

AsteRxi: IMU enhanced GPS/GLONASS Dual-frequency Receiver

AsteRxi processes high-quality GNSS measurements with IMU-measurements to generate an enhanced integrated position. This results in an all-in-view dual-frequency GPS/GLONASS receiver capable of providing precise positioning in shadowed environments where GNSS-only receivers fail. In addition attitude information such as heading, pitch and roll is provided. AsteRxi is available in both dual frequency (AsteRx2i) and single frequency (AsteRx1i) configuration.

Industrial GPS/GLONASS Receiver

The AsteRxi receiver family is powered by a high-end L1/L2 GPS/GLONASS/SBAS OEM receiver engine. With its 136 hardware channels it is designed for high-performance single- or dual-frequency applications.

The receiver provides cm- level positioning as well as an extensive set of measurements (raw data, position velocity, acceleration, time). Septentrio's A Posteriori Multipath Estimator (APME), unique in its ability to tackle short-delay multipath, further enhances the quality of the measurement and position data generated with the receiver.

This positioning engine has been extended with IMU processing capability.

IMU integration providing extra robustness

Signal blocking by buildings, trees, mountains and other obstructions provide limitations to applicability of GNSS in the most challenging professional applications requiring high-precision position data. Besides tracking GPS and GLONASS satellites, resulting in improved availability,



Integrated GNSS-IMU solution
GNSS only solution



the loosely coupled integration with IMU measurements allows AsteRxi to deliver precise position data, where conventional GNSS receivers can't. Additionally the integrated solution provides position data at up to 50 Hz as well as heading and attitude measurements. AsteRxi supports various grades of IMU's.

Easy to integrate

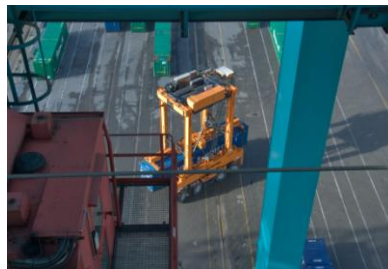
AsteRxi features low power consumption and is available in a compact OEM board version, making it suitable for on-board as well as portable battery operated

applications. Next to the OEM-version a compact waterproof plastic housing is available. A single cable provides power and communication between receiver and IMU, enabling flexible and easy integration.

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.

As with all Septentrio GNSS receivers, an intuitive GUI - RxControl - can be used with the AsteRxi 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 (RxMobile).



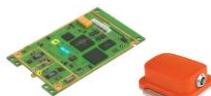
AsteRxi providing position under cranes on container yard

ASTERXi TECHNICAL SPECIFICATIONS

FEATURES

- Single -frequency L1 code/carrier tracking of GPS
- Dual-frequency L1/L2 code/carrier tracking of GPS and GLONASS signals.
- 136 hardware channels for simultaneous tracking of all visible satellites in GPS and GLONASS constellations
- 50 Hz data output rate (user selectable)
- IMU integration (loosely coupled)
- Real Time Kinematic (RTK)
- Differential GPS (base station and rover)
- Moving Base operation
- A Posteriori Multipath Estimator technique (APME)
- Includes up to 3 SBAS channels (EGNOS, WAAS, other)
- Innovative and flexible power management under user control
- x PPS output (x = 0.1, 0.5, 1, 2, 5, 10)
- 2 Event markers
- Raw data output (code, carrier, navigation data, IMU data)
- Three serial ports (LVTTTL - OEM Board, RS232 - AsteRxi HDC)
- 1 full speed USB port
- Highly compact and detailed Septentrio Binary Format (SBF) output
- NMEA v2.30 output format, up to 10 Hz
- RTCM v2.2, 2.3, 3.0 or 3.1
- CMR2.0 and CMR+
- Compact OEM board and housed solutions
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

