UM981S

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency RTK/INS Integrated Positioning Module

17.0 × 22.0 × 2.6 mm

Features

- Based on Unicore's proprietary GNSS SoC NebulasIV that integrates RF, baseband and high-precision algorithm
- All-constellation multi-frequency RTK engine and advanced RTK technology
- Instant RTK initialization technology
- Excellent anti-jamming and anti-spoofing capabilities, supporting jamming detection and spoofing detection
- Heading2 technology to provide orientation information
- STANDALONE single-station high-precision positioning technology
- Supports B2b-PPP, E6-HAS and QZSS L6E (MADOCA) PPP
- On-board MEMS integrated positioning technology and tilt compensation capability

Applications

Surveying and Mapping

UM981S is Unicore's new-generation RTK and INS integrated positioning module. Based on the NebulasIV GNSS SoC which integrates RF, baseband, and high-precision algorithm, it is capable of simultaneously tracking GPS, BDS,GLONASS, Galileo, QZSS, NavIC and SBAS signals. The module integrates a high-speed floating-point processor, a dedicated RTK co-processor, and a built-in professional IMU, enabling RTK positioning results output at up to 50Hz and IMU raw data output at 100Hz. It incorporates the JamShield anti-jamming technology to complete enhanced multi-system multi-frequency RTK engine processing, significantly improving RTK initialization speed, measurement accuracy, and reliability in complex environments such as urban canyons and under tree shade. UM981S is designed for surveying and mapping applications and features tilt compensation capability.

Physical Characteristics

Packaging	54 pin LGA
Dimension	17.0 × 22.0 × 2.6 mm
Weight	1.91 g ± 0.03 g

Environmental Specifications

Operating Temperature	-40°C ~ +85°C
Storage Temperature	-55°C ~ +95°C
Humidity	95% No condensation
Vibration	GB/T 28046.3, ISO 16750-3
Shock	GB/T 28046.3, ISO 16750-3

Communication Interfaces

3 x UART(LVTTL)
1 x I^2C*
1 x SPI*
1 × CAN* (shared with UART3)

Note: Items marked with * are supported by specific firmware.

Performance Specifications

Channel	1408 channels, based on NebulasIV		
Frequency	GPS L1C/A, L1C, L2C, L2P(Y), L5		
	BDS B1I, B3I, B1C, B2a, B2b		
	GLONASS G1, G2, G3		
	Galileo E1, E5a, E5b, E6		
	QZSS L1C/A, L1C, L2C, L5, L6		
	NavIC L5		
	SBAS L1C/A		
Single Point Positioning(RMS)	Horizontal: 1.5 m	Time Accuracy (RMS)	20 ns
	Vertical: 2.5 m	Velocity Accuracy (RMS)	0.03 m/s
DGPS (RMS)	Horizontal: 0.4 m	Cold Start	< 12 s
	Vertical: 0.8 m	Initialization Time	< 5 s (typical)
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm	Initialization Reliability	> 99.9%
	Vertical: 1.5 cm + 1 ppm	Data Update Rate	100 Hz IMU raw data
PPP (RMS)	Horizontal: 5cm		50 Hz* RTK
	Vertical: 10 cm		

Tilt Measurement	10 mm + 0.7 mm/° tilt (accuracy < 2.5 cm within 30°)			
Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/B1C/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/B1C/L1C/A/G1/E1 Carrier Phase	1 mm	1 mm	1 mm	1 mm
B2I/B2a/B2b/L5/G3/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/B2a/B2b/L5/G3/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2P(Y)/L2C/G2/E6 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2P(Y)/L2C/G2/E6 Carrier Phase	1 mm	1 mm	1 mm	1 mm
Differential Data	RTCM V3.X			
Data Format	NMEA 0183, Unicore			