



# KOLIDA K1Pro Positioning System User Guide



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## **K@ĹIDA**

K1Pro

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# **Chapter I Brief Introduction**

In this chapter you will have a brief knowledge of KOLIDA Company and K1Pro measurement system.

## **§1.1 Introduction**

K1Pro

Welcome to KOLIDA Instruments Co., Ltd, which is China's leading manufacturer of surveying equipment including GNSS receivers and Total Stations, etc. To know more about KOLIDA, please visit our official website <u>http://www.kolidainstrument.com/</u>.

In the guide, we'll show you how to operate the K1Pro RTK system as well as the accessories. We recommend you to read the guide carefully before getting started.

## **§1.2 Applications**

*Control Survey:* In static measurement with dual frequency K1Pro we can get high accuracy result, which is valuable in deformation monitoring and control point measurement.

*Highway Survey:* In RTK measurement with K1Pro, we can use K1Pro to do the work such as road survey, topo survey, mapping, cross section measurement and so on.

*CORS Connection:* K1Pro can provide stable and convenient network data communication with all the CORS system.

*Data Acquisition:* Along with KOLIDA field survey software (app), K1Pro can have a quick and accurate data acquisition.

*Stakeout*: Along with KOLIDA field survey software(app), K1Pro can achieve point stakeout, line stakeout and CAD stakeout.

*Power Survey*: The anti-interference feature of K1Pro enables us to do the powerline survey. *Marine Survey*: K1Pro can connect to echo sounder to do the marine survey.

## §1.3 Features

#### **Intelligent Platform**

Combining Linux system and KOLIDA cloud service, K1Pro is an intelligent system. Users are able to do register, upgrade and configurations by remote.

#### **Full Constellations Tracking**



With 336 GNSS channels solution, the usability of Glonass & Galileo satellites is greatly improved, so in harsh environment K1Pro is able to track more satellite than other receivers and provide more reliable positioning result.(672 channels optional)

#### **IMU Survey**

Thanks to the inertial measurement technology, K1Pro allows user to do a tilt survey in 2-4cm accuracy with a maximum tilt angle of 60 °. Centering is not a must and magnetic environment won't effect on the accuracy of tilt survey.

#### Star-Link

2cm Accuracy Star-Link correction service is available now! After subscribing to it, surveyors can work almost anywhere in the world without a base station or VRS network.

(Need subscription)

#### Star-Fill

This new function will let you continue working a few minutes when radio or mobile signal is becoming very poor or even lose in blind area, the accuracy is down to 2cm.

#### Bluetooth

Equipped with Bluetooth 4.0 module, K1Pro is able to build stable BT connections with both android and windows mobile devices.

#### WiFi

WIFI AP mode enables us to access to K1Pro' WEB UI and WIFI client mode enables K1Pro to connect to Internet downloading corrections.

#### **Advanced Built-in UHF Module**

K1Pro UHF module supports all the mainstream radio protocols in the market; and also supports radio router and radio repeater functions.



#### Speed Dial

Based on Linux platform and PPP dial up technology, K1Pro can have a fast and stable network connection.

#### **Intelligent Interaction**

We have two ways to access to K1Pro's WEB UI to config receivers, by WIFI and by USB network port mode.

#### Attractive OLED Display

1" colorful OLED screen can display K1Pro' working status.

#### **Smart Voice Guide**

K1Pro now supports, English, Chinese, Turkish, Korean, Spanish, Russian, Portuguese voice guide. In the future, we'll support more language.

#### Large capacity power support

10000mAh Non-removable battery enables K1Pro to work 14 hours after 6 hours' charging.

#### **Intelligent Storage**

K1Pro can store raw data in formats such as STH, Rinex2.01 and Rinex3.02. The internal 8G memory ensures large size data collection. And OTG function allows K1Pro to use external flash disk for data storage.

The maximum storage rate is up to 50Hz.

#### Amazing Housing

With innovative design, K1Pro's shell is using magnesium alloy materials.

#### K1Pro NFC Function



The NFC chip enables the quick touch and BT connection between controller and K1Pro.

#### **Cloud Service**

The cloud service can achieve real time online upgrade, register and remote check.



## **Chapter II** Hardware Structure

In this chapter, we can have knowledge on K1Pro hardware structure and basic function.

## §2.1 Components of The Receiver

K1Pro size is 163mm in diameter and 96mm in height. The whole shell is made of magnesium alloy material, which makes K1Pro more rugged and durable. Two physical buttons and one 1-inch OLED screen in the front panel makes K1Pro easy to operate.

## §2.1.1 Front Panel



Ref	Component	Description
1	Indicators	Indicates the working status for receiver
2	F Key	Page up/down, selection button
3	Power Key	Power on/off receiver, confirm button
4)	OLED Display	Display the working mode and status of receiver

## Indicators

The indicators are located at the left side of front panel, for details meaning please check the table below.

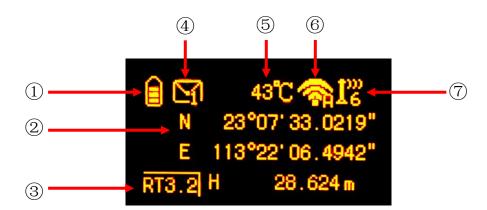


Component	Description			
WIFI	Flashes in red to indicate that WIFI hotspot is broadcasting normally			
	as AP mode.			
DATA	UHF mode: Flashes in red to indicate that the signal is			
	receiving/transmitting with the interval			
	Network mode: 1) Fast flashes in red to indicate that the receiver is			
	dialing; 2) Flashes in red with the signal receiving/transmitting			
	interval after successful dial			
	WiFi mode: 1) Fast flashes in red to indicate that the receiver is			
	establishing WiFi connection; 2) Flashes in red with the signal			
	receiving/transmitting interval after successful connection			
REC	Flashes in red to indicate that static data collection is ongoing			
BT	Keeps in red to indicate that Bluetooth connection is established			
PWR	Keeps in red to indicate the remaining power is enough. Flashes in			
	red to indicate the remaining power is not enough, and K1Pro needs			
	to be charged.			

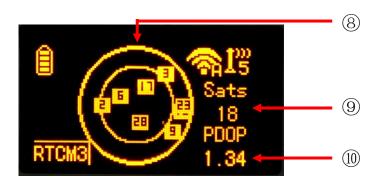
## Display and main interface

Power on K1Pro, and after initialization, K1Pro will access to the skyplot interface while detecting satellites. And then we will hear the voice indication about the current working mode. And 10 seconds later, the interface will switch to display coordinates and other information such as skyplot, the number of satellites and PDOP value.





**Coordinates page** 



Skyplot page

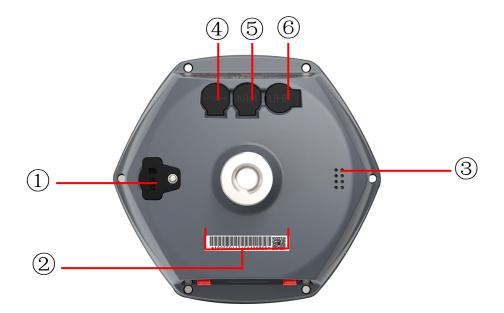
Ref	Component	Description	
1)	Battery symbol	Display the remaining power in real-time	
2	Coordinates	Display the coordinates	
3	Solution/Message type	In base mode, it will display the base's transmitted correction message type; in rover mode, it will display the rover's current solution	
(4)	Message symbol	The message symbol will appear automatically if receiver gets something error, such as error message. Press F key to read the message and press F key again to cancel	
5	Temperature	Display the temperature of receiver in real-time	
6	WiFi symbol	Display the WiFi status, when it shows , that means the receiver is establishing WiFi connection as WIFI client, and if the WIFI successfully connected the	

K1Pro		<b>K⊕ĹID</b> A
		symbol will change to be ; when it shows , that means the receiver is broadcasting its WIFI hotspot (We recommend to turn it off while unused.)
$\bigcirc$	Data link symbol	K1Pro will indicate the current used datalink at this
		location. 122 means internal UHF mode and the current channel, 126 means the GPRS mode, 11 means
		dual-emitting mode, means externl device mode
8	Skyplot	Display the satellites distribution
9	Satellites	The value under Sats indicates the number of satellites
10	PDOP	Display current PDOP value

## §2.1.2 Side View



## §2.1.3 Lower Housing



Ref	Component	Description
1	SIM card Slot	Where we can insert a SIM card when the receiver is
		set in GPRS mode
2	Serial number of the	Apply for a registration code, Bluetooth ID
	receiver	
3	Voice indicator	Mode setting and working status prompt
4	7-pin port	USB port, OTG interface and Ethernet port
5	5-pin port	Power supply, differential correction communication
		and serial port to access K1Pro'receiver data
6	UHF Port	Insert UHF antenna

## **§2.2 Physical Key Operation**

### **§2.2.1 Front OLED Interface**

After K1Pro is powered on, press F key once to access to the configuration interface, where we can do Mode Select, Set Datalink, System Option, WIFI Config, UHF Info, Config Mode, Power Off and Quit.



Press F key to move the config option from one to another, and press Power key to confirm.



### **§2.2.2 Mode Select**

In the configuration interface, press F key to access Mode Select option and press Power key to confirm. And then we can set the working mode as Base, Rover and Static.



#### **Static Mode Setting**

Press F key to select Static mode in Mode Select Interface and press Power key to confirm.

And then press power key again to access Record Option where we can set the point name, antenna height, sample interval, record mode and data type.



What we should do in the next is setup all the parameters for static mode. Press power key once and enter Record Option page, all the parameter items are displayed here including point name,



antenna height, sampling interval, record mode and data type.

**Site:** this is point ID for static, and it is the last 4 digits from serial number, but you can edit it if you choose this item, there are 0-9 and A-Z for each digit.

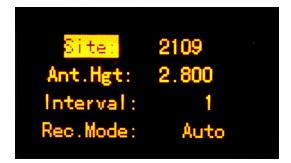
Ant.Hgt: This is the antenna height measure from ground point to measurement tape

Interval: This is the sampling rate for raw data storage

**Rec.Mode:** Auto indicates to collect static data automatically when the environment is OK; Manual indicates to start collection manually.

**DataType:** This is used to choose the data format for raw data storage, such as STH, Rinex2.01 and Rinex3.02

Press F key to move to **Edit** option and press power key to confirm, here you can select the item to edit by pressing F key. For example, press F key to move to Data type item and press power key to setup what kind of data format we are going to record, press F key to move to Rinex2.x or Rinex3.x and press power key to confirm, after that, press F key to move to OK option and press Power key to finish setting and return to the coordinate/skyplot page.

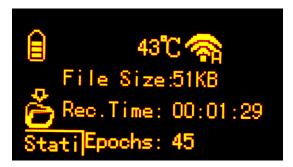


After the receiver starts to record static data, the recording information (file size, recording time and the epochs) will show on the screen.

