



G40Plus GNSS Receiver User Manual

Guangzhou GEOSURV Information Technology Co.,Ltd.

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Chapter I: Overview

In this chapter, you will learn about GINTEC Team and G40Plus GNSS Receiver.

§1.1 Introduction

Welcome to use GNSS products of GINTEC team (Guangzhou **Geosurv Information Technology Co.,Ltd**). Our team has been committed to popularize the advanced GPS surveying and mapping technology and products to the hands of measurement users. If you want to know more about us, please visit the official website: <http://www.gintec.cn/>

This manual is G40Plus measurement system as an example, for how to install, set up, upgrade, daily maintenance, the use of accessories and how to use RTK system operation to explain. Even if you have used other models of RTK products of our company, it is recommended that you read this instruction carefully before using the instrument for better use.

§1.2 Highlights of G40Plus

➤ Super Base

Equipped with 5W high power internal radio, radio signal covers up to 20 km(typical).

➤ High-Capacity Built-in Battery, Longer Duration

13600mAh large capacity built-in battery, the operation duration is up to 8-10 hours (Base mode,5W power)

➤ New-Generation Soc

Powerful GNSS SoC chip with 1408 channels.

Supports the new B3I, Galileo E6 tracking

G-FIX support.

➤ G-FIX Correction Outage Technology

Extend RTK positioning up to 10 mins

Reducing downtime waiting to re-establish RTK corrections

➤ Calibration-Free Tilt Compensation

Calibration and initialization FREE

Ready for tilt survey straight out of the box

➤ New Antenna Combination

Highly integrated GNSS,4G, WIFI, and Bluetooth antennas

Powerful Performance, Smaller Size

➤ Augmented Reality (AR)

Overlay digital information onto the real world

Assist to view the stakeout location and see designed features in real time

➤ Anti-Interference Technology

Advanced multi-frequency interference suppression and multi-step adaptive filtering technology

Strong and stable signal in challenging conditions

➤ Professional Camera

High-resolution Night vision camera

Brood perspective, sophisticated algorithms guarantee the precision of up to 1cm

Seamlessly combines 360-degree AR visual stakeout and image AR visual stakeout

Chapter II: Product Introduction

By reading this chapter, you can master the composition, installation, and functions of the G40Plus measurement system in detail.

§2.1 Introduction

G40Plus measurement system is mainly composed of device, manual and accessories, as shown in the figure:



§2.2 Introduction of G40Plus

§2.2.1 Structure and Interface







Structure and Interface	APPLICATION
UHF antenna interface	Connecting build-in radio antenna
Type-C interface	Charging and data transmission
Five-core interface	Data transmission
Connecting screw hole	Used to fix the G40Plus on the base or pole
Serial number	To identify each device and register code
Sticker	To show some information about G40Plus


Camera	Support AR stakeout
SIM card interface	Insert SIM card to enable device access the internet

§2.2.2 Buttons and Indicators

G40Plus has three indicators and two button.



Buttons and indicators	Function	Condition
	Switch on/off, confirm	Power on, power off, confirm the modification item
	Satellite indicator	Red light flashing indicates that no satellite signal Green light flashing indicates receipt of satellite signal but not fixed A constant green light indicates that device is fixed
	Data indicator	A constant blue light indicates that Bluetooth has been connected Blue light flashing indicates the data is transmitting
	Battery indicator	Click the Battery display button, then the Battery indicator will show the current

	Battery display button	charge, whether the device is turned on or off
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§2.2.3 Function of Button

I Mode checking

When G40Plus is working normally, click the power button, then a voice will broadcast the current working mode. (mode, communication mode, solution state)

II Power on

In shutdown state, long press the power button, when G40Plus tick and all the lights on, release the button and G40Plus will power on.

III Power off

In boot on state, long press the power button, when the voice broadcast "power off", click the power button again.

