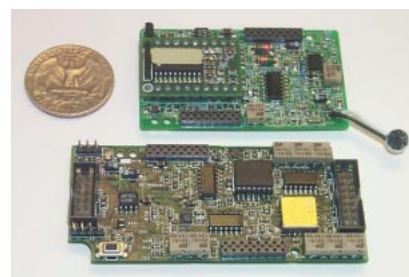


Tanner Labs Modular Sensor Assembly



Architecture Overview

The Tanner Labs Embeddable, Wearable Sensor Assembly incorporates state-of-the-art interface circuits and sensor technology. Each modular assembly is comprised of up to three boards. The base sensor board features 16 channels of 12-bit A/D data conversion and one channel of audio quality A/D conversion, plus 3-axis sensors for acceleration. Optional boards provide 3-axis sensors for rotation and magnetism as well as a microphone for audio applications. Inputs are available to support up to 5 resistive sensors for position measurement. The sensor assembly is tightly integrated with the Tanner Labs wearable DSP module.

Data Conversion Subsystem

Data conversion includes both signal conditioning and A/D conversion. Signal conditioning permits the use of a wide variety of sensor technologies with a standard A/D converter. Different conditioning circuits are provided for the accelerometers, rotation sensors, magnetic sensors, and resistive sensors.

I/O Subsystem

I/O control logic is provided to support a high-speed SPI™ interface with the Tanner Labs DSP module.

Digital Signal Processing

The Tanner Labs DSP module provides the computational capabilities needed to implement advanced signal processing algorithms such as speech and gesture recognition, tele-robotic control, and acoustic and vibration analysis.

Software Development

Tanner Labs provides several applications that use the DSP and selected sensors. These applications include an advanced gesture recognizer and a target locator. “C” language routines are provided to those users wanting to development of custom applications. These user-level routines support the acquisition of data from the sensor module as well as general health and diagnostic needs.

Board Support Libraries

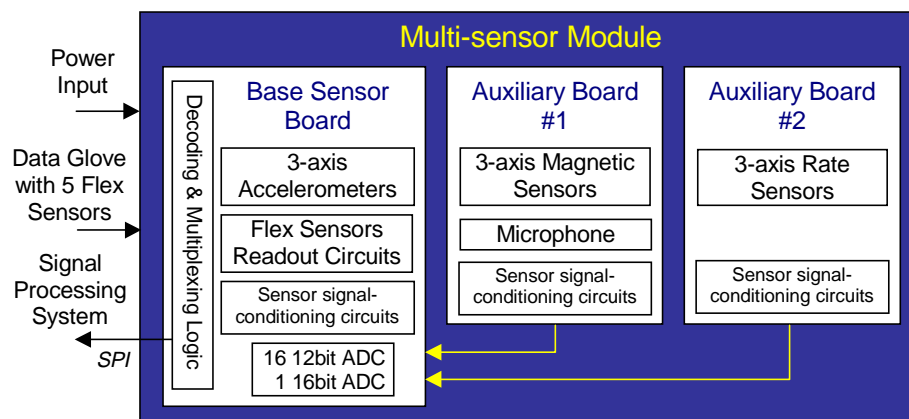
Tanner Research provides the low-level board support libraries for the DSP module that are needed to use the SPI™ interface to the sensor assembly.

Host Interface

Tanner Labs provides the PC-based software and libraries used for host-DSP communications including application and data download and upload.

Specifications

- **A/D Conversion**
 - ✓ 16 channels with 12 bit resolution and up to 200 KSPS maximum throughput.
 - ✓ 1 channel with 16 bit resolution and up to 100 KSPS.
- **Acceleration sensors**
 - ✓ $\pm 2g$ range
 - ✓ 5 mg resolution
- **Rotation sensors**
 - ✓ 1.1 mV/Deg/Sec sensitivity
 - ✓ 0.15 Deg/Sec resolution
- **Magnetic sensors**
 - ✓ 40 μ Gauss sensitivity
- **Audio sensor**
 - ✓ Miniature electret microphone
- **Resistive sensors**
 - ✓ Support for up to 5 external resistive sensors is included.
- **I/O interface:** 1 SPI™ port
- **Power:** 7 to 12 V DC
- **Technology Roadmap**
 - ✓ Miniaturization – integrated sensors
 - ✓ Power reduction
 - ✓ RF Wireless Interface



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