File Size: Real-time display the size of data file

Rec.Time: Real-time display the recording time

Epochs: Real-time display the quantity of epochs receiver already obtained





*NOTE: Please make sure the static parameters are the same when there are several receivers to collect static data at the same time.* 



#### **Base Mode Setting**

Press F key to select Base mode in Mode Select Interface and press Power key to confirm.



#### **Start Base Option**

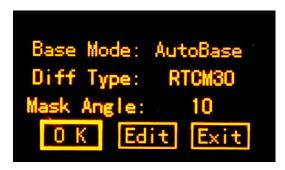
This option is to set up base transmission parameters.



Base Mode: Manual, Repeat and AutoBase for optional to start the base station.

**Diff Type:** This is the correction format which base support to transmit, there are RTD, RTCM23, RTCM30, RTCM32, CMR, SCMRX for optional.

**Mask Angle:** The minimum GPS satellite elevation angle permitted by a particular receiver design. Satellites below this angle will not be used in position solution. 10-15 degree mask angle is recommended.





#### **Record Option**

This is used to set raw data collection parameters for base station.



#### **Rover Mode Setting**

Press F key to select Rover mode in Mode Select Interface and press Power key to confirm.



#### **Rover Setting**

This is used to configure the mask angle and SBAS satellite view for rover receiver



**Mask Angle:** The minimum GPS satellite elevation angle permitted by a particular receiver design. Satellites below this angle will not be used in position solution. 10-15 degree mask angle is recommended.

SBAS SV: This is used to control the rover receiver to track the SBAS system or not.



#### **Record Option**

This is used to set raw data collection parameters for rover station.



## §2.2.3 Datalink Setting

KOLIDA K1Pro is integrated with built-in UHF radio module, cellular module, bluetooth and WIFI, etc. K1Pro also can connect to external radio. When datalink is not used, we can close datalink to save power.



In the configuration interface, press F key to access Set Data Link option and press Power key to confirm. And then we can set the data link as UHF, Cellular Net, Bluetooth, Dual Transmitting, WIFI, External(radio) and Close datalink.





#### K1Pro UHF Setting

After selecting UHF option and in the configuration interface, we can set the channel, air baud rate, communication protocol and power for internal UHF.



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

**Air Baud Rate:** This represents the radio transmission rate of data, the higher value, the bigger size of data can be transmitted per second. 9600 is the recommended air baud rate to use.



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



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



#### K1Pro Cellular Net Setting

This mode is to use the internal cellular module that connects to internet and access to reference station for the corrections.



#### **Dual Transmitting Mode**

This mode enables Base station to transmit corrections by internal UHF and cellular net at the same time.



#### **Bluetooth Mode Setting**

This mode enables rover to access the reference station for corrections by the internet of data collector.





#### K1Pro WIFI Datalink Setting

This is to use WIFI as the datalink that connect to the internet and access to reference station for corrections.



#### **External Device**

This mode enables receiver to connect external radio.



### **Close Datalink**

This option is used to turn off all of the transmission method for development and customization, usually we keep all the datalink activated.





## §2.2.4 System Setting

In the configuration interface, press F key to access System Option and press Power key to confirm. And then we can do configurations including Language setting, Voice option, self-check, online service, Online Option, Other Option and Copy Static File items.



#### Language

In language interface, we can set the receiver language into Chinese, English, Russian, Korean, Spanish, and Portuguese, Etc.



#### **Voice Option**

In voice option interface, we can set the voice indication and volume.





#### System Info

In system info interface, we can check receiver information including ID(serial number), firmware version, expire date and remaining memory.



#### Self-Check

This is used to check whether there is something wrong with the internal modules such as OEM board, internal UHF, cellular module and Bluetooth module.



#### **Online Option**

This online service option is used for registration and upgrade firmware online for KOLIDA K1Pro, it is very convenient that you don't need any more PC software to do this.



#### **Other Option**

In this page, there are USB mode, Display SV and Power items displayed.



**USB Mode:** When we connect K1Pro to PC by 7-pin USB cable, there are two kinds of USB mode for selection: USB Disk and Ethernet (USB Network).



If USB Disk is selected, then K1Pro' internal memory will display in PC, and we can access to the memory to copy static data.

If Ethernet option is selected, then we can access to K1Pro' WEB UI by inputting IP 192.168.155.155, username (admin), password (admin) in browser.

① 不安全   10.1.1.1/login_En.php			0	• ☆	Ŧ	;
		简体	(中文   E	Inglish	帮助	
	GNSS Web Server					
	Username:					
	Login Reset					



**DisplaySV:** DisplaySV enables us to decide which satellite constellation displayed in skyplot page on screen. The default setting is to display GPS.



**Power:** If we select Saving, when there's no operations in a long time, the screen of K1Pro will turn off to save power automatically. And we can press any key to exit power saving mode.

	Normal Saving
Power :	odering

#### **Copy Static Files**

In this mode, we set the USB mode as USB disk first, then we can use OTG cable to connect flash memory to K1Pro to copy static data directly from K1Pro' internal memory.





## §2.2.5 WIFI Config

K1Pro

In the configuration interface, press F key to access WIFI Config and press Power key to confirm.



#### WIFI Info

If the WIFI working mode is selected to be "**Client**", the connected WIFI information will be displayed at WIFI Info page.

**Connected SSID:** This is the connected WIFI SSID which connects to internet.

**IP:** K1Pro will generate an LAN IP address for accessing its internal web UI page after connecting to the WIFI.



If the WIFI working mode is selected to be "AP", the WIFI hotspot information will be displayed at WIFI Info page.

**WIFI SSID:** This is the WIFI hotspot SSID which broadcasted by K1Pro, it is named with KOLIDA\_xxxx (xxxx is the last 4 digits of SN).

**IP:** This is the default IP address which is used for the internal web UI access.





Search the WIFI SSID broadcasted by K1Pro with smartphone or laptop and connect it, then input the IP address 10.1.1.1 into the address bar of explorer and access to the web UI of K1Pro

ull中国联通 令 ∜ ① Login	下午 2:17	€ <b>18</b> ∰ С ¢	·III 中国联通 令 ① GNSS	下午 2:17	© <b>1</b> ≌∰ (- ¢°
	CRSS Web Server		Index and a second	Addaministry in the Hyperbolic State of the Hyper	AP 1157000         Repair Hits AM           HIDE 120         HIDE 120           Base 2 400000         HIDE 120           Base 2 400000000         HIDE 120           Base 2 4000000000000         HIDE 120           Base 2 400000000000000000000000000000000000
<	> = (		<	> ≡	

#### WIFI Option

This is used to turn on/off the WIFI and setup what working mode of WIFI, such as AP (WIFI hotspot) and Client.



#### WIFI working mode setting

For the WIFI working mode, it is not only to be the hotspot, but also to be a datalink that help KOLIDA K1Pro to connect to internet and obtain corrections from reference station.





**AP:** This item means the WIFI hotspot broadcasted by K1Pro for mobile terminals such as smartphone or tablet to connect and access the Web UI.

**Client:** If this item is selected, K1Pro will connect to the internet via WIFI connection and then download the corrections from reference station.

REMINDING: Turn off the WIFI is recommended if it is unused.

#### **§2.2.6 Datalink Info (only for Base/Rover)**

Under Base or Rover mode, there will be an additional option to view the information of current used datalink.

#### **UHF Info**

If the internal UHF mode is setup for Base or Rover, the **UHF Info** item will be displayed at main configuration page, move the select box to this item and press power key to view the information.



#### **Network Info**

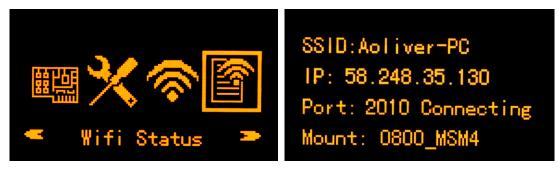
If the Cellular Net mode or Dual Trans mode is selected as current datalink for Base or Rover, the **Network Info** item will be displayed at the main configuration page, choose this item and get into its page to view more information.





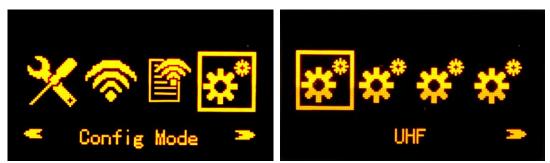
#### **WIFI Status**

If the WIFI is selected to be current datalink for Base or Rover, the **WIFI Status** item will be displayed at the main configuration page, press F key to move the select box to this item and then press Power key to enter its page to view more information.



### §2.2.7 Config Mode

This option is used to configure the modem-direct-connect mode for receiver debugging or problem diagnosis. UHF, Cellular Net, Sensor Config and GNSS OEM are contained in this mode.





## §2.2.8 Power Off

There are two ways to power off receiver. One is to hold power button for 3 seconds directly; the other is to Press F key in configuration interface to access Power Off interface. In Power Off interface, we can select OFF to power off receiver or select RESET to restart receiver.





## **ChapterIII Web UI Configuration**

## **§3.1 Overview**

With the help of smart embedded Linux operating system and KOLIDA intelligent cloud technology, we can configure and monitor the status of K1Pro on WEB UI. There are two ways to access K1Pro' WEB UI, by WIFI hotspot and by USB Ethernet mode.

#### WIFI mode

First of all, get into WIFI Config option to open the WIFI hotspot by choosing AP option in WIFI Option.

Then use smartphone, tablet or laptop to connect the WIFI hotspot (KOLIDA\_xxxx) and input the default IP (10.1.1.1) into explorer, input the default username and password for login.

#### USB mode

First of all, choose the Ethernet option in "System Option—Other option—USB Mode" to make the 7-pin port be an ethernet port, then connect K1Pro with computer via USB cable. Run the IE explorer and type IP 192.168.155.155 into IP address bar, then input the default username (admin) and password (admin) for login.

NOTE: install the corresponding driver to activate this function, the driver can be downloaded from official website.

#### **Remote Login**

If users would like to remote login the web UI of K1Pro, then K1Pro has to connect to the internet and forward its 80 port to the public network. For example, if the IP address 222.196.35.76 is the public network IP which K1Pro has connected, and the 80 port of K1Pro has been bounded with 8000 in public network, then users can input the public network IP address into IE explorer along with the forwarding port for login. (http:// 222.196.35.76:8000)



NOTE: please use the IE explorer for the Web UI login.

In this chapter, we will take "using the WIFI hotsopt to login the Web UI" for example.

Turn on the WIFI hotspot of K1Pro then search for the SSID by computer. Then connect the WIFI hotspot from K1Pro.

无线网络连接	^	*	
SOUTH-AP	ա		
Southgnss	all		
鍠碉紒浣犱細鍞卞皬鏄熸槦鍚楋紵	ա		
xm8	ա		
2-south	ыİ		
ОРРО КЗ	ыI	II	
kongtiao	all		
123	.al		
KOLIDA_8393	31		
zhimi-airpurifier-ma2_miap3db2	300	Ŧ	
打开网络和共享中心			

## **§3.2 Web UI main interface**

After connecting to K1Pro' WIFI hotspot, we can input 10.1.1.1 in browser and the login page will appear.

