G40 GNSS Receiver

User Manual

Guangzhou Geosurv Infomation Technology Co.,Ltd

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Menu

Chapter I: Overview

In this chapter, you will learn about GINTEC Team and G40 GNSS Receiver.

§1.1 Introduction

Welcome to use GNSS products of GINTEC team (Guangzhou **G**eosurv **In**formation **Tec**hnology 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 G40 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 G40

- **New-Generation Soc**

Powerful GNSS SoC chip with 1408 channels.

Supports the new B1C, B2a, B2b, and BeiDou-3.

L-band support.

- **New Antenna Combination**

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

Powerful Performance, Smaller Size

- **Calibration-Free Tilt Compensation**

Calibration and initialization FREE IMU

Ready for tilt survey straight out of the box

- **Anti-Interference Technology**

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

Strong and stable signal in challenging conditions

- **G-FIXED Correction Outage Technology**

Extend RTK positioning up to 10mins

Reducing downtime waiting to re-establish RTK corrections

- **Augmented Reality (AR)**

Overlay digital information onto the real world

Assist to view the stakeout location and seeing planned features in real time

- **Built-in Battery, PD Quick Charge**

Support USB PD3.0/45W quick charge

Charging time ≤3.5 Hours

Battery life ≥ 1,000 cycles

- **Professional Camera**

High-resolution Night vision camera

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

Seamlessly combines 360-degree AR layout and image layout

Chapter II: Product Introduction

By reading this chapter, you can master the composition, installation, and functions of the G40 measurement system in detail.

§2.1 Introduction

G40 measurement system is mainly composed of host, manual and accessories, as shown in the figure:

§2.2 Introduction of G40

§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
Connecting screw hole	Used to fix the G40 on the base or pole
Serial number	To identify each device and register code
Sticker	To show some information about G40
Camera	Support AR stakeout
SIM card interface	Insert SIM card to enable device access the internet

§2.2.2 Buttons and Indicators

G40 has two indicators and one 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

§2.2.3 Function of Button

Ⅰ Mode checking

When G40 is working normally, click the power button, then a voice will broadcast the current working mode.

Ⅱ Power on

In shutdown state, long press the power button, when G40 tick and all the lights on, release the button and G30 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 P9IV Controller