§2.3 P3 Controller

§2.3.1 Appearance



I

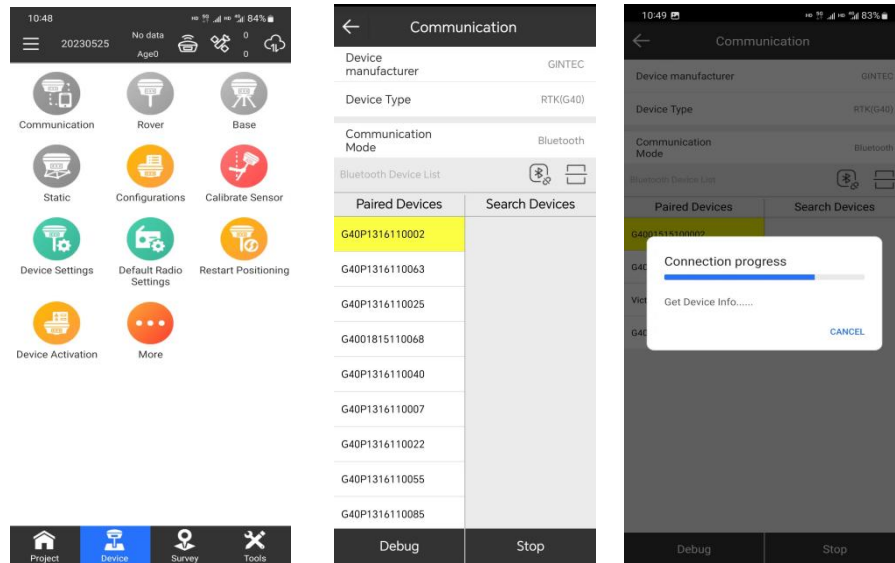
§2.3.2 Keyboard



No.	Section	Specification
1	Numeric keys	Enter numbers
	Special function key	Orange icons take effects when "Fn" is locked The functions of F1-F6 can be customized by users in "Settings"
2	Power button	Turn on/off device/sleep/wake up
3	@key	Enter the character @
4	Input method switching	Input uppercase/lowercase/digital switch
5	Return Key	Back to last interface
6	Fn Key	Tap to lock Fn and activate the function indicated by the yellow icon on the number key
7	Shift Key	Input method select key, call out "Select input method" interface
8	Tab Key	Make tableadvance to the next anchor point or move the input focus to the next control
9	Delete Key	Delete one character before entering other characters
10	Survey Key	Users can customize the function in the "Settings" button
11	Keys for direction	Move the cursor or anchor point
12	Application Key	Users can customize the function in the "Settings button

§2.3.3 Bluetooth Connection

Start the G40Plus first, and then use P3 controller to perform the following operations:



1. Open SurPad software and click "Communication" to enter the connection interface.
2. Select the manufacturer as "GINTEC", the device type as "G40", and the communication mode as "Bluetooth"
3. Select the corresponding SN and click "Connect". The connection succeeds after the progress bar ends.

§2.4 Introduction of Accessories

§2.4.1 Packing List of G40Plus+G40+P3

GINTEC®
TAKE POSITION ASSURED

G40 Plus+G40+P3 Packing List

G40 Plus GNSS Receiver (Super Base) + **G40** GNSS Receiver (Rover)

<ul style="list-style-type: none"> 1 Carrying Case 2 G40 Plus GNSS Receiver 3 G40 GNSS Receiver 4 Charger and Adapter(UK/KR/EU/US) 5 USB to Type-C Data Cable x2 6 Type-C to Type-C Charging Cable x2 7 Height Measuring Plate 	<ul style="list-style-type: none"> 8 Connector x2 9 30CM Antenna Pole 10 430-450 MHz Radio Antenna x2 11 Tribrach(Optional) 12 Carbon Fiber Pole 13 16 GB USB Flash Drive(manuals & tools) 14 3 meters Measuring Tape
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P3 Handheld Controller

- 1 P3 Handheld Controller
- 2 Charger and Adapter
- 3 USB to Type-C Data Cable
- 4 Type-C to Type-C Charging Cable
- 5 OTG Data Cable
- 6 Bracket
- 7 Screen Protector x1

TEL: 8620-82514956 | Website: www.gintec.cn | Email: overseas@gintec.cn
 ADD: Room401-403, Building A02, No. 83, Kaiyuan Avenue, Huangpu District, Guangzhou, Guangdong, China

§2.4.2 Charger

Standard configuration includes charger and charging cable:

While charging, when the power indicator is red, it means charging; when the indicator is green, it means full.

Power adapter and charging cable:



§2.4.3 UHF Radio Antenna



UHF radio antennas are required for the built-in radio Base mode and the built-in radio Rover mode.

§2.4.4 TYPE - C Cable

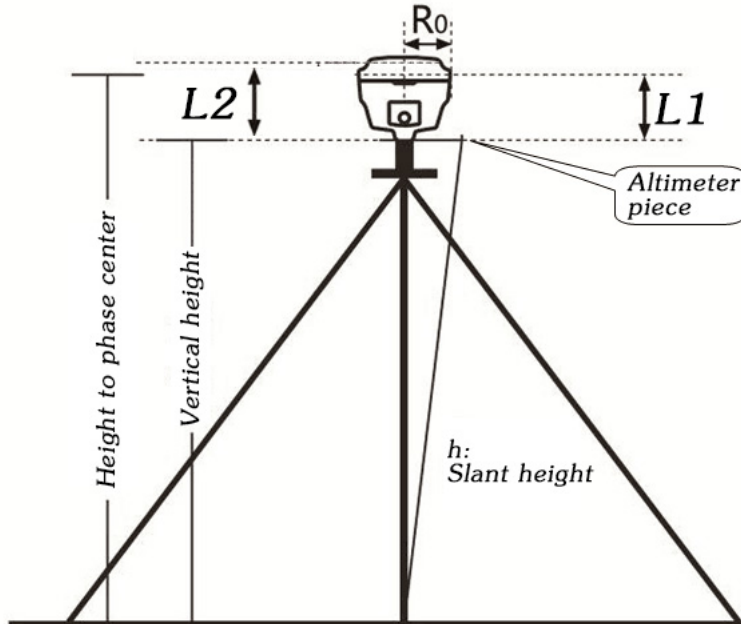
TYPE - C cable is to connect the G40Plus with computer, used for transmission of static data or receiver firmware upgrading.



