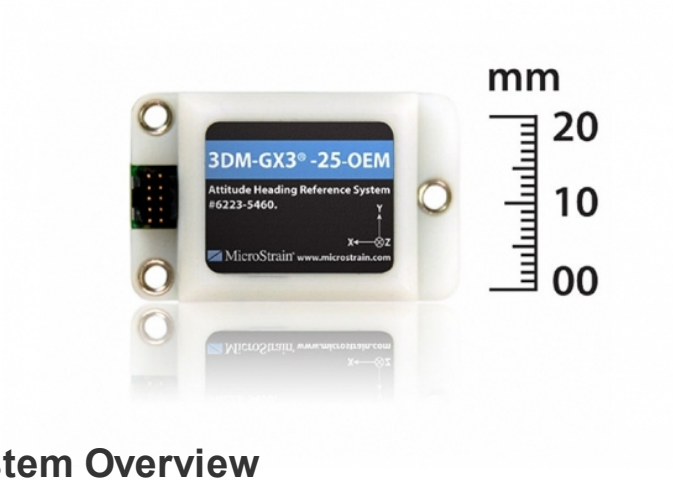
3DM-GX3® -25-OEM

Miniature Attitude Heading Reference System

The **3DM-GX3®** -25-OEM is a high-performance, miniature Attitude Heading Reference System (AHRS), utilizing MEMS sensor technology. It combines a triaxial accelerometer, triaxial gyro, triaxial magnetometer, temperature sensors, and an on-board processor running a sophisticated sensor fusion algorithm to provide static and dynamic orientation, and inertial measurements. Its form factor is ideally suited for OEM applications.



Features & Benefits

Easiest to Integrate

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

Best in Class

- precise attitude estimations
- high-speed sample rate & flexible data outputs
- high performance under vibration

Cost Effective

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

Applications

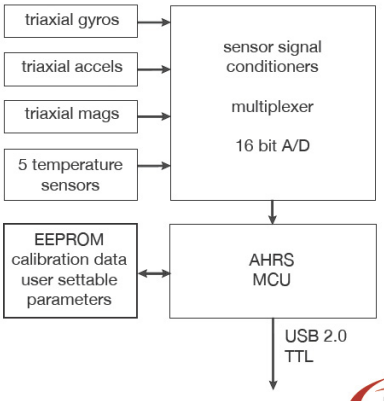
Accurate navigation and orientation under dynamic conditions such as:

- 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®** -25 OEM offers a range of fully calibrated inertial measurements including acceleration, angular rate, magnetic field, deltaTheta and deltaVelocity vectors. It can also output computed orientation estimates including Euler angles (pitch, roll, and heading (yaw)), rotation matrix and quaternion. All quantities are fully temperature compensated and are mathematically aligned to an orthogonal coordinate system. The angular rate quantities are further corrected for g-sensitivity and scale factor non-linearity to third order. The **3DM-GX3®** -25 OEM architecture has been carefully designed to substantially eliminate common sources of error such as hysteresis induced by temperature changes and sensitivity to supply voltage variations. Gyro drift is eliminated in AHRS mode by referencing magnetic North and Earth's gravity and compensating for gyro bias. On-board coning and sculling compensation allows for use of lower data output rates while maintaining performance of a fast internal sampling rate.

The **3DM-GX3®** -25 OEM is initially sold as a starter kit consisting of an AHRS module, USB communication and power cable, software CD, user manual and quick start guide. The circuit board form-factor provides thru-holes for mounting on larger circuit assemblies and custom TTL communication and power cables can be user fabricated or purchased from the factory.



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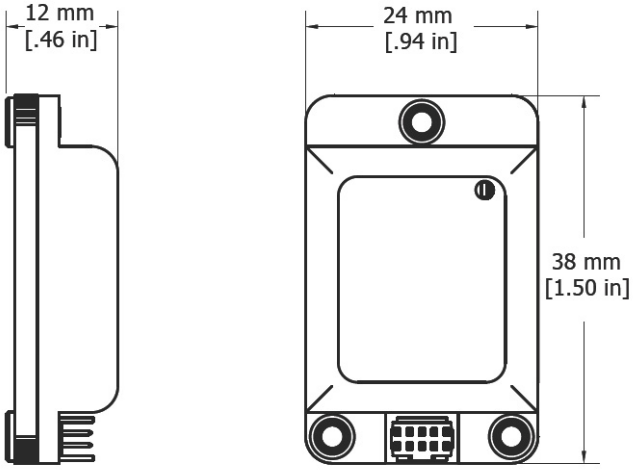
Specifications

AHRS 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, roll, heading typical for static test conditions
Dynamic accuracy	±2.0° pitch, roll, heading for dynamic (cyclic) test conditions and for arbitrary angles
Long term drift	eliminated by complimentary 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, and magnetic field deltaTheta and deltaVelocity, Euler angles, quaternion, rotation matrix
General	
A/D resolution	16 bits SAR oversampled to 17 bits
Interface options	USB 2.0 / TTL serial (3.3 volts)
Baud rate	115,200 bps to 921,600 bps
Power supply voltage	3.1 to 5.5 volts
Power consumption	80 mA @ 5 volts with USB
Connector	Samtec FTSH-105-01-F-D-K
Operating temperature	-40 °C to +70 °C
Dimensions	38 mm x 24 mm x 12 mm
Weight	11.5 grams
ROHS	compliant
Shock limit	500 *g*
Software utility	CD in starter kit (XP/Vista/Win7 compatible)
Software development kit (SDK)	complete data communications protocol and sample code

IMU Specifications

	Accels	Gyros	Mags
Measurement range	±5 *g*	±300°/sec	±2.5 Gauss
Non-linearity	±0.1 % fs	±0.03 % fs	±0.4 % fs
In-run bias stability	±0.04 m*g*	18°/hr	—
Initial bias error	±0.002 *g*	±0.25°/sec	±0.003 Gauss
Scale factor stability	±0.05 %	±0.05 %	±0.1 %
Noise density	80 µ*g*/√Hz	0.03°/sec/√Hz	100 µGauss/√Hz
Alignment error	±0.05°	±0.05°	±0.05°
User adjustable bandwidth	225 Hz max	440 Hz max	230 Hz max
Sampling rate	30 kHz	30 kHz	7.5 kHz max
Options			
Accelerometer range	±1.7 *g*, ±16 *g*, ±50 *g*		
Gyroscope range	±50°/sec, ±600°/sec, ±1200°/sec		



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