
GETTING STARTED GUIDE

X91GNSS



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FCC Notice

CHC X91 receivers comply with the limits for a Class B digital device, pursuant to the Part 15 of the FCC rules when it is used in the Portable Mode.

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.

Replacing Radio Transmitter Power Fuse

Radio transmitter is protected by a 5-A fuse inserted in the power cable. This Y-shaped cable is used to connect the car battery to the CHC Datalink.

Should you have to replace this fuse, please get a spare fuse, 5 A, ATO type, and then:

Unplug the battery end of the data/power cable

Open the fuse holder located along the data/power cable

Extract the damaged fuse

Insert the new fuse and then push the holder lid back into place

Connect the power cable back to the battery

Where to Find Information

This manual is designed to guide you through the basic X91 procedures. You can find additional information in the X91 Reference Manual and also the CHC Technical Training

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1. Introduction

- Technical Assistance
- Your Comments

Thank you for choosing CHC X91GNSS receivers.

This Getting Started Guide is designed to help you rapidly familiarize yourself with your new equipment. Only a selection of the many CHC X91 GNSS functions is presented in this guide.

1.1 Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer. Alternatively, please request technical support using the CHC Website at (www.chcnav.com) or CHC technical support email support@chcnav.com.

1.2 Your Comments

Your feedback about the supporting documentation helps us to improve it with each revision. Please e-mail your comments to support@chcnav.com.

2. Overview

- Safety Information
- Features
- Specification

2.1 Safety Information

This manual describes CHC X91 GNSS Receivers. Before you use your receiver make sure that you have read and understood this publication, as well as safety requirements.

2.1.1 Warning and Cautions

An absence of specific alerts does not mean that there are no safety risks involved.

A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.



WARNING-A Warning alerts you to a likely risk of serious injury to your body and/or damage to the equipment.



CAUTION- A Caution alerts you to a possible risk of damage to the equipment and/or loss of data.

2.1.2 Regulations and Safety

The receivers contain integral Bluetooth® wireless technology, and may also send radio signals through an externally-connected data communication radio. Regulations regarding the use of the datalink vary greatly from country to country. In some countries, the unit can be used without obtaining an end-user license. Other countries require end-user licensing. For licensing information, consult your local dealer. Bluetooth® operates in license-free bands.

2.1.3 Use and Care

The receiver can withstand the rough treatment that typically occurs in the field. However, the receiver is high-precision electronic equipment and should be treated with reasonable care.

2.2 Features

The X91 receiver provides the following features:

- Centimeter-accuracy, real-time positioning with RTK/OTF data.
- Submeter-accuracy, real-time positioning using pseudorange corrections.
- Automatic OTF initialization while moving
- Single Lithium-ion rechargeable battery
- Cable-free Bluetooth® communications with the data controllers
- One 10-Pin Lemo port for:
 - RTCM 2.X input and output
 - CMR input and output
 - NMEA outputs
- One TNC radio antenna connector
- Internal Memory for data storage

2.3 Specification

GNSS characteristic

- 220 channels with simultaneously tracked satellite signals :
 - GPS: L1C/A, L2C, L2E, L5
 - GLONASS: L1C/A, L1P, L2C/A, L2P
 - SBAS: WAAS, EGNOS, MSAS
 - Galileo: GIOVEA and GIOVEB

Real Time Kinematics (RTK)

- Horizontal: $\pm (10\text{mm} + 1\text{ppm})$ RMS
- Vertical: $\pm (20\text{mm} + 1\text{ppm})$ RMS
- Initializing Time: 10S
- Initialization Reliability: Typical >99.9%

Static

- Horizontal: $\pm (2.5\text{mm}+1\text{ppm})$ RMS
- Vertical: $\pm (5+1\text{ppm})$ RMS
- Baseline Length: $\leq 300\text{km}$

Data Format

- RTCM2.1, RTCM2.3, RTCM3.0, CMR, RTCA, Input and Output
- NMEA0183 outputs, GSOF outputs

Physical Reference

- Size (HxD): 80mm×180mm
- Weight: 1.25Kg (Battery Included)

Electrical Reference

- Power Consumption: 2.6W
- Battery Volume: 2400mAh
- Battery Life: 9 Hours (Static), 5 Hours (RTK)
1000 Recharges
- External Power: 9-18VDC

Environment

- Working Temperature: $-30\text{ }^{\circ}\text{C}$ — $+65\text{ }^{\circ}\text{C}$
- Storage Temperature: $-40\text{ }^{\circ}\text{C}$ — $+75\text{ }^{\circ}\text{C}$
- Humidity: 100% condensation
- Waterproof and Dustproof: IP67, protected from temporary immersion to depth of 1 meter, floating.
- Shock and Vibration: Survive from 2 meters drop onto concretes

Characteristics

- Buttons and Display: 2 buttons/4 LED lights
- I/O: RS232, High-speed USB, Bluetooth®
- Channel: 220 Channels*

Datalink

- Power (UHF): 1W-20W Adjustable
- Band Width: 410-430MHz/430-450MHz/450-470MHz

*Channel Configuration:

- GPS: Simultaneous L1 C/A, L2E, L2C, L5
- GLONASS: Simultaneous L1 C/A, L1 P, L2 C/A, L2 P
- SBAS: Simultaneous L1 C/A, L5
- GLOVE-A: Simultaneous L1BOC, E5A, E5B, E5AltBOC
- GLOVE-B: Simultaneous L1 CBOC, E5A, E5B, E5AltBOC

3. Preparation



- Equipment Description
- Batteries and Power
- Parts of the Receiver (Control Panel)

3.1 Equipment Description









The tables below provide an overview of the different items composing the CHC X91GNSS.

Depending on the different purchase, you may have some of the listed items. Basic Supply is the standard accessories for each kit. Transportation Cases Option and Accessories Options are depending on different orders requirements.

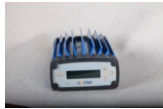




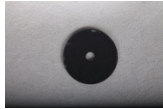
Base Kit Basic Supply

Item	Picture
CHC X91GNSS Receiver Base	
Lithium Battery	
H.I. Tape	
Connector	






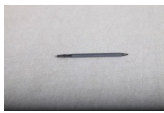
Rover Kit Basic Supply

Item	Picture
CHC X91GNSS Receiver Rover	
Lithium Battery	
Battery Charger	
Power Adapter with Cord	
GPS to PC Data Cable	
Receiving Radio Antenna	
Connector	
2M Range Pole	






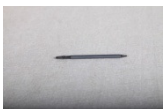
Datalink Kit Basic Supply

Item	Picture
CHC DL3 Datalink	
GPS to Datalink Cable	
Standard Datalink Antenna with 5 Meter Cable	
External Power Cable	
Datalink Antenna Mounting Pole Kit	
Pole Mounting	

Recon400 Controller Kit
Basic Supply




Item	Picture
Recon Survey RTK Controller	
USB Data Cable of Controller	
Charging Cable and Adapter of Controller	
Controller Mount for Range Pole	
Protection Film	
Click Pen	

CHC LP Controller Kit Basic Supply




Item	Picture
LP Series Survey RTK Controller	
USB Data Cable of Controller	
Charging Cable and Adapter of Controller	
Controller Mount for Range Pole	
Protection Film	
Click pen	

Transportation Options

Cases

Item	Picture
Transport Case	
Carry Pouch	
Metal Transport Case for Poles and Antenna	

Accessories Options

Item	Picture
Double Bubbles Tribach with High Adapter	
Single Bubble Tribach with Lower Adapter	
External Power Cable	

3.2 Batteries and Power



WARNING-Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment may cause an explosion or fire, and may result in personal injury and/or equipment damage.

To prevent injury or damage:

- Do not charge or use the battery if it appears to be damaged or leaking.
- Charge the Lithium-ion battery only in a CHC product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
- Discontinue charging a battery that gives off extreme heat or a burning odor.
- Use the battery only in CHC equipment that is specified to use it.
- Use the battery only for its intended use and according to the instructions in the product documentation.



WARNING –Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire, and can result in personal injury and/or property damage.

To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to, discoloration, warping, and leaking battery fluid.
- Do not expose the battery to fire, high temperature, or direct sunlight.
- Do not immerse the battery in water.
- Do not use or store the battery inside a vehicle under hot weather condition.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.



WARNING-Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive, and contact with it can result in personal injury and/or property damage.

To prevent injury or damage:

- If the battery leaks, avoid with the battery fluid.
- If battery fluid gets into your eyes, immediately rinses your eyes with clean water and seek medical attention. Please do not rub your eyes!
- If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

3.2.1 External Power and Internal Battery

The receiver can be powered by its internal battery or by an external power source connected to Receiver Lemo Port. If an external power source is connected to Port, it is used in preference to the internal battery. When there is no external power source connected, or if the external power supply fails, the internal battery is used.

External Power



Figure3.2-1



Figure3.2-2

There are two methods to provide the external power to the receiver by the CHC GPS to PC cable. The CHC GPS to PC cable has one Power port.

- In the office, the Power Adapter is connecting with AC power of 100-240V, the output port of the Power Adapter connects with the Power Port of the GPS to PC cable, shown as **Figure3.2-1**.
- In the field, the external power cable is connecting with the Car battery, the output port of the external power cable connects with the Power Port of the GPS to PC cable, shown as **Figure3.2-2**.

Internal Battery

These receivers use rechargeable lithium-ion batteries. Make sure the battery is fully charged for each CHC X91 being used in the field.

3.2.2 Charging the Battery

The receiver is supplied with two rechargeable Lithium-ion batteries, and a dual battery charger for each RTK kit. The two batteries charge sequentially and take approximately three hours each to be fully charged.

The battery charger comes with a separate universal AC Power Adapter with a 1.5 meter output cable. Follow the instructions below to operate the charger.

- Connect the two parts of the Power Adapter and the Power Adapter output with the Battery Charger. The red LED on the Battery Charger is on, which means the whole charger system is ready.
- Put battery on the battery charger in right orientation (the battery terminals should come into contact with the two sets of connectors on the charger). When the battery is placed in the right place, the Green/Yellow LED will start to flash or turn on.

- There are three LED on the Battery Charger, shown as C. The middle red LED means the power condition of the Charger. The other Green and Yellow LED represent the working condition of two charger slot respectively. When the Green/Yellow LED is flashing, it means the battery is on charging, and the slower tells the less battery is going to be charged in, in other words, when a full charged battery put on the battery slot, the Green/Yellow LED will be turn on and no flashing.

3.2.3 The Battery Usage and Disposing Notices

The rechargeable Lithium-ion battery is supplied partially charged. The following recommendations provide optimal performance and extend the life of your batteries:

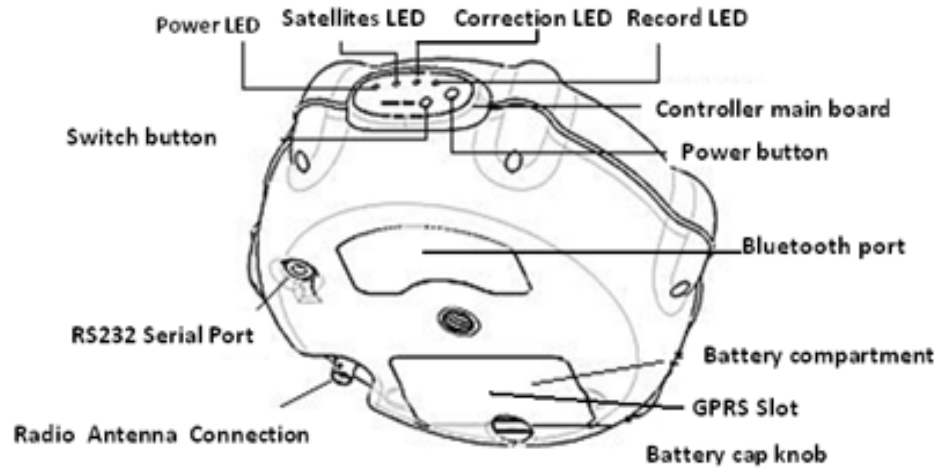
- Fully charge all new batteries prior to use.
- Do not allow the batteries to discharge below 5 V.
- Keep all batteries on continuous charge when not in use. Batteries may be kept on charge indefinitely without damage t the receiver or batteries.
- Do not store batteries in the receiver or external charger unless power is applied.
- If you must store the batteries, fully charge them before storing and then recharge them at least every three months.

Disposing of the Rechargeable Lithium-ion Battery

Discharge the lithium-ion battery before disposing of it. When disposing of the battery, be sure to do so in an environmentally sensitive manner. Adhere to any local and national regulation concerning battery disposal or recycling.

3.3 Parts of the Receiver (Control Panel)

3.3.1 Front Panel View



Power Button

To turn on X91GNSS, hold the power button press and don't release until the power LED lights up.

Switch Button

The function of switch button is to switch X91GNSS from RTK mode to static mode. The procedure can be divided into 2 steps.

Step 1: Switching

Hold the switch button press and don't release until you see the Record LED off.

Step 2: Check

Press the switch button, if the correction LED turns on, it means the switching succeed.



CAUTION: When you are doing check, if you press and hold the switch button again, it will be back to RTK mode.

Power LED

This indicator is on when X91GNSS is on, and off when it is off.

Satellite LED

This LED indicates how many satellites the receiver is tracking on, if the LED flashes 5 times and then stops, it means the receiver is tracking 5 satellites.

Record LED

The record LED only flashes in 2 situations

A. In the static mode

The interval of flashing shows the sample interval you set in the **HC-Loader** or HCGPSSet.

B.RTK mode

When you are using PDA to send commands to set the receiver's configuration or just communicating with the receiver.

Correction LED

The Correction LED only flashes once per second when

- A. Base station successfully sends out differential data in RTK mode.
- B. Rover station successfully gets differential data from Base station.

