3DM®

Orientation Sensor

The 3DM® Orientation Sensor is designed to provide 3-axis static and quasi-dynamic orientation measurements. It incorporates 3 accelerometers and 3 magnetometers together with an on-board microprocessor, embedded software algorithm, non-volatile memory for configuration, and serial communication interface. Its form-factor, rated temperature range and power supply requirements are optimized for a broad array of applications. The 3DM® outputs acceleration vectors, magnetic field vectors, Euler angles (pitch, roll, yaw) and orientation matrix.

Features & Benefits

Best in Class

- high-speed sample rate & flexible data outputs
- extended use, low-power data logging

Easiest to Use

- out-of-the-box pitch, roll, and yaw

Cost Effective

- reduced cost and rapid time to market for customer's applications
- aggressive volume discount schedule

Applications

- Antenna and Camera Pointing
- Robotic Control
- Health and Usage Monitoring of Vehicles
- Motion Tracking

System Overview

The 3DM® Orientation Sensor is initially sold as a starter kit with orientation module, RS-232 communication and power cable, universal wall transformer power supply, software CD, user manual and quick start guide.

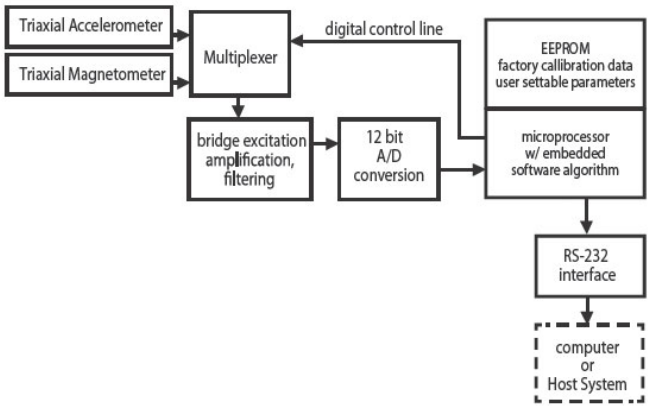
The 3DM® Orientation Sensor is factory calibrated and ready for use with power-up. The 3DM® ships with easy-to-use Microsoft Windows software which allows the user to initialize, configure and operate the instrument, view real-time measurements graphically, and write data to file for post-processing. For those users, integrators or OEMs who develop their own applications, the 3DM® is shipped with a complete Data Communications Protocol guide that provides the developer with a complete instrument command set. Applications of your own design can readily be developed in any coding language and on any computing platform including microprocessors.

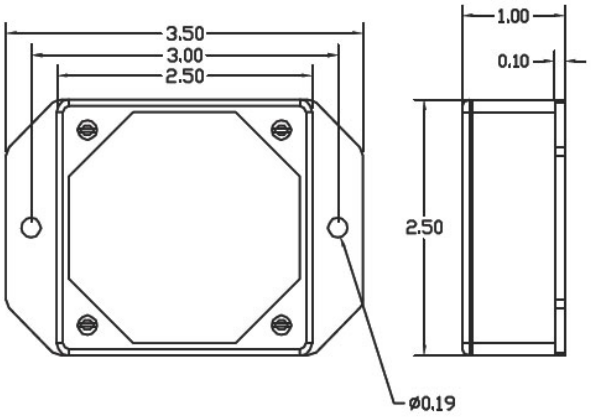
When outputting the orientation matrix, the 3DM® provides measurement of 360° about all 3 axes. When outputting Euler angles, 3DM® provides measurement of +/-180° yaw (heading), +/-180° roll, and +/-70° pitch. The 3DM® can operate in either polled mode (it outputs an orientation data packet on each host request) or continuous mode (it outputs orientation data packet after data packet to the host without request).

The 3DM® requires +5.2 to +12.0 volts DC to operate and can be powered by wall transformer, batteries, or any other capable power source. The enclosure provides a 2 hole mounting boss. Custom communication and power cables can be user fabricated or purchased from the factory.

Specifications

Application	static/quasi-dynamic measurements
Sensor suite	accelerometers, magnetometers
Orientation range	360° about all axes
Accelerometer range	+/-1.7g
Accelerometer bias stability	0.003g
Accelerometer nonlinearity	0.2%
Magnetometer range	+/-6 Gauss
Magnetometer bias stability	0.4 Gauss
Magnetometer nonlinearity	0.85%
A/D resolution	12 bits
Orientation accuracy	pitch +/-0.7° typical, roll +/-0.7° typical, yaw +/-1.5° typical
Orientation resolution	<0.1° at most aggressive setting
Repeatability	pitch and roll 0.7° typical, yaw 0.26° typical
Output modes	acceleration, magnetic fields, Euler angles (pitch, roll, yaw), orientation matrix
Communication interface	RS-232
Communication/power connector	RJ11 type
Data rate	angle mode up to 45 Hz; sensor mode up to 70 Hz
Filtering	infinite impulse response (IIR); user programmable weighted moving average
Baud rate	1200, 9600, 19200
Power supply voltage	+5.2 to +12.0 VDC
Power consumption	50 mA
Operating temperature	-25°C to +70°C
Dimensions	64mm x 89mm x 25mm
Weight	62 grams
Shock limit	500g
Software	XP/Vista/Win7





Version 8400-0026 rev. 001

LORD Corporation
MicroStrain® Sensing Systems
459 Hurricane Lane,
Suite 102
Williston, VT 05495 USA
www.microstrain.com
ph: 800-449-3878
fax: 802-863-4093
sales@microstrain.com
Patent(s) or Patent(s) Pending