UA301 Smart Antenna

User Manual

V1.1_202012

Contents

1. Introduction

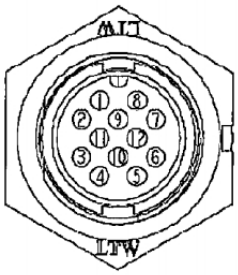
This is the user manual for eSurvey UA301 smart antenna. It gives basic description and operation guide which may help user to operate device properly.

1.1 Appearance

UA301 has superior antenna gain, phase difference, quadrature axis ratio performance to obtain centimeter- level positioning accuracy. The antenna is integrated with WIFI, Bluetooth and Web user interface. It can be used for agricultural, machinery assisted driving, engineering vehicles, ships, surveying and mapping and other fields.

1.2 Pin Ports

The 12-pin port is used for the data communication and power supply. The definition is as below:



PIN	Description	PIN	Description
1	PortA Tx	7	PortB Rx
2	PortA Rx	8	+12V POWER
3	Event Marker	9	CAN High
4	1PPS	10	CAN Low
5	Signal GND	11	USB D+
6	PortB Tx	12	USB D-

There are two RS232 ports on UA301. The port A is connected to the position board directly while the port B is not. The port A can be used for NMEA output and correction data input. The port B (also named as port user) is used for NMEA data output.

1.3 Mounting

The base mounting size on UA301 is 3/4. The convertor 5/8 size is coming with it for mounting on the pole.

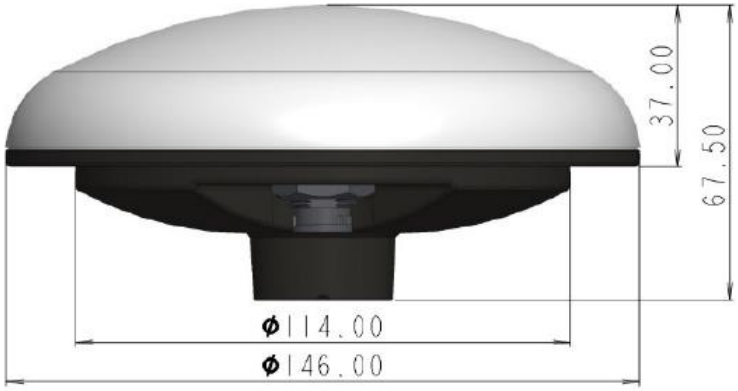
1.4 Power Indicator

E301 power indicator has three kinds of colors. The definition is as below:

Status	Description
Solid Red	No position
Red and Green Flash (5Hz)	Malfunction, OEM board/WIFI/Bluetooth communication error
Solid Yellow (Red + Green)	Single position, DGNSS, SBAS, no data recording
Yellow Flash (1Hz)	Single position, DGNSS, SBAS, with data recording
Green Flash (1Hz)	RTK position, Atlas, with data recording
Solid Green	RTK position, Atlas, no data recording

1.5 Dimension

The dimension of UA301 is as follow:



1.6 Accessories

No.	Description	Picture
1	UA301 smart antenna	
2	Communication cable	
3	Mounting converter 3/4 to 5/8	

2. Installation

2.1 Install UA301

UA301 must be installed properly. When installing UA301 on car or other moving devices, make sure it is fixed and safe. The cable should be also installed correctly to avoid danger.

2.2 Power Supply

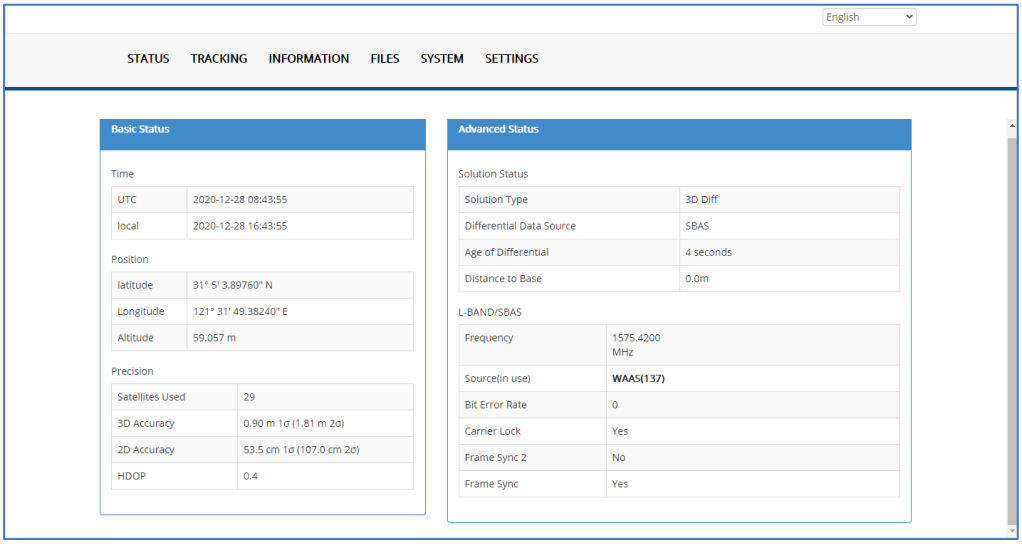
When connecting the external power, make sure the battery voltage is within 7-36VDC. Be careful of the + and – connection.

3. Web User Interface

User can connect to receiver WIFI hotspot with PC, smart phone or tablet. The hotspot name is start with “ua301_” followed with the OEM board serial number. For example “ua301_99902494”. The hotspot password is “unis1234”. Open web browser and input the IP address “192.168.100.1”. From the website, user can manage working status, change working mode, configurate basic settings, download raw data, update firmware and register device.

