simple®

S8L

High Precision Positioning Terminal Product Manual

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Revision History

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V.1	New	April, 2023

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Catalogue

Lead in

This document indicates the main features of the S8L，which is the terminal product of high precision with all frequency band and all satellites positioning and orientation function.

This document aims to indicate the hardware interface, electrical characteristics, mechanical specifications, and other related information of the S8L,the high precision positioning terminal. With the help of this document, the hardware design guide book and application manual of Simple, hope can our dear customers quickly apply the S8L high precision positioning terminal to the field of wireless communication.

1. Product Overview

S8L, the high-precision positioning terminal adopts the intelligent integration positioning solution of BDS, GPS and GLONASS, and adopts the Beidou differential positioning and IMU integrated positioning technology to ensure the accuracy under various comprehensive road conditions.Integrate the high-dynamic and high-gain GNSS antenna technology,that under the no odometer signal,no speed pulse signal,no limiting the installation direction condition,it can achieve real-time, high-precision,and three-dimensional positioning, three-dimensional velocity measurement, three-dimensional attitude measurement, and proceed with differential positioning calculating and IMU technology positioning. It can effectively locate in areas with weak or no satellite signals such as urban business districts, jungles, under viaduct, tunnels, underground parking lots, airports, etc., even can provide high positioning of accurate and available for vehicle users.

- all frequency band and all satellites positioning
- centimeter-level positioning accuracy
- 4G_CAT1 wireless communication
- high-performance IMU
- Strong installation adaptability
- with 2000mah battery built-in, support fast charging(optional)

All frequency band and all satellites positioning

S8L high-precision positioning terminal adopts the intelligent integration positioning and orientation solution of BDS/GPS/GLONASS all-constellation and all-band RTK satellites.

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. Background data management.

High performance IMU

S8L, high precision positioning terminal with built-in high performance IMU, provides customers with IMU original data, as the algorithm basis.

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. The adaptive algorithm can automatically identify

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and filter the installation error angle.

Large capacity battery, supporting fast charging (optional)

The product can be loaded with large capacity rechargeable lithium battery, and support large current fast charging. With this configuration, no external power supply is required.

2. Main Performance

Basic information		
Name	Function description	Specifications
Satellites	all satellites	BDS/GPS/GLONASS/Galileo/QZSS
Signals	main antenna	GPS: L1C/A, L2C, L2P*,L5
		BDS-2: B1I, B2I, B3I
		BDS-3: B1I, B3I, B2I
		GLONASS: G1, G2
		Galileo: E1, E5a,E5b
		QZSS: L1C/A, L2,L5
	secondary antenna	GPS: L1C/A, L2C, L2P*
		BDS-2: B1I,B2I, B3I
		BDS-3: B1I, B3I, B2I
		GLONASS: G1, G2
		Galileo: E1, E5b

		QZSS: L1C/A, L2C
SIM card	cell phone card or data card	NANO small card
LTE communication frequency band	4G full Network	LTE-FDD: B1/B3/B5/B8
		LTE-TDD: B34/B38/B39/B40/B41
Network Protocol	TCP/UDP/FTP/HTTP/HTTPS/MQTT/SMS	
Performance Index		
First positioning time	cold start	< 30s
	hot start (using RTC)	< 1s
Measurement accuracy	pseudo-range accuracy	≤ 10cm
	carrier phase accuracy	≤ 1mm
Precision	timing accuracy	20ns
	orientation accuracy	0.1 degrees /1m baseline
	positioning accuracy of single-point positioning	horizontal :1.5m; vertical :2.5m
	DGPS	horizontal: 0.4m +1 ppm; vertical: 0.8m +1 ppm
	RTK	horizontal: 0.8cm + 1ppm; vertical: 1.5cm +1 ppm
	speed measurement accuracy	≤ 0.03 m/s (PDOP ≤4)
Data rate		positioning, orientating 20Hz
		20Hz original observed value
LTE transmitting power	• LTE-TDD: class 3 (23dBm+1/-3dB) • LTE-FDD: class 3 (23dBm±2dB)	

