Figure 1**

**An accelerometer can do double duty, by supplying both acceleration and temperature information.**