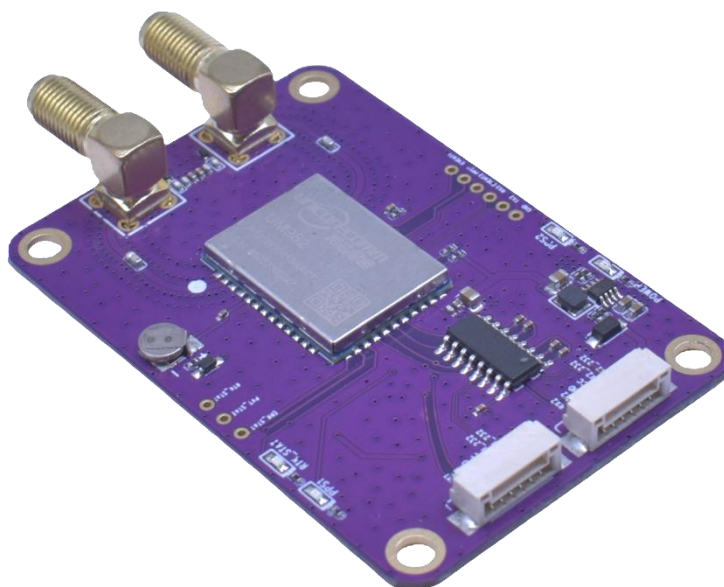




ZHI SHENG TIAN

AK372
UM982



ZHI SHENG TIAN Electronic
Technology Co., Ltd.



ZHI SHENG TIAN Electronic Technology Co., Ltd. Product Specification

Product Name:	<u>Circuit Board</u>
Product Model:	<u>AK372-UM982</u>
Version Number:	<u>V 1.0</u>
Revision Date:	<u>2024.07.02</u>

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1 Product Application Scenarios

The AK372W-UM982 module from our company is a low-cost, low-power, high-performance RTK positioning module that provides real-time centimeter-level accuracy. It utilizes a full-frequency RTK engine and is suitable for applications in UAVs, automotive, and surveying fields. The module can be configured as either a rover or a base station, using carrier phase differential technology to minimize various errors and achieve high-precision positioning. In base station mode, it outputs a standard RTCM data stream, compatible with most commercial rovers; in rover mode, it supports the RTCM format and can connect to different base stations or the Bei Dou system. With accuracy up to 1 cm and an output rate of 1-10 Hz, it offers exceptional value for its cost. See Figure 1 for details.