3.3.2 Bottom View

RS232 Serial Port

RS232 serial port is a 9 pin 0-shell Lemo connector that supports RS-232 communications and external power input.

Bluetooth® Port

Bluetooth® port is an integrated port allowing X91GNSS receiver to communicate with a Bluetooth®-enabled field terminal.

Radio Antenna Connection (only for Rover)

It allows you to connect a radio whip antenna to the X91GNSS. There is only one type of CHC radio antenna connection --- TNC.

Adaptor

The 5/8" adaptor is used for setting up the receiver on the tripod.

Battery Compartment

Please put CHC made battery into the compartment properly



WARNINGS:

- Do not store batteries in the receiver unless it is applied.
- Do not charge or use the battery if it appears to be damaged or leaking.
- Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire, and can result in personal injury and/or property damage.
- Do not expose the battery to fire, high temperature, or direct sunlight.
- Do not immerse the battery in water.

- Do not use or store the battery inside a vehicle under hot weather condition.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.

GPRS Slot (Optional)

Insert SIM card into the slot, then use GPRS net as data communication way between base and rover. The premise is that you have already gone to local Mobile service center asking for net traffic and make sure the area where you are doing surveying has strong GPRS signal.

4. Setting up the Receiver

- RTK Base Setup
- RTK Rover Setup

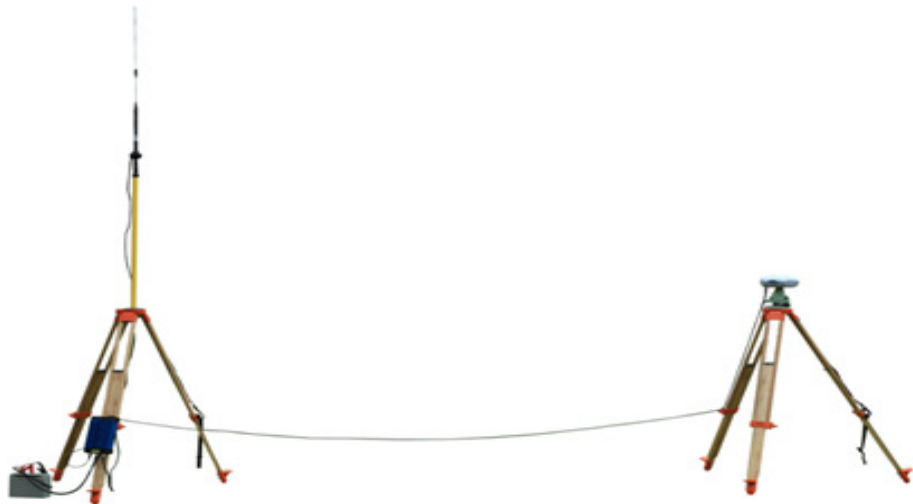
4.1 RTK Base Setup

Prerequisites:

- The base installation needs the accessories of one tripod and one tribrach.
- One standard 12-V DC car battery is needed to power the datalink station.

Datalink

Mount the different items shown as the following picture.



GSM/GPRS Model

Mount the different items shown as the following picture.



4.2 RTK Rover Setup

Prerequisites:

- If a radio link is used with the base, the rover should normally have been fitted with the radio module that matches the reception band covered by the radio transmitter used at the base.
- If a GPRS connection is used, the rover should normally have been equipped the SIM card that will allow it to perform a network connection. Removing the rear cover that gives access to an electronic card on which the user can insert the SIM card as shown on the picture.

Radio Link



Figure4.2-1

GSM/GPRS Connection



Figure4.2-2

Mount the different items shown as **Figure4.2-1**, including the X91, the radio antenna, the range pole, and the field terminal with its mounting bracket.

As a standard feature, the X91 incorporates a built-in GSM modem. Mount the different items shown as **Figure4.2-2**, including the X91.

5. Configuration

- Establishment of Bluetooth® Connection
- Static Configuration
- RTK Configuration

5.1 Establishment of Bluetooth® Connection with the Receiver

Prerequisites:

- The CHC RTK software can be installed in Windows® CE and Windows® Mobile system PDA. Here the Windows® Mobile is set as an example to show how to establish Bluetooth® connection with Receiver.
- Use the Bluetooth® manager program of the PDA to associate a COM port for Receiver, and then establish connection between the Bluetooth® and Receiver through the selected COM port.



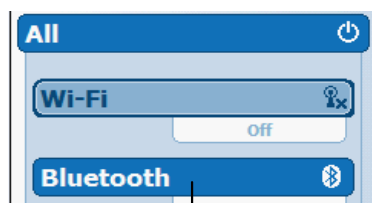
Figure5.1-1

Assigning a COM Port to Bluetooth® for Receiver

First, turn on the GNSS receivers.

Second, turn on the PDA, and activate Bluetooth® connection of PDA.

Check the Bluetooth® status on the start screen. If it is already on, skip this step; if it's off, tap on the Bluetooth® button to change status from off to on. Tap **Done** and return to the start screen.



Tap here to change the Bluetooth® status

Figure5.1-2

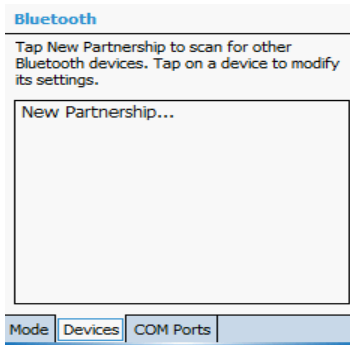


Figure5.1-3

Tap **Start** -> **Settings** -> **Connections** -> **Bluetooth®**

Tap on the Bluetooth® icon. This opens the Bluetooth® Settings window, which is on the **Device** tab.



Figure5.1-4

Tap on **Devices** -> **New Partnership**, the PDA start searching for the nearby Bluetooth® devices. For each device detected by PDA, the Bluetooth® name is returned in the search window (e.g. GNSS-400071). The **Refresh** button can be used to resume the search if necessary.

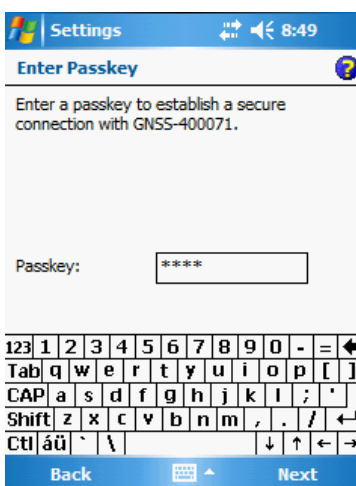


Figure5.1-5

Select the Bluetooth® name corresponding to the receiver to be communicated, and then tap **Next**, keying in the Passkey “1234”.

Configuration



Figure5.1-6

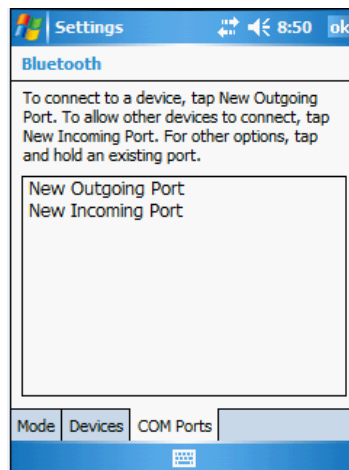


Figure5.1-7



Select Serial Port and tap **Finish** to activate the Serial Port service. Back to the Bluetooth® Settings, and then choose a receiver to communicate with.

Click **COM Ports**, then select the **New Outgoing Port**. The Bluetooth® name of the selected name now appears highlighted, then tap **Next** button.

Choose a COM port to connect Bluetooth® with the GNSS receiver. Choose **Com8** or **Com9**, then select the **Secure Connection** and tap **Finish**. **Com8** is suggested to be linked with Base and **Com9** with Rover.

Tap **OK** to the start screen and finish the Bluetooth® connection setup.

CAUTION: If to delete the Bluetooth® connection with GNSS Device, the receiver name in the **COM Ports** should be deleted first. Please do not delete the receiver name in the **Device** first.

5.2 Static Configuration

There are 3 ways to configure the receiver in Static Mode.

A. Using RS232 Port and HCLoader Software in the Office
First, connect X91GNSS to your computer through RS232 line.

Configuration

Second, run the software HCLoader and click icon **Link** to make the receiver connected with computer.

Third, click icon **Setup** to set the sample interval (15S is recommended) and mask angle of the receiver (13 is recommended) and choose the **Data Log** mode as Auto, then click **Apply** to make the configuration work and click **Exit**.

Fourth, restart the receiver.

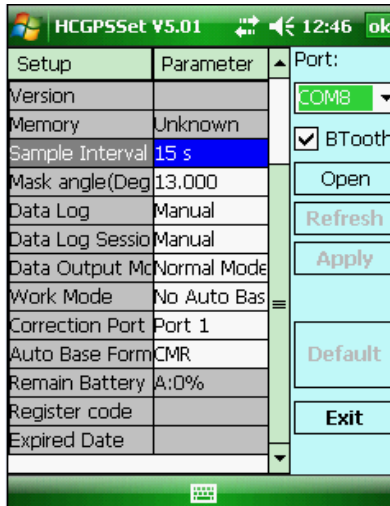


Figure5.2-1

B. Using PDA and Software HCGPRSet in the Field

First, use RS232 or Bluetooth® port connecting PDA with receiver.

Second, tap the icon **HCGPRSet** on the PDA, choosing the right com and click icon **Bluetooth®** if you are using Bluetooth®.

Third, click **Open** then see **Figure5.2-1**, set the sample interval (15S is the default setting) and mask angle of the receiver (13 is the default setting) and choose the data log mode as Auto, then click **Apply** to make the configuration works.

Fourth, Switch off the receiver and switch on the receiver again, the settings will be successful set up.

C. Switch Button in the Field

The information has been introduced in **Chapter 3.3.1**

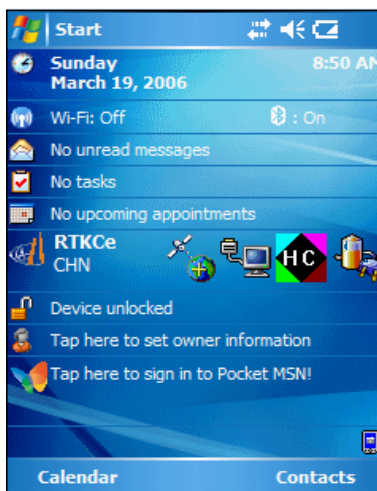


Figure5.3-1

5.3 RTK Configuration

Prerequisites:

- Base and Rover are properly set up and powered on.
- Bluetooth® connection has already been configured with Base (com 8) and Rover (com 9).

5.3.1 CHC RTK Software Package

5.3.1.1 Introduction of Software

Main function of CHC RTK software:



HCGPSset is the field software for the Receiver setup

CAUTION: The setting by **HCGPSset** software can work only after the Receiver being turn off and turn on.

HcGPSce is the field software for Radio and built-in GPRS module setup.

RTKCe is the RTK Surveying software.

5.3.1.2 Installation of the CHC RTK Software

CHC RTK software Landstar is installed in CAB format, copy the installation file to PDA, double click the file, the software will install automatically.

1. Open the CD, go to software->Landstar5.01 (if the operation system of PDA is window mobile, please select the Recon version; if you are using the HCE200, please use the HCE200 version), and copy the file to PC.



2. If the file is in **.ZIP format, release the file to your PC, and then copy the **.CAB format file to Controller. Which folder?
3. In the controller, go to start->file explore-> select the **.CAB file, double click, the landstar will install automatically.
After successfully install the software, the software program of landstar, HcGPSce , HcGPSset will add to the desktop of Controller.



CAUTION: Landstar software Version 3.40, 5.01 has started to use the *.CAB for the installation.

According to different communication modes, we separate the RTK configuration into Radio mode and GPRS mode.

5.3.2 Radio Mode Configuration

5.3.2.1 Radio Mode Base Configuration

After having successfully installed the Landstar, tap shortcut of **HCGPSSet**, and select a communication port. **Com1** is for cable connection, **Com8** and **Com9** is for Bluetooth® connection. Select **Com8** and tap **Open Port**, and then the software will read the parameter about Receiver. Please set the Base as **Figure5.3-3**. After setting all the information, tap **Apply**, there is warning information shown as: "**Warning: Auto base is only for RTK Base station, not for other receiver please**".

Click **OK** to finish the setting. Turn off the base station and then turn on it to active the setting. After searching enough satellites, the base station will send CMR data automatically.

HCGPSSet

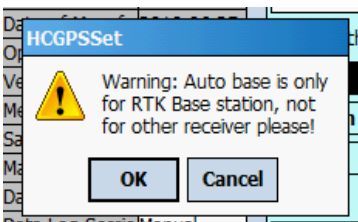
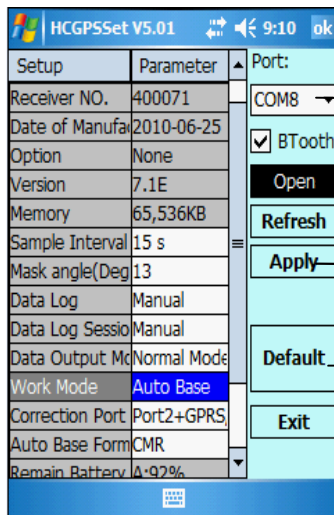


Figure5.3-2



CAUTION: If the user wants to start Base manually, please set the work mode as **No Auto Base**.



COM1 is for cable connection, COM8 and COM9 is for Bluetooth® connection.

Select the **BTooth** connection, Open the connection port.

After setting all the parameters, tap **Apply** button.

Tap this button, the GNSS will recover to default setting.

