3DM-GX3® -15

Miniature Inertial Measurement Unit And Vertical Gyro

The **3DM-GX3®** -15 is a high-performance, miniature Inertial Measurement Unit and Vertical Gyro, utilizing MEMS sensor technology. It combines a triaxial accelerometer, triaxial gyro, temperature sensors, and an on-board processor running a sophisticated sensor fusion algorithm to provide static and dynamic orientation, and inertial measurements.

Features & Benefits

Best in Class

- precise inertial measurements
- high-speed sample rate & flexible data outputs
- high performance under vibration and high g

Easiest to Use

- smallest, lightest industrial IMU available
- simple integration supported by SDK and comprehensive API

Cost Effective

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

Applications

Accurate orientation and positioning under dynamic conditions such as:

- Inertial Aiding of GPS
- Unmanned Vehicle Navigation
- Platform Stabilization, Artificial Horizon
- Antenna and Camera Pointing
- Health and Usage Monitoring of Vehicles
- Reconnaissance, Surveillance, and Target Acquisition
- Robotic Control
- Personnel Tracking

System Overview

The 3DM-GX3® -15 offers a range of fully calibrated inertialmeasurements including acceleration, angular rate, deltaTheta, anddeltaVelocity vectors. It can also output computed orientationestimates including Euler angles (pitch and roll), rotation matrix andquaternion. All quantities are fully temperature compensated and aremathematically aligned to an orthogonal coordinate system. Theangular rate quantities are further corrected for g-sensitivity and scalefactor non-linearity to third order. The 3DM-GX3® -15 architecture hasbeen carefully designed to substantially eliminate common sources oferror such as sensitivity to supply voltage variations. On-board coningand sculling compensation allows for use of lower data output rateswhile maintaining performance of a fast internal sampling rate. For those users, integrators or OEMs who develop their own orientation and navigation applications, the 3DM-GX3® -15 is shipped with a complete Data Communications Protocol guide that provides access to the powerful LORD **MicroStrain®** Inertial Packet Protocol (MIP). Applications of your own design can readily be developed in any coding language and on any computing platform including microprocessors

The 3DM-GX3® -15 is initially sold as a starter kit consisting of anIMU module, RS-232 or USB communication and power cable,software CD, user manual, and quick start guide.
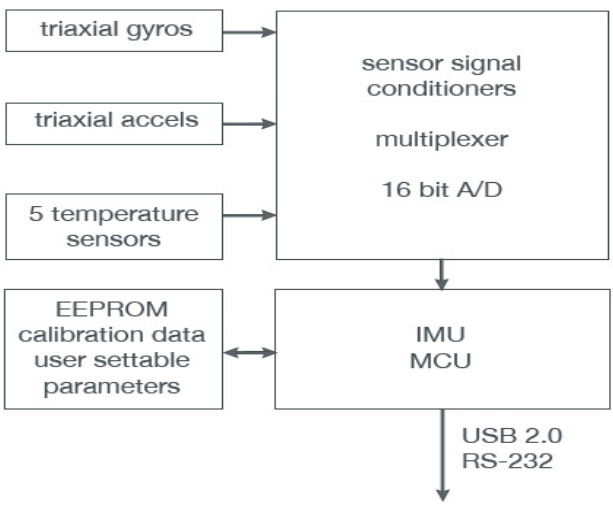
Specifications

IMU Specifications

Attitude and Heading	
Attitude heading range	360° about all 3 axes
Accelerometer range	±5 g standard
Gyroscope range	±300°/sec standard
Static accuracy	±0.5° pitch and roll typical for static test conditions
Dynamic accuracy	±2.0° pitch and roll for dynamic (cyclic) test conditions and for arbitrary angles
Long term drift	pitch and roll drift eliminated by complementary filter architecture
Repeatability	0.2°
Resolution	<0.1°
Data output rate	up to 1000 Hz
Filtering	sensors sampled at 30 kHz, digitally filtered (user adjustable) and scaled into physical units; coning and sculling integrals computed at 1 kHz
Output modes	acceleration, angular rate, deltaTheta, deltaVelocity, Euler angles, quaternion, rotation matrix
General	
A/D resolution	16 bits SAR oversampled to 17 bits
Interface options	USB 2.0 or RS232
Baud rate	115,200 bps to 921,600 bps
Power supply voltage	+3.2 to +16 volts DC
Power consumption	80 mA @ 5 volts with USB
Connector	micro-DB9
Operating temperature	-40° C to +70° C
Dimensions	44 mm x 24 mm x 11 mm - excluding mounting tabs, width across tabs 37 mm
Weight	18 grams
ROHS	compliant
Shock limit	500 g
Software utility	CD in starter kit (XP/Vista/Win7 Win8 compatible)
Software development kit (SDK)	complete data communications protocol and sample code

Sensor Specifications

	Accels	Gyros
Measurement range	±5 g	±300°/sec
Non-linearity	±0.1 % fs	±0.03 % fs
In-run bias stability	±0.04 mg	18°/hr
Initial bias error	±0.002 g	±0.25°/sec
Scale factor stability	±0.05 %	±0.05 %
Noise density	80 µg/√Hz	0.03°/sec/√Hz
Alignment error	±0.05°	±0.05°
User adjustable bandwidth	225 Hz max	440 Hz max
Sampling rate	30 kHz	30 kHz
Options		
Accelerometer range	±1.7 g, ±16 g, ±50 g	
Gyroscope range	±50°/sec, ±600°/sec, ±1200°/sec	