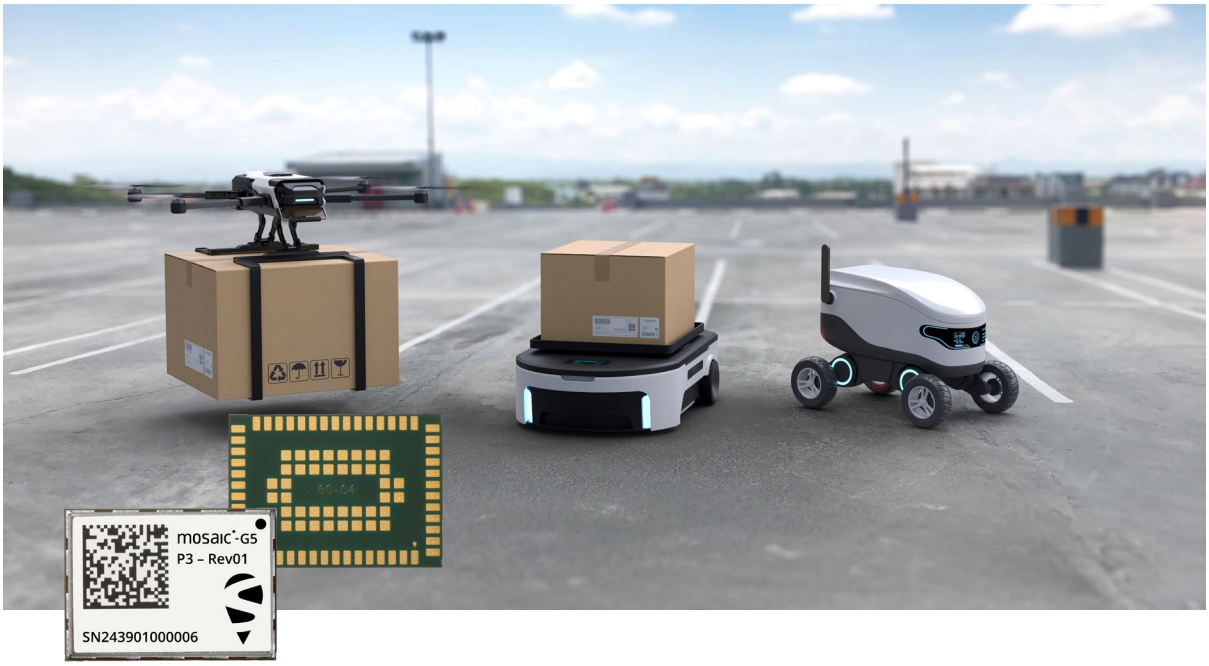
mosaic-G5 P3/P3H

High-precision GNSS receiver module with heading capability



UAV

Robotics

Automation

Septentrio mosaic-G5 P3™ & mosaic-G5 P3H™ are advanced multi-frequency GNSS receiver modules in a low-power surface mount package. The mosaic-G5 P3H™ offers heading and pitch or heading and roll angles in addition to high-accuracy positioning, ideal for autonomous navigation. With GNSS+ technology for resilience and reliability, Septentrio is now offering a performance benchmark in mass market GNSS positioning.

KEY FEATURES

- **Small size, advanced functionality**
- **All-in-view satellite tracking: multi-constellation, quad-band GNSS receiver**
- **Best-in-class RTK centimeter-level positioning**
- **Dual antenna heading with mosaic-G5 P3H™**
- **Industry-leading ultra-low power consumption**

BENEFITS

Excellent size-to-performance ratio

Sized at only 22.8 x 16.4 mm, mosaic-G5 P3™ has market-leading ultra-low power consumption. It offers full raw data with positioning measurements (P3 only) and Galileo HAS positioning service compatibility[1]. It is ideal for drones, robots, autonomous systems and space-constrained devices which require accurate positioning with a high degree of reliability.

