E108-GN02S-TB User Manual

Test Kit for GK9501 Positioning Module



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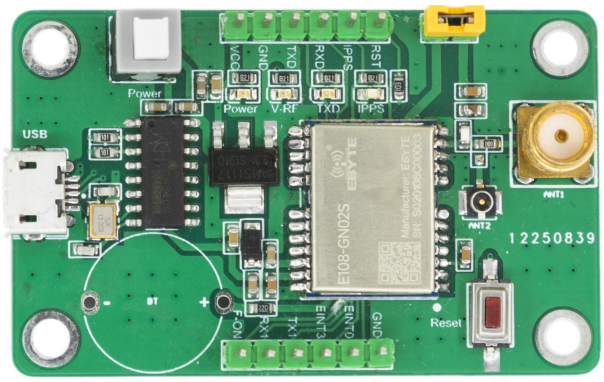
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1.Overview

1.1 Introduction



E108-GN02S-TB is a GPS positioning test kit based on E108-GN02S, which can greatly reduce the user's development cycle and supports BDS / GPS / GLONASS / GALILEO / QZSS / SBAS. For more information about E108-GN02S, please visit the official website to download related materials: http://www.ebyte.com/en/

1.2 Features:

- Support BDS / GPS / GLONASS / GALILEO / QZSS / SBAS multi-system joint positioning and single-system independent positioning;
- D-GNSS differential positioning, A-GNSS assisted positioning, ephemeris prediction, DR integrated navigation application, the fastest data update rate of 10Hz;
- 32-bit application processor with a maximum frequency of 133MHz, supporting dynamic frequency adjustment;
- Support PPS output;
- Built-in reset controller;
- Support UART, SPI, I2C, GPIO;
- RTC: Support 32.768 KHz ± 20 ppm crystal oscillator, 1.1V RTC clock output, support external signal wake-up;
- Output format: Support NMEA0183 V4.1 and previous versions, the maximum fixed update frequency can reach 10Hz;
- High sensitivity: capture cold start -149dBm, hot start -162dBm, tracking -166dBm;
- Ultra-low power consumption: capture 30mA, track 20mA ;

1.3 Applications

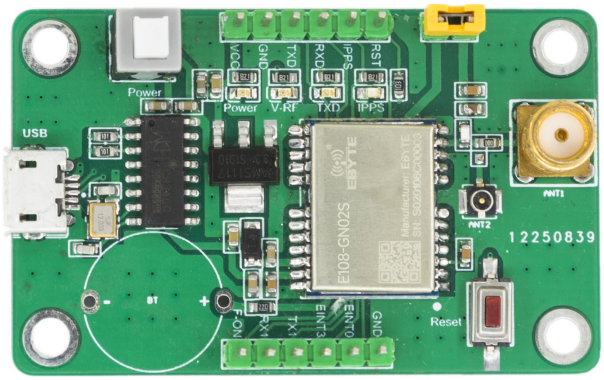
- Vehicle positioning and navigation equipment;
- Wearable devices, such as GPS trackers, etc .;
- UAV positioning, industrial computers, etc .;
- Industrial equipment that requires GNSS positioning or navigation.

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2.0 Quick Start

This chapter is based on testing of E108-GN02S.



1. First, the user needs to connect the GPS antenna, connect the computer with a USB cable, and then press the switch button to turn on.
2. The user needs to short-circuit the RF_POWER two pins of the active antenna with jumpers.
3. User can open the serial port assistant to view the data sent by the serial port, or you can use our naviTrack to view.



When the baud rate is set to 9600 bps, the data will always be reported after closing the serial port. The common output format is as follows:

GGA: time, location, number of satellites;

GSA: GPS receiver operation mode, satellite used for positioning, DOP value, positioning status;

GSV: visible GPS satellite information, elevation angle, azimuth angle, signal-to-noise ratio;

RMC: time, date, position, speed;

