



# New G1 plus Measuring System User Manual

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# **ChapterI** Preface

*Read this chapter, you will have a brief knowledge of South Company and New G1 plus measurement system.* 

# §1.1 Introduction

Welcome to South Surveying&Mapping Instruments Co., Ltd, which is China's leading manufacturer of surveying equipment including GNSS receivers and Total Stations. To know more about SOUTH, please visit our official website <a href="http://www.southinstrument.com/">http://www.southinstrument.com/</a>

This manual takes New G1 plus measuring system for example, to explain how to install, set up and uses the RTK system as well as the use of the accessories. We recommend that you read these instructions carefully before using the instrument.

# §1.2 Applications

*Control Survey:* dual-band (dual-frequency) system static measurements can accurately complete the high-precision deformation observation, photo-control point measurement.

*Highway Survey:* quickly complete the encryption of the control points, road topographic mapping, cross-section measurement, profile measurement with EGStar.

*CORS Application:* provide more stable and convenient data link for field operations. It is seamlessly compatible with all types of domestic CORS applications.

*Data acquisition measurement:* perfect match South's various measurement software to do quick and easy data acquisition.

Stakeout shot: large-scale point, line, plane lofting.

Electric Power Measurement: power line measurement orientation, ranging, angle calculation.

*Marine application*: oceanographic research, dredging, piling, inserted row, making the marine operations more convenient and easy.



## **§1.3 Main Features**

#### **Intelligent Platform**

New generation of embedded Linux operating system platform improves RTK performance and work efficiency. Its operating efficiency is higher; a unique core processing mechanism which can respond to more than one command at one time; it starts faster and more responsive in real time. While the stability of system is much higher, it can be adapt to the job of longer uninterrupted power.

#### Internal Web UI management

Embedded Web UI management platform supports WIFI and USB mode connection. Users can monitor the receiver status and configure it via the internal Web UI management platform.

#### Bluetooth

New G1 plus is equipped with dual-mode Bluetooth v4.0 standard which is able to connect the other smart devices and compatible with Bluetooth v2.1 standard. It not only enlarges the work range but also makes the data communication become more stable.

#### WiFi

As the new feature and technology adopted on New G1 plus, it not only can be used as data link to access to internet, but also can be as a hotspot which can be accessed by any other smart devices to configure the receiver.

#### **Advanced InBuilt UHF module**

New G1 plus adopts new and excellent datalink system, which is compatible with current radio protocols in the market, and realizes the random switching of the radio range 410MHZ-470MHZ and the power level as well.

#### Upgraded network module

Standard 4G module is integrated which supports WCDMA/CDMA2000/TDD-LTE/FDD-LTE

4G network and downward compatible with 3G GPRS/EDGE. Also supports all kinds of network types to access CORS seamlessly.

### Dual battery hot swappable

The new G1 Plus has two battery slots, which makes the working hours double than the previous mode. And the batteries are hot swappable.

## Speed Dial

Smart PPP dialing technology can auto dial which makes the New G1 plus keeping online continuously during the survey.

## **Intelligent Interaction**

Support to access the internal web UI manage page of receiver with WiFi and USB connection, monitor host state real-time, configure receiver freely.

#### **Smart Voice Guide**

The customizable iVoice technology is allowed to customize your local language. Multi-lingual and clear-tone messages enable users to understand the critical information and status of receiver such as network connection, solution status, working mode and more, which definitely helps to improve work efficiency by being acknowledged.

## **Full Constellations Tracking**

Equipped with most advanced GNSS boards, New G1 plus system can track most signal from all kinds of running satellite constellation, especially support B1,B2 and B3 signal from BeiDou, also get position result with only BeiDou signal.

#### **Electronic Bubble & Tilt Compensation**

The internal tilt compensator and electronic bubble can correct the coordinate result automatically at the points with tilt angel and tilt direction.

## Huge capacity power support

An useful external power package is supported which can load 4 standard batteries and provide up to 28 hours of power. It also can display the remaining power in real time.

### **Intelligent Storage**

The raw data including STH, Rinex2.01 and Rinex3.02 not only can be saved in the internal memory (8G SSD), but also can be stored into an external USB device (OTG).

The configurable sample frequency is really up to 50Hz.

### **Amazing Housing**

New G1 plus, with and innovative design, is built with magnesium alloy materials. And the top edge is design to decrease harm for receiver in case of falling down onto ground.

#### **NFC Function**

The internal NFC module can make the complicated Bluetooth communication more easy and simple.

## **Cloud Service**

The function enable realize online upgrade and register, remote diagnosis in real-time

# **Chapter II Hardware Component**

Reading this chapter, you can grasp the components, installation and the function of New G1 plus measuring system

# **§2.1 Front Components**



Ref	Component	Description
$\bigcirc$	GNSS Antenna	Grasps satellites signals
2	Bluetooth Indicator	Glows in red to indicate that Bluetooth connection has established between controller and receiver
3	Data Indicator	<ul> <li>UHF mode: Flashes in red to indicate that the signal is receiving/transmitting with the interval</li> <li>Network mode: 1) Rapidly flashes in red to indicate that the receiver is dialing; 2) Flashes in red with the signal receiving/transmitting interval when successful dial</li> <li>WiFi mode: 1) Rapidly flashes in red to indicate that the receiver is establishing WiFi connection; 2) Flashes in red with the signal receiving/transmitting interval when successful</li> </ul>



		connection
4	Satellites Indicator	Flashes in red to indicate that the satellites are tracking
5	Function Button	Switch the working mode, data link and USB mode
6	Power Button	Power on/off receiver, mode switching button

# §2.2 Rear Components



Ref	Component	Description
1	NFC label	The place of NFC paired where we can stick controller to
2	SIM card slot	Where we can insert a SIM card when the receiver is set in
		GPRS mode
3	<b>Battery housing</b>	Installing the battery, supporting dual batteries hot swappable
4)	Battery cover	Restore the cover after installing the battery to avoid the
		battery slips off



# §2.3 Bottom Components



Ref	Component	Description
1	SN label	Apply for a registration code, Bluetooth ID
2	Screw hole/external	Fix the mainframe to the tribrach or the
	battery socket	pole/connect to the specified battery pole.
3	Speaker	Mode setting and working status prompt
4	UHF antenna interface	Install UHF antenna
5	7-pin port	USB port, OTG interface and Ethernet port
6	5-pin port	1), As a power port connected with an external power
		supply device; 2), as a differential transmission port
		connected with an external radio; 3), as a serial port to
		check data output and debug

# **ChapterIII Hardware Operation**

# §3.1 Power on/off

## Power on

Press the power button for once, all the indicators glow in red, after few seconds (around 10 seconds), the instrument completes initializing along with voice prompt about the working mode (for example, "Rover, internal radio mode"). After a while, instrument starts to track satellites.



## Power off

Press the power button and hold for a while, after 3 beeps and the "Power off" voice prompt at the third beeping, release power button, the instrument will switch off.

# §3.2 Check working mode

Press the power button for once in the state of power-on, the instrument will prompt with voice message about current working mode (for example, "Rover, internal radio mode").



# §3.3 Work Mode and data link selection

## Work mode

Press F key once, the bluetooth, data and satellites indicators will blink together, and New G1 Plus will say "start to set work mode", at this moment, press power key once to confirm, and then press F key one by one, NEW G1 Plus will say "base mode, rover mode and static mode" one by one, when you hear the working mode you need, press power key to confirm.



## Data link

After confirming the work mode, for example, we set the New G1 Plus into base mode previously. Press F key once, the bluetooth, data and satellites indicators will blink together, and New G1 Plus will say "start to set work mode", at this moment, press F key once again, New G1 plus will say "select data link", and then press power key once to confirm, and then press F key one by one, New G1 plus will say "base internal radio mode, base gprs mode, base external mode and base wifi mode" one by one, when you hear the data link you need, press power key to confirm.



After that, press the power button for once to make sure if the working mode is correctly setup.

# §3.4 USB and WIFI mode selection

## **USB mode**



Press F key once, the bluetooth, data and satellites indicators will blink together, and New G1 plus will say "start to set work mode", at this moment, press F key one by one until New G1 plus says "start to set USB mode", and then press power key once to confirm, and then press F key one by one, New G1 plus will say "USB disk, USB network port mode" one by one, when you hear the USB mode you need, press power key to confirm.



USB disk is used to connect New G1 plus's internal memory; USB network port mode is used to connect to New G1 plus's WEB UI by cable connection

## WIFI mode

Press F key once, the bluetooth, data and satellites indicators will blink together, and New G1 plus will say "start to set work mode", at this moment, press F key one by one until New G1 plus says "set WIFI working mode", and then press power key once to confirm, and then press F key one by one, New G1 plus will say "Access point mode, Client mode" one by one, when you hear the WIFI mode you need, press power key to confirm.



Access point mode is for New G1 plus to allow other devices to connect New G1 plus's WEB UI by WIFI connection; Client mode is for New G1 plus to connect other WIFI hot spot so that it'll have access to the internet.

## §3.5 Self-check

Self-check is an useful operation to simply check the main hardware components if the instrument is abnormal or not working properly.

Press and hold the power button for about 10 seconds and pass over the state of power off and mode selection (do not release the button even the instrument says power off and start to set work mode), then New G1 plus will say "start to self-check", at this moment, release power button, the instrument will perform self-check automatically for the modules one by one.

The sequence of modules checking is:

- > OEM board checking
- Network module checking (GPRS module checking)
- > UHF module checking
- Sensors checking
- WiFi module checking
- Bluetooth module checking

If all the modules are normal during self-check, the instrument will get into the state of power-on.

## §3.6 Factory reset

Press and hold the power button for about 20 seconds and pass over the foregoing states (power off, mode selection, self-check, USB mode setting), New G1 plus will get into factory reset progress with voice message saying "start to restore factory default", at this moment, release power button, the instrument will perform factory reset automatically. After this progress complete, the instrument will restart automatically with the factory default settings.

# ChapterIV Web UI Management

## §4.1 Overview

Because of using the smart embedded Linux operating system and SOUTH intelligent cloud technology, the web UI allows users to configure and monitor the status of New G1 plus in real-time. The accessing way is not only by WiFi connection, but also can be USB mode.

# §4.2 Access by WiFi

The WIFI hotspot is default broadcasted by New G1 plus, search the WIFI hotspot which named with SOUTH\_xxxx using smartphone, tablet or laptop, then establish the WIFI connection, input the **default IP** (10.1.1.1) into broswer, on the login interface, apply "admin" for the username and password.

For example, search the WIFI hotspot broadcasted by a New G1 plus receiver using a laptop PC, choose the WIFI hotspot and click on connect button to establish the connection without password.





Run IE broswer on computer and input the default IP (10.1.1.1) into address bar, after a while, the system login interface is refreshed, then apply "admin" for username and password to login.

() Login		v C	$\leftrightarrow$ $\rightarrow$ 1 :
IP Address: 10.1.1.	1		简体中文   English   帮助
	GNSS Web Server		
	Username : admin Password : ·····		Username: admin Password: admin
	Login Reset		

# §4.3 Access by USB

On this mode, the USB port (7-pin) of New G1 plus must work as an Ethernet port, then internal

web UI shall be accessed via USB cable connection with computer.

First of all, a corresponding driver is required to install to the computer, then this function could be activated.

Due to different operating system is installed on computer, the drivers should be applied to a suitable one. The file bugvista64.inf is applied to 64bit operating system, and linux.inf is for 32bit operating system.

Make sure that the USB port (7-pin) is switched into USB network port (please refer to section 3.5, USB mode setting).



Choose the folder which contains the drivers



Q I Update Driver Software - Linux USB Ethernet/RNDIS G	adget		x
Browse for driver software on your comput	er		
Search for driver software in this location:			
E:\RTK\Galaxy G6\G6网囗驱动	<b>-</b> [	Browse	
Let me pick from a list of device driver. This list will show installed driver software compatisoftware in the same category as the device.	s on my <mark>co</mark> mp ible with the devic	out <mark>er</mark> e, and all driver	
		Next Cance	al D



**NOTE:** The driver can be downloaded from official website automatically or please contact with us for more supports.



If the driver has been successfully installed, the USB port of New G1 plus will be recognized as Linux USB Ethernet/RNDIS Gadget, and a local area connection will generate in Network Connections on the computer. For example, Local Area Connection 138 generates after connecting New G1 plus receiver to computer via USB Ethernet port.



However, sometimes the computer cannot detect the receiver by USB Ethernet port because there is something wrong with acquiring IP automatically, therefore, we need to do something to avoid such problem, that is to set a fixed LAN IP for the connection:

Right click on the local area connection which newly generates, choose properties to call out the local area connection properties window.



Then double click on Internet Protocol Version 4 (TCP/IPv4) option or click on properties button to call out Internet Protocol Version 4 (TCP/IPv4) properties window, set the fixed LAN IP address as shown in following, then click OK button and confirm the settings, return to the IE browser and use the IP address 192.168.155.155 to access the internal web UI.



etworking Sharing	General	
Connect using:	You can get IP settings assigne	d automatically if your network supports
Linux USB Ethemet/RNDIS Gadget	for the appropriate IP settings.	need to ask your network administrator
Configure	🔵 📗 💿 Obtain an IP address auto	omatically
This connection uses the following items:	O     Use the following IP addre	ess:
Client for Microsoft Networks	IP address:	192 . 168 . 155 . 100
File and Printer Sharing for Microsoft Networks	Subnet mask:	255 . 255 . 255 . 0
Internet Protocol Version 6 (TCP/IPv6)     Internet Protocol Version 4 (TCP/IPv4)	Default gateway:	192 . 168 . 155 . 1
✓ Internet Protocol Version 5 (TCP/IPv6)     ✓ Internet Protocol Version 4 (TCP/IPv4)     ✓ Internet Protocol Version 4 (TCP/IPv4)	Default gateway:	192 . 168 . 155 . 1
✓ Internet Protocol Version S (TCP/IPv6)     ✓ Internet Protocol Version 4 (TCP/IPv4)     ✓ Internet Protocol Version 4 (TCP/IPv4)     ✓ Unk-Layer Topology Discovery Mapper I/O Driver     ✓ Link-Layer Topology Discovery Responder	Obtain DNS server addres	192 . 168 . 155 . 1 is automatically ver addresses:
✓ Internet Protecol Version S (TCP/IPv6)     ✓ Internet Protocol Version 4 (TCP/IPv4)     ✓ Unk-Layer Topology Discovery Mapper DD Driver     ✓ Link-Layer Topology Discovery Responder     Install     Uninstall     Properties	Obtain DNS server addres Use the following DNS server: Preferred DNS server:	192 . 168 . 155 . 1 is automatically ver addresses:
✓       Internet Protocol Version € (TCP//IPv4)         ✓       Internet Protocol Version 4 (TCP//IPv4)         ✓       ✓         ✓       Unk-Layer Topology Discovery Mapper D/D Driver         ✓       ✓         ✓       Link-Layer Topology Discovery Responder         Install       Uninstall         Properties	Default gateway:     Obtain DNS server addres     Ottain DNS server addres     Ottain DNS server:     Preferred DNS server:     Alternate DNS server:	192 . 168 . 155 . 1

Run IE broswer on computer and input the default IP (**192.168.155.155**) into address bar, after a while, the system login interface is refreshed, then apply **"admin"** for username and password to login.

Login		٠: •:	$\leftarrow \rightarrow$	<b>企</b> 1	:
IP Address: 192.1	68.155.155		简体	如文   English	帮助
	GNSS Web Server Username : admin Password : ••••• Login Reset		Usernar Passwo	me: admin rd: admin	

## **Remote Login**

If users would like to remote login the web UI of New G1 plus, then New G1 plus has to connect to the internet and forward its 80 port to the public network. For example, if the IP address 222.196.35.76 is the public network IP which New G1 plus has connected, and the 80 port of New G1 plus has been bounded with 8000 in public network, then users can input the public network IP address into IE explorer along with the forwarding port for login. (http:// 222.196.35.76:8000)



NOTE: The IE explorer is recommended to use for the Web UI login.

## §4.4 Web UI main interface

After login the Web UI management of New G1 plus by WIFI or USB connection, the main interface appears with displaying configuration items and positioning. As shown at following figures.

