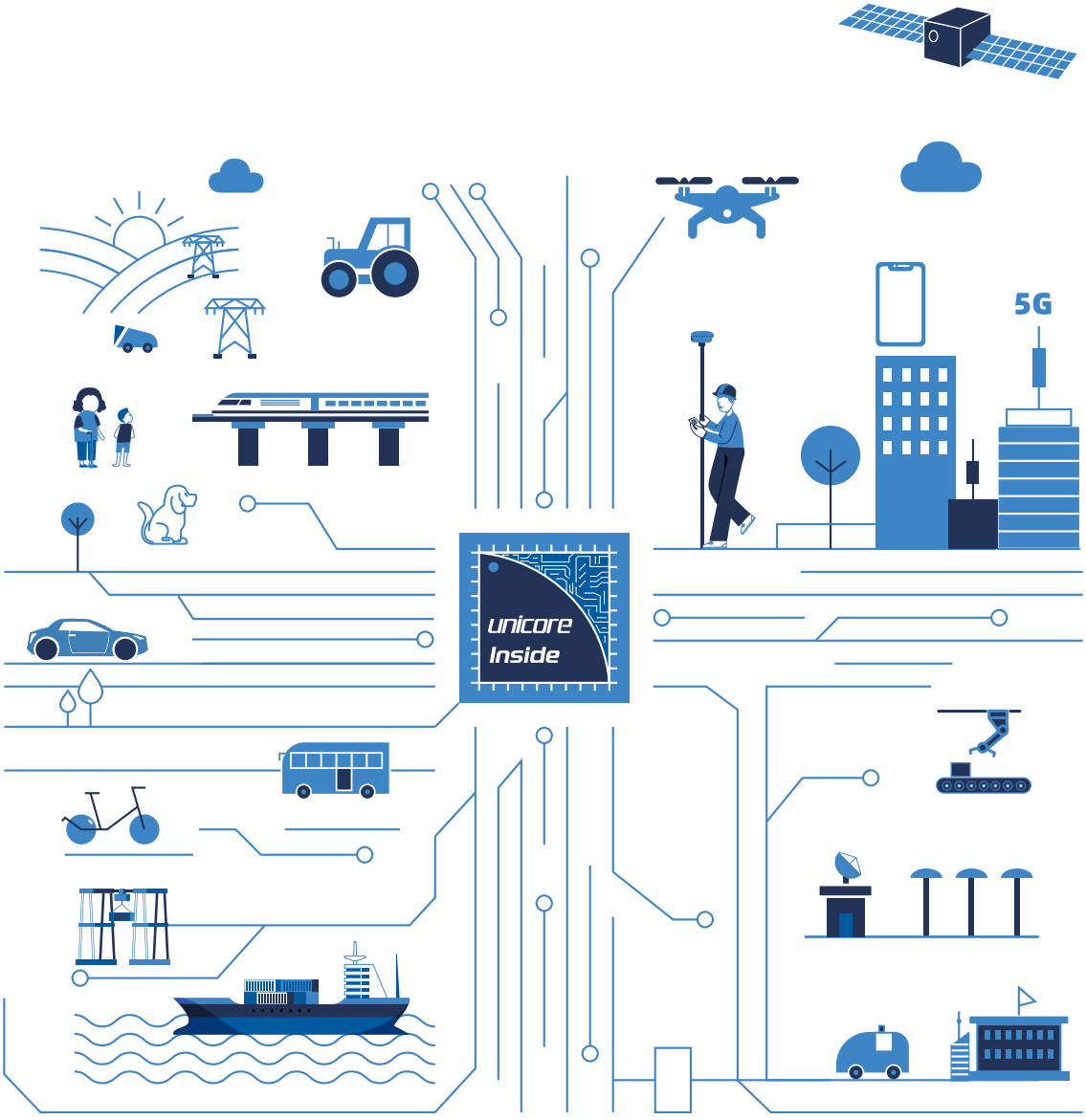
unicore
a BDStar company

PRODUCT BROCHURE

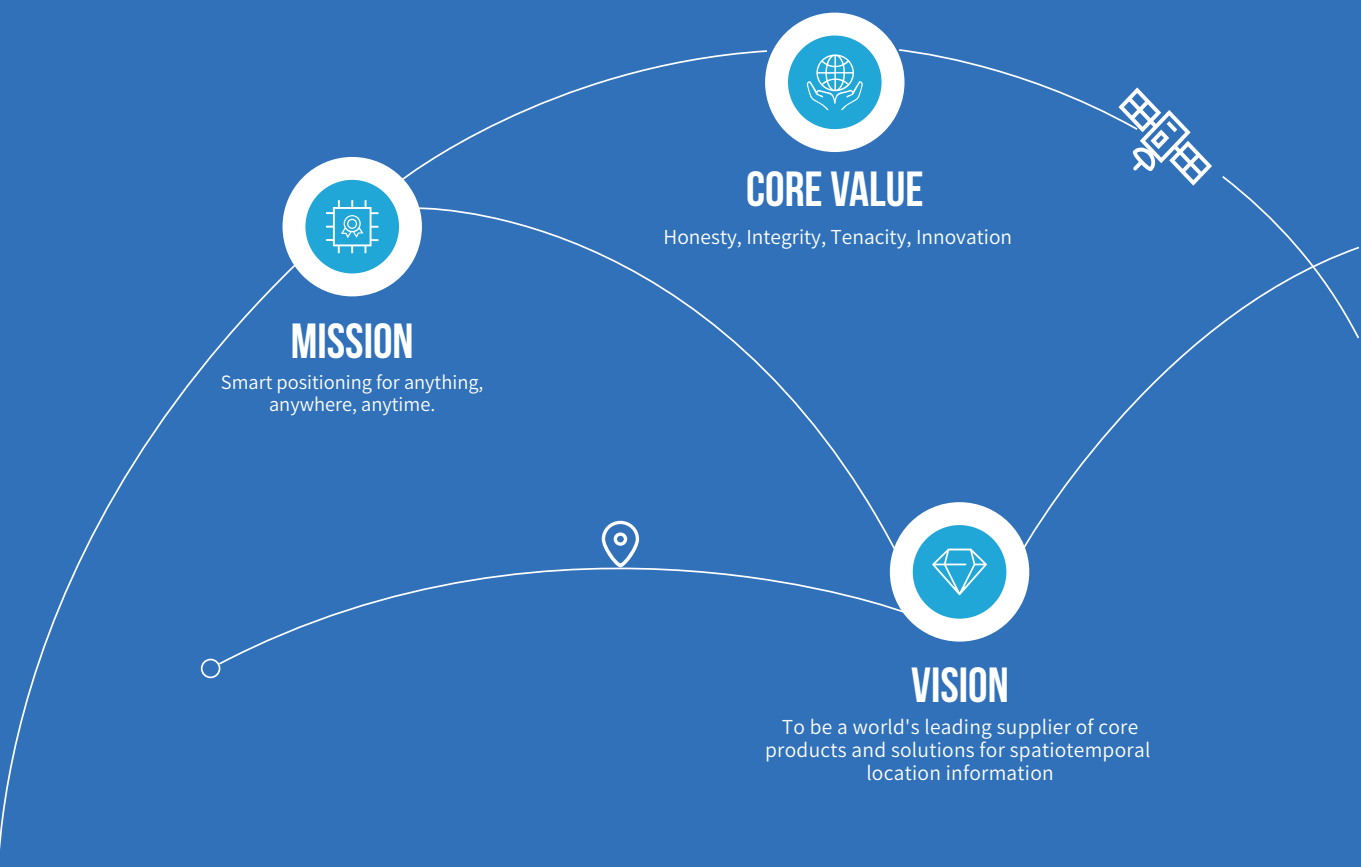


ABOUT

Unicore Communications, Inc. is a high-tech company dedicated to high performance satellite navigation and positioning, multi-sensor fusion algorithm development, and highly integrated GNSS IC design.

The accuracy of Unicore GNSS receivers covers every level from meter and sub-meter to centimeter and millimeter precision.

Using in-house designed proprietary technology, Unicore has successfully developed a series of multi-constellation, multi-frequency, high-performance GNSS receivers for applications ranging from industrial market, automotive market to consumer and IoT market.



CONTENTS

TECHNOLOGY ADVANTAGES

SMART
POSITIONING FOR
ANYTHING ANYWHERE
ANYTIME

U-GNSS Multi-System Fusion Algorithm

Based on the "multi-system fusion" concept, Unicore has developed its unique U-GNSS algorithm and GNSS SoC compatible with GPS, BDS, GLONASS, Galileo, and QZSS, providing more flexible and diversified solutions for users. U-GNSS multi-system fusion algorithm integrates the reception and processing of multiple GNSS signals on a single chip, supporting multi-constellation multi-frequency signal input and corresponding baseband processing function. By enabling support for different satellite navigation systems, it is designed to adapt to the development trends of GNSS.

UHPBBPE

Unicore High-Precision Baseband Processing Engine

Unicore's proprietary on-chip acquisition and tracking engines enable real-time scheduling and dynamic allocation of multiple frequencies from different satellites across all GNSS constellations (including GPS, BDS, GLONASS and Galileo) for independent acquisition and correlative acquisition. At the same time, it utilizes multi-frequency assistance to simultaneously process different frequencies from the same satellite. Each frequency of the same constellation can be acquired independently. When a signal is tracked stably, it can assist other signals to achieve rapid lock. Except for L2P/Y, all frequency signals are tracked independently, which significantly increases the number of available observations when some frequencies are interfered.

UniMG PPP

Universal Multi-GNSS PPP

The UniMG PPP technology enables receivers to simultaneously track all service-providing signals from BDS B2b, Galileo E6, and QZSS L6. This ensures maximum signal availability while integrating all decoded precise data from all constellations to deliver seamless global PPP coverage. By fully leveraging the strengths of all constellations and enabling cross-constellation and cross-service complementarity, UniMG PPP significantly increases the number of satellites used in the positioning solution compared to any standalone service. This results in substantial improvements in PPP accuracy, availability, and reliability. Additionally, it eliminates position jumps caused by service switching due to signal obstructions, ensuring smoother, more stable PPP with higher availability.

DUAL-RTK

DUAL-RTK solution enables the single-board dual-antenna positioning and heading receiver to realize dual-RTK calculation. The primary antenna involves in the high-performance RTK positioning calculation, while the secondary antenna also receives satellite signals and performs high-precision RTK solution. This is particularly helpful in actual road and farmland operation where the primary antenna is blocked and unable to provide RTK positioning results; if the secondary antenna can still track satellites, DUAL-RTK Solution will provide the RTK positioning results of the secondary antenna.

INSTANT HEADING

INSTANT HEADING uses the synchronized, symmetric, and multi-path mitigated observation data provided by Unicore single-board dual-antenna products, and uses the multi-mode, multi-frequency, wide-lane and narrow-lane combined ambiguity searching algorithm, cycle slip detection and repair algorithm, multi-path error model algorithm, to realize single epoch ambiguity fix, which greatly improves the calculation time and reliability. Unicore dual-antenna products support GPS, BDS, GLONASS, Galileo, and QZSS, which improves the usability and precision of INSTANT HEADING. INSTANT HEADING is deeply combined with on-board INS, maintaining high-precision heading function for a long time even if the satellite signals are blocked, which further improves the usability of the heading function.

SynerLoc
Synergy Locate

SynerLoc (Synergy Locate) is a multi-algorithm engine fusion technology that integrates carrier phase, pseudorange, and Doppler observations from all available satellites through a high-frequency processing module to compute positional changes between the latest and historical epochs, significantly improving computational efficiency and accuracy. The high-frequency output module dynamically correlates historical position solutions from three engines—RTK, PPP, and DGNSS/SBAS/SPP—to update and output the positional information for the latest epoch. Based on the multi-dimensional input from these sources, the algorithm autonomously evaluates and outputs the best solution in real time. SynerLoc continuously trains and updates positional deviation models between multiple engine outputs (RTK, PPP, DGNSS/SBAS/SPP) and the best solution. When the best solution is temporarily unavailable, it seamlessly switches to alternative solutions to maintain continuous and precise positioning.

GNSS/INS-URAIM-PL
Protection Level for GNSS/INS Integrated Navigation Based on Receiver Autonomous Integrity Monitoring

The GNSS/INS-URAIM-PL technology derives and utilizes the equivalent relationship between Kalman filtering and the least-squares algorithm with prediction, integrating PL calculation for various sensor fusion and state estimation into a single framework. It employs intermediate variables from adaptive estimation to perform PL calculation, saving redundant computational and memory overhead. To tackle the problem of error model distortion, it introduces multiple empirical inflation coefficients under stable estimator condition, ensuring the final PL output matches the true positioning and velocity errors. It also quantifies the protection level during standalone INS dead reckoning through a method of base value plus variance inflation.

CCI-PPP-RTK
PPP-RTK Technology Based on Cloud-Chip Integration

CCI-PPP-RTK (PPP-RTK Technology Based on Cloud-Chip Integration) combines the strengths of both PPP and RTK, effectively addressing the limitations of NRTK and PPP. By receiving precisely estimated orbit corrections, clock corrections, phase biases, code biases, and atmospheric corrections from the cloud, and integrating a multi-constellation, multi-frequency PPP-RTK positioning engine on the chip, it fully leverages the Chip-Cloud advantage to deliver rapid precise positioning service worldwide. Since it employs a one-way broadcast communication method, the CCI-PPP-RTK technology imposes no upper limit on the number of users.