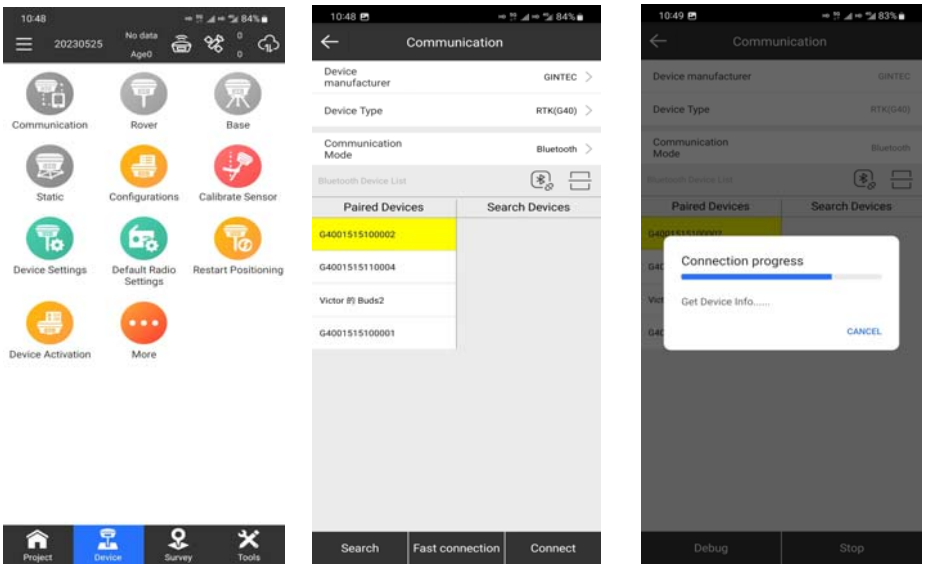
§2.3.1 Appearance

§2.3.2 Keyboard

No.	Key	Definition	
1	Keys with numbers	To enter numbers	
	Keys with functions (Related function refers to orange icons when activating）	Orange voice icon on key “1”	Voice input to make Surpad perform some voice commands (under development)
		Orange camera icon on key “2”	Can call up the Camera button
		Orange screenshot icon on key “3”	Take a quick screenshot
		F1-F5	User can define
2	Key for measuremet	When Surpad interface isn’t displayed, press to open or switch to Surpad interface.	
		When Surpad interface is on display, press to collect data.	
3	Keys for direction	Move up, down, left, and right on the screen or menu in function state, the up and down keys are for volume control; in the function state, the left and right keys are for screen brightness control.	
4	Recent Key	Call the list of recent apps	
5	Home Key	Back to Home Page	
6	Return Key	Back to last interface	
7	Enter key	Confirm/line feed In Surpad interface, this key is used to collect data in the non-input state	
8	Delete Key	Delete one character before enter other characters.	
9	Tab Key	Make table	
10	Shift Key	When using the physical keyboard as input method, this key can switch between numbers, lowercase and uppercase letters.	
11	Fn Key	Fn mark will prompt in the upper notification bar when pressing this key, meaning the functions marked by orange icons on keys can be used.	
12	Power LED	In standby mode	Solid red: power is <15%.
			Off: power is >15%.
		In charging	Flashing green: in charging Solid green: full of charge
13	Power button	Turn on/off device	
14	WiFi/Bluetooth LED	Blue: handheld is connected with receiver B/T. Green: handheld is connected with receiver WIFI. Off: handheld isn’t connected through B/T or WIFI.	

§2.3.3 Bluetooth Connection

Start the G40 first, and then use P9IV 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 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 Instrument Container

§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.

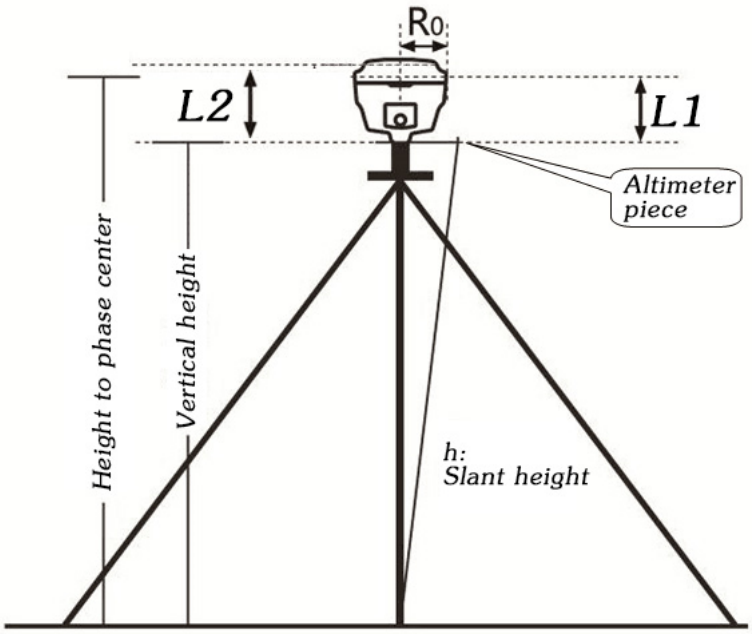
§2.4.4 TYPE - C Cable

TYPE - C cable is to connect the G40 with computer, used for transmission of static data or receiver firmware upgrading.

Chapter III: Mode Setting

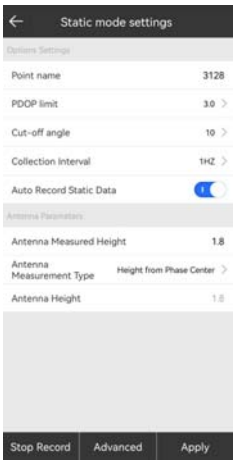
§3.1 Static Mode

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 G40 and connect with controller software, set the receiver to static mode, and set the parameters as the picture shows. (The memory capacity of G40 must be sufficient.

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

5) G40 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 G40, 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 G40, and connect the extension rod and the large radio transmitting antenna.

2) Connect the battery with Radio by Y-type power cable.