WELCOME	admin 582667117186476 [logout	> Position Information	
	Status	Location:	
*	Configuration	Lat: 23° 7′ 33.999203″ N Lon: 113° 22′ 5.157911″ E Alt: 29.406006 m Ellipsoid: WGS-	34
	oonngaraaon	RTK Status:	
×	Satellite Information	Solution: Autonomous Correction Delay: 99 HEMS: 1.257 VEMS: 2.125	
.11	Data Record	Base X: 6378137.000000 Base Y: 0.000000 Base Z: 0.000000 Base ID: NONE	
뮻	Data Transfer	Diff.format: NONE	
۲	Network Config	RTX:	
Ĩ	Radio Config	SN:元 TrackingTime: 0	
£	Firmware Update	Azimuth: 0.00 Elevation: 0.00	
(11)	Track Manage	SNR: 0.00 Solution: NOME	
۲	Coordinate System	Tracked Satellite(26):	
\$	Online Service	GPS (8): 5, 13, 15, 18, 20, 21, 24, 29 GLOWASS (7): 2, 3, 4, 13, 14, 17, 18	
25	User Management	EDS (11): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13 GALILEO (0): None	
?	Help	SBAS (0): None QZSS (0): None	
		Used Satellite(28):	

In the Web UI home page, the configuration items are listed at left side. And the positioning information including coordinates information and satellites are diplayed at right side.

Ref	Component	Description				
	Status	Positioning information, satellite tracking and the others will				
and the second second		be displayed in this page				
31	Configuration	It contains registration for receiver, base configuration,				
~		antenna configuration, satellite configuration, receiver				
		configuration and system configuration.				
15	Satellite Information	Display and control the satellites are used or not				
A.						
( <u></u> )	Data Record	Configure the parameters for static mode and raw data				
<u>[1]]</u>		download				
	Data Transfer	Contains NTRIP configuration, TCP/IP configuration and data				
Ē		transferring with PC				
Æ	Network Config	Contains network parameters configuration, WIFI				
0		configuration and the other functions				
	Radio Config	Configure the parameters and frequency for radio modem				
*						
de.	Firmware Update	It is used to upgrade the firmware for receiver and each				
<u> </u>		modem				
(1.1.1)	Track Manage	Record track file while doing measurement				
<u>[1]]</u>						
-	Coordinate System	Setup a local coordinate system for New G1 plus				
æ						



-	Online Service	Upload data onto a server in real-time
25	User Management	Add and manage the Web UI users
?	Help	Offers solutions

## §4.4.1 Status

System Information, Work Status and Position Information are listed under Status menu.

## **System Information**

In this page, all the information of New G1 plus is diplayed such as serial number, hardware ID, MAC address, firmware version and so on.

WELCOM	admin 582667117186476 [log	<u>out]</u>	> System Information	tion
	Status		Receiver Type:	Galaxy1-PLMS
	System Information		Serial Number:	S82667117186476
	Work Status	=	Hardware ID:	00100000000040031112
	Position Information		Software ID:	10000000000000
×	Configuration		Ethernet MAC:	00:71:17:18:64:76
	conngaration	-	Ethernet IF:	192. 168. 1. 1
×	Satellite Information	<b>.</b>	Wi-Fi IP:	10.1.1.1
11	Data Record	<b>±</b>	Bluetooth MAC:	00:80:25:44:80:78
炅	Data Transfer	<b>E</b>	Hardware Version:	G1A500001
-		_	Firmware Version:	1.06.161019.R826GL
•	Network Config	<b>•</b>	OEM Version:	00511
Ĩ	Radio Config	<b>H</b>	Web Version:	1.06.161014. RG60WEB
t	Firmware Update	<b>±</b>	Expired Data:	20161104
<u>.11</u>	Track Manage	Đ		
۲	Coordinate System	<b>H</b>		
	Online Service	<b>±</b>		
ð:	User Management	E		
2	Liele			

## **Work Status**

The physical state of New G1 plus such as working mode, datalink, host temperature, remaining power and the free memory is obtained from this page

NELCOME	admin 582667117186476 [log	work Status		
	Status	Work Mode	: Rover	
	System Information	Datalink	x: Radio	
	Work Status	Host Temperature	: 39.60 °C	
	Position Information	OEM Temperature	a: 45.00 ℃	
×	Configuration	Battery Type	: Internal Battery	
~	oomigaraaon	Power Voltage	≥: 7.50 V	
×	Satellite Information	🛨 Storage Type	e: Internal Memory	
11	Data Record	<b>•</b>	Pursue Pursta for a	Diele Constant
显	Data Transfer	Re	maining 70% Power	115K Capacity
۲	Network Config	•		
Ĩ	Radio Config	•		
£	Firmware Update			
(1) (1)	Track Manage	<b>•</b>		
۲	Coordinate System	•		
-	Online Service	•		
94	Hear Manadomont	PA		

## **Position Information**

In this page, users can be clear at a glance on current position information and satellite information

LCOME	admin \$82667117186476 [logo	t] > Position Information	on			
	Status	Location:				
	System Information	Lat: 23° 7′ 34.053	902" N	Lon: 113° 22″ 5.203813″ E	Alt: 33.171875 m	Ellipsoid: WGS-84
	Work Status	RTK Status:				
	Position Information	Solution: Autonomo	15	Correction Delay: 99	HEMMS: 0.803	VRMS: 1.274
*	Configuration	Base X: 6378137.000	000	Base Y: 0.000000	Base Z: 0.000000	Base ID: NONE
ж	Satellite Information	+ Diff. format: NONE				
11	Data Record	+ RTX:				
뮹	Data Transfer	± SN : 无			TrackingTime: O	
۲	Network Config	+ Azimuth: 0.00			Elevation: 0.00	
ī	Radio Config	SNR: 0.00			Solution: NONE	
+	Firmware Undate	Tracked Satellite (2	:6):			
	T minute optice	GPS (8): 5, 13, 15, 18,	20, 21, 2	24, 29	GLONASS (7): 3, 4, 13, 14, 1	7, 18, 19
11	Track Manage	BDS (11): 1, 2, 3, 4, 5,	6, 7, 8, 9	9, 10, 13	GALILEO(0): None	
	Coordinate System	+ SBAS(0): None			QZSS (D): None	
-	Online Service	+ Used Satellite(26):				
2.	Heer Management					



## §4.4.2 Configuration

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and Default Language are contained under Configuration menu. Users are able to configure all kinds of parameters for New G1 plus under Configuration menu, and all the settings are immediate effect after saving.

## **General Config**

The registration for receiver working mode setting can be completed in this general configuration page.

WELCOME	admin S82667117186476 [log	<u>cout]</u>	> General Gonfigur	ation	
	Status		Registration		
×	Configuration		Serial Number:	S82667117186476	
	General Config		Code:	81BECD3B23329A67BB6500E421BFB8484317	Register
	Base Setup	Ξ	ExpiredDate:	20161104	
	Antenna Setup	Ξ	OnlineRegistration:	OnlineRegi	
		Ξ	OperationTips:	Use Online Reig Function, please Make Sure Netw	ork is Work Well!
	Receiver Operate	Ξ	Mode setting		
	System Setup	$\equiv$			7
*	Satellite Information	•	Work Mode:	Rover	·
<u>an</u>	Data Record		Datalink:	Radio	
	Data Necola	-	RadioRoute:	None	-
显	Data Transfer	•	P. J. Turnefort		1
•	Network Config	8	Kadioiransier.		
Ī	Radio Config	Đ	RTK Record:		
			1PPS:		
T	Firmware Opdate	•	EVENT:		
<u>, 11</u>	Track Manage	•	EVENT Polarity:	Negative	•

If the code of New G1 plus has expired or is going to be run out, please provide the serial number of your New G1 plus for us to apply for another available code, then input the code into the blank or register the receiver online.

Serial Number:	S82667117186476	
Code:	81BECD3B23329A67BB6500E421BFB8484317	Register
ExpiredDate:	20161104	
nlineRegistration:	OnlineRegi	

New G1 plus allows users to setup the working mode and datalink from this Web UI that only need the mobile phone or tablet PC is able to connect the wifi hotspot of New G1 plus.

Mode setting	
Work Mode:	Rover
Datalink:	Radi o 💌
RadioRoute:	None
Radi oTransfer:	
RTK Record:	
1PPS:	
EVENT :	
EVENT Polarity:	Negative 🔻
	Enter Cancel

Work Mode: There are Rover, Base and Static contained in this dropdown list

**Datalink:** Pull down the list, there will be all kinds of options for datalink, such as radio, Network, External, Bluetooth, WIFI and CSD.

Radio	-
None	
Radio	
Network	
External	
Dual	
Blue Tooth	
WIFI	
CSD	

**Radio Route:** This feature is used to transfer the correction which from the reference station to the other rover by radio, the rovers will have the same reference coordindates. This is in the case of working in some places where there is poor signals from reference station or there is only a SIM card for a few rovers.

It is able to use internal radio or connect an external radio to transfer the correction.

This feature is only available on Rover mode.

None	÷
None	
Inner Radio Route	
External Radio Route	





#### **Operation:**

1, choose "Inner Radio Route" and click "Enter" button to confirm the settings.

lode setting		
Work Mode:	Rover	•
Datalink:	Network	•
RadioRoute:	Inner Radio Route	-

2, go to "Radio Config" page, check the channel, communication protocol and the frequency point of each channel.

Active:		
Air Baud Rate:	9600	-
Data Baud Rate:	19200	•
Channel:	1	-
Power:	۳u	•
Protocol:	SOUTH	•

3, configure the datalink of the other rovers into internal UHF mode, then make sure the channel, protocol and frequency point are same as "Route" rover.



**RadioTransfer:** This is the function that New G1 plus is able to transfer the correction from Base station to the other rovers with the internal UHF, definitely, New G1 plus can work as a radio repeater.

Mode setting		
Work Mode:	Rover	
Datalink:	Radio	
RadioRoute:	None	
RadioTransfer:		
RTK Record:		
1PPS:		
EVENT :		
EVENT Polarity:	Negative	
	Enter Cancel	





## **Operation:**

1, check the box of "RadioTransfer" on "General Config" dialog for Base station.

Work Mode:	Basa	•
	Dase	
Datalink:	Radio	-
Radi oRouta		
nauronouce.	None	

2, open the same function for Rover in critical status (when the Rover is close to working distance of Base internal UHF).

ana ana ana ana a		
Work Mode:	Rover	
Datalink:	Radio	•
RadioRoute:	None	•

3, configure the datalink of the other rovers into internal UHF mode, then make sure the channel, protocol and frequency point are same as "Repeater" rover.

Note: please take in mind that the "Repeater" rover should keep away from Base station to avoid signal interference.

**RTK Record:** This is used to enable raw data recording in base mode or rover mode for post-processing

1 PPS: This option is for the 1 pulse per second output

**EVENT:** This option is for the EVENT marker input

**EVENT Polarity:** EVENT input method.

## **Base Setup**

When New G1 plus works as a base, the basic configuration for base can be setup in this page. Users can input the correct coordinates or capture a current position for the base. Also users can define what kind of correction format is transmitted.

ELCOME	admin \$82667117186476 [log	<u>out]</u>	> Base Setup					
Ţ	Status	•	CMR ID:	28				
*	Configuration		RTCM2.x ID:	476				
	General Config	Ξ	RTCM3.x ID:	476				
	Base Setup		Lon:	113 °	22 /	5.198639		• E
	Antenna Setup	Ξ	Lat:	23 °	7	34.073373	"	(•) N (
	Receiver Operate		Alt:	33.856201			m	-
		Ξ		Position	Spare			
糸	Satellite Information	±	Base Start Mode:					
, li	Data Record	÷		Automactical	StopBase	by Lurrent poi	nt	
显	Data Transfer		Correction	Startbase	beopbase			
	Network Config	E	POP V-1	RTD				
~	Padio Config	-	for value:	3				
-		-	Status:	Start Base Su	ccess			
I	Firmware Opdate	-						
11	Track Manage	+		Enter		Cance	1	

CMR ID/RTCM2.X ID/RTCM3.X ID: Users can specify the ID for transmitting correction.

Position: Click this button to capture the coordinates for current position

**Spare:** This is used to the repeat station

**Base Start Mode:** Here contains 3 methods to start the Base, manually start base, automatically start base by fixed point, automatically start base by current point.

**Correction:** Here contains the global general used correction formats including RTD,RTCM23, RTCM30, RTCM32, CMR and SCMRx

POP Value: This value is setup for the PDOP limitation.

Status: Here will display the status for base in real-time.

## Antenna Setup

The antenna parameters are configured in this page including the antenna height, measuring method.

2	admin SG1181117244807 [logs	out]	> Antenna Setup		
¢.	Status	•	Antenna NO# :	SG1181117244807	
*	Configuration		RINEX :	HX-CSX049A	
	General Config	-	Antenna Height :	0	m
		-			
			Measuring Method ;	Carrier Phase Center	~
	System Setup	Ξ			
*	Satellite Information				
<u></u>	Data Record				
炅	Data Transfer				
0	Network Config				
I.	Radio Config				
£	Firmware Update				
<u></u>	Track Manage				
•	Coordinate System				
ŵ	Online Service			Enter	Cancel
ð:	User Management				
			1		

Antenna Height: This is the value for height of antenna while surveying.

**Measuring Method:** Here provides several methods for measuring the antenna height such as carrier phase center, slant height, antenna edge, height plate and to the bottom.

Measuring Method:	Carrier phase center				
	Carrier phase center				
	Slant height				
	Antenna Edge				
	Height tape				
	To the bottom				

## **Satellite Tracking**

In this page, users can define the mask angle for satellite tracking, and check on the box of corresponding band from the constellation that to use this band or not

NELCOME	admin \$82667117186476 [log	out]	Satellite Tracking		
	Status	•	Mask Angel: 10		di
*	Configuration				
	General Config	Ξ	Туре	Signal	
		=	GPS	L1-C/A	
	Antenna Setup		GPS	L1-P	
	Satellite Tracking		GPS	12-C/A	
	System Setup		GPS	L2-P	
	System Setup		GPS	15	
*	Satellite Information	•	GLONASS	L1-C/A	
.11	Data Record	E	GLONASS	L1-P	
뮱	Data Transfer	<b>.</b>	GLONASS	L2-C/A	
	Network Confin		GLONASS	L2-P	
			GLONASS	L3	
Ĩ	Radio Config		BDS	B1	
±	Firmware Update	<b>•</b>	BDS	B2	
11	Track Manage	<b>E</b>	BDS	B3	

## **Receiver Operate**

The page provides all kinds of operations to control the receiver such as self-check operation, clean epochs, factory reset, reboot and power off.

OME	admin \$82667117186476 [logout]	> Receive	er Operate		
	Status 🕂	Module S	elfCheck:		
×	Configuration	Item	Module	Operation	Status
	General Config =	1	OEM	Check	No Action
	Base Setup 📃	2	Radi o	Check	No Action
	Antenna Setup 📃	3	NetModule	Check	No Action
	Satellite Tracking -				<b>v</b> 1
	System Setup =	4	WiFi	Uheck	No Action
*	Satellite Information 🛛 🛨	5	Bluetooth	Check	No Action
(1-1) (11)	Data Record 🛛 🛨	6	Sensor	Check	No Action
₽.	Data Transfer 🛛 🛨			Check al	1
۲	Network Config 🛛 🛨				
ĩ	Radio Config 🛛 🛨	Default	Settings:	(Tip:This action	will reset all parameters to the factory default settir
±	Firmware Update 🔒		Clear	n EPH	Factory Default

**Self-check:** Users can also do the self-check from this configuration page, click on the Check all button to check all the modems or click on the check button corresponding to the modem to check one by one.

Clean EPH: Click this button to clear the remaining epochs to let recever track the satellites better.

Factory Default: Click this button to bring the receiver back to factory default setting.

Reboot: Click this button to restart the receiver.

Power Off: Click this button to power off the receiver.

## System Setup

This page is used to control Voice prompt, volume of voice, power saving, USB mode and the default language for receiver.