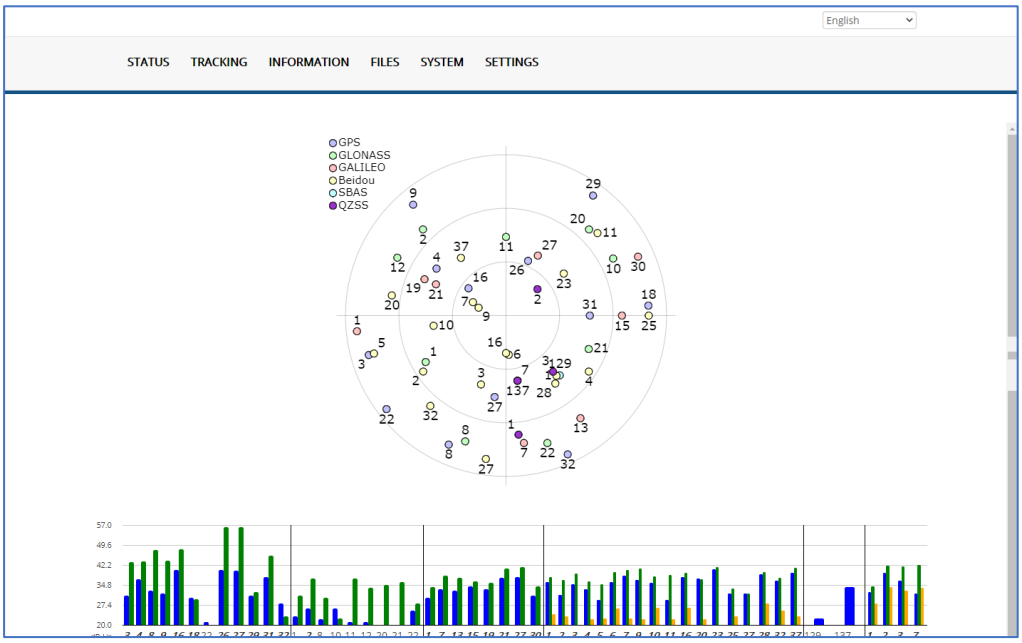
3.1 Status

View basic position information, satellite number, position accuracy, solution status and time.



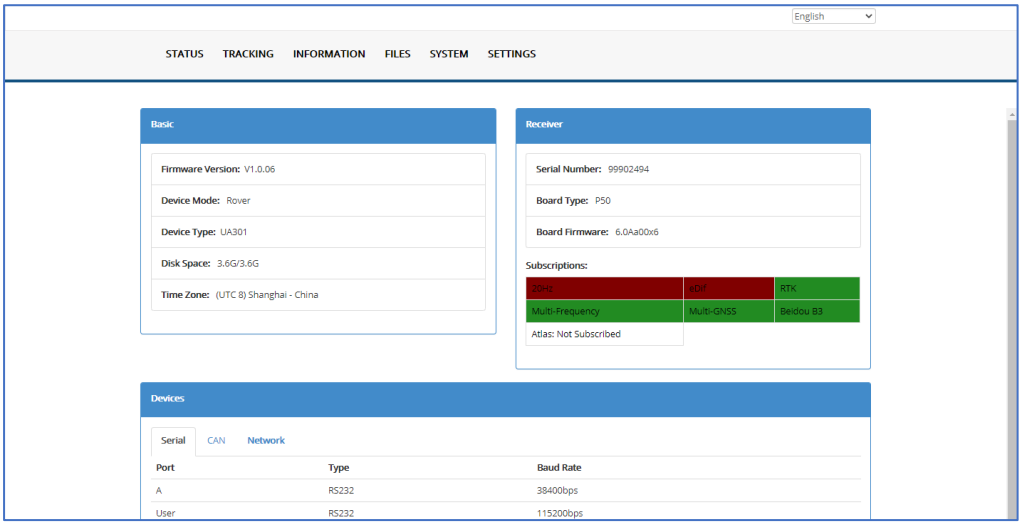
3.2 Tracking

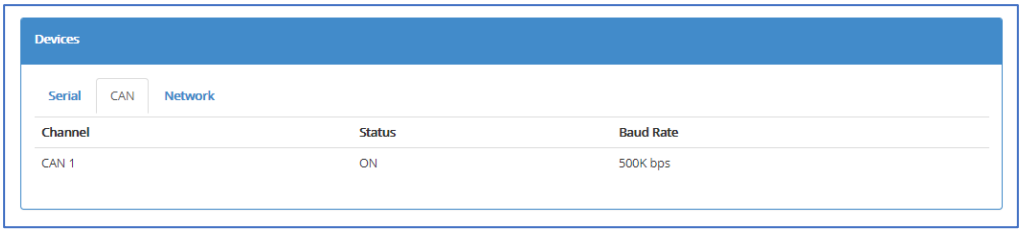
View satellite map and satellite signal strength.

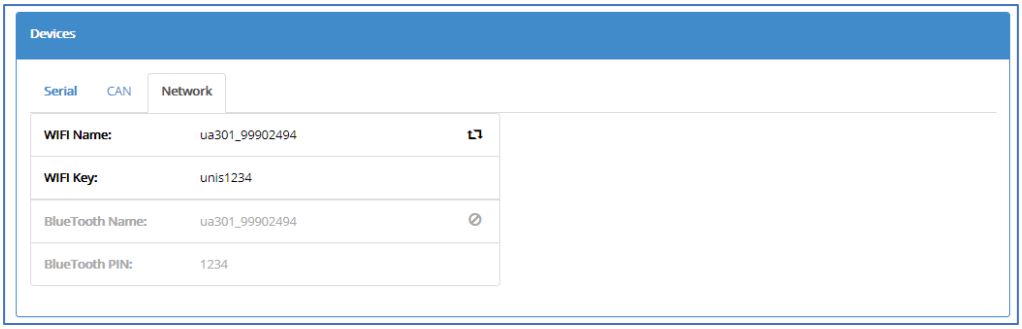


3.3 Information

View receiver information: firmware version, GNSS board serial number, board name, board version and subscription. Serial, CAN and Network status can be also found.

