

ComNav Technology

# User Guide

A100 Pro/Lite Smart Antenna



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## Use and Care

The display can withstand the rough treatment that typically occurs in the field. However, the receiver is high-precision electronic equipment and should be treated with reasonable care.

## Warning and Caution

An absence of specific alerts does not mean that there are no safety risks involved. A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

**WARNING-**A Warning alerts you to a potential risk of serious injury to your person and/or damage to the equipment, because of improper operations or wrong settings of the equipment.

**CAUTION-** A Caution alerts you to a possible risk of damage to the equipment and/or data loss.

## Warranty Notice

ComNav Technology does not warranty devices damage because of force majeure (lighting, high voltage or collision).

ComNav Technology does not warranty the disassembled devices.

## Technical Assistance

If you have any question and can't find the answer in this manual, please contact your local dealer from which you purchased the A100 Pro/Lite. Alternatively, request technical support from ComNav Technology Website: [www.ComNav tech.com](http://www.ComNav tech.com) or technical support email: [support@ComNav tech.com](mailto:support@ComNav tech.com). Your feedback about this Guide will help us to improve it with future revisions. Please email your comments to: [support@ComNav tech.com](mailto:support@ComNav tech.com).

# CONTENTS

|                                                          |    |
|----------------------------------------------------------|----|
| 1 Introduction .....                                     | 5  |
| 1.1 Standard features .....                              | 5  |
| 1.2 Receiver connections .....                           | 5  |
| 1.3 A100 Pro/Lite Smart Antenna Parts list .....         | 5  |
| 2 Installing A100 Pro/Lite Smart Antenna .....           | 7  |
| 2.1 System components .....                              | 7  |
| 2.2 Mounting the receiver .....                          | 7  |
| 2.3 Receiver Connection .....                            | 8  |
| 3 Getting started .....                                  | 9  |
| 3.1 LEDS Status Indicators .....                         | 9  |
| 3.2 Configure by A100 Assistant☆ .....                   | 9  |
| 3.3 Check device status .....                            | 15 |
| 3.4 Update .....                                         | 16 |
| 3.5 Configure A100 Pro/Lite by CRU .....                 | 18 |
| Appendix A   TEC 14 Pin arrangement and definition ..... | 23 |

# 1 Introduction

Thanks for choosing the A100 Pro/Lite smart antenna.

The ComNav A100 Pro/Lite smart antenna User Guide is aimed to help you get familiar with the A100 Pro/Lite smart antenna and start your project effectively. We highly recommend you to read this guide before working.

## 1.1 Standard features

A standard ComNav A100 Pro/Lite smart antenna provides the following features:

- 965GNSS tracking channels
- Combined GNSS/Smart Antenna and antenna
- LED status indicator
- The receiver outputs a 1 PPS (pulse per second) strobe signal. This signal enables an external instrument to synchronize its internal time with a time derived from the very accurate GNSS system time.
- Tilt compensation
- Bluetooth and 4G
- Integrated receiving radio with 12.5KHz frequency interval
- SBAS differential correction compatibility
- Advanced QUANTUM™ technology
- DP-Filter Smooth Function, which largely improves the pass to pass accuracy

## 1.2 Receiver connections

The following figure shows the connector ports on A100 Pro/Lite Smart Antenna:

The connectors can do the following:

- Accept power
- Accept RTCM and CMR inputs
- Output RTCM, and NMEA-0183、NMEA-2000 messages
- Output 1 PPS signals
- Provide support for the J1939 (CAN) serial bus

For more information about the inputs, outputs, and LED indicators, see the information in the rest of this section.

## 1.3 A100 Pro/Lite Smart Antenna Parts list

This section provides overall ComNav A100 Pro/Lite Smart Antenna parts list.

| Items                         | Picture                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------|
| 1*A100 Pro/Lite Smart Antenna |   |
| 1*A100 Pro/Lite Power cable   |   |
| 1*UHF antenna(optional)       |  |

## 2 Installing A100 Pro/Lite Smart Antenna

### 2.1 System components

Check that you have received all components for the system that you purchased. In order for the A100 Pro/Lite to perform optimally, the following components is required:

- COMNAV A100 Pro/Lite Smart Antenna
- System cable harness
- A fused power supply (user supplied)

### 2.2 Mounting the receiver

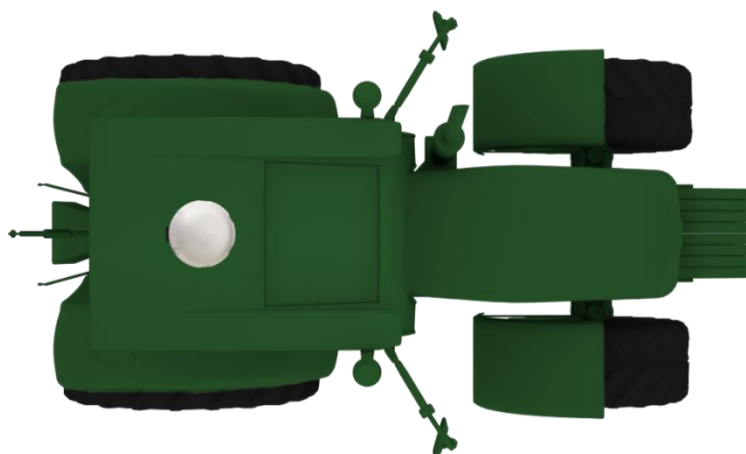
When choosing a location, consider the following:

- On a flat surface along the centerline of the vehicle
- At the highest point on the vehicle, with no metal surfaces blocking the receiver's view of the sky
- As far as possible, when you install the receiver, you should avoid placing it near sources of electrical and magnetic noise.

