

SDI510

MEMS Quartz Tactical Inertial Measurement Unit

Ideal for High-Precision Applications:

- EO/FLIR Stabilization
- Radar Stabilization
- Gimbal & Platform Stabilization
- Targeting & Pointing Systems
- Motion Sensing & Compensation
- Flight Controls
- Various Rugged Defense Applications

Key Performance Features:

- **Enhanced Gyro Bandwidth (-20°Phase / 1 dB Gain at 100 Hz.)**
- **Low 0.012°/hr. Angle Random Walk**
- **19 in.³ Compact Size**
- **1°/hr. Gyro Bias Stability over Temperature**
- **Outputs Time of Validity (TOV) Data Strobe**
- **Accepts an Input Synch Pulse**
- **Robust Shock and Vibration Performance**



The SDI510 is a platform extension of SDI's proven, tactical grade SDI500 MEMS IMU. The SDI510 IMU integrates SDI's latest generation quartz gyros, quartz accelerometers and high speed digital signal processing into a compact, 19 in.³ package, providing for maximum flexibility in densely packed gimbal systems. The EO/IR optimized SDI510 IMU maintains extremely low 0.012°/hr. angle random walk while delivering low latency, high bandwidth and user selectable phase/gain options, enabling efficient gimbal control loops for clear, jitter free images. Combined with the 3200Hz gyro and 400Hz $\Delta V/\Delta \theta$ SDLC data frame rates available, the SDI510 IMU delivers a clear SWaPC advantage over alternative technologies.

Optimized for stabilization applications, the SDI510 IMU contains no moving parts and is rated for rugged military environments. The solid state hermetic quartz sensors and sealed IMU construction provide reliable 60,000 hr. MTBF and a 20 year operating and storage life. Continuous Built-in Test (BIT), configurable communications protocols, electromagnetic interference (EMI) protection, and flexible input power requirements make the SDI510 IMU versatile in a wide range of higher order integrated system applications.

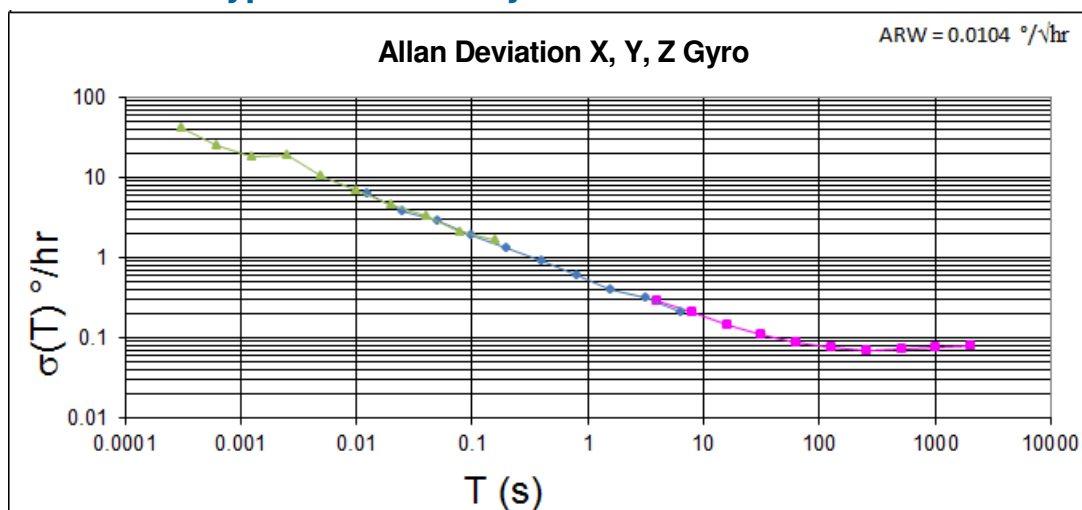
	Units	Measure	SDI510-AB00	SDI510-BB00	SDI510-CB00
System Performance					
Start Up Time for Valid Data Output	secs	max	<1.5		
Inertial Data ($\Delta V/\Delta \theta$) / Flight Control (SDLC)	Hz	nom	400 / 3200		
Low Latency Gyro Data (McASP)	Hz	nom	3200		
Bandwidth @ 100 Hz (McASP Selectable)	Phase	max	-20°		
	Gain	max	1 dB		

Gyro Channels					
Bias	deg/hr	1 σ	1.0	3.0	10.0
Bias In-run Stability	deg/hr	1 σ	1.0	1.5	2.0
Scale Factor Error	ppm	1 σ	<200	<300	<400
Angle Random Walk	deg/ $\sqrt{\text{hr}}$	1 σ	0.012	0.012	0.02
Angular Rate – Dynamic Range	deg/s	min	±490	±490	±490

