

## AsteRx-m™: Compact low-power dual-frequency GPS/GLONASS Receiver

*AsteRx-m™ is an ultra low power, smaller than credit card GPS/GLONASS dual-frequency RTK receiver, which is especially designed for integration in hand-held devices, mobile computing platforms and other space-constrained applications requiring high accuracy and low-power consumption.*

### Unique compact low-power RTK receiver

Measuring only 70 by 48 mm, and providing dual-frequency GPS-only RTK operation at less than 500 mW, and dual-frequency GPS/ GLONASS RTK positioning at less than 600 mW, AsteRx-m is designed for applications requiring high accuracy positioning combined with low power and where space is at a premium. AsteRx-m provides full scalability from L1-only positioning to L1/L2 GPS/GLONASS operation.

AsteRx-m is powered by Septentrio's field-proven GPS/GLONASS/SBAS receiver architecture built around the 136 channel multi-frequency multiconstellation GRECo3 ASIC, optimized for low power consumption, and can offer the same measurement quality and precise positioning modes (single and dual-frequency, SBAS, DGPS, RTK and PPP) as the other members of the AsteRx family.

### World-class performance with GNSS+

AsteRx-m hosts a suite of innovative tracking and positioning algorithms specifically designed for demanding industrial environments. These include:

- APME+ extends Septentrio's patented multipath mitigation technology to GLONASS and to carrier phase measurements.
- Track+ for improved tracking under weak signal conditions such as under foliage.

- Lock+ guarantees exceptionally stable tracking under high vibration conditions resulting in significant higher availability.
- RTK+ provides extended RTK baselines and faster initialization.

### Easy to integrate

AsteRx-m features very low power consumption and is available in a compact OEM board version, making it suitable for in-vehicle as well as portable battery operated applications. The board is fully shielded, to help avoid EMI issues.

Specifically for integration in hand-held devices, 2 antenna connectors are available on the board. Thus the receiver can be connected to an internal antenna, while a connection to a high-grade

external antenna for reaching the highest possible accuracy remains possible. Furthermore a compact I/O connector allows integration in slim devices.

AsteRx-m supports 3 serial and 1 USB 2.0 interface. Benefiting from the established AsteRx-family command language and its extended range of output formats, system integration is kept easy.

### A comprehensive GNSS SW-toolset

As with all Septentrio GNSS receivers, a comprehensive GNSS SW-toolset is provided (RxTools). It includes an intuitive GUI (RxControl) for receiver configuration and remote control. It also includes various other tools for mission planning, data logging, replay and analysis, reporting, etc.



## ASTERX-M TECHNICAL SPECIFICATIONS

### FEATURES

- Dual-frequency L1/L2 code/carrier tracking of GPS and GLONASS signals.
- 132 hardware channels for simultaneous tracking of all visible satellites in GPS and GLONASS constellations
- GNSS+ pack containing APME+, Lock+ and RTK+, AIM+ and ATrack+
- Positioning modes : stand-alone, SBAS, DGNSS, RTK, PPP<sup>14</sup>
- Includes up to 3 SBAS channels (EGNOS, WAAS, other)
- RAIM included
- Raw data output (code, carrier, navigation data)
- 25 Hz data output rate (user selectable)
- x PPS output (x = 1, 2, 5, 10)
- 1 Event marker
- 2 antenna connectors (internal/external antenna) with automatic external antenna detection
- 3 high-speed serial ports
- 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+
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

### PERFORMANCE

<b>Position accuracy</b> <sup>1,2,3,5</sup>		
	Horizontal	Vertical
Standalone	1.3 m	1.9 m
SBAS	0.6 m	0.8 m
DGPS	0.5 m	0.9 m
<b>RTK performance</b> <sup>1,10</sup>		
Horizontal accuracy <sup>3</sup>	0.6 cm + 0.5ppm	
Vertical accuracy <sup>3</sup>	1 cm + 1ppm	
Average time to fix <sup>4</sup>	7 sec	
<b>Velocity Accuracy</b> <sup>1,2,3</sup>		
	Horizontal <sup>3</sup>	Vertical <sup>3</sup>
	0.8 cm/sec	1.3 cm/sec
<b>Maximum Update rate</b>	25 Hz	
<b>Latency</b>	< 20 msec	
<b>Time accuracy</b> <sup>3</sup>		
1PPS	10 nsec	
Event accuracy	< 10 nsec	
<b>Time to first fix</b>		
Cold start <sup>6</sup>	< 45 sec	
Warm start <sup>7</sup>	< 20 sec	
Re-acquisition	avg 1.2 sec	
<b>Tracking performance</b>		
<b>C/N<sub>0</sub> threshold</b> <sup>8,9,11</sup>		
Tracking	26 dB-Hz	
Acquisition	33 dB-Hz	
<b>Sensitivity, internal antenna</b>		
Tracking	-148 dBm	
Acquisition	-141 dBm	
<b>Dynamics</b>		
Acceleration <sup>12</sup>	10 g	
Jerk <sup>13</sup>	4g/sec	

- 1 1 Hz measurement rate
- 2 Performance depends on environmental conditions
- 3 1 $\sigma$  level
- 4 Baseline < 20 km
- 5 Smoothed
- 6 No information available (no almanacs, no approximate position)
- 7 Ephemeris and approximate position known
- 8 95%
- 9 Max speed 600 m/sec
- 10 Fixed ambiguities
- 11 Depends on user settings of tracking loop parameters
- 12 During acquisition
- 13 During tracking
- 14 Requires Veripos or TerraStar corrections. L-band demodulator not included

### PHYSICAL AND ENVIRONMENTAL

<b>Power dissipation</b>	GPS L1/L2	490 mW
	GPS/GLONASS L1/L2	600 mW
	Shutdown	150 $\mu$ W
<b>Input supply voltage</b>	3.3 VDC +/- 5%	
<b>Size</b>	47.5 x 70 mm	
<b>Weight</b>	40 g	
<b>I/O connector</b>	30 pins Hirose DF40 socket	
<b>Antenna</b>		
Connectors	U.FL or MMCX	
Antenna supply voltage	3-6 VDC	
Maximum current	200 mA	
Detection current	< 6mA	
<b>Operating temperature</b>	-35 to +85 °C	
<b>Storage temperature</b>	-40 to +85 °C	
<b>Humidity</b>	5% to 95% (non condensing)	

### 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.

**AsteRx3** - A Multi-frequency GPS/GLONASS/GALILEO receiver for demanding industrial applications, featuring precise RTK with extended baselines, advanced multipath and interference mitigation and exceptional tracking stability under high vibration conditions.

**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.

