AK734

Dalang Communication Technology Co., Ltd Product Specification

Product Name:	GNSS Receiver
Product Model:	AK734
Version Number:	V 1.0
Revision Date:	2025.08.08

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1 Product Application Scenarios

The AK734 receiver module integrates a dual antenna GNSS receiver and a 6-axis IMU inertial navigation system. It uses the domestically produced BeiyunM22 chip and supports multi frequency satellite signal reception across the entire constellation. In RTK mode, it can achieve centimeter level real-time positioning (horizontal ± 1cm+1ppm) and 0.2 ° high-precision heading measurement. The module adopts a tightly coupled combination navigation algorithm, which automatically switches to inertial navigation to maintain positioning continuity when satellite signals are obstructed, making it particularly suitable for dynamic application environments such as drones, autonomous driving, and agricultural machinery. Support single base station/network RTK mode and provide multiple communication interfaces for system integration. Refer to Figure 1 for details.

Figure 1 Product Application Scenarios

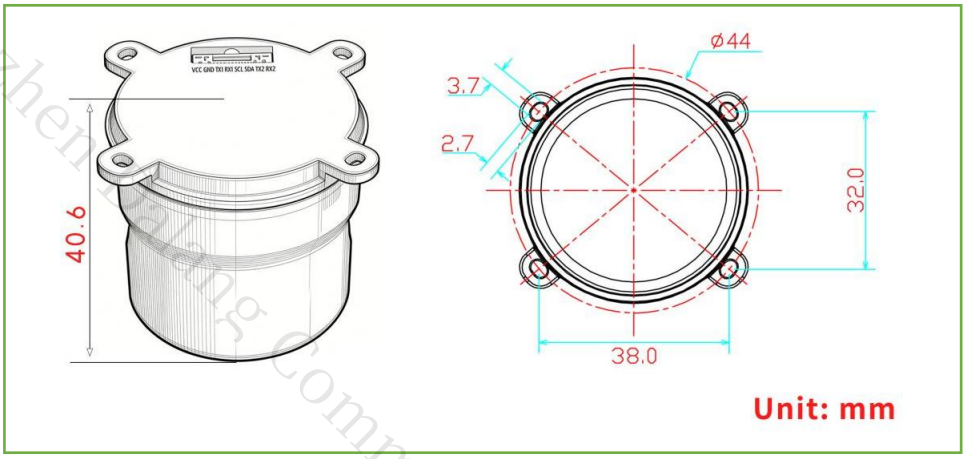
2 Features

In this chapter, we will delve into and comprehensively elaborate on the functionalities and operating principles of the AK734, detailing how it plays a pivotal role in various applications as follows:

1. **Centimeter level high-precision positioning：** supports multi system RTK such as Beidou/GPS, with real-time dynamic accuracy reaching centimeter level.
2. **Strong anti-interference ability：** stable signal in complex environments, suppressing multipath and electromagnetic interference.
3. **Low power design：** optimizes power consumption, suitable for mobile devices and field operations.
4. **Multi mode RTK：** compatible with single base station, network RTK, and PPK post-processing, flexible to adapt to different scenarios.
5. **Industrial grade reliability：** wide temperature design, dust and shock resistance, suitable for harsh applications such as drones and autonomous driving.
6. **Compatibility：** Fully compatible with other automatic flight control systems such as Pixhawk and APM, with good compatibility.
7. **Low noise reduction：** using industrial grade low-noise RF circuits, with strong resistance to multipath suppression.
8. **Advantages of Dual Inertial Navigation:** Equipped with dual IMU units, supporting redundant backup and data fusion, stronger anti-interference and anti vibration capabilities, uninterrupted navigation for single group failures, high attitude accuracy and low drift, suitable for complex operational scenarios with high reliability requirements

3 Structural Characteristic

In this section, we will conduct an in-depth analysis of the product's design details, presenting its aesthetic features and precise interface specifications through detailed structural diagrams. This perspective aims to provide a comprehensive framework, thereby enhancing the understanding and perception of the product's architecture. Refer to Figure 2, Figure 3,Table 1.