WELCOME	admin s82667117186476 [log	<u>zout]</u>	> SystemSet		
Ţ	Status	÷	voice prompt :		
*	Configuration		voice volume:	Medium	•
	General Config	Ξ	Power:	normal mode	•
		Ξ	1/58.		
	Antenna Setup	Ξ		Network Port	
	Satellite Tracking	Ξ	Default Language:	English	-
	Receiver Operate		TimeZone(h):	+8.0 (Beijing, China)	-
	System Setup				
*	Satellite Information	Ð		Tutor	Concol
11	Data Record	Ð		Enter	Caller
显	Data Transfer	<b>±</b>			
۲	Network Config	÷	1		

**Voice Prompt:** Check on this box to turn on the voice guide for New G1 plus, uncheck it to turn off the voice guid.

Voice Volume: Define the voice volume for New G1 plus's speaker.

**Power:** Configure the receiver to use the power saving mode or not.

**USB:** This is used to configure New G1 plus what kind of USB mode output from 7-pin port when connect the receiver with computer via USB cable. USB and network port for optional.

**Default Language:** Configure the default language for New G1 plus which associates with voice guid.

Note: This is not the language setup for web UI, the Web UI only supports Chinese and English.

TimeZone(h): Use this to setup the corresponding time zone for your country or area.

## §4.4.3 Satellite Information

The "Satellite Information" provides all kinds of tables, graph and the skyplot to view the information of tracking satellites. And it is allowed to configure to use which satellite in constellation on/off page by checking on the corresponding box.

#### **Tacking Table**

Here is the table to list all current used satellites and the other information for these satellites.

2	Status	HO.	Type	Elevation	Azimuth	LISNR	Code	L2SNR	Code	LSSNR	Code	Status
<	Configuration	2	GPS	34.00	290.00	38.30	CA	0.00	-	0.00	-	In use
	-	5	GPS	20.00	216.00	33.80	CA	32.70	Р	0.00	-	In us
Ŕ	Satellite Information	6	GPS	51.00	336.00	41.40	CA	38.20	P	27.40	I	In us
	Tracking Table	9	GPS	25.00	102.00	34.40	CA	33. 70	P	0.00	-	In us
	Tracking Chart	12	GPS	14.00	320.00	30.30	CA	30.50	P	0.00	-	In us
		17	GPS	59.00	60.00	42.60	CA	36, 80	P	0.00	-	In us
	GPS on/off	19	GPS	60.00	22.00	41.70	CA	23.80	Р	0.00	-	In us
	GLONASS on/off	23	GPS	14.00	68.00	34.00	CA	0.00	-	0.00	-	In us
	BDS on/off	28	GPS	31.00	170.00	37.30	CA	0,00	_	0.00	-	In us
		3	GLONASS	62.00	78.00	41 80	CA	31.80	P	0.00	-	In us
	SBAS on/off		GLONASS	40.00	176.00	39.90	CA.	30.00	P	0.00	-	To us
	QZSS on/off	10	CLOWAGE	0.00	0.00	0.00	-	0.00	-	0.00		Tr us
Î	Data Record	10 10	CLOWASS	0.00	0.00	0.00		0.00		0.00		T
1	Data Transfer	10	GLONASS	15.00	318.00	31.80	CA	22 80	P	0.00	_	In us
P		13	OLDIRASC	13.00	510.00	51.00	-	22.00	1	0.00		in us
•	Network Config		BDS	49.00	128.00	41.00	I	36.20	1	0.00	-	Int
2	Radio Config	2	BDS	48.00	236.00	39.00	I	34. 70	I	0.00	-	
		-	DDC	00.00	100.00	40.50	-	00 10		0.00		-

## **Tracking Chart**

In this page, the histogram will indicate the signals from those used satellites, and allow to check each constellation separately.



## Skyplot

In this page, all the tracking satellires are shown on the skypolt, this let users intuitively view and know where the current position of satellite is.

50i



WELCOME	admin S82667117186476 [log	<u>cout]</u>
Ţ	Status	
*	Configuration	<b>E</b>
*	Satellite Information	
	Tracking Table	Ξ
	Tracking Chart	Ξ
	Skyplot	
	GPS on/off	Ξ
	GLONASS on/off	Ξ
	BDS on/off	Ξ
		Ξ
	SBAS on/off	Ξ
	QZSS on/off	Ξ
11	Data Record	<b>•</b>
₽	Data Transfer	E.

## GPS on/off

For all the running GNSS constellations or the augmentation system, New G1 plus allows to configure to use which satellite or not.

In gnss on/off page, all the running satellites are listed, and unselect the box corresponding to the satellite to not use it.

admin \$82667117186476	[logout]
🖵 Status	Đ
× Configuration	E
🚿 Satellite Informati	on 🧧
Tracking Table	8
Tracking Chart	Ξ
	Ξ
GPS on/off	
GLONASS on/of	r 🖻
BDS on/off	Ξ
	Ξ
SBAS on/off	=
QZSS on/off	Ξ
Data Record	<b>•</b>
😞 🛛 Data Transfer	-
A Network Confid	-
Radio Config	<b>H</b>

## §4.4.4 Data Record

The "Data Record" performance is mainly used to configure all the parameters for receiver in static mode. Much more operations can be done on New G1 plus such as storage path, interval, data format and data files download.

## **Recording Config**

The page provides more practical operations for raw data storage.

WELCOME	admin S82667117186476 [log	out]	> Recording Config	
Ģ	Status		Storage Option:	Internal Memory
*	Configuration	Ð	Interval:	1 <b>v</b> s
×	Satellite Information	•	File Interval:	24 <b>v</b> H
	Data Record		Data Format:	● STH
	Recording Config	8	Point Name:	6476
	Data Download	Ξ	Auto Delete:	• Yes No
显	Data Transfer	Ð	Format:	Format Disk
•	Network Config	<b>±</b>	Recording Mode:	Anto Recording
Î	Radio Config	•		Start Stop
£	Firmware Update	•	Recording Status:	Recording
	Track Manage			
۲	Coordinate System	Ð		Enter Cancel

**Storage Option:** Here are the options to be selected for where the raw data will be stored, internal memory or external memory.

**Interval:** This is the sampling interval for data storage, 50Hz(0.02s) sampling interval now is available for New G1 plus.

File Interval: This is used to defined the data storage time for the static file.

**Data Format:** Here are 3 options to selected for New G1 plus to store what kind of format data, STH, Rinex2.0 and Rinex3.0.

**Point Name:** A point name is required, the last 4 digits of SN is default setting for the point name.

**Auto Delete:** This is used to configured New G1 plus to delete the previous data files automatically if the memory is full.

Format: Click this button to format the internal memory for New G1 plus.

**Recording Mode:** Here are 2 options to configure New G1 plus to record raw data automatically or not if it achieves the sampling conditions.

Start/Stop: Click these buttons to start recording or strop recording the raw data.

Recording Status: Here shows the status of static data storage.
### **Data Download**

This page provides the data files to download

Choose the storage where the static data recorded, and file type, then click on the blank of "Select Date" to choose what date the data was recorded and click "Get Data" button, all the files recorded in the date you choose will show in the table, tap download button to download the data files.

LCOME	admin 582667117186476 <u>[log</u>	out]	> Data Download									
	Status	•	Data Source:	• s	D Car	d	$\bigcirc$	USB		File	Type: 💿 STH 🕥 RINEX	
*	Configuration	<b>•</b>	Select Date:							Ge	t Data	
禾	Satellite Information	•	Download Tip	s:	4	1	1, 20	16		×	ave as and complete	
<u>ili</u>	Data Record		Item	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Size	Data
	Recording Config	Ξ	1		1	2	3	4	5	6		🚽 [Download]
	Data Download		2	7	8	9	10	11	12	13		🚽 [Download]
显	Data Transfer	8	3	14	15	16	17	18	19	20		👱 [Download]
	Network Config	8	4	21	22	23	24	25	26	27		🚽 [Download]
-	Dadia Capfig	-	5	28	29	30					J	🚽 [Download]
*	Radio Coning	-	6									🚽 [Download]
£	Firmware Update	Đ	7									🚽 [Download]
11	Track Manage	8	8									🚽 [Download]
۲	Coordinate System	•	9									🚽 [Download]
ŵ	Online Service	•	10									🚽 [Download]
25	User Management	8	11									🚽 [Download]

### §4.4.5 Data Transfer

This performance contains General, Serial Port Config, TCP/IP Config, NTRIP Config and Data Flow Config. The "Data Transfer" allows to configure the output mode for raw observation data and differential data, as well as to the NTRIP performance configuration.

#### General

This page shows the service condition and the output contents of the ports, if the port item display in green, that means the port is being used, and the port is not used while the item display in red.

#### New G1 Plus admin S82667117186476 [logout] Type Port Input Output Status ÷ Seriel LEMO (115200) Navigation data none × Configuration ÷. BLVETOOTH (115200) Serial Navigation data none ÷ \* Satellite Information 11 Data Record + 显 Data Transfer

### Serial port Config

This page is allowed to configure the baud rate, odd-even check and the data flow for serial port (5-pin port) and Bluetooth.

WELCOME	admin 582667117186476 [log	<u>out]</u>	> Seria	al Port Config							
Ţ	Status	•	Item	Serial Port	Baud Ra	te	Odd/E	lven	Data Flow		Enable
*	Configuration	÷	1	LEMO	115200	•	None	•	Navigation Data	•	
禾	Satellite Information	8	3	BLUETOOTH	115200	•	None		Navigation Data	•	
11	Data Record	Ð									
显	Data Transfer				Enter		C	ancel			
	General	Ξ									
	Serial port Config										
	TCP/IP Config	Ξ									



*CAUTION:* do not change the default value in this page for each item, if you want to change the settings, please contact with SOUTH technician for further support.

In the dropdown list of data flow, there shows 4 items for selection.

Raw observation data: This is the raw observation data straight from OEM board.

Correction Data: This is the correction data straight from OEM board.

**Navigation Data:** This is the navigation data output from receiver such as NMEA-0183, GSV, AVR, RMC and so on. It is configured in Data Flow Config page.

SIC Observation Data: This is the user-defined format observation data from SOUTH.

**OpenSIC Observation Data:** This is the open version of SOUTH user-defined format observation data for secondary development.



### **TCP/IP Config**

This is used to configured the raw data or navigation data to be uploaded or transferred to a server. And there are Caster and Server working mode for this performance.

**Caster:** If this working mode is selected, NEW G1 PLUS will be a client to upload the data to a specify server if it connects to the internet by WIFI or GPRS connection with SIM card inserted. Input the specified IP and port for server, and the data format what is uploaded. Then users are able to see the uploaded data on server.

Server: New G1 plus will upload the data onto internet by the static WIFI if server is selected, then users are able to obtain its dynamic data by accessing to NEW G1 PLUS through the IP from receiver.

WELCOME	admin \$82667117186476 [log	<u>zout]</u>	<b>&gt;</b> T	CP/IP Config	)					
Ģ	Status	•	Item	Work mode	Local port	Server IP	Port	Data flow	Status	on/off
*	Configuration	Ð	1	Caster 💌	1111	58.248.35.130	2010	SIC Observeation	Disconnect	
×	Satellite Information	Đ	2	Caster 💌	2222	58.248.35.130	2010	Navigation Data 🔻	Disconnect	
(iii)	Data Record	•	3	Caster 💌	3333	58.248.35.130	2010	Navigation Data 💌	Disconnect	
显	Data Transfer		4	Caster 💌	4444	58.248.35.130	2010	Navigation Data 💌	Disconnect	
	General Serial port Config	Ξ	5	Caster 💌	5555	58.248.35.130	2010	Navigation Data 💌	Disconnect	
	TCP/IP Config	=								
	NTRIP Config	Ξ				Enter	Can	cel		
	Data Flow Config	Ξ					1			
۲	Network Config	Ð								
Ĩ	Radio Config	Ð								
£	Firmware Update	E								

### **NTRIP** Config

This is used to configure the NTRIP performance while receiver is going to connect to internet. New G1 plus supports complete NTRIP performance including NTRIP Client, NTRIP Server and NTRIP Caster.

#### admin S82667117186476 [logout] NtripClient: ± Status Status: Disconnect × Configuration ÷ Active: 🔘 ℅ Satellite Information ÷ Authentication Mode: Eagle Mode LARK Mode TCP/IP Mode 11 Data Record ÷ NtripClient Address: 58.248.35.130 晟 Data Transfer -NtripClient Port: 2010 User: wmbgps Password: huli • Mountpoint: RTCM30 Get Point GetPoint Status: No Action Network Config £ NtripServer: T Radio Config ÷ Status: Disconnect 金 Firmware Update ÷ Active: 11 Track Manage ± Ntrip Version: NTRIPv1.0 Coordinate System ÷ Authentication Mode: Eagle Mode LARK Mode

#### NtripClient

This is the general used function for rover set in GPRS mode. At the field of NtripClient, the specify IP address, access port of reference station, as well as the assigned username and password shall be input for the NTRIP connection.

NtripClient:	
Status:	Disconnect
Active:	$\odot$
Authentication Mode:	Eagle Mode TCP/IP Mode LARK Mode
NtripClient Address:	58. 248. 35. 130
NtripClient Port:	2010
Vser:	wmbgps
Password:	huli
Mountpoint:	RTCM30 Get Point
GetPoint Status:	No Action
User: Password: Mountpoint: GetPoint Status:	wmbgps huli RTCM30 Get Point No Action

**Status:** This field will display the status of NTRIP connection, connect or disconnect. **Active:** Check on this circle to activate this function.

Authentication Mode: This includes Eagle Mode, TCP/IP Mode and LARK Mode.



#### New G1 Plus

- (1) Eagle Mode is SOUTH standard mode, usually, this mode is used on the case of both Base and Rover are using GPRS mode.
- 2 TCP/IP Mode is for private network use.
- ③ LARK Mode, which is a new technology on GPRS use, it is similar to GSM dial. This mode no longer rely on a CORS server that the corrections are transmitted by GPRS network. Besides, it is different from the feature of Caster.



The other fields are the standard configuration for NTRIP connection, IP, port, username and password, after this information is input into the corresponding field, click on Get Point button to download the source table from server, then choose a proper mountpoint to access.

#### NtripServer

This configuration is used in Base+GPRS mode that Base station will transfer its correction onto the server as long as it connects to internet, then Rover can download the base's correction from server for use. Or use the LARK mode.

Ntrip Version: This field provides NTRIPv1.0 and NTRIPv2.0 for optional.

Access Point: This field is allowed to user-defined the correction format which base will transfer to the server, such as HHHH RTCM30

<b>300111</b>
---------------

NtripServer:	
Status:	Disconnect
Active:	•
Ntrip Version:	NTRIPv1.0
Eagle Mode:	
NtripCaster Address:	58. 248. 35. 130
NtripCaster Port:	2010
Vser:	0488
Password:	3839
Access Point:	HHHH_RTCM30

#### **Operation on LARK**

- a) Setup the Base station on a known position or an unknown position.
- b) Insert SIM cards into both Base and Rover receiver
- c) Input the correct APN and the assigned username and password on Network Config page, then make sure both of them have connected to internet.

WELCOM	admin \$82667117186476 [log	zout]	SMS/GPRS Conf	fig
	Status		Status:	
-	Status	-	Signal:	Ψ×
×	Configuration	•		
*	Satellite Information	. <b>E</b>	ModuleMode:	ME909s-821
			IMEI:	867223021570809
(11)	Data Record		SIM Card Status:	SIM is Wrong
显	Data Transfer	Ð	Projetanti a Chatant	Cumbing
	Network Config		Registration Status.	Sear ching
	GSM/GPRS Config		Connection Type:	None
	SMS Config		PPP Dial Status:	Disconnect
	CSD Config		IP Address:	0. 0. 0. 0
	WIEL Config			
	Rive Tooth Config		Parameter Config:	
	Bod Forwarding		Active:	
	Point orwarding		1017-	
		=	AFN:	CMNET
	Network Testing		APN User Name:	
Î	Radio Config	•	APN Password:	

- d) Check the box of LARK for both Base and Rover, then we can notice that after checking LARK for Base, all the fields turn into grey and unable to input anything, and there is only Mountpoint field available for Rover.
- e) The key step is that input the **Serial Number** of Base into Mountpoint field, then click "Enter" button to confirm all the settings.