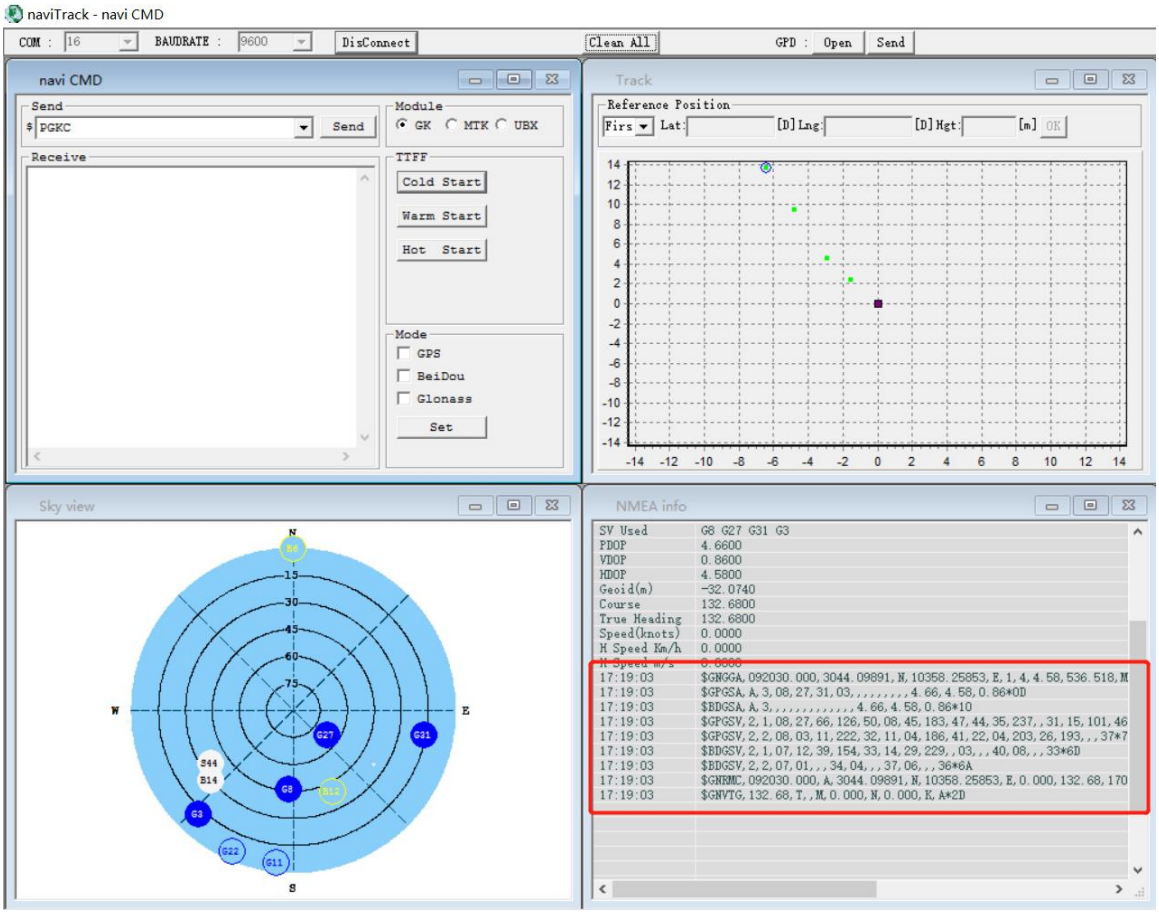
VTG: ground speed information;

For detailed meaning, please refer to the third section NMEA0183 protocol;

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For ease of use, we recommend using the dedicated tool TaviTrack for debugging. For details, see the "naviTrack User Manual".



1. Run naviTrack as administrator, run the above page;
2. Select the corresponding com port and click connect. After the connection is successful, you can see the reported data in the NMEA window.
3. For the detailed meaning, please refer to the description in the third section NMEA0183 protocol;
4. After successful positioning, you can get the latitude and longitude information in the $ GPRMC field reported by the serial port. For more detailed tool usage information, please refer to the manual in the toolkit.
5. Notice: Please refer to the corresponding user manual for the detailed software guide and software functions of the E108-GN02S module.

3.0 Parameters

3.1 GPS Parameters

Category	Index item	Typical value	Unit
	Cold start	27.5	S

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Positioning time (test condition 1)	Hot Start	＜1	S
	Recapture	＜1	S
	A-GNSS	＜10	S
Sensitivity (Test Condition 2)	Cold start	-148	dBm
	Hot Start	-162	dBm
	Recapture	-164	dBm
	track	-166	dBm
Accuracy (Test Condition 3)	Horizontal positioning accuracy	2.5	m
	High positioning accuracy	3.5	m
	Speed positioning accuracy	0.1	m/s
	Timing accuracy	30	ns
Power consumption (test condition 4)	Capture current	30	mA
	Tracking current	20	mA
Operating temperature	--	-35℃--85℃	--
storage temperature	--	-55℃--100℃	--
humidity	--	5%--95%RH (No condensation)	--

Note: The above result is GPS / Beidou dual mode working mode

[Test Condition 1]: The number of receiving satellites is greater than 6, the signal strength of all satellites is -130dBm, the average value is measured 10 times, and the positioning error is within 10 meters.

[Test condition 2]: Received signal strength value under the condition that the external LNA noise coefficient is 0.8, the number of receiving satellites is greater than 6, and it is locked within five minutes or without loss of lock

[Test Condition 3]: Open and unobstructed environment, continuous 24 hours startup test, 50% CEP.

[Test Condition 4]: The number of receiving satellites is greater than 6, and the signal strength of all satellites is -130dBm.