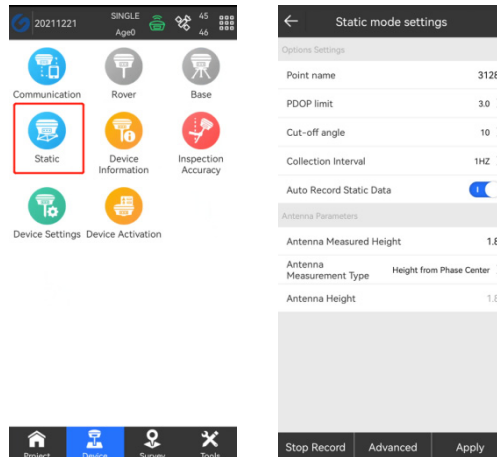
Chapter III: Mode Setting

§3.1 Static Mode

- 1) Set up a tripod at the control point, connect the tribrach, strictly center and level the measuring point.



- 2) Measure instrument height for three times, and the difference between the three times shall not exceed 3 mm and take the average value.
- 3) Record SN, point name, instrument height and start time.



- 4) Switch on the G40Plus and connect with controller software, set the receiver to static mode, and set the parameters as the picture shows. (The memory capacity of G40Plus must be

sufficient. Generally, 8 MB storage capacity is required in an hour.)

- 5) G40Plus starts to search for satellite and the satellite lights start flashing. When the recording condition is reached, the status light will flash at the set sampling interval, and the flash indicates that an epoch is collected.
- 6) After the surveying finished, shut down G40Plus, and then transport the data and process data.

§ 3.2 RTK Mode (External Radio)

§3.2.1 Base Setup

Base station must be set up in the open field, the surrounding environment should be open, the terrain should be higher. Do not set it up near high-voltage power transmission, transformation equipment, near radio communication equipment antenna, or under trees and near water.

Setting steps:

- 1) Set up the tripod as shown in the figure above, hang up the radio, fix the G40Plus, and connect the extension rod and the large radio transmitting antenna.
- 2) Connect the battery with Radio by Y-type power cable.



(External Radio)



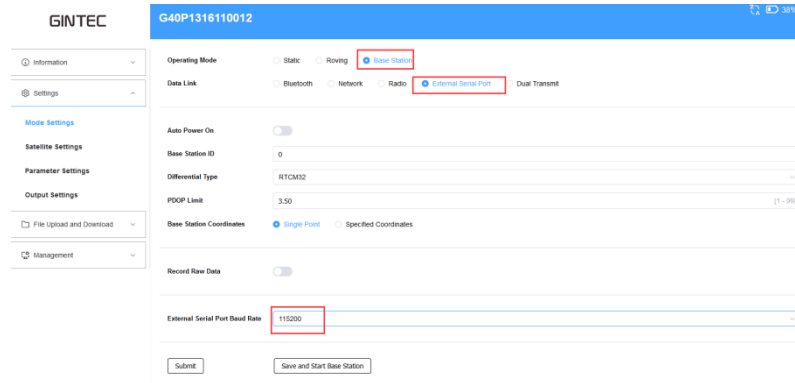
(Battery)

§3.2.2 Starting Base

Used TRU35 external radio as an example to show the process, and if has another radio, please consult the technician.

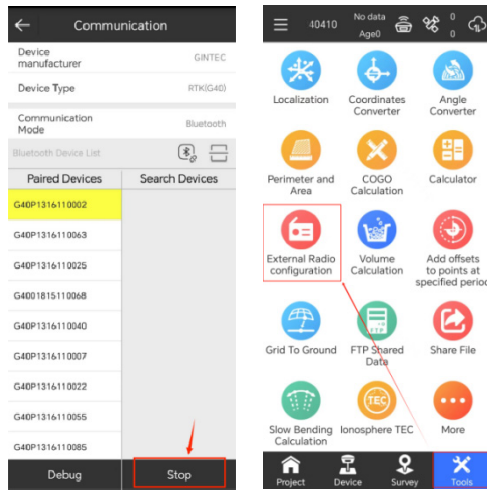
- 1) Turn on the device. Connect the device WIFI by your computer or controller, WIFI name is device SN number. Then login device WEBUI, at 192.168.10.1 (It needs to enter an account and password the first time you use a new browser to visit it: admin/password)

- 2) Under "Settings", Choose "Mode Settings" to be "Base" and Data link choose "External Serial Port"