① 不安全   10.1.1.1/login_En.php		야 ☆ 🍵
		简体中文   English   帮助
[ IP Address ]		
	GNSS Web Server	
	Username:	
	Password:	Username/password
	Login Reset	

K1Pr	0			K	<b>LIDA</b>
COME	1 admin	Location:			
WEL	SG6052117132109 [logout]	Lat: 23°7′33.001194″N	Lon:113° 22′ 6.455099″ E	Alt: 23.968994 m	Ellipsoid: WGS-84
_	Status 🗾	RTK Status:			
	System Information	Solution: Autonomous	Correction Delay: 99	HRMS: 1.149	VRMS : 1.797
	Work Status 📃	Base X: -2334973.714300	Base Y: 5384954.226300	Base Z: 2487861.272100	Base ID: NONE
	Position Information	Diff. format : RTCM			
*	Configuration 🕂	Tracked Satellite(22):			
×	Satellite Information 🛛 🕂	GPS (7):1, 2, 3, 6, 17, 28, 30		GLONASS (7): 2, 3, 14, 15, 16, 1	7, 18
11	Data Record 🛛 🕂	BDS (8) : 1, 3, 6, 7, 8, 11, 12, 14		GALILEO (0):无	
₽	Data Transfer 🛛 🕂	SBAS (0):无		QZSS (0):无	
$\oplus$	Network Config 🛛 🛨	Used Satellite(22):			
Ĩ	Radio Config 🛛 🛨	GPS (7): 1, 2, 3, 6, 17, 28, 30		GLONASS (7): 2, 3, 14, 15, 16, 1	7, 18
£	Firmware Update 🛛 🛨	BDS (8) : 1, 3, 6, 7, 8, 11, 12, 14		GALILEO (0):无	
<b>ð</b> r:	User Management 🛛 🛨	SBAS (0):无		QZSS (0):无	
?	Heln 🕂	Receiver Clock:			

In the Web UI home page, Status, Configuration, Satellite Information, Data Record, Data Transfer, Network Config, Radio Config, Firmware Update, User Management and Help are listed at left side. And the positioning information including positioning information and satellites are diplayed at right side.

Ref	Component	Description		
	Status	Positioning information, satellite tracking and the others will		
_		be displayed in this page		
31	Configuration	It contains registration for receiver, base configuration,		
~		antenna configuration, satellite configuration, receiver		
		configuration and system configuration.		
ж	Satellite Information	Display and control the satellites are used or not		
<u></u>	Data Record	Configure the parameters for static mode and raw data		
download				
	Data Transfer	Contains NTRIP configuration, TCP/IP configuration and data		
品		transferring with PC		
4	Network Config	Contains network parameters configuration, WIFI		
		configuration and the other functions		
1	Radio Config	Configure the parameters and frequency for radio modem		
	Firmware Update	It is used to upgrade the firmware for receiver and each		
-		modem		
<b>9</b> c.	User Management	Add and manage the Web UI users		
OF 1				

K1Pro	)		<b>K@LIDA</b>
?	Help	Offers solutions	

4

## §3.2.1 Status

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

#### **System Information**

In this page, information such as serial number, hardware ID, MAC address, firmware version and so on are displayed.

WELCOME	admin SG6052117132109 [log	out]	> System Informat	ion
	Status		Receiver Type:	G6
	System Information		Serial Number:	SG6052117132109
	Work Status		Hardware ID:	00F0000000000040031112
	Position Information	Ξ	Software ID:	0
×	Configuration	<b>••</b>	Ethernet MAC:	00:21:17:13:21:09
	Configuration		Ethernet IP:	192. 168. 1. 1
*	Satellite Information	•	Wi-Fi IP:	10. 1. 1. 1
.11	Data Record	<b>H</b>	Bluetooth MAC:	00:80:25:49:65:58
显	Data Transfer	<b>B</b>	Hardware Version:	GALAXY004
		_	Firmware Version:	1.05.150701.RG60GL
•	Network Config	•	OEM Version:	00493
1	Radio Config	•	Web Version:	GALAXYWeb. 1. 5. 0601
£	Firmware Update	•	Expired Data:	20150929
ð:	User Management	•		

#### **Work Status**

K1Pro' status such as working mode, datalink, receiver temperature, remaining power and the free memory is displayed on this page

K1Pro	0			<b>K</b> @LIDA
WELCOME	admin SG6052117132109 [lo	gout] > Work S	tatus	
	Status	Wor	k Mode: Rover	
	System Information	Da	talink: None	
	Work Status		rature: 43.90 °C	
	Position Information		rature: 47.00 °C	
×	Configuration		y Type: Internal Battery	
	O a ta llite da fa una a ti a u		Voltage: 0.39 V	
×	Satellite Information	Storag	e Type: Internal Memory	
.11	Data Record	<b>•</b>	Power Remaining	Disk Capacity
显	Data Transfer	<b>•</b>	Remaining 30% Power	7271M Used 170.00M Free
۲	Network Config	•		
1	Radio Config	•		
£	Firmware Update	•		
ð:	User Management	•		
?	Heln	<b>A</b>		

#### **Position Information**

In this page, we can have a clear glance at current K1Pro position and detected satellites information.

ME	admin S06052117132109 [logout]	> Position Information			
	Status 🔽	Location:			
	System Information	Lat: 23°7′33.001759″N	Lon: 113° 22′ 6.455537″ E	Alt: 23.879395 m	Ellipsoid: WGS-84
	Work Status	RTK Status :			
	Position Information	Solution: Autonomous	Correction Delay: 99	HRMS: 1.127	VRMS: 1.908
*	Configuration 🕂	Base X: -2334973.714300	Base Y: 5384954.226300	Base Z: 2487861.272100	Base ID: NONE
*	Satellite Information 🛛 🔒	Diff. format : RTCM			
11	Data Record 🛛 🔒	Tracked Satellite(21):			
믔	Data Transfer 🛛 🕂	GPS (6) : 2, 3, 6, 17, 28, 30		GLONASS (7): 2, 3, 14, 15, 16, 1	17, 18
۲	Network Config 🛛 🛨	BDS (8) : 1, 3, 6, 7, 8, 11, 12, 14	4	GALILEO (0):无	
Î	Radio Config +	SBAS (0):无		QZSS (0):无	
±	· -	Used Satellite(21):			
I	Firmware Update 🔒	GPS (6): 2, 3, 6, 17, 28, 30		GLONASS (7): 2, 3, 14, 15, 16, 1	17, 18
Sr.	User Management 🛛 🕂	BDS (8) : 1, 3, 6, 7, 8, 11, 12, 14	4	GALILEO (D):无	
2	Help				

## **§3.2.2 Configuration**

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and Default Language are contained under Configuration menu. Users are able to configure all kinds of





parameters for KOLIDA K1Pro under Configuration menu, and all the settings are immediately effected after saving.

#### **General Config**

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

ELCOME ac	dmin 36052117132109 <u>[l</u>	ogout]	> General Gonfigur	ation	
	Status		Registration:		
* (	Configuration		Serial Number:	SG6052117132109	
	General Config		Code:	81AF03F346B20711D3D8753275C0EC1856BF	Register
	Base Setup	Ξ	Expired Data:	20160124	
	ntenna Setup	Ξ	Online Registration:	OnlineRegi	
Sa	atellite Tracking	Ξ	Operation Tips:	Use Online Reig Function, please Make Sure Network	s is Work Well!
	ceiver Operate		Mode setting:		
		Ξ		-	
🚿 Sati	ellite Information	•	Work Mode:	Base 💌	
	Data Record	<b>.</b>	Datalink	Radio 👻	
8 0	Data Transfer		Radio Route:	None v	
		_	RTK Record:		
⊕ N	letwork Config	•	1PPS:		
Î I	Radio Config	•	EVENT:		
🏦 Fir	rmware Update	-		12	1

If the code of K1Pro has expired or is going to be expired, please provide the serial number of your K1Pro to your local dealer to apply for another available code, then input the code into the blank or register the receiver online.

Registration:		
Serial Number:	S66052117132109	
Code:	81AF03F346B20711D3D8753275C0EC1856BF	Register
Expired Data:	20160124	
Online Registration:	OnlineRegi	
Operation Tips:	Use Online Reig Function, please Make Sure Network	t is Work Well!

KOLIDA K1Pro is allowed to setup the working mode and datalink from this Web UI that only need the mobile phone or tablet PC is able to connect the wifi hotspot of K1Pro.



<u>K1Pro</u>			N₩LIDA
Mode setting:			
Work Mode:	Rover	•	
Datalink	Radio	-	
Radio Route:	None	•	
RTK Record:			
1PPS:	✓		
EVENT :			
EVENT Polarity:	Negative		
	Enter	Cancel	

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

**Datalink:** In the list, we have multible datalink options such as Radio, Network, External, Bluetooth and WIFI.

Radio 👻
one
adio
etwork
xternal
ual
lue Tooth
IFI
SD

**Radio Route:** This function enables K1Pro to connect to reference station by network and transfer reference station's differential corrections to other receivers by radio.

None 👻
None
Inner Radio Route
External Radio Route

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

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

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

**EVENT Polarity:** EVENT input method.

#### **Base Setup**

When K1Pro works as a base, the basic configuration for base can be setup in this page. Users can input the correct coordinates or capture a current position for the base. Also users can define



what kind of correction format is transmitted.