Although the receiver has a waterproof housing, you should install it in a dry location. To improve the performance and long-term reliability of the receiver, avoid exposure to extreme environmental conditions, including:

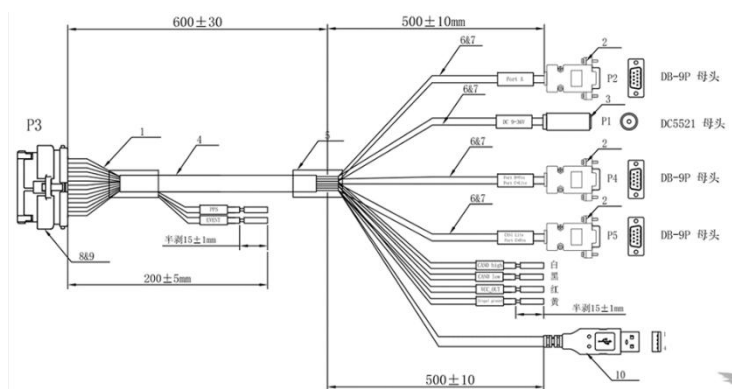
- Water
- Excessive heat ( $> 70^{\circ}\text{C}$  or  $158^{\circ}\text{F}$ )
- Excessive cold ( $< -30^{\circ}\text{C}$  or  $-22^{\circ}\text{F}$ )
- High vibration
- Corrosive fluids and gases

The A100 Pro/Lite must be mounted on the center of the vehicle and mounted with the connector facing the rear of the vehicle. See below pic.



## 2.3 Receiver Connection

After mounting A100 Pro/Lite in suitable location, connect power cable to com port on the back of A100 Pro/Lite. You can connect the receiver to various external device. The connection shown as below.

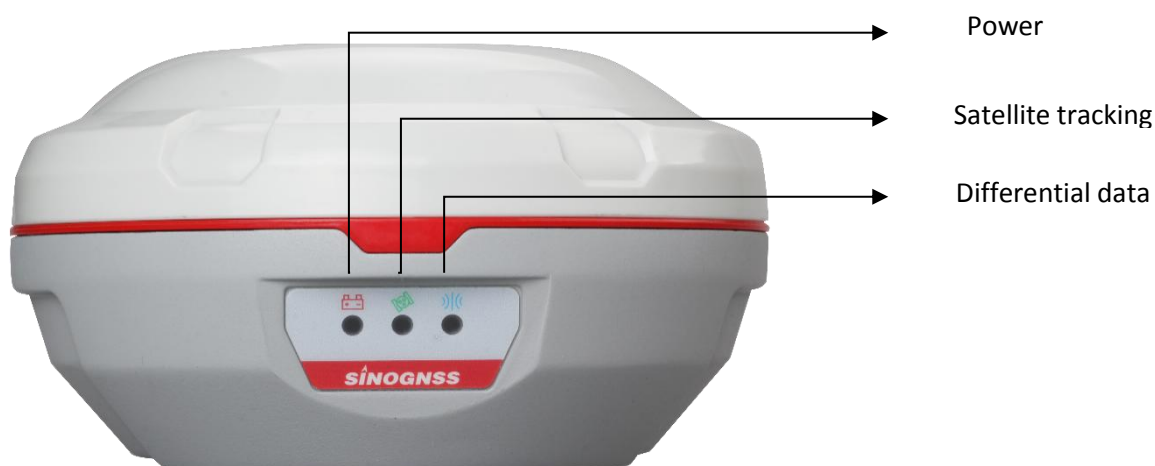


## 3 Getting started

The A100 Pro/Lite uses a 2-pin Deutsch connector as the power input interface, with the model number DT06-2S. Pin 1 (red) is the power +, and pin 2 (black) is the power ground. it requires +9 – 36VDC power supply. When power is on, it will start automatically.

### 3.1 LEDS Status Indicators

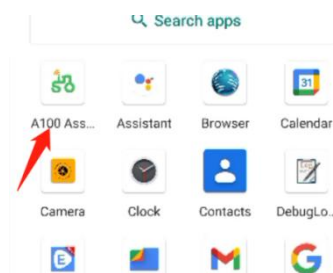
There are three leds status indicators to show A100 Pro/Lite work status. Generally, a lit or slowly flashing indicates normal operation, and an unlit LED indicates that no operation is occurring. The following figure and table define each possible LED state:



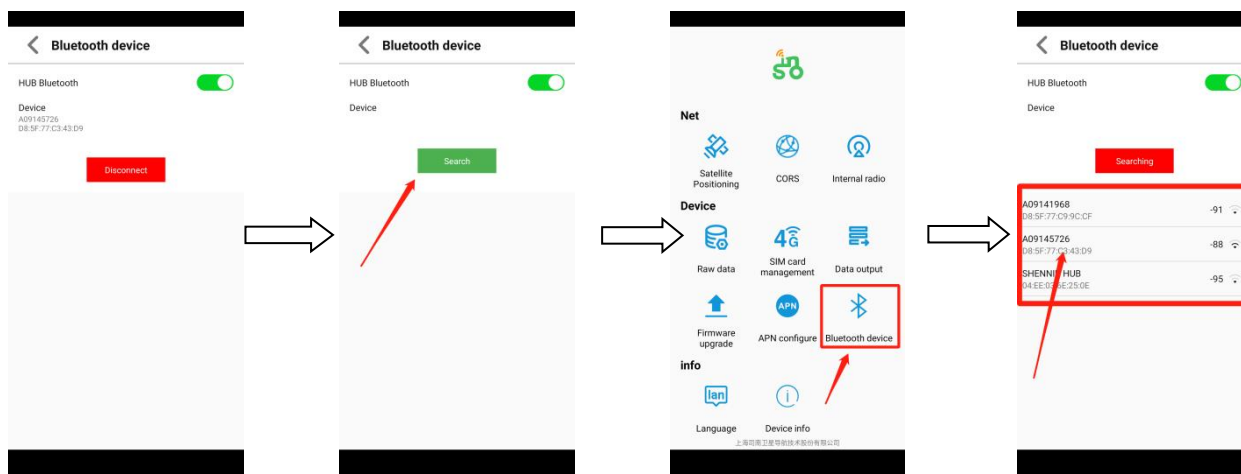
| LEDS               | States                   | Description                   |
|--------------------|--------------------------|-------------------------------|
| Power              | On                       | Power is ready                |
|                    | Off                      | No Power                      |
| Satellite Tracking | Fast flashing            | No satellite received         |
|                    | Flashes N times every 5s | Received N satellites signals |
| Differential Data  | Flashes once per second  | Receiving differential data   |

