

AsteRx1: GPS/Galileo Single-frequency OEM Receiver

The AsteRx1 receiver is the first product in a new family of GNSS receiver boards for demanding industrial applications. AsteRx1 is a creditcard-sized OEM board with low power consumption and high update rates, featuring proven high-quality all-in-view GPS and Galileo tracking and offering excellent measurement quality for high precision positioning, even in challenging environments.

First Industrial Galileo-ready Receiver

The AsteRx1 OEM board is a next generation L1 GPS/Galileo/SBAS OEM receiver platform. It is designed for high-performance single-frequency applications. AsteRx1 features 24 single-frequency channels for all-in-view mixed GPS/Galileo and SBAS tracking. Optionally, all 24 channels can be used for a single satellite constellation. Both GIOVE and Galileo modulations are supported ensuring Galileo support from today on. While AsteRx1 offers access to the signals from tomorrow, it offers an exquisite GNSS module for demanding GPS applications today.

Innovative Technology for Exceptional Performance

Innovative new technology is introduced to maximally benefit from the performance improvement possibilities inherent in the new signals. Longer code lengths and advanced modulation techniques of the Galileo BOC(1,1) signal promise lower noise tracking and lower sensitivity for multipath signals. Septentrio's A Posteriori Multipath Estimator (APME), unique in its ability to tackle short-delay multipath, maximally exploits these benefits. A dedicated acquisition unit avoids long acquisition times inherent to longer code lengths, offering faster acquisition for Galileo signals than was even available for GPS before using traditional techniques.



This results in very robust acquisition and tracking, maintaining excellent low-noise measurement quality for both code and carrier phase, the basis for precise position information and detailed signal and signal quality information. Moreover, high update rates (up to 50 Hz) and low latency (below 10ms, independent of update rate) guarantee flexible deployment even in high-dynamic environments.

Easy to integrate

AsteRx1 features low power consumption (<1W) and is available in a compact OEM board version, making it suitable for on-board as well as portable battery operated applications. For ready-to-use solutions, the AsteRx1 can be delivered in a waterproof IP65 rugged enclosure with sturdy connectors, allowing usage in tough conditions. Flexible configuration, a powerful command language, a variety of detailed output messages and formats suited for automation, serial and USB2.0 interfaces,

all facilitate the work of the system integrator.

Last but not least, as with all Septentrio GNSS receivers, an intuitive, Qt-based GUI - RxControl - can be used with the AsteRx1 for its configuration, for logging and remote control. Moreover, RxControl includes a host of enhanced visualization features. RxControl is available both on Windows and Linux platforms, as well as on WindowsMobile for PDA platforms (as RxMobile).

Future proof

A competitive GPS engine today, with seamless evolution to the new environment with Galileo tomorrow, AsteRx1 offers the ideal future-proof platform for system integrators, planning for maximal performance without the need for hardware upgrades. To this end, the AsteRx1 platform also conforms to the latest legislation, including the European Union's RoHS (Restriction of Hazardous Substances) directive.

ASTERX1 TECHNICAL SPECIFICATIONS

FEATURES

- Single-frequency L1 code/carrier tracking of Galileo and GPS signals
- 24 hardware channels for simultaneous tracking of all visible satellites in Galileo + GPS constellations
- Includes up to 3 SBAS channels (EGNOS, WAAS, other)
- Raw data output (code, carrier, SBAS navigation data)
- Up to 50 Hz raw measurement and 20 Hz PVT output rate (user selectable)
- A Posteriori Multipath Estimator technique (APME)
- Differential GPS (rover)
- x PPS output (x = 0.1, 0.5, 1, 2, 5, 10)
- EGNOS and WAAS compatible
- Provision of protection levels in SBAS positioning mode (HPL/VPL)
- RAIM included
- Three serial ports (RS232/LVTTL) and 1 full speed USB port
- Highly compact and detailed Septentrio Binary Format (SBF) output, up to 50 Hz
- NMEA v2.30 output format, up to 5 Hz
- Compact creditcard-size OEM board solution
- OEM board or mounted in IP65 waterproof enclosure
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