WELCOM	admin SG6052117132109	[logout]	> Base Setup						
-	Status	<b>E</b>	CMR ID:	29					
*	Configuration		RTCM2. × ID:	61					
	General Config		RTCM3.x ID:	2109					
	Base Setup		Lon:	113 °	22	,	6.508901		•
	Antenna Setup Satellite Tracking		Lat:	23 °	7	,	32.964771	"	( <b>•</b> ) N
	Receiver Operate		Alt:	31.427246	1		1	m	
	System Setup	Ξ		Position	Spar	e			
*	Satellite Informatic	on 🛨	Base Start Mode:	Automactical	lly Start B	Base	by Current point	•	
i.u	Data Record	<b>H</b>		StartBase	StopBa	ase			
显	Data Transfer	<b>E</b>	Correction:	RTD	•			•	
	Network Config	Đ	POP Value:	3				-1	
Î	- Radio Config	E		Starting					
t	5		Status:	Starting					

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

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

Spare: This is used to the repeat station

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

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

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

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

#### **Antenna Setup**

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



K1Pro			IDA
admin AB109A126321291 [logout]		➤ Antenna Setup	
🖵 Status	•	Antenna NO# : AB109A126321291	
× Configuration		RINEX : TIANLANGD-K708A	
General Config		Antenna Height : 0.000 n	n
Base Setup	=	MeasuringMethod : Carrier Phase Center	
Antenna Setup		MeasuringMethod : Carrier Phase Center	
Satellite Tracking	=		
Receiver Operation			
System Setup	=		
Receiver Security	-		

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

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

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

## **Satellite Tracking**

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

admin SG6052117132109 [].	ogout]
🖵 Status	Ð
× Configuration	
General Config	Ξ
Antenna Setup	Ξ
	Ξ
Receiver Operate	Ξ
X Satellite Information	<b>H</b>
Data Record	+
😞 🛛 Data Transfer	+
Network Config	<b>E</b>
👔 Radio Config	Đ
🏦 🛛 Firmware Update	+



## **Receiver Operate**

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

admin sG6052117132109 [10	ogout]	> Receive	r Operate		
🖵 Status	•	Module Se	lfCheck:		
× Configuration		Item	Module	Operation	Status
General Config		1	OEM	Check	No Action
Base Setup	=	2	Radio	Check	No Action
Antenna Setup	=	3	NetModule	Check	No Action
Satellite Tracking	Ξ	3	NetModule	Uheck	No Action
Receiver Operate		4	WiFi	Check	No Action
System Setup	Ξ	5	Bluetooth	Check	No Action
🚿 Satellite Information	<b>1</b>				
Data Record	•	6	Sensor	Check	
😞 🛛 Data Transfer	•			Che	zk all
Network Config	•	D. C. J. C		dan tu ana t	
😨 Radio Config	•	Default S	ettings:	Uip:This act	ion will reset all parameters to the factory default
Eirmware Update			Clea	in EPH	Factory Default

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

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

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

**Reboot:** Click this button to restart the receiver.

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

#### System Setup

In this interface, we can set receiver voice prompt, voice volume, power saving mode, USB mode and default language.



LCOME	admin KB10A4126337292 [lo	gout]	> SystemSet			
	Status	Ð	Voice :			
*	Configuration		OEMUserDefEnable:	Yes	• No	
	General Config		Volume:	Medium		•
	Base Setup	Ξ	Power:	Normal		•
	Antenna Setup Satellite Tracking		USB:	USB		•
	Receiver Operation	Ξ	Default Language:	English		•
	System Setup		Time Zone(h):	+8.0 (Beijing, China)	)	•
	Receiver Security		FixedMode:	Narrow		•
*	Satellite Information	•	NmeaHeader:	GN		•
.11	Data Record	<b>H</b>	SelfDefine Module:	NULL		
뮻	Data Transfer	•		NULL		_
۲	Network Config	<b>•</b>	Authority Code:			
Î	Radio Config	•	Authority Zone:	С		
±	Firmware Update					
-		-		Enter	(	Cancel

**Voice Prompt:** Check on this box to turn on the voice guide for K1Pro, cancel it to turn off the voice guide.

Voice Volume: Define the voice volume for K1Pro's speaker.

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

**USB:** This is used to configure K1Pro what kind of mode output from 7-pin port when connect the receiver with computer via USB cable. USB and network port for optional.

Default Language: Configure the default language for KOLIDA K1Pro.

Authority Zone: C means this receiver works in China only/W means it works worldwide

## **§3.2.3 Satellite Information**

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

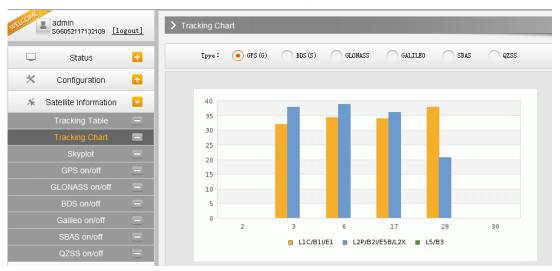
#### **Tracking Table**

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

LCOME	admin SG6052117132109 [los	<u>;out]</u>	≻ Tra	cking Ta	ble								
	Status	<b>.</b>	NO.	Type	Elevation	Azimuth	LISNR	Code	L2SNR	Code	LSSNR	Code	Status
×	Configuration		2	GPS	0.00	0.00	0.00	-	0.00	-	0.00	-	In use
	Ŭ		3	GPS	35.00	52.00	31.80	CA	37.50	P	0.00	-	In use
*	Satellite Information		6	GPS	46.00	272.00	34.30	CA	37.80	P	0.00	-	In use
	Tracking Table		17	GPS	48.00	352.00	33.50	CA	36.10	P	0.00	-	In use
	Tracking Chart	Ξ	28	GPS	76.00	160.00	35.80	CA	19.30	P	0.00	-	In use
		Ξ	30	GPS	0.00	0.00	0.00	-	0.00	-	0.00	-	In us
	GPS on/off	=	2	GLONASS	38.00	68.00	43.50	CA	34.70	P	0.00	-	In us
	GLONASS on/off		3	GLONASS	39.00	140.00	43.50	CA	37.80	P	0.00	-	In us
	BDS on/off	=	15	GLONASS	38.00	226.00	41.70	CA	34.90	P	0.00	-	In us
		Ξ	16	GLONASS	30.00	300.00	37.00	CA	31.90	Р	0.00	-	In us
	SBAS on/off	=	17	GLONASS	26.00	44.00	39.00	CA	0.00	-	0.00	-	In us
	QZSS on/off		18	GLONASS	30.00	328.00	41.00	CA	31.10	P	0.00	-	In us
11	Data Record	•	1	BDS	49.00	128.00	35.50	I	37.40	I	0.00	-	In us
뮰	Data Transfer	•	3	BDS	63.00	188.00	35.80	I	38.50	I	0.00	-	In us
۲	Network Config	•	6	BDS	48.00	158.00	35.90	I	36.90	I	0.00	-	In us
Ī	Radio Config		7	BDS	22.00	188.00	31.50	I	33.80	I	0.00	-	In us
±	Firmware Undate		8	BDS	51.00	14.00	35.80	I	37.10	I	0.00	-	In us

## **Tracking Chart**

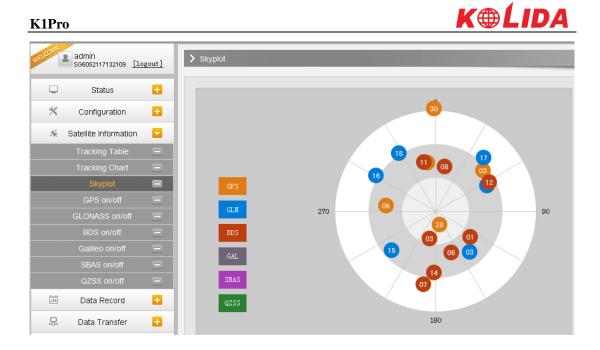
Tracking Chart is to show the used satellites' SNR (signal noise ratio).



## Skyplot

Skyplot is to show the used satellites sky position.





## GPS on/off

For all the running GNSS constellations or the augmentation system, K1Pro allows to configure to use which satellite or not.

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

WELCOME	admin so6052117132109 [lo	gout]
Ţ	Status	Ð
×	Configuration	÷
*	Satellite Information	
	Tracking Table	Ξ
	Tracking Chart	Ξ
	Skyplot	Ξ
	GPS on/off	
	GLONASS on/off	Ξ
	BDS on/off	Ξ
	Galileo on/off	Ξ
	SBAS on/off	Ξ
	QZSS on/off	Ξ
11	Data Record	+
	Data Transfer	<b>H</b>
	Network Config	•
	-	
Ĩ	Radio Config	+
±.	Firmware Undate	<b>•</b>

## §3.2.4 Data Record

The "Data Record" is mainly used to configure all the parameters for receiver in static mode. Much more operations can be done on KOLIDA K1Pro such as storage path, interval, data format and data files download.

## **Recording Config**

The page provides more practical operations for raw data storage.

WELCOME	admin SG6052117132109	[logout]	> Recording Config	
	Status	÷	Storage Option:	Internal Memory
*	Configuration	Đ	Interval:	1 <b>•</b> s
禾	Satellite Informatio	n 🛨	File Interval:	24 • H
.11	Data Record		Data Format:	STH • RINEX2. 0 RINEX3. 0
	Recording Config		Point Name:	2109
	Data Download		Auto Delete:	• Yes No
显	Data Transfer	Đ	Format:	Format Disk
•	Network Config	Đ	Recording Mode:	Auto Recording 🗸
Ĩ	Radio Config	Đ		Start Stop
±	Firmware Update	•	Recording Status:	Recording
25	User Management	t 🚦		
?	Help	Ð		Enter Cancel

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

**Interval:** This is the sampling interval for data storage, 50Hz(0.02s) sampling interval now is available for K1Pro.

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

Data Format: K1Pro can store raw data format as STH, Rinex2.0 and Rinex3.0.

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

**Auto Delete:** When the memory is full, K1Pro will delete previous data files automatically to release space for new collected data.

Format: Click this button to format the internal memory for K1Pro.

Recording Mode: Auto recording or manually start to record.

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

Recording Status: Here shows the status of static data storage.



## **Data Download**

This interface is to download collected raw data.

MECONE admin SG6052117132109 [logor	> Data Downlo	pad			
🖵 Status	🛨 Data So	nurce: 💿 SD Card 💿 USJ	8 File Type: 💿 Si	th 🕜 RINEX	
× Configuration	+ Select	Date:	Get Data		
🚿 Satellite Information	+ Downlos	d Tips:Right click "download	" button>Save as and c	mplete	
🖮 Data Record	Item	File Name	Size	Data	Delete
Recording Config	- 1			上 [Download]	🗙 [Delete]
Data Download	2			🚽 [Download]	🗙 [Delete]
🛃 🛛 Data Transfer	+ 3			🚽 [Download]	🗙 [Delete]
Network Config	+ 4			🚽 [Download]	🗙 [Delete]
Radio Config	+ 5			🚽 [Download]	🗙 [Delete]
-	6			🚽 [Download]	🗙 [Delete]
	+ 7			🚽 [Download]	🗙 [Delete]
🧞 User Management	- 8			🛨 [Download]	🗙 [Delete]
? Help	+ 9			🚽 [Download]	🗙 [Delete]
	10			🛨 [Download]	🗙 [Delete]
	11			🚽 [Download]	🗙 [Delete]
	12			🚽 [Download]	🗙 [Delete]
	10			En 1 17	• (n 1 + 1

## **§3.2.5 Data Transfer**

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

## General

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

K1Pr	0					K@LIDA
WELCOME	admin so6052117132109 [10	gout]	> General			
	Status		Type	Port	Input	Output
×	Configuration	+	Serial	LEMO (115200)	none	Navigation data
	-	_	Serial	BLVETOOTH (115200)	none	Navigation data
*	Satellite Information	÷	TCP/IP 1	172.16.90.195:6800	none	Raw observeation data
11	Data Record	<b>H</b>	TCP/IP 2	172.16.90.195:6060	none	Correction data
₽	Data Transfer					
	General					
	Serial port Config	Ξ				
	TCP/IP Config	Ξ				
	NTRIP Config					
	Data Flow Config	Ξ				
$\oplus$	Network Config	•				
Ĩ	Radio Config	<b>H</b>				
±	Firmware Update	•				
0,		-				

## Serial port Config

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

WELCOME	admin SG6052117132109 [logo	ut]	> Seria	al Port Config				
	Status	8	Item	Serial Port	Baud Rate	Odd/Even	Data Flow	Enable
*	Configuration	8	1	LEMO	115200	None 💙	Navigation Data 🗸	
*	Satellite Information	8	3	BLUETOOTH	115200	None 💙	Navigation Data 🗸	
.11	Data Record	•						
显	Data Transfer				Enter	Cancel		
	General							
	Serial port Config							
	TCP/IP Config	Ξ						
	NTRIP Config	Ξ						
	Data Flow Config	Ξ						

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

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

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

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

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

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

OpenSIC Observation Data: This is the open version of KOLIDA user-defined format



observation data for secondary development.