### 3.2 Configure by A100 Assistant☆

Install the A100 Assistant APP on the mobile phone or Android handheld. After the installation is complete, the system will have the following icon, click to open the software.



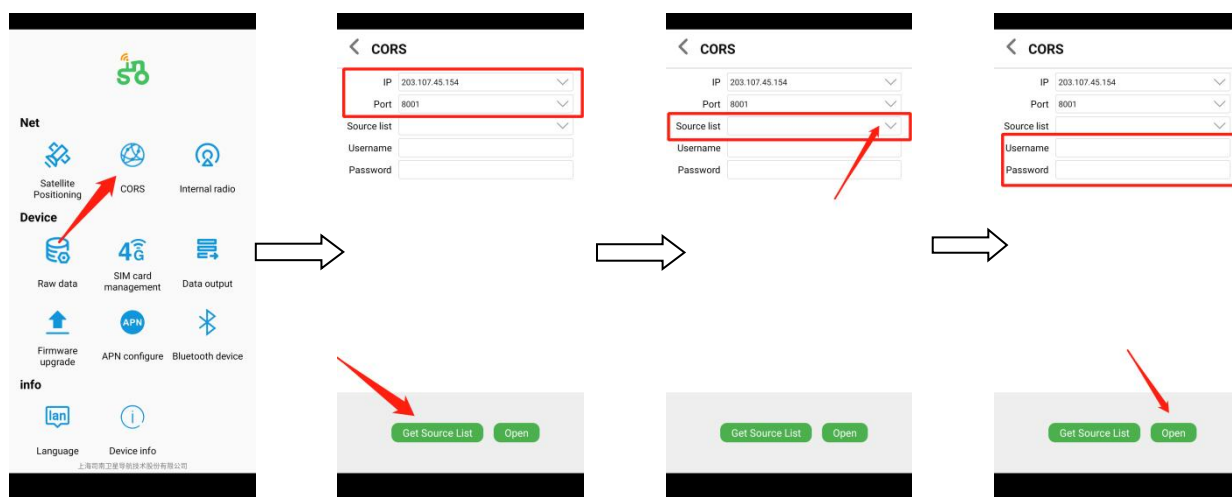
## ➤ BT CONNECT



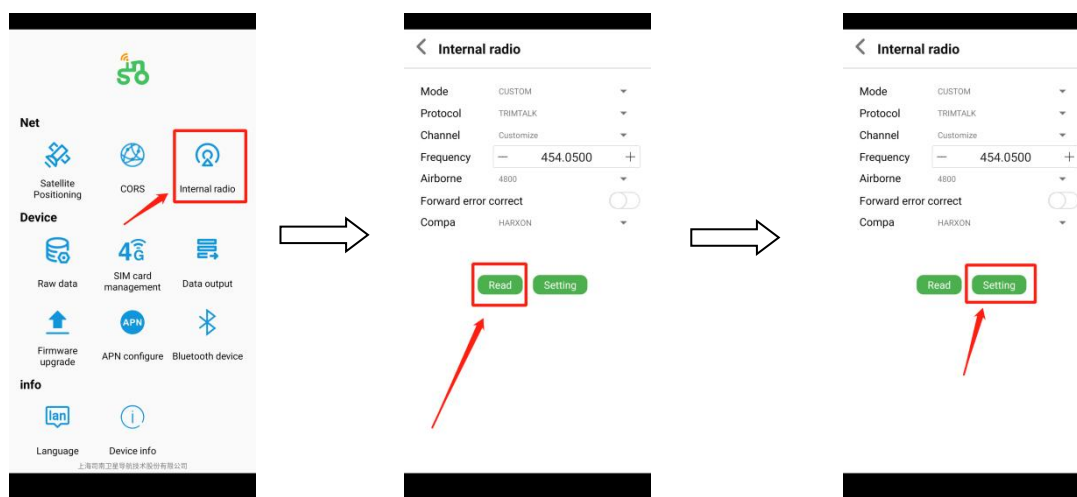
## ➤ APN SET



## ➤ Cors account password input



### ➤ Radio settings (A100 Lite don't have radio)



(1)Read

(2)Modify the corresponding content according to the setting of the base station

(3)click settings

For example:

base station =ComNav GNSS \_T300plus, frequency: 459.500; protocol: transparent.

A100 pro: Mode: custom; protocol: transeot;

frequency:459.500;airborne:9600;Compa:ComNav .

