

DATASHEET & HARDWARE MANUAL

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BASE-G5

Multi-Band RTK GNSS Board with Dual-Antenna Heading

Powered by the Septentrio mosaic-G5 engine, the BASE-G5 delivers centimeter-level RTK accuracy and 0.15° dual-antenna heading without magnetic distort

MODULE

Septentrio mosaic-G5

CONSTELLATION

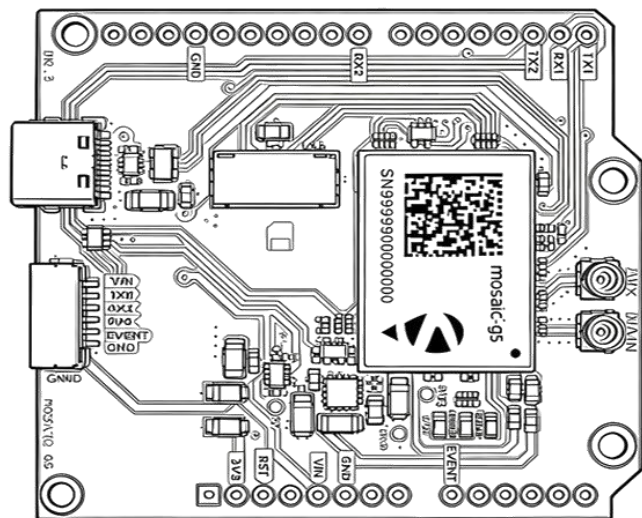
BeiDou / GPS / Galileo / GLONASS

POSITIONING

RTK cm-level

HEADING

0.15° (1 m) / 0.03° (5 m)



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About This Manual

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Safety and Warning Instructions

This manual outlines the commissioning, installation, and operation of the BASE-G5 Multi-Band RTK GNSS Board with Dual-Antenna Heading.

- This equipment may only be used for the purpose specified by the manufacturer.
- This manual should be kept accessible.
- Illegal changes and the use of spare parts as well as accessories that have not been sold or recommended by the manufacturer of this unit can cause operational failures or hazards. Such measures lead to an exclusion of liability, and the manufacturer accepts no responsibility.
- Repairs may only be carried out by the manufacturer or accredited distributor/re-seller.
- Basis for the guarantee of the manufacturer is the version of the warranty policy for the unit at the time of purchase. No liability is accepted for inappropriate, incorrect manual or automatic setting of parameters, or improper use.
- The distributor/re-seller is responsible for ensuring that the device is assembled and integrated according to recognised technical guidelines as well as valid regulations in the country of use.

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1. Introduction Summary

This datasheet and hardware manual outlines the technical characteristics, interfaces, configuration paths and integration guidelines for the BASE-G5 Multi-Band RTK GNSS Board with Dual-Antenna Heading. It collects the published product datasheet together with the information needed to commission the board — specifications, interfaces and protocols, configuration, target applications and support terms — so that an integrator can design it in and bring it into service from one document.

2. Product Overview & Technology

Compact All-Constellation RTK Engine for Base & Rover Applications

The BASE-G5 (built on the Septentrio mosaic-G5) is a plug-and-play hardware front end for demanding autonomous platforms and RTK base stations. Tracking full-constellation signals across the L1/L2/L5 bands keeps centimeter-level fixes stable in urban canyons and other multipath-heavy environments, and the same board serves either role — fixed reference or moving rover.

To guarantee mission-critical reliability, the board integrates Septentrio's firmware suite — LOCK+ for heavy-vibration environments, IONO+ for ionospheric activity, and APME+ for multipath reduction. Integrated USB-C, dual UART ports, 1PPS/Event triggers and local TF-card raw logging ensure drop-in compatibility with flight controllers, industrial PLCs and survey base stations.

Key components

- Septentrio mosaic-G5
- L1/L2/L5 tri-band
- GPS/GLONASS/Galileo/BeiDou/QZSS/NavIC/SBAS
- AIM+ anti-jamming & anti-spoofing
- P3H dual-antenna heading (0.15°)
- Up to 20 Hz RTK output
- 5 ns timing
- USB-C + dual UART + TF-card logging
- $22 \times 16 \text{ mm} \cdot \approx 0.44\text{--}0.6 \text{ W}$

3. Technical Data & Specifications

Parameter	Value	Note
Module	Septentrio mosaic-G5	Multi-band multi-constellation RTK GNSS receiver
Constellation	BeiDou / GPS / Galileo / GLONASS	QZSS & SBAS supported, centimeter-level RTK
Anti-interference	AIM+	Built-in anti-jamming & anti-spoofing for harsh RF
Power Input	5V USB-C	USB-C or external VIN supply
Operating Temp	-40°C to +75°C	Industrial wide-temperature operation
Frequency Bands	GPS: L1C/A, L1C, L2C, L2P(Y), L5 · GLONASS: L1CA, L2CA, L2P, L3 CDMA Galileo: E1, E5a, E5b, E6 · BeiDou: B1I, B1C, B2a, B2I, B2b, B3I QZSS: L1C/A, L1C, L1S, L2C, L5, L6 · NavIC: L5 SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM (L1, L5)	
Positioning	RTK cm-level	Horizontal 0.6 cm + 0.5 ppm; vertical 1 cm + 1 ppm
Init Time	< 7 s	Typical time to first RTK fix
Heading	0.15° (1 m) / 0.03° (5 m)	0.15° @ 1 m baseline; 0.03° @ 5 m baseline
Application	AGV / UAV / Surveying	Autonomous machinery, robotic automation, RTK base station