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LTE features	• non-CA CAT1 is maximally supported • Support VOLTE and 1.4 to 20MHz RF bandwidth • LTE-FDD: maximum uplink rate 5Mbps , maximum downlink rate 10Mbps • LTE-TDD: uplink and downlink configuration 2, maximum uplink rate 2Mbps, maximum downlink rate 8Mbps • LTE-TDD: uplink and downlink configuration 1, maximum uplink rate 4Mbps, maximum downlink rate 6Mbps
Differential data	RTCM 3. X
Serial data format	115200BPS, 8-N-1, NMEA-0183 standard output /1HZ

Environmental Index		
Operating temperature		-35°C～+70°C
Limit operating temperature		-40°C～+85°C
Humidity		95% non-condensation

Physical characteristics		
Size		110 * 66 * 33.3 mm

3. Electrical parameters

3.1 Electrical maximum

Parameters	Symbols	Minimum value	Maximum value	Units
Battery supply voltage	VBAT	3.3	4.2	V
Charging port voltage	Vcc	5.0	5.5	V
Vehicle power supply voltage (VCC)	Vcc	9	28	V

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IO voltage	VTTL	-0.5	3.6	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	Units
Battery supply voltage	VBAT	3.3	3.7	4.2	V
Charging voltage	Vcc	4.5	5.0	5.5	V
Vcc peak current	Ipeak			3	A
Vehicle power supply voltage (VCC)	Vcc	9V	12/24	28	V
Vcc peak current	Ipeak			3	A
Operating temperature		- 30	25	+ 80	℃
Humidity				95	%

4. Dimensions

Argument	Minimum value	Typical value	Maximum value	Units
Shell length		110		mm
Housing width	-	66	-	mm
Housing height	-	33.3	-	mm
Exposed cable length (customizable)		Customizable		m
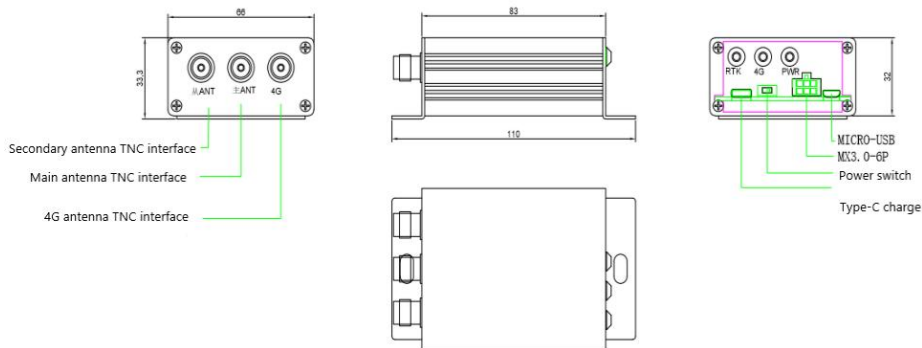
ANT1: main antenna interface;

ANT2: secondary antenna interface;

4G: 4G antenna interface

RTK: RTK status indicated light;

4G: 4G communication status indicated light;

PWR: power status and charging indicated light

MX3.0-6P power supply and data output interface

5. Interface and transmission

S8L,high-precision positioning terminal, provides many kinds of peripheral interface and transmission mode, the interfaces including vehicle mode power interface, Type-C interface, MICRO-USB interface, power switch.

S8L, high precision positioning terminal, can use the following modes to transmit high precision positioning data.