OPTIONS

- Differential GPS base station
- RTK (single-frequency)
 - RTCM v2.3 or 3.0 input/output
 - Reference Station Network compatible (FKP)
 - CMR 2.0
- 2 Event markers

FEATURES

Position accuracy ^{1,2,3}		
	Horizontal	Vertical
Standalone	1.7 m	3 m
SBAS	0.7 m	1.2 m
DGPS	0.35 m	0.65 m
RTK ⁴	0.2 m	0.35 m
Velocity Accuracy ^{1,2,3}		
	Horizontal	Vertical
Standalone	5.0 mm/sec	8.0 mm/sec
Maximum Output rate		
		50 Hz
Latency		
		< 10 msec
Time accuracy ³		
1PPS		20 nsec
Measurement precision ^{1,3,5}		
C/A pseudoranges		5 cm (GPS) ⁶ 15 cm (GPS) ^{7,8} 30 cm (GPS) ^{7,9} 8 cm (Galileo L1 BOC) ^{7,8} 35 cm (SBAS) ^{7,8}
L1 carrier phase		<1 mm
L1 doppler		20 mHz
Time to first fix		
Cold start ¹⁰		50 sec
Warm start ¹¹		40 sec
Hot start ¹²		15 sec
Re-acquisition		0.5 sec
Tracking performance (C/N₀ threshold) ^{13,14}		
Code phase tracking		19 dB-Hz
Carrier phase tracking		26 dB-Hz
Acquisition		33 dB-Hz
Acceleration		20 g
Jerk		3 g/sec

- 1 1 Hz measurement rate
- 2 Performance depends on environmental conditions
- 3 1 σ level
- 4 Float solution, after convergence
- 5 C/N₀ = 45 dB-Hz
- 6 Smoothed
- 7 Non-smoothed
- 8 Multipath mitigation disabled
- 9 Multipath mitigation enabled
- 10 No information available (no almanacs, no approximate position)
- 11 Almanacs and approximate position known, no ephemeris known
- 12 Almanacs, ephemeris and approximate position known
- 13 95%
- 14 Max speed 515 m/sec, max altitude 18 000 m

PHYSICAL AND ENVIRONMENTAL

Size	56 x 76 x 9 mm
Weight	25g
Input voltage	5 VDC \pm 5%
Antenna LNA Power Output	
Output voltage	+ 5VDC
Maximum current	200 mA
Power consumption	
	< 1 W
Operating temperature	
	-45 to +85°C
Storage temperature	
	-55 to +85°C
Humidity	
	5% to 95% (non condensing)
Input/Output Connectors	
I/O connector	2x40 pins (SAMTEC SFM)
Antenna	MMCX
Communications	
	3 serial ports (S232/LVL-TTL) up to 115 kbps (user configurable)
	1 full speed USB 2.0

OTHER SEPENTRIO PRODUCTS

PolaRx2e and PolaRx2e_OEM - Dual-frequency GNSS receiver platform for high-end applications. Based on code and carrier tracking of the L1 and L2 signals, it provides the user with satellite range measurements and position, velocity and time.

PolaRx2eH - A unique single-board dual-frequency dual-antenna receiver - suitable to being connected to 2 dual-frequency antennas, brings heading and machine control applications within economic and practical reach.

PolaRx2e@ - A unique single-board dual-frequency receiver that can be connected to up to 3 antennas, for various heading/attitude and other multi-antenna applications.

PolaRx2C - The PolaRx2C can track up to 4 satellites in L2C mode. For these satellites, the CA, P1, P2 and L2C measurements are available simultaneously.

GeNeRx1 - A combined GPS/Galileo receiver, which can be flexibly configured to simultaneously track Galileo as well as GPS satellites in multi-frequency mode. All Galileo frequencies and modulations are supported.

PolaNt - A lightweight precise positioning and survey single or dual-frequency antenna for use with PolaRx family.

RxControl - RxControl is an intuitive user interface to configure and control all types of PolaRx receivers and monitor, log and post data remotely.

RxMobile - A unique intuitive, portable GUI field controller for the PolaRx receivers. RxMobile allows controlling the receiver, monitoring the navigation solution and accessing its functions in the field in the same intuitive way as with RxControl.



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