

# ULTRA-HIGH PERFORMANCE INERTIAL MEASUREMENT UNIT (IMU)



STIM318

PRODUCT BRIEF

- Small size, low weight and low cost
- ITAR free
- Insensitive to magnetic fields
- User programmable bias trim offset
- 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
- 0.003 mg accelerometer bias instability
- 0.015 m/s/√h accelerometer noise
- ±10 g acceleration input range (optional ranges available)
- 3 inclinometers for accurate levelling



(39 mm x 45 mm x 22 mm)

**STIM318** is a new tactical grade Inertial Measurement Unit (IMU) in the STIM300 family. It has increased performance for demanding guidance and navigation applications. STIM318 is comprised of 3 highly accurate MEMS gyros, 3 high stability accelerometers and 3 inclinometers. The IMU is factory calibrated and compensated for temperature effects over the full temperature operating range.

The STIM318 is based upon Sensoror's proven gyro sensor technology in production for more than two decades. It performs exceptionally well across many applications due to its very low vibration and shock sensitivity. The IMU is qualified according to high-performance aircraft vibration standard.

## Range and features

STIM318 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 as little as 1 mrad is achieved by electronic axis alignment. STIM318 requires a single 5 V power supply and has a RS422 serial interface.

STIM318 also has a Bias Trim Offset function, allowing the user zero out any bias offset of all nine axes individually. The bias offsets can be stored in the flash memory to remain in effect after powering off the IMU.

STIM318 offers several user selectable output formats and sample rates for gyro and accelerometer data:

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

## 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. STIM318 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

## Evaluation tools

STIM318 evaluation tools supporting PCIe or USB connectivity are available. The evaluation tool offer easy access to measurement data and configuration of the IMU. It supports data sampling at different rates, graphical presentation, and data logging to file. The evaluation tool contains a RS422 interface for USB or PCIe hardware setup, all necessary cabling, and software.

## Application areas

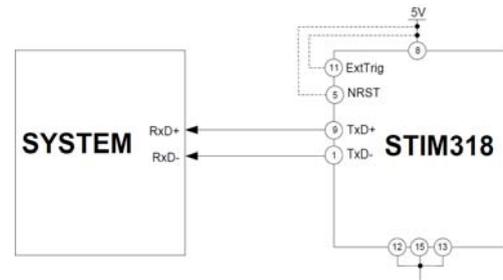
The STIM318 IMU is well suited for stabilization, guidance and navigation applications in Industrial, Aerospace and Defence markets. The design is field proven in Military Land Navigators, Missile systems, Target acquisition systems, Airborne surveillance, DIRCM, Remote Weapon Systems, Launch vehicles and Satellites.

In many applications, STIM318 can competitively replace IMUs based on Fiber Optic Gyros (FOGs) and improve system performance with respect to robustness, reliability, size, weight, power and cost.

