Handbook revision situation

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.   This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.   If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.

Receiver Introduction

Chapter Introduction

Receiver Appearance

Receiver Appearance mainly including 4 parts: upper cover,

below cover,

guard collar and control panel, as Figure 2-1

Figure 2-1 Receiver Appearance

Control Panel

Figure 2-2, in the middle of red frame of V30 receiver is control panel.
And the control panel contains the F1 key (function key 1), F2 key (function key 2) and the power button, 3 indicator leds which are respectively satellite led, the status led (dual-color led), the power led (dual-color led). The simple three buttons include all the features setting of the v30 receiver.

Control panel

Figure 2-2 control panel

satellite led   green led

status led   red-green dual-color led

power led(red-green dual-color led)

Function Key: settings of working mode, UHF radio transmitting power, satellite elevation angle, automatically base setting,self inspection,reset receiver reset receiver and so on.

Function Key: settings of data link, UHF radio channels, collection interval, back to original setting,stop and go,upload static data.

ON-OFF power key: Status Enquiry ,setting confirmation, automatically base setting,switch on/off voice assistant and so on.
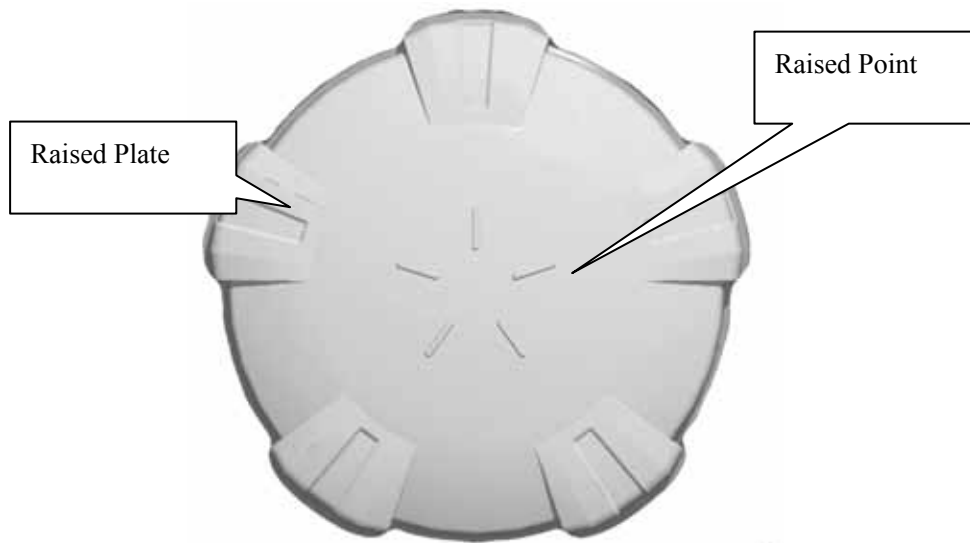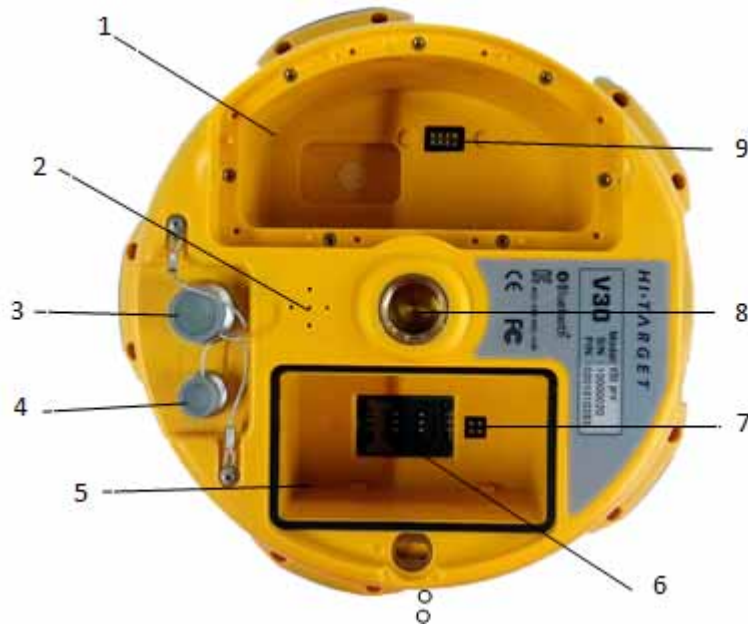
Upper Cover

Raised Point

Raised Plate

Figure 2-3

Raised Point: anti-wear point to avoid instrument being scratched

Raised Plate: 5 raised plates can avoid wear-out and falling

Below Cover

As figure 2-4, below cover of V30pro includes communication module slot, battery groove, five-pin port, eight-pin port, speaker and so on.

1-Radio module 2-Speaker 3-Eight-pin port and cover 4-Five-pin port and cover 5-Battery groove 6-SLC Power supply Block 7-Joint nut 8-Communication Module Connector

Figure 2-4 Below cover

◊Radio Module Groove:to set radio module.

◊Radio Module Connector: connect radio module and

mainframe

◊ Battery Groove: install li-ion battery

◊SLC Power Supply Block: connect li-ion battery and mainframe

◊ Five-pin port: connect mainframe with external data link or with external power supply

◊Eight Core socket: connect V30pro receiver with computer, or controller for

data download and delete

◊ Protection Plug: anti-dust and waterproof for socket

◊ Joint Nut: fix instrument with tribrach and centering pole.

◊Speaker: voice broadcast for real-time operation and status.

Note: 1. If it is not necessary to use five-pin port, eight-pin port and differential antenna port, please affix rubber plugs , to prevent it from water and dust.

