ROHS，TS16949，ISO9001

CNT836A

Dual-mode integrated navigation module instruction manual

July，2023

Revision History

Version NO.	Version	Date
V.1	New	July, 2023

Disclaimer

This document only indicates the information of the products of Shenzhen Simple Technology Electronics Co., LTD without any transfer purposes, including has no transfer any patent, trademark, Copyright or ownership right or any rights or licenses under Company or any third party by implication, estoppel or other ways. We (Shenzhen Simple Technology Electronics Co., LTD) accepts no liability other than those stated in the terms and conditions of Sale of its products. Furthermore, regarding the sale and use of its products, Simple makes no any kinds of express or implied warranties including fitness for a particular purpose, marketability or liability for infringement of any patent, copyright or other intellectual property rights. If the connection or operation is not in accordance with the manual requirements, the company is exempt from liability. Simple perhaps make modifications to product specifications and descriptions at any time without prior notice. The products of our company may contain certain design defects or errors, which will be included in the corrigendum upon discovery, and may result in differences between the product and the published specifications. An updated erratum is available upon request.

Catalogue

1.Function Description

1.1 Overview

CNT836A module launched by Shenzhen Simple Technology Electronics Co., LTD is an Integrated navigation module supporting the combination use of BDS/GPS Dual Satellite systems navigation and positioning+MEMS inertial navigation. This module can provide the automobile with continuous, no blind spot, high quality, high performance, high anti-interference, low power positioning and navigation solution with its integration of the vehicle gauge SOC base band + emitter
Frequency integrated chip, MEMS device. The module size can meet module volume reduction requirements of the design of positioning terminal products with its size of 16.6mm x 12.2mm x 2.6mm, and the production can fit the IATF1694 standards, the reliability testing in accordance with ISO 16750. And also meet the rapid pick and place requirement in the production of positioning terminal products with its 24pin stamp hole encapsulated.

CNT836A integrated internal power management function with built-in SAW+LNA.

1.2 Products Characteristics

√ 24pin stamp hole encapsulated，size/dimention 16.6mm x 12.2mm x 2.6mm
√ support BDS B1/GPS L1frequency point
√ support inertial integrated navigation
√ support the input of the vehicle speed information, ADR and UDR
√ match with map information
√ support the output of Sensor original data
√ provide a backup power input interface, support hot startup
√ Support external reset
√ highest average power consumption 50mA@3.3V
√ wide voltage input range, 2.8~ 3.6V
√ high positioning accuracy, continuous positioning without blindness
√ high integration, and simple peripheral application circuit
√ the production process complies with IATF 16949
√ module reliability tests in accordance with ISO 16750

1.3 Performance Index

Table 1-1 Performance Index of the CNT836A

Parameters	Description	Performance Index			
		Min.	Recommended (Typical)	Max.	Unit
First positioning time (TTFF)	Cold start		28		s
	A-GNSS		8		s
	Hot start		2		s
Sensibility	Capture		-147		dBm
	Track		-163		dBm
Accuracy of positioning	Horizontal		3		m
	Altitude		5		m
Accuracy of posture	Course angle		＜0.3		°
	Angle of pitch		＜1.5		°
	Roll angle		＜1.5		°
Speed measurement precision			0.2		m/s
Location update rate			1	10	Hz
MEMS update frequency			20		Hz
Standing-wave ratio			1.5		
ADR positioning deviation	Gyroscope+accelerometer +speed pulse		2% distance		m
UDR positioning deviation	Gyroscope+accelerometer		5% distance		m
Average Power consumption			40		mA
Temperature	Work	-40		85	℃
	Store	-40		85	℃

Note 1: unobstructed open sky, static test.

Note 2: The number of GPS and BDS satellites is greater than 8 when using the GNSS signal simulator conduction mode test.

Note 3: Calculated as deviation distance/traveled mileage during no GNSS signal. GNSS signal free time <30 min (MEMS+ no GPS signal)

Note 4: Calculated as the departure distance of the end point/traveled mileage during no GNSS signal. No GNSS signal time <30 minutes
(MEMS, no GPS signal)

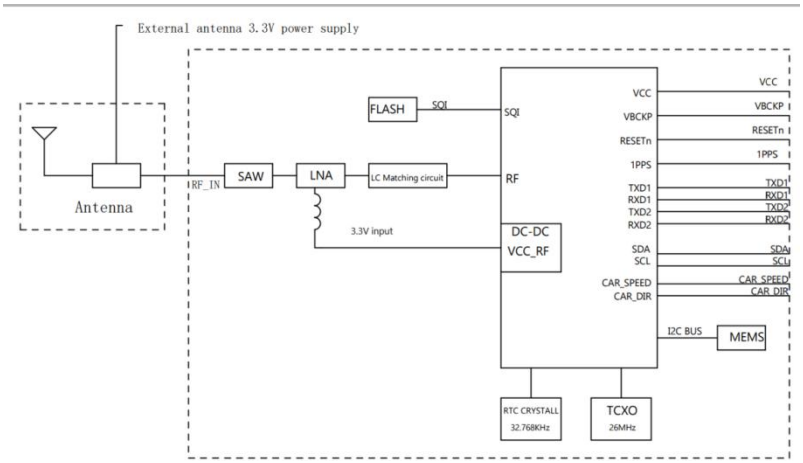
Note 5: MEMS device performance is severely affected by temperature variations, and the navigation performance will deteriorate when the temperature changes drastically. But it can be recovered once the temperature is stable.