	Data	Flow
Navi	gation D	ata 🔻
Raw	observeat	tion data
	ection Da	
Navi	gation Da	ata
SIC	Observeat	tion Data
Open	SIC Obser	veation Data

## **TCP/IP Config**

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

**Caster:** If this working mode is selected, K1Pro will be a client to upload the data to a specify server if it connects to the internet by WIFI or GPRS connection with SIM card inserted. Input the specified IP and port for server, and the data format what is uploaded. Then users are able to see the uploaded data on server.

**Server:** KOLIDA K1Pro will upload the data onto internet by the static WIFI if server is selected, then users are able to obtain its dynamic data by accessing to K1Pro through the IP from receiver.

WELCOME	admin SG6052117132109 [10	gout]	<b>&gt;</b> T	CP/IP Config	]					
	Status	•	Item	Work mode	Local port	Server IP	Port	Data flow	Status	on/off
*	Configuration	÷	1	Caster 👻	1111	172.16.90.195	6800	Raw Observeatio: 🕶	Disconnect	<ul> <li>Image: A start of the start of</li></ul>
*	Satellite Information	÷	2	Server 👻	2222	172.16.90.195	6060	Correction Data 👻	Disconnect	<b>~</b>
11	Data Record	Đ	3	Caster 👻	3333	58.248.35.130	2010	Navigation Data 👻	Disconnect	
显	Data Transfer		4	Caster 👻	4444	58.248.35.130	2010	Navigation Data 👻	Disconnect	
		Ξ	5	Caster 👻	5555	58, 248, 35, 130	2010	Navigation Data 👻	Disconnect	
	Serial port Config	Ξ			0000	00.240.00.100	2010		DISCOMPCC	
	TCP/IP Config	Ξ								
		Ξ				Enter	Cano	el		
	Data Flow Config	Ξ								
۲	Network Config	Đ								
Î	Radio Config	<b>±</b>								
£	Firmware Update	<b>E</b>								

## **NTRIP** Config

This is used to configure the NTRIP performance while receiver is going to connect to internet. KOLIDA K1Pro supports complete NTRIP performance including NTRIP Client, NTRIP Server and NTRIP Caster.



KIPro							
WELCOME	admin SG6052117132109	[logout]	> NTRIP Config				
	Status	•	NtripClient:				
×	Configuration	÷	Status :	Disconnect			
*	Satellite Informatio		Active:	•			
			Authentication Mode:	✔ Eagle Mode			
	Data Record	•	NtripClient Address:	58.248.35.130			
	Data Transfer		NtripClient Port:	2010			
	Serial port Config		User:	wmbgps			
	TCP/IP Config	=	Password:	huli			
	NTRIP Config	=	Mountpoint:	0800_MSM4	Get Point	<b>~</b>	
	Data Flow Config		GetPoint Status:	No. Astion			
	Network Config		Getroint Status.	No Action			
	-		NtripServer:				
Ĩ	Radio Config	•	Status '	Disconnect			
£	Firmware Update	. 🕂					
2:	User Managemen	it 🛨	Active:				
	oser managemen		Ntrip Version:	NTRIPv1.0	~		
?	Help	•	Eagle Mode:	✓			

### NtripClient

This function is for Rover in network mode to download corrections from server. We need to input IP, Port, assigned username and password to acquire mountpoint and connect to server. **Status:** This field will display the status of NTRIP connection, connect or disconnect.

Active: Check on this circle to activate this function.

Authentication Mode: These two modes use different protocol standard for the connection, Eagle Mode is KOLIDA standard mode, and TCP/IP Mode is for private network use, usually, choose the Eagle mode for the default setting.

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

NtripClient:	
Status:	Disconnect
Active:	
Authentication Mode:	✓ Eagle Mode TCP/IP Mode
NtripClient Address:	58. 248. 35. 130
NtripClient Port:	2010
Vser:	wmbgps
Password:	huli
Mountpoint:	0800_MSM4 Get Point -
GetPoint Status:	No Action



### NtripServer

This function is for Base in network mode to upload its corrections to server. And then other rovers can connect to the server to download the corrections.

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

Access Point: This field is allowed to user-defined the correction format which base will transfer to the server, such as HHHH\_RTCM30

NtripServer:		
Status:	Disconnect	
Active:	۲	
Ntrip Version:	NTRIPv1.0	
Eagle Mode:		
NtripCaster Address:	58. 248. 35. 130	
NtripCaster Port:	2010	
Vser:	0488	
Password:	3839	
Access Point:	HHHH_RTCM30	

#### NtripCaster

This feature is finally realized on KOLIDA K1Pro, the receiver is equivalent to a CORS system that it generates and broadcasts the user-defined correction for rover if K1Pro connects a static IP address.

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

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

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

## **Data Flow Config**

In this page, users can freely to configure the content and the update rate of data flow that to

**K**@LIDA

output or not to output what kind of data format.

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

WELCOME	admin SG6052117132109 [logo	Data Flow Config	9
_	Status	Navigation Data:	
×		GGA: 1	♥ GSA: 1 ♥ GSV: 5 ♥ GST: 1 ♥
*	Satellite Information	ZDA: 1	BPQ: 10 FJK: OFF GLL: OFF
		RMC : OFF	VTG: OFF
	Data Transfer	SIC Navigation Dat	ita:
	General	PST: 1	♥ GSI: 10 ♥ ESI: 5 ♥ TFI: OFF ♥
	Serial port Config	VCV: OFF	▼ STA: OFF ▼ DEV: OFF ▼ AAT: WhenChanged ▼
	TCP/IP Config	REC: OFF	V DAL: WhenChanged V
	NTRIP Config	Raw Observeation I	Data:
•		Output Interval:	: 1 💌 s
		GPS Ephemeris:	: WhenChanged
Î		GLONASS Ephemeris:	: WhenChanged
£		BDS Ephemeris:	: WhenChanged
Ъr		GALILEO Ephemeris:	: WhenChanged
?	Help	Lonosphere :	: • Yes No

## **§3.2.6** Network Config

The "Network Config" is able to configure the ways and the contents for internet access of K1Pro. GSM/GPRS Config, CSD Config, WIFI Config, Bluetooth Config, Port Forwarding, Router and Network Testing are under the list of Network Config.

## **GSM/GPRS** Config

In this page, all the information of receiver under Rover+GPRS mode will be displayed including the hardware information and dialing status.

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

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



WELCOME	admin SG6052117132109 []	.ogout]	SGMS/GPRS Conf	ig	
	Otativa		Status:		
	Status	•	Signal :	Ψ×II	
*	Configuration	-	ModuleMode:		
*	Satellite Information	•			
.11	Data Record		IMEI:	354550050024757	
炅	Data Transfer		SIM Card Status:	Checking SIM Card	
		_	Registration Status:	Unregist	
•	Network Config		Connection Type:	None	
	GSM/GPRS Config		PPP Dial Status:	Disconnect	
	CSD Config	=			
	WIFI Config	=	Parameter Config:		
	Blue Tooth Config		Active:		
	Port Forwarding		APN :	cmnet	
	Router		APN User Name:		
	Network Testing		Arn User Name.	card	
Ĩ	Radio Config	•	APN Password:	card	
£	Firmware Update	•	Dial Mode:	Automatically	Start Dial
ð:	User Management	•			
				· · · · · · · · · · · · · · · · · · ·	

## WIFI Config

This is mainly used on the WIFI configuration for KOLIDA K1Pro, there are AP mode and Client mode for optional.

## AP:

This is used to enable the WIFI hotspot for K1Pro to broadcast for mobile terminals such as smartphone or tablet to connect and access the Web UI.

Check the box of AP in Work Mode to enable the WIFI hotspot for K1Pro, and define the SSID, password, encryption method and broadcasting channel for WIFI connection.

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



K1Pro		
admin KB10A4126337292 [logout]	> WiFi Config	
🖵 Status 🛨	Active:	$\checkmark$
🗙 Configuration 🔽	Work Mode:	• AP Client
🚿 Satellite Information 🔽		
🛅 Data Record 🔽	AP_SSID:	KOLIDA_7292
💂 🛛 Data Transfer 🔽	AP_Password:	southgnss.com.cn
Network Config	AP Encode:	Open 🔻
WiFi Config	AP Channel:	1 •
Bluetooth Config	DHCP IP Range:	192. 168 0/255. 255. 255. 0
Port Forwarding		172. 16
Route		<ul> <li>10. 1</li> <li>1</li> <li>. 0/255. 255. 255. 0</li> </ul>
Network Testing		
🖹 Radio Config 🕂		
🛧 Firmware Undate 🕂		Enter Cancel

## **Client:**

This option enables K1Pro to search and connect the other WIFI hotspot which connects to the internet, the receiver is able to download and use the mountpoint from reference station.

Client\_SSID: This is the WIFI hotspot which sis going to connect

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

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

**IP fields:** If K1Pro successfully connects to the WIFI, there will be an LAN IP address generated by K1Pro.

ClearSSID: Click this button to clear the SSID list.

Status	•	Active:	<ul> <li>Image: A start of the start of</li></ul>	]			
Configuration		Work Mode:	0	AP		۲	Client
Satellite Information			_			_	
Data Record		Client_SSID:	southgnss			Scan	
Data Transfer		Password:	southgnss.	com.cn			
Notwork Config		Encryption:	WPA2				
Network Config		DHCP :	<ul> <li>Image: A set of the /li></ul>				
WiFi Config Bluetooth Config		IP Address:	0	0	. 0	. 0	
Port Forwarding		Subnet Mask:	255 .	255	. 255	. 0	
		Default Gateway:	0.	0	. 0	. 0	
Network Testing		Status:	No Connect	1			
Radio Config	•	Signal:	₩¥				
Firmware Update	<b>.</b>						
Track Manage		Clear SSID List:	ClearSSID				
-	_	Tips: I	Reboot the re	ceiver af	ter changin;	g wifi work mode	from AP to Clien
Coordinate System	•	C	Client functi	on!			
Online Service	- <b>-</b>						



## **Bluetooth Config**

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

WELCOME	admin SG6052117132109 []	ogout]	> Blue to	ooth config			
	Status	<b>••</b>		Active: 🖌			
*	Configuration	<b>H</b>	Blue	Tooth MAC: 00:80:2	5:49:65:58		
禾	Satellite Information	<b>H</b>	Dis	coverable: 🗸			
	Data Record	<b>H</b>		PIN Code: 0			
뮻	Data Transfer	<b>E</b>	Connecti	on Device:			
•	Network Config		Item	Device Mac	RFCOMM Channel	Device Name	Disconnect Action
	GSM/GPRS Config	Ξ	1				Disconnect
	CSD Config						
	WIFI Config	Ξ	2				Disconnect
	Blue Tooth Config						
	Port Forwarding	Ξ		Ente	r	Canc	el
		Ξ		21110			
	Network Testing	Ξ					
Î	Radio Config	<b>H</b>					
£	Firmware Update	<b>H</b>					
ð:	User Management	÷					

## **Port Forwarding**

This page is mainly used to view and configure the internet transmission port for K1Pro, customize and debug receiver.