Figure5.3-3

Setup Information	Explanation
Receiver NO.	The SN NO. of Device
Date of Manufacture	The time of being made up
Version	The hardware version of Device

Configuration

Memory	The total Memory of Device
Sample interval	Only active in static mode, the recording static data interval
Mask angle	The cut off Degree to prevent the satellites signal
Data log	For recording static data, Manual mode stands for switch static mode manually, Auto mode stands for recording static data automatically when turning on the Receiver
Data log Session	Only active in static mode, for the file session
Work mode	Auto Base Mode : Base station will automatically send the CMR data Auto Rover : set the device as Rover mode No Auto Base : the base station will not send differential data automatically
Correction Port	The differential data output port. If the Base has the Built-in GPRS Module, select Port2+GPRS/CDMA , If the Base does not have Built-in GPRS, select the Port2
Auto base format	Only CMR for X91 GNSS
Remain battery	The power of the internal battery

Table1: The Explanation for HcGPSset Setup Parameters

HCGPSset

Work Mode	Auto Rover	≡	Default
Correction Port	Port2+GPRS		
Auto Base Form	CMR		

Figure5.3-4

5.3.2.2 Radio Mode Rover Configuration

Tap the **HCGPSset** to connect with Rover via Bluetooth®. Set Rover work mode as **Auto Rover**, then turn off and turn on Rover.

Tap shortcut of **HcGPRSc** and select the communication port. Then tap **Get Mode** to get the current setting in the **HcGPRSc** software.

HcGPRSCe

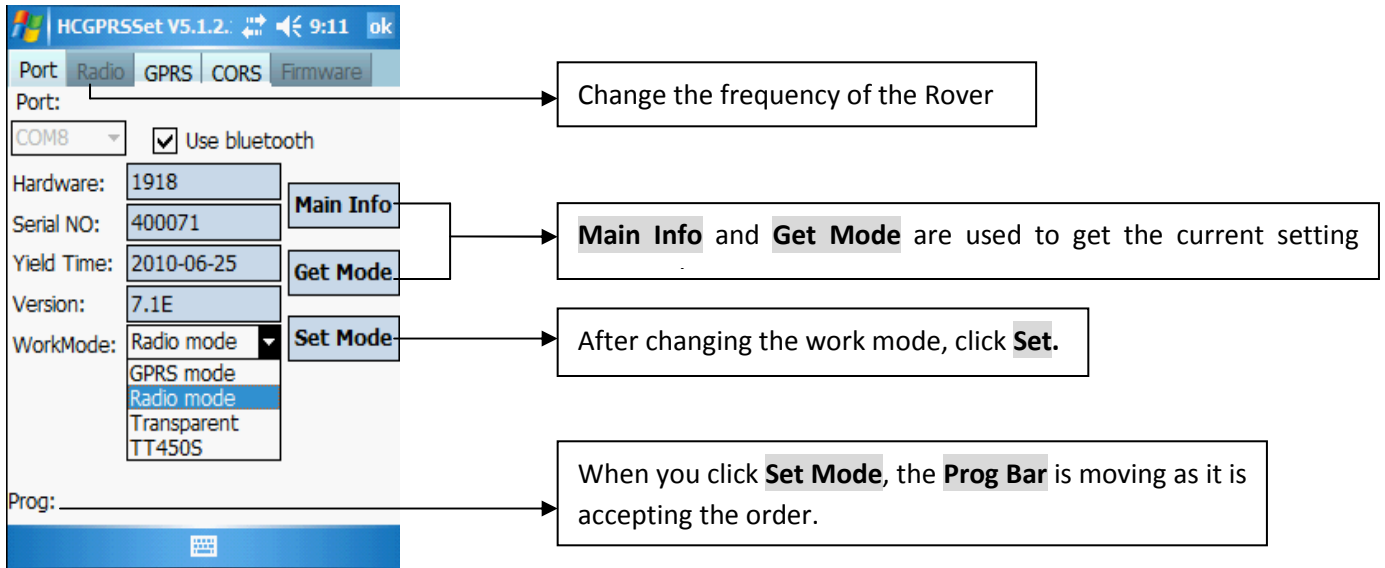


Figure5.3-5

The Work Mode	Explanation (Band Rate is 9600)	Other Settings
Radio mode	The CHC Radio protocol	On Radio tab ,change the frequency of Rover
TT450S	Trim Talk 450S protocol	On Radio tab ,change the frequency of Rover
Transparent	Transparent protocol	On Radio tab ,change the frequency of Rover
GPRS mode	Set the communication mode for Built in GPRS Module	Tap GPRS and CORS option set the server IP and other parameters

Table2: X91 Rover work with other Datalinks

After changing the Radio protocol on **Port**, go to **Radio** to change the Rover frequency.

HCGPSSet

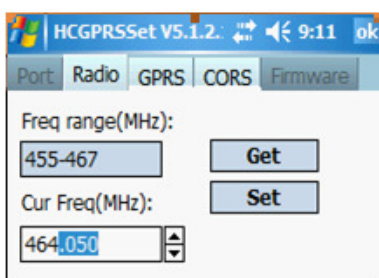


Figure5.3-6

5.3.3 GPRS Mode Configuration

If the CHC Receiver has the Built-in GPRS module, the GPRS module can be used as the communication tool between Base and Rover.

According to different logging protocol, the GPRS mode is separated into UDP mode and TCP mode.

UPD mode (Base +Rover): Use Base and Rover to log on the APIS server, and then they match as one unite.

TCP Client mode (one Rover to log on CORS): Use Rover to log on the CORS server by keying in user name and password. After logging, the CORS center will send the differential data to the Rover.

HCGPSSet

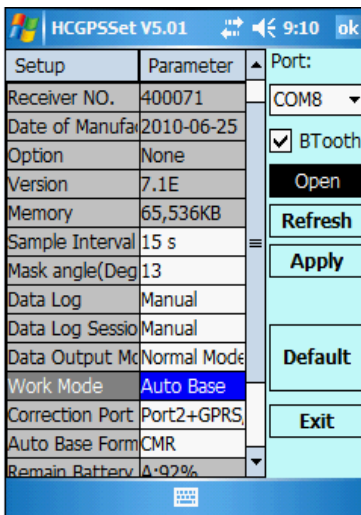


Figure5.3-7

UDP Mode Configuration

Base configuration:

-Use the **HCGPSSet** to set the work mode as **Figure5.3-7**.

-Set the IP of Base station: use the **HcGPRSc** to set the Server IP and log on internet information

First, set the work mode as **GPRS mode** in the **HcGPRSc**, then Tap **Set Mode**.

HCGPSSet

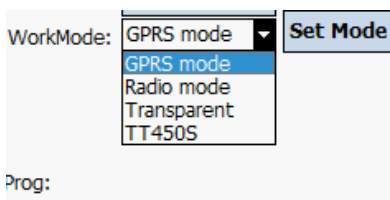


Figure5.3-8

HCGPSSet(GPRS)

Figure5.3-9

Second, on **GPRS** option, tap **Get** to get the current setting, then key in the necessary parameters and tap **Set** to set all the parameters for Built-in GPRS Module. Turn on and turn off the Device again.

Server IP and Port is provided by local APIS Server provider.

The APN Name and the Mobile Server NO. is provided by your local Mobile Server provider.

The user name and password is provided by Mobile server, in some country there is no user name and password

HCGPSSet

Figure5.3-10

Rover configuration:

-Use the **HCGPSSet** to set the work mode as **Figure5.3-10**. Power off and power on again.

HcGPRScce

Figure5.3-11

-In the **HcGPRScce**, set the work mode as **GPRS mode**.

HcGPRSCe(GPRS)

Figure5.3-12

Then on **GPRS** option, tap **Get** to get the current setting, then key in all the parameters. Click **Set** to set necessary parameters in the Built-in GPRS Module.

Mode: Rover mode.

Key in the SN number of the corresponding Base station.

5.3.3.2 TCP Mode Configuration

TCP mode (CORS mode): users have to key in the user name and password when logging on the CORS center. For the Rover working as CORS mode, the CORS Mode Configuration also needs to use both **HCGPSSet** and **HcGPRSCe** software

HCGPSSet

Figure5.3-13

Built-in GPRS Module CORS Configuration

Use the built in GPRS Module as the datalink.

Set **HCGPSSet** the work mode as **Figure5.3-13**.

TCP Client

The server IP of CORS center

Figure5.3-14

Configuration

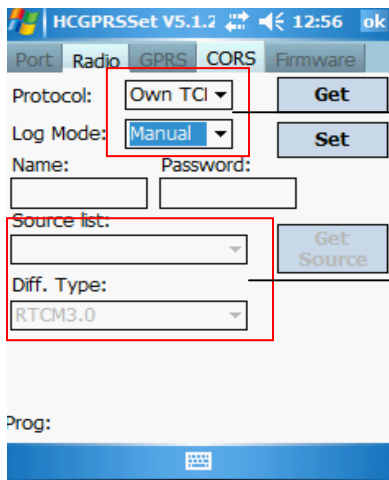
Use the **HCGPRSSet** to set protocol and Server information of CORS, and then tap **CORS** option, set the log mode of CORS center as auto mode or manual mode.

- Manual Mode**-key in the user name and password in Landstar and it will send the GPGLA information to CORS center manually

- Auto Mode**-after setting the Receiver as Auto Mode, the Receiver will try to log on CORS center automatically, and when the correction LED flashes once each second, it means that the receiver has successfully logged in CORS center.

Log on CORS Manual Mode

Log CORS Manual Mode



Tap **CORS option** and set the parameters as **Figure5.3-15**.

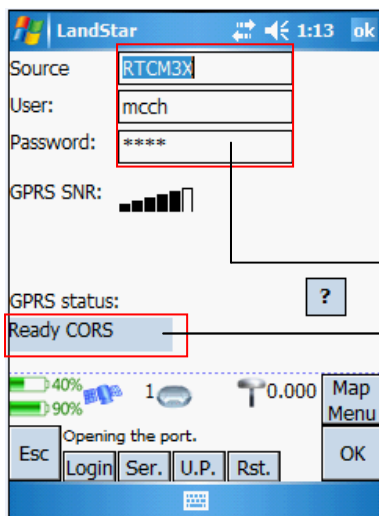
Manual Mode

Delete all the information

Figure5.3-15



Caution: If the user wants to use the Manual Mode, delete all the information of Name and password, and the Source list, then select the Manual mode as **Figure5.3-15**.



Set the Users Name and Password in Landstar.

Tap **Landstar**, **Configuration**-> **Rover par.**->**Inner VRS**, key in the source, user name and password, please see as **Figure5.3-16**.

Key in the Source list, User name and Password.

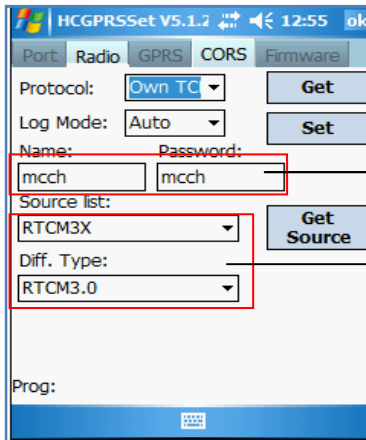
When shows **Ready CORS** tap **Login**, sending the GGA information to CORS center, then the CORS center will send the differential data to Rover.

Figure5.3-16

Log CORS Auto Mode

Click HCGPRSSet to set CORS IP. Tap **CORS**, then key in user name and password to apply for CORS center. Meanwhile, select the sourcelist and differential type.

After setting parameters, power off and power on the Receiver. Then the Receiver will log on CORS automatically.



The user name and password apply for CORS center.

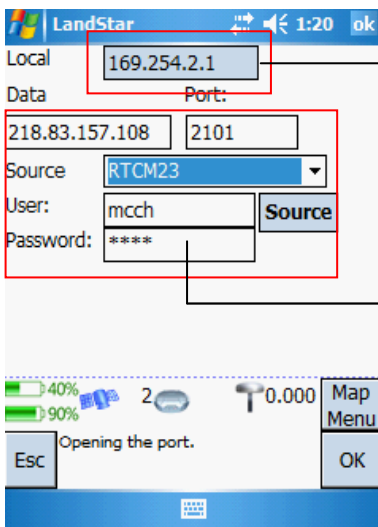
The Source List and Different Type.

Figure5.3-17

5.3.4 PDA CORS Configuration

If the user wants to use a CDMA or 3G cell phone, the user can make the PDA and cell phone communication.

First establish and then pair a Bluetooth® link between the cell phone and the PDA, using Bluetooth® Manager. Then use the Network and Dial-up connection utility in the PDA to connect it to the internet (more information, please see **Appendix C**).



Launch Landstar and link Bluetooth® with the Rover. Then tap **Configuration** -> **Rover par.** -> **PDA VRS**

The IP of CORS center

Tap **Source** to get the source list of CORS center and select the proper one from the Source list

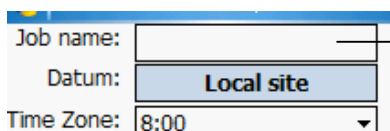
Figure5.3-18

6. RTK Surveying

- Creating New Job
- Starting Base Station
- Carrying out Surveying Project

6.1 Creating New Job

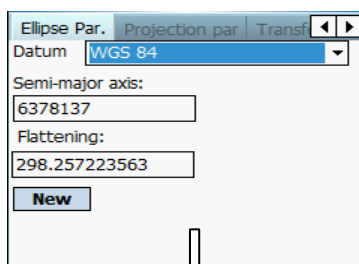
Launch landstar first. Then tap the **Files**->**New job** to key in the Job name and select the right Time Zone of local.



