AsteRx-m
Compact low-power dual frequency GNSS receiver

Key Features

- Unique compact GPS/GLONASS RTK receiver
- Industry leading low power consumption (600mW at full operation)
- cm-level RTK positioning accuracy
- Special GNSS+ algorithms for solid industrial performance
- Full EMI shielding
- Easy to integrate, incl. extensive and well documented interface language
- A comprehensive GNSS SW-toolset

Ultra-low power, smaller than credit card GPS/GLONASS dual-frequency RTK receiver, for integration in hand-held devices, mobile computing platforms and other space-constrained applications requiring high accuracy and low-power consumption.

Compact RTK receiver
Measuring only 70mm x 48 mm, the AsteRx-m provides cm-level dual-frequency GPS RTK operation at less than 500 mW, and dual-frequency GPS/GLONASS RTK positioning at less than 600 mW. It is fully scalable from L1-only positioning to L1/L2 GPS/GLONASS operation.

World-class performance with GNSS+
AsteRx-m offers innovative tracking and positioning algorithms designed for demanding industrial environments, including:

- APME+ code and phase multipath mitigation technology
- Track+ for robust tracking under weak signal conditions such as under foliage
- RTK+, a novel, multi-system cm-accurate positioning engine using innovative real-time modeling of GNSS errors and a new mixed-mode fixing approach for robust performance and high availability in difficult environments
- GLO+, a special ultra-precise GLONASS bias calibration method to increase accuracy, robustness and compatibility

Easy to integrate
Two antenna connectors are available: one can be connected to an internal antenna, while connecting a high-grade external antenna remains possible. A compact I/O connector allows integration in slim devices. The board is fully shielded to help avoid EMI issues. An extensive set of commands and data messages provides the integrator with full flexibility.

A comprehensive GNSS SW-toolset
RxTools provides an intuitive GUI (RxControl) for receiver configuration and remote control. Various tools for mission planning, data logging, replay and analysis, reporting, and more are included.
FEATURES

GNSS Technology
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, PPP14
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)

Connectivity
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

Formats
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

Position accuracy\(^{1,2,3}\)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standalone</td>
<td>1.3 m</td>
<td>1.9 m</td>
</tr>
<tr>
<td>SBAS</td>
<td>0.6 m</td>
<td>0.8 m</td>
</tr>
<tr>
<td>DGPS</td>
<td>0.5 m</td>
<td>0.9 m</td>
</tr>
</tbody>
</table>

RTK performance\(^{1,9}\)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>0.6 cm + 0.5 ppm</td>
<td>1 cm + 1 ppm</td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average time to fix(^7)</td>
<td>7 sec</td>
<td></td>
</tr>
</tbody>
</table>

Velocity Accuracy\(^{1,2,3}\)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>0.8 cm/s</td>
<td>1.3 cm/s</td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maximum Update rate
25 Hz

Latency
< 20 msec

Time accuracy\(^2\)

<table>
<thead>
<tr>
<th>Mode</th>
<th>1PPS</th>
<th>Event accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time accuracy</td>
<td>10 nsec</td>
<td>&lt; 10 nsec</td>
</tr>
</tbody>
</table>

Time to first fix
Cold start\(^6\) < 45 sec
Warm start\(^7\) < 20 sec
Re-acquisition avg 1.2 sec

Tracking performance (C/N0 threshold)\(^{9,11}\)

| Tracking | 26 dB-Hz |
| Acquisition | 33 dB-Hz |

Sensitivity, internal antenna

<table>
<thead>
<tr>
<th>Mode</th>
<th>Tracking</th>
<th>Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking</td>
<td>-148 dBm</td>
<td>-141 dBm</td>
</tr>
<tr>
<td>Acquisition</td>
<td>-141 dBm</td>
<td></td>
</tr>
</tbody>
</table>

Dynamics

<table>
<thead>
<tr>
<th>Mode</th>
<th>Acceleration</th>
<th>Jerk(^{1,11})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>10 g</td>
<td></td>
</tr>
<tr>
<td>Jerk(^{1,11})</td>
<td>4 g/sec</td>
<td></td>
</tr>
</tbody>
</table>

PHYSICAL AND ENVIRONMENTAL

Power dissipation

<table>
<thead>
<tr>
<th>Mode</th>
<th>Power Dissipation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS L1</td>
<td>320 mW</td>
</tr>
<tr>
<td>GPS L1/L2</td>
<td>490 mW</td>
</tr>
<tr>
<td>GPS/GLONASS L1/L2</td>
<td>600 mW</td>
</tr>
<tr>
<td>Shutdown</td>
<td>150 μW</td>
</tr>
</tbody>
</table>

Input voltage
3.3 VDC +/- 5%

Size
47.5 x 70 mm

Weight
40 g

I/O Connector
30 pins Hirose DF40 socket

Antenna

Connectors
U.FL

Antenna supply voltage
3-6 VDC

Maximum current
200 mA

Detection current
< 6 mA

Operating temperature
-40 to +85 °C

Storage temperature
-40 to +85 °C

Certification
RoHS

1 Hz measurement rate
Performance depends on environmental conditions
1σ level
Baseline < 100 km
Smoothed
No information available (no almanacs, no approximate position)
Ephemeris and approximate position known
95%
Max speed 600 m/sec
Fixed ambiguities
Depends on user settings of tracking loop parameters
During acquisition
During tracking
Requires Veripos or TERRASTAR® corrections.
L-band demodulator not included

\(^1\) 1 Hz measurement rate
\(^2\) Performance depends on environmental conditions
\(^3\) 1σ level
\(^4\) Baseline < 100 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