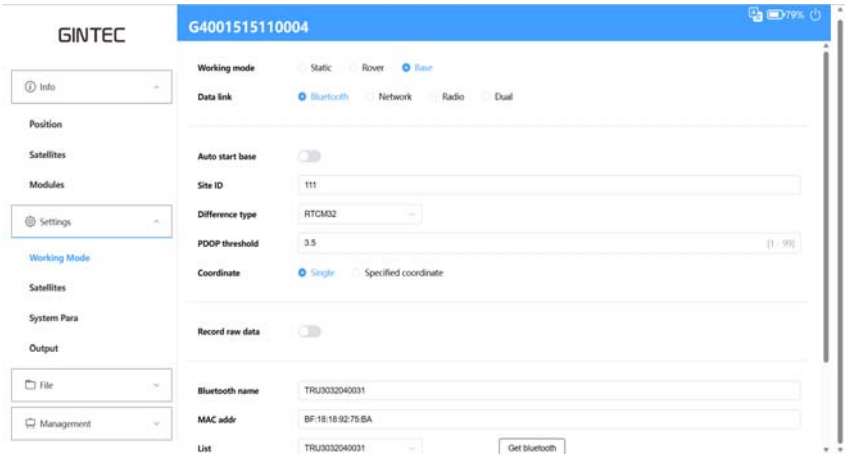
（External Radio）

（Battery）

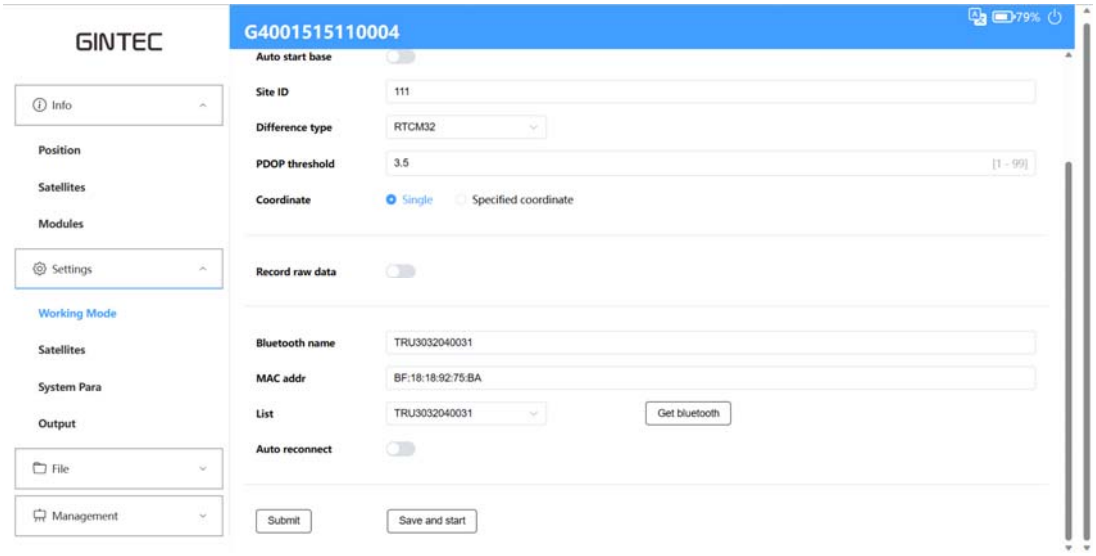
§3.2.2 Starting Base

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

1) Turn on the device. Connect the device WIFI by your computer or controller, WIFI name is device SN number. Then login device webui, website is 192.168.10.1

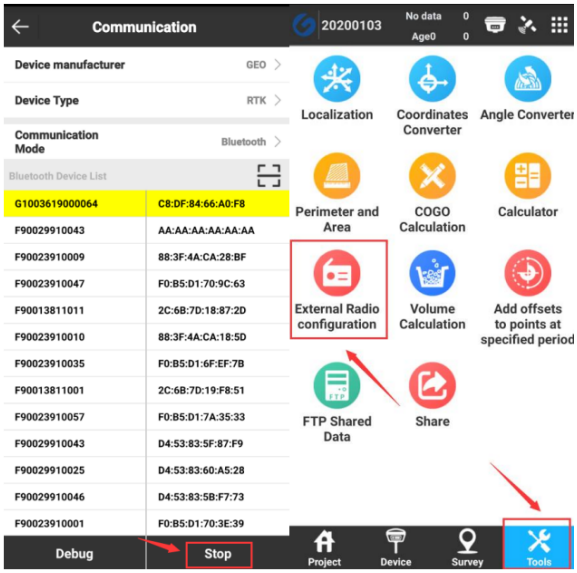


2) Under “Settings”, Choose “Working Mode” to be “Base” and Data link choose “Bluetooth”