2. when speaker is filled with water, maybe speaker becomes silent or hoarse. But it will be back to normal after drying .

Battery

As figure 2-7, the appearance of 5000mAhli-ion Battery

Close | Open

Figure 2-5 Battery Front

Battery positive pole
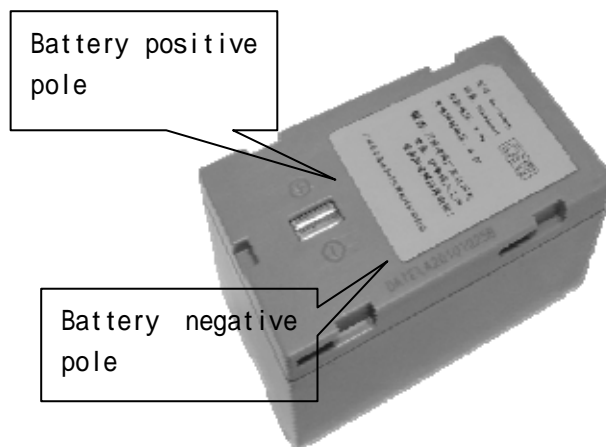
Battery negative pole

Figure 2-6 Battery Back

Environmental Requirement

Even though V30 receiver uses waterproof materials, maintaining in a dry environment is still helpful. In order to improve the stability, and duration of the receiver, please avoid exposing the receiver in extreme environments, such as:

Moist

temperature higher than 65 degrees

temperature lower than -40 degrees

corrosive liquid or gas

Electrical Interference

Do not place GNSS receiver around a strong power interference signal source, such as:

Oil Road (spark plug)

television and computer monitor

generator

electric motor

DC-AC power conversion equipment

Fluorescent Light

Power switcher

C H A P T E R 3

General Operations

Control   Panel

Most of the operations of V30pro receiver can be done by the three buttons on the mainframe panel.

Buttons on the panel:

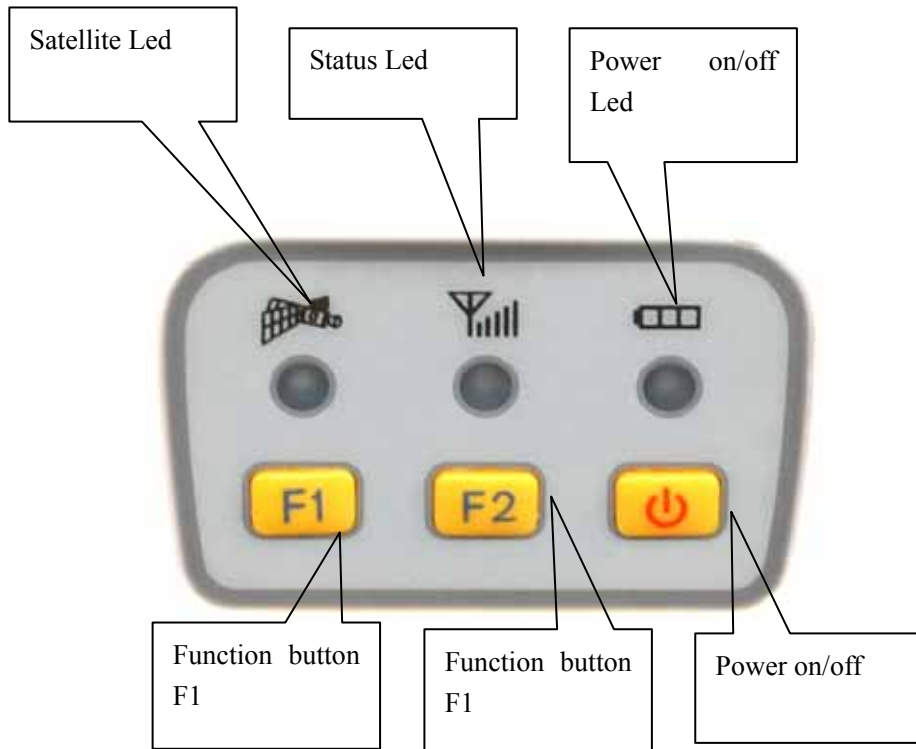Figure3-1 Mainframe Panel

Explanations of buttons operations and leds hints as below:

Operations Explanation

3.1	
operation	introduction
Single click button	Press a button within 1 second
Double click button	Press a button within 1 second
Long pressing button	Pressing button for 3 to 6 seconds,until you hear the sound of "dingdong"

Super long pressing	Pressing button more than 6 seconds,until you heard the sound of "dingdong".
Long press F1+power button to turn on receiver	Hold F1+power button,until you hear the sound of "dingdong"
Slow flash of led	Flashing interval more than 0.5 second
Fast flash of led	Flashing interval less than 0.3 second

Button functions

Table3.2 Button function introduction

function		Button operations	introduction
Working mode		Double click F1	Than single click F1 to choose the receiver work mode between " base″, " rover″, " static″
Data link		Double click F2	Than single click F2 to choose the data link between " External″
UHF mode	power	Long press F1	Then single click F1 to set the transmit power to be high,
	Channel	Long press F2	Than single click F1 to choose channel by minus 1; or you can long pressing F1 to choose channel by minus 10;or single click F2 to choose channel by plus 1; or you can long pressing F2 to choose channel by plus 10
Static	Elevation angle	lLong press F1	Single press F1 to set elevation angle to be 5 degrees,10 degrees, or 15 degrees