Where G5 and X5 each win

	mosaic-G5	Mosaic-X5
Bands	L1 / L2 / L5 (multi-band)	L1 / L2 / L5 + L6
Constellation	GPS / GLONASS / Galileo / BeiDou / QZSS / NavIC / SBAS	Same full multi-constellation
Anti-jamming	AIM+ anti-jamming & anti-spoofing	AIM+ anti-jamming & anti-spoofing
RTK rate	Up to 20 Hz	Up to 20 Hz
Heading	P3H dual-antenna, magnetometer-free	Dual-antenna (model-dependent)
Timing	Solid timing (5 ns)	Extreme timing performance
Power / size	~0.44–0.6 W · 22×16 mm	Higher power (L6 adds demand)
Positioning	Multi-band & price/performance sweet spot	L6 + timing-critical applications

4. Core Advantages

AIM+ RF Security & Anti-Spoofing

- Jamming: actively detects & suppresses narrowband CW and wideband/pulsed interferer signals.
- Anti-spoofing: rejects malicious spoofed signals for trustworthy positioning.
- Spectrum: real-time RF interference monitoring via the Web UI.

Full-Constellation Tri-Band Tracking

- Systems: GPS / GLONASS / Galileo / BeiDou / QZSS / NavIC / SBAS — no coverage blind spots.
- Bands: L1 / L2 / L5 tri-band tracking across high-performance frequencies.
- Urban: stronger multipath resilience than dual-band in city canyons.

Centimeter Precision & P3H Heading

- Rate: up to 20 Hz RTK output for UAV, robotics & fast-moving platforms.
- Precision: centimeter-level RTK with 0.15° heading accuracy.
- Heading: P3H dual-antenna, magnetometer-free — valid while stationary.

Advanced Signal & Environment Mitigation

- LOCK+: vibration-robust tracking for heavy machinery & multi-rotor drones.
- IONO+: mitigates ionospheric scintillation during high solar activity.
- APME+: reduces multipath reflections from buildings & ground.

Ultra-Compact Footprint & Low Power (~0.5 W)

- Power: ≈ 0.44 –0.6 W typical — highly efficient for RTK.
- Size: all GNSS logic in a 22×16 mm module footprint.
- Integration: simplified RF design for compact product integration.

5. Interfaces, Protocols & Timing

Parameter	Value	Note
Interfaces	USB-C / Dual-UART / TF	Dual-SMA antenna, raw data logging to TF card (max 32GB)
Time Sync	PPS / EVENT	Nanosecond-level PPS output, EVENT time-mark input
Timing	5 ns	Timing / 1PPS accuracy
Antenna	MAIN / AUX	Dual antenna input for heading calculation
I/O	2x UART, USB 2.0, TF; 2x Event In, 2x GPIO, 2x PPS	2x UART · USB 2.0 HS · TF card (max 32GB); 2x Event, 2x GPIO, 2x PPS out
Protocols	NMEA, RINEX, SBF, RTCM v2.x/3.x	Data formats & protocols supported

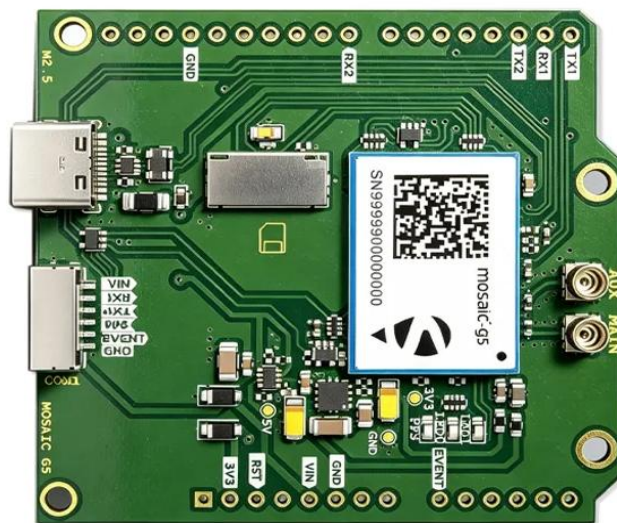


Figure 2 — BASE-G5 board outline

6. Configuration & Operation

Configure your module locally in the browser — no cloud account, no software install. The detailed configuration guides will follow official guides references.

7. Target Applications

1. **RTK Surveying:** Covers both ends of a survey — a fixed reference on the tripod and a moving rover on the pole — with L1/L2/L5 tri-band tracking that holds centimeter-level fixes steady through building and ground multipath.
2. **UAV Surveying:** Up to 20 Hz RTK output goes straight to the flight controller over USB-C or dual UART, while LOCK+ keeps tracking through the vibration of multi-rotor flight.
3. **Precision Agriculture:** LOCK+ vibration-robust tracking and magnetometer-free P3H heading keep guidance true on heavy machinery, at a typical draw of $\approx 0.44\text{--}0.6\text{ W}$ that the machine's own supply can carry.

8. Ordering, Shipping & Support

- Goods are quoted FOB Shanghai Airport. The default carrier is DHL Economy, freight is prepaid by the seller and added to the invoice, and delivery to the airport is free of charge. Air freight takes 7–10 days and express courier 3–5 working days, depending on the destination region and the carrier's official tracking. Main markets are Europe, the Middle East, the USA and South America; shipping is worldwide.
- Discounts are granted at the seller's discretion according to the project volume. For special projects and long-term partners, terms and pricing are negotiable — tell us the expected volume and the deployment plan and we will quote accordingly.

FOR MORE INFORMATION PLEASE CONTACT QUMTRIX SALES TEAM.

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