X28

Smart Antenna Specifications

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Edit history

Version number	Modified date	author	Modifications
V1.0	December 20, 2025	Chen Xian	Initial version
V1.1	January 5, 2026	Chen Xian	Chapter sorting adjustment

1. Product Introduction

The X28 smart antenna is a new generation of high-precision positioning board, supporting dual-mode operation as both a rover and a base station. The product integrates GPRS, Bluetooth/WIFI, LoRa, CAN, and multiple serial communication ports, providing centimeter-level GNSS positioning capabilities and supporting AGPS fast positioning and RTK differential enhancement. Its modular design allows for on-demand configuration, featuring dual power management (external power supply and battery pack), temperature detection, remote upgrades, and blind zone data retransmission. The X28 can be flexibly adapted to various IoT and high-precision positioning scenarios, such as agricultural machinery autopilot, robots, and drones, providing a stable and scalable positioning and data communication solution.

This product is primarily applicable to autonomous driving control systems.

2. Product Features

4G Cat.1	Multi-band RTK positioning
Bluetooth communication	Wi-Fi communication
CAN communication	Remote upgrade
IMU navigation	Attitude data
Built-in TF card slot	Rover station & base station

3. Product Specifications

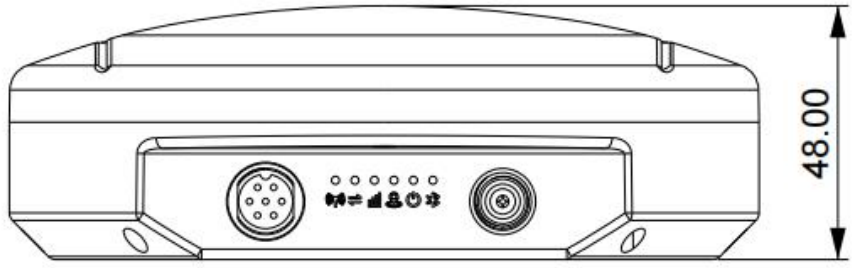
Classification	Property	Description
Host Features	4G operating frequency band	LTE FDD B1/ 3/ 5/ 8
		LTE TDD B34/ 38/ 39/ 40/ 41
	Supported by	Global 4G

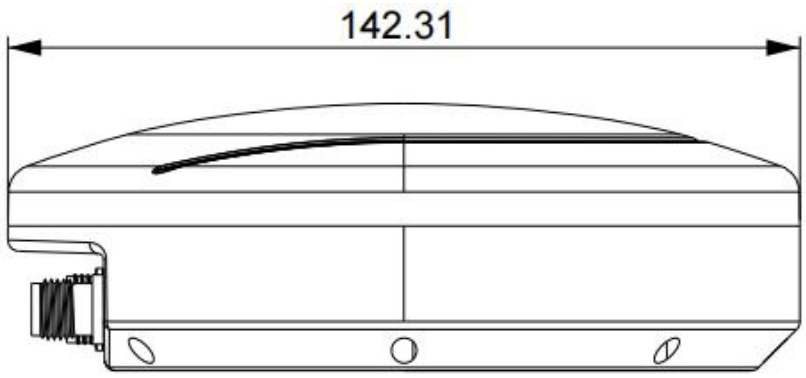
	operators	
	Communication methods	TCP, UDP
	Bluetooth	Supports BLE 5.2
	Bluetooth transmission distance	30 meters
	Radio station	Data pass-through
	Radio transmission distance	1000M
	Wi-Fi	Customization based on customer needs
	Wi-Fi transmission distance	Customization based on customer needs
Electrical characteristics	Operating voltage	9V ~ 36V
	Operating current	≤200mA@DC12V
	Built-in backup power	250mAh@3.7V
Environmental characteristics	Operating temperature	-20℃ ~ +75℃
	Storage temperature	-40℃ ~ +75℃
	Operating humidity	10% ~ 85% RH, non-condensing
Mechanical properties	Waterproof rating	IP67
	Main unit size	143×143×48 mm
	Main unit weight	350g
	Material	ASA