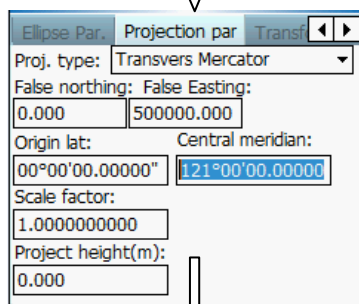
Key in the Job name

Click **Local site** to set the Job name and coordinate system parameters.

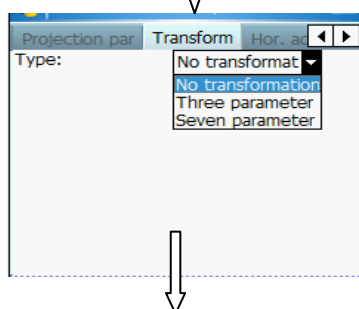
Figure6.1-1



Select the Ellipse Model or key in the new Ellipse Model.



Select the Projection type, and key in the local Projection parameters.



Transformation: if using the 3 or 7 parameters, please key in the parameters here.

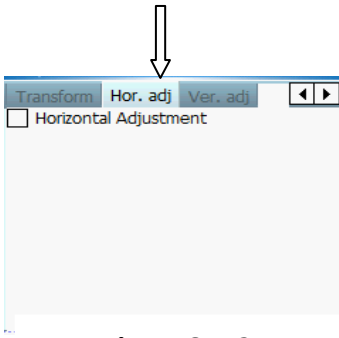


Figure6.1-2

After doing **Site Calibration**, the Hor.adj and Ver.adj information will appear.



CAUTION: After key in all the parameters of the local coordinate system information, tap **Files**->**Save Job** to save the Job.

6.2 Start Base Station (if the function is the Auto Base function, please skip this step)

Prerequisites:

- Fix the Base on the known point.
- Use the Bluetooth® or cable connected with the Base. If use Bluetooth®, launch Landstar and tap **Configuration**->**Com configuration** ->select the Bluetooth® port of the Base station.

Not used for X91 GNSS, only for X90 GPS

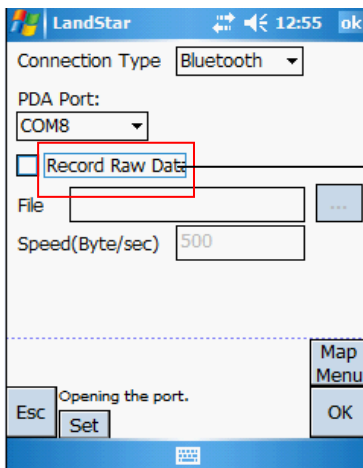


Figure6.2-1

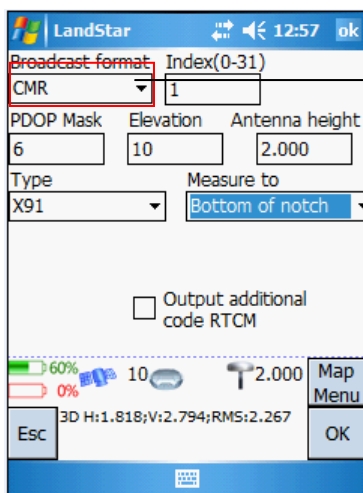
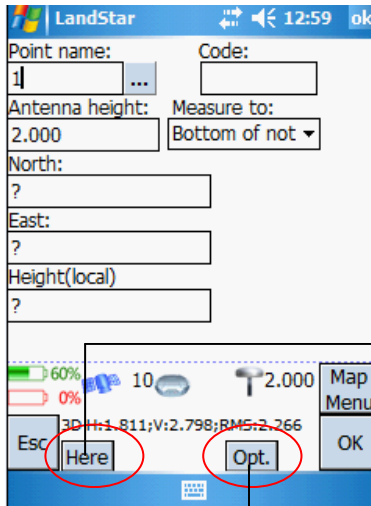


Figure6.2-2

Radio Mode: Start Base Station

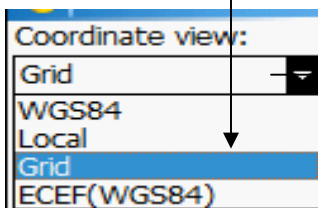
Go to **Configuration**-> **Base Options**, and then select the options as **Figure6.2-2**.

The format of differential data type (CMR or RTCM)



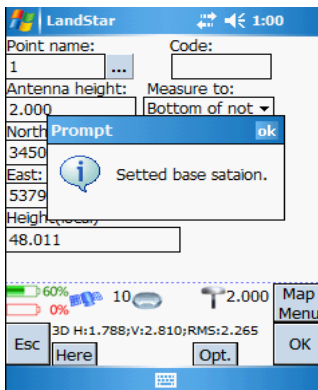
In **Survey**->**start the base receiver**-> key in the base coordination.

Here: get the current position as the base station coordination.



Start the base station in different kind of coordinate

Figure6.2-3

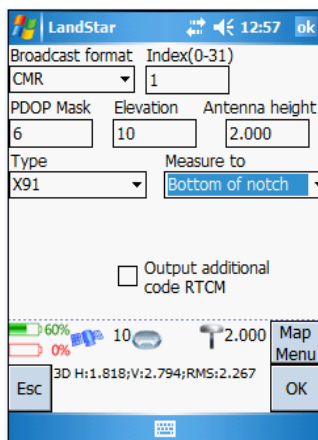


Key in the coordinates of Base station, then tap **OK** to start Base station.

Tap **OK** to continue when dialog box **Setted base station** shows up.

After successfully started the Base, please break the connection with Base and link with the Rover.

Figure6.2-4



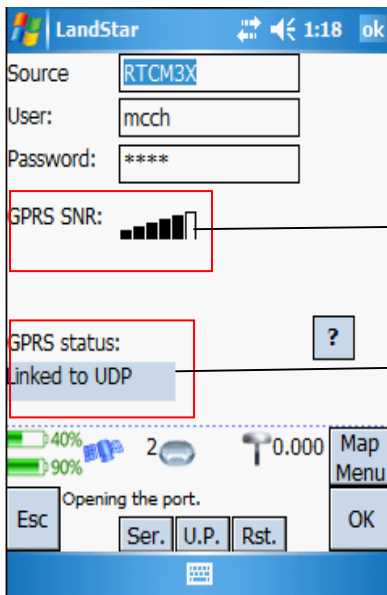
GNSS Mode: Start the Base Station

Tap **Configuration**-> **Base Options**, and then select the options as **Figure6.2-5**

Figure6.2-5

When use the GPRS mode, the differential data is transmitted through GPRS Network, please check the GPRS status before start the Base.

Click **Configuration**-> **Rover Par**-> **Inner VRS**, and then check the GPRS status of the Base.

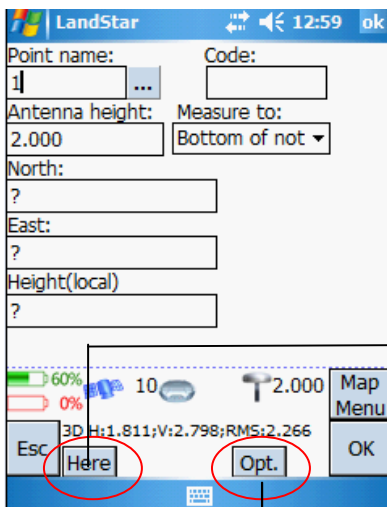


The signal strength of GPRS

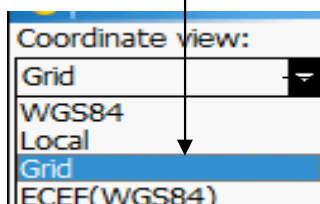
The GPRS status, link to the GPRS network

Figure6.2-6

On **Survey**->**start the base receiver**-> key in the base coordination



Here: get the current position as the base station coordination.



Start the base station in different kinds of coordinate.

Figure6.2-7

After keying in the coordinates of base station, tap **OK** and dialog box **Setted Base** will come out. Then tap **OK** and link the Bluetooth® with Rover.

6.3 Carrying out Survey Project

After the Base start sending the differential data, switch the Bluetooth® connection to the Rover, and check the Correction LED (Green light) of Rover. If the green light continuously flashes (means getting the differential data), please wait for the rover getting fixed; otherwise, please check the DL3 radio and Base.

The rover then starts to acquire corrections data from the selected base. Please note that the rover will automatically recognize the format of the received data.

6.3.1 Measuring Points

From **Survey**->**Measure Points**, the user can start measure points. After setting all parameter, tap **Mea.** And the point coordinates will be saved in the Job.

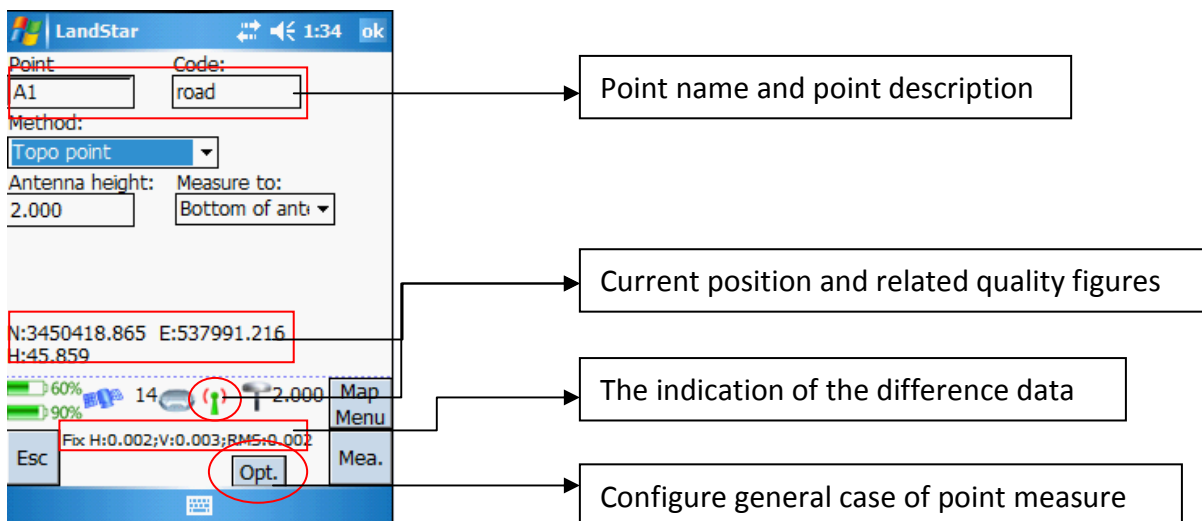


Figure6.2-8

6.3.2 Site Calibration and Reset Grid Functions

6.3.2.1 Site Calibration: Convert the WGS 84 to Local Coordinate

If key in the 3 or 7 parameters when built new job, please skip this step, otherwise please do **Site Calibration** as follows:

First, measure all the control points, then import (key in) the local control points coordinates.

Second, carry out site calibration work, tap **Survey->Site Calibration** and then click the **Add** to add the Site calibration points.

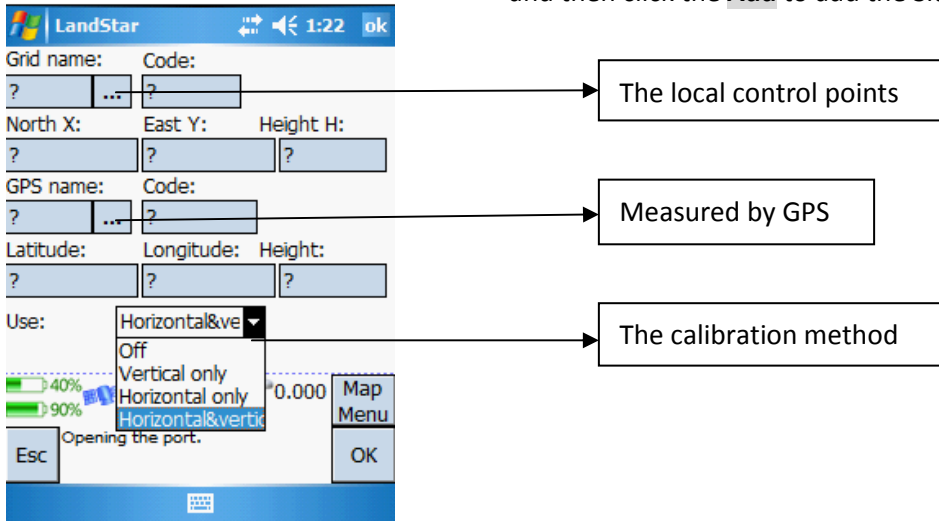


Figure6.3-1

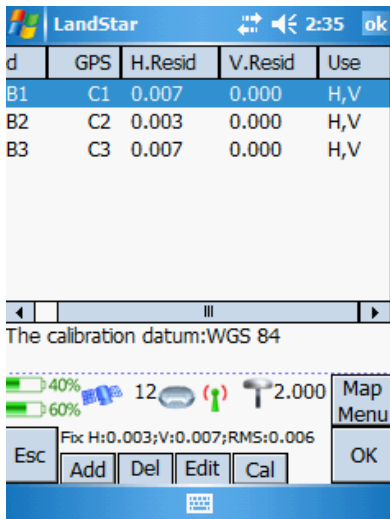


Figure6.3-2

After added all the points, click **Cal** button, the software will calibrate all the points, and the "H.Resid" value (3 points appear this value) and "V.Resid" (4 points appear the value).



CAUTION: The Max value of H.Resid has to be less than 0.015m
The Max value of V.Resid has to be less than 0.02m

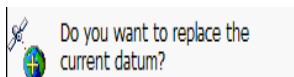


Figure6.3-3

If the Value of "H.Resid and V .Resid" meets the requirement of Max value, click **OK**, a pop box will appear "Do you want to replace the current datum? ", click **OK**, and finish the step.