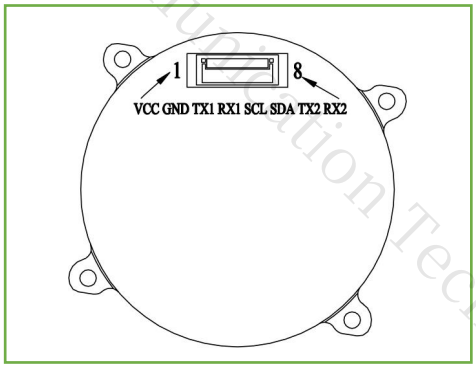


Figure 2 Dimensional Drawing (in millimeters)

Table 1 PIN Function

NO.	Pin Name	Description
1	VCC	Main power input,+3.3V~5V
2	GND	Module grounding
3	TX1	UART1 output, 3.3V TTL
4	RX1	UART1 input, 3.3VTTL
5	SCL	I ² C serial clock
6	SDA	I ² C serial data
7	TX2	UART2 output, 3.3V TTL
8	RX2	UART2 input, 3.3VTTL

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 2.

Table 2 Product Specifications

Chip characteristics	Chip	Beiyun M22
	Operating Frequency	BDS-2: B1I/B2I/B3I BDS-3：B1C*/B2a/B2b(PPP)*/B3I GPS: L1 C/A/L1C*/L2/L5 GLONASS: G1/G2 Galileo: E1/E5a/E5b/E6(HAS)* QZSS: L1C/A/L1C/L2/L5、L6(CLAS)* NavIC: L5 SBAS*:L1C/A
	Receiving channel	1507 channel
Accuracy	Horizontal positioning accuracy (RMS)	Single point: 1.5m
		RTK:1.0cm + 1ppm
	Elevation positioning accuracy (RMS)	Single point: 2.5m
		RTK:1.5cm + 1ppm
	Timing accuracy (RMS)	≤ 20 ns
	Speed accuracy (RMS)	0.03m/s
	RTK calculation delay	50ms
Start Time	cold start	30s
	hot start	5s
	RTK initialization time	<5s (typical value)
	Lost lock recapture time	<1s
IMU performance (Gyroscope)	range	±300°/s
	angle random walk	0.5° / √h
	Zero bias instability	5° /h
	Full temperature zero bias	0.3° /s
	Scale error	4‰
	Three-axis orthogonal cou	1.7（0.1° ）‰）

	pling error	
IMU performance (accelerometer)	range	± 16g
	rate random walk	0.3m/s/ √h
	Zero bias instability	50 μ g
	Full temperature zero bias	5 μ g
	Scale error	2‰
	Three-axis orthogonal cou pling error	0.9（0.05°）‰
	System functional safety*	ASIL B
Output data	Baud rate	115200bps (default) [Optional: 4800-921600]
	output interface	TTL
	Output Protocol	NMEA0183、RTCM 3.3
	update frequency	GNSS positioning: 5-10 Hz INS positioning: 100 Hz IMU raw data: 100 Hz
Differential data	Differential data	RTCM 3.3/3.2/3.1/3.0
	Carrier phase output	Support, output RAWX statement
	FLASH	built-in
Electrical specifications	working voltage	3~5.5V DC
	power consumption	800mW
Physical parameters	size	Φ44*40.6mm
	weight	21g
	joint	GH1.25mm 8pin
Environment	operation temperature	-35℃-80℃
	storage temperature	-40℃-95℃

5 Product Photos

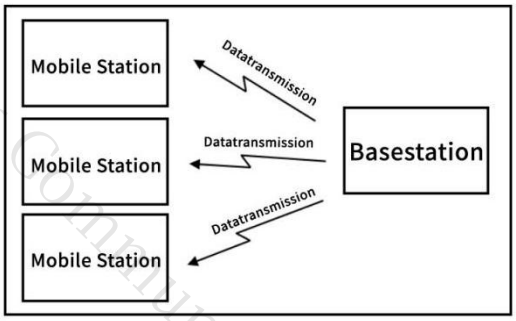
In this chapter, we will showcase real-life images of the product, as shown in Figure 4. These images provide a detailed view of our product from various angles and perspectives. We believe that through authentic representation, we can better convey the value and concept of the product, thereby enhancing your trust and satisfaction.