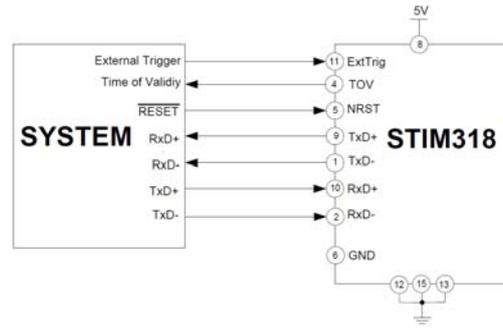


Parameter	Min	Nom	Max	Unit
<b>GENERAL</b>				
Weight		57		g
Operating temperature	-40		85	°C
Supply voltage	4.5	5.0	5.5	V
Power consumption		1.8	2.5	W
Start-up time		0.7	1	s
Sample rate			2000	SPS
Mechanical shock, any direction			1500	g
RS422 transmission bit rate			5.18	Mbit/s
Misalignment		1		mrad
<b>GYRO</b>				
Input range		±400 <sup>1)</sup>		°/s
Non-linearity @ ±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 <sup>2)</sup>		°/h rms
Linear acceleration effect				
Bias		1 <sup>4)</sup>		°/h/g
Scale factor		50 <sup>4)</sup>		ppm/g
Scale factor accuracy		±500		ppm
<b>ACCELEROMETER</b>				
Input range		±10 <sup>3)</sup>		g
Resolution		1.9		µg
Bias instability		0.003		mg
Velocity random walk		0.015		m/s/√h
Bias 1 year stability	1.25	1.5 <sup>5)</sup>		mg
Bias error over temperature gradients		±0.7 <sup>2)</sup>		mg rms
Scale factor accuracy		±200		ppm
<b>INCLINOMETER</b>				
Input range		±1.7		g
Resolution		0.2		µg
Scale factor accuracy		±500		ppm

ELECTRICAL CONNECTIONS

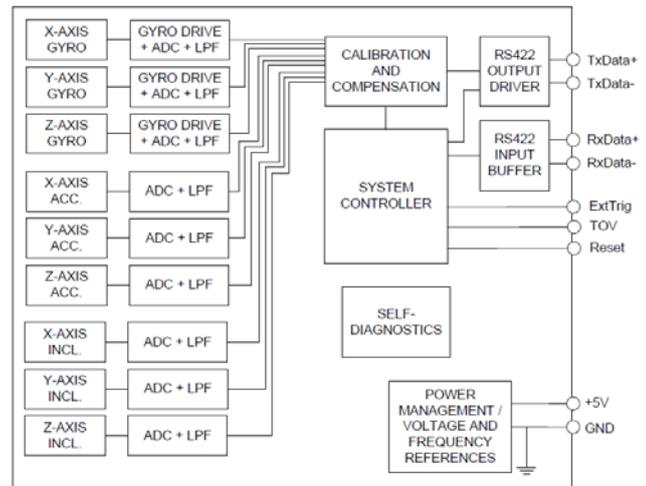


(TRANSMIT ONLY)

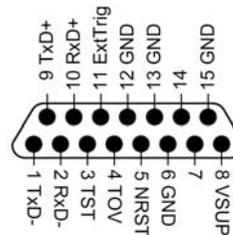


(FULL FUNCTION)

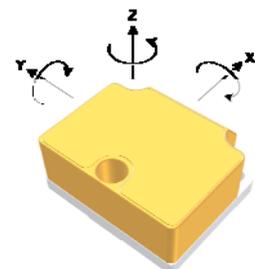
FUNCTIONAL BLOCK DIAGRAM



PINOUT



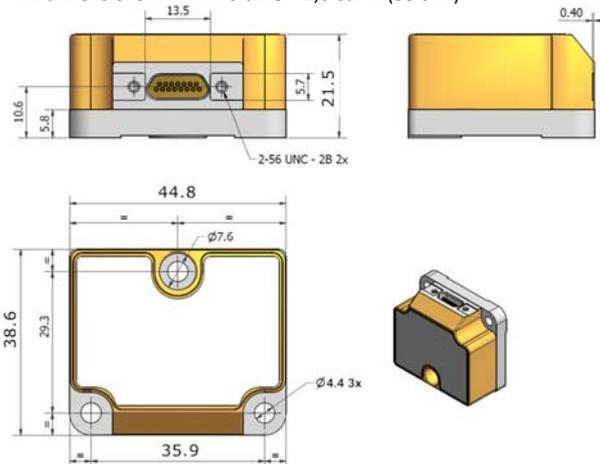
AXIS DEFINITIONS



1) Optional ranges are available  
 2) Condition: ΔT ≤ 1°C/min  
 3) Optional ranges: ±5 g, ±30 g, ±80 g  
 4) With g-compensation  
 5) Export controlled version (STIM318e) available with 1.2 mg 1 year bias stability

MECHANICAL DIMENSIONS

All dimensions in mm. Volume < 2,0 cu. in (33 cm<sup>3</sup>)



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