**Internal radio**

Mode: CUSTOM

Protocol: **TRANSEOT**

Channel: Customize

Frequency: — **459.5000** +

Airborne: **9600**

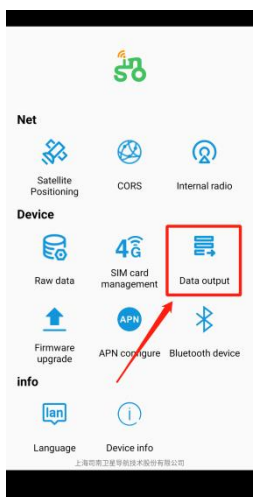
Forward error correct: ☐

Compa: **SINO**

**Read** **Setting**

## ➤ Data output

operation steps:



The main menu is divided into three sections: Net, Device, and info. In the Device section, 'Data output' is highlighted with a red box. An arrow points from this box to the 'Data output' configuration screen.

**Data output**

Board cmd:  **Send**

Gyro frequency:  **Send**

NMEA2000:

☐ VEL ☐ PRU ☐ POS

☐ DRU ☐ GTS **Send**

## ● Board CMD list:

| NO. | Command            | Interpretation                           |
|-----|--------------------|------------------------------------------|
| 1   | freset             | Reset                                    |
| 2   | Log com4 testinfor | View board SNR                           |
| 3   | Log com4 loglista  | Query current board data output          |
| 4   | Log com4 version   | Query board firmware version information |
| 5   | Reset              | Reboot                                   |

|    |                                       |                                                                                                                                                            |
|----|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6  | Unlogall                              | Clear all output                                                                                                                                           |
| 7  | Com comX 115200                       | Modify serial baud rate                                                                                                                                    |
| 8  | Saveconfig                            | Save the current configuration command                                                                                                                     |
| 9  | LOCKOUTSYSTEM<system>                 | Close the satellite system involved in the solution (GPS, BD2, GLONASS, GALILEO, BD3, QZSS )                                                               |
| 10 | UNLOCKOUTSYSTEM<system>               | Cancel the shutdown of satellite systems involved in the solution                                                                                          |
| 11 | log comX gpgga ontime 1               | GPGLL GNSS Positioning data, if no com port information is entered, the current communication port will be used by default, for example:log gpgga ontime 1 |
| 12 | log comX gpgll ontime 1               | GPGLL geolocation information                                                                                                                              |
| 13 | log comX gpgsa ontime 1               | GPGLL geolocation information                                                                                                                              |
| 14 | log comX gpgsv ontime 1               | GPGLL geolocation information                                                                                                                              |
| 15 | log comX gphdt ontime 1               | GPGLL geolocation information                                                                                                                              |
| 16 | log comX gpvtg ontime 1               | GPGLL geolocation information                                                                                                                              |
| 17 | log comX gpzda ontime 1               | GPGLL geolocation information                                                                                                                              |
| 18 | log comX gptra ontime 1               | GPGLL geolocation information                                                                                                                              |
| 19 | Interfacemode comX auto auto on       | Set the RTK port, the serial port can receive/send RTCM, RTCMV3, CMR differential information, automatic switching                                         |
| 20 | Interfacemode comX compass compass on | Release the RTK port, the serial port only receives/sends Sinan commands and messages                                                                      |

◆ Example:

**Unlogall**

**log com4 gpgga ontime 1**

**log com4 gpvtg ontime 1**

**Interfacemode comX auto auto on**

**Saveconfig**

(Note:A100 lite Please use the computer to connect the cable P4 interface to observe the data output)

## ● Gyro Frequency output:

Enter the value **1-10** and output the gyro data through the serial port. Gyro data can be viewed through CRU, please refer to **3.5**. A100 Lite do not have Gyrp.

The screenshot shows the 'Data output' configuration window. It includes a 'Board cmd' dropdown, a 'Gyro frequency' input field set to '5', and checkboxes for NMEA2000 data types: VEL, PRU, POS, DRU, and GTS. Each input field has a 'Send' button next to it.

## ● NMEA2000 Output settings :

Output Data Format:

| NO. | Command | PGN             | LENGTH   | Unit      | Meaning                                      |
|-----|---------|-----------------|----------|-----------|----------------------------------------------|
| 1   | VEL     | 129026(0x1F802) | 8 bytes  | 1000ms±20 | COG & SOG -- Quick updating                  |
| 2   | PRU     | 129025(0x1F801) | 8 bytes  | 100ms±20  | Location -- Quick updating                   |
| 3   | Pos     | 129029(0x1F805) | 51 bytes | 100ms±20  | GNSS location data                           |
| 4   | DRU     | 129027(0x1F803) | 8 bytes  | 100ms±20  | Position Delta, high-accuracy quick updating |

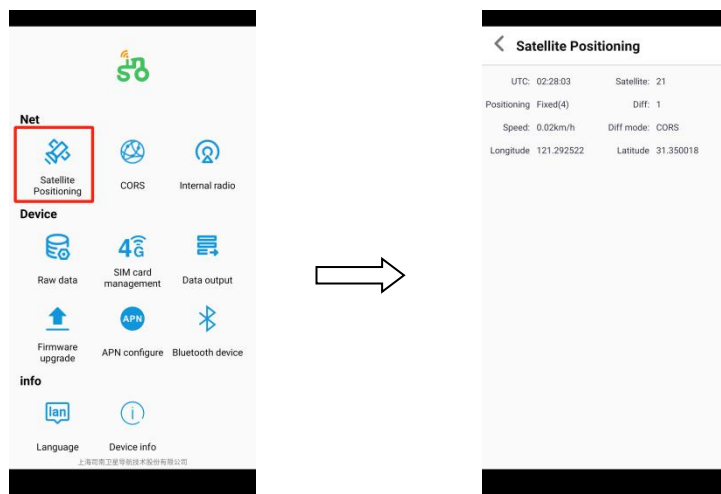
## ◆ Command example:

```
log com1 gpgga ontime 1
log com1 gptra ontime 1
log com1 gpvtg ontime 1
log com1 gpzda ontime 1
log com1 gpgsa ontime 1
Saveconfig
```