6.3.2.2 Reset Grid Function

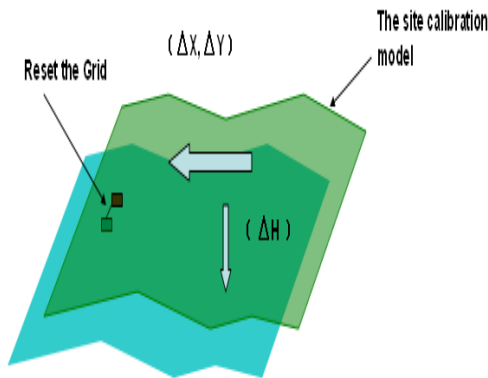


Figure6.3-5

The idea for Reset Grid is to make all the points have been surveyed in the same coordinate system.

After we do the site calibration or key in the 7 parameter, the relationship between the WGS84 and Local coordinate system is available. But each time when the Base is turned off and turned on, the local coordinate system will shift. For how to solve the problem, we are going to provide solutions based on two kinds of situations.

- If start the Base Station Manually
 - On the Known point, the procedure is in **Survey**-> **Start the Base Receiver** -> Select the base coordinate from the point list, then by clicking **OK**, the Base will start to send differential data.
 - On the Unknown point, when the Rover receives the Base correction data, and after measuring one point, there would be one New Base Coordinate in the Job.
 - In the **File**-> **Element Manager**-> **Point Manager**, choose the New Base Coordinate and tap **Reset Grid** Button.
 - Tap **...** button, and select the original Base coordinate.
 - Click **OK**, and then the present local coordinate system is the same as the original local coordinate system.

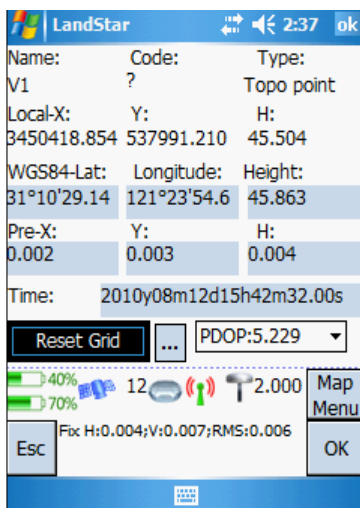


Figure6.3-6

- If start the Base Station by AUTO BASE
 - Place the Rover at one Known point in the survey area, and Measure the point (e.g. V1 as in the Figure 6.3-6).
 - In the **File**-> **Element Manager**-> **Point Manager**, select the point you have measure (V1), and double click this point, coming out the Table 6.3-6 page.
 - Tap **Reset Grid** Button.
 - Tap **...** button, and select the point you measured before.

- Click **OK**. And the coordinate of V1 is the same as that of the located known point.

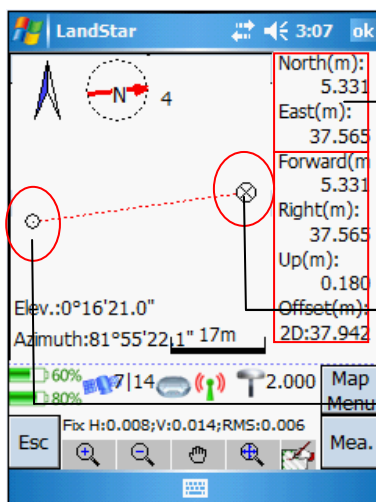
6.3.3 Staking out Points

Prerequisites:

- Upload the stake out points to the current job (**Appendix D**), and do site calibrations.

There are two kinds of stake out mode, simple mode and complex mode; you can go to **Configuration** -> **stake type** to select the stake type. Here is the complex mode showing how to stake out points.

Far away from the target position



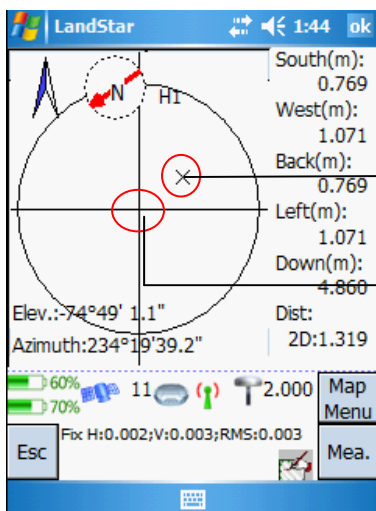
Tap **Survey**->**Stake out points**-> **Add** to add the stake out points to the points list. Then select the point name you want to stake and tap **Stake**.

Navigate direction

Stake out points (target)

Current position and heading

Figure6.3-7



Near the target: when you reached the target position exactly, the landstar will make a sound to show that you are on the target position. If you want to measure this point, tap **Mea.** to log in the coordinates of the point.

Current position

Target position

Figure6.3-8

6.3.4 Downloading RTK Results to PC

When going back to your office and getting result, please connect the PDA to your PC using the USB cable.

Launch Landstar and open your Job. Then tap **Files->Export->Grid points** and select the data format of your measure. After exporting the data, copy the data from PDA to PC and import the data to map software.

Appendix A

Configuration on DL3 DataLink

A.1 General Specification

Dimension: 23.5cmL X 13cmW X 6.5cmH

Weight: 1.9kg

Communication: RS-232 port

User interface: 1 LED Digital screen

4 Buttons

External power: 12V DC

Baud rate: 4800 9600 19200 bps

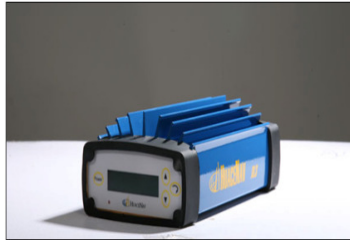
Protocol: CHC

Frequency bands: 438-470 MHz

RF Transmitter output: 1-20W

Operating temperature: -40 °C -----+65 °C

Appendix A-1



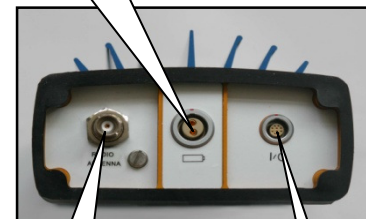
A.2 Connection

Radio antenna: This socket is for fixing CHC made antenna on the Radio.

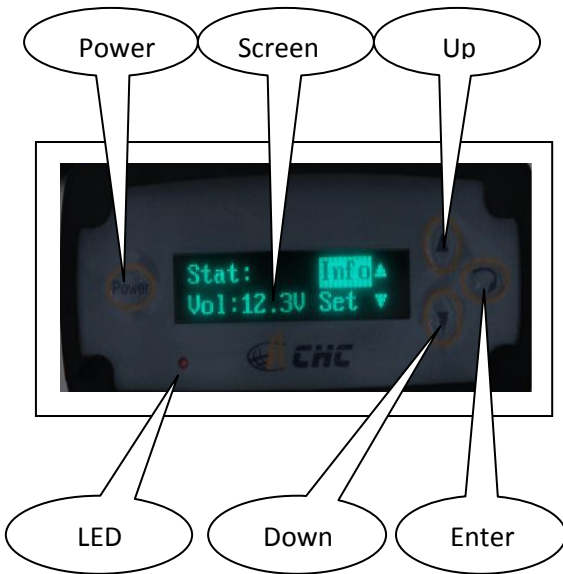
Car battery: This socket is for using CHC made power cable to link the Radio to the Car battery (insuring the red point match the red point).

Data: This socket is for using CHC made data cable to link the Radio to the receiver.

Appendix A-2



WARNING: There is sequence for the cables linking to DL3
Second, please fix the Power cable to the radio
Third, please fix the data cable to the radio



Appendix A-3

A.3 Control panel

Power Button: When you press this button, the front page will show on the screen

LED: This LED will flash once per second when the radio successfully sends out the correction data.

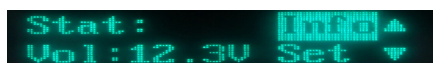
Screen: The system information and setting information of the datalink would be showed in the LED screen.

Up Button: when you press this button, the cursor on the screen will move up

Down Button: when you press this button, the cursor on the screen will move down.

Enter Button: when you press this button, it will make the configuration work.

A.4 Configuration



Appendix A-4



Appendix A-5



Appendix A-6



Appendix A-7

When you switch on DL3, you will see this picture

1) Reading the current configuration of Radio

Choosing icon **info** and pressing **Enter**, you will see the current configuration Baud, Mode, P &F, Temp and Version of the Radio.

CAUTION: The **info** can be used in the checking after changing the Radio parameters.

2) Setting the configuration of Radio

Choosing icon **Set** and pressing **Enter**, you will see this picture, and then you can start to set up DL3



```

Baud: 4800 ▲
9600 19200 Exit ▼
  
```

Appendix A-8



```

Mode: T&R Rece ▲
Relay Exit ▼
  
```


Appendix A-9



```

Find Noise? ▲
Yes No Exit ▼
  
```

Appendix A-10



```

PowSet ▲
FreqSet Exit ▼
  
```

Appendix A-11



```

Pow: 16.0 ▲
Sub Enter Exit ▼
  
```

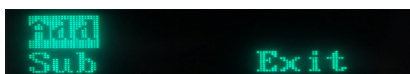
Appendix A-12



```

:456.050 ▲
Sub Enter Exit ▼
  
```

Appendix A-13



```

LED ▲
Sub Exit
  
```

Appendix A-14

**A). Baud**

Choosing icon **Baud** and pressing **Enter**, you will see 3 Baud rate **4800**, **9600** and **38400**. For CHC Rover station, please choose Baud rate **9600** and press **Enter** to make the configuration work.

B). Mode

Choosing icon **Mode** and pressing **Enter**, you will see 4 modes, they are **Receive**, **Transmit**, **Relay** and **R&T**, if using Radio to transmit the correction data from Base station to the Rover, please choose **Transmit** and press Enter to make the configuration work.

C). Noise

Choosing icon **Noise** and pressing **Enter**, you will see it asking you to find Noise YES or NO to detect where there is one radio station having the same Frequency.

D). P & F

Choosing icon **P&F** and pressing **Enter**, you will see **Powset** and **Freset**.

First, choosing **Powset** and pressing **Enter**, setting how much watt you want then press icon **Enter**. For CHC DL3 power is from 1W to 20W, and each adding value is 1W.

Second, choosing **Freqset** and pressing **Enter**, please set frequency as xxx.050 then press icon **Enter**.

E). LED

Choose icon **LED** and press **Enter**, you will see icon **add** and **sub**, you can choose **add** or **sub** and press **Enter** to regulate the light of screen.

CAUTION: After changing the radio settings, please choose Enter to active the setting, otherwise the setting will not come into function.

Appendix B

X91 GNSS Rover Memo

91GNSS Rover could work with other brand Radios, you can see the Radio types in the following list.

Radio type: ADL ROX
Protocol: Transparent

Radio type: ADL sentry
Protocol: Transparent TT450

Radio type: ADL vantage
Protocol: Transparent TT450

Radio type: Satelline -3AS NMS
Protocol: Transparent

Radio type: Satelline -3AS Epic NMS
Protocol: Transparent

Radio type: Satel IP67 radio Modems
Protocol: Transparent

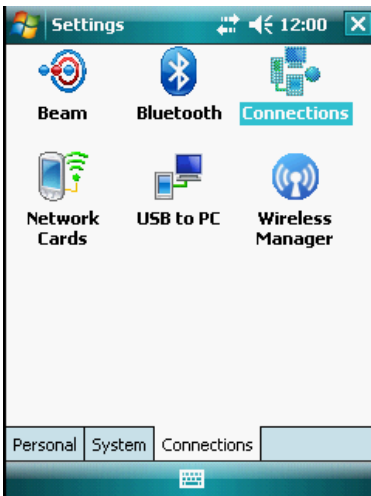
Radio type: Satelline-3AS Epic pro 35W
Protocol: Transparent TT450

Appendix C

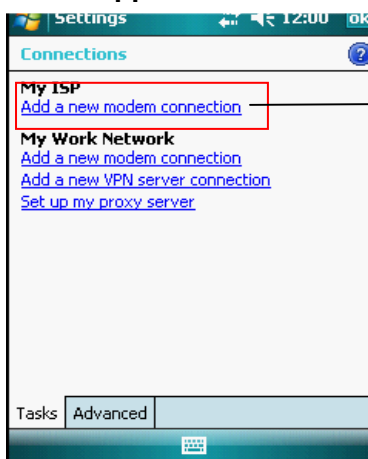
Recon 400 Link with Cell Phone and Log on the Internet

Turn on Bluetooth® of the PDA and cell phone.

Tap **Start**->**Settings**->**Connections**: select **Connections**.

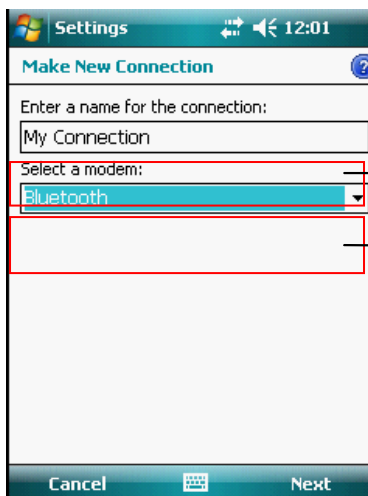


Appendix C-1



Tap **Add a new modem connection**

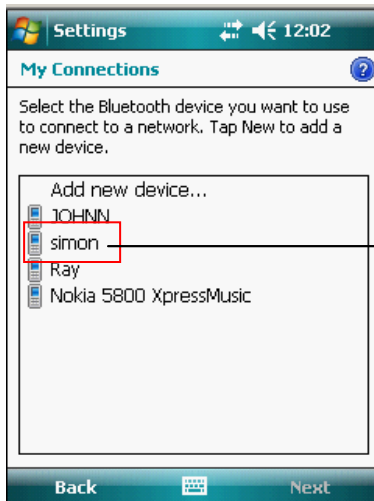
Appendix C-2



Key in the name of the Connection

Select the Bluetooth® option

Appendix C-3



Tap **Add new device**, searching the Bluetooth® of cell phone.

