Septentrio
satellite navigation

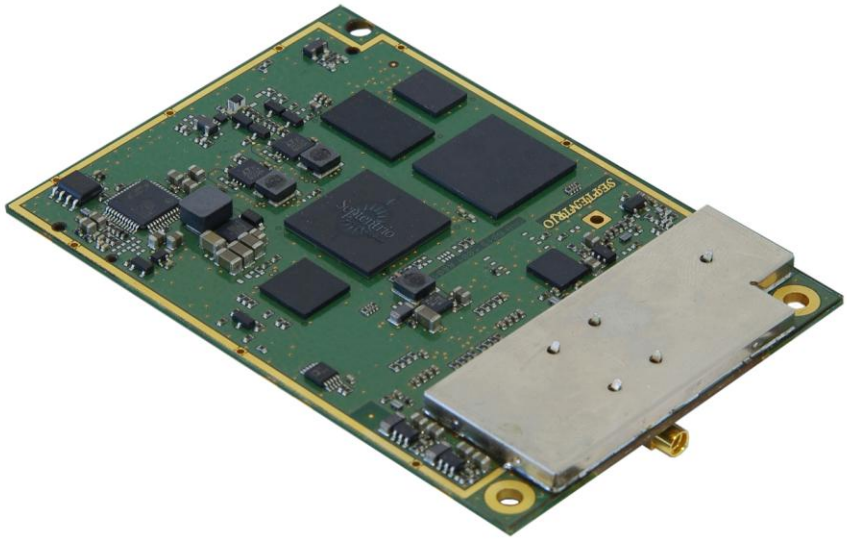
AsteRx3: GNSS Multi-frequency Receiver

AsteRx3 is a multi-frequency GPS/GLONASS/Galileo receiver for demanding industrial applications. AsteRx3 features proven simultaneous high-quality GPS, GLONASS and Galileo tracking and a range of innovative features, such as the patented Galileo AltBOC tracking, the advanced multipath mitigation algorithm APME, LOCK+ tracking for exceptional tracking stability under high vibration conditions, RTK+ for extended RTK baselines and faster initialisation, and AIM+, Septentrio's Advanced Interference Mitigation technology. AsteRx3 is plug-in compatible with AsteRx2 and AsteRx2e GPS/GLONASS receivers, allowing users the easiest possible preparation for and switchover to modernized GNSS signals from all constellations.

Tracking all visible signals

The AsteRx3 receiver family is powered by a next generation L1/L2/L5/E5ab AltBOC GPS/GLONASS/Galileo/SBAS/COMPASS-ready OEM receiver engine. Built around the 136 channel multi frequency multi constellation GReCo3 ASIC AsteRx3 is designed for high-performance multi-frequency applications.

The receiver provides high quality cm- level positioning as well as an extensive set of measurements at up to 100 Hz raw data and position including RTK at up to 25 Hz. 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.



GNSS+™ technology

AsteRx3 hosts a suite of innovative tracking positioning algorithms specifically designed for the demanding industrial environment. These include:

- **APME+** extends APME to GLO, GAL and COMPASS
- **Lock+** exceptional stable tracking under high vibration conditions resulting in significant higher availability.
- **RTK+** extended RTK baselines and faster initialization.
- **AIM+** advanced Interference mitigation successfully protecting receivers against in-band continuous wave interference signals. A user selectable spectrum plot is available for interference signal identification.
- **ATrack+** patented Galileo AltBoc tracking.

Easy to integrate

AsteRx3 is plug-in compatible with AsteRx2 and AsteRx2e making the upgrade from a dual-frequency to a multi-frequency application virtually effortless.

As all AsteRx receivers, AsteRx3 is available as OEM board, or integrated in a compact waterproof hardplastic housing (AsteRx3 HDC). Flexible configuration, a powerful command language, a variety of detailed output messages and formats suited for automation, serial, Ethernet and USB2.0 interfaces, all facilitate the work of the system integrator.

Command and control

As with all Septentrio GNSS receivers, an intuitive GUI – RxControl – can be used with the AsteRx3 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).