1.4 Application Field

- Vehicle navigation

1.5 Function Block Diagram and Typical Application

1.5.1 Function Block Diagram

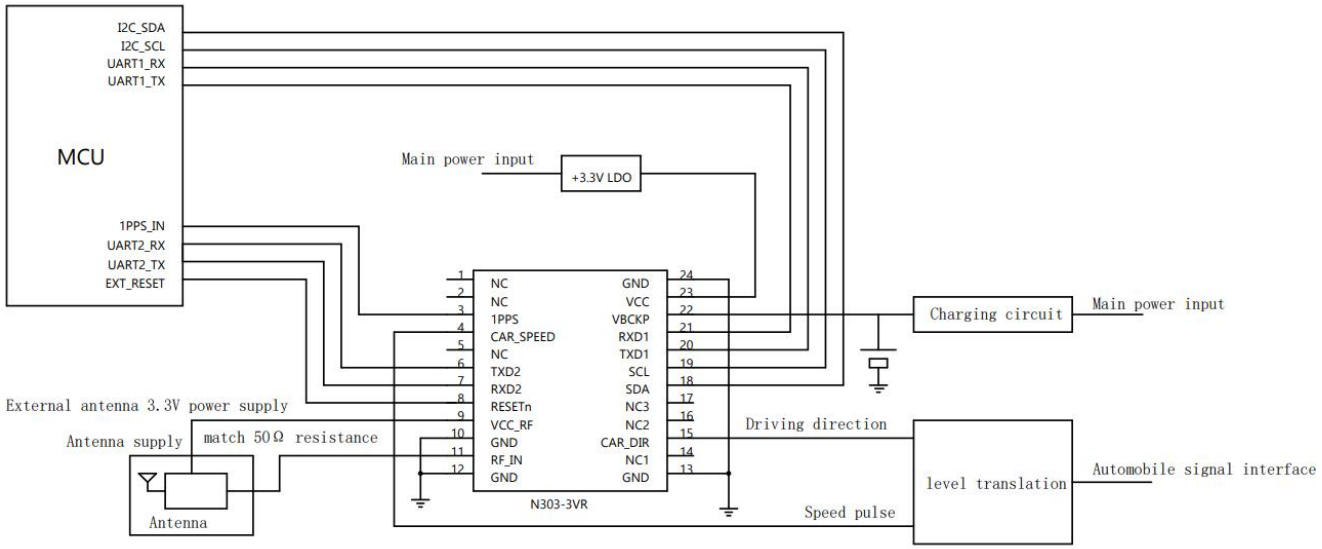


Drawing 1-1 Function Block Diagram

The module uses integrated navigation technology to fuse GNSS and MEMS navigation information to provide continuous and more reliable and stable positioning and navigation services.
The module integrates the GNSS chip and the MEMS chip, where the GNSS chip receives the satellite signal through the antenna to solve the position and velocity information, and MEMS chip built-in 3-axis -accelerometer and 3-axis-gyroscope, through the sense the motion change of the carrier the output of the acceleration and angular velocity.

The MEMS original data is transmitted through the I2C communication interface to GNSS chip, GNSS chip built-in processor fuse satellite navigation data and MEMS inertial navigation data, to derive the position, speed and posture of the vehicle carrier (roll Angle, course Angle and pitch Angle). The module combines the advantages of both satellite navigation and inertial navigation, compareing with the traditional satellite navigation module, it can provide continuous and reliable positioning for the vehicle carrier even in the environment of multipath, weak signal or no signal environment.

1.5.2 Typical Application



Drawing 1-2 Typical Application

2. Module Interface Instruction

2.1 Hardware Interface

2.1.1 Power Supply

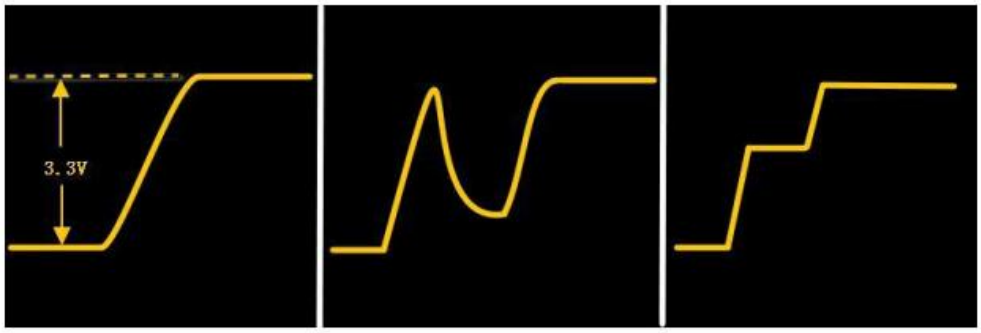
The module has two power input pins (VCC and VBCKP) and one power output pin (VCC_RF). VCC is the main power supply of the module. VBCKP is the backup input power for the module,which will supply the power when the VCC supplies power to the RTC circuit is off, to ensure the critical satellite information would not lose. The hot start function depends on the uninterrupted power supply of VBCKP. If the hot start function is required, an external rechargeable battery or large capacity

capacitor can be connected. If the hot start function is not required, grounding is recommended. To ensure the normal operation of the backup circuit, external preparations power supply VBCKP Charging circuit must be designed. VCC_RF output +3.3V voltage, maximum output current of 25 mA, can be used for external active antenna power supply.

VCC has certain requirements for the power-on waveform, which requires the power-on waveform to rise monotonously. The following situations need to be avoided:

1) The duration of the rise from 0 to 3.3V is more than 10mS;
2) Power on steps that exceed 1mS (keep the voltage above 1mS unchanged during the voltage on the ascent);
3) There is more than 100mV back hook while he voltage is between 0.6 and 2.0V;
4) Sustained ripple over 50mV.