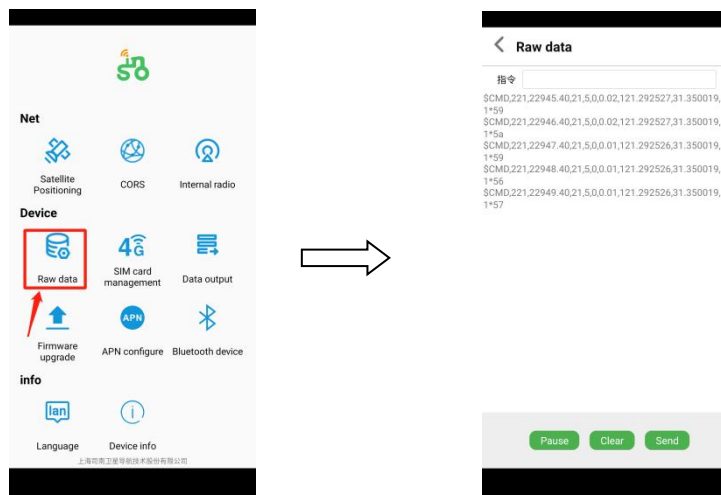
(Note: For standard cables, please use a computer to connect CAN 0 in the P5 interface of the cable)

### 3.3 Check device status

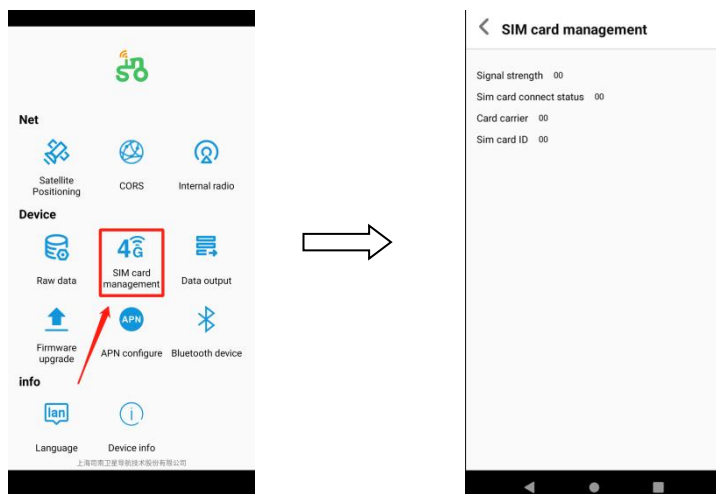
#### ➤ GNSS Status



#### ➤ Main control module data



#### ➤ SIM Card Carrier Information



### ➤ Firmware and version info



A100 Lite has no radio, so the software cannot detect its information.

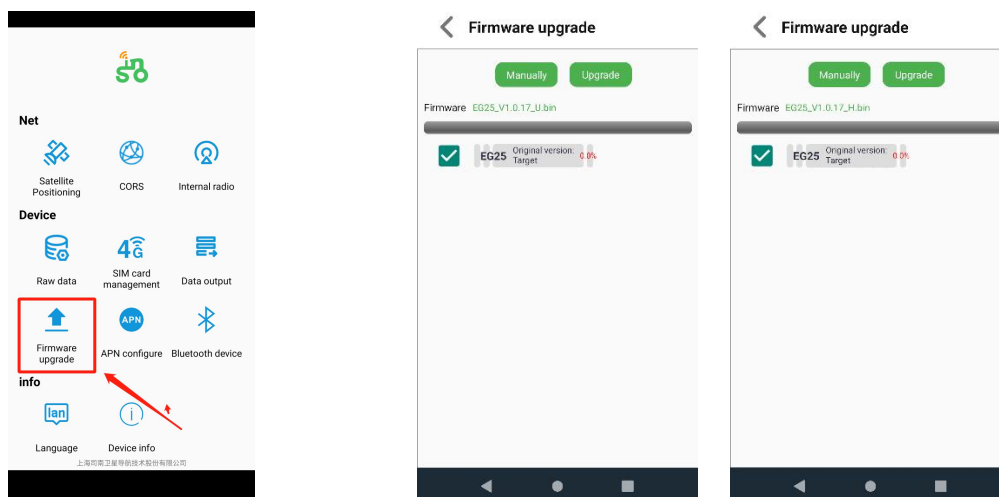
## 3.4 Update

### ➤ 4G(EG25) Communication module upgrade

- 1) Import the firmware EG25\_Vx.x.xx\_x.bin into the phone

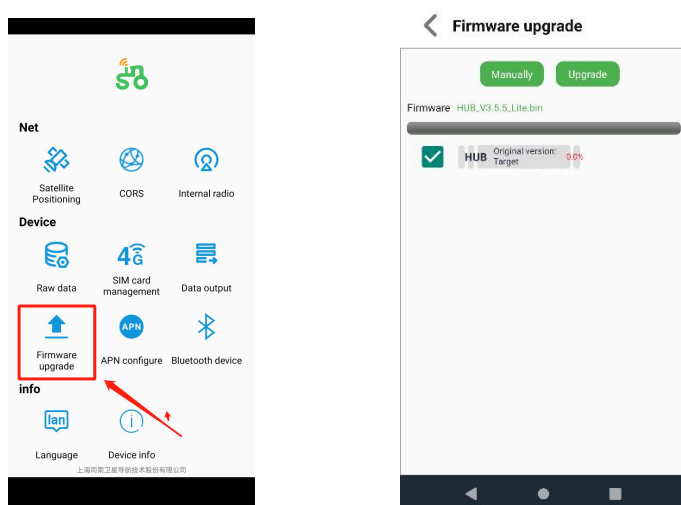
Note: Due to different built-in radio modules, the communication paths of EG25 are also different. There are two types of firmware. U represents ComNav 's U70 radio, and H represents Harxon radio.