	Collection interval	Long press F2	Single press F2 to set collection interval to be 1s,5s,10s,15s
	Stop and go	Double click F2	Double click F2 to start or stop record only when you start the "stop and go ",this operation works
Confirm setting		Single press power button	Than the receiver will speak out its current work mode, data link, radio transmit power, channel; meanwhile the power led will flash to hints its power status
Auto-set base		F1+Power button to turn on receiver	Press F1 while than press power button at th same time to turn on the receiver until hearing " Dingdong". Then the receiver speak out its current status.
Reset receiver and self inspection		Supper long press F1	Single press F1 to self inspection
			Single press F2 to reset the motherboard
Upload static file and come back to original settings		Supper long pressing F2	Single pressing F1 to upload static file
			Single pressing F2 to come back to original setting
power button	Turn on	Press power button for 1s	In shutdown state long press power button for 1s relax the button after all the LED flash
	Turn off	Long press power button	In turning on state long press power button for3s then it will shutdown

|		
Check currect work status	Single pressing power button	In non-settings status inquiry the current working mode,data link and radio channel,voice hints,at the same time the power led flashing times hints the power status
Confirm setting	Single pressing power button	In setting status , then confirm
Open or close voice assistant	Double pressing power button	Double pressing power button will open or close voice assistant
Voice assistant		After you have opened the voice assistant,single press F1 or F2 you will get voice assist
Other button operation		Invalid operation when you do invalid operation,the machine will come up with an alarm of "du",if you do 3 errors ,you will hear 3"du" ,with the voice tip:invalid operation,if you need voice assist ,please double click power power button

Start and stop the receiver

Table 3.3 LED in power on/off status

Power on	Press the power button for 1s	All the LED will flash	With the shutdown music it will prompt you the working mode and data link last time
Power off	Long pressing power button 3s	All the LED go out	With shutdown music

Static data storage

Acquisition of GNSS static data will be stored in iRTK receiver's internal 1 G storage- "static" plate , avaliable storage space is 800 M, there are three folders: log, gnss and rinex, log folder store log information, the format of GNSS folder data is *. GNS,the format of rinex folder stored data is standard RINEX format. You can connect the computer with Y data cable or USB , copy the static data to your computer.
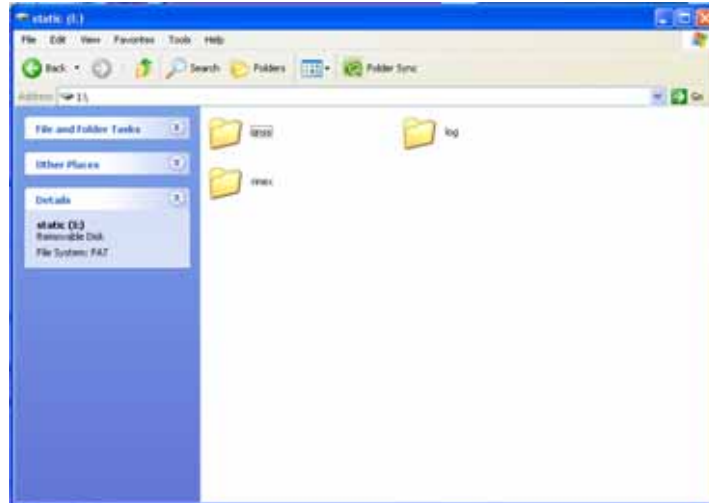
Note:when the storage space of the receiver is less than 1M,data lamp quickly flash,and stop to record data,the existed data file will not be covered.

RTK data storage

IHand 28/iHand 28G hand book can connect HI-TARGET iRTK receiver through the network, bluetooth or cable connection , when you finished the setting and start working , the collected RTK data will be stored in the hand book storage card, you can download RTK data to your computer by data cable.

If you want to know more about the information of hand book, please read iHand 28/iHand 28G hand book manual.

Self inspection

Super long pressing the F1, you will hear the voice broadcast "press   F1 to self inspection, press F2 reset motherboard, click F1 to start self inspection, after self inspection,it will announce the current instrument working status and parameter.\

Upload static data file (only for deluxe edition, compass edition)

There are to methods to upload the latest static data file

Method one:

In static mode, super long pressing F2, the static data acquisition will stop, and then click F1, voice prompt will tips you :"start upload static file to the server", at this time the signal red light flash. Upload data after the success of the speech to be automatic hint "upload data success". After you upload data successfully,you will hear the voice prompt "upload data successfully".After you upload data successfully ,the receiver will automatically   start of a new round of static data acquisition.

Method 2:

1. Double-click the F1 to stop recording and change the current work mode to base or rover mode;

2. Super long press F2, single click the F1 ,you will hear voice prompt :start to upload static file to the server, at this time the signal red light flash. After uploading data successfully ,you will hear the voice prompt "upload data successfully".

Note: 1. Before using this function,you need to insert the 3 G SIM card which is available to network , register on the LBS server before uploading the data.
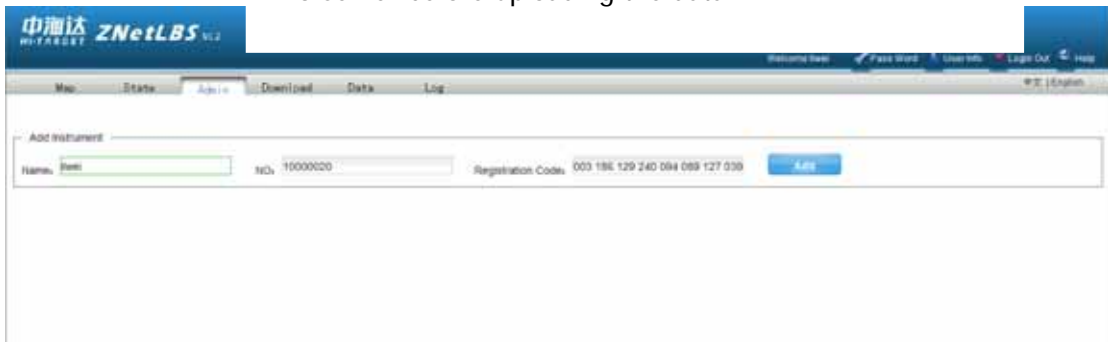
2 The data which receiver upload is a static data files (only support *. GNS format data to upload).