Designed for automated assembly

The mosaic-G5 P3™ and mosaic-G5 P3H™ modules are designed for high-volume automated assembly lines and come with a comprehensive set of interfaces. All interfaces, commands and data messages are fully documented. The RxTools software suite allows convenient receiver configuration and analysis.

Advanced technologies inside

Septentrio's **GNSS+** technologies enable accuracy and reliability under the toughest conditions. They include:

- **AIM+ Advanced** functionality with jamming and spoofing detection and automatic mitigation.
- **LOCK+** for robust tracking during high vibrations and shocks.
- **APME+** multipath mitigation to disentangle direct signal and those reflected from nearby structures.
- **IONO+** protection against ionospheric disturbances.

mosaic-G5 P3/P3H

mosaic
Your positioning cornerstone

septentrio
part of HEXAGON

FEATURES

GNSS technology

789 hardware channels for simultaneous tracking of all visible supported satellite signals:

- GPS: L1C/A, L1C, L2C, L2PY, L5
- GLONASS: L1CA, L2CA, L2P, L3 CDMA
- Beidou: B1I, B1C, B2a, B2I, B2b, B3I
- Galileo: E1, E5a, E5b, E6
- QZSS: L1C/A, L1 C/B, L2C, L5, L6 [8]

GNSS Heading (P3H only)
Galileo High Accuracy Service (HAS) [1]
Galileo OSNMA
Full raw measurement data (P3 only)
5 constellations RTK (rover)

Septentrio's patented GNSS+ technologies

- AIM+ Advanced functionality with jamming and spoofing detection automatic interference mitigation
- APME+ a posteriori multipath estimator for code and phase multipath mitigation
- LOCK+ superior tracking robustness under heavy mechanical shocks or vibrations
- IONO+ provides advanced protection against ionospheric disturbances.
- RAIM+ receiver autonomous integrity monitoring

Protocols

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

Interfaces

2 UART (LVTTL, up to 4 Mbps)
USB device (2.0, HS up to 480Mbps)
2 GPIO user programmable
2 Configurable PPS out
2 Event markers

PERFORMANCE

RTK performance [2,3,4]

Horizontal accuracy	0.6 cm + 0.5 ppm
Vertical accuracy	1 cm + 1 ppm
Initialization time	7 s

Other positioning modes accuracy [2,3]

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
DGNSS	0.4 m	0.7 m

Velocity accuracy

3 cm/s

GNSS attitude accuracy (P3H only) [2,3]

Antenna Separation	Heading	Pitch/Roll
1m	0.15°	0.25°
5m	0.03°	0.05

Maximum update rate

Position	20 Hz
Measurements only (P3 only)	20 Hz

Latency [5]

<10 ms

Time precision

PPS resolution	1.4 ns
Event accuracy	< 3 ns

Time to first fix

Cold start[6]	< 35 s
Warm start[7]	< 10 s
Re-acquisition	1 s

Tracking performance (C/N0 threshold)

Tracking	20 dB-Hz
Acquisition	30 dB-Hz

PHYSICAL AND ENVIRONMENTAL

Package

Type	SMT solderable land grid array
Size	22.8 x 16.4 x 2.4 mm
Weight	2.2 g

Electrical

Antenna preamplification range	15-50 dB SA 15-35 dB DA
Antenna bias voltage	3.0-5.5 V Build-in current limit (150 mA)
Input voltage	3.3 VDC
Power consumption P3	0.44 W typ/0.57 Max
Dual Antenna (P3H only)	0.6 W typ/0.785 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	IEC 60721-3-5 Profile 5M3 MIL-STD-810H 514.8 - Category 4 MIL-STD-810H 516.8 - Procedure I
Certification	CE, FCC, RoHS, WEEE, ISED

[1] Future-proof feature which will be roll out by regular software updates
[2] Open sky conditions
[3] RMS levels
[4] Baseline <40 km
[5] 99.9%
[6] No information available (no almanac, no approx. position)
[7] Ephemeris and approx. position known
[8] Will be rolled out via software updates

MS 5/2025

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ISO 9001 2015 CERTIFIED

mosaic-G5 P3

mosaic-G5 P3H