If the preceding situation is unavoidable, you can reset the module though the pin pairs externally after the power-on is stable. Procedure See Resetting Interface RESETn



correct **wrong** **wrong**

It is recommended to choose a separate enable LDO to power the module VCC until the whole machine is working. After the electrical stability, the GPIO of the host computer's main control chip is used to control the LDO enabled and turn on the VCC power supply. When the positioning navigation function is not needed, the LDO is turned off using GPIO to save power.

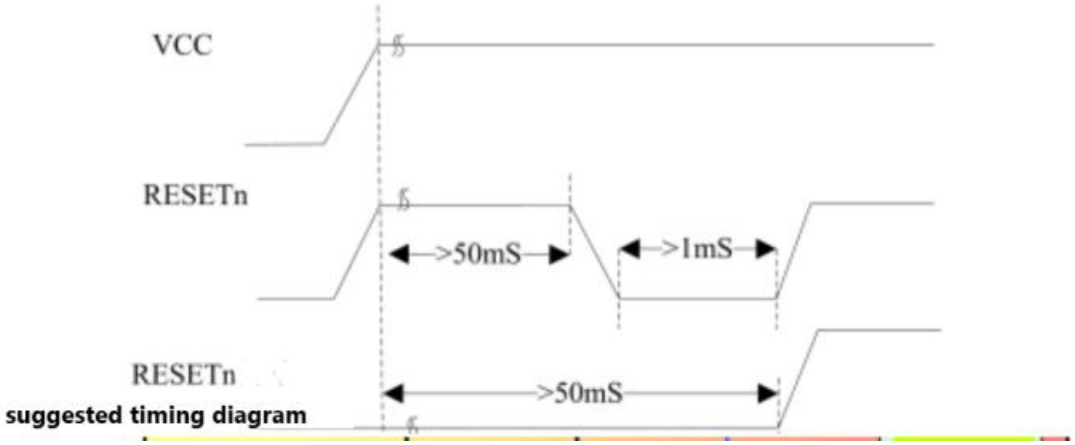
It is not recommended that the navigation module and other high-power digital/analog circuits share the same LDO power supply.

2.1.2 Antenna Interface

The antenna interface (RF_IN pin) of the module can be directly connected to the BD2 B1/GPS L1 dual-mode active antenna. The interface match 50Ω resistance internally, and the PIN9 pin of the module can provide +3.3V for the external antenna supply with a maximum current of 25mA.

2.1.3 Reset Interface

Module supports external RESETn pin reset (active at low level).



Drawing 2-2 Reset signal suggested timing diagram

As shown in Drawing 2-2, it is recommended in order to perform an external reset to ensure that the internal reset circuit of the module is not affected by the abnormal power-on /RESETn waveform, it should be in complex application environments, or when the power-on waveform or reset signal is in hook back, burr, or long step, delay the power-on stability by at least 50mS, lower the reset pin by at least 1mS, and release it for external.

In the preceding scenario, you are advised to ground the backup power supply VBCKP to improve reliability.The startup timing does not depend on the data values stored in the backup power domain, in which case the module will be cold started every time, and all data will be obtained from the real-time satellite signal received and located using the real-time satellite signal. In the case of complex power-on waveforms, you are advised to keep the RESETn low during the power supply to ensure the normal running of the module. Release the RESETN after the power supply becomes stable for more than 50mS. If the preceding requirements cannot be met, you are advised to reset the module externally after powering it on.

The hot start function relies on RESETn pin suspension. When RESETn is used to reset the chip, it will cause the module to start cold/warm instead of hot, and the data stored inside the chip for hot start, including ephemeris data, will be cleared. The hot start also relies on the uninterrupted supply of the VBCKP power supply. When the hot start function needs to be used, ensure that the RESETn is suspended, high level, or placed in a high resistance state, and ensure that the total capacity of the external bypass capacitor of the RESETn must be less than 10nF, otherwise it may enter the cold start. When an external circuit must be used to control the reset signal due to the power supply relationship, it is necessary to set it quickly after starting up,recommended to use A-GNSS auxiliary startup to speed up the positioning process. In this process, the host computer will obtain the latest ephemeris data through the network and transmit it to the positioning module through the serial port, so as to achieve rapid positioning. The A-GNSS function provides the corresponding interface in the driver.

2.1.4 1PPS Signal Interface

The third foot of the module 1PPS is the second pulse signal output.

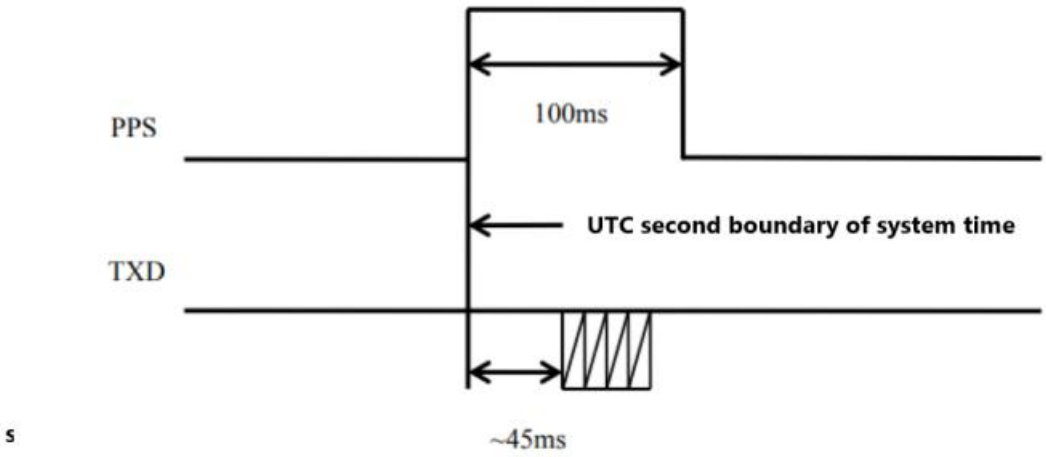


Figure 2-3:1PPS second pulse

The 1PPS second pulse signal is shown in Figs. 2-3. The rising edge aligns the second boundary of UTC time.