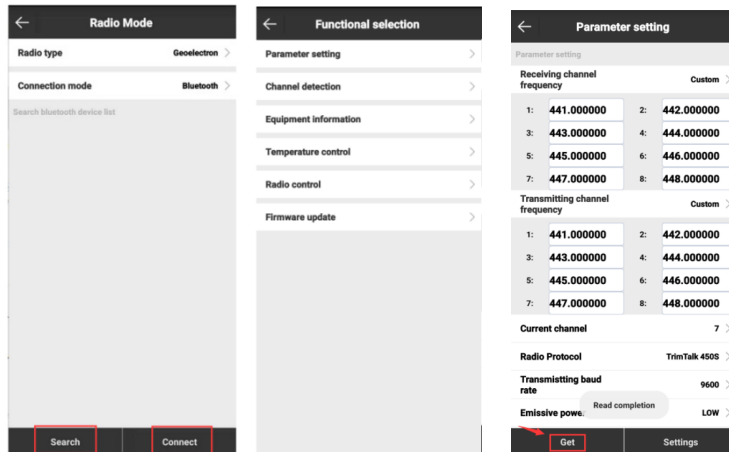


- 3) Set the base info and choose the baud rate at 115200, then click "Save and start base station".

- 4) Click "External Radio Configuration" under "Tools" in SurPad.



- 5) In "External Radio configuration", choose "Radio type" to be "Geoelectron" and "Connection mode" to be "Bluetooth", then search TRU35 radio and connect it. (Pairing code is "1234") .



- 6) After connected, you will come to "Functional selection" interface, click "Parameter Settings", click "Get" to receive TRU35 parameters and there to change the "Receiving channel frequency", "Transmitting channel frequency" and other settings, then press "Settings" to finish settings.

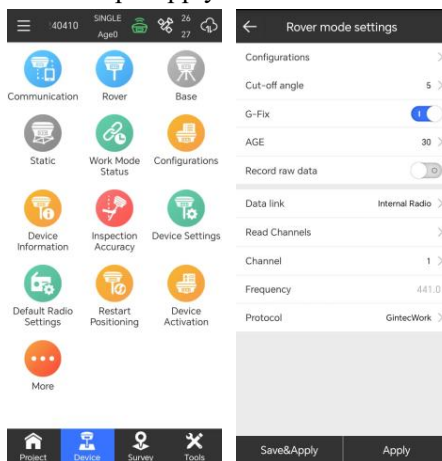
§3.2.3 Rover Setup

After successful set up of the base station, now we can start the rover setting.

Install the G40Plus on the centering lever, install the radio antenna, bracket, clamp the controller.

The steps are as follows:

- 1) Turn on the G40Plus and controller, open SurPad software and connect Bluetooth.
- 2) Click "Device" - "Rover", choose "Data link" as "Internal Radio", and choose the same channel and protocol as Base. Click "Apply" to start rover.



- 3) When it shows "Fixed", it is correctly setting, now you can start the surveying work.

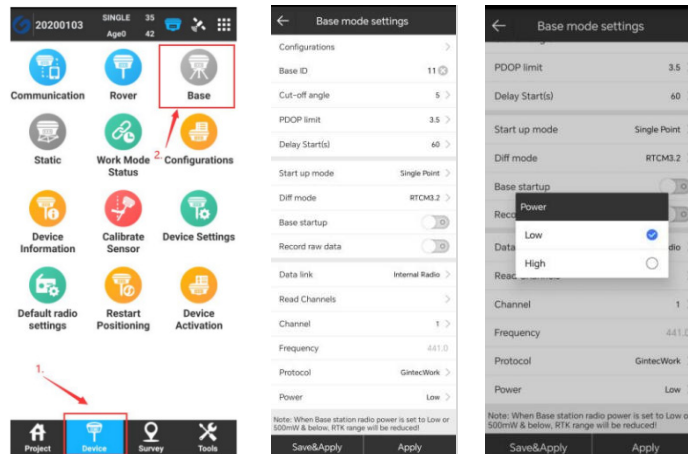
§ 3.3 RTK Mode (Internal Radio)

§3.3.1 Base setup

Base station must be set up in the open field, the surrounding environment should be open, the terrain should be higher. Do not set it up near high-voltage power transmission, transformation equipment, near radio communication equipment antenna, or under trees and near water.

§3.3.2 Starting Base

- 1) Open SurPad in the controller, Click "Device"→ "Base" to set Base station.



- 2) Under "Base Mode Settings", Choose "Data link" to be "Internal Radio", set the channel, frequency and protocol, then apply to finish setting. (For the power setting, “High” is 5 W, and “Low” is 3 W.)

§3.3.3 Rover Setup

This step is the same as §3.2.3 Rover Set up, please check this section.

§3.4 RTK Mode (Network mode)

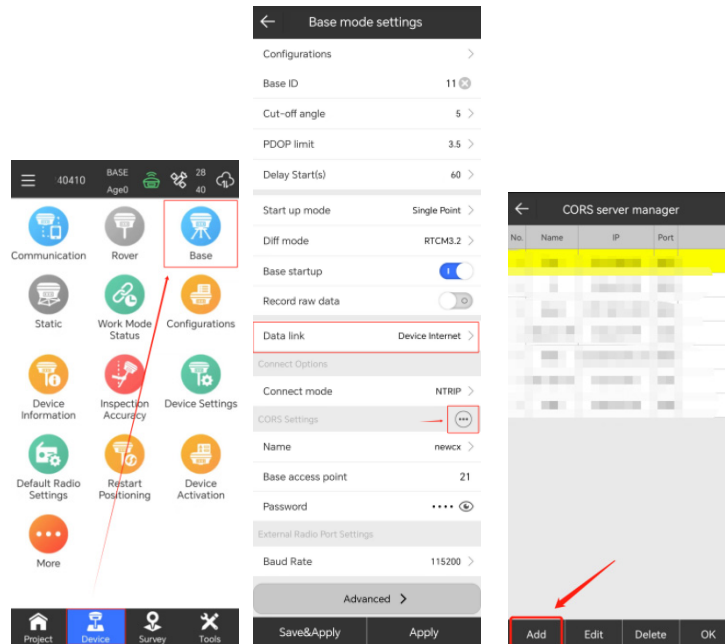
§3.4.1 Base Setup

Base station must be set up in the open field, the surrounding environment should be open, the terrain should be higher. Do not set it up near high-voltage power transmission, transformation equipment, near radio communication equipment antenna, or under trees and near water.

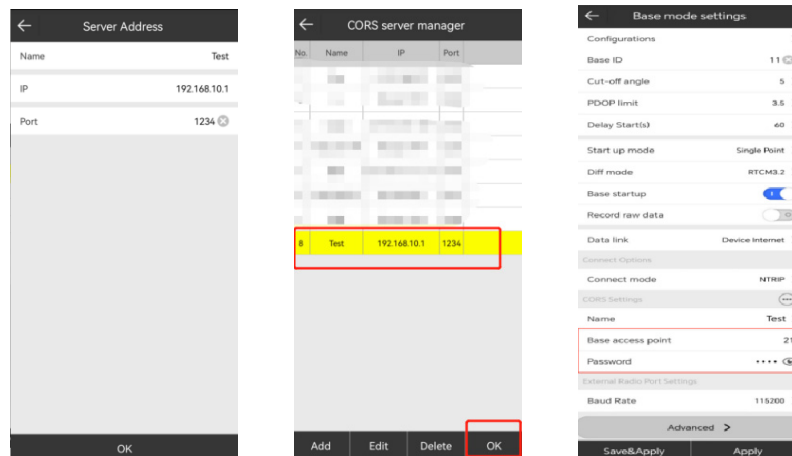
Set up the tripod, fix the G40Plus, and connect the radio antenna.

§3.4.2 Starting Base

- 1) After setting, please make sure there is a workable Sim card inside G40Plus base. Then open SurPad in the controller, Click "Device"→ “Base” to set Base station.



- 2) Under "Base Mode Settings", Choose "Data link" to be "Device Internet", then go to set CORS parameter. (When use "Device Internet", please input the correct the APN setting as your mobile network service provider ask for)
- 3) Clip "Add" in the CORS setting page, then import your CORS "IP" and "Port", then choose the CORS information you set, clip "OK".
- 4) Input the name you want in "Base access point", and you can also input "password" , then apply. (Remember what you have input, it will be useful when you set up rover).



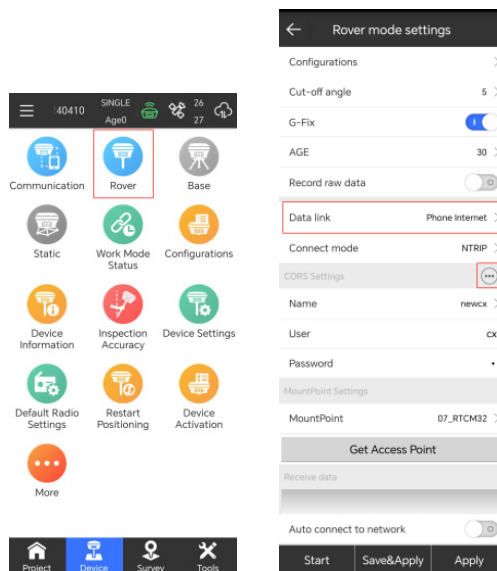
§3.4.3 Rover Setup

After successful set up of the base station, now we can start the rover setting.

Install the G40Plus on the centering lever, install the radio antenna, bracket, clamp the controller.

The steps are as follows:

- 1) Turn on the G40Plus and controller, open SurPad software and connect Bluetooth.
- 2) Click "Device" - "Rover", choose "Data link" as "Phone/Device Internet" (When use "Device Internet", please input the correct the APN setting as your mobile network service provider ask for).
- 3) Click "CORS Setting" and choose the same item as what your base used.
- 4) "Get Access Point" and choose the access point as your base setting. Click "Apply" to start rover.



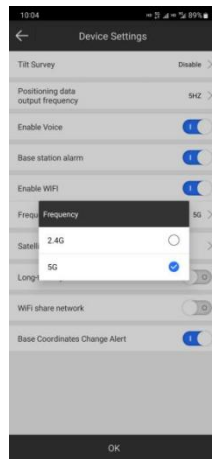
- 4) When it shows "Fixed", it is correctly setting, now you can start the surveying work.

§ 3.5 AR Stakeout

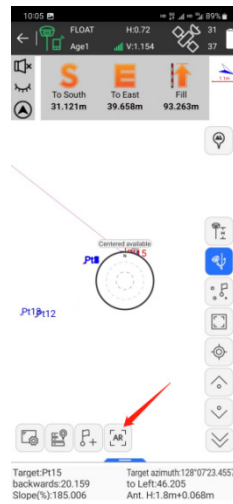
- 1) Turn on SurPad software, Click "Device" - "Communication", Communication Mode choose "WIFI"



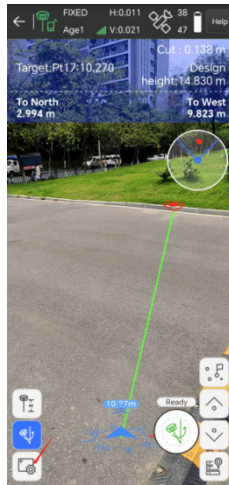
2) Click "Device Settings" - "Frequency", choose "5G"



3) Click "Survey" - "Point Stakeout", choose the point what you want to stakeout and click "AR"

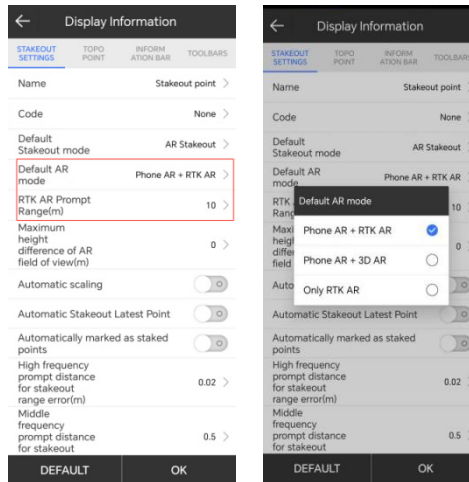


4) Find lofting points by following the arrows and line segments.(This is the phone AR mode,The camera settings for the lofting can be changed through settings)

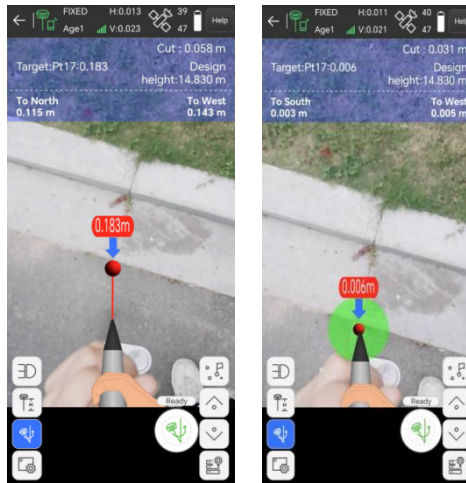


When the Default stakeout mode is set to “Phone AR+RTK AR”, the RTK AR prompt Range(m) is the boundary distance between the phone AR and the RTK AR.(e.g.If set to 10 meters, when the device distance from greater than 10m to less than 10m,the mobile phone screen will display phone camera to RTK camera)

You can also use Only RTK AR according to your personal preference or use a combination of phone AR and device 3D view.



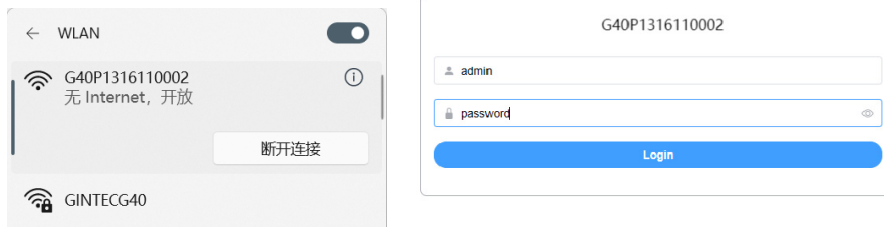
The following is the view of the RTK AR camera, when the target point is reached, a green circle will appear at the collection point.



Chapter IV: WEB UI

§4.1 WEBUI Login

Start the G40Plus properly, use a mobile terminal such as a laptop or mobile phone, open WiFi, and find the G40Plus hotspot. The hotspot name format is the device SN number. After connecting successfully, enter 192.168.10.1 in the browser and go to the WEBUI background page.



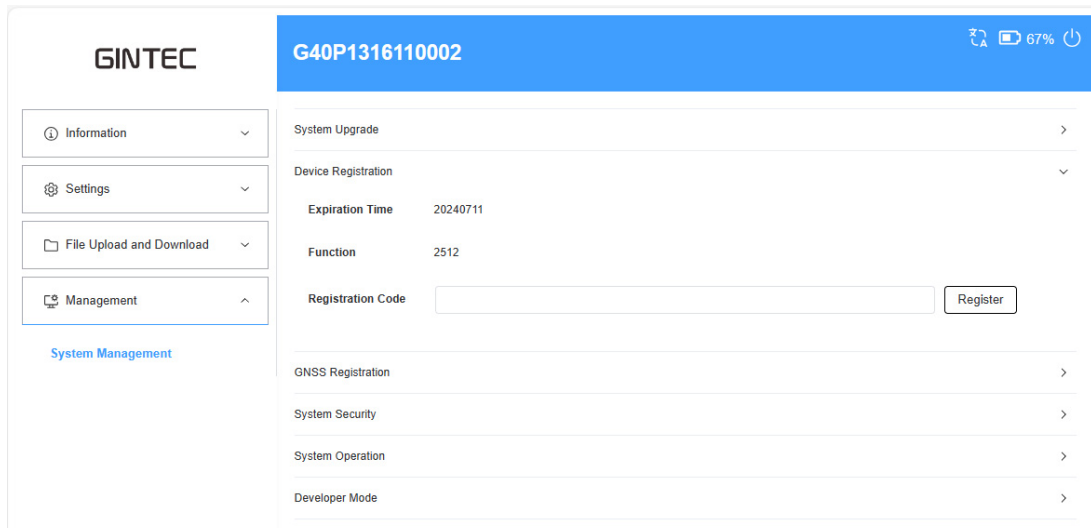
The user name and password needs to be entered when first time login WEBUI through a new browser.

User name: admin

Password: password

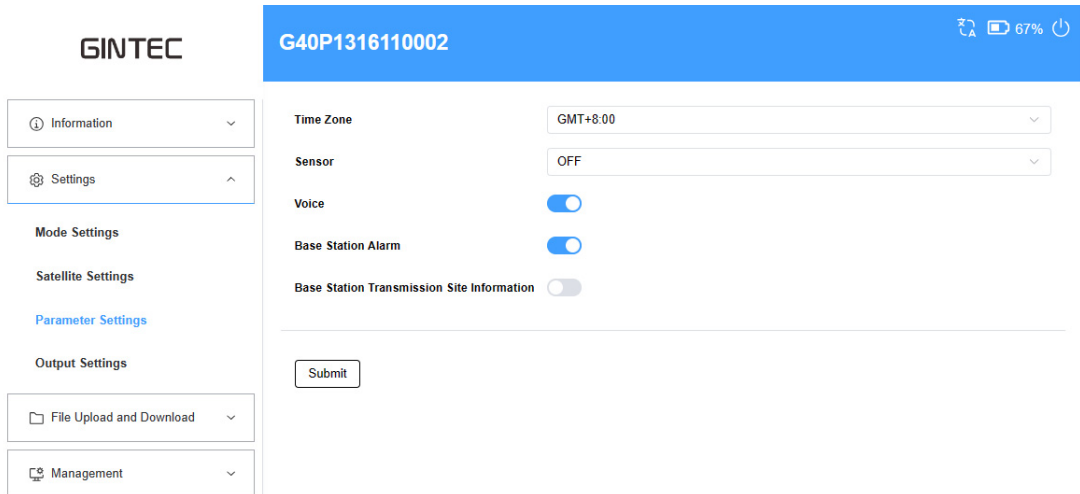
§4.2 Common Function from WEB UI

§4.2.1 Code Registering



Click "Management-Management", you can paste the register code here to active the G40Plus.

§4.2.2 Time Zone Setting

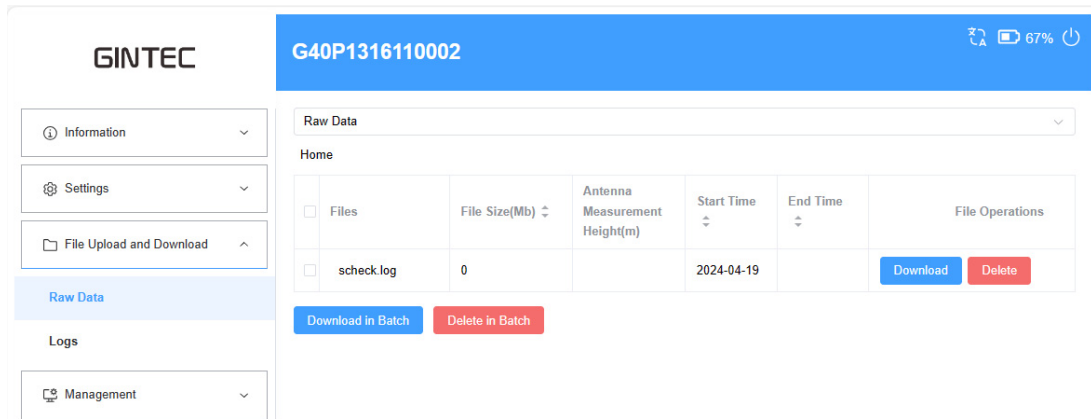


Click "Settings-System Para", where you can modify time zone. You can also modify other parameters here.

