

Si-Flex™ Digital Seismometer  
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Applied MEMS developed a tri-axial digitally force balanced MEMS accelerometer for their parent company Input/Output, Inc. This sensor was originally developed for use in oil and gas exploration and is now being modified and packaged for use in other fields of seismology such as mining, earthquake, and the study of volcanoes. The technology for this sensor is new in that the sensor is embedded in a 5<sup>th</sup> order sigma-delta 24 bit converter. The over-sampled 128 kHz bitstream output, before decimation, is used to generate the  $\pm 1$  bit feedback force. The output of the converter is then decimated and the user will be able to select sample rates from 0.5 to 2000 samples per second. The DC coupled sensors operate in all orientations, have a full scale of  $\pm 200$  mg, a noise floor from 5 Hz to 400 Hz is  $40 \text{ ng}/\sqrt{\text{Hz}}$  ( $1.5 \times 10^{-15} \text{ m}^2 \text{ s}^{-4}/\text{Hz}$ ) and report the gravity vector of each sensor to  $\pm 0.3\%$  accuracy. The completed unit will be approximately 50 mm in diameter and 150 mm long. The module is expected to be ready for users to integrate into their data acquisition systems in the second half of 2004.