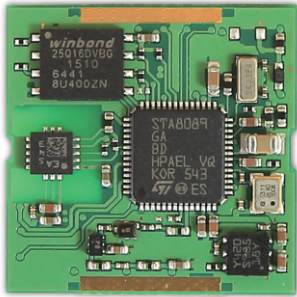


Hummingbird Series



Automotive Dead-Reckoning



20.8 x 20.8 x 2.1 mm



Multi-GNSS
GPS/Glonass/
Beidou/Galileo/QZSS



Automotive Grade
AEC-Q Certified



3D Dead Reckoning
Vertical Positioning



Multi-Interfaces
Odometer, CanBus



High Positioning
Accuracy



Integrated 3D Gyroscope &
Accelerometer Sensors



Anti-Jamming
Technology



Reliable Quality
ROHS, CE, FCC

Hummingbird X1

Multi-GNSS Automotive DR Module

Product Description

The Hummingbird X1 is the first “fully automotive grade” Multi-GNSS Dead Reckoning module available worldwide. It is available in a compact QFN package of 20.8 x 20.8 x 2.1 mm.

The Hummingbird X1 is uniquely designed with over 50 AEC-Q certified components. It is based on market-proven STmicro’s TESEO III GNSS engine, and comes with embedded 6-axis Gyroscope and Accelerometer to offer the best dead-reckoning performance.

Hummingbird X1 can track up to three constellations simultaneously with full support for GPS, QZSS, Glonass, Beidou and is also Galileo ready. It supports superior positioning accuracy of < 1.5 m CEP, with support for SBAS.

The Hummingbird X1 incorporates a complete set of high-quality automotive grade components including 6-axis MEMS sensor, 16Mbits Flash, TCXO, RTC Crystal, LDO, SAW Filter, and an additional LNA to provide the most reliable dead-reckoning performance right out of the box without the need for any additional components.

The Hummingbird X1 offers interfaces and support for both CAN-Bus and Odometer, as well as UART for NMEA output.

GlobalTop’s industry leading firmware customization service is also available for Hummingbird X1 to provide an ideal and personalized solution for automotive customers.

All modules are produced at GlobalTop’s in-house ISO 9001:2008 and TS16949** certified manufacturing facility, with 100% unit testing and complete quality control, allowing for a consistent annual yield rate of 99.98%.

With compact size, best in class automotive DR chipset, embedded 6-axis MEMS sensor and outstanding RF sensitivity and performance, the Hummingbird X1 is an unbeatable choice for Automotive DR Multi-GNSS positioning.

** In process of acquiring TS16949 certification.

Highlights

- Fully Automotive Dead Reckoning Odometer, and CAN-Bus
- Integrated 6-axis Gyro and Accelerometer
- More than 50 AECQ certified components
- Based on latest ST TESEO III Engine
- Multi-GNSS with triple constellation support

Applications

- | | |
|-----------------------------|-----------------------------|
| Automotive navigation | Personal, pet tracking |
| Fleet management | Marine Navigation |
| Animal Navigation | Autonomous Navigation |
| eCall / ERA-GIONASS systems | UAV (unmanned air vehicles) |
| Avionics | Pedestrian DR |
| Usage-based insurance | Emergency services |

Ordering Information

- | | |
|-------------------------|--|
| Part number | GSM-8901 |
| Default Constellation | GPS / Glonass |
| Packaging | Tape on reel |
| Evaluation Kit | GSM-8901-EVB-KIT |
| Firmware configurations | UART + Odometer (Default)
UART + Canbus (On demand) |

Samples and EVAL-Kits available Q2, 2016.

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Hummingbird X1

Automotive Dead Reckoning Module

Track with GlobalTop

Quality Innovation

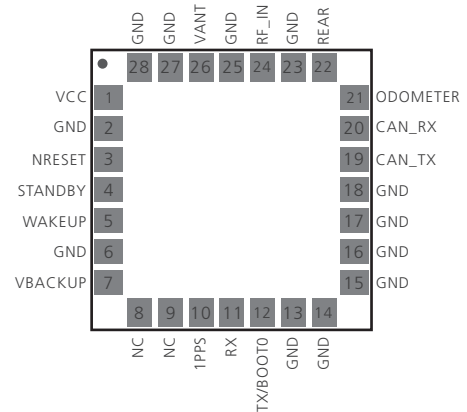
Customization Longevity

Product Features

Receiver Type	ST8089 Engine (AEC-Q100)			
CPU	ARM964 MCU (196 Mhz)			
Frequency Bands	GPS L1, GLONASS L1, QZSS L1 BEIDOU B1, GALILEO E1, SBAS L1			
Channels	48 tracking channels 2 fast acquisition channels			
DGPS (SBAS)	USA	EU	Japan	India
	WAAS	EGNOS	MSAS	GAGAN
Positioning Accuracy	Minimum	< 1.5 m		
	Typical	< 3.0 m		
	SBAS	< 2.5 m		
Velocity Accuracy	0.05 m/s (with SBAS) 0.10 m/s (without SBAS)			
Timing Accuracy (1 PPS)	TBD			
Maximum Altitude	100000 m			
Minimum Altitude	-1500 m			
Maximum Velocity	600 m/s			
Maximum Acceleration	2G			
Anti-Jamming	Yes			
AGPS	7 to14 days prediction			
Built-In Components	TCXO, RTC Crystal, Additional LNA SMPS, SAW Filter, 16Mbits Flash			
MEMS Sensor	6-axis Gyroscope & Accelerometer			
Antenna	External			

Dimensions

28-Pad QFN Package	20.8 x 20.8 x 2.1 mm
Weight	2.3 g
Pinout	



Electrical Data

Supply Voltage	2.7 V to 3.6 V (Typical 3.3 V)		
Backup Supply	2.0 V to 4.3 V (Typical 3.0 V)		
Power Consumption**	Minimum	Typical	Maximum
	Acquisition	72 mA	78 mA
	Tracking	71 mA	81 mA
	Standby Mode	73 µA (Typical)	

** Including power consumption of MEMS Sensors & Flash Memory

Environmental Data and Approvals

Operating Temperature	- 40°C to 85°C
Storage Temperature	- 40°C to 85°C
Operating Humidity	5% to 95% (no condensing)
Approvals and Compliance	CE, FCC, ROHS, REACH, E911
All internal components AEC-Q qualified	
Qualification according to ISO16750	
Manufactured and tested at ISO9001:2008 and TS16949 certified facility	

Firmware Customization

Parameters and Sensors can be configured
Various Dead Reckoning configurations offered

Sensitivity

TTFF (time-to-first-fix)	Open Sky, Stationary	
	Hot Start	1 Second
	Warm Start	34 Seconds
	Cold Start	35 Seconds
Sensitivity	Tracking - 162 dBm	
	Acquisition - 145 dBm (Cold Start)	
	Re-acquisition - 155 dBm (Hot Start)	

Interfaces

Serial Interfaces	UART, Odometer, CAN-Bus
Max. Baud Rate	115200 bps (Default : 9600 bps)
Max. Update Rate	10 Hz (Default : 1 Hz)
Digital I/O	1 PPS
Protocols	NMEA 0183 v3.01 NMEA Command

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