1. For network transmission, the default transmission protocol of the terminal is JT808 standard protocol or TCP private protocol
2. MICRO-USB interface, test port, not for user use;
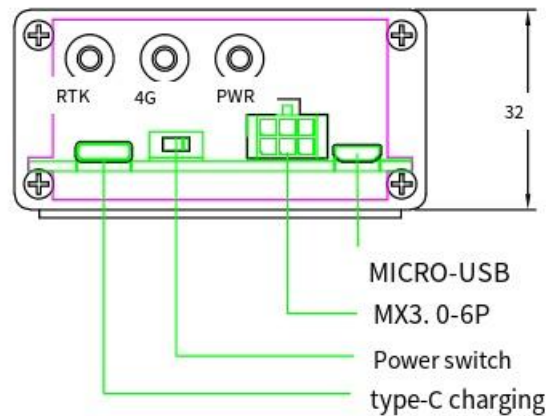3. MX3.0-6P interface, high-precision positioning data is outputted from vehicle interface

Figure 4-1 S8L high-precision positioning interface diagram

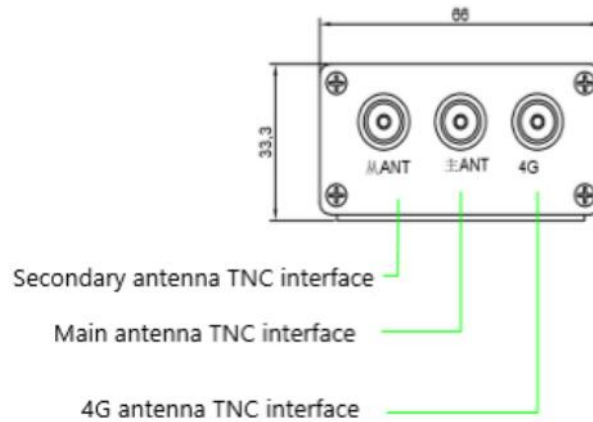| Interface description	Interface location	Interface function	Description
LED status indicated light	LED- Yellow	4G network status indicated light	Network found: flash once every 5 seconds. Network not connected: quick flash twice every 1 second
	LED-Green	GNSS positioning indicated light	Single-point positioning: flash once every 5 seconds RTK positioning: quick flash twice every 1 second Unpositioned: light keeping on or off
	LED- Red	Charge indicated light	Charging: keeping on; Low charge: quick flash twice every 1 second; Regular electricity: flash once every 5 seconds
			Charging completed: keeping on
MX3.0-6 p	upper Left	* External power input positive	connect to the positive of the vehicle power
	lower left	*ACC input end	connect car ACC
	Upper middle	GND	Connect ground wire
	lower middle	*NC	Reserved for digital input or output
	upper right	RS232-RXD	Serial port input/or USB_DM, select 1
	lower right	RS232-TXD	Serial output/or USB_DP, select 1
Power switch	On/off	Power on/off control	Left: Power off right: power on
MICRO-USB	MICRO-USB	Debugging port	Used for AT instruction, data transmission, software debugging, software upgrade
Type-C	Type-C	Charged port	Fast charging input,5V DC
* mean optional			

Figure 4-2 interface of the terminal antenna S8L high-precision positioning

Interface description	Interface location	Interface function	Description
LTE ANT	LTE ANT	External 4G antenna	External 4G antenna, TNC interface
Main antenna	Main ANT	External GNSS antenna	External GNSS antenna, TNC interface
Secondary antenna	seconary ANT	External GNSS antenna	External GNSS antenna, TNC interface

6. Model Description

S8L, high-precision positioning terminal, is divided into several types, according to different performance. the specific description shown as below:

Main Model	Types and instructions
S8L	B type: Built-in battery type
	Without battery type: vehicles supply power type

7. Units of the product

Names	Specifications	Quantity
S8L High precision positioning terminal		1
GNSS antenna		2
4G antenna		1

8. Precautions

 1. Do not operate with power on/connected.

 2. Insert the SIM card correctly, with the SIM card core downward and the notch inward.

 3. The dynamic vehicle test required to fix the device (horizontally).

 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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