- 2) Click manually to find the firmware in the system
- 3) Click to upgrade



### ➤ Upgrade HUB

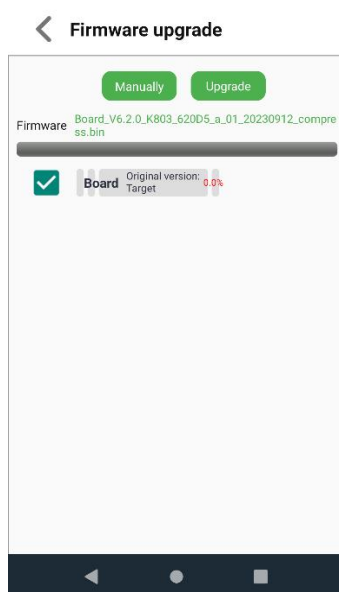
- 1) Import the firmware HUBV3.5.x\_Lite.bin into the phone  
 A100 Lite: HUBV3.5.x\_Lite.bin                      A100 Pro: HUBV3.5.x\_Pro.bin
- 2) Click manually to find the firmware in the system
- 3) Click to upgrade



### ➤ Upgrade Board

A100 Pro/Lite built in ComNav 's K803 Gnss Module.

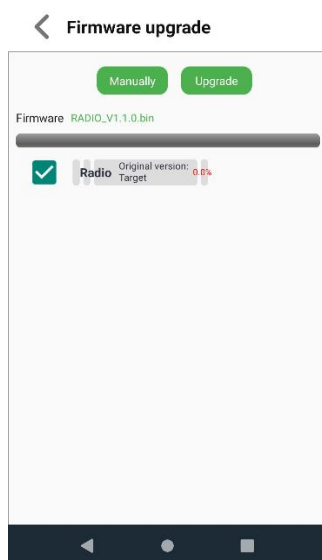
- 1) Import the firmware Board\_Vxxxxxxx\_compress.bin into the phone
- 2) Click manually to find the firmware in the system
- 3) Click to upgrade



### ➤ Upgrade Radio

A100 Pro built in Different Radio module, please select correct firmware. A100 Lite do not have radio.

- 1) Import the firmware Radio\_V1.1.0.bin into the phone
- 2) Click manually to find the firmware in the system
- 3) Click to upgrade



## 3.5 Configure A100 Pro/Lite by CRU

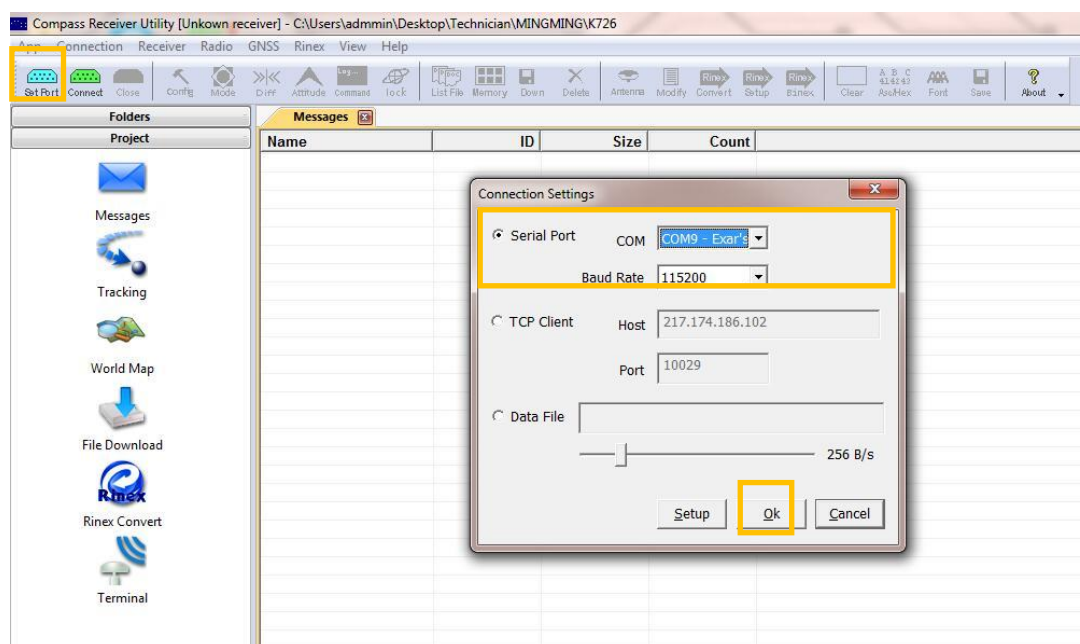
Compass Receiver Utility (CRU) is a windows-based Software that allows you to access most features of the

receiver without using a terminal emulator. It lets you easily communicate with and configure the receiver via serial ports, using a PC with Windows XP, windows 7, windows 8 or windows 10 operating system on it.