SOUTH	
-------	--

NtripClient:	
Status:	Disconnect
Active:	•
Authentication Mode:	Eagle Mode TCP/IP Mode 🖌 LARK Mode
NtripClient Address:	58. 248. 35. 130
NtripClient Port:	2010
Vser:	wmbgps
Password:	huli
Mountpoint:	S82667117186476 Get Point 🔹
GetPoint Status:	No Action
NtripServer:	
Status:	Disconnect
Active:	•
Ntrip Version:	NTRIPv1.0
Authentication Mode:	Eagle Mode 🖌 LARK Mode
NtripCaster Address:	58, 248, 35, 130
NtripCaster Port:	2010
Vser:	user
Password:	password
Access Point:	galaxy

### NtripCaster

This feature is finally realized on New G1 plus, the receiver is equivalent to a CORS system that it generates and broadcasts the user-defined correction for rover if NEW G1 PLUS connects a static IP address.

**Port:** This is the specify port for the access.

Access Point: This is mountpoint which can be user-defined.

|--|

NtripCaster:			
Status:	Disconnect		
Active:	•		
Port:	6666		
Access Point:	fdld		
	Enter	Cancel	

### **Data Flow Config**

In this page, users can optionally to configure the content and the update rate of data flow that to output or not to output what kind of data format.

Click on the dropdown list for each data format to define the update rate

WELCOME	admin SG6052117132109 [lo	Sout]	ig
Ţ	Status	Navigation Data	
×	Configuration	GGA: 1	▼ GSA: 1 ▼ GSV: 5 ▼ GST: 1 ▼
*	Satellite Information	ZDA: 1	V BPQ: 10 V FJK: OFF V GLL: OFF V
(iii)	Data Record	EMC: OFF	VTG: OFF
显	Data Transfer	SIC Navigation D	
	General	PST: 1	✓ GSI: 10 ✓ BSI: 5 ✓ TPI: 0FF ✓
	Serial port Config	VCV: OFF	STA: OFF V DEV: OFF V AAT: WhenChanged V
	TCP/IP Config	REC: OFF	DAL: WhenChanged
	NTRIP Config	Raw Observeation	Data:
	Data Flow Config	Ξ	
۲	Network Config	Uutput Interval	· 4 · 5
Î	Radio Config	GPS Ephemeris	: ThenChanged
-		GLONASS Ephemeris	: WhenChanged
T	Firmware Update	BDS Ephemeris	: WhenChanged
₿r	User Management	GALTLEO Enhemeris	· WhenChanged
?	Help	+ Lonosphere	: • Yes No

### §4.4.6 Network Config

The "Network Config" is able to configure the ways and the contents for internet access of New G1 plus. GSM/GPRS Config, CSD Config, WIFI Config, Bluetooth Config, Port Forwarding, Router and Network Testing are under the list of Network Config.

### **GSM/GPRS** Config

In this page, all the information of receiver under GPRS mode will be displayed including the

hardware information and dialing status.

**Status:** The dialing status and hardware information are displayed in this field that users can intuitively to view the signal of network, module model and the IMEI number of the module.

**Parameter Config:** The parameters of SIM card are input in this field including APN, assigned username and password, dial mode.

WELCON	admin \$82667117186476 [logout]		> GMS/GPRS Config					
14			Status:					
	Status	Ð						
×	Configuration		Signal:	T×III				
			ModuleMode:	ME909s-821				
×.	Satellite Information	•	IMEI:	867223021570809				
( <u>11</u> )	Data Record	8						
	Data Transfer	8	SIM Card Status:	Checking SIM Card				
		-	Registration Status:	Unregist				
•	Network Config		Connection Type:	None				
	GSM/GPRS Config		DDD D: -1 C4.4	D:				
	SMS Config	Ξ	fff bial Status.	Disconnect				
	CSD Config	Ξ	IP Address:	0. 0. 0. 0				
	WIFI Config	Ξ	Parameter Config:					
	Blue Tooth Config	Ξ	-					
	Port Forwarding	Ξ	Active:					
		Ξ	APN:	CMNET				
	Network Testing	Ξ	APN User Name:					
Ī	Radio Config	Đ	ADW D	I				
+	Eirmware Undate	-	ArN rassword:					
T	Filliware Opuale	-	Dial Mode:	Automatically	Start Dial			
11	Track Manage	•						

#### **MSM Config**

On this configuration dialog, input a phone number into the blank, New G1 plus will send text message onto the phone which number is written.

WELCOME	admin 582667117186476 <u>[lo</u>	gout]	> SMS Config	
	Status	8	Status:	
	0		Signal:	T <mark>×</mark> II
~	Configuration		STM Card Status:	Charling SIM Cord
派	Satellite Information	÷		outling our out
<u></u>	Data Becord	-	Registration Status:	Unregist
	Data Recuru		Parameter Config:	
显	Data Transfer	Ð	SMSEnable:	
۲	Network Config		SMSReport:	
	GSM/GPRS Config	Ξ	SMSReportNumber:	13612345678
	CSD Config	Ξ		
		Ξ		Enter Cancel
	Blue Tooth Config	Ξ		
	Port Forwarding	Ξ		
		Ξ		
		Ξ		

### CSD Config

CSD is the meaning of direct dial between Base and Rover with SIM card inserted (the CSD function should be activated on local SIM card), this function is mainly used in the area where there is very poor internet signal coverage.

Status: This field displays the dialing status when CSD is used on New G1 plus.

**Parameter Config:** To enable the CSD function with checking the box of Enable option in this field, then input the phone number for Rover and Base in CallNumber and LocalNumber.

*Tips: please choose CSD as datalink for receiver in General Config.* 

WELCOMM	admin S82667117186476 [logout]		> CSD Config	
55		_	Status:	
	Status	•		
*	Configuration	Đ	Signal:	: Y <b>x</b> II
*	Satellite Information	8	Connection Type:	: CSD
			IMEI:	: 0
11	Data Record	Ð	CTH Card Chatran	
	Data Transfer		Sim Card Status;	: Lnecking Sim Card
		-	Registration Status:	: Unregist
•	Network Config		PPP Dial Status:	: Disconnect
	GSM/GPRS Config	Ξ		
	SMS Config			
	CSD Config		Parameter Config:	;
	WIFI Config	Ξ	Enable:	
	Blue Tooth Config			
	Port Forwarding		CallNumber:	: 1361111111
			LocalNumber:	: 13612345678
		=	T:	Plana anti CCD dataini tafan ana anata ti anat
	Network Testing	二	lips:	. Trease enable Con ustalling before you operate this page!
Î	Radio Config	Đ		
£	Firmware Update	•		Enter Cancel

### WIFI Config

This is mainly used on the WIFI configuration for New G1 plus, there are AP mode and Client mode for optional.

#### AP:

This is used to enable the WIFI hotspot for New G1 plus to broadcast for mobile terminals such as smartphone or tablet to connect and access the Web UI.

Check the box of AP in Work Mode to enable the WIFI hotspot for New G1 plus, and define the SSID, password, encryption method and broadcasting channel for WIFI connection.

DHCP IP Range: This is allowed to user-defined the IP for Web UI login.

WELCOM	admin S82667117186476 <u>[lo</u>	gout]	> WIFI Config			
<b></b>	Status	•	Active:			
*	Configuration	Đ	Work Mode:	() AP	Client	
*	Satellite Information	Đ		<u></u>		-
11	Data Record	<b>E</b>	AP_SSID:	SOUTH_6476		_
显	Data Transfer		AP_Password:	southgnss.com	. cn	
	Network Config		AP Encode:	Open		•
	GSM/GPRS Config	=	AP Channel:	1		•
	SMS Config	Ξ	DHCP IP Range:	192.168.	. 0/255. 255. 255. 0	
	CSD Config			172. 16.	. 0/255. 255. 255. 0	
	WIFI Config			10. 1	. 1 . 0/255. 255. 255. 0	
	Blue Tooth Config	Ξ		Ŭ		
	Port Forwarding	Ξ				
				Enter	Cancel	
	Network Testing					

#### **Client:**

New G1 Plus

This option enables New G1 plus to search and connect the other WIFI hotspot which connects to the internet, the receiver is able to download and use the mountpoint from reference station.

Client\_SSID: This is the WIFI hotspot which New G1 plus is going to connect

Scan: Click this button to search the surrounding available WIFI hotspot.

Password: This is the password which the WIFI hotspot requires.

**IP fields:** If New G1 plus successfully connects to the WIFI, there will be an LAN IP address generated by New G1 plus.

ClearSSID: Click this button to clear the SSID list.

WELCON	admin \$82667117186476 [log	<u>zout]</u>	> WIFI Config					
	Status	•	Active:	•				
*	Configuration	•	Work Mode:			💿 Cli	ent	
淅	Satellite Information	•		<u></u>				
<u></u>	Data Record	Đ	Client_SSID:	southgnss			Scan	
炅	Data Transfer		Password:	southgnss	. com. cn			
æ	Network Config		Encryption Type:	WPA2				
	GSM/GPRS Confia		DHCP :					
	SMS Config		IP Address:	0	0	0	0	
	CSD Config	Ξ	Subnet Mask:	255	255	. 255	. 0	
	WIFI Config		Default Gateway:	0	0	. 0	0	_
	Blue Tooth Config	Ξ	Status:	No Connect				
	Port Forwarding Pouter	=	Signal:	¶ <mark>×</mark> ∥				
	Network Testing		Clear SSID List:	ClearSSID				
Î	Radio Config	-	Operation Tip: '	When change	wifi work	mode from AF	'to Client n	please reboot bost to take effect
£	Firmware Update	•	optitution Tip.	Client funct	ion!		to our care, p	

**Bluetooth Config** 

SOUTH



In this page, users can view the information and connection status of Bluetooth, such the MAC of Bluetooth, discoverable or not, the PIN code, and the connection devices in following table.

WELCOM	admin S82667117186476 [log	out]	> Blue tool	th config					
	Status			Active: 🖌					
*	Configuration	E	Blue To	oth MAC: 00:80:25	::4A:80:78				
糸	Satellite Information	•	Discoverable: 🖌						
	Data Record	•	P	IN Code: O					
显	Data Transfer	Đ	Connection	Device:					
•	Network Config		Item	Device Mac	RFCOMM Channel	Device Name	Disconnect Action		
	GSM/GPRS Config	Ξ	1				Disconnect		
	SMS Config	Ξ					Diggonnogt		
	CSD Config	Ξ	2				Disconnect		
	WIFI Config	Ξ							
		8		Enter		Cano	re]		
	Port Forwarding	Ξ							
		Ξ							
Ĩ	Radio Config	•							
£	Firmware Update								

### **Port Forwarding**

This page is mainly used to view and configure the internet transmission port for New G1 plus, customize and debug receiver.

WELCON	admin \$82667117186476 [logout]		> Port Forwarding		
Q	Status	•	HTTP Port:	30	
*	Configuration	Đ	FTP Port:	21	
×	Satellite Information	Đ	TELNET Port:	23	
	Data Record	8			
显	Data Transfer	Đ		Enter	Cancel
۲	Network Config				
	GSM/GPRS Config	Ξ			
	SMS Config	Ξ			
	CSD Config	Ξ			
	WIFI Config	Ξ			
	Blue Tooth Config	Ξ			
	Port Forwarding				
		Ξ			
	Network Testing	Ξ			



NOTE: Usually we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.

### Router



This is mainly used to view and configure the parameters for router, only under the condition of customize and debug receiver.

adr S826	in 67117186476 <u>[log</u>	out]	> Router				
	Status	•	Destination	Gateway	Mask	Sign	Interface
<b>*</b> Co	infiguration	•	192. 168. 155. 0	0.0.0.0	0.0.0.0	V	usbO
🚿 Satell	ite Information	•	Change the default :	route: PPPO	- Enter		
Da Da	ata Record	•	Refresh				
显 Da	ta Transfer	•					
Net	work Config						
GSM/	GPRS Config	Ξ					
	MS Config	Ξ					
	SD Config	Ξ					
	/IFI Config	Ξ	Add Route				
	Tooth Config	E	nuu koutt				
	t Forwarding	Ξ	Destination:				
-	Router		Gateway:				
Net	vork Testing	Ξ	Mask:				
🖹 Ra	adio Config	8	Interface:	PPPO V	Enter		

NOTE: Usually we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.

### **Network Testing**

This function is mainly used to test network status for New G1 plus after logging on the internet. How to do:

Input the IP address which New G1 plus already connected, then click PING button, the testing information will be displayed in the following window.

ON	admin \$82667117186476 [log	<u>out]</u>	> Network Testing		
Ģ	Status	•	Input IP:	58. 248. 35. 130	PING
ĸ	Configuration	Đ	PingStatus:	No Action	
×	Satellite Information	Ð			
<u>ii</u>	Data Record	•			
5	Data Transfer	•	PingResult:		
۲	Network Config				
	GSM/GPRS Config	Ξ		1	
	SMS Config	Ξ			
	CSD Config	Ξ			
		Ξ			
	Blue Tooth Config	Ξ			
	Port Forwarding	Ξ			
		Ξ			
	Network Testing				

### §4.4.7 Radio Config

As the name implies, the parameters of radio can be done in "Radio Config", it is divided into Radio Parameter and Radio Frequency.

#### **Radio Parameter**

This page is mainly used to configure the parameters for internal radio module of New G1 plus.

WELCOME	admin \$82667117186476 [logout]		> Radio Parameters	\$		
	Status	•	Active:			
*	Configuration	Đ	Air Baud Rate:	9600	•	
×	Satellite Information	•	Data Baud Rate:	19200	•	
(iii)	Data Record	Đ	Channel:	1	•	
显	Data Transfer	8	Power:	ГОЖ	•	
۲	Network Config	Đ	Protocol:	SOUTH	•	
Î	Radio Config		Factory Default:	FactoryDefault		
	Radio Parameters	Ξ				
		8		Enter	Cancel	
£	Firmware Update	Đ				
11	Track Manage	Đ				
۲	Coordinate System	<b>±</b>				

Air Baud Rate: This represents the data transmission rate in the air of internal radio, the higher value, the bigger of data size transmitted per second, usually keep the default setting.

**Data Baud Rate:** This represents the rate of data transmission port of internal radio, this rate should be the same in both Base and Rover. In general, the data baud rate of SOUTH radio module has been unified to be 19200, keep it as default.

**Channel:** This is the communication channels for internal UHF, the value of the channel must be the same both in Base and Rover.

**Power:** This appears only in Base mode, the radio transmitting power is allowed to define in High, Middle or Low power.

**Protocol:** This is radio communication protocol for data transmission, SOUTH and TRIMTALK are optional in this page and SOUTH is the default setting, if it is changed, Base and Rover must use the same protocol for communication.

Factory Default: Click this button to restore the factory default for internal UHF module.

#### **Radio Frequency**

For New G1 plus, the powerful internal radio module supports much more radio channels apply to the legal frequency in different countries or areas.

There are 16 radio channels listed in this page after clicking on radio frequency. Users are able to change the frequency freely in the channel spacing, click Restore button to bring the frequency



of each channel back to default setting.

ON	admin S82667117186476 [log	<u>cout]</u>	> Radio Frequer	су				
Ţ	Status	•	Channel 1:	463. 125	MHZ	Channel 9:	463.125	мна
*	Configuration	E	Channel 2:	464.125	MHZ	Channel 10:	464.125	MHZ
*	Satellite Information	•	Channel 3:	465.125	MHZ	Channel 11:	465.125	MHZ
<u>.11</u>	Data Record	•	Channel 4:	466.125	MHZ	Channel 12:	466.125	MHZ
显	Data Transfer	•	Channel 5:	463.625	MHZ	Channel 13:	463.625	MHZ
۲	Network Config	<b>•</b>	Channel 6:	464.625	MHZ	Channel 14:	464.625	MHZ
1	Radio Config		Channel 7:	465.625	MHZ	Channel 15:	465.625	MHZ
	Radio Parameters	Ξ	Channel 8:	466.625	MHZ	Channel 16:	466.625	MHZ
	Radio Frequency							
£	Firmware Update	<b>•</b>		Enter		Cancel	Restore	

### §4.4.8 Firmware Update

Update the latest firmware for receiver or for corresponding modems can be done in "Firmware Update".