PRODUCTS

UNICORE NEBULASIV SERIES PRODUCTS

	UM980	UM980C	UM982	UM982C	UB9A0	UM981	UM981C	UM981S	UM960	UM960E	UT986
	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision RTK Positioning Module	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision RTK Positioning Module (L-Band & CLAS Supported)	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision Positioning and Heading Module	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision Positioning & Heading Module (L-Band & CLAS Supported)	All-Constellation GNSS High-Precision Board	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency RTK/INS Integrated Positioning Module	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency RTK/INS Integrated Positioning Module (L-Band & CLAS Supported)	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency RTK/INS Integrated Positioning Module	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision RTK Positioning Module	GPS/BDS/GLONASS/Galileo /QZSS All-Constellation Multi-Frequency High-Precision RTK Positioning Module	GNSS All-Constellation Multi-Frequency High Accuracy Timing Module
Quality Certificates	RoHS, REACH, CE, FCC, IC, RED		RoHS, REACH, CE, FCC, IC, RED		RoHS, REACH, CE,FCC, IC, RED	RoHS, REACH, CE, FCC, IC, RED			RoHS, REACH, CE, FCC, IC, RED, POPS, TSCA	RoHS, REACH, CE, FCC, IC, RED, POPS, TSCA	RoHS, REACH, RED
Application Areas	Surveying and Mapping; Precision Agriculture		UAV, Precision Agriculture, Autonomous Machine		CORS, GBAS, High-Precision Surveying and Mapping	Precision Agriculture		Surveying and Mapping	Robotic Lawn Mower, GIS Handheld, Drone Light Show, Robots	Robotic Lawn Mower	Telecom Base Station Timing, Electrical Power Grid Timing, Network Time Synchronization
Dimensions Packaging Weight	17.0 × 22.0 × 2.6 mm 54 pin LGA 1.88 g ± 0.03 g		16.0 × 21.0 × 2.6 mm 48pin LGA 1.82g ± 0.03 g		60.0 × 100.0 × 11.4 mm 40 pin 46.5 g ± 2.5g	17.0 ×22.0 × 2.6 mm 54 pin LGA 1.91g ± 0.03g			12.2 × 16.0 × 2.6 mm 24 pin LGA 1.11 g ± 0.03 g	12.2 × 16.0 × 2.6 mm 24 pin LGA 1.08 g ± 0.03 g	17.0 × 22.4 × 2.4 mm 28 pin LCC 1.9 g
Single Point (RMS)	Hor: 1.5 m Ver: 2.5 m		Hor: 1.5 m Ver: 2.5 m		Hor: 1.5 m Ver: 2.5 m	Hor: 1.5 m Ver: 2.5 m			Hor: 1.5 m Ver: 2.5 m	**Hor: 1.5 m Ver: 2.5 m**	Hor: 1.5 m Ver: 2.5 m
DGPS (RMS)	Hor:0.4 m Ver:0.8 m		Hor:0.4 m Ver:0.8 m		Hor:0.4 m Ver:0.8 m	Hor:0.4 m Ver:0.8 m			Hor:0.4 m Ver:0.8 m	Hor:0.4 m Ver:0.8 m	—
RTK (RMS)	Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm		Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm		Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm	Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm			Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm	Hor: 0.8 cm+1 ppm Ver:1.5 cm+1 ppm	—
Heading (RMS)	—		0.1° /1 m baseline		—	—			—	—	—
Frequency	BDS B1I, B3I, B1C, B2a, B2b, B3I GPS L1C/A, L1C, L2C, L2P(Y), L5 GLONASS G1, G2, G3 (UM980) GLONASS G1, G2 (UM980C) Galileo E1, E5a, E5b, E6 QZSS L1C/A, L1C/B, L1C, L2C, L5, L6 NAVIC L5 SBAS L1C/A L-Band (UM980C)		BDS B1I, B3I,B1C*,B2b* GPS L1C/A, L2C, L2P(Y), L5 GLONASS G1, G2 Galileo E1, E5a, E5b,E6* QZSS L1C/A, L1C/B, L2C, L5, L6* SBAS L1C/A L-Band (UM982C)		BDS B1I, B3I, B1C, B2a, B2b GPS L1C/A, L1C, L2C, L2P(Y), L5 GLONASS G1, G2, G3 Galileo E1, E5a, E5b, E6 QZSS L1C/A, L1C, L2C, L5, L6 NavIC L5 SBAS L1 C/A L-Band*	BDS B1I, B3I, B1C, B2a, B2b GPS L1C/A, L1C, L2C, L2P(Y), L5 GLONASS G1, G2, G3 Galileo E1, E5a, E5b, E6 QZSS L1C/A, L1C, L2C, L5, L6 NavIC L5 SBAS L1C/A L-Band (UM981C)			BDS B1I, B3I, B1C, B2a, B2b GPS L1C/A, L2C, L2P(Y), L5 GLONASS G1, G2 Galileo E1, E5a, E5b, E6 QZSS L1C/A, L2C, L5 SBAS L1C/A	BDS B1I, B3I, B1C, B2a, B2b GPS L1C/A, L2C, L2P(Y), L5 GLONASS G1, G2 Galileo E1, E5a, E5b, E6 QZSS L1C/A, L2C, L5	BDS B1I, B1C, B2a GPS L1C/A, L2C, L5 GLONASS G1 Galileo E1, E5a, E5b QZSS L1C/A, L2C, L5
IMU	—		—		—	●			—	—	—
Dual Antenna	—		●		—	—			—	—	—
RTK Initialization Time (s)	< 5		< 5		< 5	< 5			< 5	< 5	—
Cold Start (s)	<12		<30		< 12	<12			<30	<35	<30
Data Update Rate (Hz)	50		20		50	100Hz (IMU Raw Data) 50 Hz (RTK)			20	20	1
Output Latency (ms)	<25		<20		< 25	<10			<20	<20	<20
Interface: Serial Port	3 x LVTTL		3 x LVTTL		1 x RS-232 2 x LVTTL	3 x LVTTL			3 x LVTTL	3 x LVTTL	2 x LVTTL
Interface: Ethernet Port (10/20 M)	—		—		1	—			—	—	—
Interface: 1PPS	1		1		1	1			1	1	1
Interface: External Clock	—		—		1	—			—	—	1
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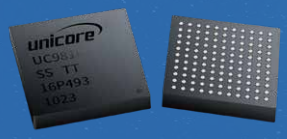
● Support; -N/A; * Optional

NebulasIV
UC9810

All-Constellation All-Frequency RF Baseband and High-Precision Algorithm Integrated GNSS SoC

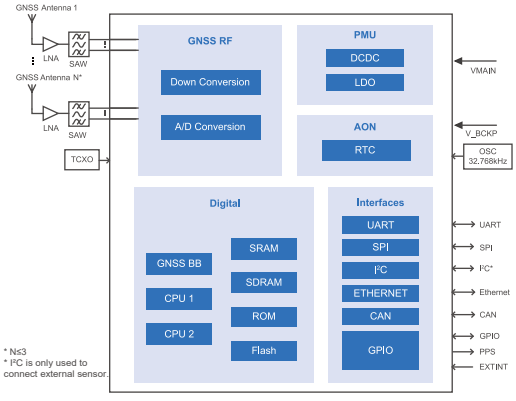


Key Technologies

- Dual-processor primary-secondary asynchronous architecture
- Dedicated RTK matrix processor
- UPF low-power technology
- All-constellation and all-frequency joint acquisition and tracking algorithm
- Anti-jamming capability (JamShield)
- RTKKEEP technology

Features

- All-constellation all-frequency RF, baseband and high-precision algorithm integrated GNSS SoC
- Supports 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 L1, L2, L5; NavIC L5; SBAS; L-Band
- Ultra-small size of 7 × 7 mm with a minimum PCB layout area of only 12×16 mm
- Ultra-low power consumption of 300mW
- 1408 channels and up to 100 Hz data update rate
- All-constellation all-frequency on-chip RTK positioning and dual-antenna heading solution



NebulasIV UC9810 is Unicore's new generation proprietary GNSS SoC that integrates RF, baseband, and high-precision algorithm. By leveraging advanced process node architecture, high-performance multi-mode baseband GNSS processor and embedded microprocessor, the chip delivers superb performance and maintains low power consumption. UC9810 supports 1408 channels and tracks multiple signals, including GPS, BDS, GLONASS, Galileo, QZSS, NavIC, SBAS, and L-Band. The integrated RTK matrix processing technology allows the chip to deliver an enhanced all-constellation all-frequency centimeter-level RTK positioning and heading.

NebulasIV features high integration, high performance, low power consumption and compact form factor. It is an ideal solution for technically demanding high-precision applications, such as drones, robotic lawn mowers, precision agriculture, surveying and mapping, intelligent driving and timing.

NebulasIV supports various external interfaces that cover almost all the common application interfaces, including RTC power supply, PPS, EVENT, CAN, network,UART, SPI, I2C, odometer, configurable GPIOs, etc.

Applications

- UAV
- Surveying and Mapping
- Robot
- Telecom Timing
- Deformation Monitoring
- Autonomous Driving
- Precision Agriculture

Performance

Channel	1408 channels
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 L1, L2, L5
	NavIC L5
	SBAS
	L-Band
Dimensions	7 × 7 mm
Cold Start	< 12 s
RTK Initialization Time	< 5 s

Single Point Positioning (RMS)	Horizontal: 1.5 m
	Vertical: 2.5 m
DGPS (RMS)	Horizontal: 0.4 m
	Vertical: 0.8 m
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm
	Vertical: 1.5 cm + 1 ppm
Initialization Reliability	> 99.9%
Differential Data	RTCM V3.X
Data Update Rate	100 Hz
Timing Accuracy	2.5 ns (1σ)
Power Consumption	300 mW (single antenna)
Heading Accuracy	0.1°/1 m baseline

UM982

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency High-Precision Positioning and Heading Module

16.0 × 21.0 × 2.6 mm

Features

- Based on Unicore's proprietary GNSS SoC NebulasIV that integrates RF, baseband and high-precision algorithm
- Supports all-constellation multi-frequency on-chip RTK positioning and dual-antenna heading solution
- Dual-RTK engine using master-slave antenna GNSS raw observations for independent positioning solution
- Excellent anti-jamming and anti-spoofing capabilities, supporting jamming detection and spoofing detection
- Adaptive recognition of RTCM format differential data
- STANDALONE single-station high-precision positioning technology
- Supports B2b-PPP, E6-HAS , QZSS L6E (MADOCA) PPP and SouthPAN L5 PVS

Applications

- UAV
- Autonomous Machine
- Precision Agriculture

UM982 is Unicore's new-generation proprietary high-precision positioning and heading module. Its primary and secondary antennas can simultaneously track multiple frequencies of all GNSS systems, and the module can perform on-chip RTK positioning and dual-antenna heading calculation. The built-in advanced anti-jamming unit ensures that the module delivers reliable and accurate positioning data even in complex electromagnetic environments. Featuring the extraordinary positioning performance and reliability, UM982 is a perfect choice for high-precision navigation and positioning applications such as UAV, autonomous machine and precision agriculture.

Physical Characteristics

Packaging	48 pin LGA
Dimensions	16.0 × 21.0 × 2.6 mm
Weight	1.82 ± 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 × UART (LVTTL)
1 × SPI*
1 × I^2C*
1 × CAN* (shared with UART3)

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

Performance Specifications

Channel	1408 channels, based on NebulasIV			
Frequency	Master Antenna	Slave Antenna		
	GPS L1C/A, L2P(Y), L2C, L5	GPS L1C/A, L2C		
	BDS B1I, B3I, B1C, B2a, B2b*	BDS B1I, B3I		
	GLONASS G1, G2	GLONASS: G1, G2		
	Galileo E1, E5a, E5b, E6	Galileo E1, E5b		
	QZSS L1C/A, L1C/B, L2C, L5, L6	QZSS L1C/A, L1C/B, L2C		
	SBAS L1C/A	-		
Single Point Positioning(RMS)	Horizontal: 1.5 m			
	Vertical: 2.5 m			
DGPS (RMS)	Horizontal: 0.4 m		Heading Accuracy (RMS)	0.1°/1 m baseline
	Vertical: 0.8 m		Time Accuracy (RMS)	20 ns
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm		Velocity Accuracy (RMS)	0.03 m/s
	Vertical: 1.5 cm + 1 ppm		Cold Start	< 30 s
PPP (RMS)	Horizontal: 5 cm		Initialization Time	< 5 s (typical)
	Vertical: 10 cm		Initialization Reliability	> 99.9%

Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/L1C/A/G1/E1 Carrier Phase	1 mm	1 mm	1 mm	1 mm
B2I/L5/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2P(Y)/L2C/G2 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2P(Y)/L2C/G2 Carrier Phase	1 mm	1 mm	1 mm	1 mm
Data Update Rate	20 Hz (RTK+Heading)			
Differential Data	RTCM V3.X			
Data Format	NMEA 0183, Unicore			

UM982C

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency High-Precision Positioning & Heading Module (L-Band & CLAS Supported)

16.0 × 21.0 × 2.6 mm

Features

- Based on Unicore's proprietary GNSS SoC NebulasIV which integrates RF-baseband and high-precision algorithm
- All-constellation, multi-frequency on-chip RTK positioning and dual-antenna heading solution
- Dual RTK engine using master-slave antenna GNSS raw observations for independent positioning solution
- Excellent anti-jamming and anti-spoofing capabilities, supporting jamming detection and spoofing detection
- Adaptive recognition of RTCM format differential data
- STANDALONE single-station high-precision positioning technology
- Supports B2b-PPP, E6-HAS and QZSS L6E (MADOCA) PPP and SouthPAN L5 PVS
- Supports QZSS L6D (CLAS) PPP-RTK solution
- Supports TruePoint|REACH Sat L-band-based PPP-AR service[1]

Applications

- UAV
- Autonomous Machine
- Precision Agriculture

UM982C is Unicore's new-generation proprietary all-constellation, multi-frequency high-precision GNSS positioning and heading module, developed based on the GNSS SoC NebulasIV which integrates RF, baseband and high-precision algorithm. The module supports all-constellation multi-frequency on-chip RTK positioning and dual-antenna heading solution, supports QZSS L6D (CLAS) PPP-RTK solution, and supports TruePoint|REACH Sat L-band-based PPP-AR service. UM982C can be used as a rover or a base station for applications such as UAV, precision agriculture, and autonomous machine.

UM982C supports configuring the multi-system joint positioning mode or single-system standalone positioning mode, and tracking multiple signals. With the built-in anti-jamming unit, the module ensures accurate positioning even in complex electromagnetic environments.

UM982C has various types of interfaces for different purposes, including UART, I2C*, SPI*, PPS, EVENT and CAN*.

Physical Characteristics

Packaging	48 pin LGA
Dimensions	16.0 × 21.0 × 2.6 mm
Weight	1.82 ± 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 × UART (LVTTL)
1 × SPI*
1 × I²C*
1 × CAN* (shared with UART3)

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

1. This is is a paid service
2. Under open sky and without jamming

Performance Specifications

Channel	1408 channels, based on NebulasIV

Master Antenna	Slave Antenna
GPS L1C/A, L2P(Y), L2C, L5	GPS L1C/A, L2C
BDS B1I, B3I, B2a, B2b	BDS B1I, B3I
GLONASS G1, G2	-
Galileo E1, E5a, E5b, E6	Galileo E1, E5b
QZSS L1C/A, L1C/B, L2C, L5, L6	QZSS L1C/A, L2C
L-Band	-

Single Point Positioning(RMS)	Horizontal: 1.5 m
	Vertical: 2.5 m
DGPS (RMS)	Horizontal: 0.4 m
	Vertical: 0.8 m
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm
	Vertical: 1.5cm + 1 ppm
PPP (RMS)[2]	Horizontal: 5 cm @20min
	Vertical: 10 cm @20min

PPP-AR (RMS)[2]	Horizontal: 3 cm @5min
	Vertical: 6 cm @5min
CLAS (RMS)[2]	Horizontal: 5 cm @1min
	Vertical: 10 cm @1min
Heading Accuracy (RMS)	0.1°/1 m baseline
Time Accuracy (RMS)	20 ns
Velocity Accuracy (RMS)	0.03 m/s
TTFF	Cold Start < 30 s
	Hot Start < 4 s
Initialization Time	< 5 s (typical)
Initialization Reliability	> 99.9%
Data Update Rate	20 Hz (RTK+Heading)
Differential Data	RTCM V3.X
Data Format	NMEA 0183, Unicore

Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/L1C/A/G1/E1 Carrier Phase	1 mm	1 mm	1 mm	1 mm
B2I/L5/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2P(Y)/L2C/G2 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2P(Y)/L2C/G2 Carrier Phase	1 mm	1 mm	1 mm	1 mm

UM980

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency High-Precision RTK 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

Applications

- Surveying and Mapping
- Precision Agriculture

UM980 is Unicore's new-generation proprietary high-precision RTK positioning module based on the GNSS SoC NebulasIV which integrates RF, baseband and high-precision algorithm. The module supports GPS, BDS, GLONASS, Galileo, QZSS, NavIC and SBAS. The built-in multi-frequency anti-jamming technology enhances RTK calculation on multiple modes and frequencies, which significantly improves RTK initialization time, measurement accuracy and reliability in complex environments such as city blocks and tree shades. UM980 is well suited for high-precision navigation and positioning applications such as precision agriculture, surveying and mapping and so on.