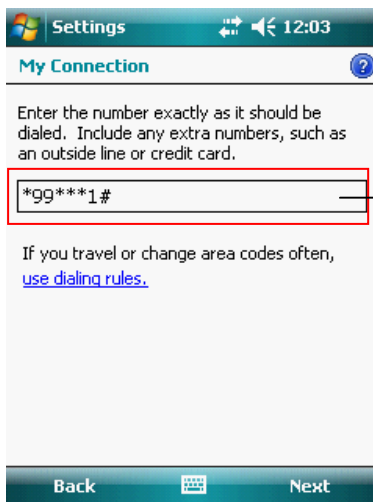
After successfully search out the name of cell phone, tap the name and click **Next**.

Phone name

The PDA will inform to key in the password for the connection, so please key in the password for connection.

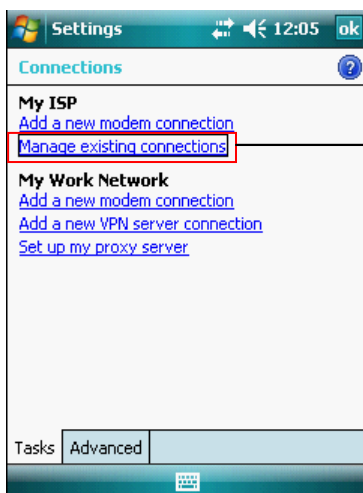
After keying in the password in PDA, cell phone will inform you to key in the connection password, please key in the same password as you set in your PDA.

Appendix C-4



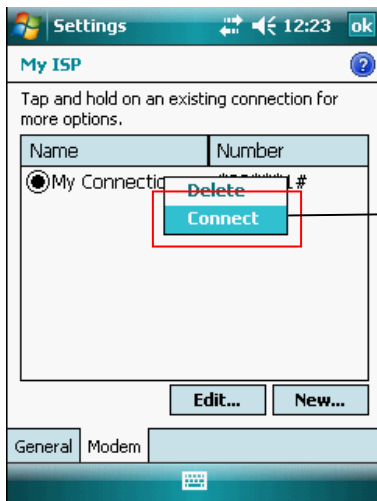
Key in *99***1#, click **Next**, tap **Finish** in the next page.

Appendix C-5



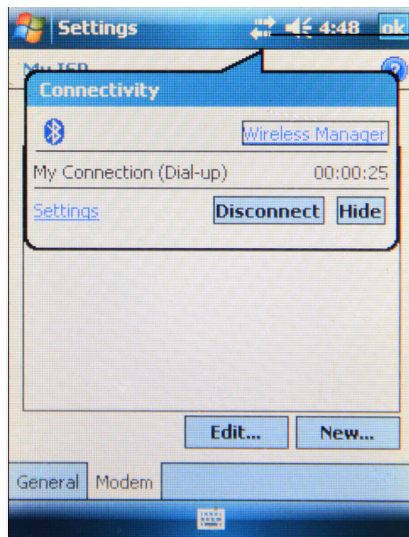
Tap **Manage existing connection** and select the connection.

Appendix C-6



Tap the connection name and select **Connect**. Then PDA will dial number automatically and log on the internet.

Appendix C-7



After successfully log on the GPRS network, tap **Connectivity** to check the total time of log on the GPRS network.

Appendix C-8

Appendix D

Import Points to Current Job

In your office, do the following:

Connect the PDA to your office computer using the USB data cable. Make sure ActiveSync is installed in your computer and is allowed to perform USB connections. If you have not installed ActiveSync, download the latest version from the following web page:

<http://www.microsoft.com/windowsmobile/activesync/default.msp>
x.

Copy the coordination of the points to your PDA, please copy the data to root directory of PDA.

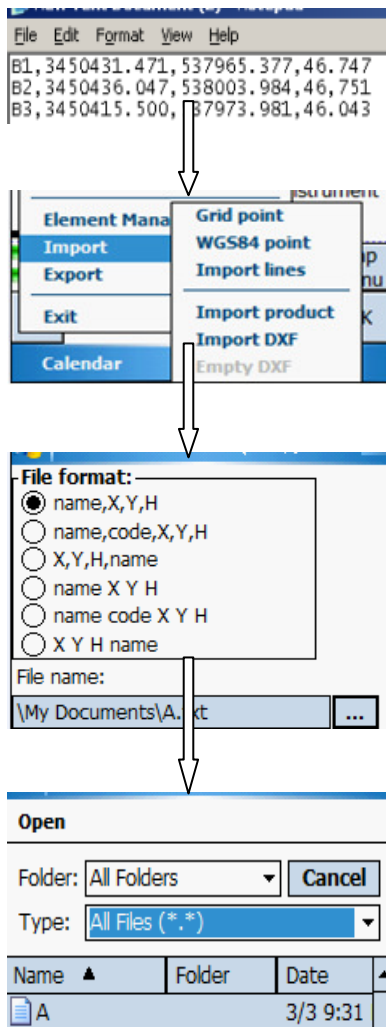
Tap **Survey->Import->Grid point** (local points coordinate) to select the right format of the points according and choose the file copied to PDA, then click **OK**. After importing the points, go to **Files->Elements Manager->points manage** and check the points have uploaded to the current Job.

Copy the file to the root fold of PDA.

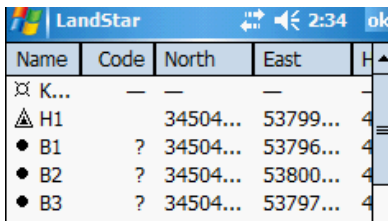
Import the points.

Select the right format of the points.

Tap points file.



Appendix D-1



The screenshot shows the LandStar software window. At the top, there is a title bar with the LandStar logo, a status bar with a speaker icon, a volume icon, and a time display of 2:34. Below the title bar is a table with the following columns: Name, Code, North, East, and a fifth column with a small icon. The table contains the following data:

Name	Code	North	East	
K...	—	—	—	—
H1		34504...	53799...	4
B1	?	34504...	53796...	4
B2	?	34504...	53800...	4
B3	?	34504...	53797...	4

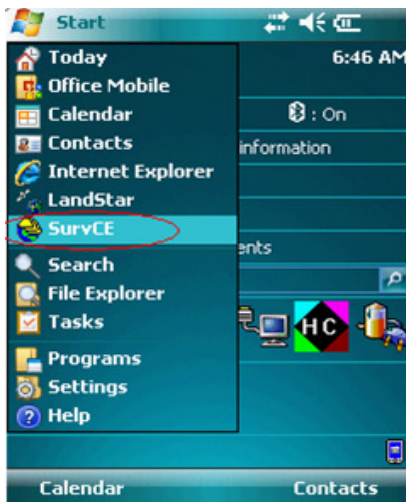
Click **Files->Element manager->Point manager** to check the point in the current Job.

Appendix D-2

Appendix E

SurvCE software with CHC Receiver: Base station

E.1 Connect CHC Base station with SurvCE



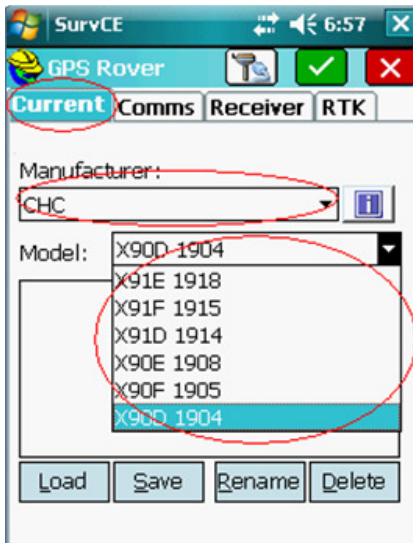
Appendix E.1-1

First, link the CHC receiver with controller by Bluetooth. Set the base station as **No Auto Base** mode in **HCGPSet** software. Then run **SurvCE** software.



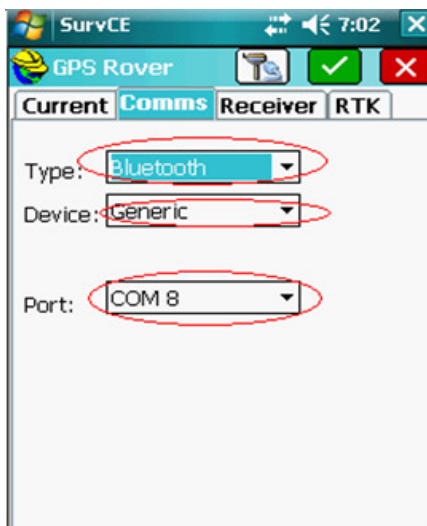
Appendix E.1-2

Second, in **SurvCE** software, move to **Equip Tab** -> **GPS Base** and click it.



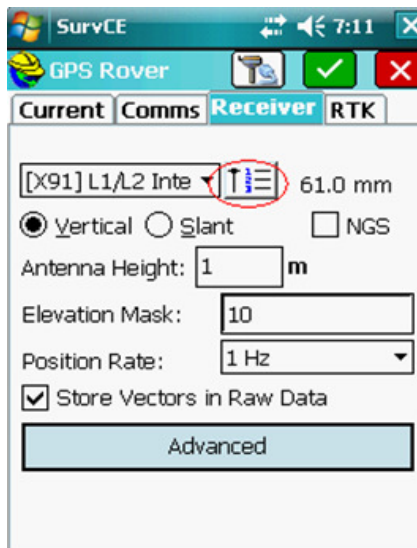
Appendix E.1-3



Third, in the **Current Tab**, please choose CHC in the **Manufacturer** list and choose the right receiver type in **Model** list



Fourth, in the **Comms Tab**, Please choose **Bluetooth** in the **Type** list, **Generic** in the **Device** List and choose the right COM in the **Port** list

Appendix E.1-4

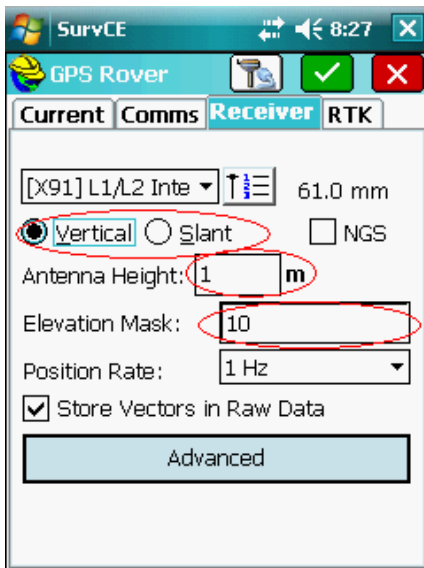


Fifth, in the **Receiver Tab**, Click icon  to choose the right internal antenna type, and then click 

Appendix E.1-5

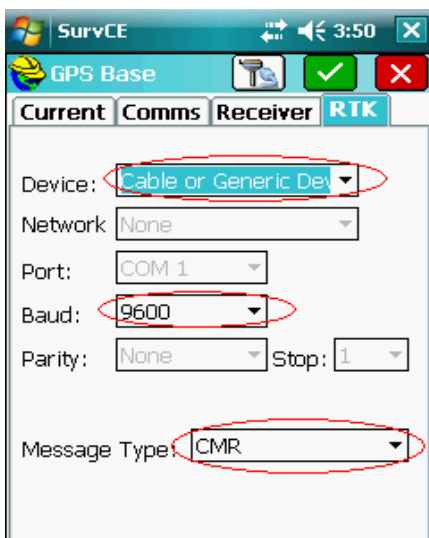


Appendix E.1-6



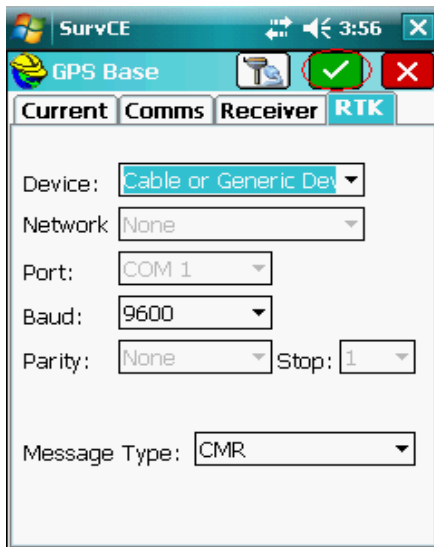
Sixth, choose the way how measuring the height and input the height value and Elevation Mask.


Appendix E.1-7



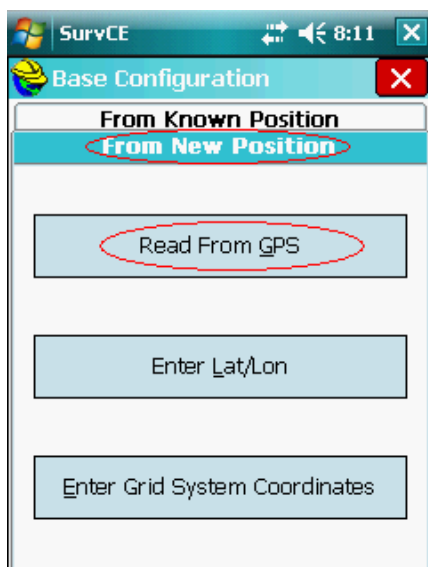
Seventh, In the RTK Tab, please choose **Cable or Generic Device** in the **Device** list and **9600** in the **Baud** list. In the **Message Type** list, the user could choose the correction data type.