3.2 Basic Parameters

Category	Description
letter of agreement	Support NMEA0183 V4.1 and previous versions, the maximum fixed update frequency can reach 10Hz
Supported positioning system	BDS / GPS / GLONASS / GALILEO / QZSS / SBAS
Support peripheral interface	UART (TXD / RXD) or GPIO
Low power consumption	support
Ultra low power consumption	support
Periodic low power consumption	support
Direct low power consumption	support
Parameter setting software	support

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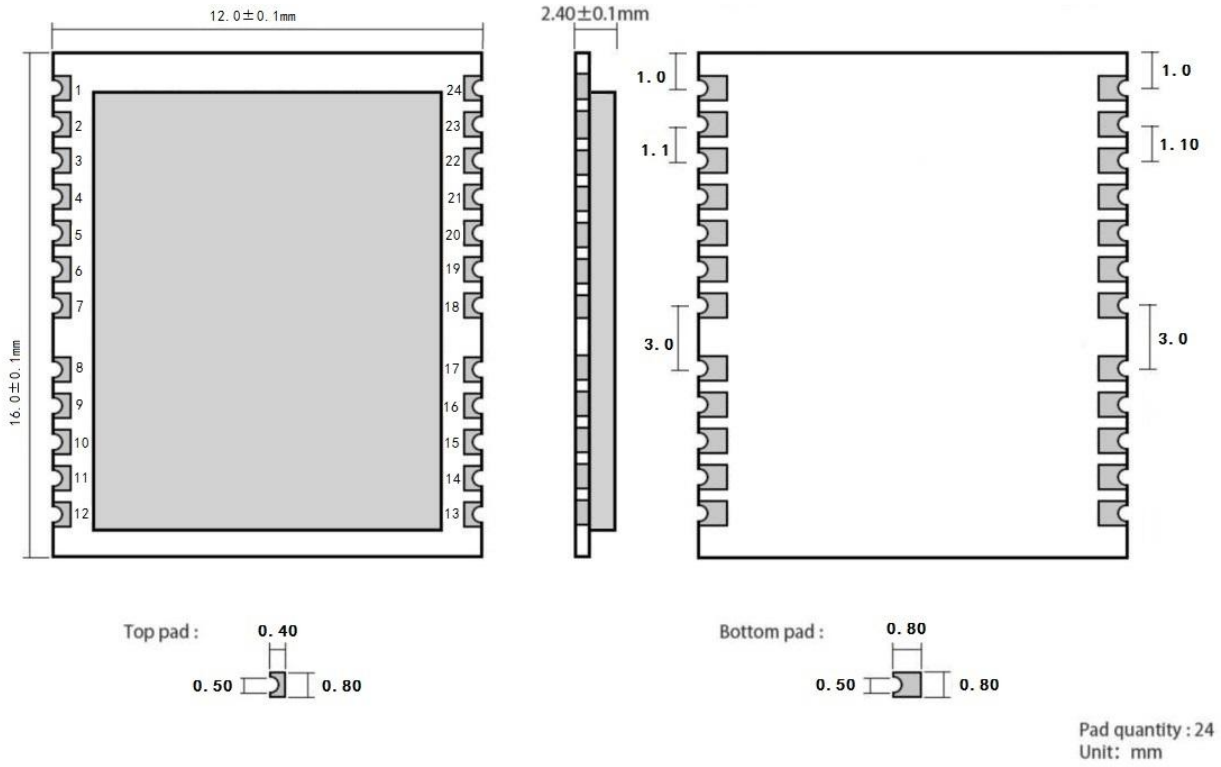
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Certification	Pending	
Module size	53 * 33 * 13.5mm (L * W * H)	
Package interface	Half hole (SMT surface mount)	
power supply	VCC	5.0V
Serial port	Communication level	2.8V
	Baud rate (bps)	9600 (default), 115200 (customizable)
	Data bit	8bit
	Stop bit	1
	Check Digit	None

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4.0Mechanical dimension drawing and label definition



Pin number	Pin Name	Pin description
1	NC	Reserved pin
2	NC	Reserved pin
3	1PPS	Positioning indicator, square wave will be output after successful positioning
4	EINT3	External interrupt 3, default: pull-down, 8 mA drive current
5	FORCE_ON	Sleep wake-up pin, pulled high when the module enters ultra-low power consumption
6	EINT0	This pin exits the ultra-low power mode (this pin
7	NC	Voltage is 1.1V, if the control pin level is not 1.1V, need
8	RSTN	Partial pressure processing)
9	VCC_RF	External interrupt 0, default: pull-down, 8 mA drive current
10	GND	Reserved pin
11	RF_IN	The reset pin is pulled high by default and reset by pulling low.
12	GND	RF power output, used to power the active antenna (this RF
13	GND	The output power supply voltage is equal to VCC)
14	NC	Module ground
15	NC	RF input
16	RSTN	Module ground
17	EINT1	Module ground
18	TX1	Reserved pin

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19	RX1	Reserved pin
20	TXD	The reset pin is pulled high by default and reset by pulling low.
21	RXD	External interrupt 1, default: pull-down, 8 mA drive current
22	VBKP	UART1 output (reserved, 2.8V level)
23	VCC	UART1 input (reserved, 2.8V level)
24	GND	UART output (AT port, 2.8V level)

5.0 Working Mode

1. For the command format, Please refer to "GK9501 Input and Output Format"
2. For AGPS setting, please refer to "Goke AGPS User Manual".

6.0 Related models

Product model	model Chip	Support satellite	Package form	Product size	mm communication interface
E108-GN02S	GK9501	BDS/GPS/GLONASS/GALILEO/QZSS/SBAS	SMD	16*12*2.4	UART/GPIO

About us

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