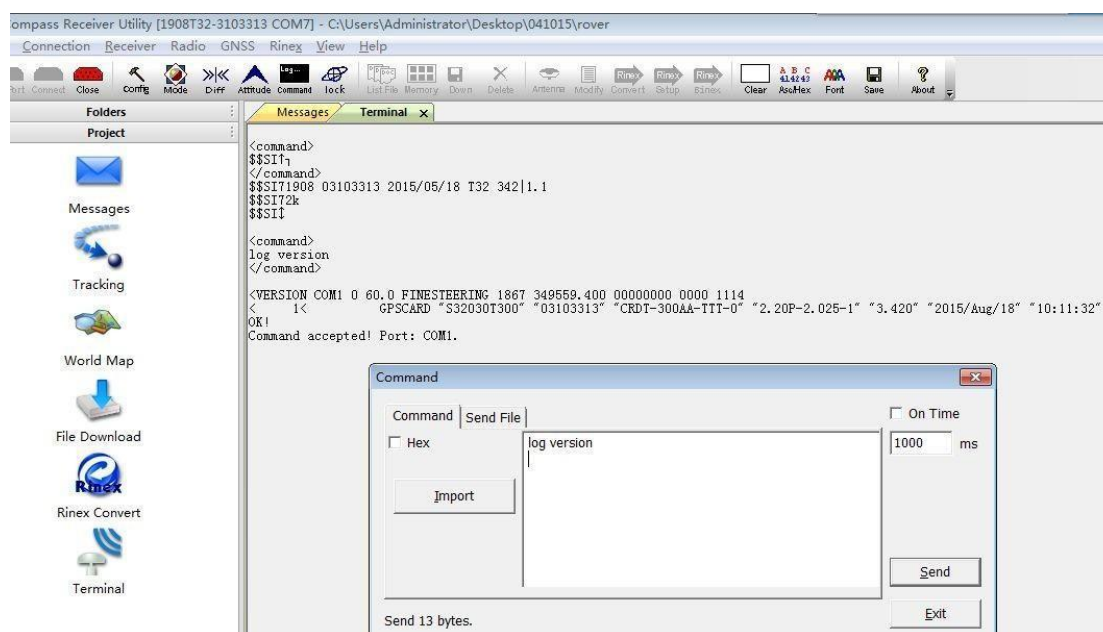
Visit ComNav Technology website to access CRU software: <http://www.ComNav.tech.com/companyfile/4/>

#### ➤ OEM BOARD configuration

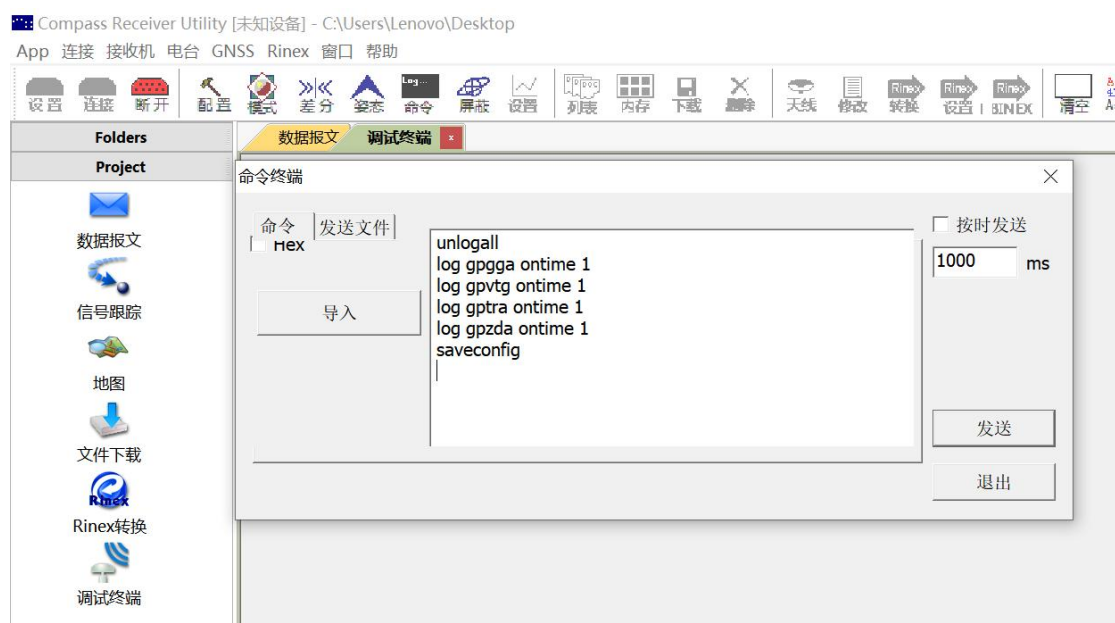
You can use serial port of PC to connect with the receiver, the default baud rate is 115200. Go to Set Port, set up the connections, and click OK . (Connect 9-pin oemboard port, depend on model)



- Click “Command”, send the command “log version” to check if the receiver has connected with PC successfully. If not, please change another port on this cable



- Click Command, enter the following commands, then you can get NMEA message.



obtain RTK information using 4G, Connect PC to oemboard port

Click Command, enter the following commands, then you can get correction message in CRU.