### **Firmware Update**

This page displays all the information of the firmware which current installed on New G1 plus, and allows to update the latest version firmware for receiver. To get latest version firmware please contact with SOUTH technician.

WELCON	admin \$82667117186476 [logo	xt] > Firmware update
	Ctatua	Firmware Information:
-	Status	Firmware Version: 1.06.161019.8826GL
*	Configuration	<b>∃</b>
*	Satellite Information	Core Engine Version: Sirius. 1.05
(iii)	Data Record	Release Date: 20161019
_	Data Notora	Warranty Date: 20150101
岁	Data Transfer	Firmware Check Sum: 0
•	Network Config	Coline Update:
Î	Radio Config	<b>H</b>
+	Firmware Undate	Latest Version:
	Firmware Update	Update Status:
	Modulo Lipdato	Download Status:
		Last Update Time: O
11	Track Manage	En Indeta: Undeta
•	Coordinate System	
ŵ	Online Service	Local Update:
25	Liser Management	Firmware Path: Browse
	oser management	Installation

Online Update: New G1 plus supports to update the firmware online anytime if there is



something update or optimized.

Local Update: Update the latest firmware by using a firmware file.

#### How to upgrade the firmware with Local Update

a) Click on "Browse" button to load firmware file (Please take in mind that the firmware is ended with .img as the extension name).

) 🔵 🚽 🦇 Galaxy G6	▶ 固件 ▶ 1.05.150827.RG60GL ▶	✓ Search	1.05.150827.RG60GL
Organize 🔻 🛛 New folde	r		i 🕶 🛨 🚺 🌘
🛠 Favorites 📩	Name	Date modifie	d Type
🧮 Desktop	📕 Gadget 风动	2015/10/28 1	6:46 File folder
〕 Downloads	6 1.05.150827.RG60GL.img	2015/8/27 9:	12 Disc Image File
🗓 Recent Places	升级说明.txt	2015/10/8 9:	54 Text Document
Desktop			
<ul> <li>Desktop</li> <li>Libraries</li> <li>Documents</li> <li>Music</li> <li>Pictures</li> <li>Videos</li> <li>迅雷下载</li> <li>Homegroup</li> <li>hzb</li> </ul>	<		
<ul> <li>Desktop</li> <li>Libraries</li> <li>Documents</li> <li>Music</li> <li>Pictures</li> <li>Videos</li> <li>迅雷下载</li> <li>Homegroup</li> <li>hzb</li> </ul>	< III		(**)

b) And then click "Installation" button to start upgrading.

B	Data Transfer	÷	Firmware Check Sum: 0
۲	Network Config	•	
Î	Radio Config	Đ	Message nom webpage
£	Firmware Update		Firmware updated successfully! Host reboot, please log in later
	Firmware Update	Ξ	
	Module Update	Ξ	ОК
ð:	User Management	Đ	
?	Help		Online Update: Update
			Local Update:
			Firmware Path: E:\RIK\Galaxy G6\固件\1.05.150827.RG60GL\1.05.15082' Browse Installation
			Status: Firmware is uploading, please wait

c) After the firmware is completed upgrading, a dialog will appear saying "Firmware updated



successfully! Host reboot, please log in later...", then the receiver will restart automatically.





SPECIAL REMIND: New G1 plus doesn't support to update the firmware with the help of INstar program any more, in the future, update the firmware for New G1 plus shall be done through the Web UI.

### Module Update

This page is used to update the firmware for corresponding modem such as OEM board, radio module and sensor.

WELCOM	admin \$82667117186476 <u>[log</u>	out]	Updating module	le
	Statue	-	OEM Vpdate:	
-	Status		Path:	Browse
*	Configuration	E		
*	Satellite Information	Đ		Installation
.11	Data Record	8	Status: 1	Not Action
显	Data Transfer	Đ	firware Version: U	00511
-	Network Centie	-	Tips: l	Update Firmware need about 30 minutes!
	Network Coning	-	Radio Update:	
Î	Radio Config	Ð	Path:	Browse
£	Firmware Update			Installation
		Ξ	Stature 1	Wet Antion
	Module Update	8		
	Track Manage	•	RadioType: }	HARXON
۲	Coordinate System	÷	Firmware Version: B	N/A
	Online Contine	-	Sensor Update:	
10	Unime Service	-	Path:	Browse
25	User Management	Đ		Testellation
	44.4	-		INSTALLATION

### §4.4.9 Track Manage

New G1 plus now supports to record the track while doing measurement, and upload the data onto the server.

#### **Parameter Setting**

WELCOM	admin 582667117186476 <u>[log</u>	out]	> Parameter Settin	ig
	Status		Record Setting	
*	Configuration		RecordEnable:	
 	Satellite Information	8	RecordInterval:	0.5 second
	Data Record		RecordStatus:	No record
	Data Hotora	-	EchoEnable Setting	
显	Data Transfer	Ð		
۲	Network Config	E	Status:	Disconnect
Ť	Radio Config	8	EchoEnable:	
-			EchoIP:	58. 248. 35. 130
£	Firmware Update	<b>±</b>	EchoPort:	2010
.11	Track Manage		EchoUserName:	USER
	Data Download	Ξ	EchoPassword:	OSWD
۲	Coordinate System	8		
٢	Online Service	<b>H</b>		Enter Cancel
25	User Management	8		

#### **Record Setting**

Check on the box of "RecordEnable" to activate track recording function, and choose a proper recording interval in dropdown list of "RecordInterval".

Record Setting			
RecordEnable:			
RecordInterval:	0.5	▼ second	
RecordStatus:	No record		

#### **EchoEnable Setting**

This configuration dialog is used to upload the recording data to a server in real-time.



Status:	Disconnect
EchoEnable:	
EchoIP:	58. 248. 35. 130
EchoPort:	2010
EchoUserName:	USER
EchoPassword:	OSWD

### **Data Download**

On this page, users can download the track data file from receiver. Choose the recording date and click "Get Data" to load all the data files recorded at that day, then choose the files and click download button.

ELCOM	admin S82667117186476 [log	out]	➤ Data Download	ł								
Ģ	Status	8	Select Date	•						Ge	t Data	
*	Configuration	Đ	Download Ti	ps:	•	1	1, 20	16		×	ave as and complete	
ж	Satellite Information	•	Item	Mor	Tue	Wed	Thu	Fri	Sat	Sun	Size	Data
11	Data Record	•	1		1	2	3	4	5	6		🚽 [Download]
炅	Data Transfer	A	2	7	8	9	10	11	12	13		🚽 [Download]
-	Network General	-	3	14	15	16	17	18	19	20		🚽 [Download]
	Network Config	•	4	21	22	23	24	25	26	27		👱 [Download]
Î	Radio Config	Ð	5	28	29	30					J	👱 [Download]
£	Firmware Update	•	6									👱 [Download]
11	Track Manage		7									🚽 [Download]
	Parameter Setting	Ξ	8									🚽 [Download]
	Data Download		9									🚽 [Download]
۲	Coordinate System	8	10									🚽 [Download]
\$	Online Service		11									🚽 [Download]
25	Liser Management		12									🚽 [Download]
60	eser management	-	13									👱 [Download]

### §4.4.10 Coordinate System(reserve)

New G1 plus allows users to setup the local coordinate system on internal web UI management. The instrument would output the local coordinates according to this coordinate system.

G1 Plus			SOUTH
admin S82667117186476 <u>[logou</u>	t] > Coordinate Sys	tem	
Status	Coordinate projec	tion:	
Configuration	ProjectionName:	WGS84	-
Satellite Information	ProjectionA:	6378137.000	_
Data Bacard	ProjectionF:	298. 257223563	-
	ProjectionBO:	0.0	
Data Transfer	FrojectionLO:	114.0	
Network Config	+ ProjectionEO:	500000.0	-
Radio Config	+ ProjectionNO:	0.0	-
Firmware Update	+ ProjectionSNO:	1.0	-
Track Manage	+ ProjectionPS:	0.0	2
Coordinate System			
Coordinate System	Seven parameter:		
Online Service	🚹 🗛 🗛 🗛	0.0	-
User Management	+ AY(meter):	0.0	
Help	± AZ(meter):	0.0	
	G1 Plus admin ssessor117186476 [lozed Status Configuration Satellite Information Data Record Data Reco	Conditionate System         adminin       Status       Image: Status       Im	Confliguration       Coordinate System         Status       Configuration         Status       Coordinate System         Status       Coordinate System         Status       Coordinate System         Status       Coordinate System         Data Record       ProjectionBies         Data Record       ProjectionBies         Data Record       ProjectionBies         Data Record       ProjectionBies         Data Transfer       ProjectionBies         Radio Config       ProjectionBies         Firmware Update       ProjectionBies         Track Manage       ProjectionSine         Coordinate System       0.0         Status       0.0         Status       ProjectionSine         User Management       ProjectionSine         Help       ProjectionSine

## §4.4.11 Online Service(reserve)

This function is to upload the data onto a server real-time, including Navigation data, raw observation data, correction data, SIC observation data and open SIC observation data.

WELCOM	admin \$82667117186476 [log	out]	> Online Service	
<b>P</b>	Status	Đ	Status: 1	Disconnect
*	Configuration	Ð	Active:	$\bigcirc$
×	Satellite Information	Ð	Be controlled:	
11	Data Record	Ð	Anonymous Login:	
显	Data Transfer	Ð	Inactive In 2G Mode:	
۲	Network Config	Ð	DataType:	Navigation Data
Î	Radio Config	Đ	IP:	192. 168. 1. 1
£	Firmware Update	8	Port:	6060
11	Track Manage	8	UserName:	UserName
•	Coordinate System	Ð	Password:	Password
ŵ	Online Service			
	Online Service			Enter Cancel
8:	User Management	Đ		
?	Help	Ð		

### §4.4.12 User Management

This page is used to manage the authority of login Web UI for users, including the username, password and add users.

ON	admin S82667117186476 [log	out]	User Management				
Ģ	Status	•	Add user				
*	Configuration	•					
×	Satellite Information	<b>••</b>	Name	Limits of authority	Status	Operating	Operati
(il)	Data Record	<b>E</b>	admin	Administrator	online	derete	eart
显	Data Transfer	<b>•</b>					
۲	Network Config	<b>E</b>					
Î	Radio Config	8					
£	Firmware Update	<b>11</b>					
11	Track Manage	•					
⊕ (	Coordinate System	<b>•</b>					
÷	Online Service	•					
ð:	User Management						
	Lines Management						

### §4.4.13 Help

In this page, users can get help and check the log book of receiver (the log book can help to backtrack the working status of receiver).

NOTE: Only the administrator can modify any parameters for receiver and manage users, and the ordinary users only have the right to view the relative parameters.

WELCOM	admin SG6052117132109 [1	ogout]
Ţ	Status	Đ
*	Configuration	Đ
×	Satellite Information	Đ
	Data Record	Ð
뮻	Data Transfer	÷
۲	Network Config	Đ
Î	Radio Config	Đ
£	Firmware Update	•
<b>ð</b> :	User Management	Đ
?	Help	
	Sysstem Help	

# Chapter V Data Collector X11



## §5.1 Basic introduction to the handheld

Here takes X11 for example (If you want to know more controller options, please contact local agency or SOUTH team directly), appearance of X11:

Standard Configuration	Description
Li-ion Battery	7.2V/ 24.4Wh
Size	193x91x42mm(L*W*D)

)UIH



Waterproof/Dustproof	IP67
Display	Blanview TFT, LED backlighted
ROM	8GB, up to 32GB
X11 pro	72 channel,5MP camera

### 1. Charging

Connect the charger with collector by the USB Link cable to recharge.

Main Screen (Upper right corner) will show the Charging Icon in power off (on) status.(Once you connect Collector with PC to recharge; the charging time will be longer).

#### 2. Power on/off

Make sure that the battery is fully charged or you can connect the Collector to PC via the USB Cable. (Collector should be with battery).

Press Power Key for 3-5 seconds to power on/off.

(If there is no any response from Collector or other unusual situations happened, press the Reset Key besides the USB socket in the bottom of Collector with the Touch Screen Pen).

#### 3. Connect to PC

Make sure that you've installed **Microsoft ActiveSync 4.5** or higher version, if your computer equipped with win7 or win8 system, please make sure that you have installed **Windows Mobile Device Center** program.

Connect the Collector to PC via the Mini USB Data Cable.

Connection will be preceded automatically by Microsoft ActiveSync. <sup>Sol</sup> Icon will turn green and an interface of Setting will come out, you can just click "Cancel". After this, you can manage and edit the data in Collector.

### 4. Installing Program

Make sure that collector is synchronized with PC. Run the Installation file at PC side.

If the installation program is also suitable for collector, you can copy the installation program into collector to install. You can just copy the folder into collector when you need.





We suggest you installing programs into Flash Memory and save data into Storage Card.

#### 5. Camera

Get into the Camera Mode by pressing the Camera Key for 3 or more seconds. Press Camera Key to take a photo and click "OK" on the screen to save.



Note: If you want to know more information about X11, Please refer to X11 manual.

### §5.2 Bluetooth Connection

The short-range wireless Bluetooth communication facilities are for the wireless exchange of



information among a variety of Bluetooth-enabled devices.

Tap on the Start menu (Settings)  $\rightarrow$  (control panel) to open (Bluetooth Device Manager). tap on the(scanning device) after setting the Bluetooth device, and the surrounding Bluetooth devices will be listed in the search list. And then input the passcode 1234 to have pair between controller and receiver. As shown below:



After the pair, select an available com port for the receiver (usually COM 8 and COM 5 are OK). As shown below:



Bluetooth 💦 🛠 🗰 12:04	Bluetooth 💦 🕂 🗰 12:04
Bluetooth	Mode 🖌 COM Ports 🔪 Devices
Port: COMS	After pairing with a device, to set up a COM port tap New Outgoing Port. For other options, tap and hold an existing port. S82335117077146 (COM8) New Outgoing Port
Back Finish	

After the establishment of the virtual serial port, other applications can use the serial port for data communication with a Bluetooth device.

### §5.3 Software installation and connecting

Professional surveying and mapping software are made for measurement applications for different industry:"EGStar", "Power Star", "Mapping Star", "Navigation Star" and so on. Here takes EGStar for example:

EGStar is the specific software for NEW G1 PLUS measuring system, mainly for the collection and calculation of the measuring points.

Before installing of EGStar, you need to install Microsoft Active Sync. After installing it on your computer, connect handheld to computer with a cable, and install EGStar into the handheld, at the same time, keep the mainframe power on, then set as follows:

Open EGStar software and enter the main interface. Click "OK" on the "prompt" window.





1. "Configure"  $\rightarrow$  "Port Config", in the "Port Configuration "dialog box, select the port "COM8", with the same serial number which you use to connect the Bluetooth serial port service. Click "OK." If the connection is successful, the status bar will display related data. If there is barrier, exit EGStar to reconnect (If the above settings are correct, then link directly). Handheld connecting with the host PC can do the follow-up measurement.

EGStar	#** \} +€ @	12:06	EGSt	ar 🗧	:\:\*@	12:06
🜖 Com port s	setting 📃		<u>)</u> c	om port setting		
Port: Baud rate: HostType:	COM8 COM0 COM1 COM2 COM3 COM4 COM5 COM6 COM7 COM8		Pi Bi H	ort: COM8 aud rate: 115200 ostType: RTK		
S P:Single	H:1.874 V:3.612	G	s	P:Single H:1.66	4 V:3.241	G
I S:6+2+3	<b>3 ∛8</b>	м	I	S:6+2+3	<b>₹8</b>	м
С	09:23:55	ок	С	09:24	:11	ок
			æ		)	

2. Or go to "Bluetooth Manager", in this interface tap on "Search" button and the controller will search the surrounding Bluetooth devices, select the correct serial number from the list and click on "Connect" button, controller will connect to receiver without setting any COM port. If the prompt message "Bluetooth connect success" appears, that means that controller has successfully connected with receiver, then please check the Bluetooth indicator on receiver.