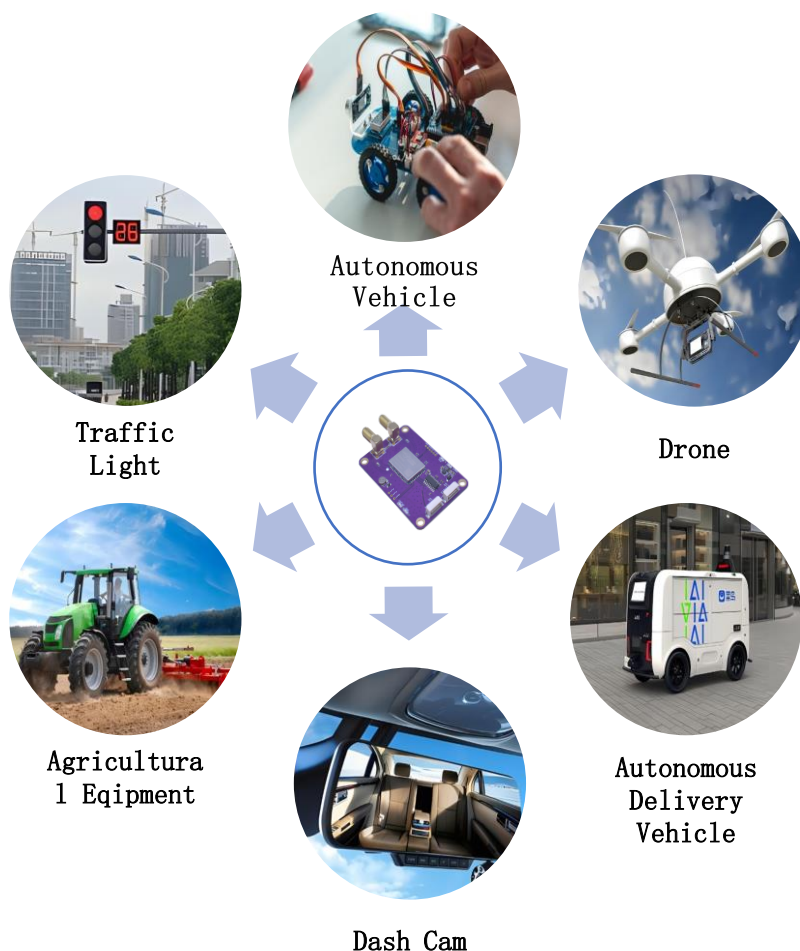


Figure 1 Product Application Scenarios

2 Features

In this chapter, we will delve into and comprehensively elaborate on the functionalities and operating principles of the AK372W-UM982, detailing how it plays a pivotal role in various applications as follows:

1. **Advanced Technology:** Based on UM982 series, supports full-frequency RTK and dual antennas for stable, high-precision positioning in harsh environments.
2. **Multi-System Frequency Support:** Receives and processes signals from BDS, GPS, GLONASS, Galileo, QZSS, and SBAS, enhancing global coverage and accuracy.
3. **Quad-Mode RTK:** Ensures fast and accurate positioning in various environments.
4. **Dual-RTK Technology:** Enhances reliability and accuracy with dual RTK engines and dual antennas.
5. **50Hz Data Output:** Adapts quickly to dynamic environments, ideal for UAVs.
6. **Base Station or Rover Configuration:** Offers high flexibility for different scenarios.
7. **Differential Positioning and Vector Attitude Measurement:** Provides precise position and orientation.
8. **Compatibility with Flight Control Systems:** Integrates with Pixhawk and APM.
9. **Industrial-Grade Low-Noise RF Circuit:** Suppresses multipath interference for clear, accurate signals.

3 Structural Characteristic

In this section, we will thoroughly present and analyze the design details of the product, depicting its exterior features through comprehensive imagery. This view offers a holistic perspective, facilitating an understanding of the product's architecture. Refer to Figure 2, Table 1, and Table 2 for details.