The 1PPS second pulse is generally used with the RMC command, which uses GPS and BDS dual system time to display the year, month, day, UTC hour, minute and second data. Here are some things to note in your application:

1. Time needs to be converted to a time zone, because the receiver time zone is not known from UTC, so the RMC output time is not converted to a time zone. Upper-level clients need to do additional time zone conversions to make sure the time is correct.
2. All satellite signals of GNSS system use weekly count to indirectly indicate year and month. The GPS system uses 10bits to represents the number of weeks and will zero when the count value exceeds 10bit. Therefore, the GPS system has the problem of turning weeks every 18.9 years, while the BDS will face the problem of turning weeks after more than 160 years. Therefore, it is recommended for only customers to use GSP + BDS dual mode. When only using GPS, client applications need to set the correct turning value for the module to ensure that the range of output is correct. At the factory, the module is configured by default as the rotation value of the production batch.
3. This module is not intended for professional timing purposes.

4.1 PPS output and positioning output are relatively independent functions. After power on, there is 1 PPS output, not necessarily immediately to achieve positioning. The first positioning time may be advanced or delayed by more than ten seconds. This is a normal phenomenon.

5. If the client needs to know whether the module positioning state is normal, it can also use 1PPS as the hardware heartbeat signal or debugging signal light.

2.1.5 UART Interface

The module design has two groups of UART serial ports, which are serial port 1 (TXD1/RXD1) and serial port 2 (TXD2/RXD2).
The baud rate supported by the module ranges from 4800bps to 115200bps, and the default baud rate is 115200bps. The data format is: start bit 1 bit, data bit 8 bits, stop bit 1 bit, no check bit.
Serial port 2 is a standby serial port, which is used to output data of custom format, and also supports NMEA data and binary protocol data. There is no output by default, and output must be configured by serial port instructions. Serial port 2 is not available for software upgrades.

2.1.6 I2C Interface

The module is designed with a set of I2C interfaces, which are PIN18 (data interface I2C_SDA) and PIN19 of the module
Clock interface I2C_SCL.
The I2C transmission rate supported by the module is 100kbps, 400 kbps, and it supports 7bit address mode.
I2C interface, used to output custom format data, also supports NMEA data and binary protocol data, no output by default, must be configured through the serial port instructions to output.
There is no pull-up resistance inside the I2C of the module, and when used, the pull-up resistance must be added outside.

2.1.7 CAR_SPEED and CAR_DIR Interface

The module supports ADR combined navigation mode and UDR mode. There is no need to provide the vehicle speed signal in UDR mode. In ADR mode, CNT836A allows entering the speed of the vehicle in two ways. One way is that the vehicle speed pulse and driving direction information are input into the internal module through Car_Speed and Car_Dir, respectively. In this way, a square wave pulse on the Car_Speed pin corresponds to a fixed distance of wheel rotation, and the length of wheel travel corresponding to each pulse is called the speed factor.
Another way is to provide the vehicle speed to the CNT836A module through the TD-ESF-MEAS instruction. In this way, the speed is given directly as a four-byte hexadecimal signed value in millimeters per second, and the direction is given as a sign, with positive values indicating the direction of travel.
In both modes, there is a certain delay from the wheel rotation to the internal processing of the vehicle and the bus transmission. The speed provided to CNT836A must ensure a certain real-time performance. The total delay of the speed processing and transmission process is not more than 500mS, and the jitter of the delay is not more than 50mS.
The Car_Speed signal or the TD-ESF-MEAS command can be used via the TD-CFG-ESFWT command. You cannot enter conflicting data in both ways at the same time.
The speed factor can be configured using the TD-CFG-ESFWT command or can also be automatically configured during the installation and calibration phase. And further automatic calibration in subsequent use.

The two pins are the TTL level input. The speed and direction information input from the automobile signal interface must go through the 12V/3.3V level conversion circuit before being input to the module interface.

Note that there is a pull up inside the Car_Speed and Car_Dir signal module, please hang it when not in use, do not pull down or put it in the middle level, otherwise the module will not be properly installed and calibrated because of the wrong input.

