

## IMU601

### Six Degree-of-Freedom Inertial Measurement Unit Preliminary Specifications

Rev. P-A

Sentera Technology Corporation

The IMU601 is a 6 degree-of-freedom inertial measurement unit in a 40-pin DIP hybrid package. It uses the low-noise MEMS accelerometers to sense accelerations in the x, y and z axes, and three MEMS rate gyros to measure the rate of rotation around the x, y and z axes. A low power microprocessor digitally filters the sensor data and compensates for the offset, scale factor, cross-axis sensitivity and misalignment of each sensing axis.

#### Applications

- Platform stabilization
- Motion Control Systems
- Human motion measurement
- Attitude Reference Systems
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#### Features

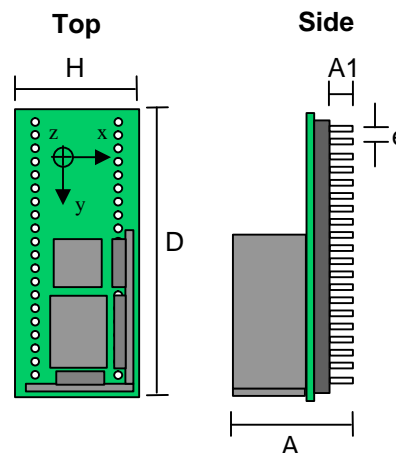
- **Small and Lightweight Package**  
DIP-40 hybrid package allows easy insertion into system-level boards without the need for additional connectors. Weighs less than 20 grams.
- **MEMS Technology**  
Offers fast response at very low power.
- **Fully Compensated Outputs**  
Factory calibrated for offset, scale factor, cross-axis sensitivity and misalignment of each accelerometer and gyro axis. Temperature compensated for improved bias stability.
- **Digital Outputs**  
UART and SPI outputs for easy interfacing with system processor or peripherals.
- **Analog Supply Voltage Regulation**  
Works with unregulated voltage supply between 6V to 10V.
- **User-Configurable FIR Filters**  
Customize the bandwidth of the accelerometers by configuring the FIR filters.
- **Power Cycling Mode Support**  
Supports power cycling of sensors.

#### General Description

Sentera's IMU601 uses low-noise MEMS accelerometers and MEMS rate gyros. The IMU601's triad of accelerometers measure accelerations in the range of +/- 2g, and the triad of gyros measure rotational rates in the range of +/-150°/sec (300°/sec version available). With a high sampling rate of 1 KHz and user-configurable FIR filters, the IMU601's bandwidth can be easily customized to suit the requirements of the application.

Each IMU601 is individually factory calibrated to ensure accuracy over the entire operating temperature range. Accelerometer and gyro outputs are digitally compensated for offset, scale factor, cross-axis sensitivity and misalignments to the DIP hybrid package. The gyro outputs are also compensated for the effects of linear acceleration and vibration.

#### Package Drawing



Symbol	Millimeters	Inches
H	24.1	0.95
D	55.9	2.20
A	26.4	1.04
A1	4.8	0.19
e	2.54	0.100

Specification		Remarks
Digital Output Rate (Hz)	Up to 250	
Fully Stabilized Data (msec)	< 50	
<b>Angular Rate</b>		
• Range: Roll, Pitch, Yaw (°/sec)	±150	±300 version available
• Bias: Roll, Pitch (°/sec)	±1	Over full temperature range
• Scale Factor Accuracy (%)	< 2	Over full temperature range
• Non-linearity (% FS)	0.1	Typical
• Resolution (°/sec)	< 0.025	
• Bandwidth (Hz)	Up to 40	User configurable
• Noise Density (°/sec/Hz <sup>1/2</sup> )	0.05	Typical
<b>Acceleration</b>		
• Range: X/Y/Z (g)	±2	Higher g ranges available
• Bias: X/Y/Z (mg)	±15	Over full temperature range
• Scale Factor Accuracy (%)	< 2	Over full temperature range
• Non-linearity (% FS)	0.5	Typical
• Resolution (mg)	< 0.3	
• Bandwidth (Hz)	Up to 40	User configurable
• Noise Density (µg/Hz <sup>1/2</sup> )	< 100	
<b>Environment</b>		
• Operating Temperature (°C)	0 to 70	Extended temperature range available
• Mechanical Shock (g)	2000	0.5 ms
<b>Electrical</b>		
• Analog Supply Voltage (V)	6 to 10	Unregulated
• Digital Supply Voltage (V)	3.3	
• Current Consumption (mA)	35	Without power cycling
• Digital Output Format	UART and SPI	

An evaluation kit for the IMU601 is available. The evaluation kit includes the IMU601, a demo system board, power supply and RS-232 serial cable. It also includes the PC application for configuring the IMU601 and for viewing sensor data.

### Optional Co-Processor(s)

The IMU601 also comes with an optional digital signal processor and/or an ultra-low power microcontroller. These co-processors can be used to carry out additional algorithmic processing and/or communication protocols. An entire motion-processing sub-system can be realized on the same DIP-40 hybrid package. The co-processors are programmed via JTAG pins on the DIP-40 hybrid package. For more information on the co-processors, please contact [info@senteratechnology.com](mailto:info@senteratechnology.com)