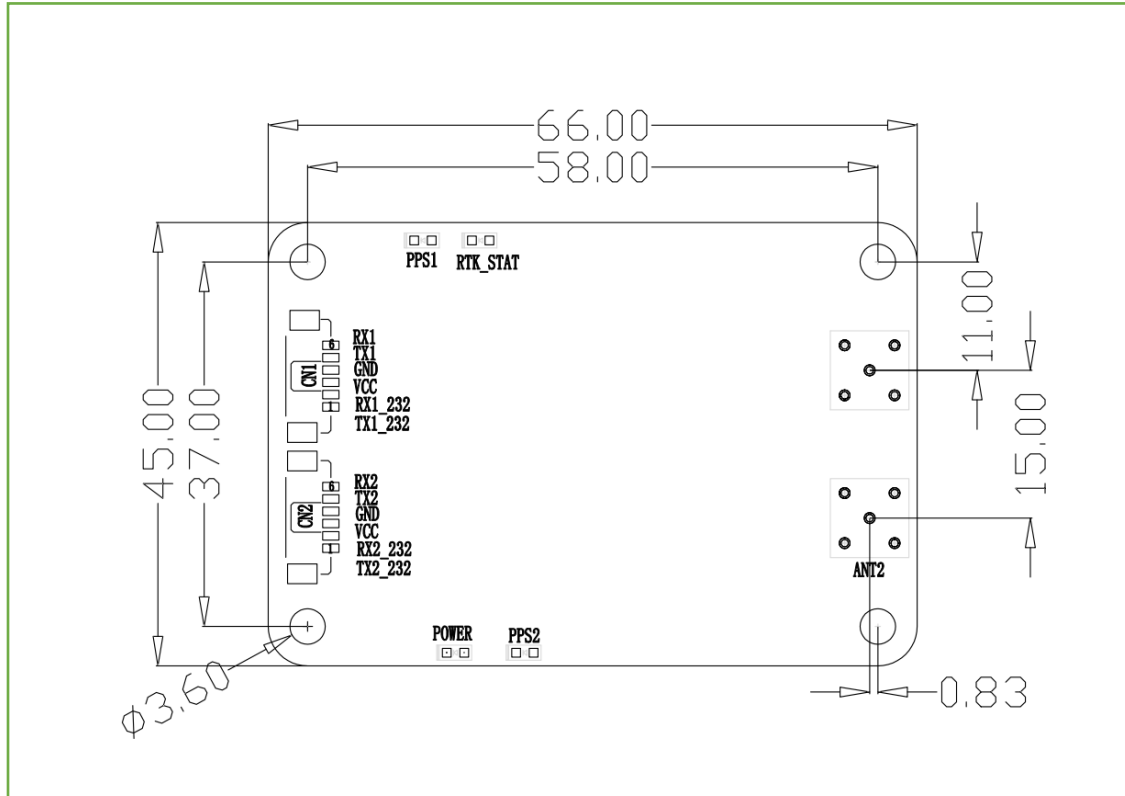


Figure 2 Dimensional Drawing (in millimeters)

Pin Number	Signal Name	Signal Description	
CN1	1	TX1_232	Serial port 1 transmit, RS232 level
	2	RX1_232	Serial port 1 receive, RS232 level
	3	VCC	+5V power input
	4	GND	Ground
	5	TX1	Serial port 1 transmit, 3.3V TTL level
	6	RX1	Serial port 1 receive, 3.3V TTL level
CN2	1	TX2_232	Serial port 2 transmit, RS232 level
	2	RX2_232	Serial port 2 receive, RS232 level
	3	VCC	+5V power input
	4	GND	Ground
	5	TX2	Serial port 2 transmit, 3.3V TTL level
	6	RX2	Serial port 2 receive, 3.3V TTL level
LED Indicators	1	RTK-STAT	RTK positioning indicator, high level active, outputs high level when RTK fixed. Other positioning states or no positioning output low level.

	2	POWER	Indicates power supply status
	3	PPS1	Pulse per second output 1, outputs pulse per second after positioning, LED flashes
	4	PPS2	Pulse per second output 2, outputs pulse per second after positioning, LED flashes

Table 1 PIN Functionality

Table 2 Interface Characteristics

No.	Name	Symbol	Min	Typical	Max	Unit
1	Main Power Supply	V _{CC}	2.7	3.3	5.0	V
2	RF Port Feeding	V _{RF}	1.4	3.3	3.6	V
3	Input High Level	V _{IH}	2.0			V
4	Input Low Level	V _{IL}			0.7	V
5	Output High Level	V _{OH}	3.2			V
6	Output Low Level	V _{OL}			0.1	V
7	Main Serial Baud Rate	Baud		115200		bps
8	Differential Wave	Baud		115200		bps

4 Specifications

In this section, we will provide a detailed list and explanation of the product's chip features, sensitivity, accuracy, operating principles, and other technical details, as detailed in Table 3.

Table 3 Product Specifications

	Chip	UM982
Chip Characteristics	Main Antenna Working Frequency Bands	BDS: B1I、B2I、B3I GPS: L1C/A、L2P (Y)、L2C、L5 GLONASS: L1、L2 Galileo: E1、E5a、E5b QZSS: L1、L2、L5
	Auxiliary Antenna Working Frequency Bands	BDS: B1I、B2I、B3I GPS: L1C/A、L2P (Y)、L2C、L5 GLONASS: L1、L2 Galileo: E1、E5a、E5b QZSS: L1、L2、L5
	Reception Channels	1408 channels based on NebulasIVTM
Sensitivity	Tracking	-167 dBm
	Reacquisition	-160 dBm
	Cold Start	-148 dBm
	Hot Start	-157 dBm
Time to First Fix (TTFF)	Cold Start	26s
	Hot Start	2s
	Reacquisition	2s
Precision	Horizontal Accuracy	Standard positioning: 1.5m CEP RTK positioning: 0.8cm + 1 ppm CEP
	Speed Accuracy	0.2m/s
	Pulse Precision	20ns
	Orientation Accuracy	0.2 degrees / 1m baseline
Output Data	Baud Rate	115200bps (default) [adjustable: 4800-921600]
	Output Interface	TTL 和 RS232
	Output Protocol	NMEA0183、RTCM 3.3
	Update Frequency	Default 1Hz (0.25Hz-50Hz)
	Carrier Phase Output	Supported, output RAWX information
	FLASH	built-in
Working Conditions	Altitude	<5000m
	Speed	<500m/s
	Gravitational Acceleration	<4g
Environment	Operating Temperature	-40°C-85°C
	Storage Temperature	-40°C-105°C
Electrical	Operating Voltage	3.3V-5V DC

Specifications	Power Consumption	<800mW
Physical Parameters	Dimensions	66*45mm*3.5mm
	Weight	17.4g
	Connector	2×GH1.25mm 6pin
	Antenna Connector	SMA Elbow

5 Product Photos

In this chapter, we will showcase real-life images of the product, as shown in Figure 3. These images provide a detailed view of our product from various angles and perspectives. We believe that through authentic representation, we can better convey the value and concept of the product, thereby enhancing your trust and satisfaction.

