

HIGH PERFORMANCE INERTIAL MEASUREMENT UNIT



STIM377H

PRODUCT BRIEF

- Small size, low weight and low cost
- Hermetic package without paint and separate label
- ITAR free
- Insensitive to magnetic fields
- 0.3 °/h gyro bias instability
- 0.15 °/√h angular random walk
- ±400 °/s angular rate input range
- 10 °/h gyro bias error over temperature gradients
- 0.05 mg accelerometer bias instability
- ±10 g acceleration input range (optional ranges available)
- 3 inclinometers for accurate levelling
- Backwards compatible with STIM300

STIM377H is a tactical grade 3-axis inertial measurement unit (IMU) comprised of 3 highly accurate MEMS gyros, 3 high stability accelerometers and 3 inclinometers. It is based on the well established STIM300, the STIM377H is assembled in a cleanroom and the aluminum enclosure has a glass-to-metal sealed electrical micro-d connector and a laser welded lid to secure long term hermetic operation. All parts are tested for fine and gross leak to conform to MIL-STD-883J, Class H. The STIM377H enclosure is also free of paint and the label is supplied separately.

The IMU is factory calibrated and compensated for temperature effects over the full operating temperature range. Sensoror's proven gyro sensor technology has been in production for more than two decades. It performs exceptionally well across many applications due to its very low vibration and shock sensitivity. The gyro is qualified according to high-performance aircraft vibration standard.

Range and features

STIM377H full-scale angular rate input range is ±400 °/s and the output is capped at ±480 °/s. Standard acceleration input range is ±10 g. Axis misalignment of 1 mrad is achieved by electronic axis alignment. STIM377H requires a single 5 V power supply and has a digital serial RS422 interface.

STIM377H offers several user selectable output formats and sample rates for gyro and accelerometer data:

- Angular Rate
- Incremental Angle
- Average Angular Rate
- Integrated Angle
- Acceleration
- Integrated Velocity
- Incremental Velocity
- Average Acceleration

Device configurations and self-diagnostics

A reliable RISC ARM microcontroller enables easy device configuration and programming. The user can set output unit format, sample frequency and datagram content, LP filter cut-off frequency, RS422 transmission bit rate and line termination.

STIM377H is continuously monitoring its internal status and track more than 100 parameters that the user can access. This includes monitoring of:

- Internal references
- Sensors for error and overload
- Internal temperatures
- RAM and flash
- Supply voltage



(39 mm x 45 mm x 22 mm)

Evaluation tools

STIM377H evaluation tools supporting PCI or USB connectivity are available. The evaluation tools offer easy access to measurement data and configuration of the IMU. It supports data sampling at alternative rates, graphical presentation, and data logging to file. The evaluation tools contain a RS422 interface for USB or PCI hardware setup, all necessary cabling, and PC software.

Application areas

STIM377H is a good fit for satellite attitude & orbit control systems (AOCS) and launchers. Other applications are stabilization, guidance and navigation applications in Industrial, Aerospace and Defence markets. The design is field proven in Military Land Navigators, Missile systems, Target acquisition systems, Airborne surveillance, DIRCM, Remote Weapon Systems, Launch vehicles and Satellites.

In many applications, STIM377H can competitively replace IMUs based on Fiber Optic Gyros (FOGs) and improve system performance with respect to robustness, reliability, size, weight, power and cost.