Figure 4 Product Images

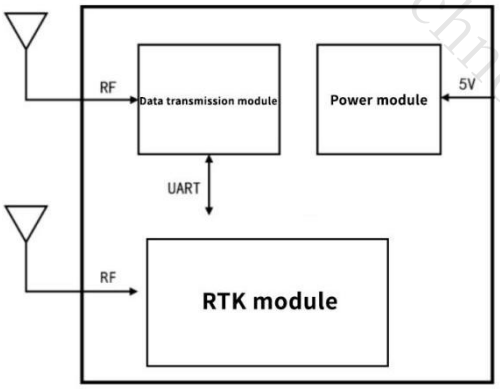
6 Typical Applications

6.1 Application of high-precision positioning for medium and short distances

In high-precision positioning applications for medium to short distances (<3km), the module can be combined with a data transmission module to form a complete high-precision positioning system with only a small amount of external circuits. It is suitable for applications with a large number of mobile stations in a small range, and the module is fully compatible with other automatic flight control systems such as Pixhawk and APM. The schematic diagram is as follows:



The reference station is stationary and fixed, and differential data is broadcasted to all mobile stations through a data transmission module. The circuit diagrams of the mobile station and the reference station are as follows:



3) If the antenna coordinates have been accurately determined through other surveying methods, please use the # set position command to input the antenna coordinates into the reference station module in latitude, longitude, and altitude format;

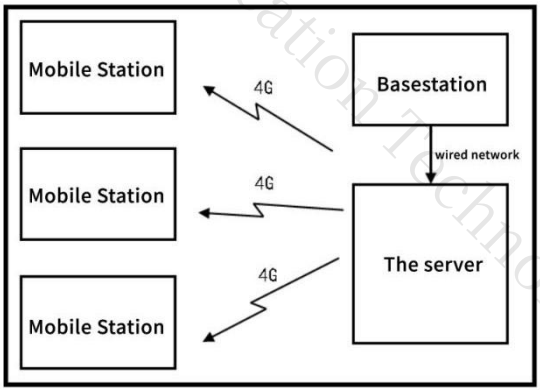
4) If the antenna coordinates are unknown, please wait patiently for about 5 minutes. The module will calculate the antenna position as accurately as possible. After the calculation is c

ompleted, the differential data port will begin to output data. At this point, the base station has already recorded the coordinates and broadcasted them wirelessly to ensure that the base station does not lose power, as the coordinates will be recalculated after a power outage and the repeatability of the mobile station measurement points cannot be guaranteed;

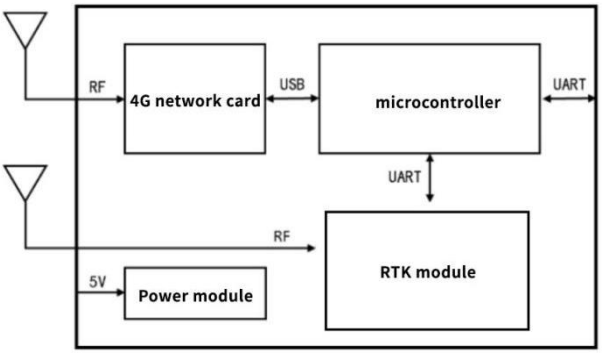
5) Install the mobile station antenna on the mobile carrier, confirm receipt of differential data, and wait for about 120 seconds to obtain high-precision positioning results.

6.2 Application of Medium to Long Range High Precision Positioning

In the application of high-precision positioning over medium to long distances (<10km), common data transmission modules are difficult to provide reliable differential data connections and suffer from serious packet loss problems. For this purpose, the company provides a solution based on 4G network (as shown in the figure below). The benchmark station sends differential data to the server through a wired network and is cached by the server. Mobile stations access servers through 4G networks to obtain differential data. This solution can greatly expand the coverage area of base stations, and mobile stations equipped with 4G network cards can simultaneously transmit positioning results back to designated servers.



The circuit diagram of the mobile station is as follows:



In practical applications, the number of mobile stations that a server can access simultaneously is limited only by server performance and is more suitable for a large number of users. Requirements between the server and the base station: the server can be directly accessed from the public network (with a public IP address), and a network connection can be established between the base station and the server (either through the public network or local area network).

6.3 High precision positioning application without reference station

In high-precision positioning applications without reference stations, the module needs to cooperate with the 4G communication module to obtain differential data. We provide Qianxun with differential data sources nationwide, and users can obtain high-precision positioning results without deploying base stations. The circuit diagram is as follows: