

# 3DM-GX3-25™

## Miniature Attitude Heading Reference System



### Introduction

3DM-GX3-25™ is a high-performance miniature Attitude Heading Reference System, 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.

It offers a range of output data quantities from fully calibrated inertial measurements (acceleration, angular rate and magnetic field or deltaAngle & deltaVelocity vectors) to computed orientation estimates, including pitch, roll and heading (yaw) or rotation matrix. 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™ AHRS is available with RS-232, USB 2.0 and TTL serial communication interfaces and is a member of the 3DM-GX3™ family of inertial sensors.

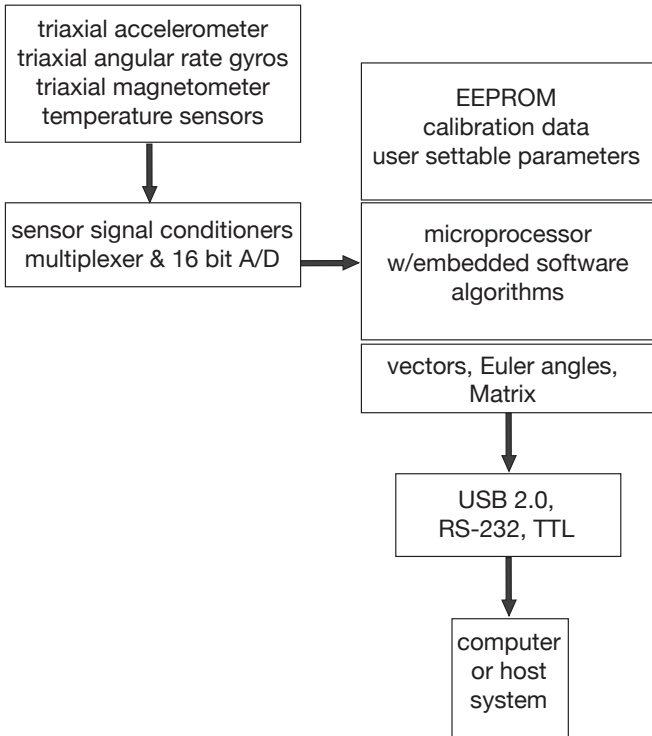
### Features & Benefits

- smallest and lightest AHRS available on the market, weighing only 18 grams
- fully temperature compensated over entire -40°C to 75°C operational range
- calibrated for sensor misalignment, gyro G-sensitivity, and gyro scale factor non-linearity
- improved navigation under vibration, as sensors are sampled at 30 kHz and digitally filtered and scaled into physical units; coning and sculling integrals are computed at 1 kHz
- available with RS-232, USB 2.0 and TTL serial communication interfaces
- user adjustable data rate, 1 to 1000 Hz
- outputs Euler angles, rotation matrix, deltaAngle & deltaVelocity, acceleration angular rate and magnetic field

### Applications

- inertial aiding of GPS
- location tracking of personnel
- unmanned vehicles, navigation, artificial horizon
- computer science, biomedical animation, linkage free tracking/control
- platform stabilization
- antenna and camera pointing
- robotics

The system 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. On-board coning and sculling compensation allows for use of lower data output rates while maintaining performance of a fast internal sampling rate.



## Specifications

Orientation range	360° about all axes
Accelerometer range	± 5 g standard ± 2 g, ± 18 g, and ± 50 g also available
Accelerometer bias stability	± 0.005 g for ± 5 g range ± 0.003 g for ± 2 g range ± 0.010 g for ± 18 g range ± 0.050 g for ± 50 g range
Accelerometer nonlinearity	0.2%
Gyro range	± 300°/sec standard, ± 1200°/sec, ± 600°/sec, ± 150°/sec, ± 75°/sec also available
Gyro bias stability	± 0.2°/sec for ± 300°/sec
Gyro nonlinearity	0.2%
Magnetometer range	± 2.5 Gauss
Magnetometer nonlinearity	0.4%
Magnetometer bias stability	0.01 Gauss
A/D resolution	16 bits (SAR)
Orientation Accuracy	± 0.5° typical for static test conditions ± 2.0° typical for dynamic (cyclic) test conditions & for arbitrary orientation angles
Orientation resolution	<0.1°
Repeatability	0.2°
Output modes	acceleration, angular rate and magnetic field deltaAngle and deltaVelocity Euler angles rotation matrix
Interface options	standard: USB 2.0 or RS232 OEM: USB 2.0 / TTL serial (3.3 volts)
Data rate	1 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.
Baud rate	115200 baud to 921,600 baud
Supply voltage	standard: 4.4 to 6 volts [up to 15 volts operation possible at limited temp range] OEM: 3.2 to 5.5 volts
Power consumption	80 mA @ 5 volts with USB
Connectors	micro-DB9, OEM: Samtec FTSH-105-01-F-D-K
Operating temp.	-40 to +75°C (consult factory for higher temperature operation)
Dimensions	44 mm x 25 mm x 11 mm - excluding mounting tabs, width across tabs 37 mm, OEM: 38 mm x 24 mm x 12 mm
Weight	18 grams RS-232 and USB, 11.5 grams OEM



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Patent Pending