EGStar 🔶	Ì Ă] ╡× 🖅 10:32		
Device name	Device address		
B LENOVO-PC-LX	EC:55:F9:FE:EC:BE		
\$\$ \$82952117130579	00:80:25:42:25:95		
882552117131408 S82552117131408	00:80:25:49:36:5B		
LENOVO-PC	90:48:9A:C5:87:0E		
BGStar3.0	ok		
Bluetooth co	onnect success		
[ <b>&lt;</b> ] =	: 🔪		
Status: Bluetooth connect success			
Connected: \$82552117131408			
Search Connect	Close Exit		

# **ChapterVI** External Radio

### §6.1 Overview

The radio Hx-U202 is a high-speed semi-manual wireless data transmission radio, whose air transfer rate can be up to 19200 bps and the RF transmitter power is larger, used in SOUTH RTK measurement system.

Radio Hx-U202 adopts GMSK modulation, 19200bps transfer rate, low bit error rate. RF frequency can cover 410-470MHz band. Data transmission mode of Hx-U202 is transparent

mode, that is, the received data is sent to the RTK GPS system unchanged.

Radio Hx-U202 data interface is a standard RS-232 interface, which can be connected to any RS-232 terminal equipment for data exchange.

Hx-U202 digital radio research employs advanced radio frequency technology, digital signal processing technology and baseband processing technology, carefully selected high quality components to organize production, to ensure the long-term stable and reliable operation;

Have a forward error correction control, digital error correction function.

It has eight transmitting and receiving channels. Can be changed according to the actual use of the channel frequency, transmit power adjustable interval is 0.5MHz.

Channel number	Frequency (410-470MHz)
Channel 1	463.125
Channel 2	464.125
Channel 3	465.125
Channel 4	466.125
Channel 5	463.625
Channel 6	464.625
Channel 7	465.625
Channel 8	466.625

## **§6.2 Frequency Table**

## §6.3 Radio Appearance



**Control Panel** 



Control panel lights display the status of the radio, the key operation is simple and convenient, one-to-one interface can effectively prevent connection errors.



(1) Channel indicator light.

2 Power indicator light,

③ ON / OFF power key: This key controls the unit's power switch. The red light on the left indicates the power status of the machine.

④ TX red light indicator: This indicator flashes once per second means that the radio is transmitting data with the transmitting interval in 1 second;

(5) AMP PWR indicator: Indicates the level of radio power, light on indicates low-power, light off indicates high-power

<sup>(6)</sup> CHANNEL button: By pressing this switch, you can switch channels 1-8.

## **§6.4 Radio Interfaces**

Mainframe Interface: 5-pin jack for connecting a GPS receiver and power supply



Antenna interface: For connecting the transmitter antenna





### §6.5 Transmitting Antenna

The UHF transmitting antenna is particularly suitable for field use, the receiving antenna is 450MHz Omni-directional antenna, light and durable.



## **§6.6 Application Notice**

The battery power is too low: When the flashing channel indicator appears on the control panel, which means the lack of battery power, replace the battery in time, otherwise there would be data link unstable or unable to launch.

radio power supply: voltage 12-15V (typical 13.8V) RF transmitter power 25W, current 7.0A.

Radio transmits power: radio transmits power based on the voltage of the power supply, check the voltage before use.

High and low power use: use low-power transmitter when low power can satisfy the operation as high-power transmitter will exponentially consume battery power, excessive use will reduce battery life. Install the radio station as high as possible.

Power corrugated coefficient: power ripple coefficient must be less than 40mV, the smaller the ripple factor is, the smaller will the beam spectrum be and the higher communication quality will be.

Power Connection: Power of positive and negative connected correctly.

Electromagnetic environment: Before using the radio, it is better to perform electromagnetic environment measurement, to avoid the communications blackout.

Radio match antenna: the basic parameters of the antenna selection are the band width, frequency, gain, directivity, impedance, VSWR and other indexes .Usually the effective bandwidth of the antenna is 3-5MHz,antenna selecting should be based on the frequency bands



used by the to be selected channel. For the long-distance transmission, it is better to use a directional antenna and high-gain antenna, and pay attention to the impedance of the antenna and feeder to match with the Radio antenna interface (50 ohms).

#### We recommend:

Recommend that you use plug-in battery which is more than 12/36Ah, the use of maintain a regulated current of 10A during the operation.

Recommend that you charge it in time, do not overuse the battery, otherwise it will reduce battery life.

Recommend that you replace the batteries after six months to a year, to ensure the radio distance.

## **Chapter** M Accessories

### **§7.1 Instrument Case**



The instrument case for New G1 plus contains two layers of packing: the inner layer is filled with anti-collision foam, the host and other accessories can be dispersed and embedded; the outer layer is a hard instrument case, sealing-strong, wear-resistant anti-wrestling. Compact, durable, can effectively prevent the impact, easy to clean

### **§7.2 Batteries**

2 pcs of large capacity Li-ion batteries are the standard configuration for New G1 plus that to make sure New G1 plus has enough power for whole day work.



Specifications of battery Model: BTNF-L7408W Capacity: 7.4V×3400mAh





§7.3 Charger&Adapter

### §7.3.1 Charger

Model: CH-SA3002 INPUT: 12VDC=1.25A OUTPUT: 2\*8.4VDC=550mA Please use the standard battery.



### §7.3.2 Adapter

Model: DSA-20CA-12 INPUT: 100-240V~50/60Hz 0.8A OUTPUT: +12V=1.5A





NOTE: If CHARGE indicator glows in red, it indicates the battery is being charged, If FULL indicator glows in green, it indicates the battery is full charged.

### §7.5 Differential Antennas



The differential antenna is as shown above;

If the receiver is set up to use GPRS mode, the receiver has internal GPRS antenna, so don't need install external GPRS antenna.

The UHF differential antenna is required to install to the interface at the bottom of receiver if New G1 plus is set up into internal UHF mode.

## §7.6 Cables

#### 7-pin to USB cable

This cable is used to connect the receiver with computer for static data transmission, Web UI accessing and firmware update.





L7U50

### 7-pin to OTG cable

This cable is used to connect an external storage directly to New G1 plus for static data storage and copy.



L7U40

### **Communication cable**

This cable is used to connect the receiver to computer for receiver debugging, differential data checking and firmware update.



L5930B

## **§7.7 Other Accessories**

Other accessories include rover station centering rod, handheld bracket, base point, connectors, measuring plate and measuring tape.









Measuring tape





Bracket for controllers

Carbon fiber pole

NOTE: The models and types of instrument accessories will vary with the instrument upgrade.
# **ChapterVII** Measuring Operation

Reading this chapter, you can grasp in detail how to use the New G1 plus measurement to do system static, RTK operations.

GPS measurement operation scheme refers to the operating scheme used to determine the relative position between the stations with the help of GPS technology. Point coordinate precision obtained is not the same; its operating methods and observation time are also different, thus having different range of applications. GNSS receiver operating program is divided into two types: static measurement and RTK dynamic measurement (including the base station and rover station).

Test environment requirements:

(1) Observation stations (ie, the receiving antenna settlements) should stay away from high-power radio transmitters and high voltage transmission lines in order to avoid the magnetic field around the GPS satellite signal interference. Receiver antenna and its distance shall not be less than 200 m;

(2) Observation stations should not be near to the large area waters or objects which can strongly reflect (or absorb) electromagnetic wave to weaken the effects of multi-path;

(3) Observation stations should be located in places where the receiving device can be installed easily, and good vision available. Elevation angle of obstacles in view should generally be greater than  $10^{\circ}$  to  $15^{\circ}$ , in order to weaken the effects of troposphere refraction;

(4)Observation stations should be selected in a convenient place, and easy to use other means of measuring, joint measurement and expansion;

(5) For the long baseline GPS network, should also consider the vicinity good communication facilities (telephone and telegraph, post and telecommunications) and power supply, for power between the stations and equipments.

# **§8.1 Static Operation**

# §8.1.1 Static Measurements Profile

#### Static measurements

GPS positioning measurement by installed three (or more) GNSS receivers to perform simultaneous observation and determine the relative position between the stations.

#### Scope

The establishment of a national geodetic control network (second or less);

The establishment of precision engineering control network, such as bridge measurement, tunnel measurements, etc;

The establishment of a variety of encryption control network, such as city measurements, Drawing Point measurement, road surveying, demarcation measurements.

For the GPS measurements of small and medium-sized cities, towns, as well as mapping, cadastral, land information, real estate, geophysical exploration, surveying, construction and other control measurement, should meet the accuracy requirements of the D, E grade GPS measurements.

## **§8.1.2 Operating Procedures**

#### **Pre-measurement**

Project approval Program design Construction design Surveying and mapping data collection and arrangement Instrument test, test Reconnaissance, choice of site, buried stone Measurement Operating team stationed in Satellite status Forecast Observation planning Dispatch of operation and field work observation After the measurement Data transmission, dump, backup, Baseline Solution and quality control Network adjustment (data processing, analysis) and quality control Finishing results, technical summary Project acceptance

# §8.1.3 Field Operation Notes

1)Static mode of New G1 plus receiver is able to be set on receiver, and also can be set on software (Such as EGStar3.0), please refer to the EGStar manual for more information.

2)Set up a tripod on the control point, leveling and centering strictly on the measuring point.

3)Measure the instrument height three times, the difference of the results shall not be more than 3 mm, and average the results. The instrument height should be measured from the center of the control point to the mark line on the instrument.

4)Record instrument number, point name, instrument height, and start time.

5)Power on, confirm the static mode, the mainframe begins to search satellites and satellite lights begin to flash. Recording condition reached, the status light flashes in accordance with the set sampling interval, flashing once indicates the acquisition of an epoch.

6)After the test, the mainframe shut down, and then begins data transmission and data processing.

## §8.1.4 GPS Net Design

The net design mainly subject to the users' requirement, but outlay, time interval of observation, type of receiver and the receiver amount, etc also relate to the net design.

In order to satisfy the users' requirement, we should keep the principle as follows:

1. GPS net normally forms closed graph by independent observation borders, such as triangle, polygon or connecting traverse, etc, to add checking conditions and to improve the net consistency.

2. When designing the net, the net point should be superposition with the original ground net points. The superposition points are generally no less than three and distribute evenly on the net in order to ensure the changing parameters between GPS net and local net.

3. GPS net point should be superposition with the level points, and the other points are normally united—surveyed with level surveying way or the equivalent way. You can also set some level united—surveying points in order to offer geoid's information.

4. In order to observe and level united survey, we often set GPS net points at a clear and easy arriving field.

5. We often distribute some well eyeshot azimuth points around GPS net to ensure united survey direction. The distance from azimuth to observation station should be more than 300 meters.

According to different purpose of GPS surveying, independent observation borders of GPS net should compose definite geometry graph. The basic graphs are as follows:

#### **Triangle net**

The triangle in GPS net is composed of independent observation borders, it has strong geometry structure and well self-checking ability, it can also find out the coarse difference of result and to share the difference to each baseline with adjustment.

But this net need a lot of observation, especially when receivers are lacking it will greatly prolong the observation time. So only when accuracy and security are required very high, and receivers are more than three, we can use this graph.

#### Circle net

Circle net is composed of many loops which are formed of many independent observation borders. This net is similar with one of the classical surveying-- lead net. Its structure is a little worse than triangle net. The amount of baselines in closed loop decides the self--checking ability and consistency. General speaking, the amount of baselines has such limit as follows:



The advantage of circle net is the small workload, good self-checking and consistency. But the main disadvantage is that the accuracy of indirect-observed border is lower than that of direct-observed border, and the baseline accuracy of neighbor points distributes unevenly. In field surveying, we usually use annexed traverse as special example according to practical situation and the net usage. This requirement for this traverse is the high accuracy for the known vectors between two point ends. Furthermore, the amount of annexed traverses cannot exceed the limits.



#### Star shape net

Star net has simple geometry graph, but the baselines of it mostly don't compose a closed graph, so it has a bad checking ability and consistency.

The advantage of this net is that it only needs two receivers, the work is very simple, so it is mostly used in the quick surveying as quick static orientation and kinematical orientation. This working mode is widely used in project layout, border surveying and GIS surveying, etc.



## §8.1.5 Antenna Height Measurement

After fixed the instrument, user should measure antenna height at the beginning and the end of every period of time to ensure the accuracy "mm" level. We usually measure from the center point on the ground to the center waterproof loop of antenna. That is an inclined height. Please refer to the following figure.





We use a formula to calculate antenna height.

$$H = \sqrt{h^2 - R_0^2} + h_0$$

"h" is the inclined height that measure from point on the ground to the measuring plate edge.

 $R_{\rm b}$  is the distance from middle of antenna to the edge of measuring plate.

 $h_0$  is the distance from antenna phase center to the bottom of receiver (measuring plate).

H is the calculation result. We usually measure antenna height twice and adopt the average. *Attention:* We input the inclined height as the antenna height, which is the inclined distance from point on the ground to the waterproof loop of antenna.



# **§8.2 RTK measurement**

RTK is the abbreviation of Real-Time Kinematic measurements.

RTK technology is the real-time dynamic differential carrier phase positioning technology, combining global satellite navigation and positioning technology with data communication technology which includes base station and rover station. Base station transmits the data by radio or network to the rover station, which will perform differential analysis, thus providing real-time coordinates of the measurement point in the specified coordinate system.

Depending on the different ways of differential signals transmission, there are two methods for RTK operation by using the radio and internet (GPRS).

## §8.2.1 By using radio (Internal radio)



#### §8.2.1.1 Base Station Set up

Base station shall be set up in the broad view, unobscured and higher places; avoid the vicinity of the high-voltage power transmission equipment and the transmitting and receiving antennas of radio communication equipment, the shade of trees, and the sides of waters, all of which will produce different degrees of impact on the GPS signal reception and emission of radio signals

- 1) Set a tripod to the location with known coordinates (or unknown), attach base receiver to the tribrach adapter set (the measuring plate is recommended to install under base receiver).
- 2) Install the transmitting antenna onto the receiver.

- 3) Make sure all connections are alright, then power on receiver.
- 4) The receiver is set as base with internal radio mode. (set on the control panel, or on internal Web UI or on the software installed on data collector).

#### §8.2.1.2 Start the Base station

First time to start the base station, all the relative parameters are completely configured before starting.

#### Using EGStar3.0

- 1) Run EGStar3.0 program on data collector;
- 2) Go to "Config—Device Config—Instrument Config" page to configure the working mode and datalink for base receiver.



- Tap on "Work mode setting" and then check the box of "Set work mode", then click on "Next" to continue;
- 4) Check the box of "Base" option and click "OK" and return to Instrument setting page. At this moment, New G1 plus prompts the correct working mode with voice guide.



EGStar	🛱 🎦 帐 🔁 1:19	EGStar	(1:20
<b>)</b>		0	
₽₽		₽ ₽	
Set wo	rk mode		○ Rover
⊖ Set sta	tic parameters		Base
🔿 Set dat	a link		○ Static
Next	Cancel	ОК	Cancel
	ОК		ОК

- 5) Then tap on "Work mode setting" and then check the box of "Set data link", then click on "Next" to continue;
- 6) Check the box of "Internal radio" option and click "OK" to complete the settings.

EGStar	# ど € 1:21	EGStar	🛱 🏹 帐 配 1:22
<b>)</b>		0	
₽₽		₽₽	
⊖ Set v	work mode	(	Internal radio
⊖ Set s	static parameters	(	GPRS/GSM
Set o	data link	(	) External radio
Next	Cancel	ОК	Cancel
	ОК		ОК

- 7) Return to the main interface and again get into instrument config page, tap on "Base setting" to get into Base configuration page.
- Choose the correction format in Msg, Type, choose the antenna measuring method and input correct antenna height in Ant, H, input the proper value for Interval time, Mask angle and PDOP limit.
- 9) Then tap on the symbol **(P)** to save and complete the parameters.
- 10) Input the coordinates for base location or tap on the symbol 🔝 to obtain a single

position for base.

11) After all the parameters are completely set, click on "Start" button to start the base station.