3. When static data file is bigger than 3M, we do not suggest you to use network to upload so as not to affect the running speed of server ,also affect your work efficiency.

4. Before uploading ,if the receiver shutdown ,or the 3G card can not offer network service normally ,all the files will be uploaded unsuccessfully and you can never upload this file!

Set receiver password

Connect the PC with Y data cable, run the HI-TARGET serial receiver management software,choose the right port and connect it,after connection,set remote connection password and remember it.
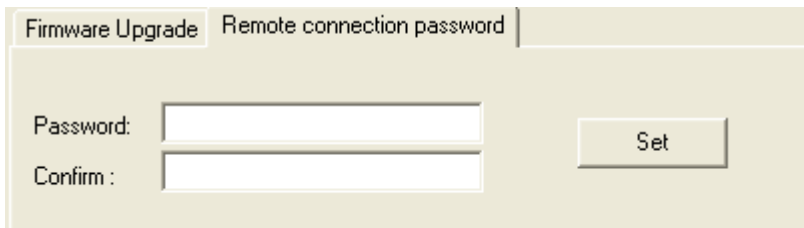

Figure3-4

Note: 1. We suggest you immediately set the password after you buy it,when you use the remote connection ,remember your password to guard against theft intelligently.

2. If you forgot the password, you can set it to original state to get your password.

Voice assist

In any mode, double-click power key, it can open voice assist to help the user accomplish your operation.

Reset receiver

Super long press the F1, single click the F1 to self inspection, single click F2 to reset motherboard, it takes you 1 minutes to reset motherboard, after reset there will be voice prompt.

Back to factory setting

Super long press F2, single click F2 to original parameter Settings, each module will automatically diagnosis and recovery. Details please refer to appendix 4: iRTK parameters.

Formatting receiver

When you want to format iRTK receiver, use Y data cable to connect with computer , run the GPS receiver management software, choose a serial port and open the serial port, when instrument get connection, the serial number will be displayed in the bottom of the software interface, click "format/delete all" to complete the receiver's formatting, all data are deleted, unable to recover.
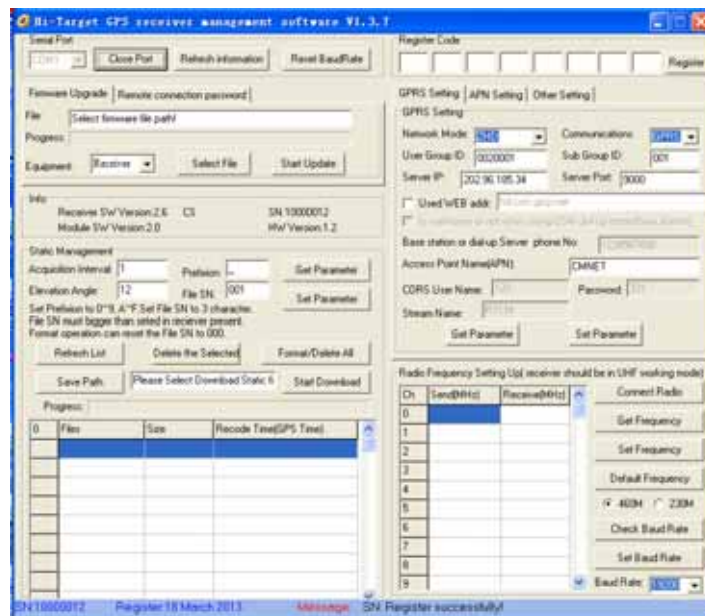
Figure

Warning: Before formatting iRTK receiver , make sure that useful data in the receiver have been copied to the computer, once deleted or formated,it will never   recover!

Power Supply System

✧ Assembly and Disassenbly of Battery Cover

Assembly:

1.Firstly put two teeth of the cover into the slots and press the cover.

Figure 3-6

2.Rotate the metal lock 90 degree anticlockwise and press the lock.

``

Figure 3-7

Disassembly

1.Pull the lock up and rotate it 90 degree clockwise

Figure 3-8

2.Pull it to remove the battery cover

Figure 3-9

✧ **Install and Unistall Battery**

Install:

1.Match [image] one the battery with the [image] on the battery groove

Figure 3-10

2.Insert battery towards "Close" side (see the red arrow) to install it

Figure 3-11

Uninstall:

Slide the battery towards to the "Open" side, and then pull out battery.

Figure 3-12

✧ **iRTK Receiver Battery Name and Model**

Name	Model
5000mAh lithium battery	BL-5000
iRTK lithium battery charger	CL-4400

✧ **Power Supply Mode**

Power Supply	Mode	1. lithium battery; 2. 8-pan port and 5-pin port on the mainframe for external power supplier
	Range	DC 6V~30V

iRTK receiver can get power by external supplier by 8-pin or 5-pin port on the mainframe. When using the GSM or UHF communication mode, the external power supply should be 6~36V and current should be more than 500mA.

When it is connected to both power suppliers(external and battery), receiver will adopt the one with a higher voltage. To avoid any destroy to the receiver, make sure that your engaged external power supplier should be the one furnished by Hi-target.

Note   1.The endurance of li-ion battery will be decreased by the decreasing temperature and increasing time of charging and consuming. Normally a new BL-5000 battery can provide power for 14 hours under the static mode, 9 hours under GSM rover mode and 2 watt UHF base mode.

    2.In order to prolong the life of battery, please charge the drained battery in 8 hours.

