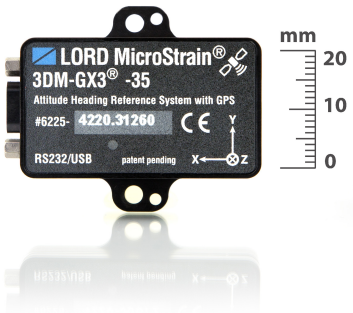
LORD DATASHEET

3DM-GX3-35™

Attitude Heading Reference System (AHRS) with GPS

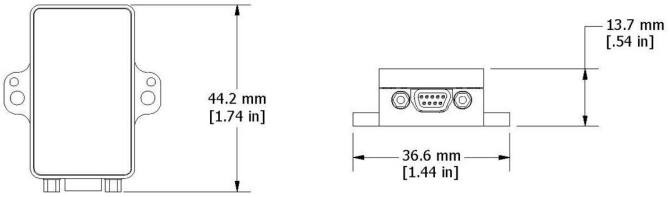


3DM-GX3-35™ - *lower cost, miniature, industrial-grade attitude heading and reference system (AHRS) with integrated GPS and magnetometers, and high data output rates*

The **LORD MicroStrain® 3DM-GX3®** family of **industrial grade inertial sensors** provides a wide range of triaxial inertial measurements and computed attitude and navigation solutions.

In all models, the Inertial Measurement Unit (IMU) includes direct measurement of acceleration, angular rate, and atmospheric pressure. Sensor measurements are processed through an on-board processor running a sophisticated fusion algorithm to produce high accuracy computed outputs with compensation options for magnetic and linear acceleration anomalies, sensor biases, auto-zero update, and noise offsets. The computed outputs vary between models and can include pitch, roll, yaw, a complete attitude, heading, and reference solution (AHRS) or a complete position, velocity and attitude solution (PVA), as well as integrated GPS outputs. All sensors are fully temperature compensated and calibrated over the operating temperature. The use of Micro-Electro-Mechanical System (MEMS) technology allows for highly accurate, small, lightweight devices.

The LORD MicroStrain® **MIP™ Monitor** software can be used for device configuration, real time measurement monitoring, and data recording. Alternatively, the **MIP™ Data Communications Protocol** is available for users who want to develop customized software solutions.



Product Highlights

- High performance integrated GPS receiver and MEMS sensor technology provide direct and computed AHRS outputs in a small package.
- Triaxial accelerometer, gyroscope, magnetometer, and temperature sensors achieve the best combination of measurement qualities.
- On-board processor runs a sophisticated Complimentary Filter (CF) fusion algorithm for precise position, velocity, and attitude estimates and inertial measurements
- Sampling rates up to 30 KHz and data output up to 1 KHz

Features and Benefits

Best in Class Performance

- Fully calibrated, temperature compensated, and mathematically aligned to an orthogonal coordinate system for highly accurate outputs
- Bias tracking, error estimation, threshold flags, and adaptive noise, magnetic, and gravitational field modeling allow for fine tuning to conditions in each application.

Ease of Use

- Easy integration via comprehensive SDK
- Common protocol with the 3DM-GX4® and 3DM-RQ1™ sensor families for easy migration

Cost Effective

- Out-of-the box solution reduces development time.
- Volume discounts

Applications

- GPS-aided navigation system
- Unmanned vehicle navigation
- Platform stabilization, artificial horizon
- Antenna and camera pointing
- Health and usage monitoring of vehicles

Best in Class Inertial Measurement

LORD MicroStrain®
SENSING SYSTEMS

3DM-GX3-35™ Attitude Heading Reference System (AHRS) with GPS

Specifications

General			
Integrated sensors	Triaxial accelerometer, triaxial gyroscope, triaxial magnetometer, and temperature sensors,		
Data outputs	**Inertial Measurement Unit (IMU) outputs:** acceleration, angular rate, magnetic field , deltaTheta, deltaVelocity **Computed outputs** LLH position, NED velocity, attitude estimates (in Euler angles, quaternion, orientation matrix),		
Resolution	16 bit SAR oversampled to 17 bits		
Inertial Measurement Unit (IMU) Sensor Outputs			
	Accelerometer	**Gyroscope**	**Magnetometer**
Measurement range	±5 *g* (standard) ±1.7±16, and ±50 *g* (option)	300°/sec (standard) ±50, ±600, ±1200 °/sec (options)	±2.5 Gauss
Non-linearity	±0.1 % fs	±0.03 % fs	±0.4 % fs
Bias instability	±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 µg/√Hz	0.03°/sec/√Hz	100 µGauss/√Hz
Alignment error	±0.05°	±0.05°	±0.05°
Adjustable bandwidth	225 Hz (max)	440 Hz (max)	230 Hz (max)
IMU filtering	Digitally filtered (user adjustable) and scaled to physical input; coning and sculling integrals computed at 1 kHz		
Sampling rate	30 kHz	30 kHz	7.5 kHz
IMU data output rate	1 Hz to 1000 Hz		

Computed Outputs	
Attitude accuracy	±0.5° roll, pitch, and heading (static, typ), ±2.0° roll, pitch, and heading (dynamic, typ)
Attitude heading range	360° about all axes
Attitude resolution	< 0.01°
Attitude repeatability	0.2° (typ)
Calculation update rate	1000 Hz
Computed data output rate	1 Hz to 500 Hz
Global Positioning System (GPS) Outputs	
Receiver type	50-channel, L1 frequency, C/A code SBAS: WAAS, EGNOS, MSAS
GPS data output rate	1 Hz to 4 Hz
Time-to-first-fix	Cold start: 27 sec, aided start: 4sec, hot start: 1 sec
Sensitivity	Tracking: -159 dBm, cold start: -147 dBm, hot start: -156 dBm
Velocity accuracy	0.1 m/sec
Heading accuracy	0.5°
Horizontal position accuracy	GPS: 2.5 m CEP SBAS: 2.0 m CEP
Time pulse signal accuracy	30 nsec RMS < 60 nsec 99%
Acceleration limit	≤ 4 *g*
Altitude limit	No limit
Velocity limit	500 m/sec (972 knots)
Operating Parameters	
Communication	USB 2.0 (full speed) RS232 (9,600 bps to 921,600 bps, default 115,200)
Power source	+ 3.2 to + 16 V dc
Power consumption	200 mA (typ), 250 mA (max) - Vpri = 3.2 V dc to 5.5 V dc 850 mW (typ), 1000 mW (max) - Vaux = 5.2 V dc to 16 V dc
Operating temperature	-40 °C to +65 °C
Mechanical shock limit	500 *g*
Physical Specifications	
Dimensions	44.2 mm x 24.0 mm x 13.7 mm (excluding mounting tabs), 36.6 mm (width across tabs)
Weight	23 grams
Regulatory compliance	ROHS
Integration	
Connectors	Data/power output: micro-DB9 GPS antenna: MMCX type
Software	MIP™ Monitor, MIP™ Hard and Soft Iron Calibration, Windows XP/Vista/7/8 compatible
Compatibility	Protocol compatibility with 3DM-RQ1™ and 3DM-GX4® sensor families.
Software development kit (SDK)	MIP™ data communications protocol with sample code available (OS and computing platform independent)

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