IMU characteristics	Gyroscope	Measurement range: ±125°/s
		Zero-bias repeatability: 0.5°/s
		Zero bias stability: 5°/h
		Angle random walk: 0.12°/sqrt(h)
	Accelerometer	Measurement range: ±2g
		Zero-biased repeatability: 20mg
		Zero bias stability: 50ug
		Velocity random walk: 0.07 m/s/sqrt(h)
GNSS characteristics	Supports constellations and frequencies	GPS: L1C/A.L2P,L2C.L5,L1C
		BDS-2:B1I,B2I, B3I
		BDS-3: B1I, B1C, B2a, B2b, B3I
		Galileo: E1, E5b, E5a, E5 AltBoC,E6c
		QZSS:L1C/A,L2C,L5,L1C
		SBAS: L1C/A, L5
		IRNSS*: L5
	Single point accuracy	≤1.5m
	RTK positioning accuracy	2.5cm±1ppm
	Velocity accuracy	≤0.02m/s
	Heading accuracy	0.2/1m baseline
	Auxiliary dead reckoning (error)	3%d (d is the distance traveled)

	Capture Time	Cold start ≤30 seconds
		Warm start ≤10 seconds
	Sensitivity	Tracking sensitivity: -155dBm
		Acquisition sensitivity: -140dBm
	Update rate	1～10Hz (default 1Hz)
	Baud rate	115200~460800 bps (default 115200 bps)
	Data format	NMEA 0183
	Differential data	RTCM 3.3/3.2/3.1/3.0
other	Explosion-proof certification	We can assist clients with explosion-proof certification.

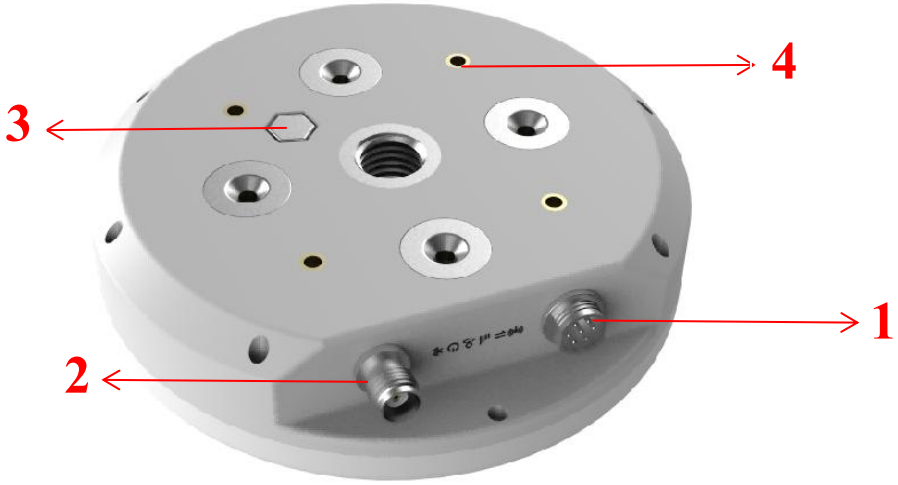
4. Product Dimension Diagram





Unit：mm

5. External Interfaces of the Product



SN.	Interface definition	Function	Functional status
1	Aviation Connector	Data transmission (see Table 1 for line	✔
2	From antenna	From the antenna connector (TNC female	✔
3	air valve	Waterproof and breathable valve	✔
4	Fixed control	M4*7 mounting holes	✔
(Function status description : ✔ indicates that it has been implemented) —Indicates			

