

# MAGNETIC SENSOR HYBRID APPLICATION CIRCUIT

AN-202

Honeywell's magnetic sensor hybrids, HMC2002/3, are sensitive to magnetic fields less than 100  $\mu$ gauss in a  $\pm 2$  gauss range. For the HMC2003, the output signals Xout, Yout, and Zout represent the three ordinal axis of the magnetic field being measured. These signals swing within 0 to 5 volts with a zero magnetic field output at 2.5V. These signals can be connected directly to an analog-to-digital (A/D) converter with the Vref output of the hybrid as the zero field reference voltage - Figure 1.

In order to achieve high resolution, the magnetic hybrid must first be "set" for maximum sensitivity. This can be achieved by using Honeywell's unique on-chip current strap to set/reset the permalloy film. This technique is also referred to as flipping the film magnetization and does not require external coils. Several methods for implementing a set/reset pulse circuit are described in application note AN-201.

Using a 12 bit A/D, the least significant bit will represent about 1 milligauss for a full scale range of  $\pm 2$  gauss. To attain more sensitivity, either use a higher resolution A/D converter (14 or 16 bits) or insert a gain stage between the hybrid and the 12 bit A/D. This will increase the sensitivity but will at the expense of full scale range. For example, applying a gain of 4 amplifier between Xout and AIN0 will result in a 250 microgauss sensitivity but yield only a  $\pm 0.5$  gauss full scale range.

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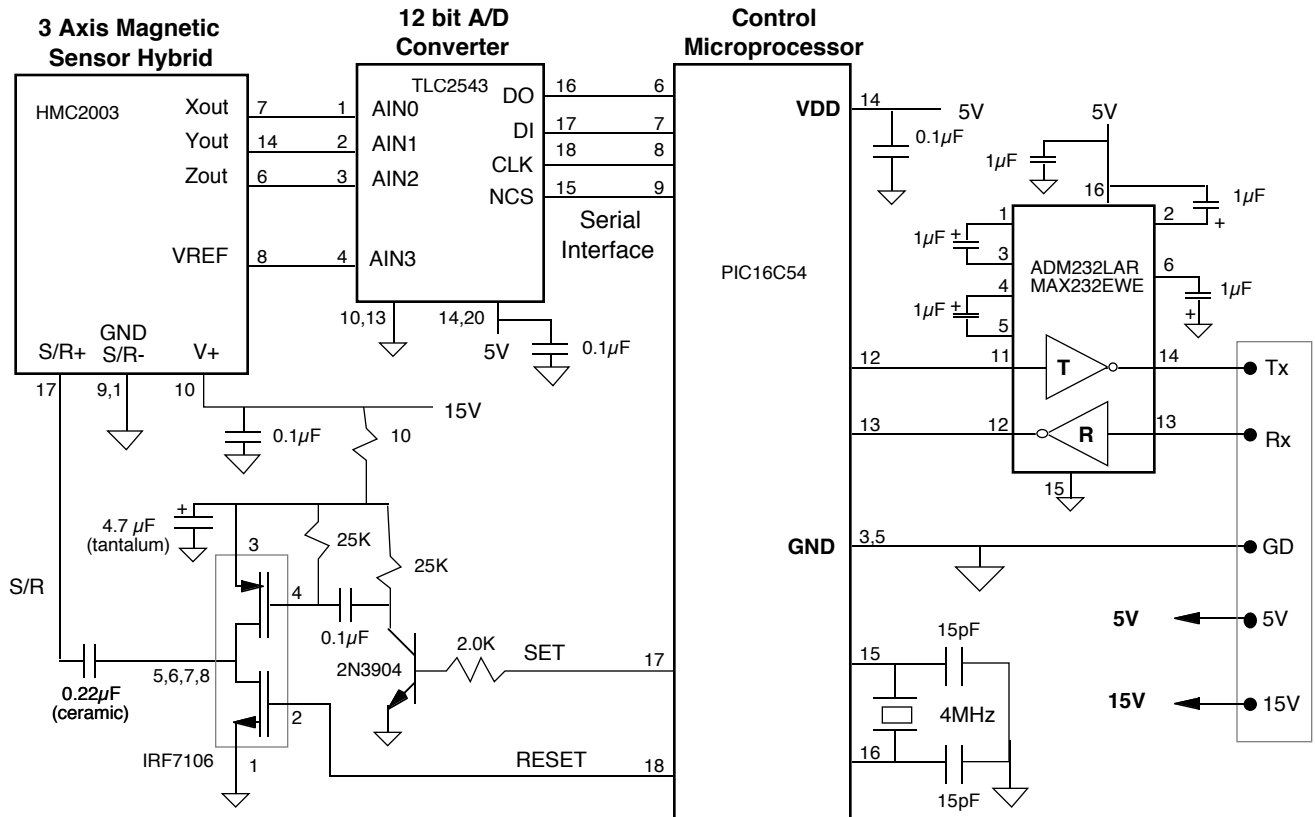


Figure 1 - Application Circuit Showing Hybrid External Connections