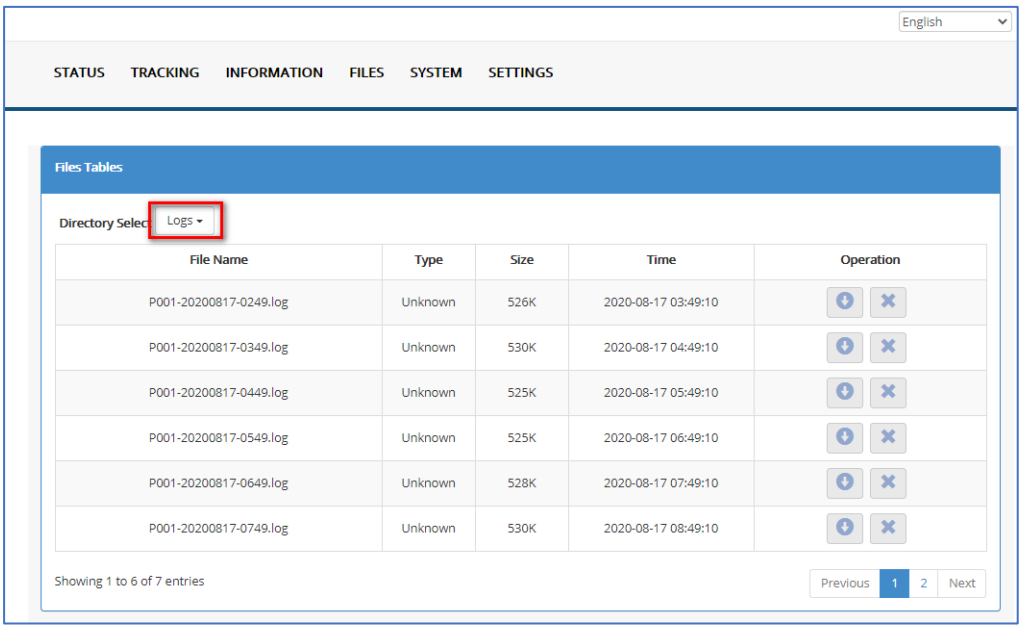






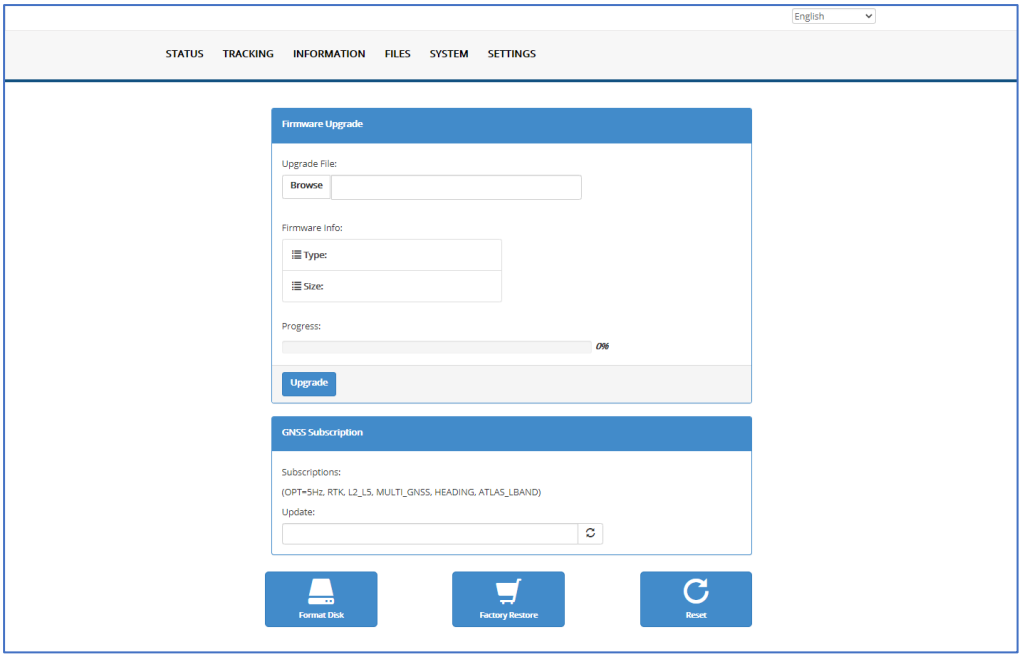
3.4 Files

The page is mainly used to download log file. The files is stored from Settings -> Logging.