EGStar 🕂 🏠 🕂 🖅 1:19	EGStar ♣ ▲ ▲ 4 🖅 ▲ 1:17
💊 Instrument 🛛 🚱 🌉 🗐 🕞	<b>)</b>
Base	Base parameters
	Msg.type <b><u>RTCM3</u></b> Interval time 1
Rover setting	Diff.mode RTK Mask angle 0
	Ant.H 0 PDOP Limit 3
Base setting	🔘 Real 🔵 Slant 🔵 Pole 🔵 Slice 😰
	Base coordinate
Work mode setting	Latitude 23.0732918480
	Longitu 113.2206468601 🔘 Lat/Lon
	Elevatic 27.8410 O Plane
S P:Single H:3.498 V:4.870 G	Calc.7 para.mode repeated station
I S:6+5 TO M	Can't input ant.H in single position status
С Blue 11:25:26 ОК	Start Help Exit
	С

*REMIND:* If the base station is still set up on the same position next time, check the box of "repeated station" option and the base station will start automatically with known coordinates.

#### **Radio channels setting**

- 1) Go to "Config—Device Config—Radio Config" page.
- 2) In radio channel field, click on "Read" button to read the current channel value, or select a radio channel from the list and click on "Switch" button to change the radio channel.
- 3) In radio power field, click on "Read" button to read the current radio power, or select high/low from the list and click on "Setup" button to apply power for radio.



EGStar	. ⊂ 🛱	🗧 🔁 4:07
₽ ₽		Exit
Radio Channel-	81 32	
Current channel:	6	Read
Switch channel:	1	Switch
<b>Radio Power</b> Don't use when d	evice not sup	port!
Read power:	Unknown	Read
Setup power:	high 💌	Setup
		ОК

#### Using internal Web UI

 Connect New G1 plus with computer via 7-pin to USB cable and set the USB port to output as Ethernet on New G1 plus. (a driver is required to installed on computer to enable this function).



- Login the internal Web UI of New G1 plus with the default username and password (admin/admin).
- 3) Get into "General Config" interface under "Configuration";
- Choose "Base" in "Work Mode" and "Radio" for "Datalink", then click "Enter" button to save configurations;
- 5) Get into "Base Setup" interface, and input known coordinates or click "Position" button to obtain a single coordinates for base station;
- 6) Choose the correction format in "Corrections", then click "StartBase" button to start the base station.



#### New G1 Plus

WELCOME	admin SG6058117149518 [10	gout]	> Base Setup							
Ģ	Status	•	CMR ID:	14					_	
*	Configuration		RTCM2.× ID:	302					-	
	General Config	Ξ	RTCM3.x ID:	1326					-	
	Base Setup	8	Lon:	113	•	22	-,	6.406587		e 🔿 w
	Antenna Setup		Lat:	23		7	—,	33, 191387	- " (	N S
-	Receiver Operate		41+•	35 41470	25			1		
	System Setup	Ξ	ALC.	Desiti						
×	Satellite Information	•		Automac	on ticel	Ju Star	pare	by Current poin		
	Data Record	•	Base Start Mode:	Automac		il) ota	D	- by current point		
炅	Data Transfer	<b>H</b>	_	STATTDA	ise	Sto	ppase			
A	Notwork Copfic	-	Correction:						-	
	Network Cornig		POP Value:	3						
Ĩ	Radio Config	÷	Status:	Start Bas	e Su	ccess				

7) Get into "Radio Parameters" interface under "Radio Config", configure the radio parameters for base station such air baud rate, channel value, power and protocol.

	admin SG6058117149518 [lo	gout]	> Radio Parameter	s	
	Status	<b>•</b>	Active:		
×	Configuration	<b>E</b>	Air Baud Rate:	9600	•
×	Satellite Information	•	Data Baud Rate:	19200	•
11	Data Record	•	Channel:	6	•
5	Data Transfer	•	Power:	TOM	•
۲	Network Config	•	Protocol:	SOUTH	•
Ī	Radio Config				
	Radio Parameters			Enter	Cancel
	Radio Frequency	-			. <u></u> J

### §8.2.1.3 Rover station set up

After verifying the successful transmitting of the Base station, the rover station shall be set up at this moment.

1) Install the bracket holder onto the carbon fiber pole, and fix the controller into the bracket, then power on the controller.



- 2) Install the receiving antenna onto the rover receiver, and screw the receiver into the carbon fiber pole, then power on the receiver.
- Set the receiver as rover with internal radio mode. (set on the control panel, or on internal Web UI or on the software installed on data collector).



#### §8.2.1.4 Rover settings

#### **Using EGStar3.0**

- 1) Run EGStar3.0 program on data collector;
- 2) Go to "Config—Device Config—Instrument Config" page to configure the working mode and datalink for rover receiver.
- Tap on "Work mode setting" and then check the box of "Set work mode", then click on "Next" to continue;
- 4) Check the box of "Rover" option and click "OK" and return to Instrument setting page. At this moment, New G1 plus prompts the correct working mode with voice guide.





- 5) Then tap on "Work mode setting" and then check the box of "Set data link", then click on "Next" to continue;
- 6) Check the box of "Internal radio" option and click "OK" to complete the settings.





- 7) Radio channels setting
- 8) Go to "Config—Device Config—Radio Config" page.
- 9) In radio channel field, click on "Read" button to read the current channel value;
- 10) Select the same radio channel value as set on base station from the list and click on "Switch" button to apply this channel value.



EGStar	ta ta	<b>€ Œ 4:07</b>
₽ <sup>©</sup>		Exit
Radio Channel-		
Current channel:	6	Read
Switch channel:	1	Switch
Radio Power—		
Don't use when de	evice not sup	port!
Read power:	Unknown	Read
Setup power:	high 💌	Setup
<u></u>		
		ОК

#### Using Web UI

 Connect New G1 plus with computer via 7-pin to USB cable and set the USB port to output as Ethernet on New G1 plus. (a driver is required to installed on computer to enable this function).





- Login the internal Web UI of New G1 plus with the default username and password (admin/admin).
- 3) Get into "General Config" interface under "Configuration";
- 4) Choose "Rover" in "Work Mode" and "Radio" for "Datalink", then click "Enter" button to save configurations;



5) Get into "Radio Parameters" interface under "Radio Config", configure the same radio parameters as set on base station for rover station such air baud rate, channel value, power and protocol



#### New G1 Plus

WELCOME	admin SG6058117149518 []c	gout]	<b>&gt;</b> Ra	dio Paramete	ers		
	Status	E		Active			
*	Configuration	<b>H</b>		Air Baud Rate	9600		•
*	Satellite Information	Ħ	I	ata Baud Rate	19200		
11	Data Record	Ð	1	Channel	6		•
显	Data Transfer	•		Power	LOW		•
	Network Config	Đ		Protocol	SOUTH		•
Î	Radio Config						
	Radio Parameters				Enter		Cancel
	Radio Frequency	Ξ					
		EGSt	ar		ど) ♣ @	12:56	
		👏 h	zb			l [L]	
					50	3	
					000		
		В	Job	Input	Conf	īg	
			Ĩ.				
			МÅ	LŤ		-	
		S	urvey	Tool	Abo	ut	
		_				_	
		S	P:Fixed	H:0.004	V:0.010	G	
		I Evit	5:0+0		10		
		Exit	Blue	11:02:40	)	UK	
		H					

## §8.2.2 By using radio (external radio)

#### §8.2.2.1 Base station setup

- 1) Set a tripod to the location with known coordinates (or unknown), attach base receiver to the tribrach adapter set (the measuring plate is recommended to install under base receiver).
- 2) Mount the UHF antenna set onto a tripod, and connect it to the external radio which is linked with the external power supply via the multi-function cable.
- 3) Power on the base receiver and set the receiver as base with external radio mode. (set on the control panel, or on internal Web UI or on the software installed on data collector).





NOTE: place the 2 tripods at least 2m away from each other against signal interference.

#### **Using EGStar3.0**

Set the base receiver as base working mode from "Config-Device Config-Instrument Config—Work mode setting—Set work mode--Base", choose the External option in "Set data link".





#### §8.2.2.2 Radio settings

- 1) Make sure all connections are alright, then power on the radio by pressing power button, and then press "C" button to define the channel for data transmission.
- 2) Please keep in mind the channel is selected to match the settings in controller later on.
- 3) Radio starts to transmit when TX LED is flashing.



§8.2.2.3 Start Base Station (Please refer to 8.2.1.2)

## §8.2.3 By using internet (GPRS)

- 1) In this mode, base station is no longer to set up as CORS is permanently installed.
- 2) Insert a SIM card into the SIM card slot in battery component.
- 3) Power on the rover receiver and connect with controller via Bluetooth.

#### EGStar3.0 settings

- 1) Go to "Config—Device Config—Instrument Config—Work mode setting—Set data link" interface to choose "GPRS/GSM" option for rover station.
- 2) Then return to main interface and go to "Config—Device Config—Network Config" page.
- 3) Add a new NTRIP connection in this page or select the existed one to re-edit/use directly.



EGStar 🕂 🏠 🕂 🔁 1:25	EGStar 🕂 🎦 🕂 🖅 1:31
<u>)</u>	🔌 hzb 💮 🍘 🗐 🚍
₽ <b>₽</b>	Job Config
🔿 Internal radio	Job Coordinate System
GPRS/GSM	Coordinate Parameter
C External radio	Instrument Config
	S P: NetWork Config
OK Cancel	I S: Mobile difference ger
EGStar 🎝 🕂 🔁 1:32	EGStar (금 산) ◀ (금 1:33
- Network Setting	Network
Network <vrs 58.248.35.130:2010=""></vrs>	
Network <vrs 123.231.114.117:60606=""></vrs>	
Network <eagle 58.248.35.130.2010=""></eagle>	Connect: GPRS/CDMA
Network <vrs 220.247.240.88:60606=""></vrs>	APN: cmnet Change
Network <vrs 58.248.35.130:2010=""></vrs>	IP: 58.248.35.130
Hetwork (WKS 50.210.55.150.00002	Port: 2010 DNS
	User Name: wmbgps
	Password: ****
	Access 0800_RTCM30
Add Edit Delete	Read from module Get sourcetable
Connect Break OK Cancel	OK Cancel
Ст ОК	СК

- 4) Input a name for NTRIP connection and choose "NTRIP-VRS" for "Mode" and choose "GPRS/CDMA" for Connect.
- 5) Then click on "Change" button to define the ANP for your local SIM card.



EGStar	+	×⊃ +€	<b>1</b> 4:25
● ┌ <sup>APN</sup> ────			
Name:	cmnet		
UserName:			
Password:			
			9
ОК		Ca	ncel
			(ок)

- 6) Input the IP address and port, then input the assigned username and password for your NTRIP connection.
- 7) Press "Get Sourcetable" button to obtain mountpoint list, then select the appropriate one from the list in Access option, press "OK" button to confirm and return to Network Setting interface.

EGStar 🕂 🎦 📢 🖅 1:34	EGStar 🕂 🏠 🕂 建 1:34
0000_MSM4 0000_RTCM30	<b>)</b>
Name: No000_RTD	Name: Network
Mode: N0000SCMRX	
Connect: G0800_RTD 0800SCMRX APN: G12345678900	Co AF ? Network <vrs< td=""></vrs<>
IP: 52000_MSM4 2000_RTCM30	IP 58.248.35.130:2010>Config ure to present receiver
Port: 2000_RTD	Pc modul
User Name: 2000SCMRX	
Password: RDSD	Pa
Access 0800_RTCM30	Access 0800_RTCM30
Read from module Get sourcetable	Read from module Get sourcetable
OK Cancel	OK Cancel
Ск	С

- 8) Press "Connect" button to access CORS network and obtain corrections from selected mountpoint.
- 9) After the message "Uplink GPGGA data success" appears in the status bar, click "OK" button to return to main interface, and check the general info at the bottom.



EGStar 🕂 🎦 🕂 🖅 1:35	EGStar 👫 🎦 ┥× 🖅 4:0	5
0		
Network Setting           Network <vrs< td="">         58.248.35.130:2010&gt;           Network <vrs< td="">         123.231.114.117:60606&gt;           Network <eagle< td="">         58.248.35.130:2010&gt;           Network <eagle< td="">         58.248.35.130:2010&gt;           Network <vrs< td="">         220.247.240.88:60606&gt;           Network <vrs< td="">         58.248.35.130:2010&gt;           Network <vrs< td="">         58.248.35.130:2010&gt;           Network <vrs< td="">         58.248.35.130:2010&gt;</vrs<></vrs<></vrs<></vrs<></eagle<></eagle<></vrs<></vrs<>	<ul> <li>Start connection</li> <li>SIM card checking</li> <li>Network registration</li> <li>Connect network</li> <li>Log on server</li> <li>Uplink GPGGA data</li> </ul>	
AddEditDeleteConnectBreakOKCancel	Uplink GPGGA data success! OK Cancel	
Ск	С	)

NOTE; the parameters would be automatically saved up once input, the receiver would track the CORS info most recently input and connect when it gets started next time.

#### Web UI settings

- 1) Login the web UI of New G1 plus and go to "General Config" interface, then choose "Network" in "Datalink" option, click on "Enter" button to confirm and save the settings.
- 2) Then go to "GSM/GPRS Config" interface under "Network Config" to check if the SIM card is detected, and input the APN information at the bottom.

	Ctotus	-	Registration:	
*	Configuration		Serial Number:	SG6058117149518
	General Config		Code:	E1F836BFCB6B0C8E01D4D82341EB4E304E85
	Base Setup	Ξ	Expired Data:	20151109
	Antenna Setup	Ξ	Online Registration:	OnlineRegi
	Satellite Tracking	Ξ	Operation Tips.	Mrs Online Reig Rungtion places Make Sure Naturals
	Receiver Operate	Ξ	Mode setting:	use online herg function, prease make Sure Network
	System Setup	Ξ	more second.	
×	Satellite Information	8	Work Mode:	Rover
مم	Data Daaraa	-	Datalink	Network 🗸
	Data Record	•	Radio Route:	None 🗸
显	Data Transfer	Ð		
•	Network Config	Ð	RTK Record: 1PPS:	

۲	Network Config			107004
	GSM/GPRS Config	E	Connection Type:	NSUFA
	CSD Config	Ξ	PPP Dial Status:	Connected
	WIFI Config	Ξ	IP Address:	10. 228. 249. 124
	Blue Tooth Config	Ξ	Paramatar Config.	
	Port Forwarding	Ξ	Tatameter contrig.	
	Router	Ξ	Active:	
	Network Testing	Ξ	APN:	cmnet
Î	Radio Config	Đ	APN User Name:	card
£	Firmware Update	Đ	APN Password:	card

3) Go to "NTRIP Config" interface under "Data Transfer", and input the CORS server information including IP, Port, User and password, then click "Get Point" button to download mountpoint list from server. Then select the appropriate one from the list and click on "Enter" button at the bottom to access.

	Otatua		NtripClient:				
*	Configuration		Status:	Load Success			
×	Satellite Information	8	Active:	•			
	Data Record	<b>E</b>	Authentication Mode:	Eagle Mode TCF/IP Mode			
显	Data Transfer		NtripClient Address:	58. 248. 35. 130	_		
	General	Ξ	NtripUlient Fort:	2010			
	Serial port Config	Ξ	User:	wmbgps			
	TCP/IP Config	Ξ	Password:	huli			
	NTRIP Config	Ξ	Mountpoint:	0800_RTCM30	Get Point	RTCM23	•
	Data Flow Config	Ξ	GetPoint Status:	Get Success			
۲	Network Config	÷	occontrolation.				

# §8.2.4 By using internet (WIFI)

WiFi datalink is a new feature and new technology adopted on New G1 plus, it is more faster and stable in network RTK job.

Set the receiver as rover with WIFI mode on the control panel or on Web UI.

## Web UI settings

1) Login the web UI of New G1 plus and go to "General Config" interface, then choose "WIFI" in "Datalink" option, click on "Enter" button to confirm and save the settings.

