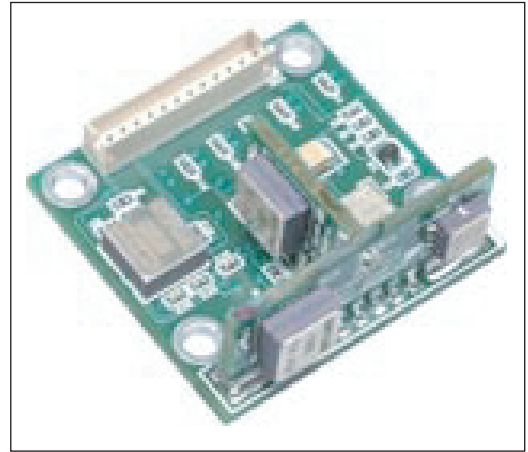


**STANDARD FEATURES**

- **High Performance MEMS Inertial Sensors**
- **Solid State Reliability**
- **Versatile Analog Interface**
- **On-Board Temperature Monitor**
- **Low Cost**
- **Ultra Compact Package**
- **Low Power Consumption (Single 5V Supply)**



**PRODUCT DESCRIPTION**

The Gyrocube3A is a complete three axis silicon MEMS inertial measurement module with analog outputs. The Gyrocube3A integrates three MEMS angular rate gyros and three MEMS accelerometers in a triaxial orthogonal configuration. Featuring low bias drift and excellent scale factor stability, these rugged inertial sensor modules are rated for 500g operating and 1000g non-operating shock survival. The Gyrocube3A is packaged in just under one cubic inch of volume. The module requires a single 5V supply and consumes only 135mW.

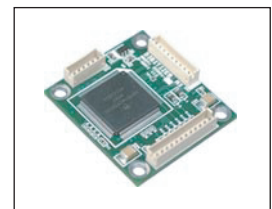
Angular rate outputs are available in three ranges of  $\pm 100^\circ/s$ ,  $\pm 200^\circ/s$  and  $\pm 400^\circ/s$ , with optional gain, output sensitivities can be configured to  $\pm 25^\circ/s$  full scale. Acceleration outputs are available in two ranges  $\pm 2g$  or  $\pm 10g$ , with optional gain, output sensitivities to  $\pm 0.5g$  full scale are available. Self test inputs are provided to verify proper operation.

Rate and acceleration outputs are buffered to drive up to 30mA. An unbuffered temperature output is also provided for thermal compensation, if desired. Outputs are terminated on a detent-locking header for reliable contact in dynamic environments. The wire-to-board connection allows mounting the module in any orientation. Preassembled cable sets are available for easy system integration.

An evaluation kit is available with everything needed to power and test a Gyrocube3A on a desktop or in your application. The evaluation kit includes a Gyrocube3A, connecting cables, AC power supply and a user manual. An optional digitizer unit is available for serial (RS-232) interfacing to a PC or users system. An optional milled aluminum enclosure is available for installations in rugged environments.

**APPLICATIONS**

- Platform Stabilization
- Motion Control Systems
- Inertial Guidance & Navigation
- Vehicle Stabilization & Control
- Antenna Tracking
- Attitude Reference Systems
- Seismic Event Sensing
- Motion Instrumentation
- Virtual Reality Input Sensing
- Vehicle Failsafe Systems



Optional Digitizer/MX A/D Converter Module

**ORDERING INFORMATION**

**STANDARD CONFIGURATIONS**

GYROCUBE 3A 23503- 0 0 0 - X A

$\pm 100^\circ/s$

$\pm 200^\circ/s$

$\pm 400^\circ/s$

02 =  $\pm 2g$

10 =  $\pm 10g$

REV

Standard stock configuration is  $\pm 200^\circ/s$  (40Hz) angular rate &  $\pm 2g$  (60Hz) acceleration. Custom bandwidth and mixed sensitivities/bandwidths are available. Please see price sheets.

**CUSTOM CONFIGURATIONS**

- Custom Bandwidth 1-40Hz (Rate) 1-100Hz (Accel.)
- Custom rate sensitivity to  $\pm 25^\circ/s$
- Custom Accelerometer sensitivity to  $\pm 0.5g$
- Mixed sensitivities
- Custom I/O Header (Removed or Reversed)
- Machined aluminum enclosures

**DISCLAIMER**

Data contained herein is believed to be reliable and accurate. O-Navi LLC assumes no liability for the use of any information contained herein, nor for any infringements of patents or other rights of third parties that may result from its use. No license is granted for any patent rights of O-Navi LLC.