Figure 1: Definition of aviation connector wiring sequence

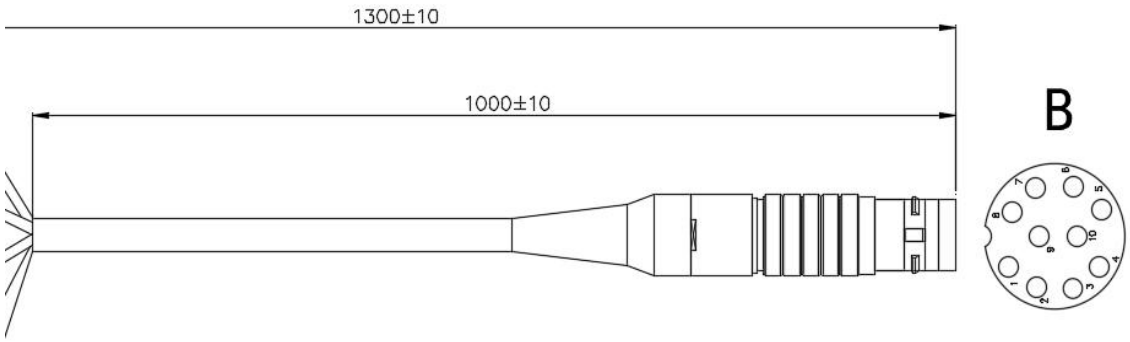


Table 1: Definition of Aviation Connector Wiring Sequence

SN.	Color	Function	Functional status
1	Red	Power input (DC 9-36 V)	✔
2	Black	GND	✔
3	Blue	MCU RX (RS23 2-level 9600bps)	✔
4	Green	MCU TX (RS23 2-level 9600bps)	✔
5	Yellow	GNSS TX (RS23 2-level 1152 00bps)	✔
6	Orange	GNSS RX (RS23 2-level 1152 00bps)	✔
7	Purple	BOOT0 (Firmware upgrade mode control)	✔
8	Brown	Reserved	—
9	Grey	Reserved	—
10	White	Reserved	—
(Function status description : ✔ indicates that it has been implemented) —Indicates			

6. Differences explanation

Model	Positioning solution	Function Description
X11	Multi-constellation, multi-frequency	Default version
X11P	Multi-constellation, multi-frequency	Support PPP
X21	Multi-constellation, multi-frequency	Support posture
X27	Multi-constellation, multi-frequency	Supports attitude and IMU
X28	Multi-constellation, multi-frequency	Supports attitude and IMU

7. Main Functions

Classification	Function	Description	Status
Main functions	RTK positioning	This product supports the NTRIP protocol and achieves high-precision RTK positioning by receiving differential signals from base stations, centimeter level accuracy.	✔
	JT/T808	This product supports the Ministry of Transport industry standard JT/T 808-2013 "Communication Protocol and Data Format for Satellite Positioning System Terminals of Road Transport Vehicles".	✔
	SMS Configuration	This product supports remote adjustment of device operating parameters via SMS. Users can easily configure the device without connecting to a platform, making it convenient to operate.	✔
	Serial port configuration	This product supports adjusting the device's operating parameters via an external aviation plug interface, providing a more flexible control method.	✔
	JT/T808 configuration	This product supports adjusting the device's operating parameters via the JT/T808 platform. Note: This function requires platform support.	✔
	Rover station mode	Mobile station serial port outputs NMEA data	✔
	Remote upgrade	This product supports remote firmware upgrades.	✔
	Bluetooth configuration	This product supports connection to the device via Bluetooth from a mobile phone, allowing for	—

		easy adjustment of device operating parameters. It is simple to operate and convenient to use.	
	Base station mode	Base station mode serial port output RTCM data	—
	Attitude output	This product supports pushing heading and pitch attitude information to a designated platform via JT/T808 .	—
	Wi-Fi configuration	This product supports Wi-Fi connection via mobile phone, allowing you to easily control and adjust device parameters.	—
	TF card	TF cards are used to store device operation logs.	—
(Function status description : ✔ indicates that it has been implemented) —Indicates reservation)			