2.2 Software Interface protocol

3. Mechanical Characteristics

3.1 Module Dimension

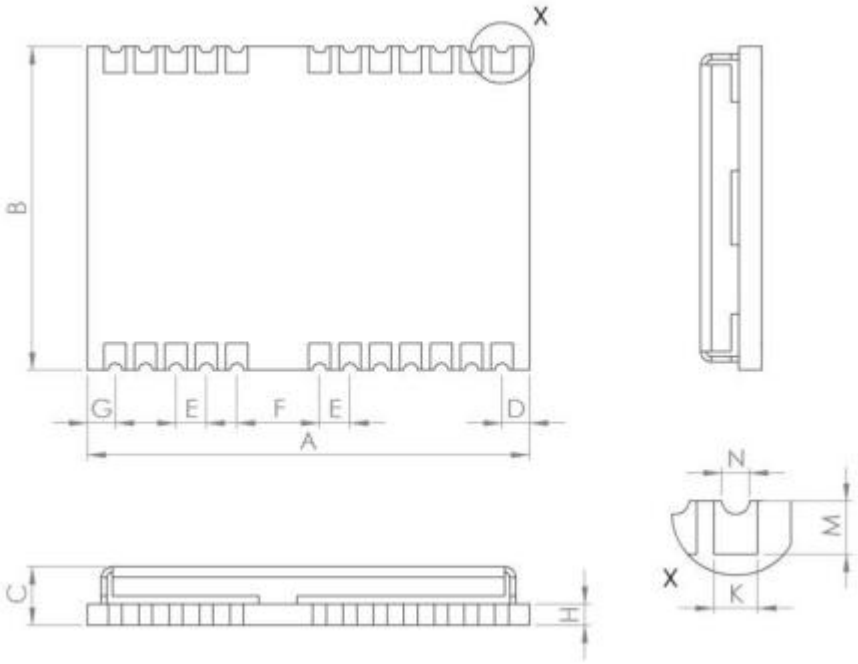


Figure 3-1 Schematic of CNT836A module packing size

Symbol	Min.(mm)	Typ.(mm)	Max.(mm)
A	15.9	16.6	16.8
B	12.1	12.2	12.3
C	2.4	2.6	2.8
D	1.2	1.3	1.4
E	1.0	1.1	1.2
F	2.9	3.0	3.1
G	0.9	1.0	1.3
H	0.9	1.0	1.1
K	0.7	0.8	0.9
M	0.8	0.9	1.0
N	0.4	0.5	0.6

3.2 Pins Description

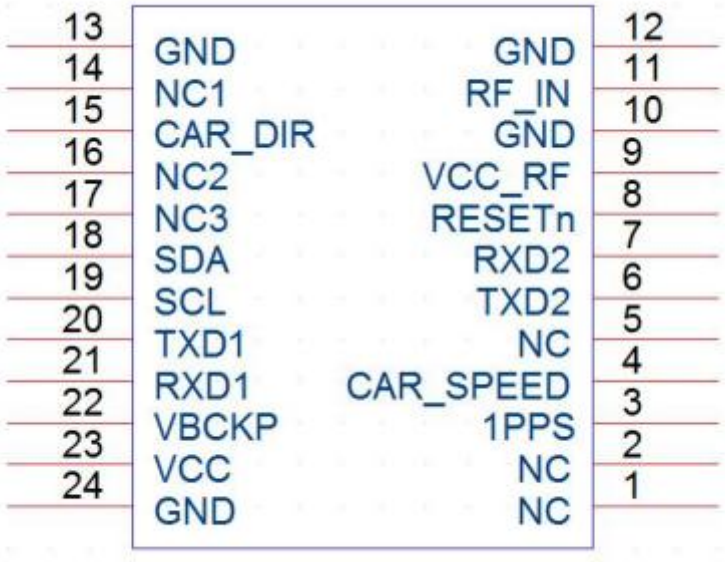


Figure 3-2 CNT836A module pin diagram

Table 3-2 Pin definitions of the CNT836A module

Pin	Signal Name	Direction	Level Standard	Description
1	NC	-	-	reserve
2	NC	-	-	reserve
3	1PPS	O	3.3V	Second pulse output
4	CAR_SPEE D	1	3.3V	vehicle speed input
5	NC	-	-	reserve
6	TXD2	O	3.3V	UART serial port sending
7	RXD2	I	3.3V	UART serial port receiving
8	RESETn	I	-	External reset, low active
9	VCC_RF	O	3.3V	Power the external active antenna
10	GND	-	-	ground
11	RF_IN	I		Antenna input
12	GND	-	-	ground
13	GND	-	-	ground
14	NC	-	-	reserve
15	CAR_DIR	I	3.3V	Forward or backward signal input
16	NC	-	-	reserve
17	NC	-	-	reserve
18	SDA	I/O	3.3V	Serial data cable
19	SCL	I/O	3.3V	Serial clock line
20	TXD1	O	3.3V	UART serial port sending
21	RXD1	I	3.3V	UART serial port receiving

22	VBCKP	I	2.5V-3.6V	Backup power input
23	VCC	I	2.8-3.6V	Main power supply
24	GND	-	-	ground

4. Electrical and Temperature Characteristics

4.1 Module DC Characteristics

4.1.1 Operating Limits

Table 4-1 Extreme working conditions

parameter	symbol	Min.	Max.	Unit
Main power input voltage	VCC	-0.3	4.2	V
Back up the power input voltage	VBCKP	-0.3	4.2	V
IO input voltage	VIO	-0.3	4.2	V
IO pin DC current	Ioh	-	4	mV
VCC_RF pin supply current	ICC_RF	-	25	mV

Note 1: Use beyond the maximum limit value may result in permanent damage to the module.

4.1.2 Recommended Working Condition

Table 4-2 Recommended working condition

parameter	symbol	Min.	Recommended value	Max.	Unit
Main power input voltage	VCC	2.8	3.3	3.6	V
Back up the power input voltage	VBCKP	2.0	3.3	3.6	V
IO input high level	VIH	0.7*VCC	-	VCC	V
IO input low level	VIL	-0.3	-	0.2*VCC	V
IO input high level	VOH	VCC-0.4	-	VCC	V
IO input low level	VOL	0	-	0.4	V

Note: It is not recommended to use the product under recommended working conditions. Prolonged use beyond the recommended working conditions may affect the reliability of the product.

4.2 Humidity Sensitivity Class

This module belongs to MSL3 humidity sensitivity device. Please check the humidity card status immediately after unpacking the vacuum package. If the humidity card discoloration exceeds the standard, it is necessary to bake the module in accordance with the J-STD-033 standard before production. Baking requirements: This module coil packaging can withstand baking temperature not higher than 65 degrees. If unwrapped, the module is placed in a high-temperature tray, which can withstand 125 degrees of baking temperature.