WELCOME	admin SG6052117132109	[logout]	> Port Forwarding			
	Status	<b>E</b>	HTTP Port:	80		
*	Configuration	•	FTP Port:	21		
*	Satellite Informatio	on 🛨	TELNET Port:	23		
.11	Data Record	<b>H</b>				
显	Data Transfer	<b>H</b>		Enter	Cancel	
۲	Network Config					
	GSM/GPRS Confi	g 🖃				
	CSD Config					
	WIFI Config	Ξ				
	Blue Tooth Config					
	Port Forwarding					
		Ξ				
	Network Testing	Ξ				



## Router

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

Status Image: status   Status Image: status   Status Image: status   Status Image: status   Image: stat	WELCOME	admin SG6052117132109 [10	gout]	> Router				
Configuration   Data Record   Data Record   Data Transfer   Data Transfer   Network Config   SSM/GPRS Config   CSD Config   Strip   Blue Tooth Config   Blue Tooth Config   Blue Tooth Config   Blue Tooth Config   Gaterey:   Strip   Redio Config   Image:   Image: <th></th> <th>Status</th> <th>•</th> <th>Destination</th> <th>Gateway</th> <th>Mask</th> <th>Sign</th> <th>Interface</th>		Status	•	Destination	Gateway	Mask	Sign	Interface
Image: Data Record   Image: Data Record   Image: Data Transfer   Image: Data Transfer <td>*</td> <td>Configuration</td> <td>•</td> <th>192. 168. 155. 0</th> <td>0.0.0.0</td> <td>0.0.0.0</td> <td>V</td> <td>usbO</td>	*	Configuration	•	192. 168. 155. 0	0.0.0.0	0.0.0.0	V	usbO
Image: Second secon	糸	Satellite Information	•	Change the default	route: PPPO	<ul> <li>Enter</li> </ul>		
Image: Second secon		Data Record	•	Refresh				
GSM/GPRS Config   CSD Config   WIFI Config   Blue Tooth Config   Blue Tooth Config   Port Forwarding   Port Forwarding   Routler   Network Testing   Gateway:   Gateway:   Gateway:   Interface:   PPTO   Enter	뮻	Data Transfer	•					
CSD Config   WIFI Config   Blue Tooth Config   Port Forwarding   Port Forwarding   Rouler   Network Testing   Radio Config   Radio Config   Hask:   Firmware Update		Network Config						
CSD Config   WIFI Config   Blue Tooth Config   Port Forwarding   Port Forwarding   Rouler   Network Testing   Radio Config   Radio Config   Hask:   Firmware Update		GSM/GPRS Config	Ξ					
WIFI Config   Blue Tooth Config   Port Forwarding   Router   Router   Radio Config   Radio Config   Firmware Update   Interface:     Preduction		CSD Config	Ξ					
Blue Tooth Config   Port Forwarding   Router   Router   Network Testing   Radio Config   Radio Config   Firmware Update   Interface:     PPro   Enter		WIFI Config						
Router     Destination:       Network Testing     Gateway:       Radio Config     Hask:       Firmware Update     Hask:		Blue Tooth Config	Ξ	tdd Route				
Router     Destination:       Network Testing     Gateway:       Radio Config     Hask:       Firmware Update     Hask:		Port Forwarding	Ξ					
Image: Config interface:     Mask:		Router		Destination:				
Firmware Update     Interface:     PPP0     Enter		Network Testing	Ξ	Gateway :				
	Ĩ	Radio Config	•	Mask:		· · · · ·		
🐉 User Management 🕂	£	Firmware Update	•	Interface :	PPPO	Enter		
	<b>ð</b> :	User Management	•					



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

## **Network Testing**

This function is mainly used to test network status for K1Pro after logging on the internet. How to do:

Input the IP address which K1Pro already connected, then click PING button, the testing information will be displayed in the following window.

E	admin KB10A4126337292 [lo	gout]	> Network Testing	
2	Status	<b>.</b>	Input IP:	PING
	Configuration		PingStatus:	No Action
Ŕ	Satellite Information			
ĵ	Data Record			
1	Data Transfer		PingResult:	
Ð	Network Config			
	WiFi Config			



## §3.2.7 Radio Config

All the settings related to the radio can be done in Radio Config. There are two main settings: Radio Parameter and Radio Frequency.

## **Radio Parameter**

This page is mainly used to configure the parameters for internal radio module of KOLIDA K1Pro.

WELCOME	admin se6052117132109 []	logout]	> Radio Parameters	rs
	Status	•	Active:	
*	Configuration	÷	Air Baud Rate:	9600
*	Satellite Information	÷	Data Baud Rate:	19200
	Data Record	e	Channel :	4
	Data Transfer	Đ	Power:	HIGH
	Network Config	•	Protocol:	TRIMTALX
Î	Radio Config			
	Radio Parameters	8		Enter Cancel
	Radio Frequency	Ξ		
£	Firmware Update	•		
25	User Management	Đ		
?	Неір	÷		

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

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

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

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

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

## **Radio Frequency**

For KOLIDA K1Pro, the powerful internal radio module supports much more radio channels apply to the legal frequency in different countries or areas.

There are 120 radio channels listed in this page after clicking on radio frequency. Users are able



to change the frequency freely in the channel spacing, click Restore button to bring the frequency of each channel back to default setting.

NELCOME	admin sc6052117132109 [	logout]	> Radio Frequer	юу				
	Status	Đ	Channel 1:	463.125	MHZ	Channel 9:	463.125	MHZ
*	Configuration	Đ	Channel 2:	464.125	MHZ	Channel 10:	464.125	MHZ
禾	Satellite Information	•	Channel 3:	465.125	MHZ	Channel 11:	465.125	MHZ
11	Data Record	•	Channel 4:	466.125	MHZ	Channel 12:	466.125	MHZ
	Data Transfer	Đ	Channel 5:	463.625	MHZ	Channel 13:	463.625	MHZ
$\oplus$	Network Config	Đ	Channel 6:	464.625	MHZ	Channel 14:	464.625	MHZ
Î	Radio Config		Channel 7:	465.625	MHZ	Channel 15:	465.625	MHZ
	Radio Parameters	Ξ	Channel 8:	466.625	MHZ	Channel 16:	466.625	MHZ
	Radio Frequency							
±	Firmware Update	•		Enter		Cancel	Restore	
ð:	User Management	•						
?	Help	Đ						

## §3.2.8 Firmware Update

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

## **Firmware Update**

We can update the firmware of receivers and modules in this interface.

	Otation	•	Firmware Informatio	n:
-	Status	•	Firmware Version:	1.05.150827.RG60GL
*	Configuration	<b>E</b>	rirmware version:	1. 05. 150021. Mobile
	O to When to ferror officer		Core Engine Version:	Sirius. 1.05
禾	Satellite Information	•	Release Date:	20150827
.11	Data Record	<b>H</b>		
显	Data Tanadan		Warranty Date:	20150101
*	Data Transfer	•	Firmware Check Sum:	0
$\oplus$	Network Config	<b>H</b>	Online Update:	
Î	Dedia Orafia	•	omine opuace.	
*	Radio Config	•	Latest Version:	
£	Firmware Update		Update Status:	
	Firmware Update		opulle bratabi	
	Module Update	Ξ	Download Status:	
			Last Update Time: O	)
<b>8</b> 5	User Management	•		
?	Help	<b>B</b>	Online Update:	Update
			Local Update:	
			Firmware Path:	Browse
			in ware latt.	D10w36
				Installation

Online Update: KOLIDA K1Pro supports to update the firmware online anytime if there is



something update or optimized.

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

## How to upgrade the firmware with Local Update

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

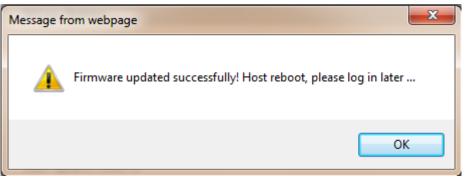
● Gadget驱动 ● 1.05.150827.RG60GL.img ● 升级说明.txt	2015/10/28 16:46 2015/8/27 9:12 2015/10/8 9:54	File folder Disc Image File Text Document
		-
☐ 升级说明.bxt	2015/10/8 9:54	Text Document
•		
name: 1.05.150827.RG60GL.img	✓ All Files (*.*)	•

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

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

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





SPECIAL REMIND: KOLIDA K1Pro doesn't support to update the firmware with the help of INstar program any more, in the future, update the firmware for KOLIDA K1Pro shall be done through the Web UI.

## **Module Update**

This page is used to update the firmware for corresponding module parts such as GNSS board, radio module, network module and other sensors.