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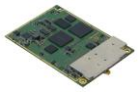
AsteRx3 Technical Specifications

Features

- Multi-frequency L1/L2/L5/E5abAltBoc code/carrier tracking of GPS, GLONASS and GALILEO signals
- COMPASS ready
- 136 hardware channels for simultaneous tracking of all visible satellites in GPS GLONASS and GALILEO constellations
- Raw data output (code, carrier, navigation data)
- A Posteriori Multipath Estimator technique (APME)
- Moving Base support
- GNSS+ pack containing APME+, Lock+, RTK+, AIM+ and ATrack+
- Includes up to 3 SBAS channels (EGNOS, WAAS, other)
- 100 Hz measurements, SBAS, DGPS and SA PVT [2], 25Hz RTK (user selectable)
- x PPS output (x = 1, 2, 5, 10)
- 2 Event markers
- RAIM included
- Innovative and flexible power management under user control
- 4 hi-speed serial ports (OEM)
  3 hi-speed serial ports (HDC)
- 1 Ethernet port
- 1 full speed USB port
- 2 GB standard on-board logging (up to 32GB optional) (HDC only)
- Plug compatatible with AsteRx2 and AsteRx2e
- 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 IP65 housed solutions
- Includes intuitive GUI (RxControl) and detailed operating and installation manual



AsteRx3 OEM

Integrator Kit

AsteRx3 HDC

Performance

Position accuracy[1,2,3,6]

	Horizontal	Vertical
Standalone	1.3 m	1.9 m
SBAS	0.6 m	0.8 m
DGPS	0.5 m	0.9 m

RTK performance[1,14]

Horizontal accuracy[3]	0.6 cm + 0.5 ppm
Vertical accuracy[3]	1 cm + 1ppm
Average time to fix[4]	7 sec

Velocity Accuracy[1,2,3]

Horizontal[3]	Vertical[3]
0.8 cm/sec	1.3 cm/sec

Maximum Update rate	100 Hz
Latency	< 20 msec

Time accuracy[3]

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]
E1 pseudoranges	8 cm (GALILEO)[7,8]
L5/E5a	6 cm (GALILEO)[7,8]
GPS P2pseudoranges[7]	0.1 m
GLONASS P pseudoranges[7]	0.1 m
L1 carrier phase	1 mm
L2 carrier phase	1 mm
L5/E5a carrier phase	1.3 mm
L1/L2/L5 doppler	0.1 Hz

Time to first fix

Cold start[10]	< 45 sec
Warm start[11]	< 20 sec
Re-acquisition	avg 1.2 sec

Tracking performance (C/N_0 threshold)[12,13,15]

Tracking	26 dB-Hz
Acquisition	33 dB-Hz
Acceleration[16]	10 g
Jerk[17]	4g/sec

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

OEM	
Size	60 x 90 mm
weight	60 g
Input voltage	3-5.5 VDC
HDC	
size	130 x 185 x 46 mm
weight	510 g
Input voltage	9-30 VDC
Antenna LNA Power Output	+ 5VDC
Output voltage	200 mA
Maximum current	
Power consumption	2.9W typical
Operating temperature	-40 to +70°C
Storage temperature	-40 to +85 °C
Humidity	5% to 95% (non condensing)
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

AsteRx2e/2eL - Compact dual-frequency GPS/GLONASS receiver platform, offering top-quality GPS code and carrier phase data and dual-frequency positioning (including DGPS, RTK and PPP (AsteRx2eL)) 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.

AsteRxi - IMU assisted Compact Dual-frequency GNSS receiver platform, offering a 50Hz RTK position based on integrated IMU and GNSS measurements. In addition attitude information such as heading, pitch and roll are provided even in shadowed environments where conventional GNSS receivers fail.

PolaRx4 - fully featured high performance GNSS receiver providing network operators and scientific users with high-quality tracking and measurement of all available and upcoming GNSS signals (GPS/GALILEO/GLONASS/COMPASS/SBAS)

PolaRxS - a multi-frequency multi-constellation receiver dedicated to ionospheric monitoring and space weather applications

PolaNt* - A set of lightweight sturdy precise positioning and survey single, dual- or multi-frequency GPS, GPS/GLONASS and GPS/GLONASS Galileo/L-band antennas for use with the PolaRx and AsteRx receiver family.

Chokering MC - A multi-frequency GPS/GLONASS/Galileo L1/L2/E5abAltBOC chokering antenna for use with the PolaRx receiver family

RxTools - A suite of software applications for easy control of PolaRx and AsteRx receivers, and for easy manipulation, analysis and reporting of the data generated with these receivers

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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