

## AsteRx1: GPS/Galileo Single-frequency OEM Receiver

*AsteRx1 receiver is a member of an innovative 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

AsteRx1 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. While AsteRx1 offers access to the signals of 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 to 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 and GPS signals than was available for GPS 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, AsteRx1 can be delivered in a waterproof IP65 rugged enclosure with sturdy connectors, allowing use 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 AsteRx1 for configuration, 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

- 24 hardware channels for simultaneous single-frequency L1 code/carrier tracking of GPS and Galileo (optional) signals
- L1 RTK
- 50 Hz data output rate (user selectable)
- A Posteriori Multipath Estimator technique (APME)
- Differential GPS (rover, base station option)
- Includes up to 3 SBAS channels (EGNOS, WAAS, other)
- x PPS output (x = 0.1, 0.5, 1, 2, 5, 10)
- Provision of protection levels in SBAS positioning mode (HPL/VPL)
- 2 Event markers
- RAIM included
- Raw data output (code, carrier, SBAS navigation data)
- Three serial ports (RS232- Housed receiver, LVTTTL-OEM Board)
- 1 full speed USB port
- Highly compact and detailed Septentrio Binary Format (SBF) output
- NMEA v2.30 output format, up to 10 Hz
- Compact creditcard-size OEM board solution
- OEM board or mounted in IP65 waterproof enclosure
- Different models available
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

## OPTIONAL UPGRADE POSSIBILITIES

- Optional high data rate capability (Up to 50 Hz raw measurement and 50 Hz PVT output rate)
- Optional RTK (single-frequency)
- Optional Galileo L1 tracking and PVT



AsterX1 OEM



AsterX1



Integrator Kit

## PERFORMANCE

### Position accuracy<sup>1,2,3</sup>

	Horizontal	Vertical
Standalone	1.7 m	3 m
SBAS	0.9 m	1.6 m
DGPS	0.5 m	0.9 m
RTK <sup>4</sup>	0.2 m	0.35 m

### Velocity Accuracy<sup>1,2,3</sup>

	Horizontal	Vertical
Standalone	2 cm/sec	4 cm/sec

### Maximum Output rate Latency

50 Hz
< 20 msec

### Time accuracy<sup>3</sup>

1PPS	10 nsec
Event accuracy	< 8 nsec

### Measurement precision<sup>1,3,5</sup>

C/A pseudoranges	5 cm (GPS) <sup>6</sup>
	16 cm (GPS) <sup>7,8</sup>
	8 cm (Galileo L1 BOC) <sup>1,8</sup>
	35 cm (SBAS) <sup>1,8</sup>

L1 carrier phase < 1 mm

L1 doppler 0.2 Hz

### Time to first fix

Cold start <sup>10</sup>	50 sec
Warm start <sup>11</sup>	15 sec
Re-acquisition	0.5 sec

### Tracking performance (C/N<sub>0</sub> threshold)<sup>12,13,14</sup>

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 1σ level

4 Float solution, after convergence

5 C/N<sub>0</sub> = 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 Ephemeris and approximate position known

12 95%

13 Max speed 515 m/sec, max altitude 18 000 m

14 Depends on user settings of tracking loop parameters

## PHYSICAL AND ENVIRONMENTAL

Size	59 x 76 x 9 mm
Weight	40g
Input voltage	5 VDC ± 5%
Antenna LNA Power Output	
Output voltage	+ 5VDC
Maximum current	200 mA
Power consumption	1.2 W typ.
Operating temperature	-40 to +70°C
Storage temperature	-40 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 (RS232/LVL-TTL) up to 460 kbps (user configurable)	
1 full speed USB 2.0	

## OTHER SEPTENTRIO PRODUCTS

**AsterX2** - Compact dual-frequency GNSS receiver platform, offering top-quality GPS code and carrier phase data and dual-frequency positioning (including DGPS and L1/L2-RTK) at up to 20 Hz, with a seamless upgrade possibility to GLONASS.

**PolarX2eH and PolarX2e@** - A unique single-board dual-frequency multi-antenna receiver that can be connected to 2, respectively 3 antennas, for various machine control, heading/attitude and other multi-antenna applications.

**PolarX3G** - A high-performance integrated dual-frequency GNSS receiver that provides access to the new and upcoming Galileo signals. The modernized GPS signals are also supported.

**PolarX3TR** - A high-performance integrated dual-frequency GNSS Timing/Reference receiver.

**PolarNt\*** - A lightweight precise positioning and survey single or dual-frequency GPS or GPS/GLONASS antenna for use with the 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.

Specifications subject to change without notice. Certain features and specifications may not apply to all models.  
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