WELCOME	admin SG6052117132109	[logout]	> Updating module
	Status	÷	OEM Update:
	Status		Path: [] 浏览]
*	Configuration	Đ	
*	Satellite Informatio	n 🛨	Installation
11	Data Record	<b>E</b>	Status: Not Action
			Tips: Update Firmware need about 30 minutes!
	Data Transfer	÷	
•	Network Config	•	Radio Update:
1	Radio Config	e	Path: [浏览]
£	Cimeron Undete	_	Installation
T	Firmware Update		
	Firmware Update		Status: Not Action
	Module Update	۳	Tips: Update Firmware need about 5 minutes!
25	User Managemen	t 🗄	
?	Help	e	Sensor Update:
*	neip		Path: 浏览
			Installation
			Status: Not Action
			Tinz: Undata Piymwara naad ahout 5 minutarl



## §3.2.9 User Management

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

admin socose117132109 [10	gout]	User Management				
Status	•	Add user				
× Configuration	•					
🚿 Satellite Information	•	Name	Limits of authority	Status	Operating <u>delete</u>	Operatin <u>edit</u>
Data Record	•	admin	Administrator	ontrite	uerece	eure
💂 🛛 Data Transfer	•					
Network Config	•					
👔 Radio Config	•					
🔹 Firmware Update	•					
🐉 User Management						
User Management						
? Help	<b>•</b>					

## §3.2.10 Help

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

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

WELCOME	admin SG6052117132109 [	logout]
-	Status	÷
*	Configuration	•
糸	Satellite Information	•
	Data Record	+
묘	Data Transfer	•
•	Network Config	•
Î	Radio Config	<b>H</b>
±	Firmware Update	<b>H</b>
25	User Management	<b>H</b>
?	Help	
	Sysstem Help	Ξ



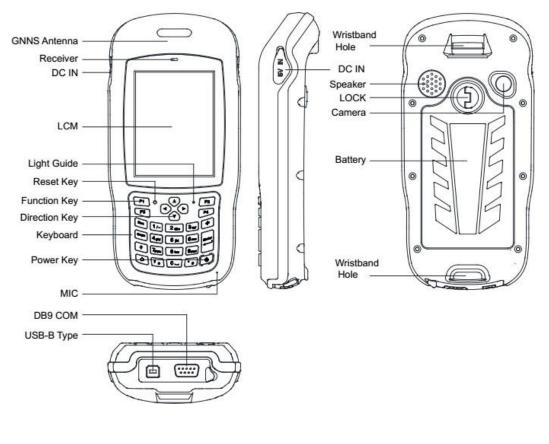
# **ChapterIV** Data Collector T17N

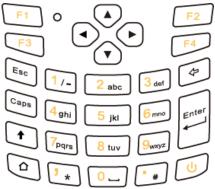


# §4.1 Basic introduction to the handheld

Here takes T17N for example (If you want to know more about KOLIDA controller, please go to KOLIDA website http://www.kolidainstrument.com/ for for information), appearance of T17N:







The yellow sections are the system defaults, and the functions of the 4 hotkeys are below:

- F1: Start menu.
- F2: Off.
- F3: Camera.
- F4: System main interface



The other keyboard operation:					
	System defaults to the digital input method				
Gustara Dafault	▶ <b>*</b> ,				
System Default	*				
	Lowercase letters				
	1/- Switch between / and -				
	* *				
Press↑ (shift)	<b>*</b> #				
	Press $m{\uparrow}$ (shift) again, it will be digital input method				
	Capital letters				
	Switch between / and -				
	*				
	<b>*</b> #				
Press Caps	Press the Caps button again for lowercase letters				

## 1. Charging

a) DC adapter: Open the DC IN cover on the right side, and charge with a specialized DC adapter. Charging current can reach 2A.

b) USB cable: A USB cable can also be used to charge the device, and current is limited to 500mA.

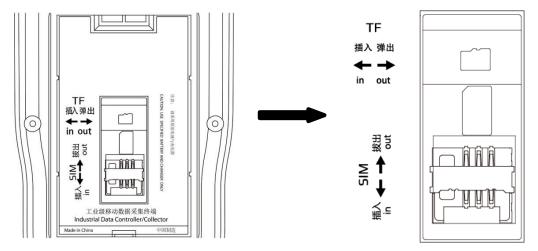
## 2. Installing Battery, SIM Card and Storage Card

Turn the back cover screw to the open position according to the instructions on the back cover and take off the back cover.

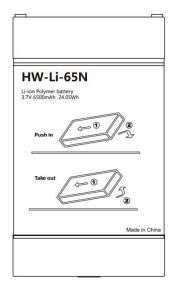




Insert the SIM card and TF card according to the instructions in the battery cabin.



Insert the battery according the instructions on the battery label.



Close the back cover and turn the back cover screw to the lock position.



### 3. Power on/off

- a) Make sure the battery has enough power, or connect the T17 to a DC adaptor.
- b) Press power button for 3~5 seconds to turn on (until the boot screen appears).
- c) Press the power button for 3~5 seconds, and confirm to power off.

NOTE: If there are abnormal situations, such as the T17 cannot operate normally, use the tip of the stylus to press the reset key to restart the T17.

#### 4. Connect to PC

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

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

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

## 5. Installing Program

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

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



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



### 6. How to use GPS

a) Go to \My Device\GNSSViewer and run GNSSViewer.exe

b) T17 supports COM3 and COM5 GNSS ports and its BaudRate is 9600. Choose a GPS Port and BaudRate by clicking Setup->Port Setup as indicated below.

Click 'OK '.



If you want to check the working status of GPS via checking or collecting software, please set the COM port to COM6 and the baud rate to 57600.

## 7. Camera

- a) Select 'Start->Picture & Video', select 'Camera' or the 'camera' key icon to take photos.
- b) Press the camera key (F3) to take photos.
- c) Click screen and select 'OK' to exit.

# §4.2 Software installation and connecting

EGStar is the specific software for K1Pro measuring system, mainly for the collection and calculation of the measuring points.

Before installing of EGStar, you need to install Microsoft Active Sync. After installing it on your



computer, connect handheld to computer with a cable, and install EGStar into the handheld, at the same time, keep the mainframe power on, then set as follows:

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



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

EGStar	🗱 🎦 ┥× 🖅 10:32	EGStar	🛱 🎦 🛋 🖅 10:32
🜖 EGrtk 🦷		Device name	Device address
		B LENOVO-PC-LX	EC:55:F9:FE:EC:BE
	Coordinate Parameter	🛞 S8295211713057	
		🚷 S8255211713140	8 00:80:25:49:36:5E
Job	Instrument Config	8 LENOVO-PC	90:48:9A:C5:87:0E
505	Instrument comig	BGStar3.0	ok Ff
<b>Å</b> Å	Radio Config	Bluetoot	h connect success
Survey	Mobile difference		
	Port Config	( );;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	
S P:Sing	Tort coming	Status: Bluetooth co	onnect success
I S:8+5	Bluetooth Manager	Connected: S825	552117131408
Exit Blue	K	Search Connect	t Close Exit
	~		ОК



for more information if using Android EGstar.



# Chapter V Accessories

# **§5.1 Instrument Case and Accessories**



## **Base Receiver and Accessories**

- ① --- Instrument Case
- ② --- K1Pro Receiver
- ③ --- Height measurement piece
- ④ ---- Charger for K1Pro Receiver
- ⑤ --- Short Pole for Base receiver
- ⑥ --- UHF antenna for Base and Rover
- $\bigcirc$  --- Carbon fiber pole
- (8) ----7-Pins cable for connectin the receiver with computer for static data transmission, Web UI accessing and firmware update.
- (9) ---- Connector

**Rover Receiver and Accessories** 





*NOTE: The models and types of instrument accessories will vary with the instrument upgrade* 

# **§5.2** Portable Battery Case (power bank)

Battery case SA6003 is an optional accessory, able to contain 4 batteries, provide extra power supply to base or rover.



①——Indicators, the indicators indicates how much power remain by pressing the power button.

- 2 —— The combination batteries installed into the portable power source
- ③—— Hang buckle, hang the battery package onto tripod
- ④—— 7-pin port, connect the cable with receiver for power supply.
- ⑤—— Power supply cable, this cable is used to connect the power source to receiver.

# **§5.3 Other Cables and Accessories**

## 7-pin to OTG cable

This cable is used to connect an external storage directly to KOLIDA K1Pro for static data storage and copy.



## **Communication cable**

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



Other accessories include carbon-fiber pole, handheld controller bracket, tribrach, connectors, height measuring plate and measuring tape.



Tribrach & connector





Measuring tape

Support pole

Bracket for controllers

# **Chapter VI** Measuring Operation

Reading this chapter, you can grasp in detail how to use the K1Pro measurement to

## do system static, RTK operations.

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

Test environment requirements:

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

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

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

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

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

# **%.1 Static Operation**

## **%6.1.1 Static Measurements Profile**

#### Static measurements

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

## Scope

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



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

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

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

## **%6.1.2 Operating Procedures**

## **Pre-measurement**

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

# **§6.1.3 Field Operation Notes**

1)Static mode of KOLIDA K1Pro receiver can be set in EGStar software or other software (Such as SurvX, Field Genius or SurvCE), also can be performed by receiver keypad.

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

3)Measure the instrument height three times, the difference of the results shall not be more than 3 mm, and average the results. The instrument height should be measured from the center of the control point to the mark line on the instrument.(Refer to §3.4)

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



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

6)After the test, the mainframe shut down, and then begins data transmission and data processing (data transmission sees Chapter IV, data processing, please read another manual GPS data processing software operation manual).

## %.1.4 GPS Net Design

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

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

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

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

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

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

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

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

## **Triangle net**

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

But this net need a lot of observation, especially when receivers are lacking it will greatly prolong the observation time. So only when accuracy and security are required very high, and receivers are more than three, we can use this graph, see fig 5-3.

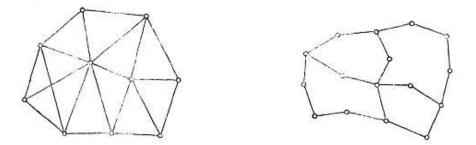
## **Circle net**

Circle net is composed of many loops which are formed of many independent observation borders. This net is similar with one of the classical surveying-- lead net. Its structure is a little worse than triangle net. The amount of baselines in closed loop decides the self--checking ability



and consistency. General speaking, the amount of baselines has such limit as follows:

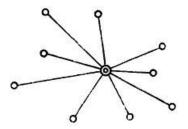
The advantage of circle net is the small workload, good self-checking and consistency. But the main disadvantage is that the accuracy of indirect-observed border is lower than that of direct-observed border, and the baseline accuracy of neighbor points distributes unevenly. In field surveying, we usually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



#### Star shape net

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

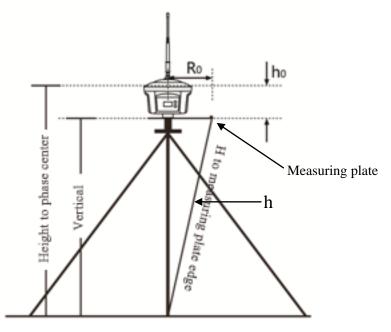
The advantage of this net is that it only needs two receivers, the work is very simple, so it is mostly used in the quick surveying as quick static orientation and kinematical orientation. This working mode is widely used in project layout, border surveying and GIS surveying, etc.



## **%.1.5** Antenna Height Measurement

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





We use a formula to calculate antenna height.

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

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

 $R_0$  is the distance from middle of antenna to the edge of measuring plate.

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

H is the calculation result. We usually measure antenna height twice and adopt the average.

*Attention:* We input the inclined height as the antenna height, which is the inclined distance from point on the ground to the waterproof loop of antenna.



# **%.2 RTK measurement**

RTK is the abbreviation of Real-Time Kinematic measurements.

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

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

# 

# **§6.2.1** By using radio (Internal radio)



### **§6.2.1.1 Base Station Set up**

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

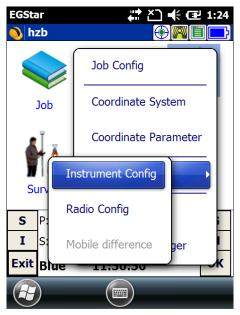
- 1) Set a tripod to the location with known coordinates (or unknown), attach base receiver to the tribrach adapter set (the measuring plate is recommended to install under base receiver).
- 2) Install the transmitting antenna onto the receiver.
- 3) Make sure all connections are alright, then power on receiver.
- 4) The receiver is set as base with internal radio mode. (set on the control panel, or on internal Web UI or on the software installed on data collector).