Its workshop life is: Class 3 - less than or equal to 30°C/60% RH 168 hours workshop life. After opening, the humidity card is normal, such as in the non-vacuum packaging 30°C/60% RH workshop environment storage, beyond the workshop storage life, need to refer to J-STD-033 standard, bake the product. Baking standards and methods refer to the treatment method of excessive opening humidity.

4.3 Welding Temperature Curve

The recommended furnace temperature curve of the CNT836A module is shown in Figure 4-1. Among them, the CNT836A module can withstand the maximum temperature of 265℃ 10s as a whole, and can withstand 340±20℃ for no less than 5s during repair.

4.3.1 Preheating Stage

Temperature rise rate: less than 3 ° C /s

Preheating end temperature:

4.3.2 Constant Temperature Stage

Temperature rise rate: (150℃-183℃ range) less than 0.3℃/s
(150℃-183℃ range) less than 0.3℃/s
Constant temperature time: 60-120 seconds
Constant temperature end temperature: 217°C

4.3.3 Melting Tin Stage

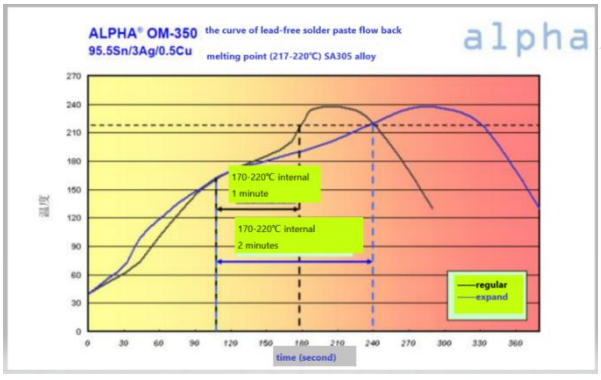
Melting time: 60-75 seconds
Peak temperature: 240°C (+5 °C)

4.3.4 Cooling Stage

Temperature drop rate: not higher than 4°C/s.

4.3.5 Recommended Furnace Temperature Curve

The recommended furnace temperature curve is as follows:



General recommendations for reflux curves （take SAC305 Plus^tm as an example）		
Set internal	Residence time	Expand internal (No damage to PCB and components)
(40-220)℃	<4minutes	<4minutes
(130-220)℃	<2minutes and a half	<3minutes
(170-220)℃	<1minute and a half	<2minutes
>220℃	<(45-90) second	
Peek temperature	<240℃ （ to the OSP surface treatment）	Have no limit to other surface treatments
Chilling speed of welding spot begin to chilling from 170℃	>3-8℃	Recommendation value, in case the break of the welding spot

Figure 4-1 The recommended furnace temperature curve

If the lead welding process is used, it is recommended to use the furnace temperature parameters of the mixed process for production.
For the detailed process requirements of CNT836A module, such as recommended packaging, furnace temperature curve and steel mesh openings, please refer to the document "Application Process Requirements of CNT836A Integrated navigation and positioning Module", pay attention to the steel mesh openings must be set in accordance with the process requirements, and pay special attention to the module cannot be arranged on the secondary back flow surface.

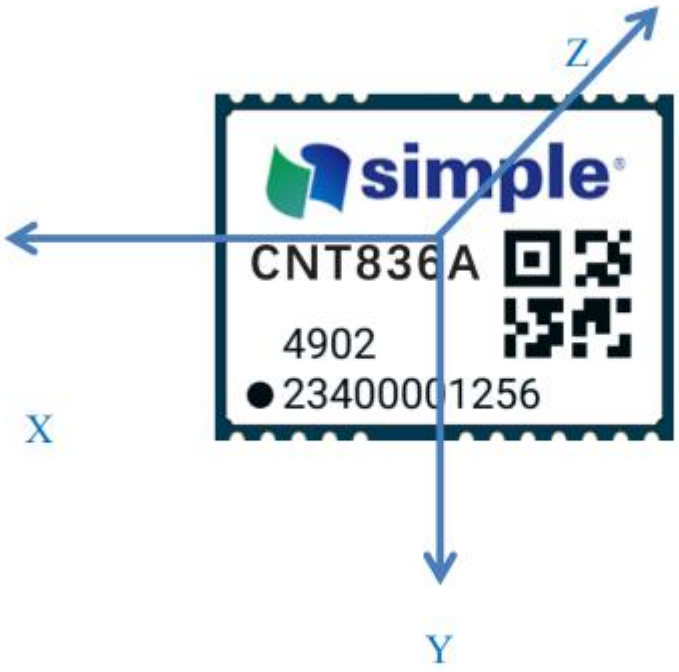
5. Installation and Configuration Process

5.1 Working Mode

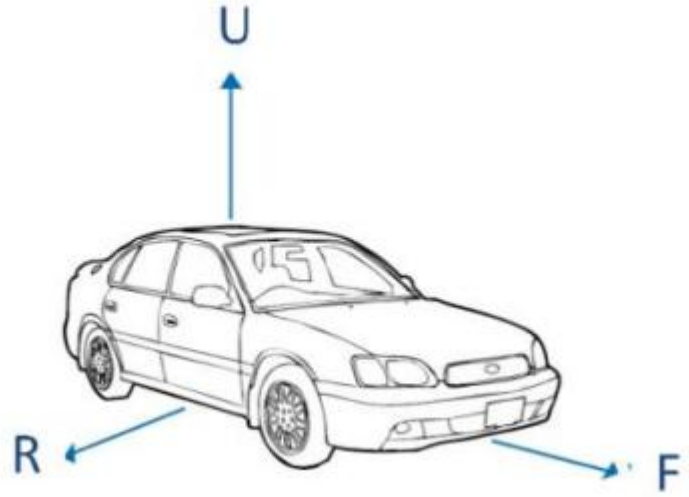
The integrated navigation module uses multi-sensor fusion modes such as GNSS, IMU and vehicle speed to realize positioning and navigation functions. According to different sensor fusion modes, it is divided into two working modes: ADR/UDR. The main difference is that in ADR mode, vehicle speed information can be input. In UDR mode, no speed data or pulses are provided. Carrier type, the carrier type applicable to the integrated navigation module, the current version is only suitable for four-wheeled and above vehicles, not suitable for two-wheeled motorcycles or electric vehicles, aircraft, drones, ships and other carriers.