Physical Characteristics

Packaging	54 pin LGA
Dimension	17.0 × 22.0 × 2.6 mm
Weight	1.88 ± 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 × UART (LVTTL)

1 × SPI*

1 × I^2C*

1 × CAN* (shared with UART3)

Note: Items marked with * are only supported by specific firmware or hardware

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/B, L1C, L2C, L5, L6				
	NavIC L5				
	SBAS L1C/A				
Single Point Positioning(RMS)	Horizontal: 1.5 m				
	Vertical: 2.5 m				
DGPS (RMS)	Horizontal: 0.4 m				
	Vertical: 0.8 m				
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm				
	Vertical: 1.5 cm + 1 ppm				
PPP (RMS)	Horizontal: 5 cm				
	Vertical: 10 cm				

Time Accuracy(RMS)	20 ns			
Velocity Accuracy (RMS)	0.03 m/s			
Cold Start	< 12 s			
Initialization Time	< 5 s (typical)			
Initialization Reliability	> 99.9%			
Data Update Rate	50 Hz*			

Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/B1C/L1C/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/B1C/L1C/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/B2a/B2b/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2P(Y)/L2C/G2 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2P(Y)/L2C/G2 Carrier Phase	1 mm	1 mm	1 mm	1 mm
Differential Data	RTCM V3.X			
Data Format	NMEA 0183, Unicore			

UM980C

GPS/BDS/GLONASS/Galileo/QZSS
All-Constellation Multi-Frequency
High-Precision RTK Positioning
Module (L-Band & CLAS Supported)

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
- STANDALONE single-station high-precision positioning technology
- Supports B2b-PPP, E6-HAS and QZSS L6E (MADOCA) PPP
- Supports QZSS L6D (CLAS) PPP-RTK solution
- Supports TruePoint|REACH Sat L-band-based PPP-AR service[1]

Applications

- Surveying and Mapping
- Precision Agriculture

UM980C is Unicore's new-generation proprietary all-constellation, multi-frequency high-precision RTK positioning module, developed based on the GNSS SoC NebulasIV which integrates RF-baseband and high-precision algorithm. The module supports multiple systems including GPS, BDS, GLONASS, Galileo, QZSS, NavIC, SBAS and L-Band, supports QZSS L6D (CLAS) PPP-RTK solution, and supports TruePoint|REACH Sat L-band-based PPP-AR service. The built-in multi-frequency anti-jamming technology enhances RTK solution on multiple modes and frequencies, which significantly improves RTK initialization speed, measurement accuracy and reliability in challenging environments such as urban canyons and tree shades. UM980C is ideal for surveying and mapping, and precision agriculture.

Physical Characteristics

Packaging	54 pin LGA
Dimensions	17.0 × 22.0 × 2.6 mm
Weight	1.88 ± 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 × UART (LVTTL)
1 × SPI*
1 × I²C*
1 × CAN* (shared with UART3)

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

1. This is is a paid service
2. Under open sky and without jamming

Performance Specifications

Channel	1408 channels, based on NebulasIV
Frequency	BDS B1I, B3I, B1C, B2a, B2b
	GPS L1C/A, L1C, L2C, L2P(Y), L5
	GLONASS G1, G2, G3
	Galileo E1, E5a, E5b, E6
	QZSS L1C/A, L1C, L2C, L5, L6
	NavIC L5
	SBAS L1C/A
	L-Band
Single Point Positioning(RMS)	Horizontal: 1.5 m
	Vertical: 2.5 m
DGPS (RMS)	Horizontal: 0.4 m
	Vertical: 0.8 m
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm
	Vertical: 1.5cm + 1 ppm
PPP (RMS)[2]	Horizontal: 5 cm @20min
	Vertical: 10 cm @20min

PPP-AR (RMS)[2]	Horizontal: 3 cm @5min
	Vertical: 6 cm @5min
CLAS (RMS)[2]	Horizontal: 5 cm @1min
	Vertical: 10 cm @1min
Time Accuracy (RMS)	20 ns
Velocity Accuracy (RMS)	0.03 m/s
TTFF (Time to First Fix)	Cold Start < 12 s
	Hot Start < 4 s
Initialization Time	< 5 s (Typical)
Initialization Reliability	> 99.9%
Data Update Rate	Up to 50 Hz RTK data output
Differential Data	RTCM V3.X
Data Format	NMEA 0183, Unicore

Observation Accuracy (RMS)	BDS	GPS	GLONASS	Galileo
B1I/B1C/L1C/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/B1C/L1C/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/B2a/B2b/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2P(Y)/L2C/G2 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2P(Y)/L2C/G2 Carrier Phase	1 mm	1 mm	1 mm	1 mm

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 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 and E6-HAS
- On-board MEMS integrated positioning technology to ensure continuous positioning when loss of lock on GNSS signals occurs

Applications

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 is designed for high-precision navigation and positioning applications and is ideal for high-precision agriculture applications.

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 I²C*
1 x SPI*
1 × CAN*

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/B, 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		

Attitude Accuracy	Heading	Roll	Pitch	
	0.3°	0.2°	0.2°	
Positioning Error of INS only	< 5 % of the distance traveled without GNSS signals			
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			

UM981C

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency RTK/INS Integrated Positioning Module (L-Band & CLAS Supported)

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
- Output 100 Hz IMU raw data or integrated positioning data
- Supports B2b-PPP, E6-HAS and QZSS L6E (MADOCA) PPP
- Supports QZSS L6D (CLAS) PPP-RTK solution
- Supports TruePoint|REACH Sat L-band-based PPP-AR service[1]
- On-board MEMS integrated positioning technology to ensure continuous positioning when loss of lock on GNSS signals occurs

Applications

Precision Agriculture

UM981C is Unicore's new-generation proprietary all-constellation, multi-frequency high-precision RTK/INS integrated positioning module, developed based on the GNSS SoC NebulasIV which integrates RF-baseband and high-precision algorithm. The module supports multiple systems, including GPS, BDS, GLONASS, Galileo, QZSS, NavIC and SBAS, supports QZSS L6D (CLAS) PPP-RTK solution, and supports TruePoint|REACH Sat L-band-based PPP-AR service. It integrates a high-speed floating point processor and an RTK co-processor to enable position data output at 100 Hz. Additionally, its on-board MEMS chip and integrated algorithm effectively solves the issue of position loss due to loss of signal lock, ensuring continuous, accurate positioning output even in challenging environments such as urban canyons, tunnels, overpasses and tree shades. UM981C is ideal for high-precision agriculture applications.

Physical Characteristics

Packaging	54 pin LGA
Dimensions	17.0 × 22.0 × 2.6 mm
Weight	1.91 ± 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 × UART (LVTTL)
1 × SPI*
1 × I²C*
1 × CAN*

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

1. This is is a paid service
2. Under open sky and without jamming

Performance Specifications

Channel	1408 channels, based on NebulasIV
Frequency	BDS B1I, B3I, B1C, B2a, B2b
	GPS L1C/A, L1C, L2C, L2P(Y), L5
	GLONASS G1, G2, G3
	Galileo E1, E5a, E5b, E6
	QZSS L1C/A, L1C, L2C, L5, L6
	NavIC L5
	SBAS L1C/A
	L-Band
Single Point Positioning(RMS)	Horizontal: 1.5 m
	Vertical: 2.5 m
DGPS (RMS)	Horizontal: 0.4 m
	Vertical: 0.8 m
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm
	Vertical: 1.5cm + 1 ppm
PPP (RMS)[2]	Horizontal: 5 cm @20min
	Vertical: 10 cm @20min
PPP-AR (RMS)[2]	Horizontal: 3 cm @5min
	Vertical: 6 cm @5min

CLAS (RMS)[2]	Horizontal: 5 cm @1min
	Vertical: 10 cm @1min
Time Accuracy (RMS)	20 ns
Velocity Accuracy (RMS)	0.03 m/s
Attitude Accuracy	Heading 0.3° Roll 0.2° Pitch 0.2°
Positioning Error of INS only	< 5 % of the distance traveled without GNSS signals
TTFF (Time to First Fix)	Cold Start < 12 s
	Hot Start < 4 s
Initialization Time	< 5 s (Typical)
Initialization Reliability	> 99.9%
Data Update Rate	100 Hz IMU raw data or integrated positioning data output
	Up to 50 Hz RTK positioning data output

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			

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			

UM960

GPS/BDS/GLONASS/Galileo/QZSS
All-Constellation Multi-Frequency
High-Precision RTK Positioning
Module

12.2 × 16.0 × 2.6 mm

Features

- High precision, low power consumption and compact size
- Based on the new generation GNSS SoC -NebulasIV, which integrates RF, baseband and high-precision algorithm
- 16.0 × 12.2 × 2.6 mm surface mount device
- Supports all-constellation multi-frequency on-chip RTK positioning solution
- All-constellation multi-frequency RTK engine and advanced RTK technology
- Tracking different frequencies independently
- Excellent anti-jamming and anti-spoofing capabilities, supporting jamming detection and spoofing detection

Applications

- Drone Light Show
- Robotic Lawn Mower
- GIS Handheld
- Robotics

UM960 is Unicore's new generation high-precision RTK posititioning module based on the proprietary GNSS SoC-NebulasIV, which integrates RF, baseband and high-precision algorithm. It supports all constellations, including GPS, BDS, GLONASS, Galileo and QZSS, and can track multiple frequencies concurrently.

With its superb performance, UM960 is perfectly suited for high-precision navigation and positioning applications, such as drone light show, robotic lawn mowers, handheld devices, high-precision GIS, robotics, etc.

Physical Characteristics

Packaging	24 pin LGA
Dimension	12.2 × 16.0 × 2.6 mm
Weight	1.11 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

Power Supply

Voltage	3.0 V ~ 3.6 V DC
Power Consumption	450 mW (typical)

Communication Interfaces

3 × UART (LVTTL)

1 × I^2C*

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

Performance Specifications

Channel	1408 channels, based on NebulasIV			
Frequency	GPS L1C/A, L2C, L2P(Y), L5			
	BDS B1I, B3I, B1C, B2a, B2b			
	GLONASS G1, G2			
	Galileo E1, E5a, E5b, E6			
	QZSS L1C/A, L2C, 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	Data Update Rate	20 Hz positioning	
	Vertical: 0.8 m	Cold Start	< 30 s	
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm	Initialization Time	< 5 s (typical)	
	Vertical: 1.5 cm + 1 ppm	Initialization Reliability	> 99.9%	

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/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/B2a/B2b/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2C/L2P(Y)/G2/E6 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2C/L2P(Y)/G2/E6 Carrier Phase	1 mm	1 mm	1 mm	1 mm
Differential Data	RTCM V3.X, RTCM V2.3, CMR			
Data Format	NMEA 0183, Unicore			

UM960E

GPS/BDS/GLONASS/Galileo/QZSS All-Constellation Multi-Frequency High-Precision RTK Positioning Module

12.2 × 16.0 × 2.6 mm

Features

- High precision, low power consumption and compact size
- Based on the new generation GNSS SoC -NebulasIV, which integrates RF, baseband and high-precision algorithm
- 16.0 × 12.2 × 2.6 mm surface mount device
- Supports all-constellation multi-frequency on-chip RTK positioning solution
- All-constellation multi-frequency RTK engine and advanced RTK technology
- Tracking different frequencies independently
- Excellent anti-jamming and anti-spoofing capabilities, supporting jamming detection and spoofing detection

Applications

Robotic Lawn Mower

UM960E is Unicore's new generation high-precision RTK module based on the proprietary GNSS SoC-NebulasIV, which integrates RF, baseband and high-precision algorithm. The module features a compact size of 16.0 mm × 12.2 mm with SMT pads, supporting fully automated integration through standard pick-and-place and reflow soldering. UM960E has various types of interfaces for different purposes, including UART and I2C*. It is primarily designed for the high-precision positioning field and is particularly suitable for robotic lawn mowers.

Physical Characteristics

Packaging	24 pin LGA
Dimension	12.2 × 16.0 × 2.6 mm
Weight	1.08 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

Power Supply

Voltage	3.0 V ~ 3.6 V DC
Power Consumption	360 mW (typical)

Communication Interfaces

3 × UART (LVTTL)

1 × I²C*

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

Performance Specifications

Channel	1408 channels, based on NebulasIV		
Frequency	GPS L1C/A, L2C, L2P(Y), L5		
	BDS B1I, B3I, B1C, B2a, B2b		
	GLONASS G1, G2		
	Galileo E1, E5a, E5b, E6		
	QZSS L1C/A, L2C, L5		
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	Data Update Rate	20 Hz positioning
	Vertical: 0.8 m	Cold Start	≤ 35 s
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm	Initialization Time	< 5 s (typical)
	Vertical: 1.5 cm + 1 ppm	Initialization Reliability	> 99.9%

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/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/B2a/B2b/L5/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2C/L2P(Y)/G2/E6 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2C/L2P(Y)/G2/E6 Carrier Phase	1 mm	1 mm	1 mm	1 mm

Differential Data	RTCM V3.X, RTCM V2.3, CMR
Data Format	NMEA 0183, Unicore

UT986

GNSS All-Constellation Multi-Frequency High-Accuracy Timing Module

17.0× 22.4 × 2.4 mm

Features

- Based on Unicore's proprietary GNSS SoC NebulasIV that integrates RF, baseband and high-precision algorithm
- New-generation GNSS all-constellation multi-frequency high-accuracy timing module
- Nanosecond-level PPS accuracy, with time quality indicator output
- Excellent anti-jamming capability, tracking different signals by different RF channels
- Supports jamming detection and spoofing detection
- Supports single-satellite timing

Applications

- Telecom Base Station Timing
- Electrical Power Grid Timing
- Network Time Synchronization

UT986 is Unicore's new-generation proprietary GNSS high-accuracy timing module working on all systems and multiple frequencies. The module integrates filters and linear amplifiers, providing optimized RF structure and having interference suppression capability. Combining the adaptive anti-jamming technology and multi-path mitigation algorithm, it supports jamming detection and spoofing detection, ensuring that the module continuously provides excellent performance even in complex electromagnetic environments. UT986 delivers nanosecond-level PPS accuracy and allows multiple timing modes, including fixed-location timing, optimized-location timing, and positioning timing, enabling exceptional timing accuracy in complex signal environment.