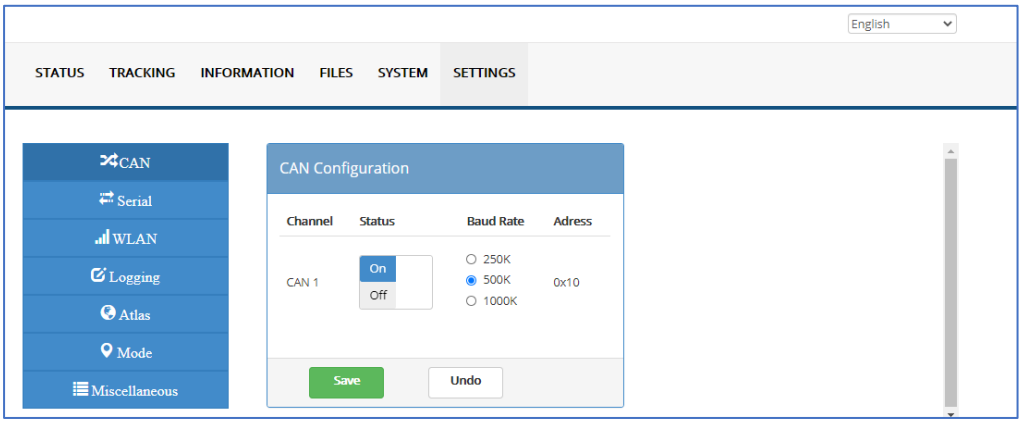
3.5 System

This page is used to update firmware, submit activation code, format disk, restore factory setting and reboot device. Click [Browse] to find the firmware file, then click [update] to wait for the update process been finished. The device activation information is also shown here. User can submit activation code such as Atlas code. Click [Format Disk] to format the internal storage. Click [Factory Restore] to reset factory setting. Click [Reset] to reboot device.



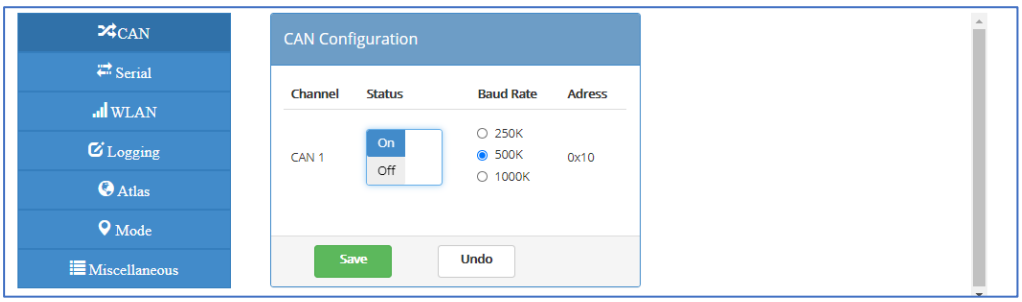
3.6 Settings

This page is used for device configurations.



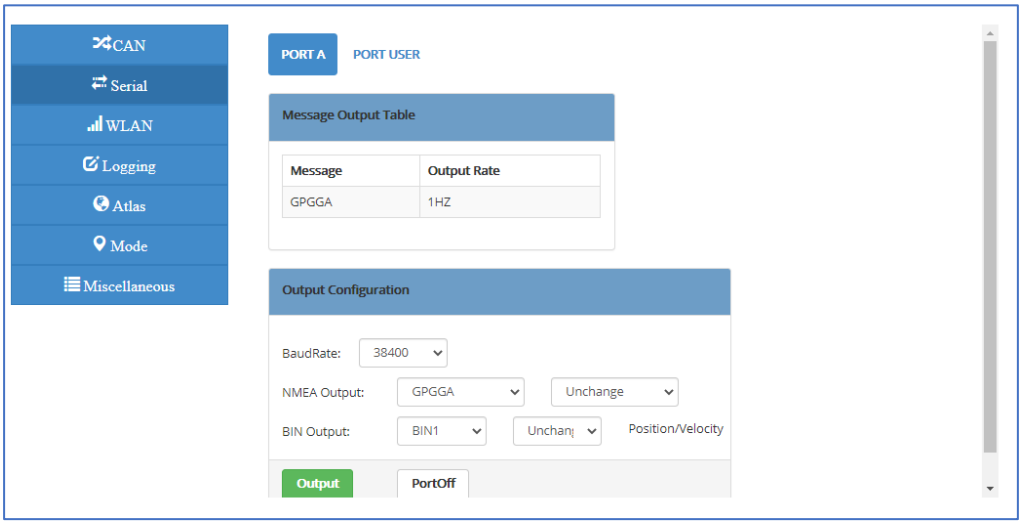
3.6.1 CAN

Enable or disable CAN function as well as change CAN baud rate.