5.2 Installation Direction and Coordinate System

The best installation position of the module is the position of the vehicle, and the installation is fixed with the rigid connection of the vehicle body. The module coordinate system and vehicle body coordinate system are shown in Figure 5-1 and Figure 5-2



Picture 5-1 Module coordinate system



Picture 5-2 Car Body coordinate system

When the module is installed, the X-axis of the module and the R-axis of the car body are overlaps. The module supports adaptive installation. The Y-axis of the module and the F-axis of the car body are allowed to have a certain installation Angle, and the installation Angle must meet the requirements of -45° < installation Angle < +45°. The module installation Angle can be initialized by command configuration, and the installation Angle self-adaptation is also supported. The self-adaptive installation Angle process is described in Section 5.3. If the configuration mode is written to the installation Angle, the process of adaptive installation Angle is disabled.

5.3 The Process of Adaptive Installation Angle and Vehicle Speed Pulse Scale Factor

Installation: The connection between the module and the body must be firmly rigid, and the module is not allowed to have a relative shake/slide situation relative to the body. The use of loose connections will affect the calibration accuracy of the installation Angle, which will affect the navigation performance.

If the speed pulse scaling factor (speed factor) and mounting Angle are not configured by command, the module will estimate the module installation Angle through the adaptive installation process, and calibrate the installation and speed pulse scaling factor through a certain driving process.

If the mounting Angle and vehicle speed factors are configured by the TD-CFG-ESFALG and TD-CFG-ESFWT instructions, the module will consider this value to be absolutely correct and will not continue to calibrate.

In the process of module adaptive installation, the driver needs to cooperate to meet the following requirements:

1) Module power;

2) The vehicle remains at a horizontal standstill for 30 seconds, this step does not depend on GNSS signals, GNSS positioning can be not positioned;

The following steps need to be carried out in the vehicle movement, during which the module has GPS+BDS positioning, but has not yet entered the integrated navigation mode, positioning depends on satellite signals.

3) The vehicle is driving in the area with good GNSS signal conditions, completing 6 times of acceleration (the speed is maintained at more than 25KM/H), and the speed change per second on the speedometer is more than 2KM/H;

4) The vehicle continues to perform the following maneuvers in areas with good GNSS signal conditions:

5) Linear acceleration and deceleration several times, the speed is maintained at more than 25KM/H;

6) Hold the static state for several times for more than 10s. It's like waiting for a red light. This step only speeds up the installation completion process, and the absence of this step only affects the length of time it takes to complete the calibration.

7) To the left/right for more than 6 to 8 times of 45 degrees or more steering, the speed is maintained at 25KM/H or more.

During the whole calibration process, there are no special requirements, which is convenient for customers to complete the process unconsciously in actual use.

The calibration process of the speed factor can be automatically completed by driving a distance within the speed range of 20~40Km/H on a straight road with good GNSS satellite signal. The precise calibration is automatically repeated during subsequent driving. If the reading speed factor value changes slightly, it may be due to seasonal temperature changes, tire pressure or wear causes causing a change in the calibration value, not a fault.

The TD-ESF-Status statement allows you to observe whether the above two initialization processes are complete.

5.4 Initialization Configuration

If you do not set module parameters, the integrated navigation module uses the factory default configuration information. After powering on the integrated navigation module, no initial configuration is required. For details about how to configure other configuration items.

5.5 Configuration Method of Vehicle Speed and Driving Direction

The module can configure the speed pulse or speed information (received via serial port) through the TD-CFG-ESFWT command, and the ADR uses the speed pulse by default. If the speed pulse mode is selected, the counting mode of relative speed pulse or absolute speed pulse should be configured according to the corresponding field. The module can be configured with speed factor and delay time, and the values of these two parameters will be constantly corrected by the module during driving. The polarity of the vehicle's direction of travel can be configured, with a high level by default representing vehicle forward.

5.6 Ferry and Trailer

In a special scenario, the actual movement of the vehicle may occur, but there is no speed signal. For example, when using a trailer to transport a car, or on a ferry, or because of a broken line, the speed signal is lost. At this time, the motion state of the CNT836A's multiple sensors does not correspond to each other, and when this error exceeds a certain range, the module will recognize this abnormal phenomenon. At this time, the TD-ESF-Status statement can be used to observe the change of the speed factor calibration state. When this situation is eliminated, when the speed signal returns to normal, the speed calibration state will return to normal after a short time. During the entire process, the module continues to locate and navigate, and the performance may be degraded.

5.7 Antenna Position Requirement

The antenna must be installed face up and fixed, and the space must be unobstructed. The elevation Angle between the antenna plane and the horizontal plane must be less than 15° (the best effect is 0°). It is recommended that the linear distance between the antenna center and the module center be no more than 3 meters. The antenna has been installed and the installation Angle has been configured. Do not move the antenna or module. Otherwise, the module performance will be affected. If a movement occurs, you can reconfigure the mounting Angle as described in Section 5.8. Ensure that no strong interference sources exist in the 1548MHz to 1588MHz frequency band in the electromagnetic environment where the antenna is installed.