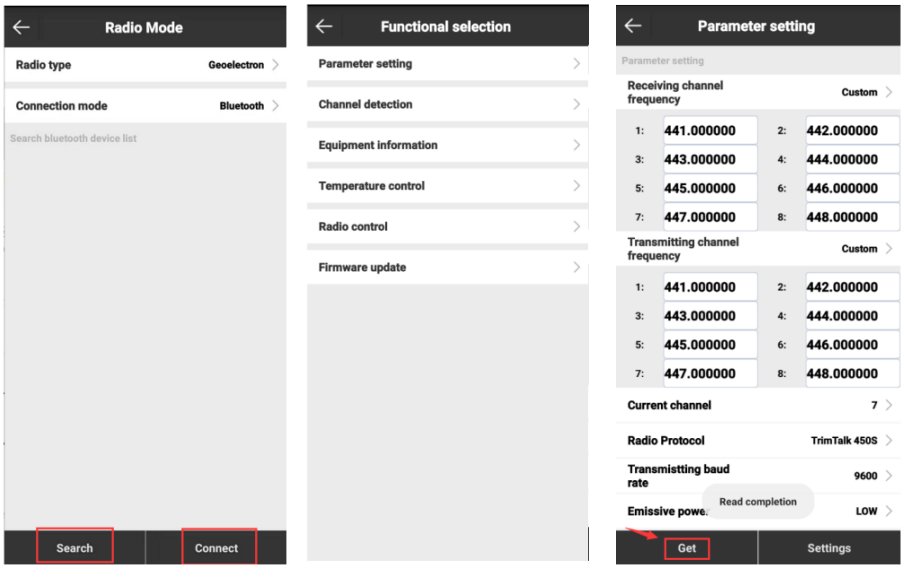


3) Choose “Get bluetooth” , connect external radio type from the List

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”).



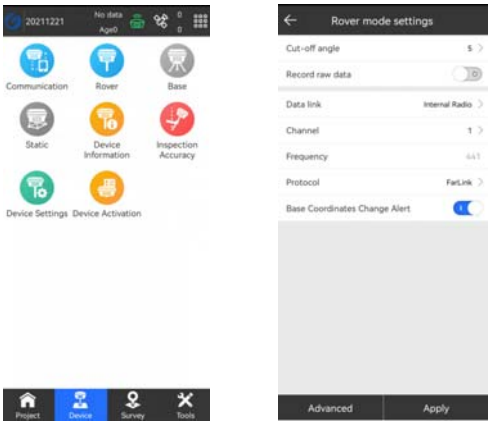
6) After connected, you will come to “Functional selection” interface, click “Parameter settings”, click “Get” to receive TRU35 parameters and there to change the “Receiving channel frequency”, “Transmitting channel frequency” and other settings, then press “Settings” to finish settings.

§3.2.3 Rover Setup

After successful set up of the base station, now we can start the rover setting.
Install the G40 on the centering lever, install the radio antenna, bracket, clamp the controller.

The steps are as follows:

1) Turn on the G40 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. Clip “Apply” to start rover.



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

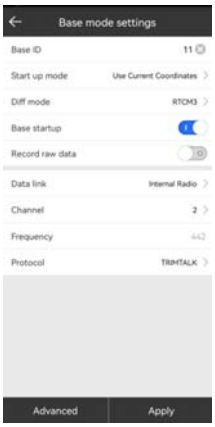
§ 3.3 RTK Mode （Internal Radio）

§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.

§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

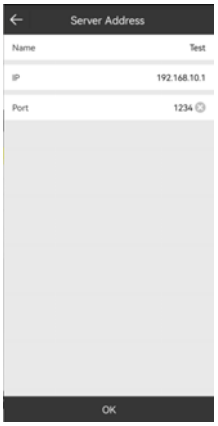
Base station must be set up in the open field, the surrounding environment should be open, the terrain should be higher. Do not set it up near high-voltage power transmission, transformation equipment, near radio communication equipment antenna, or under trees and near water.

Set up the tripod, fix the G40, and connect the radio antenna.

§3.4.2 Starting Base

1) After setting, please make sure there is a workable Sim card inside G40 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 “Bae 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 G40 on the centering lever, install the radio antenna, bracket, clamp the controller.