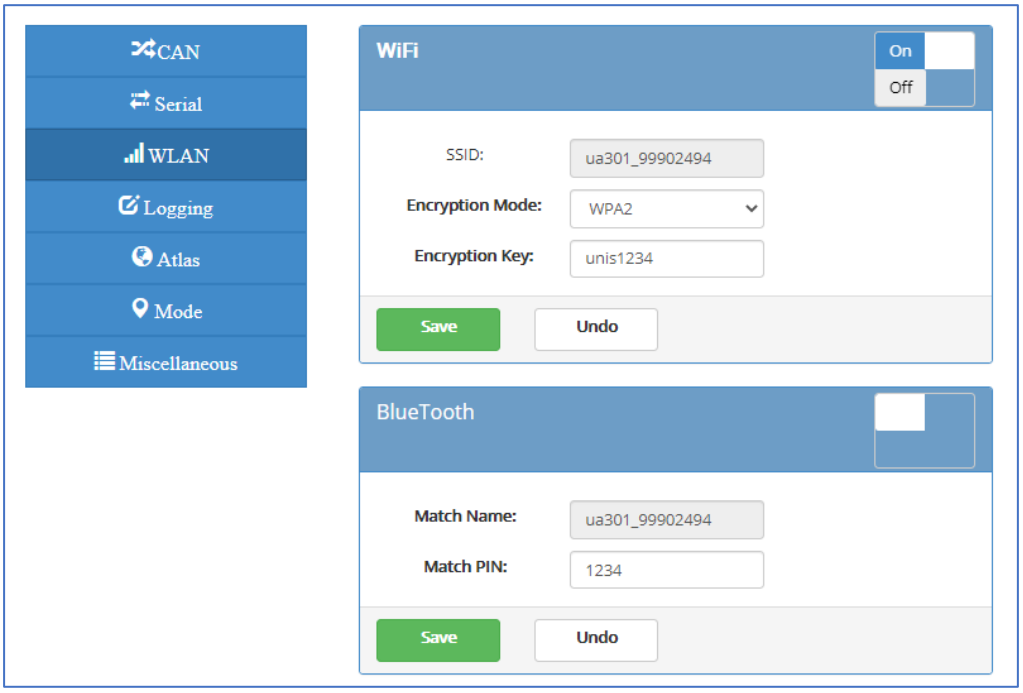
3.6.2 Serial

Set port A & B data output. Port A baud rate is changeable. Port B (port user) baud rate is fixed as 115200.



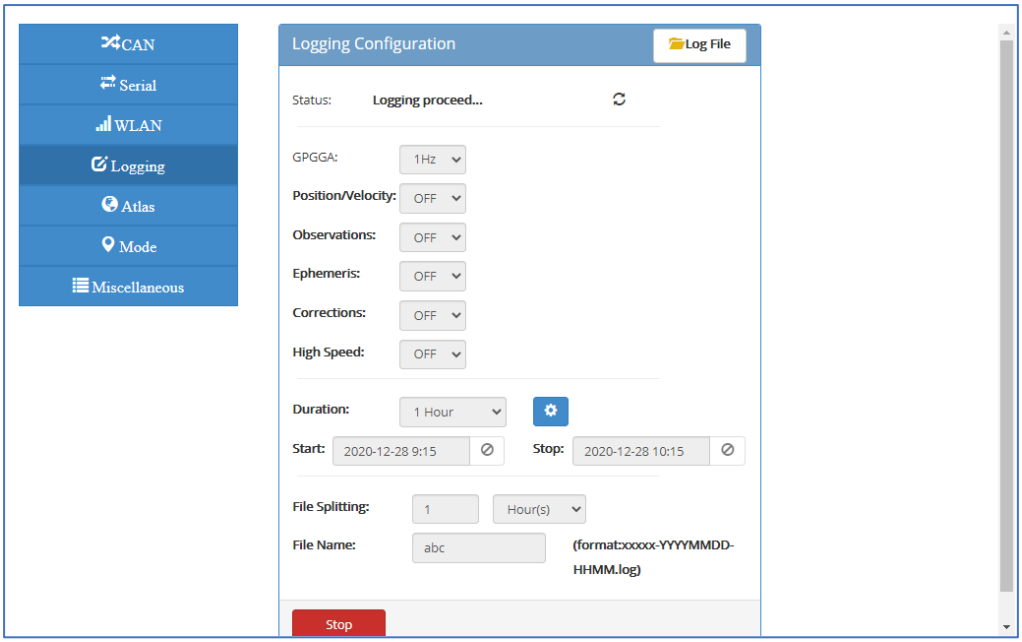
3.6.3 WLAN

This is used to change WIFI and Bluetooth password. It is not suggested to change if user is not familiar with the product.



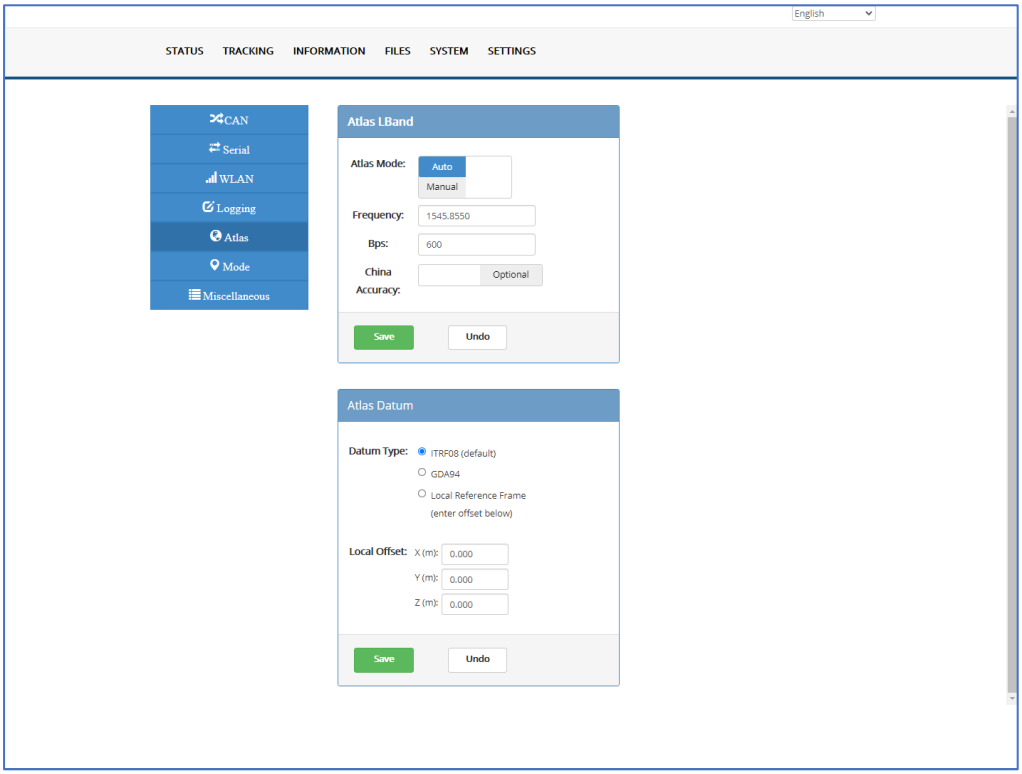
3.6.4 Logging

From this page, the data can be stored in the internal storage. Click [Log File] to view and download the data. For static post processing, [GPGGA], [Observation], [Ephemeris] data is suggested to be enabled.