**SPECIFICATIONS**

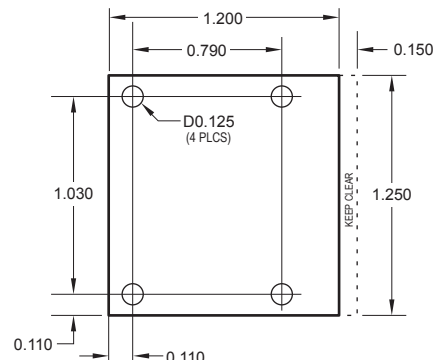
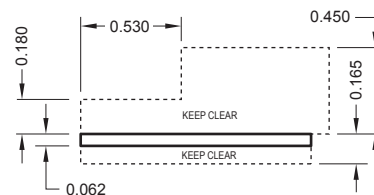
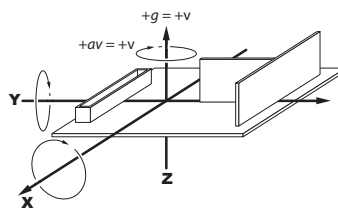
 Example 23503-200-0020-CA for  $\pm 200$   $\pm 2g$  Rev C Version (Other ranges available)

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS / REMARKS
<b>ANGULAR RATE</b>					
Dynamic Range		$\pm 200$		$^{\circ}/s$	Full Scale (F.S.) Range
Sensitivity	11.25	12.5	13.75	mV/ $^{\circ}/s$	@25°C
Sensitivity (Over Temp)	11.25		13.75	mV/ $^{\circ}/s$	4.75V < VCC < 5.25
Noise		0		$^{\circ}/s$	
Noise Density		0.05		$^{\circ}/s/\sqrt{Hz}$	@25°C
Bias		2.5		V	Fixed (Not ratiometric)
Bias Temp Drift			$\pm 300$	mV	
Non-Linearity		0.10		% F.S.	Best Fit Straight Line
Cross Axis Sensitivity		2		% F.S.	
Bandwidth		40		Hz	-3db
Self Resonant Freq		14		KHz	
Linear Acceleration Effect		0.2		$^{\circ}/s/g$	Any Axis
Voltage Sensitivity		1		$^{\circ}/s/V$	4.75V < VCC < 5.25V
Start-up Time		35		mS	To within $\pm 0.5^{\circ}/s$ of final
<b>ACCELERATION</b>					
Dynamic Range	$\pm 2$			g	Full Scale (F.S.) Range
Sensitivity	(250)	(312)	(375)	mV/g	@25°C
Sensitivity Drift over Temp		$\pm 0.5$		%	Delta from 25°C
Non-Linearity		0.2		% F.S.	Best Fit Straight Line
Noise Density		200	1000	$\mu g/\sqrt{Hz}$	@25°C
Bias		2.5		V	Ratiometric (V <sub>DD</sub> / 2)
Offset Drift		2.0		mg/ $^{\circ}C$	
Sensor Die Align Error		1		$^{\circ}$	
Cross Axis Sensitivity		$\pm 2$		%	
Bandwidth		50		Hz	-3db
Resonant Freq (Sensor)		10	4.0	kHz	
Supply Voltage Sensitivity		1.0		% / V	
Self-Test Deviation		10		%	
Start-up Time		<20		mS	BW: 50Hz
<b>TEMP SENSOR</b>					
Temperature Output		2.5		V	@25°C
Temperature Scale		8.4		mV/ $^{\circ}C$	
Temp. Output Drive			10	mA	Rev. C Only (50 $\mu$ A Rev B)
<b>ELECTRICAL</b>					
Inertial Signal Output	0.25		4.75	V	
Inertial Output Drive			30	mA	Indefinite S.C.
Supply Voltage	4.75	5.00	5.25	V	
Supply Current		27		mA	Vcc=5V
Power		135		mW	Vcc=5V
<b>PHYSICAL</b>					
Temp Range (OP)	-40		+85	$^{\circ}C$	Absl Max: -55 to +125°C
Temp Range (NOP)	-65		+125	$^{\circ}C$	
Shock (OP)			500	g	Any Axis 0.5mS
Shock (NOP)			1000	g	Any Axis 0.5mS
Humidity	0		90	% R.H.	Non-Condensing
Mass		7.0		gram	

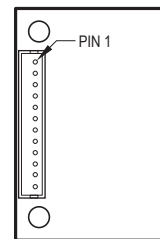
Dimensions: 30.5 X 31.75 X 15.62MM  
 Mounting Hole: Diameter 3.175mm (M3 or SAE 4-40)  
 Interface Connector: JST - B12B-ZR  
 Mating Connector: JST - ZHR-12

**OPTIONS**

I/O Cable (Flying Leads)	305-1206A
I/O Cable (Power Connector)	305-1235A
Digitizer Bridge Cable	305-1212A
AC Power Supply	310-0502A
Digitizer/MX ADC Module	DMX-23501
Stand-Off Kit (1/2" X 4-40) [w/Screws]	810-7440

**DIMENSIONS**

**TOP VIEW**

**Z PROFILE**
**AXIAL SENSITIVITY**

**CONNECTOR PINS**
**PINOUT**

- 1 - +5V
- 2 - RATE Z
- 3 - RATE Y
- 4 - RATE X
- 5 - ACCEL Z
- 6 - ACCEL Y
- 7 - ACCEL X
- 8 - TEMP
- 9 - ST1
- 10 - ST2
- 11 - GND
- 12 - GND


**SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE**