ISO9001

S12

High Precision Positioning Terminal Product Manual

April, 2022

Revision History

Ver. NO.	Version	Date
V.1	New	April, 2023

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Catalogue

Lead in

This document indicates the main features of the S12，the terminal product of high precision positioning.

This document aims to indicate the hardware interface, electrical characteristics, mechanical specifications, and other related information of the S12, the terminal product of high precision positioning. With the help of this document, the hardware design guide book and application manual of Simple, can S12 be widely used in the wireless communication, high- precision positioning monitoring of the vehicles, and emergency rescue and other fields.

1. Product Overview

S12， the terminal product of high precision positioning of Simple, can support GPS, BEIDOU,GLONASS,GALILEO and satellite enhancement system SBAS (WAAS, EGNOS, GAGAN, MSAS) in all frequency bands (L1, L2, L5, L6) with the base of the receiver chip of multi-band and multi- system.

- Support Beidou III
- High integration, single chip receiver solution
- With built- in ese/des/sm4 data code/ decoding and encryption engine
- Adopt the differential technology with the satellite-based, achieve the precision of centimeter
- Multi- system satellite positioning

Data communication

Support 4G full network, access to CORS network to obtain differential data and return the data to server, to ensure bidirectional communication between vehicle terminal and server.

Strong installation adaptability (Easy to install)

There is no special requirement for the installation angle of the product, and the ideal positioning effect can be achieved by just keeping it to lie horizontally.

Voltage range of the vehicle

Not recommended for use in a 36V vehicle, the normal using range is 7-28V.

2. Main Performance

2.1 GNSS specifications

Frequency	GPSL11575.42MHz,C/Acode; Beidou(COMPASS/BD2)B11561.098MHz; GLONASSL11602MHz;	
Refresh rate	Default: 2Hz, Max.: 10Hz	
Sensitivity	Tracking	-160dBm
	Re-catching	-156dBm
	Cold start	-147dBm
	Warm start	-153dBm
Convergence Time	RTK	<60s
Positioning time	Warm start	1S
	A-GNSS assist	10S
	Cold start	28S
Horizontal positioning accuracy	self-localization	3m
	Wide Area Differential	2.5m
	RTK	2.5cm+1ppm(V) 1.0cm+1ppm(H)
Velocity measurement accuracy	0.1m/s	
Azimuth accuracy	0.5degrees	
Elevation limitation	>18,000m	
Rate limitation	>515m/s	
Acceleration limitation	>4G	
Output protocol	NMEA0183	115200 bps, 8 data bits, no parity, 1 stop bits (default) 1Hz: GGA, GLL, GSA, GSV, RMC and so on

1. more than 6 available satellites, and the signal strength of all satellites is not less than -130dBm

2. CEP,50%, more than 8 satellites, 24 hours static positioning, the signal strength of all satellites is not less than

-130dBm

3. 50% @ 30 m/s

4. LNA test with good performance for external use

2.2 4G LTE Specifications

Features	Instructions
Supportable frequency band	LTE-FDD: B1/B3/B5/B8 LTE-TDD: B34/B38/B39/B40/B41
Transmitted power	LTE-TDD: Class3(23dBm+1/-3dB) • LTE-FDD: Class3(23dBm±2dB)
USB-powered	VBAT 3.3V ~ 4.3V, typical value 3.8V
LTE Features	Maximally support Non-CA CAT1, supports VOLTE • Supports 1.4 to 20MHz RF bandwidth • LTE-FDD: Max. uplink rate 5Mbps; Max.downlink rate 10Mbps • LTE-TDD: uplink and downlink configuration 2, Max uplink rate of 2Mbps, Max downlink rate of 8Mbps • LTE-TDD: uplink and downlink configuration 1, Max uplink rate of 4Mbps, Max downlink rate of 6Mbps
Network Protocol Features	Have supported TCP/UDP/FTP/HTTP/MQTT/SMS
USIM card interface	Support USIM/SIM card: 1.8V and 3V
USB interface	Compatible with USB 2.0 (support slave mode only), data transfer rate up to 480Mbps using for AT instructions, data transfer, software debugging, software upgrade • USB virtual serial port driver: Support USB driver under Windows 7/8.1/10, Linux 2.6.x/3.x/4.1, Android 4.x/5.x/6.x/7.x and other operating systems

3. Electrical parameters

3.1 Electrical maximum

Parameters	Symbols	Minimum value	Maximum	Units
Vehicle power supply voltage (VCC)	Vcc	7V	28	V
IO voltage	VTTL	-0.5	1.8	V
Maximum acceptable ESD level (contact)	VESD(HBM)		2000	V
Storage temperature		- 40	+ 85	℃

3.2 Working Conditions

Parameters	Symbols	Minimum value	Typical value	Maximum value	unit
Vehicle power supply voltage (VCC)	Vcc	4.5 V	12 - 24	28	V
Peak phase average current	Ipeak			2	A
Operating temperature		- 30	25	+80	℃
Humidness				95	%

4. Interface and transmission

The S12, high precision positioning terminal, can transmit high precision positioning data by the following modes:

1. Network transmission, the default transmission protocol of the terminal is JT808 standard protocol to upload location data to the user platform.

Interface descriptions of this terminal as below:

Interface Description	Interface location	Interface function	Description
POWER	red	Positive	Connect to the positive of the battery
	black	Negative	Connect the negative of the battery
USB/TTL/RS232Interface (3 choose 1)	DP+/TX	TYPC-C USB interface/serial port to send	Supports win7 and above systems
	DM-/RX	TYPC-C USB interface/serial port to receive	Supports win7 and above systems

5. Units of the Product

Name	Specifications	Quantity

S12 high precision positioning terminal		1
Warranty Card		1
Certificate of Conformity		1
Aviation head power cord		1

6. Precautions

1. Do not operate with power on/connected.
2. Insert the SIM card correctly.
3. The dynamic vehicle test required to fix the device (if the terminal is equipped with IMU inertial navigation function, please install and operate according to the instructions on the terminal IMU label).
4. The module is electrostatic sensitive product. The RF circuit on the module contains electrostatic sensitive components, please pay attention to do ESD protection during welding, installation, and transportation. Do not touch the module pins directly, otherwise the module may be damaged.

ESD CAUTION

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