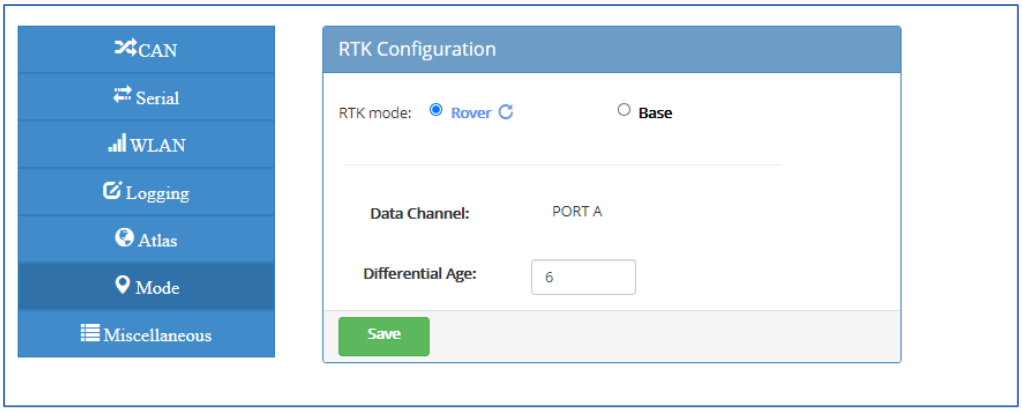
3.6.5 Atlas

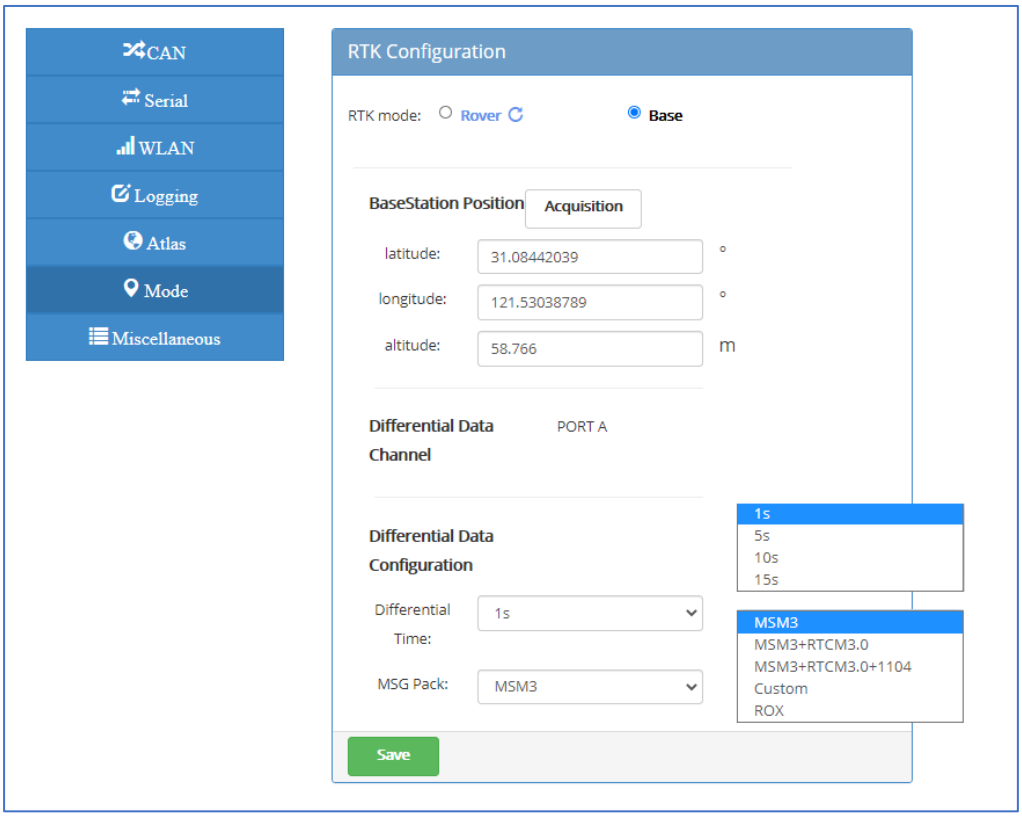
This page is used to set Atlas mode and Atlas datum. [Auto] mode is suggested while the device search the Atlas frequency automatically.