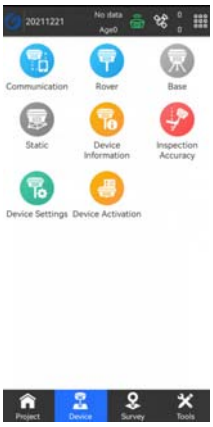
The steps are as follows:

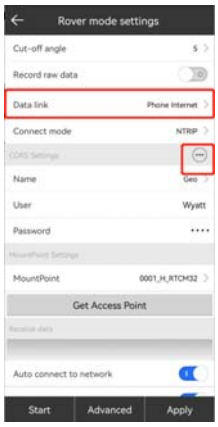
1) Turn on the G40 and controller, open SurPad software and connect Bluetooth.

2） Clip “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） Clip “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. Clip “Apply” to start rover.

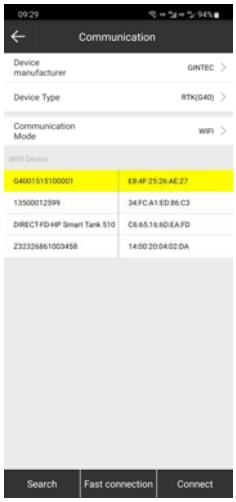




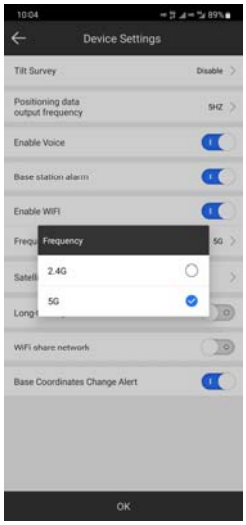
4） When it shows “Fixed”, it is correctly setting, now you can start the surveying work.

§ 3.5 AR Stakeout

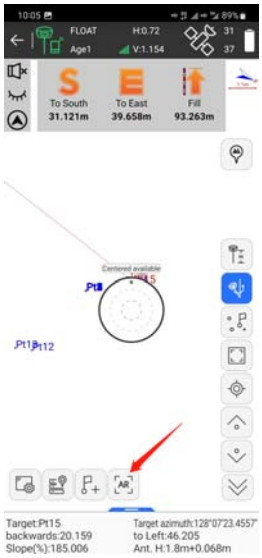
1）Turn on SurPad software, Click “Device”- “Communication”, Communication Mode choose “WIFI”



2）Click “Device Settings”- “Frequency”, choose “5G”



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

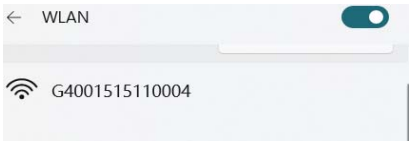


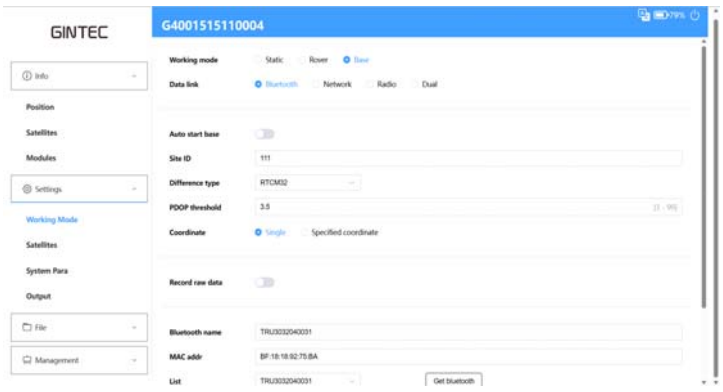
Chapter IV: WEB UI

§4.1 WebUI Login

Start the G40 properly, use a mobile terminal such as a laptop or mobile phone, open wifi,

