3DM-GX3-15-OEM™
OEM Inertial Measurement and Vertical Reference Unit (IMU/VRU)

Product Highlights
- High performance integrated MEMS sensor technology provide direct and computed IMU and VRU outputs in a small package.
- Triaxial accelerometer, gyroscope, and temperature sensors achieve the best combination of measurement qualities.
- On-board processor runs a sophisticated Complementary Filter (CF) fusion algorithm for precise inclination estimates and inertial measurements.
- Sampling rates up to 30 KHz and data output up to 1 KHz.
- Small size, lightweight packaging, and header connector interface ideal for OEM integration.

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

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.

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.
## Specifications

### General
- **Integrated sensors**: Triaxial accelerometer, triaxial gyroscope, and temperature sensors.

### Data outputs
- **Inertial Measurement Unit (IMU) outputs**: acceleration, angular rate, deltaTheta, deltaVelocity.
- **Computed outputs**: attitude estimates (Euler angles, quaternion, orientation matrix).

### Resolution
- 16 bit SAR oversampled to 17 bits.

### Inertial Measurement Unit (IMU) Sensor Outputs

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>Accelerometer</th>
<th>Gyroscope</th>
</tr>
</thead>
<tbody>
<tr>
<td>±5 g (standard)</td>
<td>±0.1 % fs</td>
<td>±0.04 mg</td>
</tr>
<tr>
<td>±1.7, ± and ±50g</td>
<td>±0.25°/sec</td>
<td>±18°/hr</td>
</tr>
<tr>
<td>(option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>±50, ±600, ±1200</td>
<td>±0.05 %</td>
<td>±0.05 %</td>
</tr>
<tr>
<td>°/sec (options)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Non-linearity    | ±0.1 % fs     | ±0.02 %   |
| Initial bias error | ±0.002 g   | ±0.25°/sec |
| Bias instability | ±0.05 %       | ±0.25°/hr |

| Scale factor stability | ±0.05 % |
| Noise density         | 80 µg/√Hz |
| Alignment error       | ±0.05° |
| Adjustable bandwidth  | 225 Hz (max) |
| IMU filtering         | Digitally filtered (user adjustable) and scaled to physical inputs; coning and sculling integrals computed at 1 kHz |
| Sampling rate         | 30 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.

### Operating Parameters
- **Communication**: USB 2.0, TTL serial UART (3.3 V dc, 9,600 bps to 921,600 bps, default 115,200).
- **Power**: +3.1 to +5.5 V dc.
- **Power consumption**: 80 mA at 5 V dc (USB).
- **Operating temperature**: -40°C to +70°C.
- **Mechanical shock limit**: 500 g.

### Physical Specifications
- **Dimensions**: 38 mm x 24 mm x 11.6 mm.
- **Weight**: 11.6 grams.
- **Regulatory compliance**: ROHS.

### Integration
- **Connectors**: Data/power output: Samtec FTSH Series (FTSH-105-01-F-D-K).
- **Software**: MIP™ Monitor, 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).