Physical Specifications

Packaging	28 pin LCC
Dimension	17.0 × 22.4 × 2.4 mm
Weight	1.9 g

Power Supply

Voltage	3.0 V ~ 3.6 V DC
Power Consumption	700 mW (typical)

Environmental Specifications

Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-40 °C ~ +95 °C

I/O Interface

2 x UART LVTTL, baud rate: 9600 bps to 921600 bps

RF Input

Input Impedance	50 Ω
Antenna Gain	5 dB ~ 35 dB

Performance Specifications

Channel	1408 channels, based on NebulasIV				
Frequency	GPS L1C/A, L2C, L5				
	BDS B1I, B1C, B2a				
	GLONASS G1				
	Galileo E1, E5a, E5b				
	QZSS LC/A, L2C, L5				
TTFF	Cold Start	< 30 s			
	Reacquision	< 3 s			
Positioning Accuracy (CEP)	Horizontal: 1.5 m (dual system, open sky)				
	Vertical: 2.5 m (dual system, open sky)				
Velocity Accuracy (RMS)	0.03 m/s (dual system horizontal, open sky)				
Sensitivity (RMS)		BDS	GPS	GLONASS	Galileo
	Cold Start	-145 dBm	-147 dBm	-145 dBm	-145 dBm
	Tracking	-160 dBm	-161 dBm	-155 dBm	-155 dBm
1PPS Accuracy	< 5 ns (1σ)				
Data Update Rate	1 Hz Up to 10 Hz				
Differential Data	RTCM V3.X				
Data Format	NMEA-0183,Unicore				

UB9A0

All-Constellation Multi-Frequency
GNSS High-Precision Board

100 x 60 x 11.4 mm

Features

- Based on NebulasIV - a new generation multi-constellation multi-frequency high-precision GNSS SoC, with 1408 channels and powerful signal processing capability
- Supports GPS/BDS/GLONASS/Galileo/QZSS/NavIC/SBAS single-constellation standalone positioning and multi-constellation joint positioning
- Supports advanced multi-path mitigation and low elevation angle tracking
- Supports the output of carrier-phase observations with millimeter-level accuracy
- High reliability, high stability, suitable for challenging environment
- Supports RS232, Ethernet, 1PPS and external clock input
- Supports antenna signal detection and short circuit protection
- Size compatible with mainstream GNSS OEM boards on the market

Applications

- CORS
- GBAS
- Surveying and Mapping

UB9A0 is Unicore's new-generation proprietary high-precision RTK positioning board based on Unicore's proprietary GNSS SoC NebulasIV that integrates RF, baseband and high-precision algorithm, supporting GPS, BDS, GLONASS, Galileo, QZSS, NavIC and SBAS. The board provides millimeter-level carrier-phase observations and centimeter-level RTK positioning output, and supports advanced multi-path mitigation and low elevation angle tracking. UB9A0 is compatible with mainstream GNSS OEM boards on the market and provides UART, Ethernet, and other interfaces to meet the needs of users in different applications such as surveying and mapping, CORS stations, portable base stations, earthquake monitoring and global monitoring stations.

Physical Specifications

Dimensions	100 x 60 x 11.4 mm
Weight	46.5 ± 2.5 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

Electrical Specifications

LNA	+3.0 V ~ +3.6 V DC
Backup Power	+2.2 V ~ +3.6 V DC
Ripple Voltage	100 mVpp (max)
Power Consumption	800 mW (typical)

Communication Interfaces

1 x UART (RS-232)
2 x UART (LVTTL)
1 x LAN, 10 / 100 M
1 × 1PPS (LVTTL)
1 × External Clock, 10M / 20M

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

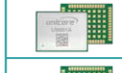
Performance Specifications

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		
	L-Band*		
Single Point Positioning(RMS)	Horizontal: 1.5 m	Time Accuracy (RMS)	5 ns
	Vertical: 2.5 m	Velocity Accuracy (RMS)	0.03 m/s
SBAS(RMS)	Horizontal: 0.8 m	Sensitivity: Reacquisition	-148 dBm
	Vertical: 0.8 m	Sensitivity: Tracking	-160 dBm
DGPS (RMS)	Horizontal: 0.4 m	TTFF: Hot Start	< 5 s
	Vertical: 0.8 m	TTFF: Cold Start	12 s
RTK (RMS)	Horizontal: 0.8 cm + 1 ppm	TTFF: Acquisition	1 s (Unlock ≤ 30s)
	Vertical: 1.5 cm + 1 ppm	TTFF: Reacquisition	2 s (30 s ≤ Unlock ≤ 90s)
Data Update Rate	Up to 50 Hz		

Observation Accuracy (RMS)	BDS	GPS/ QZSS	GLONASS	Galileo
B1I/B1C/L1C/L1C/A/G1/E1 Code	10 cm	10 cm	10 cm	10 cm
B1I/B1C/L1C/L1C/A/G1/E1 Carrier Phase	1 mm	1 mm	1 mm	1 mm
B2I/B2a/B2b/L5/L2P(Y)/G3/E5a/E5b Code	10 cm	10 cm	10 cm	10 cm
B2I/B2a/B2b/L5/L2P(Y)/G3/E5a/E5b Carrier Phase	1 mm	1 mm	1 mm	1 mm
B3I/L2C/G2/E6 Code	10 cm	10 cm	10 cm	10 cm
B3I/L2C/G2/E6 Carrier Phase	1 mm	1 mm	1 mm	1 mm

Differential Data	RTCM V3.X, RTCM V2.X, MSM
Data Format	NMEA 0183, Unicore, BINEX

UNICORE UFIREBIRD SERIES PRODUCTS

	Products	Applications	Grade		Dimensions	GNSS							Single frequency	Dual frequency	Ports				Functions						Page
			Industrial grade	Automotive grade		GPS	BDS	GLONASS	Galileo	NavIC	QZSS	SBAS			UART1	UART2	SPI	I²C	Built-in Flash	Data Update Rate	DR	AGNSS	Timing	RTK	
UFirebird IV Series																									
Chip	 UFirebird IV UC7510A	UAV, Vehicle Navigation, Industrial Applications		●	4.0 × 4.0 × 0.75 mm	●	●	●	●		●	●	●		●		○	●	●	1 Hz / 5 Hz / 10 Hz		●			21
	 UFirebird IV UC7510I		●		4.0 × 4.0 × 0.75 mm	●	●	●	●		●	●	●		●		○	●	●	1 Hz / 5 Hz / 10 Hz		●			21
Module	 UM760	Industrial Applications	●		12.2 × 16.0 × 2.4 mm	●	●	●	●		●	●	●		●			●	●	1 Hz / 5 Hz / 10 Hz		●			23
	 UM760A	Vehicle Navigation,T-BOX,Vehicle Monitoring, Streaming Rearview Mirror		●	12.2 × 16.0 × 2.4 mm	●	●	●	●		●	●	●		●			●	●	1 Hz / 5 Hz / 10 Hz		●			24
	 UM761	Industrial Applications	●		12.2 × 16.0 × 2.4 mm	●	●	●	●		●	○	●		●				●	1 Hz / 5 Hz / 10 Hz	●	●			25
	 UM761A	Vehicle Navigation, T-BOX, Vehicle Monitoring, Streaming Rearview Mirror		●	12.2× 16.0 × 2.4 mm	●	●	●	●		●	○	●		●				●	1 Hz / 5 Hz / 10 Hz	●	●			26
UFirebird II Series																									
Chip	 UFirebird II UC6580A	GIS, UAV, Automated Delivery Vehicle, Sharing Bike/Scooter，Intelligent Driving		●	5.0 × 5.0 × 0.85 mm	●	●	●	●	○	●	●		●	●	●	○	●	●	1 Hz / 5 Hz / 10 Hz		●			27
	 UFirebird II UC6580I		●		5.0 × 5.0 × 0.85 mm	●	●	●	●	○	●	●		●	●	●	○	●	●	1 Hz / 5 Hz / 10 Hz		●			27
Module	 UM680	Industrial Applications	●		17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz		●		●	29
	 UM680A	Intelligent Driving, P-Box, T-Box		●	17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz		●		●	30
	 UM681	Industrial Applications	●		17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz	●	●		●	31
	 UM681A	Intelligent Driving, V2X, T-Box		●	17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz	●	●		●	32
	 UM670A	Intelligent Driving, P-Box, T-Box		●	17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz		●			33
	 UM671A	Intelligent Driving, P-Box, T-Box		●	17.0 × 22.0 × 2.6 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz	●	●			34
	 UM620	Industrial Applications	●		16.0 × 12.2 × 2.4 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz		●			35
	 UM620A	Vehicle Navigation, T-BOX, Intelligent Cockpit		●	16.0 × 12.2 × 2.4 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5Hz / 10Hz		●			36
	 UM621	Industrial Applications	●		16.0 × 12.2 × 2.4 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz	●	●			37
	 UM621A	Vehicle Navigation, T-BOX, Intelligent Cockpit		●	16.0 × 12.2 × 2.4 mm	●	●	●	●	○	●	●		●	●	●	○	○	●	1 Hz / 5 Hz / 10 Hz	●	●			38

● : support ○ : support after firmware upgrade

UFirebird IV
UC7510

Multi-GNSS Single-Frequency Positioning SoC

Automotive Grade | Industrial Grade

Unicore UFirebird IV SoC (automotive: UC7510A; industrial: UC7510I) adopts a 22nm process, combining low power consumption with an ultra-small form factor. Designed for global applications, the UC7510 supports L1 band of GPS, BDS, GLONASS, Galileo, and QZSS, enabling multi-constellation joint positioning. It also supports the reception and processing of various SBAS signals. Its sub-model UC7510A-01 integrates DR algorithms and supports the connection of an external IMU, delivering fast, accurate, and high-performance positioning experience to users. It is suitable for applications such as vehicle navigation, UAVs, and handheld devices.

Features

» 64 channels

» Supports L1 of GPS, BDS, GLONASS, Galileo, QZSS and SBAS; supports single constellation standalone positioning and multi-constellation joint positioning

» Built-in anti-jamming and spoofing detection technologies, with superior environmental adaptability

» Ultra high sensitivity: tracking -165 dBm, cold start -148 dBm

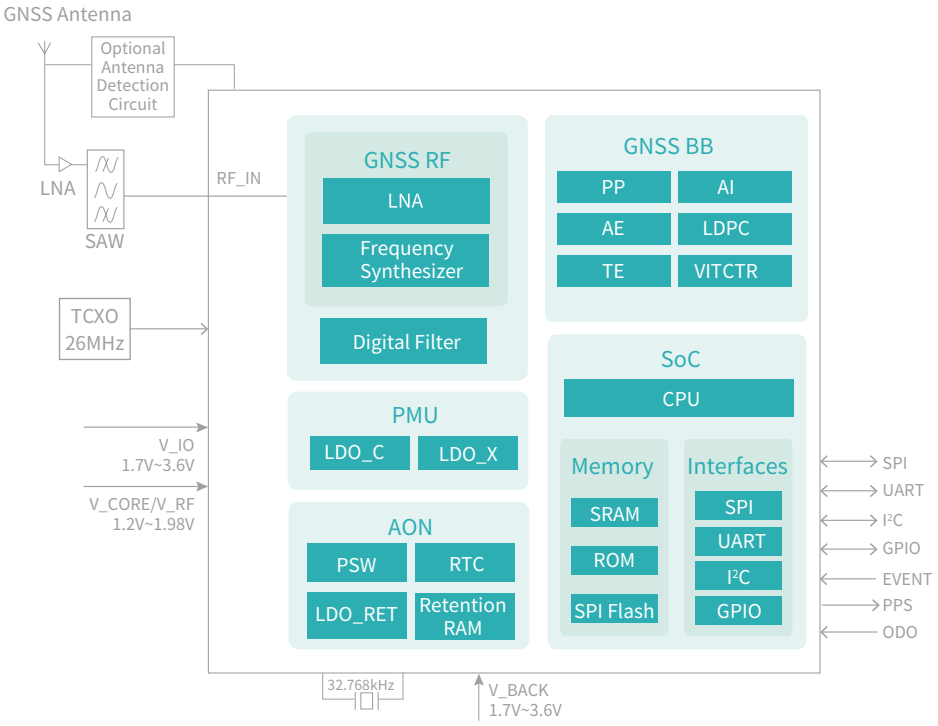
» Industrial grade and automotive grade available

» The automotive-grade chip qualified according to AEC-Q100

» 4 × 4 mm QFN28 package

Ordering Information

Supply at multiples of 3000 pieces



Applications

- UAV
- Vehicle Navigation
- Industrial Applications

Performance Specifications

Channel	64 channels
Frequency	BDS B1I, B1C
	GPS L1C/A
	GLONASS G1
	Galileo E1B/C
	QZSS L1C/A, L1C/B, L1S
	SBAS L1
Single Point Positioning (CEP)	Horizontal: 1.5 m (SBAS)
	Vertical: 2.5 m
Velocity accuracy (RMS)	0.05 m/s
TTFF	Cold start < 26 s
	Hot start < 1 s
	Reacquisition < 1 s
	AGNSS < 3 s

Sensitivity	Tracking	-165 dBm
	Cold start	-148 dBm
	Hot start	-156 dBm
	Reacquisition	-160 dBm
Updata Rate	1 Hz / 5 Hz / 10 Hz	
Differential Data	RTCM V3.X	
Data Format	NMEA 0183, Unicore	
Power Supply	V_IO 1.7 V ~ 3.6 V	
	V_CORE 1.2 V ~ 1.98 V	
	V_BACK 1.7 V ~ 3.6 V	
Interfaces	1 × UART	
	1 × I²C	
	1 × SPI*	

	Product	Package	Flash	Operating Temp	Grade
	UC7510A	QFN28 4.0 × 4.0 × 0.75 mm	Yes	-40 °C ~ +105 °C	Automotive
	UC7510I	QFN28 4.0 × 4.0 × 0.75 mm	Yes	-40 °C ~ +85 °C	Industrial

Note: * Supported by specific firmware

UM760

Industrial-Grade Multi-GNSS Single-Frequency Positioning Module

12.2 x 16.0 x 2.4 mm

Industrial Grade

Features

- Supports BDS B1I, B1C; GPS L1 C/A; GLONASS G1; Galileo E1B/C; QZSS and SBAS
- Supports A-GNSS to reduce the TTFF
- Built-in jamming detection and filtering technology
- Compatible with UM220-IV series modules
- Production process conforms to IATF16949

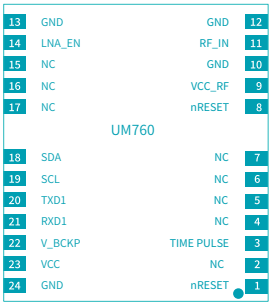
Applications

Industrial Applications

Ordering Information

Supply at multiples of 500 pieces

The UM760 module is an industrial-grade, multi-constellation, single-frequency navigation and positioning module developed by Unicore Communications. Based on the UC7510I, a high-performance GNSS SoC with fully independent intellectual property rights, the module features high integration, low power consumption, and anti-jamming capabilities. It supports simultaneous reception of GPS, BDS, GLONASS, Galileo, QZSS, and SBAS signals in the L1 band. The UM760 is widely used in applications such as vehicle navigation, fleet management, and vehicle monitoring.



Physical Specifications

Dimensions	12.2 x 16.0 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-45 °C ~ +90 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA

Interfaces

1 × UART (LVTTL)
1 × I²C*
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 95% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	64 channels, based on UFirebird IV	
Frequency	GPS L1C/A	
	BDS B1I, B1C	
	GLONASS G1	
	Galileo E1B/C	
	QZSS L1C/A, L1C/B*, L1S	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 1 s	
	Reacquisition: < 1 s	
	A-GNSS: < 3 s	
Positioning Accuracy(CEP95)	Horizontal: 1.5 m (with SBAS)	
	Horizontal: 2.0 m (without SBAS)	
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Velocity Accuracy[1]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-165 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Format	NMEA 0183, Unicore	

UM760A

Automotive-Grade Multi-GNSS Single-Frequency Positioning Module

12.2 x 16.0 x 2.4 mm

Automotive Grade

Features

- Supports BDS B1I, B1C; GPS L1 C/A; GLONASS G1; Galileo E1B/C; QZSS and SBAS
- Supports A-GNSS to reduce the TTFF
- Built-in jamming detection and filtering technology
- Compatible with UM220-IV series modules
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949

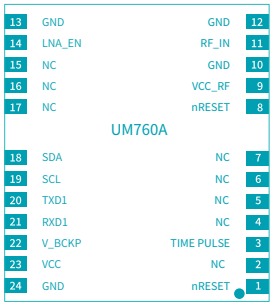
Applications

- Vehicle Navigation
- T-BOX
- Vehicle Monitoring
- Streaming Rearview Mirror

Ordering Information

Supply at multiples of 500 pieces

The UM760A module is an automotive-grade, multi-constellation, single-frequency navigation and positioning module developed by Unicore Communications. Based on the UC7510A, a high-performance GNSS SoC with fully independent intellectual property rights, the module features high integration, low power consumption, and anti-jamming capabilities. It supports simultaneous reception of GPS, BDS, GLONASS, Galileo, QZSS, and SBAS signals in the L1 band. The UM760A is widely used in applications such as vehicle navigation, fleet management, and vehicle monitoring.