✧ Charging battery

BL-5000 battery must be charged in specified CL-4400 charger of Hi-Target for about 7.5 hours. The indicator led will be in red while charging and turn to green when it is almost finished and then be fully charged after another 1~1.5 hours.

Green led for almost finishing charging

Figure 3-13

✧ Charging Operations

Red led for charging now

1.Matching the ⬚ side of battery with ⬚ of the charger, put it as the Figure 4-11 shows.

Figure 3-14

2.Slide battery towards ~~"Close"~~ side (as the ~~above~~ `Close` direction) until battery is locked

3.After connecting charger with power supply, the "Charging" led becomes red.

Warning: 1. Battery can only be charged by charger furnished by Hi-Target. Do not throw it into fire nor touch with things that will lead to short circuit fault.

2.If battery is heating, leaking, deformed or smelly at work, charge or being stored, stop and change another one at once.

3.If the endurance is much shorter than it was before, change another one.

Hi-RTK Multifunction Controller Software

Introduction

- Introduction

- Connect Mainframe

- iRTK Operation

- Instrument Register

Introduction

In order to give user a quick start, this chatper simply introduce the basic operation of Hi-RTK software including connecting the iRTK mainframe, setup surveying mode, config files, etc. See <Hi-RTK Software Manual> to know more about the software.

Mainframe Connecting

GPS —> *Connect GPS*, setup the HPC(Type of Controller), type, port, baudrate and analyzer, click *Connect*. If connection is done, receiver

information window will display the receiver's S/N.
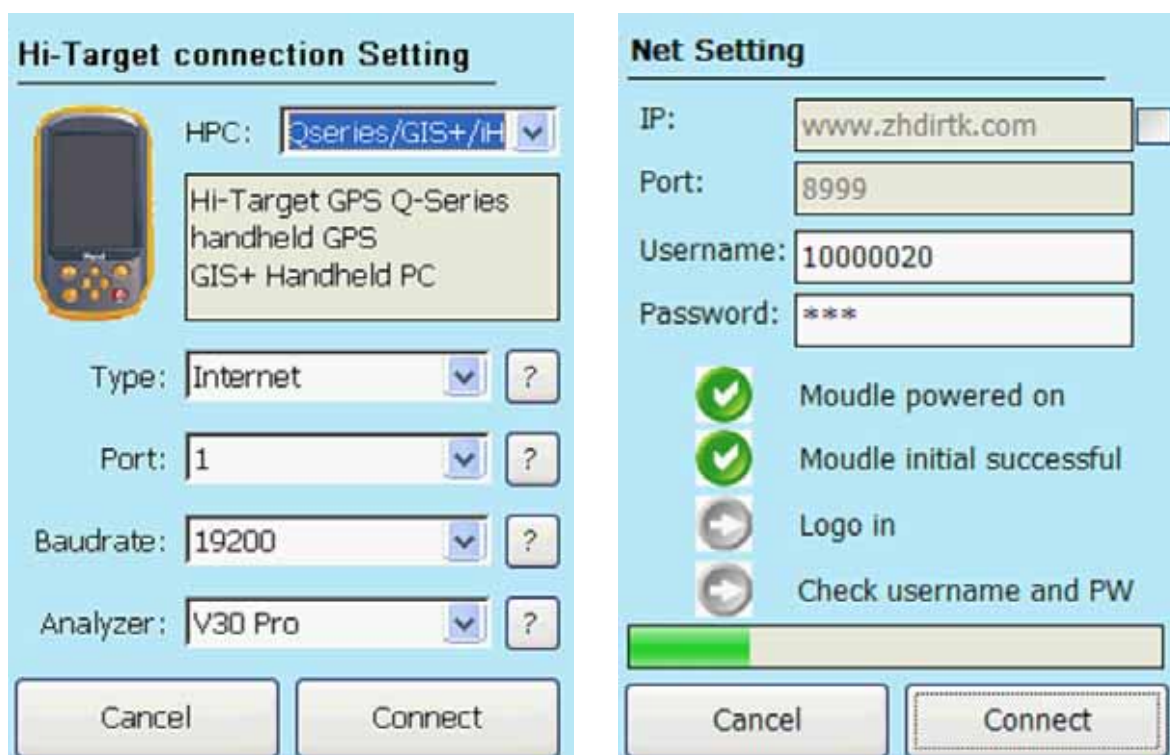
Figure 4-1

1. Network Connection

Figure 4-2

Note:

● Only iRTK receiver can use the network connection function.

● Input S/N of receiver and user password.

● If failed, restart the receiver or the software on controller.

iRTK Operation

Before or in the surveying, you can use Hi-RTK installed in the controller to set iRTK receiver to enable "Show Update Message", "Store Renix Data", "Stop-move Static", "Net Connect","Config File", "Set Static", "DIY Voice", "Remote Connection", etc.
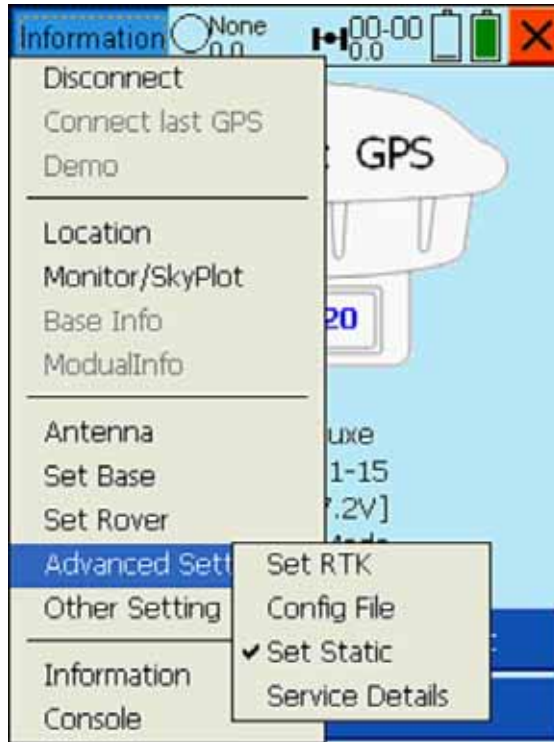

Figure 4-5

iRTK Setup

"Store Renix Data":   enable instrument to record Renix data synchronously in static mode.

