

MEMS LANDMARK10 GPS/AHRS



- **Low Cost Silicon MEMS AHRS & GPS**
- **Fully Compensated Bias, Scale Factor, Misalignment, g-Sensitivity, Heading & Altitude**
- **In Run Gyro Bias** *10° to 100%/hour typical*
- **Pitch, Roll & Yaw Angles** *0.5° typical*
- **Altitude** *±3 meter typical*
- **Spare Analog Port for Air Data or Wheel Counter**
- **GPS Receiver - 10Hz Position Update 16 Channel C/A Code**
- **Synchronized Timing Outputs for Inertial and GPS Data**
- **Supports DGPS, WAAS, EGNOS and MSAS**
- **Rechargeable Battery Power** up to (4 hrs int. / 12 hrs ext.)
- **Low Power** *< 600 milliwatts typical*
- **Light Weight** *< 149/189 grams (w/battery)*
- **Small Size** *< 115cm³/7in³*
- **Low Voltage** *+3.3V (single sided power)*
- **Sensor Bandwidth** *100 Hz*
- **RS485 Output** *200Hz/Inertial 10Hz/GPS*

Synchronized Timing & Rechargeable Battery Power

Export Classification: Commerce ECCN7A994

The all new MEMS LandMark10 GPS/AHRS is an ultra low power combined digital Attitude and Heading Reference System (AHRS) that provides internally temperature compensated RS485 output of delta velocity, delta theta, heading, pitch and roll angle and altitude information and a 16 channel C/A code GPS receiver with 10Hz position update rate.

The LandMark10 GPS/AHRS is ideal for applications requiring ultra low power consumption or autonomous power. A spare port is available for air data or wheel counter input that supports error correction for



turning errors. The signature feature of the LandMark10 AHRS is the performance, which is optimized with **fully compensated bias, scale factor, misalignment, g-sensitivity, heading, pitch and roll angle, altitude information and 10Hz update rate GPS with synchronized timing and rechargeable battery power.** The unit is highly durable and can withstand environmental vibration and shock typically associated with commercial aircraft requirements.

The LandMark10 GPS/AHRS offers various standard ranges and other customer options are available. This GPS/AHRS is well suited for low cost flight control, navigation, antenna stabilization and pointing, general aviation as well as laboratory use. The LandMark10 GPS/AHRS is ideal where excellent modeled performance, coupled with small size, ultra low or autonomous power and light weight are desired for MEMS digital GPS/AHRS applications.

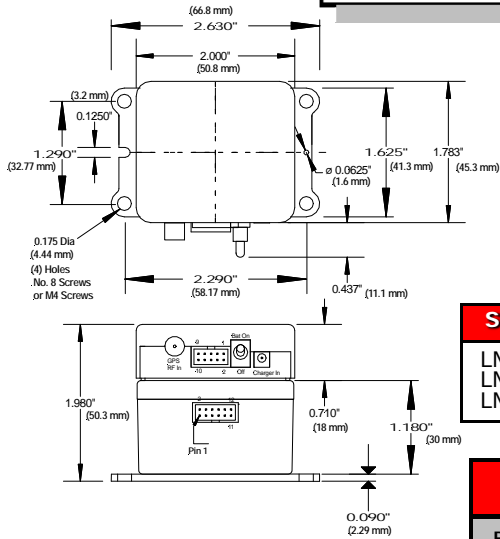


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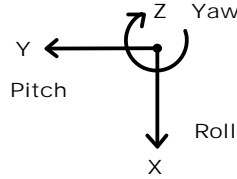
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MEMS LANDMARK10 GPS/AHRS



Axes (Top View) Right Hand Rule



Pin No.	AHRS Assignment
1	RS-485A
2	RS-485B
3	Power Ground
4	Digital Input (0 to 5V)
5	+3.3V ± 0.3V Input Power
6	Sync In (1kHz)
7	Analog Input (0 to 5V)
8	Signal Ground
9	Self Test Input (0 to 5V)
10	3.3V Regulator Out
11	5V Regulator Out
12	Case

Standard LandMark10 GPS/AHRS

LMRK10GPSA-300-12-100
LMRK10GPSA-150-02-100
LMRK10GPSA-075-02-100

Outputs	Serial Sequence at 200Hz or 100Hz (optional)
1, 2, 3	Gyros: Roll (X), Pitch (Y), Yaw (Z)
4, 5, 6	Accelerometers: (X), (Y), (Z)
7, 8, 9	Magnetometers: (X), (Y), (Z)
10	Pressure
11, 12, 13	Heading, Altitude, Temperature

GPS Output	Serial Data NMEA-1083
1	GGA-GPS Fix Data
2	GLL-Latitude & Longitude
3	GSA-DOP & Active Satellites
4	GSV-GPS Satellites in View
5	RMC-Recommended Min Data
6	VTG-Ground Speed
7	ZDA-Time & Date
8	DTM-Datum Reference
9	TXT-Text Transmission
10	(Other Data Selectable)

Pin No.	GPS Assignment
J1	GPS Antenna
1	+3.0V to +4.2 VDC Ext. Input
2	Power Ground
3	GPS RS485 A
4	GPS RS485 B
5	Signal Ground
6	Battery Out (to AHRS)
7	/RE (Not Read Enable)
8	DE (Drive Enable)
9	1kHz Sync Pulse (to AHRS)
10	+3.3V Power

PARAMETER	RATE AXES	ACCEL AXES		
Power Requirements				
Input Voltage	+3.0V to 4.2VDC (or internal battery at 3.7V)			
Input Current <i>Typical (Max)</i>	600mW (750mW)			
Battery Life	4 hours <i>typical (internal battery)</i> / 12 hours <i>typical (external battery)</i>			
Performance				
Standard Full Scale Ranges	±75°/sec or ±150°/sec	±300°/sec	±1.7 g's	±12 g's
Scale Factor Error %	≤1% (over temperature)			
Bias In-Run Stability	10° to 100°/hour <i>typical</i>		0.5mg <i>typical</i>	2mg <i>typical</i>
Bias Over Temperature	<0.2°/sec <i>typical</i>		<3mg <i>typical</i>	<10mg <i>typical</i>
Resolution	0.03°/sec	0.075°/sec	0.3mg	2mg
Noise	0.05°/sec/√Hz	0.1°/sec/√Hz	0.07mg/√Hz	0.5mg/√Hz
Alignment	1mrad <i>typical</i>			
G-Sensitivity	≤0.10°/sec/g <i>typical</i>			
GPS Accuracy	2.5 m CEP			
Heading	±0.5° <i>typical</i>			
Altitude	±3m <i>typical</i>			
Start-Up Time (Inertial)	< 1 sec			
GPS Acquisition (Cold Start)	< 30 sec			
GPS Reacquisition (Warm Start)	< 1 sec			
Update Rate (Inertial)	200 Hz or 100 Hz (user selectable)			
Data Rate (GPS)	10 Hz <i>typical</i>			
Weight	< 189 grams or < 149 grams (without battery)			
Size	<i>U.S.</i>	2.0 x 1.98 x 1.783 = 7.0 in ³		
	<i>Metric</i>	5.1 x 5.0 x 4.5 = 116 cm ³		
Operating Life	10 Years <i>typical</i>			
Environments				
Operating Temperature	-40°C to +85°C (w/out battery) / -30°C to +70°C (with battery)			
Storage Temperature	-55°C to +100°C (w/out battery) / -30°C to +70°C (with battery)			
Vibration Operating	6gRMS (12g accelerometers)			
Shock	500g's ½ sine 30 msec powered, any axis			

Specification subject to change without notice



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