Physical Specifications

Dimensions	12.2 x 16.0 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-45 °C ~ +90 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA

Interfaces

1 × UART (LVTTL)
1 × I²C*
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 95% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	64 channels, based on UFirebird IV	
Frequency	GPS L1C/A	
	BDS B1I, B1C	
	GLONASS G1	
	Galileo E1B/C	
	QZSS L1C/A, L1C/B*, L1S	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 1 s	
	Reacquisition: < 1 s	
	A-GNSS: < 3 s	
Positioning Accuracy(CEP95)	Horizontal: 1.5 m (with SBAS)	
	Horizontal: 2.0 m (without SBAS)	
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Velocity Accuracy[1]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-165 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Format	NMEA 0183, Unicore	

UM761

Industrial-Grade Multi-GNSS Single-Frequency Integrated Positioning Module

12.2 x 16.0 x 2.4 mm

Industrial Grade

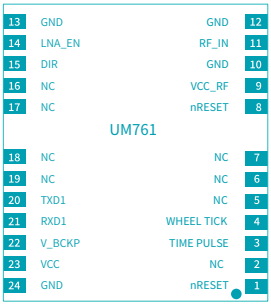
Features

- Supports BDS B1I, B1C; GPS L1 C/A; GLONASS G1; Galileo E1B/C; QZSS and SBAS
- Built-in 6-axis IMU, with 50Hz/100Hz IMU raw data output
- Supports odometer pulse input/vehicle speed input
- 100% continuous navigation even in tunnels or underground parking lots
- Supports the output of GNSS+IMU integrated positioning results and GNSS-only positioning results through one serial port
- Production process conforms to IATF16949

Applications

Industrial Applications

UM761 series modules are GNSS + IMU integrated positioning and navigation modules independently developed by Unicore Communications. Based on the multi-constellation, single-frequency and high-performance GNSS SoC – UFirebird IV (UC7510I), and with the built-in six-axis inertial measurement unit, the modules support multi-constellation single-frequency joint positioning, and can directly output GNSS + IMU integrated positioning results, which ensures continuous positioning even in tunnels and underground garages. This module can be used with terminal devices to achieve Android Auto and CarPlay certification.



Ordering Information

Supply at multiples of 500 pieces

Physical Specifications

Dimensions	12.2 x 16.0 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-45 °C ~ +90 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA

Interfaces

1 × UART (LVTTL)

1 × FWD

1 × SPEED

1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 95% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	64 channels, based on UFirebird IV	
Frequency	GPS L1C/A	
	BDS B1I, B1C*	
	GLONASS G1	
	Galileo E1B/C	
	QZSS L1C/A, L1C/B*, L1S	
	SBAS L1C/A*	
Modes	Single-constellation standalone positioning	
	Multi-constellation joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 1 s	
	Reacquisition: < 1 s	
	A-GNSS: < 3 s	
Positioning Accuracy (CEP95)	Horizontal: 1.5 m* (with SBAS)	
	Horizontal: 2.0 m (without SBAS)	
INS Positioning Error without GNSS	ADR < 2% of distance traveled (without GNSS for 120 s)	
	UDR < 5% of distance traveled (without GNSS for 120 s)	
Data Update Rate	GNSS only or GNSS + INS	1 Hz / 5 Hz / 10 Hz
	IMU raw data output	50 Hz /100 Hz
Velocity Accuracy[1]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-165 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Format	NMEA 0183, Unicore	

UM761A

Automotive-Grade Multi-GNSS Single-Frequency Integrated Positioning Module

12.2 x 16.0 x 2.4 mm

Automotive Grade

Features

- Supports BDS B1I, B1C; GPS L1 C/A; GLONASS G1; Galileo E1B/C; QZSS and SBAS
- Built-in 6-axis IMU, with 50Hz/100Hz IMU raw data output
- Supports odometer pulse input/vehicle speed input
- 100% continuous navigation even in tunnels or underground parking lots
- Supports the output of GNSS+IMU integrated positioning results and GNSS-only positioning results through one serial port
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949

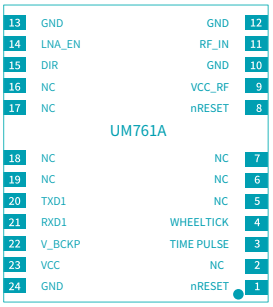
Applications

- Vehicle Navigation
- T-BOX
- Vehicle Monitoring
- Streaming Rearview Mirror

Ordering Information

Supply at multiples of 500 pieces

UM761A series modules are GNSS + IMU integrated positioning and navigation modules independently developed by Unicore Communications. Based on the multi-constellation, single-frequency and high-performance GNSS SoC – UFirebird IV (UC7510A), and with the built-in six-axis inertial measurement unit, the modules support multi-constellation single-frequency joint positioning, and can directly output GNSS + IMU integrated positioning results, which ensures continuous positioning even in tunnels and underground garages.This module can be used with terminal devices to achieve Android Auto and CarPlay certification.



Physical Specifications

Dimensions	12.2 x 16.0 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-45 °C ~ +90 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA

Interfaces

1 × UART (LVTTL)
1 × FWD
1 × SPEED
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

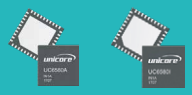
Note: * Supported by specific firmware.
1 95% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	64 channels, based on UFirebird IV	
Frequency	GPS L1C/A	
	BDS B1I, B1C*	
	GLONASS G1	
	Galileo E1B/C	
	QZSS L1C/A, L1C/B*, L1S	
	SBAS L1C/A*	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 1 s	
	Reacquisition: < 1 s	
	A-GNSS: < 3 s	
Positioning Accuracy(CEP95)	Horizontal: 1.5 m* (with SBAS)	
	Horizontal: 2.0 m (without SBAS)	
INS Positioning Error without GNSS	ADR < 2% of distance traveled (without GNSS for 120 s)	
	UDR < 5% of distance traveled (without GNSS for 120 s)	
Data Update Rate	GNSS only or GNSS + INS	1 Hz / 5 Hz / 10 Hz
	IMU raw data output	50 Hz /100 Hz
Velocity Accuracy[1]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-165 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Format	NMEA 0183, Unicore	

UFirebird II
UC6580

Dual-Frequency Multi-Constellation GNSS Positioning SoC



Automotive Grade

Industrial Grade

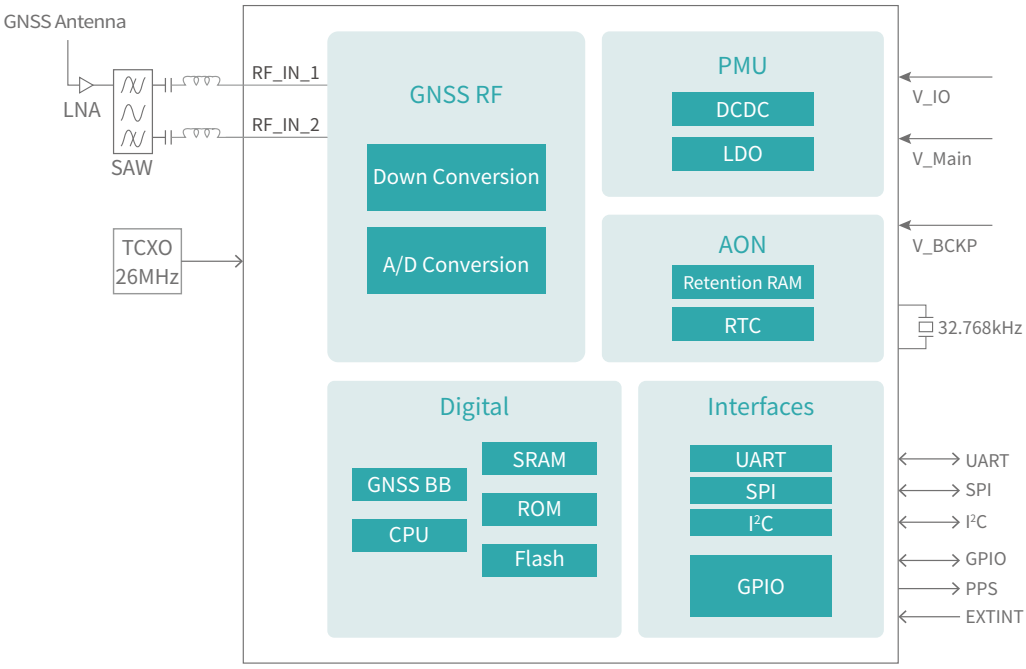
UFirebird II is a dual-frequency multi-constellation GNSS SoC with low power consumption and miniature design developed by Unicore Communications. It integrates RF and baseband on a single chip, adopts multi-path mitigation technology, anti-jamming technology and high -precision GNSS positioning technology. UFirebird II supports GPS, GLONASS, BDS, Galileo, NAVIC and QZSS multi-constellation joint positioning, and also supports SBAS signal processing, providing fast and accurate positioning service. It is suitable for vehicle navigation, robotic applications, UAVs, and handheld devices, with excellent performance especially in urban multi-path environment.

Features

- 96 channels
- Compact size, low power design, 5 × 5 mm QFN40 package
- Supports GPS, BDS, GLONASS, Galileo, QZSS and SBAS, including BDS-3; supports single system standalone positioning and multi-system joint positioning
- L1+L5 dual frequencies, excellent multi-path mitigation ability
- Single point positioning accuracy better than 1.5 m
- Ultra high sensitivity: tracking -162 dBm, acquisition -148 dBm
- Industrial grade & automotive grade, and the automotive grade chip qualified according to AEC-Q100
- Supports A-GNSS and DGNSS

Ordering Information

Supply at multiples of 3000 pieces



Applications

- GIS
- UAV
- Automated Delivery Vehicle
- Sharing Bike /Scooter
- Intelligent Driving

Performance

Channel	96 channels
Frequency	GPS L1C/A, L5
	BDS B1I, B1C, B2a
	Galileo E1, E5a
	GLONASS G1
	QZSS L1C/A,L1S,L5
	NavIC L5*
	SBAS L1C/A
Single Point Positioning (CEP)	Horizontal: 1.5 m
	Vertical: 2.5 m
Velocity Accuracy (RMS)	0.05 m/s
Time Accuracy (RMS)	20 ns, peak-to-peak value 30 ns (24 h)
TTFF	Cold start < 26 s
	Hot start < 2 s

Sensitivity	Tracking	-162 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Update Rate	GNSS 1 Hz / 5 Hz / 10 Hz	
Differential Data	RTCM V3.X	
Data Format	NMEA 0183,Unicore	
Power Supply	VCC: 1.7 ~ 3.6 V	
	VIO: 1.7 ~ 3.6 V	
	Vbackup: 1.7 ~ 3.6 V	
Power Consumption@3V	< 40 mA	
Interfaces	2 × UART	
	1 × I²C	
	1 × SPI*	

	Product	Package	Flash	Operating Temp	Grade
	UC6580A	QFN40 5.0 × 5.0 × 0.85 mm	Yes	-40 ~ + 105 °C	Automotive
	UC6580I	QFN40 5.0 × 5.0 × 0.85 mm	Yes	-40 ~ + 85°C	Industrial

Note: * Supported by specific firmware

UM680

Industrial-Grade Multi-GNSS Dual-Frequency High-Precision RTK Positioning Module

Industrial Grade

17.0 x 22.0 x 2.6 mm

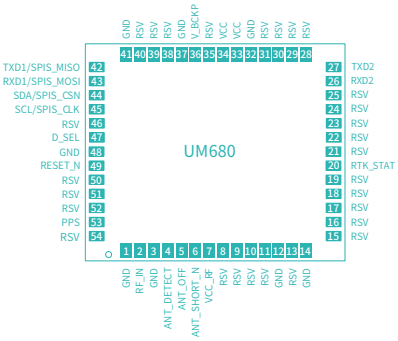
Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo (L1 + L5)
- Supports A-GNSS to reduce the TTFF
- Production process conforms to IATF16949
- Anti-jamming design to ensure the module working stably in complex electromagnetic environment
- Centimeter-level positioning accuracy & raw data output

Applications

Industrial Applications

UM680 is a high-precision GNSS RTK positioning and navigation module developed by Unicore for industrial applications. It is designed based on the proprietary multi-system, dual-frequency, high-performance GNSS SoC - UC6580I, and the production process complies with IATF16949. UM680 supports L1+L5 dual frequencies of GPS, BDS, GLONASS*, Galileo, QZSS, and NavIC*, enabling multi-system dual-frequency joint positioning or single-system standalone positioning.



Ordering Information

Supply at multiples of 250 pieces

Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40°C ~ +85 °C/105 °C
Storage Temperature	-40°C ~ +85 °C/105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption[1]	240 mW

Interfaces

2 × UART (LVTTL)

1 × I²C*

1 × SPI*

1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS *

Note: * Supported by specific firmware.
1 Open sky, continuous tracking
2 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C*, B2a	
	GLONASS G1*	
	Galileo E1, E5a	
	QZSS L1, L5	
	NavIC L5*	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning(RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
RTK (RMS)	Horizontal: 1 cm + 1 ppm (open sky)	
	Vertical: 2 cm + 1 ppm (open sky)	
Velocity Accuracy(RMS)[2]	0.05m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Correction	RTCM V3.V	
Data Format	NMEA 0183,Unicore	

UM680A

Automotive-Grade Multi-GNSS Dual-Frequency High-Precision RTK Positioning Module

Automotive Grade

17.0 x 22.0 x 2.6 mm

Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo (L1 + L5)
- Supports A-GNSS to reduce the TTFF
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949
- Anti-jamming design to ensure the module working stably in complex electromagnetic environment
- Centimeter-level positioning accuracy & raw data output

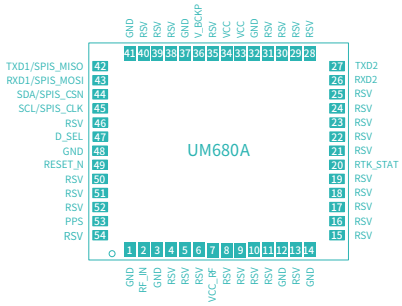
Applications

- Intelligent Driving
- P-BOX
- T-BOX

Ordering Information

Supply at multiples of 250 pieces

UM680A is a high-precision GNSS dual-frequency navigation module developed by Unicore for the intelligent driving market. Based on the proprietary multi-system dual-frequency high-performance SoC-UC6580A, the module supports multi-system dual-frequency joint positioning or single-system standalone positioning with centimeter-level accuracy.



Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40°C ~ +85 °C/105 °C
Storage Temperature	-40°C ~ +85 °C/105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption[1]	240 mW

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS *

Note: * Supported by specific firmware.
1 Open sky, continuous tracking
2 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C*, B2a	
	GLONASS G1*	
	Galileo E1, E5a	
	QZSS L1, L5	
	NavIC L5*	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning(RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
RTK (RMS)	Horizontal: 1 cm + 1 ppm (open sky)	
	Vertical: 2 cm + 1 ppm (open sky)	
Velocity Accuracy(RMS)[2]	0.05m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Correction	RTCM V3.V	
Data Format	NMEA 0183,Unicore	

UM681

Industrial-Grade Multi-GNSS Dual-Frequency High-Precision RTK & INS Integrated Positioning Module

17.0 x 22.0 x 2.6 mm

Industrial Grade

Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo (L1 + L5)
- Provides high-precision positioning service via standard interface
- Centimeter-level positioning accuracy & raw data output
- Production process conforms to IATF16949
- Built-in MEMS, output of integrated navigation results with a single module, continuous positioning even in tunnels and underground parking lots.