3.6.6 Mode

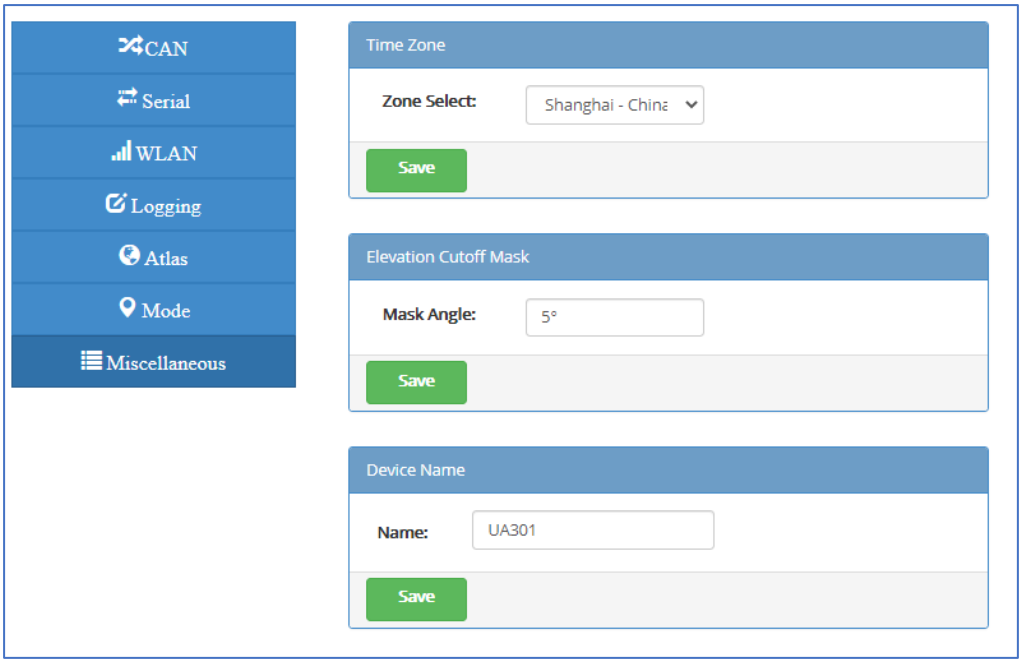
Configurate the device as base or rover mode.



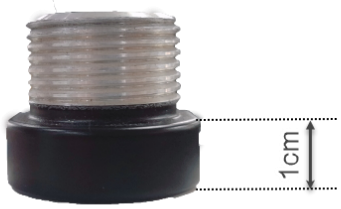


3.6.7 Miscellaneous

Change time zone, cut-off angle and device name.



4. Antenna Phase Center



5. Technical Specifications

GNSS	
Satellites Tracking	GPS: L1CA/L1P/L1C/L2P/L2C/L5 BDS: B1I/B2I/B3I/B1C/B2a/B2b/ ACEBOC GLONASS: G1/G2 GALILEO: E1/E5a/E5b/E6/ALTBOC QZSS: L1CA/L1C/L2C/L5 SBAS[1]: L1/L5 L-Band: Atlas H10/H30/Basic
Channels	700
Sensitivity	-142 dBm
Signal Reacquisition	< 1 sec
Cold Start	< 60 sec
Warm Start	< 30 sec
Hot Start	< 10 sec
Initialization Reliability	> 99.9%
Update Rate	5 Hz standard, up to 50 Hz
Internal Memory	4 GB
Performance	
RTK	H: 10 mm + 1 ppm V: 15 mm + 1 ppm
Code Differential	H: 0.3 m V: 0.6 m
SBAS	H: 0.3 m V: 0.6 m
L-Band	Atlas H10: 4 cm RMS Atlas H30: 15 cm RMS Atlas Basic: 30 cm RMS
1PPS	10 ns
Power Supply	
Voltage	7~36 VDC with over-voltage protection
Consumption	3.2 W @12 V
Communication	
Bluetooth	V2.1 + EDR/V4.1 dual model, class 2
WIFI	802.11 b/g/n
Port	2 x duplex RS232 1 x CAN
Baud Rate	4800 ~ 460800 bps
Web UI	View status, update firmware, set up working mode, download data
NMEA Output	NMEA0183, NMEA2000, Binary
Correction Data	ROX, RTCM2.X, RTCM3.X, CMR, CMR+
1PPS	COMS, active high, upper edge sync
Event	COMS, active low, falling edge sync
Physical	
Dimension	Φ146 mm x H67.5 mm

Weight	470 g
Material	ASA plastic top and aluminum alloy base
Operating Temperature	-40℃ ~ +70℃
Storage Temperature	-40℃ ~ +85℃
Water/Dust Proof	IP67
Shock and Vibration	ISO 16750-3 MIL-STD-202F
EMC	CE (ISO 14982 Emission and Immunity)
Safety Requirement	FCC Part 15, subpart B, CISPR 22
Humidity	Up to 95%
Indicators	Status indicator
Pin Port	12 pins, male
Installation	3/4, 5/8-inch thread
Certificate	RoHS

6. Commands

There are two USB serial ports on UA301. The port A is connected to the position board directly while the port B is not. The port A commands totally refers to Hemisphere command manual. The port B command is a little bit different from port A. Below are the commands mostly used in port A and port B.

