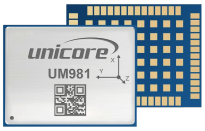
UM981

GPS/BDS/GLONASS/Galileo/QZSS
All-constellation Multi-frequency
RTK/INS Integrated Positioning Module



17.0 × 22.0 × 2.6 mm

Features

- Based on the new generation GNSS SoC -NebulasIV, which integrates RF, baseband and high precision algorithm
- All-constellation multi-frequency RTK engine and advanced RTK technology
- Instant RTK initialization technology
- 60 dB narrowband anti-jamming and jamming detection
- Heading2 technology to provide orientation information
- STANDALONE single-station high-precision positioning technology
- Supports B2b-PPP and E6-HAS
- On-board MEMS integrated navigation and U-Fusion technology to ensure continuous positioning when loss of lock on GNSS signals occurs

Applications

- Surveying and Mapping
- Precision Agriculture

UM981 is Unicore's new-generation proprietary RTK/INS integrated navigation module. It can simultaneously track multiple satellite systems and frequencies, including GPS, BDS, GLONASS, Galileo, QZSS, NavIC and SBAS. The module integrates a high-speed floating point processor and an RTK dedicated coprocessor, being able to output positioning data at 100Hz. The on-board MEMS chip and U-Fusion integrated navigation algorithm ensure continuous positioning even loss of lock on GNSS signals occurs, providing high-quality positioning results in complex environments such as building blocks, tunnels, overpasses and tree shades. Due to its high precision and high performance, UM981 is well suited for surveying and mapping, precision agriculture, etc.

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	MIL-STD-810F
Shock	MIL-STD-810F

Communication Interfaces

3 x UART (LVTTL)
1 x I²C*
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, B2I, B3I, B1C, B2a, B2b		
	GLONASS G1, G2, G3		
	Galileo E1, E5a, E5b, E6		
	QZSS L1C/A, L1C, L2C, L5		
	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		

Positioning Error of INS only	< 5 % of the distance traveled without GNSS signals			
Tilt measurement	10 mm + 0.7 mm/° tilt (accuracy < 2.5 cm within 30°)			
Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/B1C/L1 C/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/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/L2P(Y)/L2C/G2/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/B2a/E5a/L5 Code	10 cm	10 cm	10 cm	10 cm
B3I/B2a/E5a/L5 Carrier Phase	1 mm	1 mm	1 mm	1 mm
Differential Data	RTCM V3.X			
Data Format	NMEA 0183, Unicore			