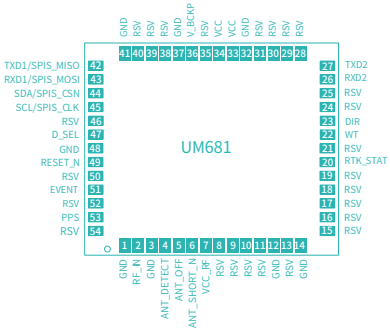
Applications

Industria Applications

Ordering Information

Supply at multiples of 250 pieces

UM681 is a high-precision GNSS + IMU integrated positioning and navigation module developed by Unicore for industrial applications. The module is based on the proprietary multi-system, dual-frequency, high-performance GNSS SoC - UC6580I, and is equipped with a 6-axis IMU. It can achieve centimeter-level positioning and can maintain continuous positioning in environments without satellite signals, such as tunnels and underground garages.



Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40 °C ~ +85 °C/105 °C
Storage Temperature	-40 °C ~ +85 °C/105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption[1]	240 mW

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS *

Note: * Supported by specific firmware.
1 Open sky, continuous tracking
2 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L1C*, L5	
	BDS B1I, B1C*, B2a	
	GLONASS G1*	
	Galileo E1, E5a	
	NavIC L5*	
	QZSS L1, L5	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning (RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
RTK (RMS)	Horizontal: 1 cm + 1 ppm (open sky)	
	Vertical: 2 cm + 1 ppm (open sky)	
Positioning error of INS only	< 1% of the distance traveled without GNSS signals	
Velocity Accuracy(RMS)[2]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Correction	RTCM V3.X	
Data Format	NMEA 0183, Unicore	

UM681A

Automotive-Grade Multi-GNSS Dual-Frequency High-Precision RTK & INS Integrated Positioning Module

17.0 x 22.0 x 2.6 mm

Automotive Grade

Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo (L1 + L5)
- Provides high-precision positioning service via standard interface
- Centimeter-level positioning accuracy & raw data output
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949
- Built-in MEMS, output of integrated navigation results with a single module, continuous positioning even in tunnels and underground parking lots.

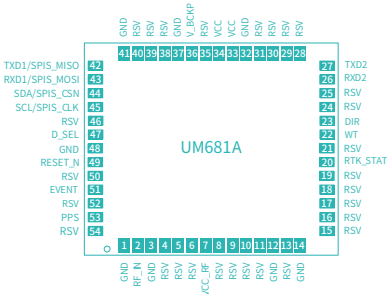
Applications

- Intelligent Driving
- V2X
- T-BOX

Ordering Information

Supply at multiples of 250 pieces

UM681A is a high-precision dual-frequency GNSS & INS integrated navigation module developed by Unicore for the intelligent driving market. Based on the proprietary multi-system dual-frequency high-performance SoC - UC6580A, the module supports multi-system dual-frequency joint positioning or single system standalone positioning with centimeter-level accuracy.



Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40 °C ~ +85 °C/105 °C
Storage Temperature	-40 °C ~ +85 °C/105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption[1]	240 mW

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS *

Note: * Supported by specific firmware.
1 Open sky, continuous tracking
2 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L1C*, L5	
	BDS B1I, B1C*, B2a	
	GLONASS G1*	
	Galileo E1, E5a	
	NavIC L5*	
	QZSS L1, L5	
	SBAS L1C/A	
Modes	Single-system standalone positioning	
	Multi-system joint positioning	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning (RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
RTK (RMS)	Horizontal: 1 cm + 1 ppm (open sky)	
	Vertical: 2 cm + 1 ppm (open sky)	
Positioning error of INS only	< 1% of the distance traveled without GNSS signals	
Velocity Accuracy(RMS)[2]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Correction	RTCM V3.X	
Data Format	NMEA 0183, Unicore	

UM670A

Automotive-Grade Multi-GNSS Dual-Frequency Positioning Module

17.0 x 22.0 x 2.6 mm

Automotive Grade

Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo L1+L5 or L1+L2*
- Dual-frequency single point positioning, providing higher accuracy and reliability compared to single-frequency solution
- Supports A-GNSS to reduce the TTFF
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949
- Anti-jamming design to ensure the module working stably in complex electromagnetic environment
- Supports raw data output

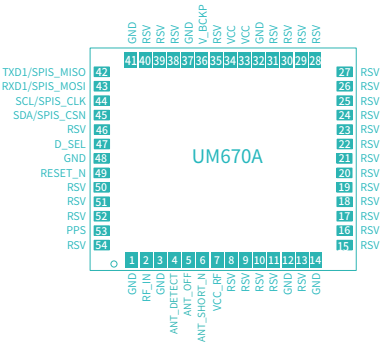
Applications

- Intelligent Driving
- P-BOX
- T-BOX

Ordering Information

Supply at multiples of 250 pieces

UM670A is a GNSS dual -frequency navigation module developed by Unicore for the intelligent driving market. Based on the proprietary multi -system dual-frequency high-performance SoC - UC6580A, the module supports concurrent operation of GPS, BDS, GLONASS*, Galileo, QZSS and NavIC*. Different sub-models use different frequencies (L1+L5 or L1+L2) to perform single point positioning and also provide raw data output.



Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40 °C ~ + 105 °C
Storage Temperature	-40 °C ~ + 105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC, typical: 3.3V
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption	150 mW

Environmental Specifications

Humidity	95% No condensation
Vibration	GB/T 28046.3； ISO 16750.3
Shock	GB/T 28046.3； ISO 16750.3

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × RESET_N
- 1 × 1PPS (LVTTL)

Functional Characteristics

- GNSS Antenna × 1

Note: * Supported by specific firmware.
1 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	UM670A-03	UM670A-23
	BDS B1I/BIC*+ B2a	BDS B1I/BIC*
	GPS L1C/A + L5	GPS L1C/A + L2C
	GLONASS G1*	GLONASS G1*+ G2*
	Galileo E1 + E5a	Galileo E1 + E5b
	QZSS L1 + L5	QZSS L1 + L2
	NavIC L5*	-
	SBAS L1C/A	SBAS L1C/A
VSWR	≤ 2.5	
Input impedance	50 Ω	
Antenna Gain	15 dB ~ 30 dB	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning (RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
Velocity Accuracy(RMS)[1]	0.05 m/s (open sky)	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Data Format	NMEA 0183, Unicore, RTCM	

UM671A

Automotive-Grade Multi-GNSS Dual-Frequency Integrated Positioning Module

17.0 x 22.0 x 2.6 mm

Automotive Grade

Features

- Supports concurrent operation of GPS, BDS, GLONASS and Galileo L1+L5
- Dual-frequency single point positioning, providing higher accuracy and reliability compared to single-frequency solution
- Supports A-GNSS to reduce the TTFF
- GNSS chip qualified according to AEC-Q100 and production process conforms to IATF16949
- Anti-jamming design to ensure the module working stably in complex electromagnetic environment
- Supports raw data output
- Built-in 6-axis IMU, with 50Hz/100Hz IMU raw data output
- Supports odometer pulse input/vehicle speed input
- 100% continuous navigation even in tunnels or underground parking lots

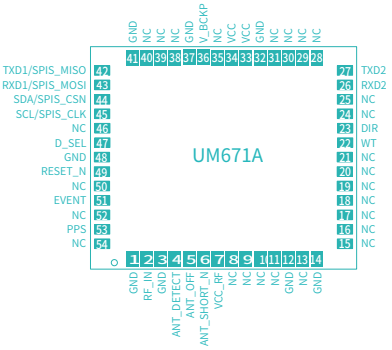
Applications

- Intelligent Driving
- P-BOX
- T-BOX

Ordering Information

Supply at multiples of 250 pieces

The UM671A is an automotive-grade GNSS + IMU integrated positioning and navigation module developed by Unicore for the intelligent driving applications. This module is based on the proprietary multi-system, dual-frequency, high-performance GNSS SoC - UC6580A, which complies with AEC-Q100, and the production process conforms to IATF 16949. The module supports L1+L5 dual frequencies of GPS, BDS, GLONASS*, Galileo, QZSS, and NavIC*. It can output raw measurements and perform single-point positioning. It is equipped with a 6-axis IMU, capable of providing GNSS + IMU integrated positioning results and GNSS-only positioning results, ensuring 100% continuous positioning even in tunnels and underground garages.



Physical Specifications

Dimensions	17.0 x 22.0 x 2.6 mm
Package	54 pin, LGA
Operating Temperature	-40 °C ~ + 105 °C
Storage Temperature	-40 °C ~ + 105 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC, typical: 3.3V
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption	150 mW

Environmental Specifications

Humidity	95% No condensation
Vibration	GB/T 28046.3； ISO 16750.3
Shock	GB/T 28046.3； ISO 16750.3

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × RESET_N
- 1 × 1PPS (LVTTL)

Functional Characteristics

- GNSS Antenna × 1

Note: * Supported by specific firmware.
1 68% at 30 m/s for dynamic operation,open sky

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	BDS B1I + B2a	
	GPS L1C/A + L5	
	GLONASS G1*	
	Galileo E1 + E5a	
	QZSS L1 + L5	
	NavIC L5*	
	SBAS L1C/A	
VSWR	≤ 2.5	
Input impedance	50 Ω	
Antenna Gain	15 dB ~ 30 dB	
Time to First Fix (TTFF)	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Single Point Positioning (RMS)	Horizontal: 1.5 m (open sky)	
	Vertical: 2.5 m (open sky)	
Velocity Accuracy(RMS)[1]	0.05 m/s (open sky)	
Positioning error of INS only	< 1% of the distance traveled without GNSS signals	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-147 dBm
	Hot Start	-157 dBm
	Reacquisition	-158 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Data Format	NMEA 0183, Unicore, RTCM	

UM620

Industrial-Grade Multi-GNSS Dual-Frequency Positioning Module

Industrial Grade

16.0 × 12.2 × 2.4 mm

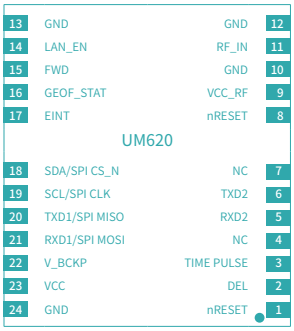
Features

- Industrial-grade dual-frequency navigation and positioning module
- Supports GPS L1 C/A, L5; BDS B1I, B1C, B2a; GLONASS G1; Galileo E1B/C, E5a; NavIC L5*; QZSS and SBAS
- Supports multi-system dual-frequency positioning, multi-system single-frequency positioning, or single-system standalone positioning
- Anti-jamming design to ensure the module working stably in complex electromagnetic environments
- Algorithm adaptable to low-dynamic application scenarios

Applications

Industrial Applications

UM620 is an industrial-grade GNSS dual-frequency navigation module developed by Unicore Communi-cations. Based on the proprietary multi-system dual-frequency high-performance SoC-UC6580I, the module supports multi-system dual-frequency positioning, multi-system single-frequency positioning, or single-system standalone positioning, ensuring high positioning accuracy even in complex environments such as multi-path surroundings.



Ordering Information

Supply at multiples of 500 pieces

Physical Specifications

Dimensions	16.0 x 12.2 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-40 °C ~ +85 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, < 100 mA
Power Consumption[3]	150 mW

Interfaces

2 × UART (LVTTL)
1 × I²C*
1 × SPI*
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware
1 Open sky
2 68% at 30 m/s for dynamic operation, open sky
3 Open sky, continuous tracking

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C, B2a	
	GLONASS G1	
	Galileo E1B/C, E5a	
	NavIC L5*	
	QZSS L1C/A, L1S, L5	
	SBAS L1C/A	
Positioning Mode	Single-System Standalone Positioning	
	Multi-System Joint Positioning	
Time to First Fix (TTFF)[1]	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Positioning Accuracy (CEP)[1]	Horizontal: 1.5 m (Dual-frequency quad-system)	
Velocity Accuracy (RMS)[2]	0.05 m/s	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Data Format	NMEA 0183, Unicore	

UM620A

Automotive-Grade Multi-GNSS Dual-Frequency Positioning Module

Automotive Grade

16.0 x 12.2 x 2.4 mm

Features

- Automotive-grade dual-frequency navigation and positioning module
- Supports GPS L1 C/A, L5; BDS B1I, B1C, B2a; GLONASS G1; Galileo E1B/C, E5a; NavIC L5*; QZSS and SBAS
- Supports multi-system dual-frequency positioning, multi-system single-frequency positioning, or single-system standalone positioning
- GNSS chip qualified according to AEC-Q100 and productition process conforms to IATF16949
- Anti-jamming design to ensure the module working stably in complex electromagnetic environments

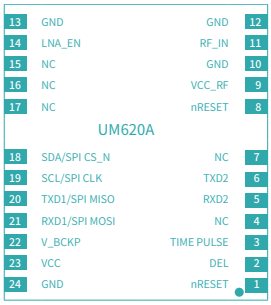
Applications

- Vehicle Navigation
- T-BOX
- Intelligent Cockpit

Ordering Information

Supply at multiples of 500 pieces

UM620A is an automotive-grade GNSS dual-frequency navigation module developed by Unicore Communications for the automotive market. Based on the proprietary multi-system dual-frequency high-performance SoC-UC6580A, the module supports multi-system dual-frequency positioning, multi-system single-frequency positioning, or single-system standalone positioning, ensuring high positioning accuracy even in complex environments such as multi-path surroundings.



Physical Specifications

Dimensions	16.0 x 12.2 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40°C ~ +85°C
Storage Temperature	-40°C ~ +85°C

Electrical Specifications

Voltage	2.7V ~ 3.6 V DC
LNA	2.7V ~ 3.3 V, <100 mA
Power Consumption[3]	300 mW

Interfaces

- 2 × UART (LVTTL)
- 1 × I²C*
- 1 × SPI*
- 1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 Open sky
2 68% at 30 m/s for dynamic operation,open sky
3 Open sky, continuous tracking

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C, B2a	
	GLONASS G1	
	Galileo E1B/C, E5a	
	NavIC L5*	
	QZSS L1C/A, L1S, L5	
	SBAS L1C/A	
Modes	Single-System Standalone Positioning	
	Multi-System Joint Positioning	
Time to First Fix (TTFF)[1]	Cold Start : < 26 s	
	Hot Start : < 2 s	
	Reacquisition : < 2 s	
Positioning Accuracy(CEP)[1]	Horizontal: 1.5 m (Dual-frequency quad-system)	
Velocity Accuracy(RMS)[2]	0.05 m/s	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
Data Update Rate	1 Hz / 5 Hz / 10 Hz	
Data Format	NMEA 0183, Unicore	

UM621

Industrial-Grade Multi-GNSS Dual-Frequency Integrated Positioning Module

16.0 x 12.2 x 2.4 mm

Industrial Grade

Features

- ndustrial-grade dual-frequency GNSS+MEMS integrated navigation and positioning module
- Supports GPS L1 C/A, L5; BDS B1I, B1C, B2a; GLONASS G1; Galileo E1B/C, E5a; NavIC L5*; QZSS and SBAS
- Supports multi-system dual-frequency positioning, multi-system single-frequency or positioning single-system standalone positioning
- Built-in MEMS to output integrated positioning results with a single module
- Supports odometer pulse input/vehicle speed input
- Supports the output of integrated positioning results and GNSS-only positioning results through one serial port
- 100% continuous navgation even in tunnels or underground parking lots
- Algorithm adaptable to low-dynamic application scenarios

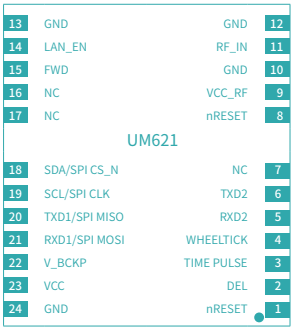
Applications

Industrial Applications

Ordering Information

Supply at multiples of 500 pieces

UM621 is a GNSS dual-frequency + MEMS integrated navigation module developed by Unicore Communications. Based on the proprietary multi-system dual-frequency high-performance SoC-UC6580I, and equipped with a 6-axis MEMS device, the module supports multi-system dual-frequency joint positioning or single-system standalone positioning, and can directly output GNSS + MEMS integrated positioning results, which ensures the continuity of positioning even in tunnels or underground parking lots.