5.8 Handling of Moving the Installation Position after Installation

Do not move the position of the module and antenna head after adaptive installation, because the performance will be affected (Lever Arm setting will be affected). If the installation position changes, perform the following operations:

Adaptive installation or command to configure the installation Angle after moving the installation position:

After the installation and calibration is complete, remove the test board and reinstall it. You need to send the installation Angle allocation instruction through the serial port again. The command name is TD-CFG-CFG. The hexadecimal value is 54 44 06 09 0D 00 00 01 00 00

00 00 00 00 00 00 00 00 00 00 00 1D C5. It can also be done via TD-ESF-ResetALG. Differ in

TD-ESF-ResetALG does not affect the speed factor value. After the installation Angle configuration is complete, you need to calibrate the module by configuring the installation Angle information or adaptive installation Angle.

5.9 Blind Push after Non-signal Area been Powered on again

The CNT836A supports blind push when the CNT836A is powered off in the no-signal area. This application scenario is mainly to park the car in the garage for a short time or a long time, such as parking the car in the underground garage at night, and driving the car directly from the garage the next day.

In this application scenario, it is necessary to pay attention to the following points:

1) The car is stopped, and ensure that the module is completely stationary before power off.
2) In UDR mode, because there is a certain deviation in distinguishing forward/backward, slow reversing in the basement may cause the deviation to increase.
3) This function depends on the backup power supply, if the backup power supply stops during the parking period, even if the power supply stops instantaneously, it may cause poor blind push effect.
4) Too long parking time will cause the saved satellite data to fail after driving out of the basement, and the GPS signal recovery time is likely to become longer.
5) After driving out of the basement, the GPS signal takes a few seconds to reach the most stable reception state, during which the position accuracy may be slightly decreased.

6. Notes

6.1 Antenna Power Supply

The 9th pin of the module VCC_RF is the power supply pin of the external antenna, which can provide the module with a +3.3V power supply output with a maximum current of 25mA.

6.2 IO Prevention of Backflow Instructions

When the module is in dormant or powered off, if the module RX and RESETn pins are directly input high levels, the backflow current will be caused, and the module may start abnormally. Solution:

(1) Software solution: Before the chip is powered on, set the IO port connected to the pin to a low level or high resistance state;

(2) If the relevant function is not used, the two pins can be suspended;

6.3 Electrostatic Protection

The e RF Circuit on the module contains electrostatic sensitive components. Pay attention to ESD protection during welding, installation, and transportation. Do not touch the module pins with bare hands

6.4 PCB Design Advice

When the product is applied, the connection line sent to the 11th foot RF_IN needs to match 50Ω resistance, the line should not go right angles and sharp angles, try not to replace the signal layer, and the adjacent layer below the connection line is best to have a complete ground plane, the ground on both sides of the RF signal and the following layer play two rows of holes, pay attention to the interference of the RF signal noise in the board. Avoid multiple harmonics on the board near the satellite signal frequency, as shown in Drawing 6-1. At least ensure that the identification area has a complete ground plane corresponding to the area at the next layer.

Avoid routing cables from the module to the antenna under the module or other components. Should follow the principle of shortest, and away from other circuits.

6.5 Reset Interface

To ensure the normal operation of the module, you are advised to wait for the VCC voltage to stabilize for 50ms after powering on the module, and then reset the module. Keep the reset signal low level for more than 1ms.

When using reset, you can only enter the warm start or cold start, and cannot use the hot start.

If the hot start function is required, pleasure that the reset pin is suspended.

6.6 Mudule Software Update

The software version of the module is upgraded through serial port 1 (the upper computer is transmitted and upgraded, and the upper computer system needs to cooperate with the development according to the upgrade interface protocol). During the upgrade, avoid other processes on the host from interrupting the upgrade. Serial port 2 does not support upgrade.

6.7 Positive Direction of the Coordinate System

For the positive direction of the installation coordinate system, see the coordinate system direction indicated on the module label.

6.8 Fall Avoidance

MEMS internal is the use of precision elastic structure to measure the device, module use should avoid falling, avoid strong impact (>4G acceleration shock), to avoid MEMS thus affected

6.9 Moisture Sensitive

The module is a moisture sensitive device, MSL level 3

6.10 Maintenance

The module does not contain maintenance spare parts. Please hand them over to qualified personnel for maintenance. When removing, use an electric soldering iron to heat and remove from the side pins. Do not use hot air heating disassembly to avoid internal component displacement damage.

6.11 Others

1) The ripple of the VCC power supply of the module is controlled within 50mV as far as possible, and avoid interference on the power supply.

2) Please ensure that the baud rate set by the upper computer and the module is consistent.

3) The antenna is recommended to use a dual-mode active antenna with quality assurance, and ensure that the antenna power supply.

4) During module welding, please control the temperature and operation way to avoid module damage.

7. Order Information and Identification Rule

7.1 Order Information

Table 7-1 Order information

Module	Packing			PN
	Form	Qty	Packing Size	
CNT836A		1000	45*40*7cm	Pending to confirm

7.2 Identification Rule

[Line 1] Simple LOGO

[Line 2] Module model and module QR code

[Line 3] Module serial number

Shenzhen Simple Technology Electronics Co., LTD.

Focus on Precise Space-time, Assist in Smart Service Worldwide

Address: 23rd Floor, Xinlikang Building,QianHai
Nanshan District, Shenzhen City,
Guangdong Province

Website: https://xbteek.com