"Stop-move Static":   enable instrument to support stop&go(PPK) function in static mode.

"Show Update Message":   enable instrument to check new firmware version automatically and prompt user to update.

| Figure 4-6 | Figure 4-7 |

> ⚠ **Warning   Receiver will restart after the firmware's upgrade. Controller need to "Disconnect GPS" and "Connect GPS" so that it can work regularly!**

"Net Connect":   enable terminal control device to connect with receiver by network. If it is disabled, software on the controller will prompt user that instrument is not ready when it is online in the network.

⚠ **Warning**	**In case of connection failed, in "Net Connect" Hi-Target suggest you to keep IP and Port number default ! (IP: www.zhdrtk.com Port: 8999)**

Figure 4-8

"DIY Voice":   Switch the language of the voice: Silent, Chinese, English and User(user-definded)

Config File

Offer you 4 files to save and load configuration

Save the current configuration of the receiver

Load the saved configuration of the receiver

Switch the work mode when apply the configuration

You can share your files by copying them to other controller's "CfgFile" folder.

Figure 4-9

| Warning | When the config file has been saved, you can apply it to a receiver. But you should do an average for the receiver which work in base mode before starting a RTK surveying. |

When your base is working in external readio mode, software will prompt you to input the channel of the external radio after you have save the configuration.

Set Static

Static collecting mode can offer you an easy way to see, delete files, format and easy to set the elevation mask, interval, file name and antenna height, etc.

"OK": To set elevation mask, interval, file name and antenna height and switch the working mode into Static.

"Refresh": To refresh the list.

"Delete": To delete the static file.

"Format": To format the data and impossible to recover

Figure 4-11

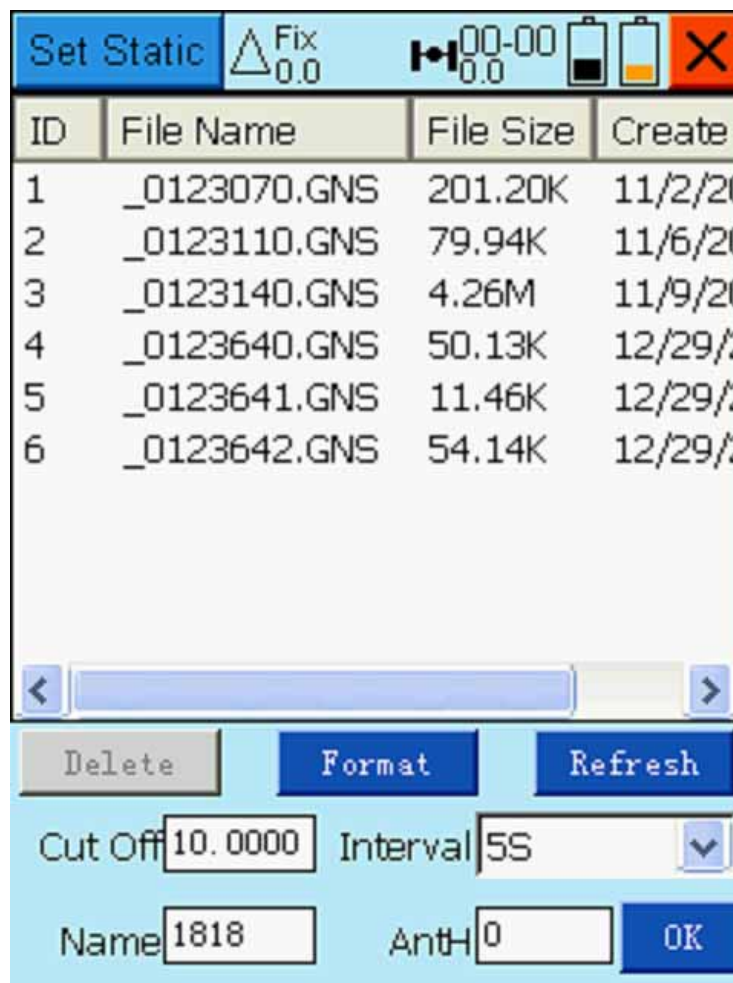|	**Warning** The data will not be recovered after the operation of format or delete. So please make sure that all the useful data have been copied to a safe place before you do these operations.

Service Details

In this interface you can check the current functions that are authorized. You can contact Hi-Target's sales representative to get an upgrade to apply more functions.

STATIC and DATA TRANSMISSION

Introduction of This Chapter

■ **Introduction**

■ **Procedure of iRTK Static Survey**

■ **Download Data with U Disc Download**

■ **Remote Download Static Files**

■ **Management Software Operation For Static Survey**

Introduction

iRTK can be used as dual-frequency static surveying instrument. You can double click F1, when the voice reminds you, press power button to fix. After the setting is done, the red status LED flashes once while collecting an epoch in a few seconds (depends on the setting of sampling interval). The collected static survey data is saved in the memory card of the main frame. The static survey data have to be downloaded to PC with post-processing software to be processed.