Physical Specifications

Dimensions	16.0 x 12.2 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-40 °C ~ +85 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, <100 mA
Power Consumption[3]	168 mW

Interfaces

2 × UART (LVTTL)
1 × I²C*
1 × SPI*
1 × SPEED
1 × FWD
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 Open sky
2 68% at 30 m/s for dynamic operation, open sky
3 Open sky, continuous tracking

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C, B2a	
	GLONASS G1	
	Galileo E1B/C, E5a	
	NavIC L5*	
	QZSS L1C/A, L1S, L5	
	SBAS L1C/A	
Positioning Mode	Single-System Standalone Positioning	
	Multi-System Joint Positioning	
Time to First Fix (TTFF)[1]	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Positioning Accuracy(CEP)[1]	Horizontal: 1.5 m (Dual-frequency quad-system, open sky)	
Positioning Error of INS only	< 2 % of the distance traveled without GNSS signals	
Velocity Accuracy(RMS)[2]	0.05 m/s	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
GNSS Data Update Rate	1 Hz / 5 Hz / 10 Hz	
INS Data Update Rate	50 Hz / 100 Hz	
Data Format	NMEA 0183, Unicore	

UM621A

Automotive-Grade Multi-GNSS Dual-Frequency Integrated Positioning Module

Automotive Grade

16.0 x 12.2 x 2.4 mm

Features

- Automotive-grade dual-frequency GNSS+MEMS integrated navigation and positioning module
- Supports GPS L1 C/A, L5; BDS B1I, B1C, B2a; GLONASS G1; Galileo E1B/C, E5a; NavIC L5*; QZSS and SBAS
- Supports multi-system dual-frequency positioning, multi-system single-frequency positioning or single-system standalone positioning
- Built-in MEMS to output integrated positioning results with a single module
- Supports odometer pulse input/vehicle speed input
- Supports the output of integrated positioning results and GNSS-only positioning results through one serial port
- 100% continuous navigation even in tunnels or underground parking lots
- GNSS chip qualified according to AEC-Q100; production process conforms to IATF16949

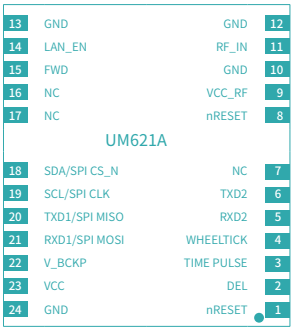
Applications

- Vehicle Navigation
- T-BOX
- Intelligent Cockpit

Ordering Information

Supply at multiples of 500 pieces

UM621A is a GNSS dual-frequency + MEMS integrated navigation module developed by Unicore Communi -cations for the automotive market. Based on the proprietary multi-system dual-frequency high -performance SoC-UC6580A, and equipped with a 6-axis MEMS device, the module supports multi -system dual-frequency joint positioning or single -system standalone positioning, and can directly output GNSS+MEMS integrated positioning results, which ensures the continuity of positioning even in tunnels or underground parking lots.



Physical Specifications

Dimensions	16.0 x 12.2 x 2.4 mm
Package	24 pin, LCC
Operating Temperature	-40 °C ~ +85 °C
Storage Temperature	-40 °C ~ +85 °C

Electrical Specifications

Voltage	2.7 V ~ 3.6 V DC
LNA	2.7 V ~ 3.3 V, <100 mA
Power Consumption[3]	330 mW

Interfaces

2 × UART (LVTTL)
1 × I²C*
1 × SPI*
1 × SPEED
1 × FWD
1 × 1PPS (LVTTL)

Functional Characteristics

Passive Antenna, Active Antenna, AGNSS

Note: * Supported by specific firmware.
1 Open sky
2 68% at 30 m/s for dynamic operation, open sky
3 Open sky, continuous tracking

Performance Specifications

Channel	96 channels, based on UFirebird II	
Frequency	GPS L1C/A, L5	
	BDS B1I, B1C, B2a	
	GLONASS G1	
	Galileo E1B/C, E5a	
	NavIC L5*	
	QZSS L1C/A, L1S, L5	
	SBAS L1C/A	
Positioning Mode	Single-System Standalone Positioning	
	Multi-System Joint Positioning	
Time to First Fix (TTFF)[1]	Cold Start: < 26 s	
	Hot Start: < 2 s	
	Reacquisition: < 2 s	
Positioning Accuracy(CEP)[1]	Horizontal: 1.5 m (Dual-frequency quad-system, open sky)	
Positioning Error of INS only	< 2 % of the distance traveled without GNSS signals	
Velocity Accuracy(RMS)[2]	0.05 m/s	
1PPS	20 ns	
Sensitivity	GNSS	
	Tracking	-162 dBm
	Cold Start	-148 dBm
	Hot Start	-156 dBm
	Reacquisition	-160 dBm
GNSS Data Update Rate	1 Hz / 5 Hz / 10 Hz	
INS Data Update Rate	50 Hz / 100 Hz	
Data Format	NMEA 0183, Unicore	

AUTOMOTIVE APPLICATIONS

Recommended products

UM680A
UM681A
UM670A

INTELLIGENT DRIVING

High-precision positioning is a vital part of intelligent driving. High-precision RTK positioning provides centimeter-level position and speed information, and when using a dual-antenna heading receiver, it can determine the direction of the vehicle. It can be integrated with inertial device to provide high frequency position, velocity, altitude and time information, ensuring continuous operation even when the GNSS signal is blocked.

Unicore high-precision products offer accurate positioning and heading information with low latency, ensuring high reliability and safety for autonomous vehicles, suitable for low-speed applications such as logistics vehicles, cleaning vehicles, shuttle vehicles, intelligent driving passenger cars, intelligent driving freight trucks and other large-scale applications in different application scenarios.

Intelligent Driving Applications

The application scenarios include: high-precision map collection, route planning, intelligent parking, three-dimensional intelligent transportation, intelligent driving, etc. The products have been adopted by many intelligent connected vehicle brands, applied in a variety of mass-produced cars, as well as used in sightseeing vehicles and patrol vehicles.

VEHICLE NAVIGATION

In recent years, with the acceleration of the urban construction process, urban roads and highways have developed rapidly, and the scope of human activities has become wider and wider. Automobile users need to adapt to the increasingly complex road network and road conditions, find the best route among the roads winding through high-rise buildings, avoid getting lost when traveling to a new city, and find the exit of the underground parking lot.

Along with these needs, vehicle navigation system has become popular and is developing towards multi-constellation joint positioning. In-dash navigation products have undergone strict quality testing by the vehicle manufacturer, providing users with high-quality navigation experience with stable and reliable quality assurance.

Unicore provides automotive-grade products for the vehicle navigation applications. Based on multi-system fusion GNSS algorithm and GNSS+MEMS integrated navigation technology, the products provides users with continuous and reliable positioning experience. The production process strictly follows the IATF16949 requirements, AEC-Q100 and RoHS2.0 standards to ensure first-class quality, which is very suitable for automobile factory to use and other high-end navigation applications.

Recommended products

UC6580A

UM621A

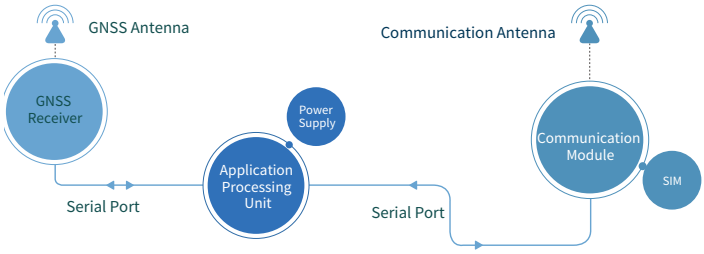
UM620A

UC7510A

UM761A

UM760A

VEHICLE MONITORING



Recommended product

UC6580I

UM620

UM621

UC7510I

UM760

UM761

Vehicle monitoring terminals receive signals from GNSS satellites, combining with vehicle status information, to perform data communication with the monitoring and control center.

Monitoring terminals upload the vehicle's location, movement state and alarm information in real time to the monitoring center and the monitoring center sends the traffic and warning information to the vehicle terminals through communication network to realize real-time scheduling and controlling management.

The navigation and positioning function is primary for vehicle monitoring terminals, and GNSS navigation module is the core part. Unicore UM220 series modules have excellent navigation and positioning performance, with fast TTFF and stable ability of signal acquisition and tracking in complex environments. The advanced multi-path mitigation technology ensures high positioning accuracy and reliability.

Unicore's products take the lead in large-scale applications and have been widely adopted by many manufacturers for mass production.

GNSS EMBEDDED REARVIEW MIRRORS
GNSS RADAR DETECTORS

Auxiliary tools of driving including rear view mirrors, watchdogs and automobile data recorders integrated with positioning function can help drivers to record route and road conditions. It enables drivers to have a clear idea of the road conditions and avoid breaking traffic rules while providing evidence in case of disputes arising during driving.

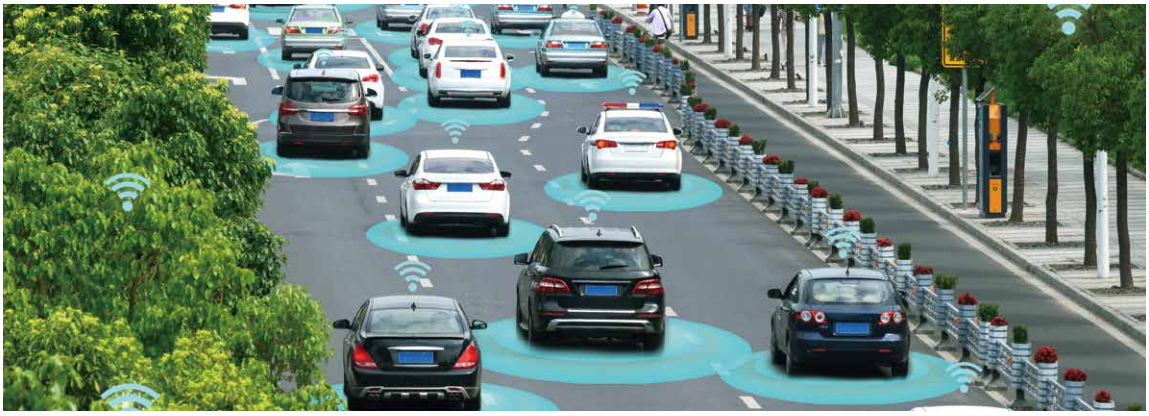
Internet of Vehicles (IOV), after mounted with intelligent devices such as cloud-based rear view mirrors, can provide location based services. With a booming IOV market, the cloud-based rear view mirror, which plays an important role in vehicle networking and positioning, has become the core device of IOV and foresees a promising market in the future.

Recommended products

UC6580I UC7510I

UM620 UM760

UM621 UM761



Recommended products

UC6580I UC7510I

UM620 UM760

UM621 UM761

ON-BOARD DIAGNOSTICS (OBD)

Intelligent vehicle-mounted terminals equipped with OBD may provide various information such as GNSS track, remote diagnosis and reminding of vehicle error, CAN data stream report, statistics of mileage, oil consumption and speed, alarming of vehicle collision and statistics of vehicle conditions.

Vehicle-mounted terminals equipped with OBD are important parts of IOV, providing comprehensive vehicle services and new experiences for the car owner during its whole life cycle; it also provides online vehicle management and service platform for automobile dealers and innovative modes of after-sale market service. Intelligent vehicle-mounted terminals provide core data for IOV and help to establish big data platform based on IOV.

INDUSTRY APPLICATIONS

CORS

Recommended products

UB9A0

The Continuously Operating Reference System (CORS) is one of the modern information infrastructures based on the dynamic, continuous, fast and high-precision network to acquire spatial data and geographical features. It can provide services for mobile positioning, the construction of dynamic and continuous spatial reference frame, and the determination of geodynamic parameters. As an important infrastructure providing geodetic and geospatial information, CORS is widely used in various industries and fields such as surveying and mapping, transportation, security, and location-based services.

As the key part of the CORS, the reference stations are evenly distributed in the coverage area. They are responsible for collecting GNSS satellite observations and transmitting them to the data processing center, as well as providing system integrity monitoring service. One of the core components of the reference station is the high-precision reference station receiver.

Unicore's UB-series boards support multiple satellite navigation systems including GPS, BDS, GLONASS and Galileo, and can provide millimeter-level carrier phase observations, with excellent signal tracking capability under low elevation angle and multi-path suppression capability. Unicore products also provide plenty of peripheral interfaces such as network, external clock, and 1PPS, as well as concise and easy-to-use Web configuration interface, which is particularly designed for CORS application.

CORS Application

Unicore base station receivers have been widely and successfully applied to CORS projects.

SURVEYING

Satellite positioning and navigation technology has brought a technological revolution for the surveying area and GNSS RTK products have become basic instruments. Compared with traditional surveying methods, GNSS products are more accurate, easy to use, small in size, easy to carry and can operate in all weather conditions. They are widely used in geodetic surveying, resource exploration, monitoring, engineering survey, land survey, city management and deformation monitoring.

The surveying and mapping instruments based on Unicore's RTK modules and boards provide ultra-high positioning accuracy and availability in harsh environments such as urban building blocks, tree shades and places with strong multi-path signals, with more reliable positioning results, especially suitable for high-precision measurement and positioning applications. The interfaces of Unicore's high- precision boards are compatible with the mainstream boards on the market, which is convenient to use, helping users to reduce the R&D cycle and saving cost.

Surveying applications

Unicore's high-precision boards have been widely used in GNSS base station receivers, integrated RTK rover stations, handheld GIS devices, etc.

Recommended products

UM980

UM980C

UM981S

UB9A0

PRECISION AGRICULTURE

Recommended products

UM982

UM982C

UM981

UM981C

UM980C

Precision agriculture is a new trend of modern agriculture. By analyzing information of farmland soil, crop growth, plant diseases and insect pests, farmers can obtain information about the amount of seeds, fertilizers, water, and pesticides required for crops that change with space and location. Combined with intelligent agricultural machinery system, precision agriculture can save the input of various raw materials, reduce the production cost, increase the land yield, and protect environment at the same time.