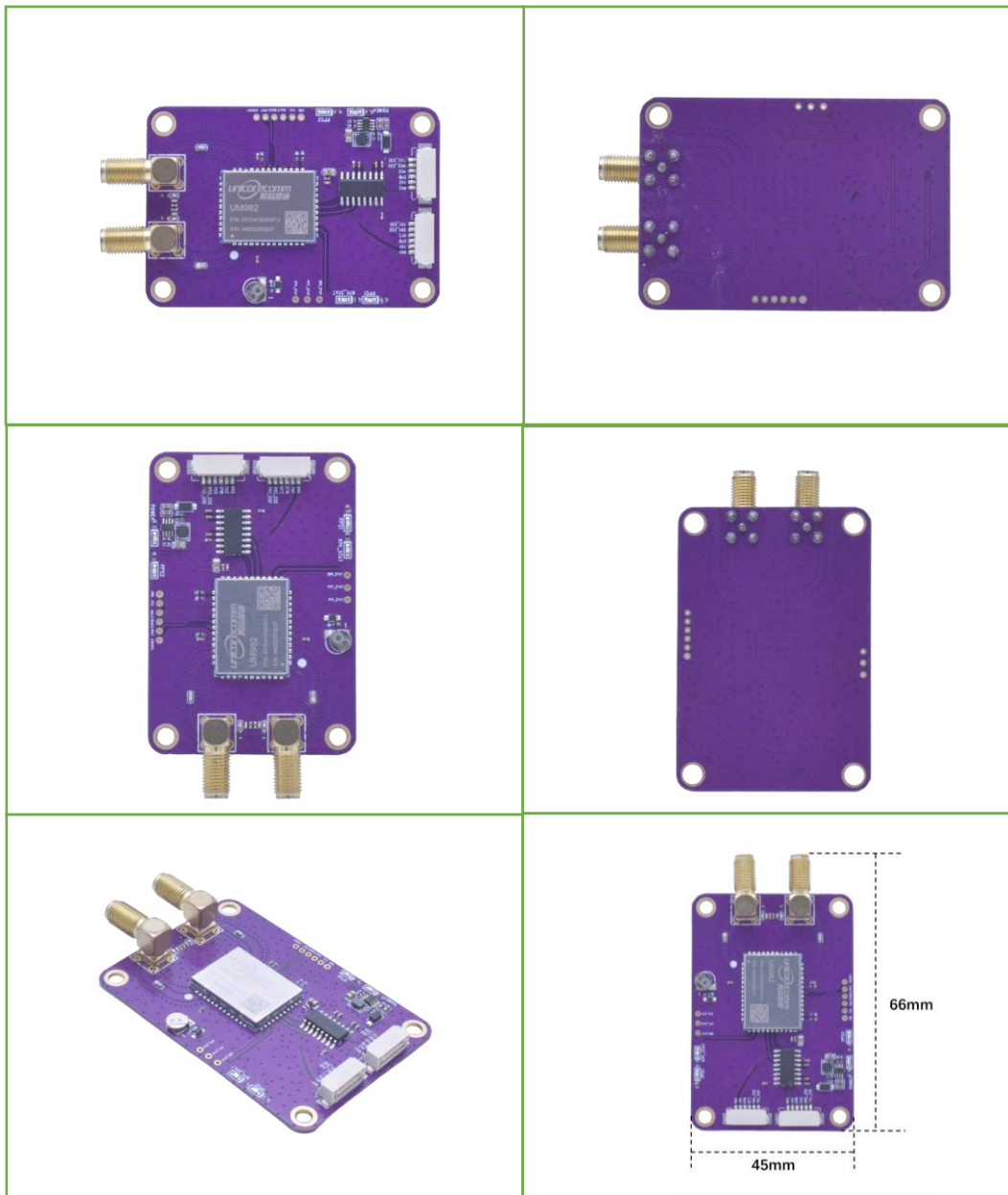


Figure 3 Product Images