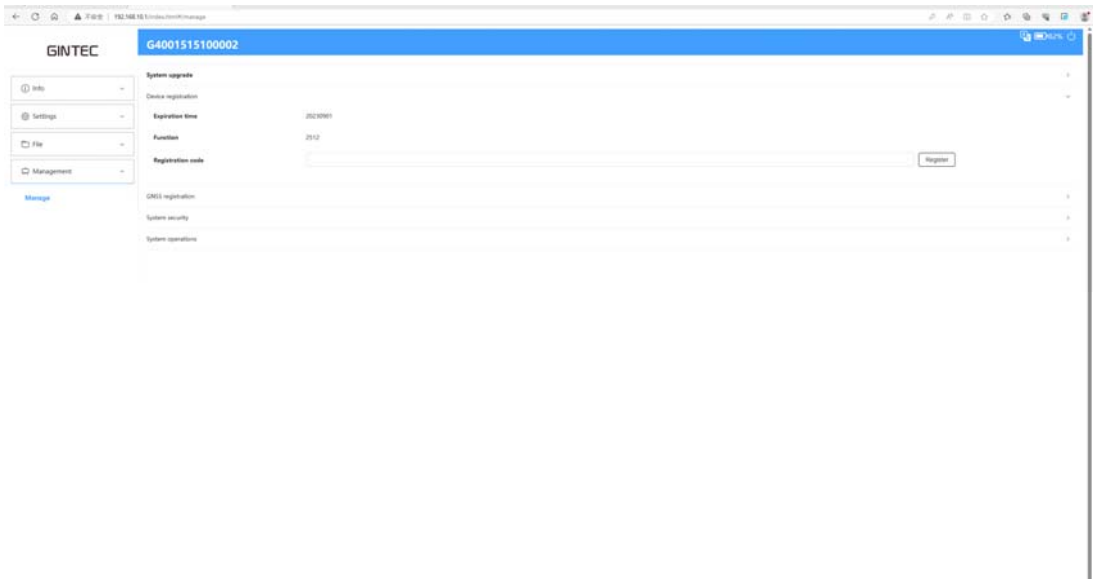
and find the G40 hotspot. The hotspot name format is the device SN number. After connecting successfully, enter 192.168.10.1 in the browser and go to the WebUI background page.





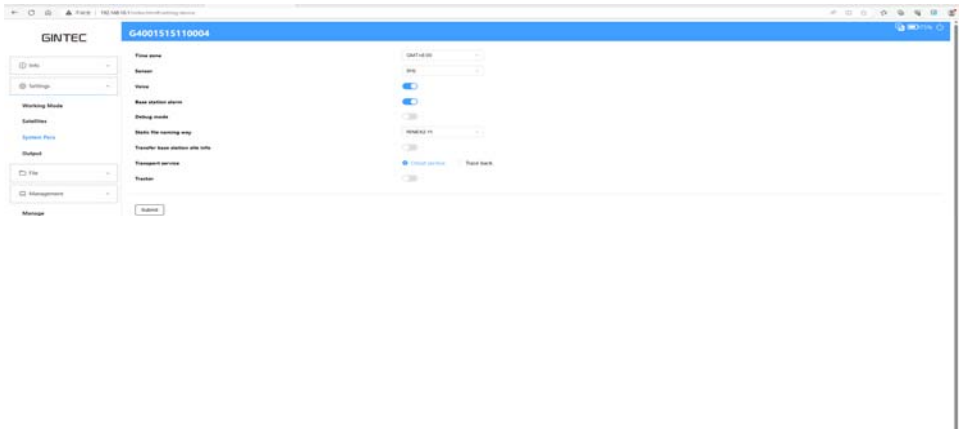
§4.2 Common Function from WEB UI

§4.2.1 Code Registering



Click “Management-Manage”, you can paster the register code here to active the G40.

§4.2.2 Time Zone Setting

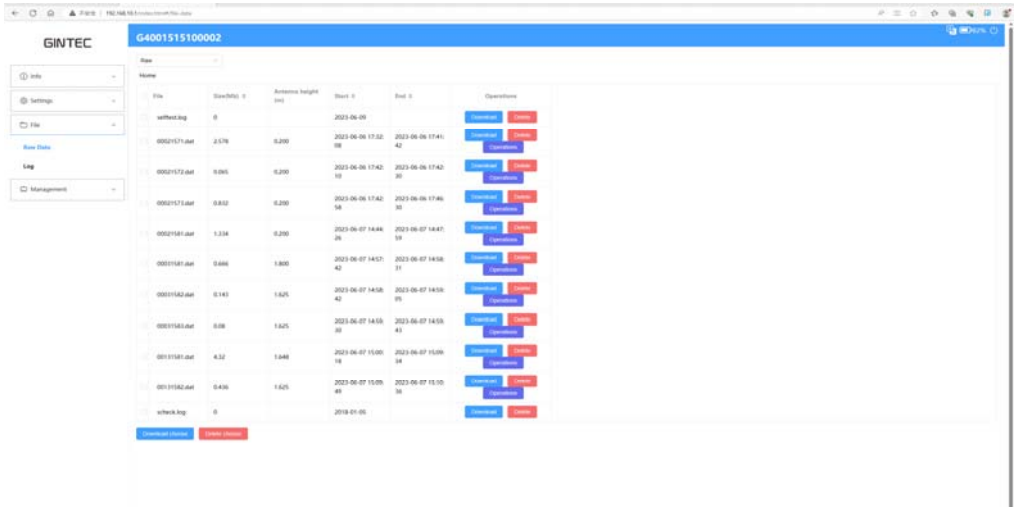


Click “Settings-System Para”, where you can modify time zone. You can also modify other parameters here.