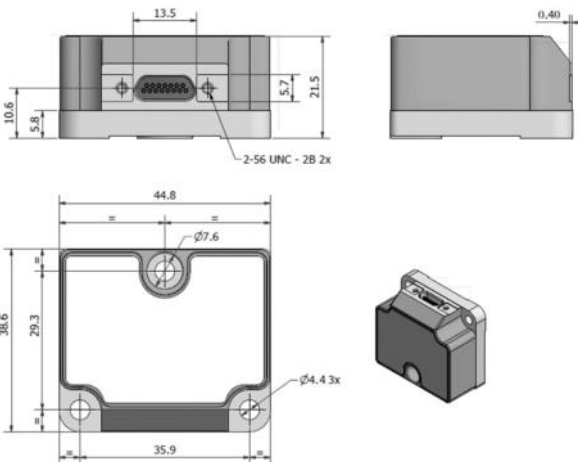
Parameter	Min	Nom	Max	Unit
GENERAL				
Weight		55		g
Operating temperature	-40		85	°C
Supply voltage	4.5	5.0	5.5	V
Power consumption		1.5	2	W
Start-up time			1	s
Sample rate			2000	SPS
Mechanical shock, any direction			1500	g
RS422 transmission bit rate			5.18	Mbit/s
Misalignment		1		mrad
GYRO				
Input range		±400		°/s
Non-linearity (condition: ±200 °/s)		15		ppm
Resolution		0.22		°/h
Bias instability		0.3		°/h
Angular random walk		0.15		°/√h
Bias error over temperature gradients		±10 ¹⁾		°/h rms
Linear acceleration effect				
Bias		1 ²⁾		°/h/g
Scale factor		50 ²⁾		ppm/g
Scale factor accuracy		±500		ppm
ACCELEROMETER				
Input range		±10 ³⁾		g
Resolution		1.9		µg
Bias instability		0.05		mg
Velocity random walk		0.07		m/s/√h
Bias error over temperature gradients		±2 ¹⁾		mg rms
Scale factor accuracy		±300		ppm
INCLINOMETER				
Input range		±1.7		g
Resolution		0.2		µg
Scale factor accuracy		±500		ppm

1) Condition: ΔT ≤ 1°C/min
2) With g-compensation

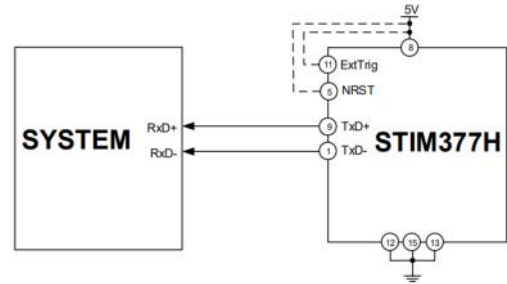
3) Optional ranges: ±5 g and ±30 g

MECHANICAL DIMENSIONS

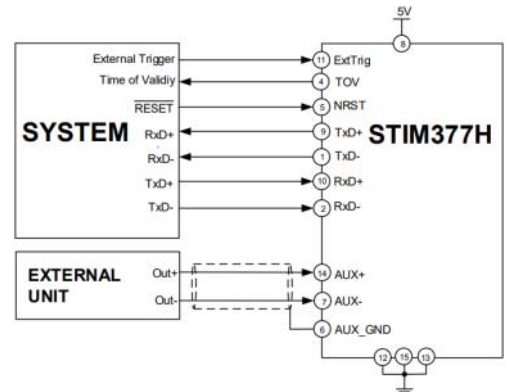
All dimensions in mm. Volume < 2,0 cu. in (33 cm³)



ELECTRICAL CONNECTIONS

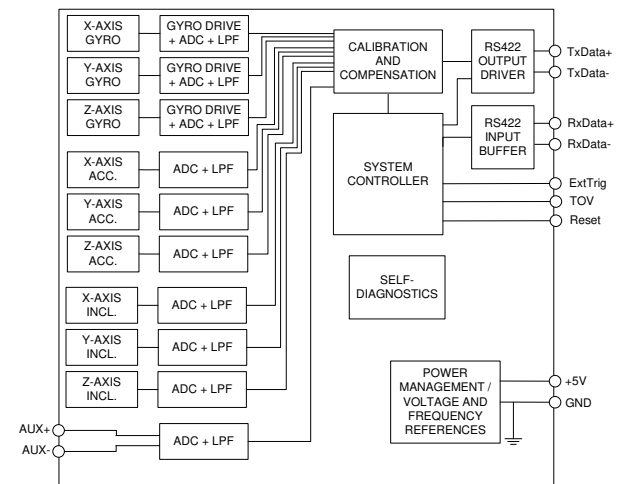


(TRANSMIT ONLY)

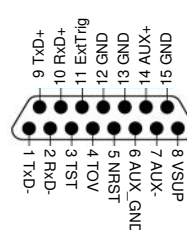


(FULL FUNCTION)

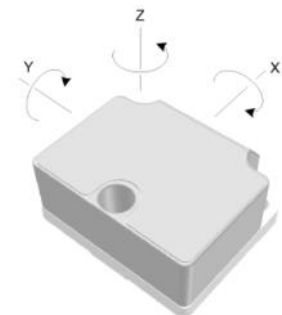
FUNCTIONAL BLOCK DIAGRAM



PINOUT



AXIS DEFINITIONS



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