*unlogall*

*log gpgga ontime 1*

// Depends on what kinds of NMEA you want

*saveconfig*

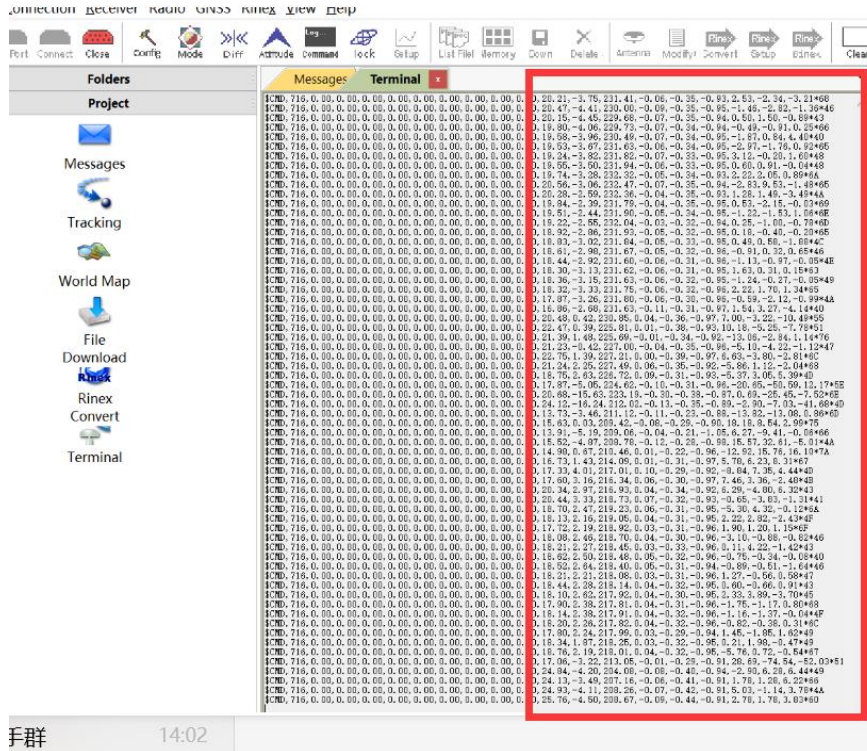
// It will connect automatically once you saved the configuration

For more commands, please refer to ComNav OEM board reference manual

## ■ Gyro data configuration

You can use serial port of PC to connect with the receiver, the default baud rate is 115200. Go to Set Port, set up the connections, and click OK . (Connect Port A, A100 Lite do not have gyro)

In the single point state, you can see the gyro attitude data of A100 Pro



When you are in a floating or fixed state and A100 Pro requires a continuous movement of more than 2km/h, it can output real-time gyro data.

Control the serial port data output frequency by modifying the command.

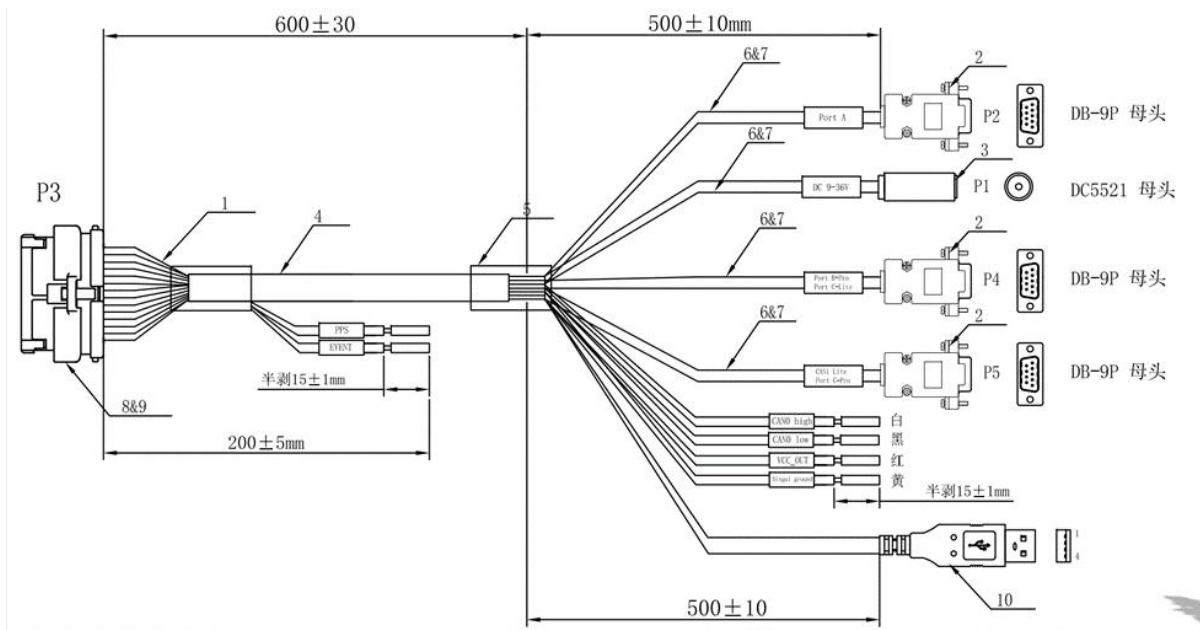
Message format: \$CMD,ID,sum,index,cmd\*\r\n

For example: \$CMD,700,2\*4E,\r\n

| Name  | describe                   | explanation                                         |
|-------|----------------------------|-----------------------------------------------------|
| \$CMD | Head                       |                                                     |
| ID    | IN_SWITCH_IMU_SET          | 700                                                 |
| freq  | Gyro data output frequency | (1~10) , 0_close output ,only support integer value |
| *XX   | Check code                 |                                                     |
| \r\n  | End                        |                                                     |

Calculate the check value, and configure it through CRU.

## Appendix A TEC 14 Pin arrangement and definition



### ➤ A100 Lite:

P1 : POWER (DC9~36V)      P2:9pin-Hub      P4:9pin-oemboard      p5:9-pin CAN

### ➤ A100 Pro

P1 : POWER (DC9~36V)      P2:9pin-Hub      P4:-----      P5:9-pin oemboard

### P3: 14-pin definition

| Signal Name | P3 |
|-------------|----|
| PWR+        | 1  |
| PWR-        | 2  |
| COM1_TXD    | 3  |
| COM1_RXD    | 4  |
| GND         | 5  |
| COM2_TXD    | 6  |
| COM2_RXD    | 7  |
| CAN0+       | 8  |
| CAN0-       | 9  |
| CAN1+       | 10 |
| CAN1-       | 11 |

|         |           |
|---------|-----------|
| PPS     | <b>12</b> |
| EVENT   | <b>13</b> |
| VCC-OUT | <b>14</b> |

**FCC Caution:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.