



## ADC CONSIDERATIONS FOR SENIS 3-AXIS TRANSDUCERS

### Selecting an ADC

With the multitude of Analog to Digital Converters (ADCs) on the market, one can become somewhat confused about which one is most suitable for data conversion and acquisition for use with Senis Transducers.

We offer here a brief summary of the features that are most important to consider when choosing an ADC for this task.

### Input type:

Differential or Single-Ended. Most ADCs offer the option of either input type, selected with jumpers, switches, or through software control. The Senis Hall Transducers are designed with a differential output, so you should choose an ADC with a differential input. If for some reason this is not possible, you may use a single-ended input device, but performance may be degraded depending upon how the transducer is connected.

### Resolution:

This is likely the most important item to consider when selecting an ADC. The resolution is the number of 'steps' that the ADC uses to achieve a 'full-scale' reading. For general use with the Senis transducers, a 16-bit ADC will suffice, but if you are using a low noise transducer, a 20-bit ADC is recommended.

### Scaling:

Many ADCs will offer input scaling. This feature allows the user to divide or multiply the input voltage to more closely match the full scale range of the ADC, effectively enhancing the measurement.

### Sample Rate:

This would be perhaps the second most important item to consider. The sample rate must be at least twice the frequency the you are measuring, but 5 times is much better. So if you are looking for frequencies of 120Hz, a sample rate of at least 240Hz will suffice, but a rate of 600Hz will provide better data.

### Channel Scan Rate:

Since we are dealing with a three axis transducer, we must use more than one channel. The channel scan rate is the maximum rate that the ADC can select a new channel and make a measurement. This is an important consideration, since many ADCs actually have a relatively slow scan rate (when compared to the sample rate.) To achieve a sample rate of 600Hz on three channels, you will need a channel scan rate of at least 1.8kHz.

Michael E. Duffy, October 2000