Appendix E.1-8



Eighth, after all the settings have been finished, click .

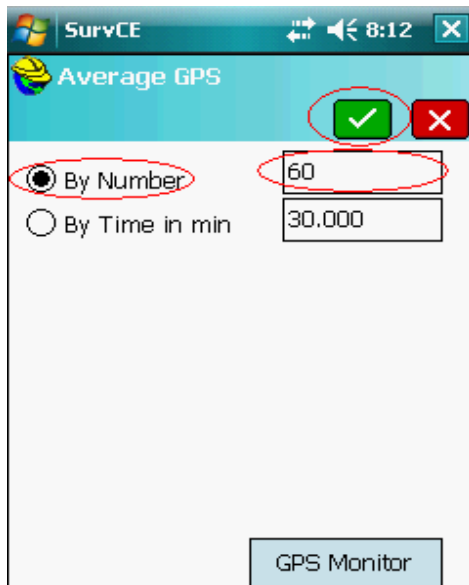
Appendix E.1-9



E.2: Start the Base Receiver on New Position

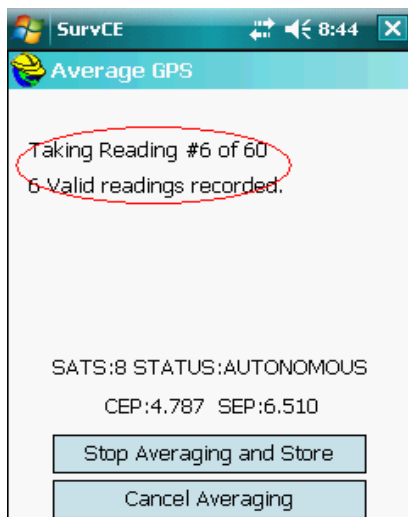
E.2.1 Start the Base Receiver on New Position by Reading from GPS

First, Click **Tab From New Position**->**Read From GPS**, then you will see figure come out

Appendix E.2.1-1

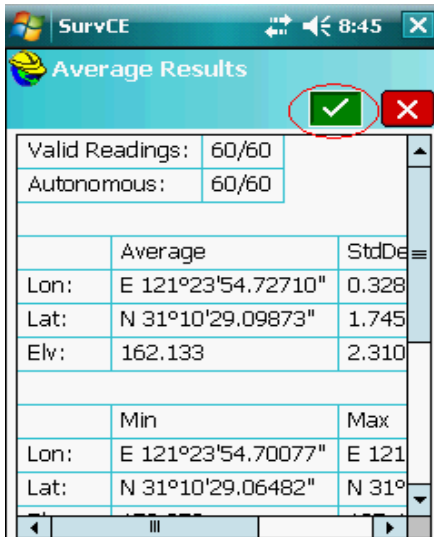
Second, choose **By number** and input the value (Here By number means receiver will start to send out correction data after it has get

60 Valid Reading Records epochs), then click Tab 

Appendix E.2.1-2

Third, the **Average GPS** window shows the status of the receiver, it is starting to collect epochs


Appendix E.2.1-3



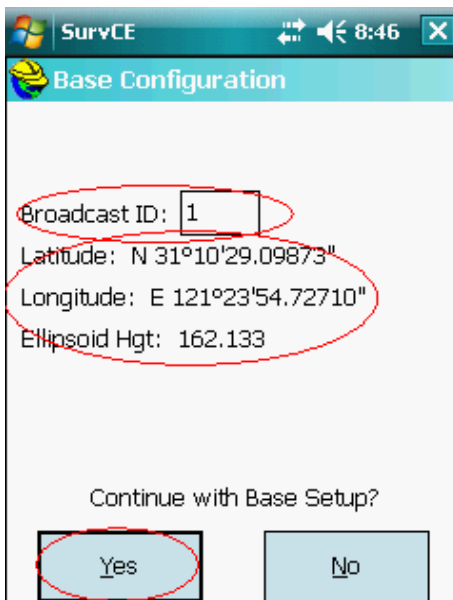
	Average	StdDev
Lon:	E 121°23'54.72710"	0.328
Lat:	N 31°10'29.09873"	1.745
Elv:	162.133	2.310

	Min	Max
Lon:	E 121°23'54.70077"	E 121
Lat:	N 31°10'29.06482"	N 31°

Fourth, when the collection finished, the user will see the **Average**

Results Window come out, then please click Tab 

Appendix E.2.1-4



Broadcast ID: 1

Latitude: N 31°10'29.09873"

Longitude: E 121°23'54.72710"

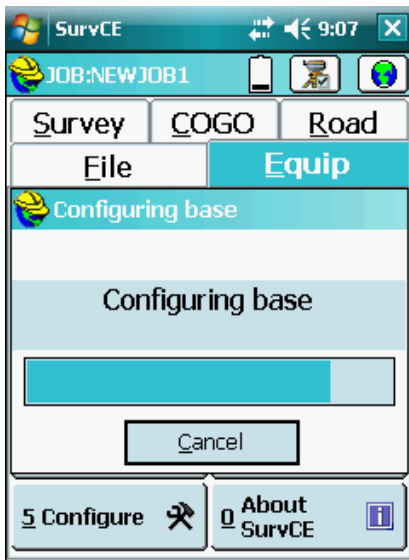
Ellipsoid Hgt: 162.133

Continue with Base Setup?

Yes No

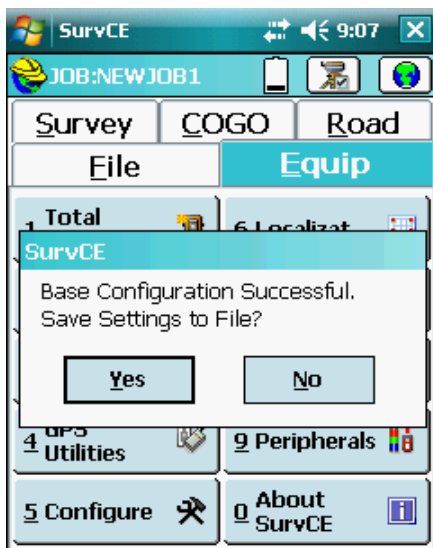
Fifth, in the next step as E.2.1-5, the user will see the final positioning result, then please input the **Broadcast ID** and click **Yes**. **For Broadcast ID, it is used to identify the BaseStation.**

Appendix E.2.1-5



Sixth, then the **Configuring Base** process bar is moving forward.

Appendix E.2.1-6



Seventh, when the **Configuring Base** process bar goes to the end, the dialogue window will come out as E.2.1-7, please click **Yes** to save the Base Configuration file.

Appendix E.2.1-7



E.2.2: Start the Base receiver on New Position by Entering Grid Coordinates

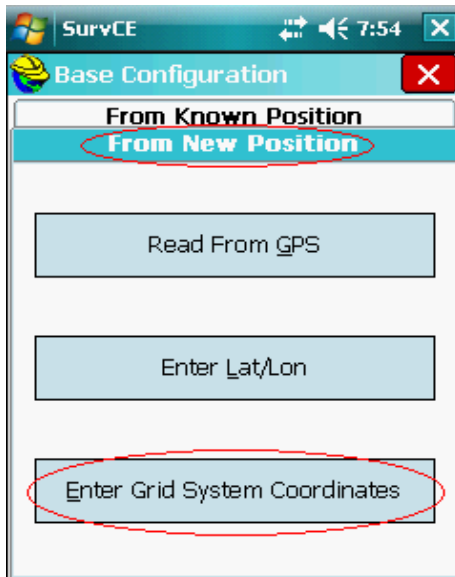
First, **COGO Tab** -> **Keyboard Input**

Appendix E.2.2-1

The screenshot shows the 'Enter and Edit Coordinates' dialog box in the SurvCE software. The title bar says 'SurvCE' and the status bar shows '8:05'. The dialog box has a title 'Enter and Edit Coordinates' and a back arrow button. Below the title, it says 'Type CRD: Alphanumeric'. There are four input fields: 'Point ID:' with the value '1', 'Northing:' with the value '0.0000', 'Easting:' with the value '0.0000', and 'Elevation:' with the value '0.0000'. Each of these fields has a unit 'm' next to it. There is also a 'Description:' field which is empty. At the bottom of the dialog box, there are four buttons: 'Prev', 'Next', 'Store', and 'Utilities'.

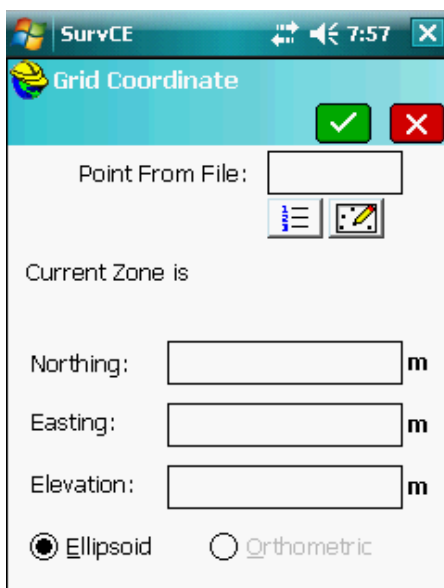
Second, input the grid coordinate and click **Store**.

Appendix E.2.2-2





Appendix E.2.2-3

Third, Click **From New Position**->**Enter Grid System Coordinates**, then the Grid Coordinate Window will come out as E.2.2-4.



Appendix E.2.2-4

Fourth, click icon  to find the coordinate already been keyed in and then click .

SurvCE 8:26

Grid Coordinate

Point From File:

Current Zone is AL East

Northing: 4666083.677311 ft

Easting: 4630355.070147 ft

Elevation: -31.675133 ft

☒ Ellipsoid ☐ Orthometric

Fifth, the Current Zone shows the parameters of the coordinate system defined when creating the new job.

Appendix E.2.2-5

E.3: Start the base on Known Position

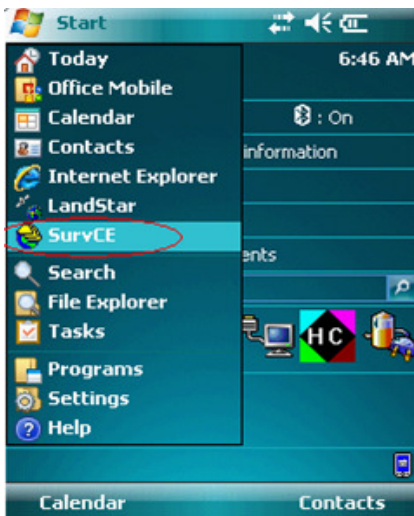
For start the base on Known position, please turn to SurvCE manual page from 137 to 140.

Appendix F

SurvCE software with CHC Receiver: Rover Station

F.1 : Connect CHC Rover station with SurvCE

First, after the Data collector is linked with the CHC receiver via bluetooth, start the field collection software SurvCE software.

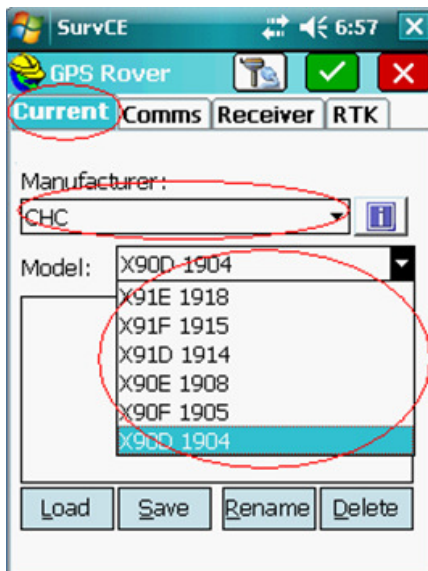


Appendix F.1-1



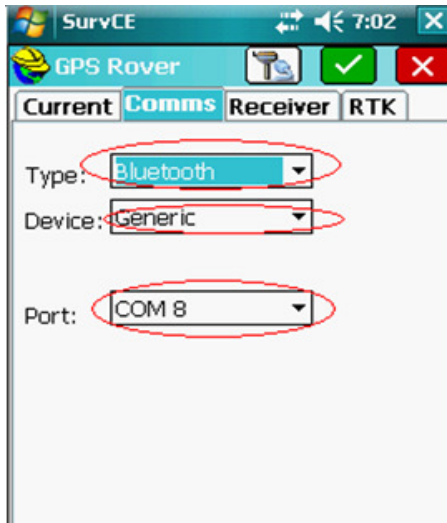
Second, move to **Equip Tab**->**GPS Rover**.

Appendix F.1-2



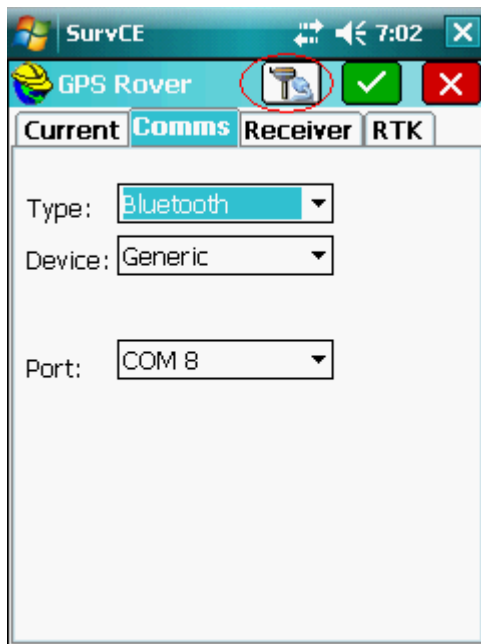
Third, in the **Current Tab**, please choose CHC in the Manufacturer list and choose the right receiver type in Model list


Appendix F.1-3



Fourth, in the **Comms Tab**, Please choose **Bluetooth** in the **Type** list, **Generic** in the **Device** List and choose the right COM in the **Port** list

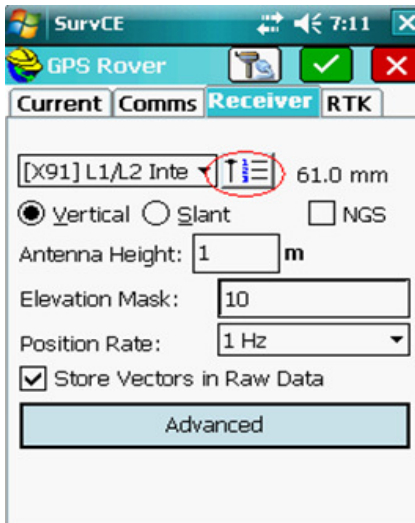
Appendix F.1-4





Fifth, Click  to connect receiver with SurvCE software.

