



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**
- ▶ **OSNMA Support**
- ▶ **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 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 anti-jamming, anti-spoofing 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 signals<sup>1</sup>:

- ▶ GPS: L1, L2
- ▶ Galileo: E1, E5b
- ▶ GLONASS: L1, L2
- ▶ Beidou: B1, B2, B3
- ▶ QZSS: L1C/A, L1C/B, L2
- ▶ SBAS: Egnos, WAAS, GAGAN, MSAS, SDCM (L1)

### Septentrio's patented GNSS+ technologies

- ▶ **AIM+** industry leading anti-jamming, anti-spoofing interference monitoring & mitigation technology
- ▶ **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

OSNMA Support  
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  
CAN<sup>9</sup>  
2 Event markers<sup>1</sup>  
1 Configurable PPS out<sup>6</sup>

## PERFORMANCE

### RTK performance <sup>2,3,4</sup>

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

### Other positioning modes accuracy <sup>2,3</sup>

	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 <sup>2,3</sup>

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 <sup>4</sup>

<10 ms

### Time precision

xPPS out<sup>6</sup> 5 ns  
Event accuracy < 20 ns

### Time to first fix

Cold start<sup>7</sup> < 45 s  
Warm start<sup>8</sup> < 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 15-35 dB  
Antenna bias voltage 3.0-5.5 V  
Build-in current limit (150 mA)  
Input voltage 3.3 VDC  
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, UKCA,  
ISO 9001-2015



<sup>1</sup> Configuration dependent

<sup>2</sup> Open sky conditions

<sup>3</sup> RMS levels

<sup>4</sup> Baseline <40 km

<sup>5</sup> 99.9%

<sup>6</sup> Incl. software compensation of sawtooth effect

<sup>7</sup> No information available (no almanac, no approx position)

<sup>8</sup> Ephemeris and approx. position known

<sup>9</sup> Hardware ready

### EMEA

Greenhill Campus (HQ)  
Interleuvenlaan 15i  
3001 Leuven, **Belgium**

Espoo, **Finland**

### Americas

Suite 200  
23848 Hawthorne Blvd  
Torrance, CA 90505, **USA**

septentrio.com/contact

### Asia-Pacific

Shanghai, **China**  
Yokohama, **Japan**  
Seoul, **Korea**

septentrio.com



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