8. Product Indicator Light Definitions

Indicator light diagram

SN.	Indicator lights	color	State definition	LED display	Functional status
1	Radio station	Yellow	Idle state	Light on	✔
			One complete protocol packet was sent.	Flash once	✔

			One complete protocol packet was successfully received.	Flashing 3 times	✔
2	CAN	Green	Idle state	Light on	✔
			One complete protocol packet was sent.	Flash once	✔
			One complete protocol packet was successfully received.	Flashing 3 times	✔
3	Communi cation	Blue	No SIM card detected	Light off	✔
			Search for online card overdue payment	Light on	✔
			Online registration successful	1 flash /S	✔
			Connection to server successful	5 flashes /S	✔
4	Position	Green	No data/Antenna not connected	Light off	✔
			Unlocated	1 flash/2S	✔
			Location Already	1 flash	✔

				/S	
			Received RTCM data	2 flashes per second	✔
			Floating-point solution	5 flashes per second	✔
			Fixed solution	Light on	✔
5	Power supply	Red	External power supply to the equipment is interrupted.	Light off	✔
			The equipment power-on procedure is running normally.	Light on	✔
6	Bluetooth -WIFI	Blue	Bluetooth not connected	Light off	✔
			Bluetooth is connected, idle state	Light on	✔
			One complete protocol packet was sent.	Flash once	✔
			One complete protocol	Flashing	✔

			packet was successfully received.	3 times	
(Function status description : ✔ indicates that it has been implemented) —Indicates reservation)					

9. Product Appearance Drawings

Front view

Rear View

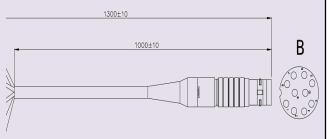
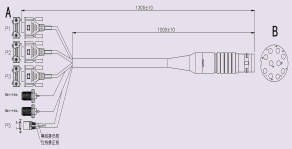
Top view

Bottom view

Side view

Side view

10. Packing List

SN.	Name	QTY	Unit	Remark	Image
1	Terminal equipment	1	PC	Standard configuration	
2	Aviation connector harness bare wire	1	PC	Standard configuration	
3	Aviation connector harness to DB9 1 to 3 splitter	1	PC	Optional	
4	RS232 to USB cable harness	1	PC	Optional	
5	SMA to TNC antenna (5 meters)	1	PC	Optional	
6	Mushroom-shaped antenna with magnetic base	1	Set	Optional	

11. After-sales service

(1) For equipment damage during the warranty period caused by non-human factors or product quality issues, please contact the dealer promptly.

(2) We will not repair damage caused by unauthorized disassembly by customers or by force majeure (such as floods or fires).

(3) After the warranty period expires, for any product damage or malfunction caused by use, a repair material cost will be charged.

(4) We provide free consultation and technical services for product purchase, use, and installation.

12. Common Problem Analysis and Troubleshooting

Fault phenomenon	Cause Analysis	processing method
The platform is not online.	SIM card service suspended due to unpaid bills	Contact your internet service provider to pay your bill.
	SIM card contact problem	Reinstall SIM card
	Incorrect online parameter settings	Refer to the instruction manual for setup.
	SIM card locked	Contact your network operator to unlock your SIM card.
	The device is located in a basement/tunnel/with weak signal.	Leave the area with poor signal
	Replacing the device will cause the device to lock.	Contact your network operator to unlock.
Unable to locate	The equipment is installed indoors/by a window/in a parking lot.	Leave the above areas and go to an open outdoor area.
	Antenna not installed/Antenna face not facing upwards	Adjust antenna placement

Unable to fix the solution	SIM card service suspended due to unpaid bills	Contact your internet service provider to pay your bill.
	SIM card contact problem	Reinstall SIM card
	RTK account settings error	Refer to the instruction manual for setup.
	RTK mount point configuration error	The default mount point uses the WGS84 coordinate system.