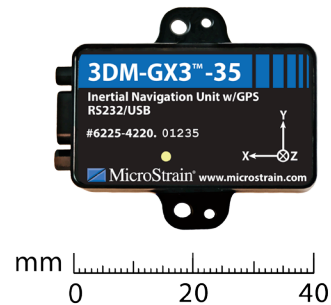


3DM-GX3™ -35

Miniature Inertial Navigation Unit with GPS



Introduction

The 3DM-GX3™ -35 high-performance, miniature Inertial Navigation Unit (INU), combines MEMS sensor technology and a highly sensitive embedded GPS receiver. It incorporates a triaxial accelerometer, triaxial gyro, triaxial magnetometer, temperature sensors, with a dedicated 32 bit inertial sensor processor running a sophisticated inertial sensor fusion algorithm to provide static and dynamic orientation, and inertial measurements. Data from a high sensitivity GPS receiver is available in parallel with data from the inertial sensor and is synchronized with a UTC based absolute time reference. All data output quantities are available on demand or in a continuous stream which is fully customizable by the user.

The system offers a range of output data quantities, including fully calibrated inertial measurements: acceleration, angular rate, and magnetic field; or deltaAngle & deltaVelocity vectors. It can also output computed orientation estimates: pitch, roll, and heading (yaw); rotation matrix; or quaternion. All inertial and magnetic 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 system supports all standard NMEA 3.0 GPS messages along with UBX NMEA extensions, and the full u-blox5 UBX binary GPS message suite with over 80 status, configuration, and data calls. The amount of data sent continuously is defined by the bandwidth of the serial communications being used. The command interface is compatible with all MicroStrain® GX2 and GX3 family devices.

The 3DM-GX3™ -35 IMU supports USB or RS-232 serial communication interfaces and is a member of the 3DM-GX3™ family of inertial sensors.

Features & Benefits

- smallest, lightest, lowest power INU with GPS available on the market
- rugged aluminum enclosure with precision alignment holes
- fully temperature compensated over -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
- fully customizable data output: inertial data 1 to 1000 Hz and NMEA or UBX GPS data up to 4 Hz
- Versions available from 2 g to 50 g and 75°/s to 1200°/s

Applications

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

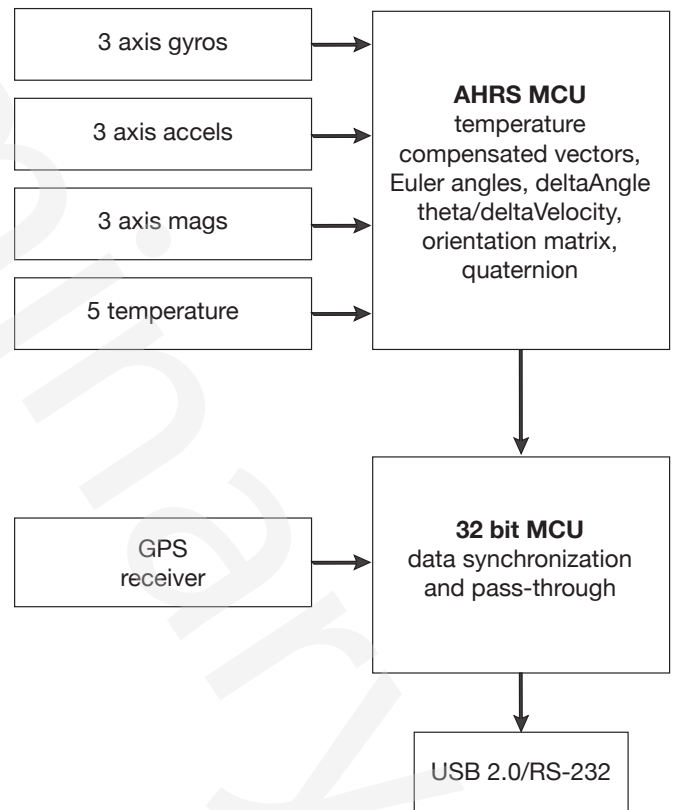


Specifications

Inertial Sensors	
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) (oversampled to 17 bits)
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°
Optional altimeter/barometer	(30 kPa-120 kPa range, 2 Pa sensitivity)
GPS Receiver	
GPS receiver type	50 channel, GPS L1, C/A code
GPS tracking sensitivity	-160 dBm
GPS timing accuracy	30 ns RMS
GPS heading accuracy	0.5 degrees
GPS velocity accuracy	0.1 m/s
Time-to-First-Fix	Cold Start: 32 s Warm Start: 32 s Hot Start: 1 s Aided Start: <3 s
General	
Output modes	NMEA GPS protocol records UBX GPS protocol records 3DM-GX3 protocol records: (acceleration, angular rate, magnetic field, deltaAngle, deltaVelocity, Euler angles, rotation matrix quaternion)
Interface options	standard: USB 2.0 or RS232
Data rate	1 Hz to 1,000 Hz
Filtering	sensors sampled at 30 kHz, digitally filtered (user adjustable) and scaled into physical units; coning and sculling integrals computed at 1 kHz.
Serial baud rate	115,200 baud to 921,600 baud

Supply voltage	standard: 4.4 to 6 volts [up to 15 volts operation possible at limited temp range or low duty cycle]
Power consumption	120 mA @ 5 volts with USB
Connectors	micro-DB9,
Operating temp.	-40 °C to +75 °C (consult factory for higher temperature operation)
Dimensions	44 mm x 25 mm x 14 mm - excluding mounting tabs, width across tabs 37 mm,
Weight	20 grams RS-232 and USB
Shock limit	1000 g (unpowered), 500g (powered)

*Accuracy and stability specifications obtained over operating temperatures of -40 to 70°C with known sine and step inputs, including angular rates of ± 300° per second.



MicroStrain Inc.

459 Hurricane Lane, Suite 102
Williston, VT 05495 USA
www.microstrain.com

ph: 800-449-3878
fax : 802-863-4093
sales@microstrain.com

Patent Pending