



With dual-antenna input, mosaic-H™ provides precise and reliable heading combined with centimeter-level RTK positioning. Dual antenna heading capabilities in such a small form factor opens the door to advanced automation and navigation performance in both static and dynamic states, with reduced power consumption. Dual antenna GNSS delivers heading & pitch or heading & roll angles, which are available immediately at start-up, helping initialize inertial sensors which rely on movement for their attitude measurements.

KEY FEATURES

- ▶ **Dual antenna support for sub-degree heading & pitch or heading & roll angles**
- ▶ **All-in-view satellite tracking: multi-constellation, multi-frequency**
- ▶ **Best-in-class RTK performance**
- ▶ **AIM+ industry-leading anti-jamming anti-spoofing technology**
- ▶ **Lowest power consumption on the market**
- ▶ **Standard mosaic footprint enables several application-specific solutions based on a single design**

BENEFITS

Reliable heading performance

With dual-antenna input, mosaic-H™ provides precise, reliable and positioning independent heading combined with centimeter-level RTK. GNSS heading provides the best performance in both static and dynamic conditions removing the reliance on vehicle movement for INS initialization. It also provides an alternative to magnet-based heading sensors, which can be effected by metal.

Designed for automated assembly

The mosaic-H™ is a single module delivering high-accuracy heading and positioning without the need for any additional components. It is designed for high volume production on automated assembly lines. All interfaces, commands and data messages are fully documented. The RxTools software suite allows convenient receiver configuration, monitoring, data logging and analysis. Offline processing is easy via our GeoTagZ software and its SDK library for PPK (Post Processed Kinematic).

Advanced technologies inside

Septentrio's **GNSS+** toolset enables accuracy and reliability in the toughest conditions, allowing you to complete projects with the highest quality and efficiency. It includes:

- ▶ **AIM+** the most advanced on-board interference mitigation technology on the market (narrow and wide band, chirp jammers).
- ▶ **LOCK+** for robust tracking during high vibrations and shocks.
- ▶ **APME+** multipath mitigation to disentangle direct signal and those reflected from nearby structures.
- ▶ **IONO+** provides advanced protection against ionospheric disturbances.

FEATURES

GNSS technology

448 hardware channels for simultaneous tracking of all visible supported satellite signals¹:

- ▶ GPS: L1, L2
- ▶ Galileo: E1, E5b
- ▶ GLONASS: L1, L2
- ▶ Beidou: B1, B2
- ▶ QZSS: L1, L2
- ▶ SBAS: Egnos, WAAS, GAGAN, MSAS, SDCM (L1)

Septentrio's patented GNSS+ technologies

- ▶ **AIM+** interference monitoring and mitigation (narrow band, wide band, chirp jammers)
- ▶ **IONO+** advanced scintillation mitigation
- ▶ **APME+** a posteriori multipath estimator for code and phase multipath mitigation
- ▶ **LOCK+** superior tracking robustness under heavy mechanical shocks or vibrations
- ▶ **RAIM+** receiver autonomous integrity monitoring

RTK
GNSS heading

Protocols

Septentrio Binary Format (SBF)
NMEA 0183, v2.3, v3.03, V4.0
RINEX v2.x, v3.x
RTCM v2.x, v3.x (MSM included)
CMR v2.0 (in), CMR+ (input only)

Interfaces

4 UART (LVTTTL, up to 4 Mbps)
Ethernet (RMII/MDIO), 10/100 Mbps
USB device (2.0, HS)
SDIO (mass storage)
2 GPIO user programmable
CAN⁹
2 Event markers¹
1 Configurable PPS out⁶

PERFORMANCE

RTK performance ^{2,3,4}

Horizontal accuracy 0.6 cm + 0.5 ppm
Vertical accuracy 1 cm + 1 ppm

Other positioning modes accuracy ^{2,3}

| | Horizontal | Vertical |
|------------|------------|----------|
| Standalone | 1.2 m | 1.9 m |
| SBAS | 0.6 m | 0.8 m |
| DGNSS | 0.4 m | 0.7 m |

Velocity accuracy

3 cm/s

GNSS attitude accuracy ^{2,3}

| Antenna separation | Heading | Pitch/Roll |
|--------------------|---------|------------|
| 1 m | 0.15° | 0.25° |
| 5 m | 0.03° | 0.05° |

Maximum update rate

| | |
|-----------------------------------|--------|
| Measurements only | 100 Hz |
| Standalone, SBAS, DGPS + attitude | 50 Hz |
| RTK + attitude | 20 Hz |

Latency ⁴

<10 ms

Time precision

| | |
|-----------------------|---------|
| xPPS out ⁶ | 5 ns |
| Event accuracy | < 20 ns |

Time to first fix

| | |
|-------------------------|--------|
| Cold start ⁷ | < 45 s |
| Warm start ⁸ | < 20 s |
| Re-acquisition | 1 s |

Tracking performance (C/N0 threshold)

| | |
|-------------|----------|
| Tracking | 20 dB-Hz |
| Acquisition | 33 dB-Hz |

Firmware

Free product lifetime upgrades

PHYSICAL AND ENVIRONMENTAL

Package

| | |
|--------|--|
| Type | SMT solderable land grid array |
| Size | 31 x 31 x 4 mm / 1.29 x 1.29 x 0.15 in |
| Weight | 6.8 g / 0.24 oz |

Electrical

| | |
|---------------------------------|---------------------------------|
| Antenna pre-amplification range | 15-30 dB |
| Antenna bias voltage | 3.0-5.5 V |
| | Build-in current limit (150 mA) |
| Input voltage | 3.3 VDC +/-5% |
| Power consumption | 0.6 W typ 1.1 W max |

Environmental

| | |
|----------------|-------------------------------|
| Operating temp | -40 to 85° C -40 to 185° F |
| Storage temp | -55 to 85° C -67 to 185° F |

| | |
|----------|---------------------------|
| Humidity | 5% - 95% (non-condensing) |
|----------|---------------------------|

| | |
|-----------|--------------|
| Vibration | MIL-STD-810G |
|-----------|--------------|

| | |
|---------------|----------------|
| Certification | CE, RoHS, WEEE |
|---------------|----------------|



¹ Configuration dependent

² Open sky conditions

³ RMS levels

⁴ Baseline <40 km

⁵ 99.9%

⁶ Incl. software compensation of sawtooth effect

⁷ No information available (no almanac, no approx position)

⁸ Ephemeris and approx. position known

⁹ Hardware ready

EMEA (HQ)

Greenhill Campus
Interleuvenlaan 15i
3001 Leuven, Belgium

+32 16 30 08 00

septentrio.com

Americas

Suite 200
23848 Hawthorne Blvd
Torrance, CA 90505, USA

+1 310 541 8139

sales@septentrio.com

Asia-Pacific

Shanghai, China
Yokohama, Japan
Seoul, Korea