ASTERXi PRODUCTS



AsteRx2i OEM



AsteRx1i / AsteRx2i HDC

PERFORMANCE

Position accuracy^{1,2,3,6}		
	Horizontal	Vertical
Standalone	1.0 m	1.6 m
SBAS	0.5 m	0.7 m
DGPS	0.4 m	0.8 m
RTK performance^{1,14}		
Horizontal accuracy ³	0.6 cm + 0.5ppm	
Vertical accuracy ³	1cm + 1ppm	
Average time to fix ⁴	7 sec	
Velocity Accuracy^{1,2,3}		
	Horizontal ³	Vertical ³
Standalone	0.8 cm/sec	1.3 cm/sec
Attitude Accuracy^{1,2}		
Heading	1.0°	
Pitch/Roll	0.5°	
Maximum Update rate		
	50 Hz	
Latency		
	< 20 msec	
Time accuracy³		
1PPS	10 nsec	
Event accuracy		
	< 10 nsec	
Measurement precision^{1,3,5}		
C/A pseudoranges	5 cm (GPS) ⁶	
	0.16 m (GPS) ^{7,8}	
	7 cm (GLONASS) ⁶	
	0.25 m (GLONASS) ^{7,9}	
GPS P2 pseudoranges ⁷	0.1 m	
GLONASS P pseudoranges ⁷	0.1 m	
L1/L2 carrier phase	1 mm	
L1/L2 doppler	0.02 Hz	
Time to first fix		
Cold start ¹⁰	< 45 sec	
Warm start ¹¹	< 20 sec	
Re-acquisition	avg 1.2 sec	
Tracking performance (C/N₀ threshold)^{12,13,15}		
Tracking	26 dB-Hz	
Acquisition	33 dB-Hz	
Acceleration ¹⁶	10 g	
Jerk ¹⁷	4g/sec	

- 1 1 Hz measurement rate
- 2 Performance depends on environmental conditions
- 3 1σ level
- 4 Baseline < 20 km
- 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 Ephemeris and approximate position known
- 12 95%
- 13 Max speed 600 m/sec
- 14 Fixed ambiguities
- 15 Depends on user settings of tracking loop parameters
- 16 During acquisition
- 17 During tracking

PHYSICAL AND ENVIRONMENTAL

Size	60 x 90 mm (OEM) 58 x 58 x 22 mm (IMU)
Weight	510 g (AsteRx2i HDC) 50 g (IMU)
Input voltage	9-30 VDC (HDC)
Antenna LNA Power Output	
Output voltage	+ 5VDC
Maximum current	200 mA
Power consumption	
AsteRx1i OEM incl. IMU	1.7W typical, 2W Max
AsteRx2i OEM incl. IMU	2W typical, 2.5W Max
Operating temperature	
	-40° to +70° C
(IMU)	-20° to +60° C
	-40° to +85° C
Storage temperature	
Humidity	5% to 95% (non condensing)
Single IMU PWR/COM cable	ODU 16 to 7 pins
Connectors	
Antenna	TNC female
Power (HDC Housing)	ODU 5 pins female
COM1 (HDC Housing)	ODU 16 pins female
COM2 (HDC Housing)	ODU 16 pins female

OTHER SEPTENTRIO PRODUCTS

AsteRx1 - Compact single-frequency GNSS receiver platform, offering top-quality GPS and Galileo code and carrier phase data and single frequency positioning (including GPS DGPS and L1-RTK) at up to 50 Hz.

AsteRx2e - Compact dual-frequency GPS/GLONASS receiver platform, offering top-quality GPS code and carrier phase data and dual-frequency positioning (including DGPS and L1/L2-RTK) at up to 25 Hz.

AsteRx2eH - A unique single-board dual-frequency multi-antenna GPS/GLONASS receiver in a waterproof aluminum housing, that can be connected to 2 antennas for various machine control, heading and other multi-antenna applications.

PolaRx3e/3eG/3eTR - A family of versatile high-accuracy dual-frequency GNSS receivers for precise positioning and navigation applications. Next to high-quality GPS measurements, it provides GLONASS dual-frequency data as well as modernized GPS (L2C). PolaRx3eG provides data to the new and upcoming Galileo signals whereas PolaRx3eTR is a dedicated GPS/GLONASS/GALILEO Timing/Reference receiver.

PolaRx2e@ - A unique single-board dual-frequency 3-antenna receiver for various machine control, attitude and other multi-antenna applications.

PolaNt* - 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 Septentrio 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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