The agricultural machinery system uses high-precision satellite observation to realize automatic navigation. The controller controls the driving direction and throttle of the machine to make it automatically drive according to the preset route (straight or curve), reducing the omission and overlap of the operation, and improving the quality of machinery operation. The automatic navigation system of agricultural machinery can also operate at night and under complex weather conditions, which improves the efficiency of agricultural operation, reduces the skill requirements for the operator and reduces labor intensity. The system can be used in farmland operations such as ridging, seeding, spraying, and harvesting, improving the precision of agricultural operations and improving the quality of agricultural products.

Precision Agriculture Application

Unicore's multi-system multi-frequency RTK technology provides positioning accuracy better than 2cm and orientation accuracy of 0.1°/1m baseline, ensuring the straight-line tracking and steering accuracy required by agricultural automatic navigation systems. At present, many domestic and overseas agricultural machinery integrators have adopted Unicore's high-precision products.

UAV

The UAV is widely used in aerial photogrammetry, oil pipeline inspection, power line inspection, agricultural plant protection, aerial surveillance, film and television shooting, family entertainment and other fields. The core to achieve autonomous flight control of UAV is the flight control system, which plays an important part in UAV stability, data transmission reliability, position accuracy and timeliness, and plays a decisive role in its flight performance. In the flight control system, the GNSS receiver, as the most important sensor, provides real-time location and heading information for the UAV.

To ensure the UAV successfully completing preset tasks, its starting and destination position need to be configured in advance, and parameters such as position, speed, navigation attitude and heading also need to be communicated in real time. GNSS receiver is able to provide a reliable, economic and efficient way to obtain such information.

The GNSS high-precision modules developed by Unicore can provide real-time meter, decimeter and centimeter level positioning, support high-precision positioning and heading solutions using single board dual antennas or dual boards dual antennas, and achieve relative positioning in motion to meet the demands of various UAV flight control systems.

The UAV is very popular among a large number of users and also has many amateur loyal supporters beyond the professional fields. The core unit of UAV is the flight control system. As the most important position sensors, GNSS positioning provides location information for the UAV flight control system and also serves as foundation for a series of interesting applications such as automatic UAV return.

The positioning chips of Unicore featured by high performance and low power consumption are designed for differented UAV applications. Combined with sensor fusion algorithm, the chips can achieve accurate 3D positioning in multiple scenarios with low power consumption.

Recommended products

UM982

UM982C

UM960

UC6580I

UAV Application

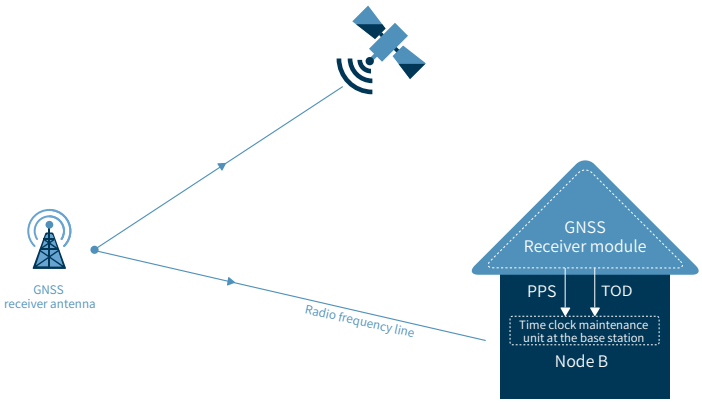
Unicore's high-precision products have been massively used by many domestic leading UAV manufacturers, with the largest market share.

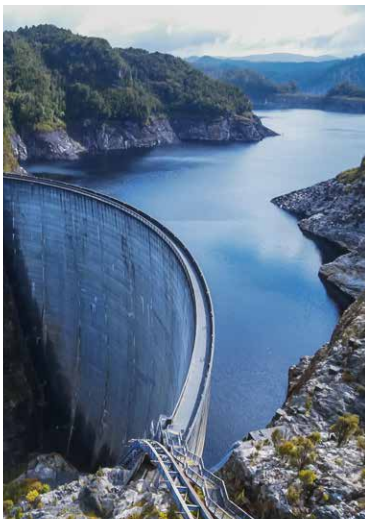
PRECISION TIMING

Recommended products

UT986

In the modern information society, the construction of communication network, electric power network, financial network and transportation network is increasingly dependent on time and frequency. Time synchronization technology with high precision and high reliability is the key to the normal operation of each network system. Satellite timing has become a widely used time synchronization technology due to its high accuracy, wide geographical coverage and ease of use, and plays an important role in communication, electric power and financial industries. Unicore's proprietary GNSS satellite timing modules can provide nanosecond-level timing accuracy to meet the high requirements of time synchronization. The modules adopt advanced interference suppression technology and RF structure design, which are more adaptable to complex electromagnetic environment. The diversified application configuration meets the requirements of different industries.





SAFETY MONITORING

Recommended products

UM960

UM980

Geological disasters such as debris flow, landslides, surface subsidence in the mining areas and safety operation of man-made buildings including reservoir dams, long-span bridges and super high-rise buildings are closely related to displacement deformation. The high-precision satellite positioning and navigation technology is widely used in different kinds of displacement monitoring and safety pre-warning systems as it offers automation, precision, fastness, all weather compatibility and low cost.

The use of multiple GNSS and multiple frequencies can effectively improve the accuracy of displacement monitoring in complex observation environment, improve the reliability of the system operation, and shorten the monitoring and early warning time.

Unicore's high-precision boards and modules can provide better than 1mm carrier phase observation accuracy. The reliable low-elevation tracking performance and super-low observation noise help to simplify the data processing work for the software. It is especially suitable for displacement monitoring application with the accuracy at millimeter level.

CONSUMER UAV

Recommended product

UC6580I

The drones are very popular among a large number of users. Beyond professional fields such as performance drones, there are also amateur loyal supporters applying them in aerial photography. The core unit of UAV is the flight control system. As the most important position sensor, GNSS chip provides position information for the UAV flight control system and also serves as foundation for a series of interesting applications such as automatic UAV return.

Unicore's high-performance chip with low power consumption is suitable for different market segments. Combined with the sensor fusion algorithm, it can provide accurate 3D positioning information while saving power for users.

ROBOTICS

Recommended products

UM980

UM982

UM960

UM960E

With the development of technology, robots have moved from factory production lines to outdoor life, from inspection robots in substations and gas stations, to agricultural spraying and fertilizing robots, to soccer field line painting robots and lawn mowers. As the application of outdoor inspection and service robots is becoming more and more popular, the technology is also becoming increasingly mature. GNSS, as the main technology for outdoor positioning, can achieve different levels of positioning accuracy covering sub-meter, decimeter and centimeter, with the help of differential correction data and precise point positioning technology. It can also be combined with inertial navigation, vision sensors, radars and other sensors to achieve high-precision positioning in various complex environments.

In combination with electronic map and path planning algorithms, GNSS can accurately locate and orient robots to automatically travel according to the planned route. For the GNSS module with a single antenna, it can provide accurate position and orientation information of a moving robot. For the GNSS module with dual antennas, even if the robot is not moving, the module can also provide accurate position and orientation information. Unicore's small-sized positioning modules support both single antenna and dual antennas, and have been successfully applied to various outdoor robots such as inspection robots, line painting robots, agricultural spraying robots and lawn mower robots.

Robot applications

Unicore's high-precision products have been applied in batches by many leading manufacturers of robotic lawn mowers and line painting robots.

SERVICE AND SUPPORT

EVK

Evaluation Kit

EVK	Supported Product	Component	Document	Figure
NebulasIV Series Products EVK				
HPL EVK 5.0 Kit	UM980eb UM982eb UM981-EB UM981S-EB UM960eb UM960Eeb UT986eb UM681A-EB UM680A-EB UM670A-EB	HPL EVK 5.0 x 1 Power adapter x 1 DB9 crossover serial cable x 2 Antenna RF cable x 2	HPL EVK 5.0 Kit Quick Guide	
UM980eb UM980Ceb UM981-EB UM981C-EB UM981S-EB	UM980 UM980C UM981 UM981C UM981S	—	UM980eb User Manual UM981-EB User Manual	
UM982eb	UM982 UM982C	—	UM982eb User Manual	
UM960eb UM960Eeb	UM960 UM960E	—	UM960eb User Manual	
UT986eb	UT986	—	UT986eb User Manual	
UFirebird Series Products EVK				
UC7510 EVK	UC7510I UC7510A	Active antenna USB cable UC7510 EVK	UC7510 EVK Quick Guide	
UM760 EVK UM761 EVK	UM760 UM760A UM761 UM761A	Active antenna USB cable UM760 EVK UM761 EVK	UM760 EVK Quick Guide UM761 EVK Quick Guide	
UC6580 EVK	UC6580I UC6580A	Active antenna USB cable UC6580 EVK	UC6580 EVK Quick Guide	
UM680A-EB UM681A-EB UM670A-EB	UM680A UM681A UM670A	—	UM680A-EB User Manual UM681A-EB User Manual UM670A-EB User Manual	
UM620 EVK	UM620A UM620	Active antenna USB cable UM620 EVK	UM620 EVK Quick Guide	
UM621 EVK	UM621A UM621	Active antenna USB cable UM621 EVK	UM621 EVK Quick Guide	

UPRECISE

GNSS EVALUATION SOFTWARE

UPrecise is a GNSS evaluation software independently developed by Unicore. It features a user-friendly interface and simple operations.

Product Features

- Adaptable to Unicore products with graphical user interface
- Visualization of real-time positioning data to display satellite signals, positioning, heading, and attitude information
- Easy configuration of frequently used commands
- Real-time message parsing with descriptions to help users analyze positioning data

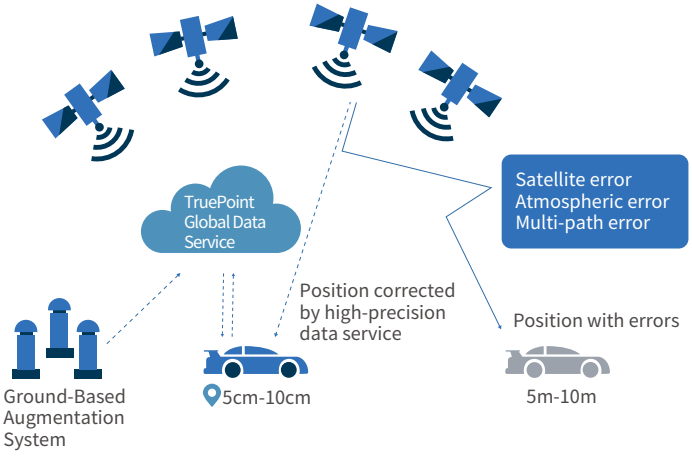
BUILT-IN HIGH-PRECISION GNSS CORRECTION SERVICE

The GNSS-based positioning technology requires data service to achieve centimeter-level high-precision positioning. Based on the globally distributed and regionally encrypted ground-based augmentation system (GBAS), the cloud service platform provides decimeter and centimeter-level high-precision data, which can be combined with the high-precision positioning algorithms such as RTK and PPP-RTK built in the GNSS chip/module to eliminate positioning errors and achieve decimeter or centimeter-level positioning accuracy.

Unicore chips and TruePoint data services are fully integrated by the Chip-Cloud technology, and the hardware chips and software algorithms are well adapted to each other in terms of the GBAS, GNSS chip/module, edge computing algorithm and cloud computing algorithm. In addition to the customized supplementary correction information, the positioning performance and availability are improved in complex environment. Besides, multi-functional SDK with troubleshooting and OTA upgrade function is provided to simplify the integration work and bring better experience for customers.

Product Advantages

- High-precision positioning service built in the chip/module (activation required)
- Chip-Cloud Integration technology to improve the positioning performance
- Easy-to-use, multi-functional SDK available
- Trustworthy, with good after-sales service to improve customer experience



A-GNSS

LOCATION ASSISTANCE SERVICE

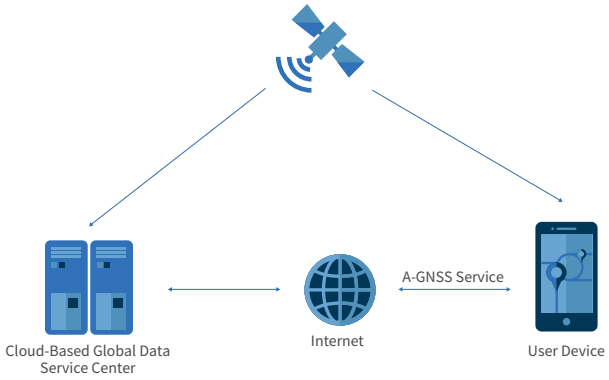
Focusing on the challenge of instantaneous positioning in various application scenarios, A-GNSS service can accelerate the time to first fix (TTFF) of cold start to 2~5 seconds, supports dual modes of real-time ephemeris and predicted ephemeris, enables smartphones, terminal devices to be located in seconds, reduces power consumption of terminal devices, and improves the user-side positioning experience.

Assistance Data Type	Ephemeris, almanac, approximate position and time
Ephemeris Validity Period	Real-time ephemeris: 2 to 4 hours; Predicted ephemeris: up to 31 days
Supported Constellations	GPS, GLONASS, Galileo, QZSS, BDS
Ephemeris File Size	Real-time ephemeris: 3kB/constellation Predicted ephemeris: GPS: 98kB/14 days GAL: 70kB/14 days BDS: 139kB/14 days GLONASS: 73kB/14 days QZSS: 13kB/14 days

Note: The predicted ephemeris file size is related to the number of satellites and the number of predicted days, and is approximately 0.23K/day/constellation.

Advantages of A-GNSS Service

- A-GNSS service built in the chip/module (activated required)
- TTFF improved to 2 ~ 5 seconds
- Real-time ephemeris and predicted ephemeris dual-mode available
- Power consumption reduced and operating hours extended
- Dynamic combination of five constellations and supports A-GPS and A-BDS



QUALITY

Superior Product Quality

Adhering to the concept of “strict standards and high quality", Unicore implements quality management throughout the product life cycle based on systematic and in-process management approaches to deliver high-quality and highly reliable products to customers.

The chips are produced by world-class integrated circuit foundries; each chip is carefully created in accordance with the industry's rigorous reliability test standards to ensure the superior quality.

The high quality of modules is guaranteed by strict in-house inspection and reliability testing, hundreds of thousands of hours of drive testing and 100% factory testing, functional and performance testing by authoritative third-party organizations, and automotive grade products meeting the requirement of ISO16750.

Continuously pursuing excellent quality, Unicore has always maintained a leading position in the industry, delivering navigation chips and modules with long-term reliability.

Product Certification

» AEC-Q100-certified automotive-grade chips

» JESD47-certified industrial-grade chips

» CE-certified products

» FCC-certified products

» RoHS2.0-certified products

» REACH-certified products

Management System Certification

» ISO9001 Quality Management System

» QC080000 Hazardous Substance Process Management System

» ISO14001 Environmental Management System

» ISO45001 Occupational Health and Safety Management System

» Contract manufacturers are certified to the IATF 16949 Quality Management System

High Customer Satisfaction

With a consistent pursuit of high customer satisfaction, Unicore has always been committed to delivering superior products and efficient and high-quality services. For such commitment, a rapid customer communication and feedback system has been put in place in Unicore to ensure timely handling of problems from customers.

Production Quality Control

- Complete PPAP and sufficient DFM experience to ensure the new product introduction
- Industry-leading SMT production line and equipment to ensure the quality and reliability of product processing
- Automated FCT to improve the test efficiency and consistency
- EBS, MES and WMS systems to realize the traceability of material sources and the whole process of production

Selection of Suppliers and Partners

- Components: Electronics from premium brands in the industry
- Manufacturer: Internationally well-known automotive manufacturers

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