Mode setting:		
Work Mode:	Rover	•
Datalink	WIFI	•
Radio Route:	None	•

- 2) Then go to "WIFI Config" interface under "Network Config", there the option of "Client" is activated if WIFI used as datalink.
- 3) Click on the "Scan" button to search the surrounding available WIFI hotspot, then select a proper one and input the password, click the "Enter" button at the bottom to confirm and access

	Status	•	Active:				
*	Configuration	•	Work Mode:	🔿 ap 💿	Client		
×	Satellite Information	•		[		1	
11	Data Record	<b>H</b>	Client_SSID:	RSDN	Scan	KSDN	•
显	Data Transfer		Password:	1222222			
	Network Config		Encryption Type:	WPA2			
	GSM/GPRS Config	=	DHCP:				
	CSD Config	Ξ	IP Address:	192 . 168 . 253	53		
	WIFI Config	Ξ	Subnet Mask:	255 . 255 . 255	; . O		
	Blue Tooth Config	Ξ	Default Gateway:	192 . 168 . 253	. 1		
	Port Forwarding	Ξ	Statur.	Connected to RSDN			
		Ξ	Status.	connected to home			
	Network Testing	Ξ	Signal:	T			
Ī	Radio Config	<b>H</b>	Clear SSID List:	ClearSSID			

4) If the WIFI connection is successfully connected, go to "NTRIP Config" interface under "Data Transfer", and input the CORS server information including IP, Port, User and password, then click "Get Point" button to download mountpoint list from server. Then select the appropriate one from the list and click on "Enter" button at the bottom to access.

_		-	NtripClient:				
	Status	<b>E</b>					
*	Configuration	E.	Status:	Load Success			
糸	Satellite Information	Đ	Active:	•			
<u>ب</u> ب	Data Descui		Authentication Mode:	🛃 Eagle Mode 📃 TCP/IP Mode			
	Data Record	•	NtripClient Address:	58. 248. 35. 130			
显	Data Transfer						
	General	Ξ	NtripClient Port:	2010			
	Serial port Config	Ξ	User:	wmbgps			
	TCP/IP Config	Ξ	Password:	huli			
	NTRIP Config	Ξ	Mountpoint:	0800_RTCM30	Get Point	RTCM23	•
	Data Flow Config	Ξ					
۲	Network Config	+	Getroint Status:	Get Success			

# §8.2.5 Tilt Survey

### **Electronic Bubble**

Start electronic bubble

- a) In the main interface, click the calibration setting button on the top of the interface, then get into the setting interface.
- b) Mark on the checkbox of "Bubble" option in the setting interface, click 'OK' return to Point survey interface, there appears the electronic bubble on the upper left of the screen.











### **Sensors Calibration**

New G1 plus supports tilt survey function, but before doing the tilt surveying on New G1 plus, the sensors calibration shall be done.

#### 1. Electronic Bubble calibration

Get into calibration interface by clicking on calibration setting button on the top of the screen. Click "Electronic Bubble" in the calibration setting interface,

EGStar	<b>₩ ≿) •</b> × @	4:16	EGStar 🕂 🎦 🕂 🖅 5:47
EGrtk			Electronic Bubble Calibrated (2015-11- Magnetic Calibrated (2015-11-
Job	Input Con	fig	Antenna H: 2 Details O Real O Slant O Pole O Slice
<b>∳</b> ľ∧	X† 🥌		Tolerance: 0.02 Check the tolerance while store points Bubble Small
Survey	Tool Abo	ut	<ul> <li>Display offset distance and angle</li> </ul>
S P:Differe	H:0.568 V:0.767 <sup>™</sup> R	G M	Tilt survey Pole tip mode Device top mode
Exit Blue	16:16:38	ок	OK Cancel
			С

In the acceleration calibration interface, make sure the device is level, hold and click "Start" button to start the calibration, until it's finished.





#### 2. Magnetic calibration

In the calibration setting interface, click "Magnetic" to enter the magnetic calibration interface.

EGStar	# ど € @	5:47
Electronic Bubble	Calibrated (2015-	11-
Magnetic	Calibrated (2015-	·11-
Antenna H: 2	Deta	ils
○ Real ○ Slant	Pole O Sli	ce
Tolerance: 0.02		
Check the tolera	nce while store po	oints
✓ Bubble Small		
✓ Display offset display	stance and angle	
Tilt survey		
Pole tip mode	O Device top m	ode
OK	Cance	I
		ОК

In the megnetic calibration interface, click "Start" to start the calibration, then flip and rotate the New G1 plus according to the sketch map on the left bottom of the screen (you can also draw " $\infty$ " after New G1 plus is connected to the carbon fiber pole), until the calibration is finished 100%.





#### **Tilt Surveying**

After finishing the calibration for sensors, you can start tilt survey with New G1 plus in the tough conditions such as under the eave or around the wall, this function can correct the slant coordinates to the normal coordinates within  $30^{\circ}$  angle of inclination.



SPECIAL REMIND: We recommend you to do the measurement in usual way with the pole centering in the open air area, the tilt survey function is not the mainly measuring method for the normal fieldwork.

# **ChapterIX** Hardware Registration

Users can get the point how to register the instrument in this chapter. Registering on New G1 plus is easier than operating on G1.

Login the web UI management of New G1 plus with WiFi or USB network connection.





Go to "Config—General Config" configuration page, the registration section is located at the top of this interface.

WELCOME	admin S82667117186476 <u>[logout]</u>	> General Gonfigur	ation
	Status	Registration	
¥	Configuration	Serial Number:	S82667117186476
~	General Config	Code:	81BECD 3B2 3329A67EB6500E421BFB8484317 Register
	Base Setup	ExpiredDate:	20161104
	Antenna Setup 📃	OnlineRegistration:	OnlineRegi
	Satellite Tracking	OperationTips:	Use Online Reig Function, please Make Sure Network is Work Well!
	Receiver Operate	Mode setting	
	System Setup 📃		
×	Satellite Information	Work Mode:	Rover
-	Data Record	Datalink:	Radio
		RadioRoute:	None
显	Data Transfer 🛛 🚹	D. M. T	
۲	Network Config 🗧	hadioiransier.	
Î	Radio Config 🔠 🔒	RTK Record:	
		1PPS:	
I	Firmware Update	EVENT :	
and a	Track Manage 🛛 🚦	EVENT Polarity:	Negative

Enter the registration code and click on "Register" button, a prompt message will appear. And the ExpiredDate would be changed.

# **Chapter X** Firmware Update

This chapter will explain how to update the firmware for New G1 plus, detail steps are written below.

Login the web UI management of New G1 plus with WiFi or USB network connection.

Go to "Firmware Update—Firmware Update" configuration page, all the information of the firmware which current installed on New G1 plus would be displayed here.

WELCON	admin \$82667117186476 [logout	> Firmware update
	Status	Firmware Information:
~	Configuration	Firmware Version: 1.06.161019.R826GL
~	Configuration	Core Engine Version: Sirius.1.06
×	Satellite Information	Release Date: 20161019
.11	Data Record	Warranty Date: 20150101
8	Data Transfer 🚦	Firmware Check Sun: 0
•	Network Config 🚦	Online Undate:
Â	Radio Config	I Tatast Version:
£	Firmware Update	2 Undate Status:
	Firmware Update	Tempad Stature
	Module Update	E Bondoar States.
11	Track Manage	Last Update Time: 0
•	Coordinate System	Online Update: Update
ŵ	Online Service	Local Update:
25	User Management	Firmware Path: Browse
0		Installation

Click on "Browse" button to load firmware file (Please take in mind that the firmware is ended with .img as the extension name).

iganize + Nev	v folder			III 🔻 🔲 🧯
🔆 Favorites	*	Name	Date modifie	ed Type
🧮 Desktop		📙 Gadget驱动	2015/10/28 1	6:46 File folder
\rm Downloads	- 1	1.05.150827.RG60GL.img	2015/8/27 9:1	12 Disc Image File
🔛 Recent Places	=	升级说明.txt	2015/10/8 9:	54 Text Document
Documents				
<ul> <li>➢ Libraries</li> <li>➢ Documents</li> <li>➢ Music</li> <li>➢ Pictures</li> <li>☑ Videos</li> <li>➢ 迅雷下载</li> <li>爻 Homegroup</li> <li>➢ hote</li> </ul>				



And then click "Installation" button to start upgrading.

昂	Data Transfer	Ð	Firmware Check Sum: 0
۲	Network Config	<b>E</b>	
Î	Radio Config	8	Message from webpage
£	Firmware Update		Firmware updated successfully! Host reboot, please log in later
	Firmware Update	Ξ	
	Module Update	Ξ	ОК
ð:	User Management	E	
?	Help	÷	Online Update: Update
			Local Update:
			Firmware Path: E:\RIK\Galaxy G6\固件\1.05.150827.RG60GL\1.05.15082' Browse Installation
			Status: Firmware is uploading, please wait

After the firmware is completed upgrading, a dialog will appear saying "Firmware updated successfully! Host reboot, please log in later...", then the receiver will restart automatically.





SPECIAL REMIND: New G1 plus doesn't support to update the firmware with the help of **INstar** program any more, in the future, update the firmware for New G1 plus shall be done through the Web UI.



# Appendix A New G1 plus technical specifications

Signals Tracked Simultaneously	
Channels	336 Channels(220 channels optional)
BDS	B1, B2, B3
GPS	L1C/A, L1C, L2C, L2E, L5
GLONASS	L1C/A, L1P, L2C/A, L2P, L3
SBAS	L1C/A, L5 (Just for the satellites supporting L5)
GALILEO	GIOVE-A, GIOVE-B, E1, E5A, E5B
	QZSS, WAAS, MSAS, EGNOS, GAGAN, SBAS
GNSS Features	
Positioning output rate	1Hz~50Hz
Initialization time	< 10s
Initialization reliability	>99.99%
Positioning Precision	
Code Differential GNSS	Horizontal: $\pm 0.25 \text{ m} \pm 1 \text{ mm}$
Positioning	Horizontal: $\pm 0.23$ m $\pm 1$ ppm
	Vertical: $\pm 0.50 \text{ m} + 1 \text{ ppm}$
SBAS positioning accuracy	typically<5m 3DRMS
Static GNSS Surveying	Horizontal: ±2.5 mm + 0.5 ppm
	Vertical: ±5 mm + 0.5 ppm
Real-Time Kinematic Surveying	Horizontal: ±8 mm + 1 ppm
(Baseline<30km)	Vertical: ±15 mm + 1 ppm
Network RTK	Horizontal: ±8 mm + 0.5 ppm
	Vertical: ±15 mm + 0.5 ppm
RTK initialization time	2~8s
Physical	
Dimension	13.5cm(Diameter)×11.3cm(Height)
Weight	1.39kg (battery included)
Material	Magnesium aluminum alloy shell
Environmental	
Operating	-30°C~+65°C
Storage	-40°C~+80°C
Humidity	95% Non-condensing
Waterproof/Dustproof	IP67 standard, protected from long time immersion to depth of 1m
	IP67 standard, fully protected against blowing dust
Shock and Vibration	Withstand 2 meters pole drop onto the cement ground naturally
Electrical	

#### New G1 Plus



Power Consumption	2W
Power Supply	9-25V DC, overvoltage protection
Battery	Rechargeable, removable Lithium-ion battery, allow to check remaining
	electricity quantity
Battery Life	Single battery: 16h (static mode)
	10h (internal UHF base mode)
	12h (rover mode)
Communications	
I/O Port	5PIN LEMO external power port + RS232
	7PIN LEMO +external USB(OTG)+Ethernet
	1 UHF antenna interface
	SIM card slot
Wireless Modem	Integrated internal radio receiver and transmitter, 1W/2W/3W optional
	External radio transmitter 5W/25W
Frequency Range	410-470MHz
Communication Protocol	TrimTalk450s, TrimMark3, PCC EOT, SOUTH
Cellular Mobile Network	WCDMA3.5G network communication module, downward compatible
	with GPRS/EDGE
	customized CDMA2000/EVDO 3G and TDD-LTE/FDD-LTE 4G
	module
Double Module Bluetooth	BLEBluetooth 4.0 standard, support for android, ios cellphone
	connection
	Bluetooth 2.1 + EDR standard
	Realizing close range (shorter than 10cm) automatic pair between New
NFC Communication	New G1 plus and controller (controller equipped NFC wireless
	communication module needed)
External Devices	Optional external GPRS/EDGE dual-mode communication module,
	switchable; allow to connect external WLAN card
WIFI	
Modem	802.11 b/g standard
WIFI hotspot	The WIFI hotspot allows any mobile terminal to connect and access to
	the internal webserver for the control and moditor receiver
WIEL Client	To work as the datalink that receiver is able to broadcast and receive
wifi Chent	differential data through WIFI
Data Storage/Transmission	
Storage	8GB SSD internal storage
	Automatical cycle storage (The earliest data files will be removed while
	the memory is not enough)
	Support external USB storage



	The customizable sample internal is up to 50Hz
Data Transmission	Plug and play mode of USB data transmission
	Support FTP/HTTP data download
Data Format	Differential data format: CMR+, CMRx, 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, Trimble GSOF
	Network model support: VRS, FKP, MAC, fully support NTRIP protocol
Inertial Sensing System	
Tilt Survey	Built-in tilt compensator, correcting coordinates automatically according
	to the tilt direction and angle of the centering rod
Electronic Bubble	Controller software display electronic bubble, checking leveling status of
	the centering rod real time
User Interaction	
Operating system	Linux
Buttons	One-button operation, visual operation, convenient and efficient
Indicators	Convenient to view and understand mode settings and status
Webserver	Allows to control and moditor the receiver in webserver through WIFI or
	Bluetooth, freely to configure receiver
Voice guide	Status and operation voice guide, support to customize local language,
	Chinese/English/Korean/Spanish/Portuguese/Russian/Turkish supported
Open platform	The OpenSIC observation data format and interactive interface support
	secondary development



## **Appendix B Technical Terms**

Ambiguity: unknown quantity is the integer number of cycles of the carrier phase measured from the satellite to the receiver.

Baseline: The connection line of the two measurement points, on which to receive GPS signals and collect observation data simultaneously.

Broadcast ephemeris: message released by the satellite demodulator satellite orbit parameters.

SNR (Signal-to-noise ratio): an endpoint signal power to noise power ratio.

Cycle skipping: interfere loop skips a few cycles from a balanced point, and stabilize in the new equilibrium point, this make the phase integer number of cycles to generate an error.

Carrier: As the carrier, Frequency, amplitude or phase modulation of the modulated wave by a known reference value.

C / A code: GPS coarse / acquisition code, modulate the pseudo-random binary code for the 1023 bit duplex, the bit rate of which is 023MHz, and code repetition period

of 1ms.

Difference measurement: GPS measurements employ cross-satellite cross-receiver and cross-epoch.

Difference Positioning: the method of determining the relative coordinates between two or more receiver by tracking the same GPS signal.

Geometric dilution of precision: Describe the contribution of satellite geometry errors factor in dynamic positioning

$$e = \sqrt{\frac{a^2 - b^2}{b^2}}$$

Eccentricity:  $\bigvee b^2$  where a, b of the semi-major axis and semi-minor axis.

Ellipsoid: mathematical graphics formed when an ellipse moves around the minor axis of rotation in Geodetic Survey.

Ephemeris: the position of celestial bodies over time parameters.

$$f = \frac{1}{a}(a-b) = 1 - \sqrt{(1-c^2)}$$

Flattening:

a is the semi-major axis, b is the semi-minor axis, e is the eccentricity.

Geoid: similar to the mean sea level and extends to the mainland special planes. Geoid everywhere perpendicular to the direction of gravity.

Ionosphere delay: delay of radio waves through the ionosphere (non-uniform dispersion medium)

L-band: The radio frequency range of 390-1550MHz.

Multipath error: the positioning error caused by the interference between two or more radio signal propagation path.

Observing session: the use of two or more receivers at the same time to collect GPS data period.

Pseudo Range: GPS receiver in the time required to copy the code aligned with the received GPS code offset and multiplied by the speed of light to calculate the distance. This time offset is the difference between the signal reception time (time series of the receiver) and the signal emission time (satellite time series).

Receiver channel: GPS receiver RF mixer and IF channel, can receive and track satellites two carrier signals.

Satellite configuration: the configuration status of the satellite with respect to a specific user or a group of users within a specific time.

Static position: do not consider the point of measurement of the movement of the receiver.



## FCC Statement

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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer


could void your authority to operate this equipment.

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.