UM981/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
- 60 dB narrowband anti-jamming and jamming detection
- Heading2 technology to provide heading 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 and 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 when loss of lock on GNSS signals occurs, providing high-quality positioning results in complex environments such as building blocks, tunnels, overpasses and tree shades. UM981 and UM981S are designed for high-precision navigation and positioning application, with UM981 for precision agriculture and UM981S for surveying and mapping, respectively.

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

2 x UART(LVTTL) (UM981)
3 x UART(LVTTL) (UM981S)
1 x I²C*
1 x SPI*
1 × CAN* (UM981)

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, 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		

Positioning Error of INS only	< 5 % of the distance traveled without GNSS signals			
Tilt Measurement（UM981S）	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			