- **Port A**

1) Query position board firmware version
   Commands: $ji
   Reply:
   ```
   >JI,99902494,20,1,15102019,01/01/1900,01/01/4380,6.0Aa00x6,89
   ```
2) Query the activation information
   Commands: $jk,show
   Reply:
   ```
   $>JK,SHOW,564,0,00/00/2000,2,OPT=,5Hz,RTK,L2_L5,MULTI_GNSS,HEADING,ATLAS_LBAND
   ```
3) Query the device detail setting
   Commands: $jshow
   Reply:
   ```
   $>JSHOW,BAUD,38400
   $>JSHOW,BAUD,19200,OTHER
   $>JSHOW,BAUD,460800,PORTC
   $>JSHOW,ASC,GPGGA,1.0,PORTC
   $>JSHOW,ASC,GPVTG,5.0,PORTC
   $>JSHOW,ASC,GPZDA,1.0,PORTC
   $>JSHOW,ASC,GPGST,1.0,PORTC
   $>JSHOW,ASC,GPGBS,0.2,PORTC
   $>JSHOW,ASC,RTKSTAT,1.0,PORTC
   $>JSHOW,BIN,1,5.0,PORTC
   $>JSHOW,BIN,2,1.0,PORTC
   $>JSHOW,BIN,3,1.0,PORTC
   $>JSHOW,BIN,35,1,PORTC
   $>JSHOW,BIN,34,1,PORTC
   $>JSHOW,BIN,39,1,PORTC
   $>JSHOW,BIN,65,1,PORTC
   $>JSHOW,BIN,69,1,PORTC
   $>JSHOW,BIN,89,1,PORTC
   $>JSHOW,BIN,94,1,PORTC
   $>JSHOW,BIN,95,1,PORTC
   $>JSHOW,BIN,99,1,PORTC
   $>JSHOW,BIN,100,1,PORTC
   $>JSHOW,BIN,209,1,PORTC
   $>JSHOW,ASC,D1,1,PORTC
   $>JSHOW,BAUD,9600,PORTD
   $>JSHOW,ASC,ROX,1,PORTD
   $>JSHOW,DIFF,LBAND,SBAS
   $>JSHOW,ALT,NEVER
   $>JSHOW,LIMIT,10.0
   $>JSHOW,MASK,5
   $>JSHOW,POS,31.1,121.5
   $>JSHOW,AIR,AUTO,NORM
   $>JSHOW,SMOOTH,LONG900
   $>JSHOW,FREQ,1545.8550,600,AUTO
   $>JSHOW,AGE,6
   $>JSHOW,THISPORT,PORTA
   $>JSHOW,MODES,MIXED,GLOFIX
   ```

4) Query NMEA message
   Commands: $jasc,[message],[num]
   Description:
   [message] can be gpgga, gpgst, gpzda, gpgsv, gpgsa…
   [num] means the output frequency, can be 0.2, 0.5, 1, 2, 5, 10, the maximum number depends on the activation
   Reply:
   $GPGGA,095903.00,3105.0607641,N,12131.8367305,E,2,18,0.8,33.038,M,9.900,M,6.0,0137*47
5) Reboot the position board
   Command: $jboot

➢ **Port B**
Port B commands is different with port A, it is start with $ju instead of $ji

1) Query antenna firmware version
   Commands: $uversion
   Reply:
   $>VERSION,UA301,1.0.06,2.6
2) Reboot device
   Commands: $ureboot
   Reply:
   $>Start to reboot...
3) Query device detail setting
   Command: $ushow
   Reply:
   $>USHOW,UA301,THISPORT,PORT CPU
   $>USHOW,BAUD,115200,PORT CPU
   $>USHOW,BootVer(V2.6),AppVer(V1.0.06),Date(Jun 24 2020),HWVer(0x0)
   $>USHOW,RTK,Rover
   $>USHOW,IMU,1,20680
   $>USHOW,CAN,1,500K
   $>USHOW,GNSS,Type(P50),Ver(6.0Aa00x6),SN(99902494),Subs(564)
   $>USHOW,ASC,GPGGA,1.0
   $>USHOW,BAUD,38400,PORTA
   $>USHOW,DIFF,LBAND,SBAS

4) Restore factory setting
   Command: $udefault,all
   Reply:
   $>Default ALL,START...
   $>Default Flash,FINISH
5) Query NMEA Data
   Command: $uasc,[message],[num]
   Description:
   [message] can be gpgga, gpgst, gpzda, gpgsv, gpgsa…
   [num] means the output frequency, can be 0.2, 0.5, 1, 2, 5, 10, the maximum number depends on the activation
   Reply:
   $GPGGA,101118.00,3105.06463673,N,12131.82314543,E,1,24,0.6,46.105,M,9.900,M,,*6E

7. Warranty Policy

The Guarantees Rights

- e-survey supports free exchange or refund within 7 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repair center.

- e-survey supports free maintenance or exchange within 15 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repair center.

- e-survey supports free maintenance or exchange the same type of device within one year from the day when you have received the products, where the device appears "performance failure", which is still not in working conditions after two repairs.

- e-survey supports a 24-month warranty service for the device host and a 3-month free warranty service for the accessory from the day when you have received the products.

Warranty service

If the device host meets the warranty conditions, the warranty service can be obtained according to the warranty card and the purchasing invoice. If the proof of purchase and the warranty card cannot be provided, and e-survey will use the delivery time as the standard for the warranty period.

- If it is a non-warranty product, and the repair center will handle the maintenance of the extra-fee.

- After the device is repaired, the same fault is con- firmed by the repair center and e-survey will provide a 3-month free warranty service.

- The transportation, delivery and disposal costs incurred during the delivery or inspection of the product to e-survey shall be borne by the user. The freight generated by the repair or inspection equipment returned to the user shall be borne by e-sur- vey.

- Equipment that needs to be repaired or sent for inspection, please back up the data in the machine in time.

- During the warranty period, the parts normally used for maintenance are free.

- The parts that have been replaced during the repair are owned by e-survey.

- e-survey is not responsible for non-product standard and software or applications that are not certified by the company.

Following conditions are not within the scope of the warranty and service

The device host and accessories have been subjected to: abnormal or improper use, improper storage of abnormal conditions, unauthorized disassembly or alteration, accidents, damage caused by improper installation.

- Damage caused by improper use of user, such as liquid injection, damage due to external force, etc.

- Failure to use, repair or transport caused by the equipment's instruction manual.

- Damage to the product is caused by external, including but not limited to, abnormal and unpredictable factors such as satellite systems, geomagnetism, static electricity, physical pressure, etc.

- Damage caused by force majeure such as earth- quakes, floods, wars, etc.

- Other conditions that cannot comply with the relevant provisions of the Guarantees Rights.