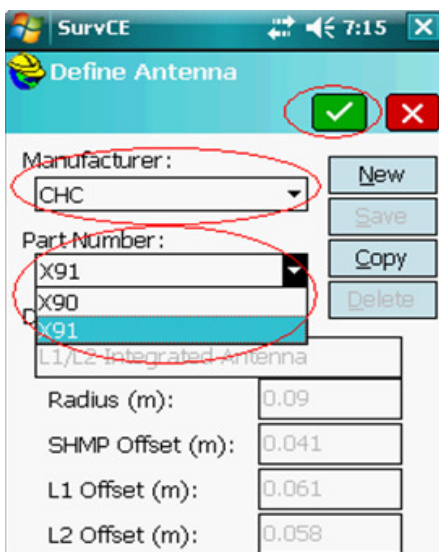
Appendix F.1-5

F.2: Radio mode

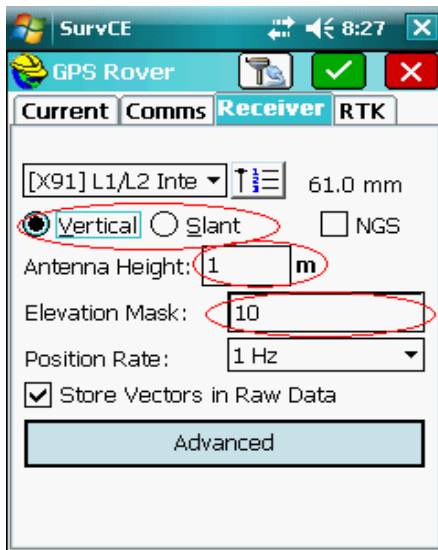


Appendix F.2-1

First, in the **Receiver Tab**, Click icon  to choose the right internal antenna height type and then click icon 

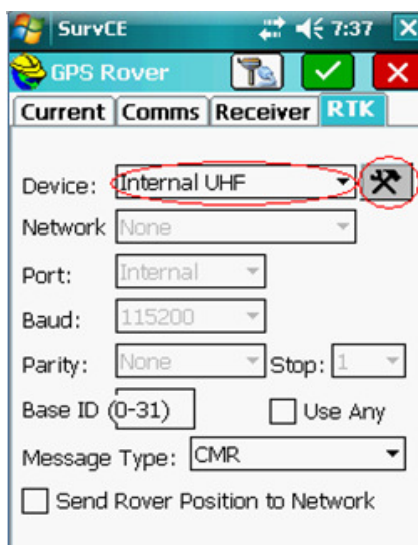



Appendix F.2-2



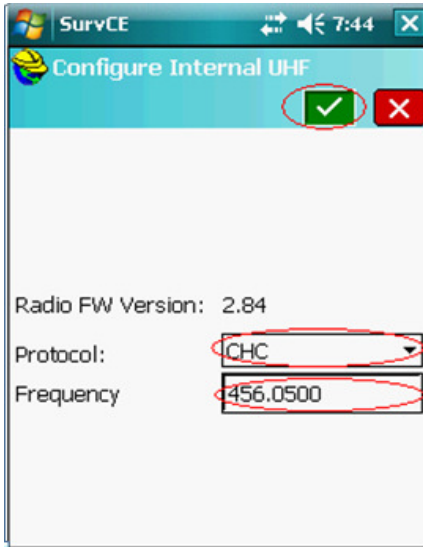
Second, choose the way how measuring the antenna height and input the value of Antenna height and Elevation Mask.


Appendix F.2-3



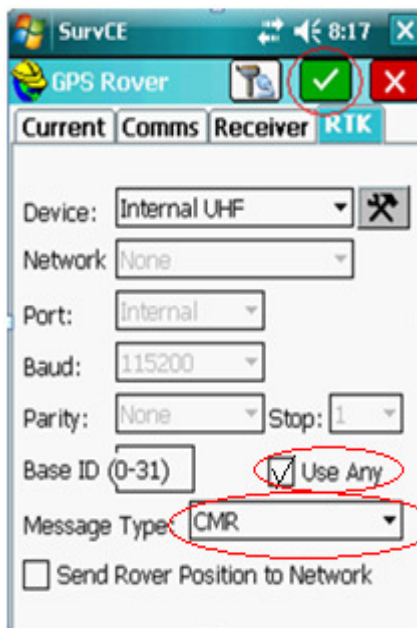
Third, in the **RTK Tab**, please choose **Internal UHF** in the **Device** list and then click icon , and then the **Configure Internal UHF** Window comes out as F.2-5.

Appendix F.2-4



Fourth, please choose the same Protocol and Frequency as the Base Datalink Radio, then click icon .

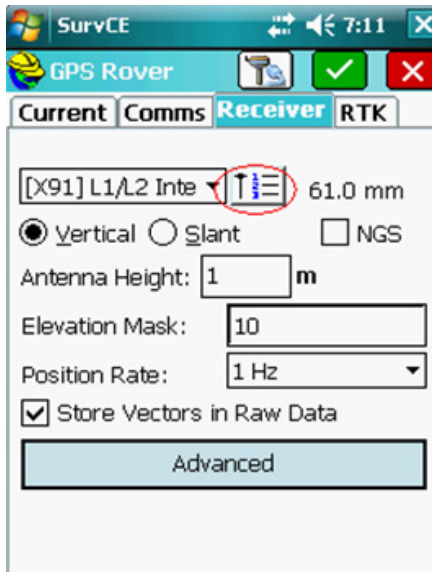
Appendix F.2-5





Fifth, choose the same **Message Type** as the base station send out in the list and make the box **Use Any** checked, after all the configuration is done, click Tab .

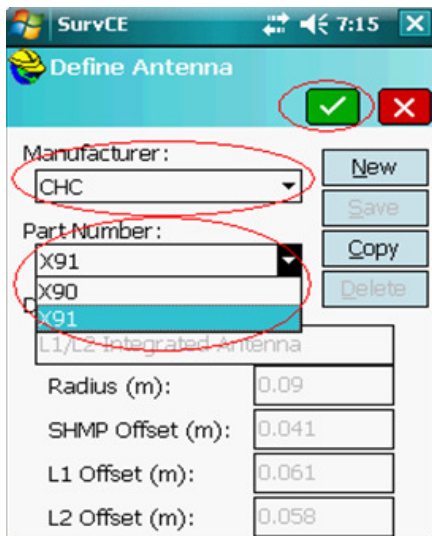
Appendix F.2-6

F.3 CORS mode (Make sure your PDA log on the Internet.)

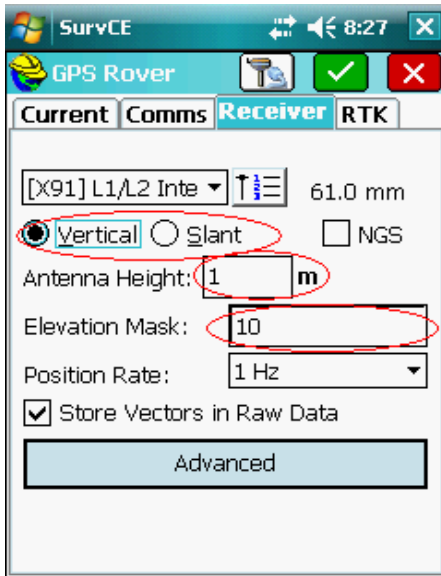


Appendix F.3-1

First, in the **Receiver Tab**, click icon  to choose the corresponding internal antenna height type as in F.3-2, and then click icon .

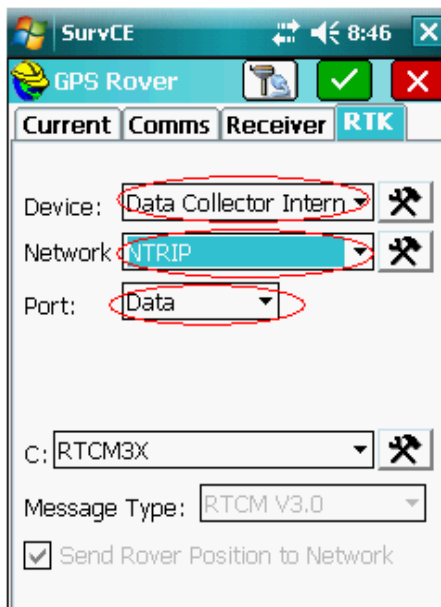


Appendix F.3-2




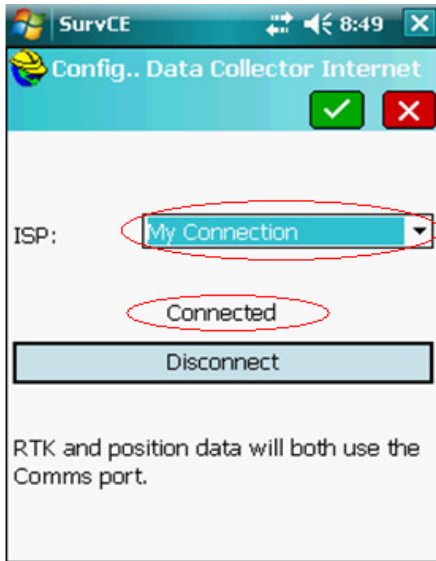
Appendix F.3-3

Second, choose the way how measuring the antenna height and input the value of the antenna height and Elevation Mask.




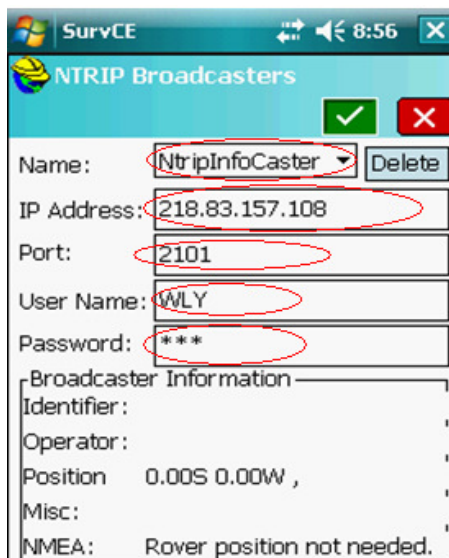
Appendix F.3-4

Third, in the **RTK Tab**, please choose **Data Collector Internet** in the **Device list**, **NTRIP** in the **Network list** and **Data** in the **Port list**. By clicking icon  in the **Device**, then the Configuration Data Collector Internet as F3-5 comes out.





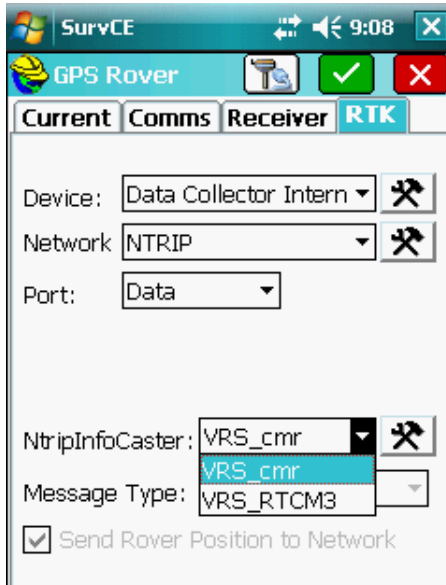
Appendix F.3-5

Fourth, please choose **My connection** in the **ISP** list and make sure the status is connected, then click icon 



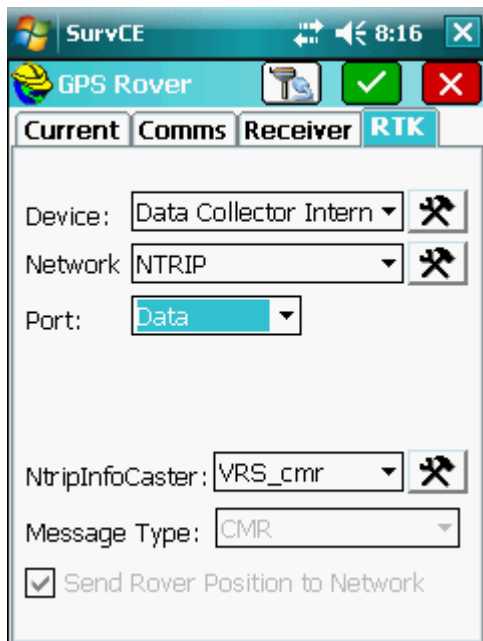
Appendix F.3-6

Fifth, click the icon  of **Network** in F.3-4,, then the **NTRIP Broadcasters Window** as F.3-6 comes out, then please choose **NtripInfoCaster** in the **Name** list and input the **IP Address**, **Port**, **User Name** and **Password** of the CORS center. Finally, please click icon 




Appendix F.3-7

Sixth, the Source List can be selected from the **NtripInfoCaster** and the corresponding message type will be shown in the **Message Type**.



Appendix F.3-8

Seventh, after all the configuration is done, click .