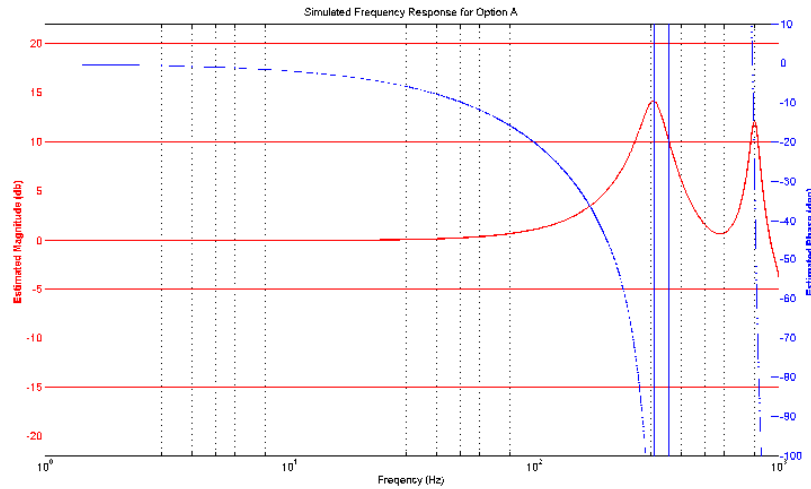
Accelerometer Channels					
Bias	milli-g	1 σ	1.0	1.5	2.0
Bias In-run Stability	μg	1 σ	100	200	200
Scale Factor Error	ppm	1 σ	<200	<300	<300
Random Walk Noise	$\mu\text{g}/\sqrt{\text{Hz}}$	1 σ	100	100	120
Acceleration - Calibrated Range	g	min	±50	±50	±50

System Physical & Environmental					
Input Voltage	Vdc		10 to 42		
Power	watts		<5.0		
I/O			RS232/422, SDLC, McASP		
Dimensions (height x diameter)	in		2.9 x 2.9		
Volume	cu in		19		
Weight	lbs		1.3		
Temperature	°C		-55 to +85		
Vibration (Operating)	g, rms		10		
Shock	g, ms		150, 11		
Operating Life	hrs		20		
Reliability @ 35°C	hrs		60,000 MTBF, ground: 7,000 MTBF, air cargo		

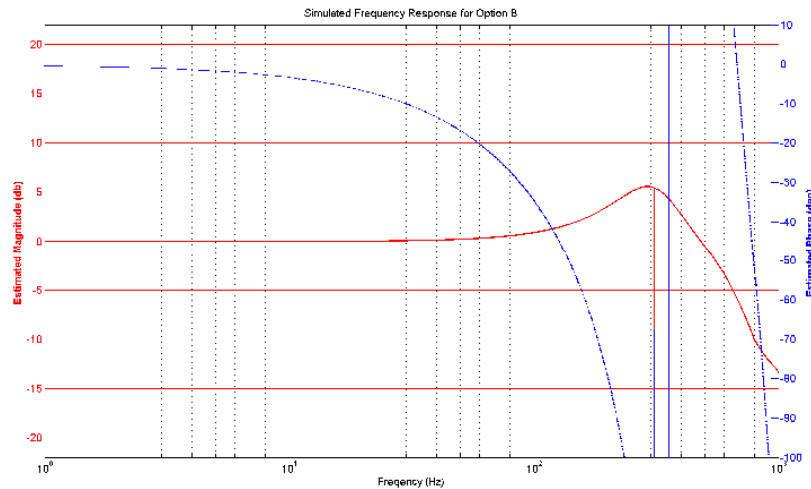
Typical SDI510 Gyro ARW Performance



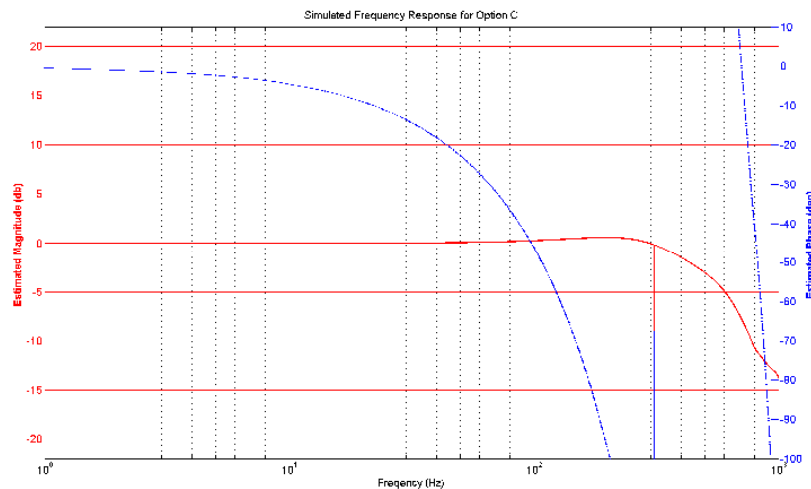
User Configurable SDI510 High Speed McASP Bandwidth Options



Response Curve @ 100 Hz
-20° Phase / 1 dB Gain



Response Curve @ 100 Hz
-35° Phase / 1 dB Gain



Response Curve @ 100 Hz
-45° Phase / 0 dB Gain

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