§4.2.3 Data Download

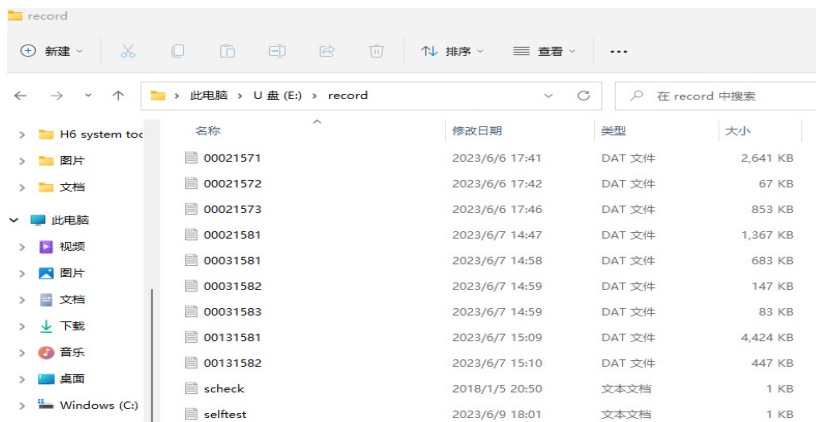
Methods I: WEBUI

Click "File-Raw Data", choose the right data format and date to get the data list. Download the data you want in the coming list.



Methods II: USB cable

Connect G40Plus with your PC by USB to Type-C cable, your computer will automatically read a G40Plus storage folder. Open it and choose the "record" to the folder you want and download the file you need.



§4.2.4 Device Firmware Update

Ask the newest firmware from the technician where you buy G40Plus from, follow the next steps to update the firmware.

WEBUI

Click "Management-Manage", better to use "Choose file" function. Choose the firmware file you got and upload. G40Plus will automatically restart after the firmware is installed successfully.

Appendix A: G40Plus Technical Specifications

Configuration		Detailed Indicators
Measurement Performance	Signal Tracking	1408 Channels GPS: L1C/A, L1C, L2P(Y), L2C, L5 GLONASS: G1, G2, G3 BDS: B1I, B2I, B3I, B1C, B2a, B2b GALILEO: E1, E5a, E5b, E6 QZSS: L1, L2C, L5, L6* NAVIC: L5* SBAS: L1C/A L-Band*
	GNSS Features	Data Update rate: 50Hz (RTK+Raw Data) Initialization time: < 5s Initialization reliability: > 99.99% Cold Start: < 12s
Positioning precision	Static GNSS Surveying	Horizontal: $\pm (2.5\text{mm}+0.5\text{ppm})$ Vertical: $\pm (5\text{mm}+0.5\text{ppm})$
	Real-Time Kinematic Surveying	Horizontal: $\pm (8\text{mm}+1\text{ppm})$ Vertical: $\pm (15\text{mm}+1\text{ppm})$
Inertial sensing system	IMU	Support
User interaction	Operating system	Linux
	Buttons	Two button operation
	Indicators	Three indicate lights
	Web UI	Support to access Web UI via Wi-Fi and USB
	Voice guide	Support for multiple languages: Chinese, English, Turkish, Polish, Korean, Indonesian, Spanish, Telugu, Russian,
Hardware Performance	Dimension	155.6mm*155.6mm*93mm
	Weight	1400g

	Material	Magnesium aluminum alloy shell
	Temperature	Operating: -30 °C~+65 °C Storage: -40 °C~+80 °C
	Humidity	99.9% Non-condensing
	Protection	IP68
	Shock	Withstand 2 meters pole drop
Power and Battery	Power Supply	12V/2A, Max 24W
	Battery	Internal Li-on, 13600mAh, 7.2V
Communications	I/O port	Type-C port (Charging and data transmission) Radio antenna interface Micro SIM card slot Five-core interface
	Wireless modem	Built-in radio, Low 3W High 5W Maximum Range:15KM+ Frequency Range: 410-470MHz Protocol: GintecWork, TrimTalk450s(T), Trim Mark III, SOUTH, PCC-EOT, Hi-target, Satel
	4G	LTE FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B19/B20/B25/B26/B28 LTE TDD: B38/B39/B40/B41 UMTS: B1/B2/B4/B5/B6/B8/B19 GSM: B2/B3/B5/ B8/
	Bluetooth	V5.0, BLE
	Wi-Fi	802.11 a/b/g/n standard
	WIFI data link	To work as the data link that receiver can broadcast and receive differential data via WIFI
Data storage/ Transmission	Data Storage	32GB internal storage
	Data Transmission	USB data transmission, supporting FTP/HTTP data download
	Data Format	Differential data format: CMR, sCMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 GPS output data format: NMEA 0183, PJK plane coordinates, Binary code Network model support: VRS, FKP, MAC, fully support NTRIP protocol

FCC Warning

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.

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.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.