§4.2.3 Data Download

Methods I: WebUI

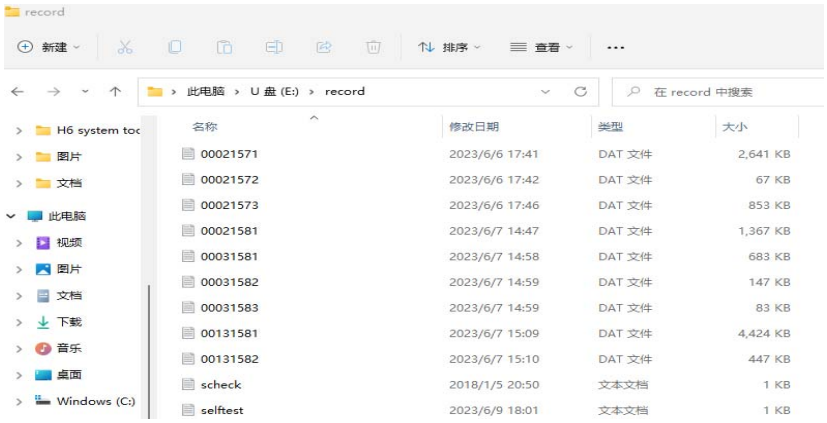
Click “File-Raw Data”, choose the right data format and date to get the data list. Download the data you want in the coming list.



Methods II: USB cable

Connect G40 with your PC by USB to Type-C cable, your computer will automatically read a G40 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 technicist where you buy G40 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. G40 will automatically restart after the firmware is installed successfully.

Appendix A: G40 Technical Specifications

Configuration		Detailed Indicators
Measurement Performance	Signal Tracking	1408 Channels GPS: L1C/A, L2P(Y), L2C,L5 GLONASS: L1,L2 BDS: B1L,B2L,B3L,B1C,B2a,B2b* GALILEO: E1,E5a,E5b,E6* QZSS: L1,L2C,L5,L6*
	GNSS Features	Positioning output rate: 1Hz ~ 20Hz Initialization time: < 5s Initialization reliability: > 99.99%

Positioning precision	Static GNSS Surveying	Horizontal: ±（2.5mm+0.5ppm） Vertical: ±（5mm+0.5ppm）
	Real-Time Kinematic Surveying	Horizontal: ±（8mm+1ppm） Vertical: ±（15mm+1ppm）
Inertial sensing system	IMU	Support
	Tilt Angle	0° ~ 60°
	Tilt compensation accuracy	10 mm + 0.7 mm/°tilt(1.8m pole)
User interaction	Operating system	Linux
	Buttons	One button operation
	Indicators	Two indicate lights
	Web UI	Support to access Web UI via Wi-Fi and USB
	Voice guide	Support for multiple languages: Chinese, English
Hardware Performance	Dimension	152mm*152mm*92mm
	Weight	900g
	Material	Magnesium aluminum alloy shell
	Temperature	Operating: –30 °C~+35 °C Storage: –35 °C~+80 °C
	Humidity	100% Non-condensing
	Protection	IP68
	Shock	Withstand 2 meters pole drop
Power and Battery	Power Supply	6-28V DC, overvoltage protection
	Battery	Internal Li-on, 6800mAh, 7.2V
Communications	I/O port	Type-C port（Charging and data transmission） 1 radio antenna interface Micro SIM card slot
	Wireless modem	Built-in radio, 1W, typically work range: 6KM Frequency Range: 410-470MHz Communication Protocol: SOUTH, TrimTalk, Hi-target, TrimMark III, Satel, Geotalk
	4G	LTE FDD: B1/B3/B5/B7/B8/B20 LTE TDD: B38/B40/B41 WCDMA: B1/B5/B8 GSM: 850/900/1800/1900MHz
	Bluetooth	V4.1, BLE

	WiFi	802.11 b/g standard
	WIFI data link	To work as the datalink that receiver can broadcast and receive differential data via WIFI
Data storage/ Transmission	Data Storage	4GB internal storage, Changeable record interval, up to 20Hz raw data collection
	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.