Procedure of iRTK Static Survey

1. Locate the instrument on a control point, do centering and leveling.

2. Measure the height of instrument for three times, on condition that the difference of each measuring is less than 3mm and the final height of the instrument should be the average height. The height of instrument should be defined from the controlling point of base centre to upper edge of marker line. The antenna radius of iRTK receiver is 0.087 meter; the height of phase center is 0.0765 meter.

Instrument height measur point

Fig 5-1

3. Record point name, instrument S/N, instrument height, observing initiated time

4. Turn on the instrument and set the main frame as static surveying mode. The satellite LED flashing means the instrument is searching the satellites. The satellites are fixed once the satellite LED turns into constant on. Status LED flashes due to your collection interval set.   The default collection interval is 5 seconds, which means an epoch will be collected every 5 second. In static mode, the receiving LED is off.

5. Turn off the instrument after the static survey is done and record the turn-off time.

6. Download and post-process data

⚠ **Note:** Don't move the tribrach nor change the collecting set while the instrument is collecting data.

Download Data with U Disc Download

iRTK saves the files with U disc download in file management, i.e. you can download the files by drag-drop. The static survey data only can be downloaded but not to re-write the data.

The data of iRTK receiver ca n be downloaded in U disc download, you can use Y type data cable, connect one side to USB port of PC and the other side to the 8-core jack of main frame. After connected, RTK iRTK new disk symbol shows up in the PC, like U disc download, you can copy the according
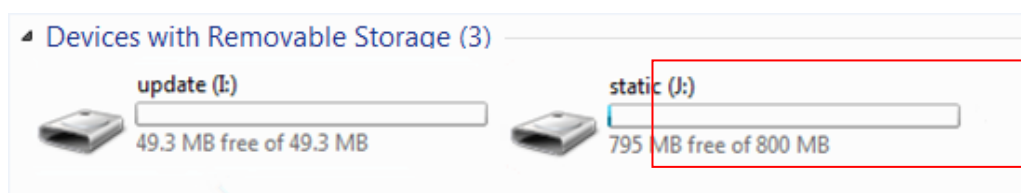
files directly.

Fig 5-2

Download static files to modify the naming and antenna height steps:

1. Choose *.GNS static file and double click mouse;

2. Choose [GNS Modify program], pop-up "File edit", we can edit point name and antenna height, for sure click [OK].
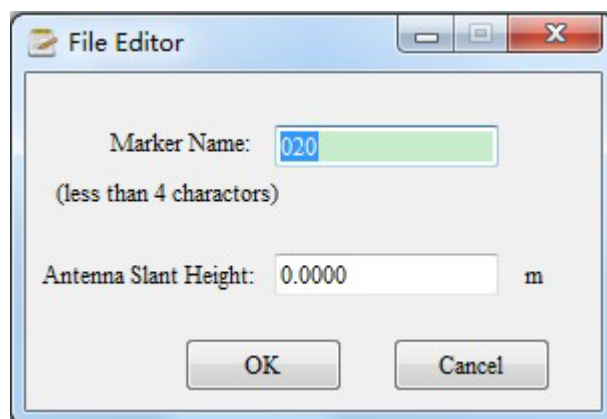

Fig 5-4

Note: The series port can't be downloaded in U disc download, but to delete static data of iRTK receiver.

Remote Download Static Data Files

After the end of the static job, the user can operate the control panel buttons: ultra-long press F2, click F1 timely upload collected static data files. Remote operator from control center can use HI-TARGET LBS server to synchronization download the data then processed.

HI-TARGET LBS server static data file download steps:

1. Login http://www.zhdlbs.com:81, Sign up for new users (first use)

Fig 5-5

2. Login system, "Management Add iRTK instrument number and registration code, instrument alias fill any character length is less than six characters or blank is empty.

Attention: The instrument of which serial number is 7 digits, the first number of receivers in the LBS registered instrument should +1. For example, the receiver Serial No. 6,980,012, and then fill in

the instrument No.: 7,980,012;

The instrument of which serial number is 8 digits, then directly input the digits. For example, the receiver Serial No. 19000010, and then fill in the instrument No.: 19000010.

Fig 5-6

3. Choose [Data download], you can do static files download, delete and other operations.

Fig 5-7

Attention: 1. Receiver serial number (S / N) in the receiver bottom of the label, the purchase of equipment will be given the corresponding version of the registration code.

2. Delete static data from network is only remove static data files stored in the LBS server and does not delete the static files in the receiver.

Management Software Operation For Static Survey

The main function of static file management software of IRTK receiver:

> Delete original data
>
> Delete and format the whole
>
> Read parameters, Set parameters

Operating steps:

1. Connect Y type data cable to 8-pin port of iRTK receiver and the series port of PC

2. Choose the right PC port and click "*connect port*"

3. Refresh list, the observation data files will be in the list

4. File name: 8 digit character: the first chart is replaced by underline; the second, third, and forth are the last two numbers of S/N number of the receiver from which the data is collected; the fifth, sixth, and seventh is the year-accumulated-date; the last chard is the collecting period of the day
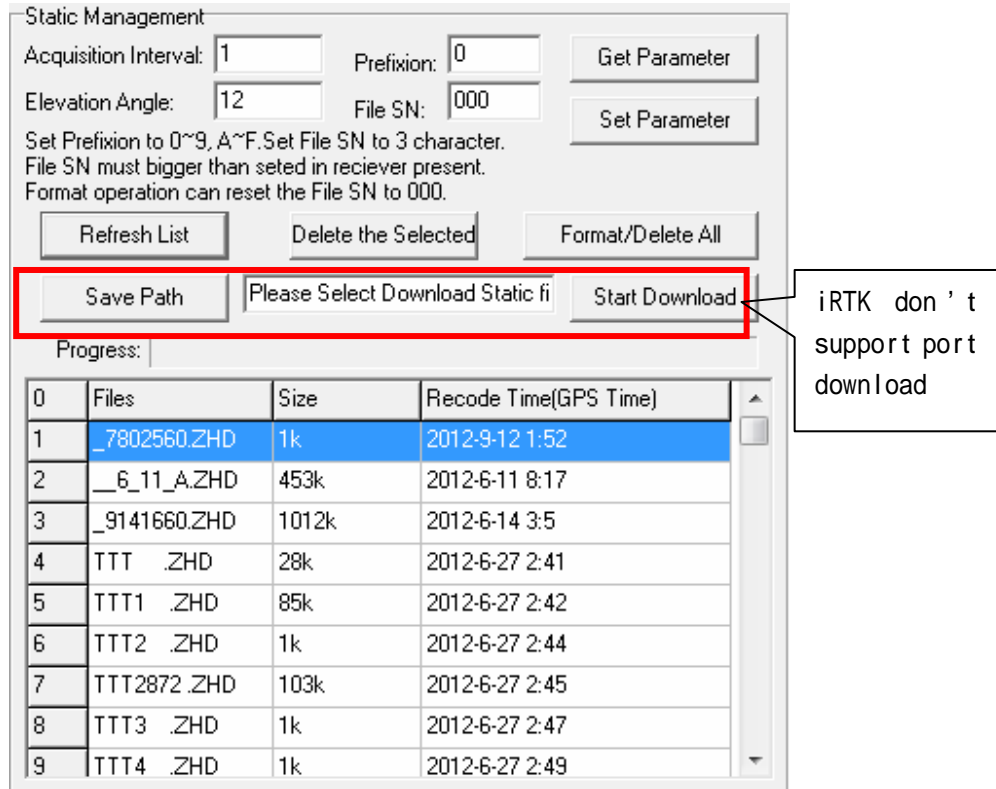
5. Set up time: GNSS time.

Fig 5-8

6. Delete data: choose the data need to be deleted, click delete files.

7. Change collecting interval and satellite cutoff/elevation angle: input value and click set parameters. Click read parameters to view the original collecting interval and satellite cutoff angle.

Attention: GPS receiver Management software V1.3.6 is a Universal Edition, and is fit for A/V/F/H/iRTK series GNSS receivers. iRTK don't support port download of static files, it's useless when you use iRTK!

Technical Parameters

Introduction of This Chapter

■ **Introduction**

■ **Receiver**

■ **Interface Part**

■ **Function Key and Indicator Led**

■ **Intelligent Voice Module**

■ **Accuracy**

■ **Physical Feature**

■ **Environment**

Introduction

Here we list out all Technical Parameters of iRTK GNSS RTK SYSTEM. The Technical Parameters will be a little different according to your purchase order. Please make sure about your configuration then find out Technical Parameters correspondingly.

Receiver

Trimble-BD970

220 channels

GPS : Synchronous tracking L1 C/A, L2E, L2C, L5

GLONASS : Synchronous tracking L1 C/A, L1 P, L2 C/A(only for GLONASS M) and L2P

SBAS: Synchronous tracking L1 C/A, L5

GIOVE-A   synchronous tracking L1 BOC, E5A, E5B and E5AltBOC   optional

GIOVE-B   synchronous L1 CBOC, E5A, E5B and E5AltBOC   optional   GALILEO   Upgrade

Trimble Maxwell 6 of advanced user-defined GNSS Technology

A high precision measurement in the relevant organs using 9 for global navigation satellite system

Very low noise GNSS carrier phase in Surveying, Accuracy < 1 mm within 1 HZ wide band

Mature low elevation-angle tracking technology

Initialization time < 10 S

Initialization Reliability > 99.9%

1 Hz, 2 Hz, 5 Hz, 10 Hz, 20Hz and 50 Hz output (default 10Hz)

Differential data format: CMR, CMR+, RTCM 2.1, 2.2, 2.3, 3.0, 3.1

Navigation Output Format: ASCII NMEA-0183 GSV, AVR, RMC, HDT, VGK, VHD, ROT, GGK, GGA, GSA, ZDA, VTG, GSTPJT, PJK, BPQ, GLL, GRS, GBS and binary system   Trimble GSOF

Function Key and LED

3 Panel buttons: 1 power switch key, 2 functional keys, with these combination you can set all the function with voice and Indicator Led flexibility

3 LEDs: 1 Satellite LED (Single color), 1 Communication LED (Dual Color), 1 Power LED (Dual Color)

Intelligent Voice Module

With broadcasting function for each operation and status checking

Accuracy

Static, Fast Static: Horizontal: $\pm(2.5\quad 1\times10^{-6}D)$ mm

Vertical: $\pm(5\quad 1\times10^{-6}D)$ mm

RTK Accuracy: Horizontal: $\pm(10\quad 1\times10^{-6}D)$ mm

Vertical: ±(20 1×10^{-6}D) mm

PPP Accuracy: Horizontal: ±10cm

Vertical: ±10cm

Physical Feature

With ARM9 Corn Control Chip, built-in 1G Flash Memory

Dimension: φ19.5cm×h10.4cm

Weight: 1.7kg(Incl. li-ion battery)

Anti-impact from 3 meters nature fall, can float and waterproof in 2 meters deep water

Internal Li-ion battery. With 2 standard battery in 5000 mAh , Voltage:7.4 V; One Single battery working continuously time: 14 hours in static mode, 9 hours in GPRS mode, and 8 hours in 2W transmitting power

6~30V external DC power supported, external and internal power supply exchanged automatic

Receiver Power Consumption (Static mode): 2.5W

Environment

IP Standard: IP67, waterproof, completely dust-proof and anti-impact.

Working temperature: -45 65, storage temperature: -55 85

100% Humidity non-condensin