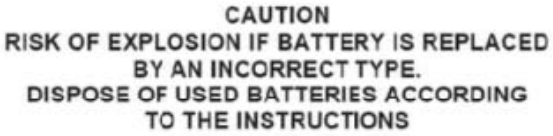
Caution:
Intended for sale and application in a business environment.
Use the Product in the environment with the temperature Between -30℃ and 35℃; Otherwise, it may damage your product. Products can only be used below 2000m altitude.

For the following equipment:
Product Name: GNSS RECEIVER
Brand Name: GINTEC
Model No.: G40, G20Plus, G30Plus, G40Plus, G40Pro, MG1, F300, G50
Guangzhou Geosurv Infomation Technology Co.,Ltd

hereby declares that this [Name: GNSS RECEIVER, Model: G40, G20Plus, G30Plus, G40Plus, G40Pro, MG1, F300, G50] is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

CE

The full text of the EU declaration of conformity is available at the internet address: http://www.gintec.cn/downloads.
The product shall only be connected to a USB interface of version USB2.0 and that the connection to a power USB is allowed.



Adapter shall be installed near the equipment and shall be easily accessible.
Only can use adapter as below:
Power Adapter Model: DSA-45PDH
Input: AC100-240V~ 50/60Hz 1.5A
Output: DC5V3A/9V3A/12V/3A/15V3A/20V2.25A
Dee Van Enterprise Co.,Ltd.
The plug considered as disconnect device of adapter.
This product is intended for sale and application in a business environment.
RED Article 10 2
-This product can be used across EU member states

RED Article 10 10
-The product is class 1 product, No restrictions

The RF distance between body and product is 20cm.

Technical Characteristics of EUT

2G	
Frequency Range:	GPRS900: Tx: 880-915MHz, Rx: 925-960MHz
	GPRS1800: Tx: 1710-1785MHz, Rx: 1805-1880MHz
RF Output Power:	GPRS900: 34.19dBm, GPRS1800: 29.55dBm EDGE900: 27.02dBm, EDGE1800: 25.99dBm
3G	
Frequency Range:	WCDMA Band 1: Tx: 1920-1980MHz, Rx: 2110-2170MHz
	WCDMA Band 8: Tx: 880-915MHz, Rx: 925-960MHz
RF Output Power:	WCDMA Band 1: 23.03dBm, WCDMA Band 8: 23.16dBm
4G	
Frequency Range:	FDD-LTE Band 1: Tx: 1920-1980MHz, Rx: 2110-2170MHz
	FDD-LTE Band 3: Tx: 1710-1785MHz, Rx: 1805-1880MHz
	FDD-LTE Band 7: Tx: 2500-2570MHz, Rx: 2620-2690MHz
	FDD-LTE Band 8: Tx: 880-915MHz, Rx: 925-960MHz
	FDD-LTE Band 20: Tx: 832-862MHz, Rx: 791-821MHz
	TDD-LTE Band 38: Tx: 2570-2620MHz, Rx: 2570-2620MHz
	TDD-LTE Band 40: Tx: 2300-2400MHz, Rx: 2300-2400MHz
Max.RF Output Power:	FDD-LTE Band 1: 23.34dBm, FDD-LTE Band 3: 23.93dBm, FDD-LTE Band 7: 23.01dBm, FDD-LTE Band 8: 23.59dBm, FDD-LTE Band 20: 23.47dBm, TDD-LTE Band 38: 23.03dBm, TDD-LTE Band 40: 22.85dBm
Bluetooth	
Bluetooth Version:	Bluetooth V4.1
Frequency Range:	2402-2480MHz
Max.RF Output Power:	4.57dBm (EIRP)
Wi-Fi(2.4GHz)	
Frequency Range:	2412-2472MHz for 802.11b/g/n(HT20) 2422-2462MHz for 802.11n(HT40)
Max.RF Output Power:	17.46dBm (EIRP)
UHF	
Frequency Range:	410-470MHz
Rated Output Power:	30.15dBm
GPS	
Frequency Range:	GPS: 1575.42MHz Receiving GLONASS :1602MHz Receiving BDS:1561.098 MHz Receiving Galileo:1589.74 MHz Receiving