### **§6.2.1.2 Start the Base station**

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

### Using EGStar3.0

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



 Tap on "Work mode setting" and then check the box of "Set work mode", then click on "Next" to continue;



4) Check the box of "Base" option and click "OK" and return to Instrument setting page. At this moment, KOLIDA K1Pro prompts the correct working mode with voice guide.

EGStar	<b># č] € Œ</b> 1:19	EGStar	<b>↓ ▲ ▲ ▲ ▲ ▲ ▲ ▲</b>
<mark>●</mark>		<b>≥</b> ₽	
Set wa	ork mode atic parameters	(	) Rover Base
🔵 Set da	ata link	(	) Static
Next	Cancel	ОК	Cancel
	ОК		ОК

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

EGStar	<b>₩ ४) 4 (2</b> 1:21	EGStar	(1:22
Ê		₽₽	
🔿 Set w	ork mode		Internal radio
⊖ Set st	atic parameters		⊖ gprs/gsm
Set da	ata link		C External radio
Next	Cancel	ОК	Cancel
	ОК		ОК

- 7) Return to the main interface and again get into instrument config page, tap on "Base setting" to get into Base configuration page.
- Choose the correction format in Msg, Type, choose the antenna measuring method and input correct antenna height in Ant, H, input the proper value for Interval time, Mask angle and PDOP limit.





- 9) Then tap on the symbol **(P)** to save and complete the parameters.
- 10) Input the coordinates for base location or tap on the symbol 🔊 to obtain a single position for base.
- 11) After all the parameters are completely set, click on "Start" button to start the base station.

EGStar ដ 🏠 🕂 🖅 1:19	EGStar 👫 🎦 🕂 🔁 1:17
💊 Instrument 💮 🎯 🔲 🕞	
Base	Base parameters Msg.type RTCME Interval time 1
Rover setting	Diff.mode RTK 💌 Mask angle 0
	Ant.H 0 PDOP Limit 3
Base setting	🖲 Real 🔵 Slant 🔵 Pole 🔵 Slice 😨
	Base coordinate
Work mode setting	Latitude 23.0732918480
	Longitu 113.2206468601 🔘 Lat/Lon
	Elevatic 27.8410 OPlane
S P:Single H:3.498 V:4.870 G	Calc.7 para.mode repeated station
I S:6+5 TO M	Can't input ant.H in single position status
C Blue 11:25:26 OK	Start Help Exit
	С

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

### **Radio channels setting**

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



Pro			
EGStar	(# ≧ 4:03	EGStar	<b>₩ ≧] 4:</b> 🔁 4:
🔌 hzb		₽ <b>₽</b>	Exit
	Job Config	_ Radio Channel ——	
	Coordinate System	Current channel:	Read
Job	Coordinate System	Switch channel: 1	Switch
<u>,</u>	Coordinate Parameter		
		Radio Power——	
	instrument Config	Don't use when device	not support!
Surv	Radio Config	Read power: Un	known Read
<b>S</b> P:		Setup power: hig	h 💽 Setup
I S:	Mobile difference ger		•
Exit Blue			
			) (0)

### Using internal Web UI

- 1) Connect KOLIDA K1Pro with computer via 7-pin to USB cable and set the USB port to output as Ethernet on K1Pro. (a driver is required to installed on computer to enable this function).
- 2) Login the internal Web UI of K1Pro with the default username and password (admin/admin).
- 3) Get into "General Config" interface under "Configuration";
- 4) Choose "Base" in "Work Mode" and "Radio" for "Datalink", then click "Enter" button to save configurations;
- 5) Get into "Base Setup" interface, and input known coordinates or click "Position" button to obtain a single coordinates for base station;
- 6) Choose the correction format in "Corrections", then click "StartBase" button to start the base station.



Admin SG6058117149518 [logout]	> General Gonfiguration
	Registration:
Status 🛨	Serial Number: SG6058117149518
X Configuration	Code: E1F836EFCB6E0C8E01D4D82341EB4E304E85 Register
General Config 📃	
Base Setup	Expired Data: 20151109
Antenna Setup – Satellite Tracking –	Online Registration: OnlineRegi
Receiver Operate	Operation Tips: Use Online Reig Function, please Make Sure Network is Work Well!
System Setup	Mode setting:
🚿 Satellite Information 🕂	Work Mode: Base 🗸
Data Record +	Datalink Radio -
	Radio Route: None
	RTK Record:
Status +	
🖵 Status 🛨	CMR ID: 14
🗙 Configuration 🧧	RTCM2.x ID: 302
General Config -	
Base Setup	RTCM3.x ID: 1326
Antenna Setup	Lon: 113 ° 22 ′ 6.406587 ″ 💿 E 🗌
Satellite Tracking	Lat: 23 ° 7 ′ 33.191387 ″ 📀 N
Receiver Operate	Alt: 35.414795 m
System Setup	ALt: 35.414795 m
	Position Spare
🚿 Satellite Information 🔒	Base Start Mode: Automactically Start Base by Current point 👻
🛅 Data Record 🕂	StartBase StopBase
🛃 🛛 Data Transfer 🗧 🛨	Correction: RTD V
① Network Config	POP Value: 3
🖹 Radio Config 🛨	Status: Start Base Success

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



K1Pro					<b>N</b> ₩LIDA
WELCOME	admin sc6058117149518 [lc	gout]	> Radio Parameters	3	
	Status	•	Active:	<ul> <li>Image: A start of the start of</li></ul>	
*	Configuration	•	Air Baud Rate:	9600	•
*	Satellite Information	•	Data Baud Rate:	19200	•
	Data Record	•	Channel:	6	*
₽	Data Transfer	•	Power:	LOW	•
•	Network Config	•	Protocol:	SOUTH	•
Î	Radio Config				
	Radio Parameters			Enter	Cancel
	Radio Frequency	Ξ			

### **§6.2.1.3** Rover station set up

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

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



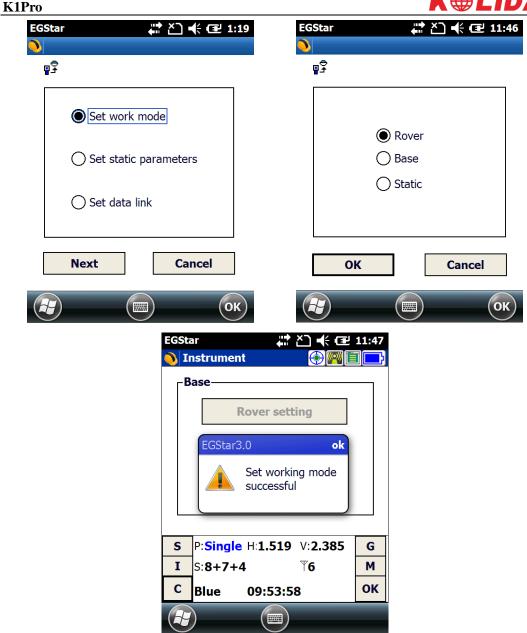


### **%6.2.1.4 Rover settings**

### Using EGStar3.0

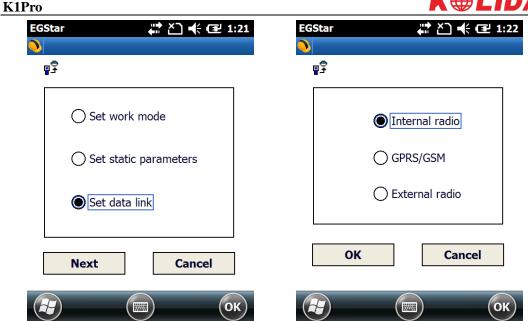
- 1) Run EGStar3.0 program on data collector;
- 2) Go to "Config—Device Config—Instrument Config" page to configure the working mode and datalink for rover receiver.
- Tap on "Work mode setting" and then check the box of "Set work mode", then click on "Next" to continue;
- 4) Check the box of "Rover" option and click "OK" and return to Instrument setting page. At this moment, KOLIDA K1Pro prompts the correct working mode with voice guide.



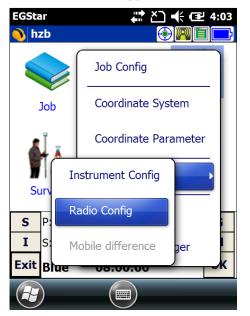


- 5) Then tap on "Work mode setting" and then check the box of "Set data link", then click on "Next" to continue;
- 6) Check the box of "Internal radio" option and click "OK" to complete the settings.





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



GStar		€ 🕑 4:0
₽₽		Exit
-Radio Channel-		
Current channel:	6	Read
Switch channel:	1	Switch
-Radio Power—		
Don't use when de	evice not sup	port!
Read power:	Unknown	Read
Setup power:	high 💌	Setup
		ОК

### Using Web UI

1) Connect KOLIDA K1Pro with computer via 7-pin to USB cable and set the USB port to output as Ethernet on K1Pro. (a driver is required to installed on computer to enable this

# **K@**LIDA

### K1Pro

function).

- 2) Login the internal Web UI of K1Pro with the default username and password (admin/admin).
- 3) Get into "General Config" interface under "Configuration";
- 4) Choose "Rover" in "Work Mode" and "Radio" for "Datalink", then click "Enter" button to save configurations;

WELCOME	admin SG6058117149518	[logout]	> General Gonfigura	ation	
	Otat va		Registration:		
	Status	•	Serial Number:	SG6058117149518	
*	Configuration				
	General Config		Code:	E1F836BFCB6B0C8E01D4D82341EB4E304E85	Register
	Base Setup	Ξ	Expired Data:	20151109	
	Antenna Setup	=	Online Registration:	OnlineRegi	
	Satellite Tracking	Ξ	Operation Tips: 1	Jse Online Reig Function, please Make Sure Network	is Work Woll
	Receiver Operate		Mode setting:	se online helg function, prease make Sure Network	. IS WORK WELL.
	System Setup	Ξ			
*	Satellite Informatio	n 🛨	Work Mode:	Rover -	
11			Datalink	Radio 👻	
	Data Record	•	Radio Route:	None 👻	

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

WELCOME	admin SG6058117149518 []	logout]	> Radio Parameters	3	
	Status		Active:	<ul> <li>✓</li> </ul>	
*	Configuration	•	Air Baud Rate:	9600	•
*	Satellite Information	•	Data Baud Rate:	19200	•
.11	Data Record	•	Channel:	6	•
뮱	Data Transfer	•	Power:	LOW	•
۲	Network Config	•	Protocol:	SOUTH	•
Ĩ	Radio Config				
	Radio Parameters			Enter	Cancel
	Radio Frequency	Ξ			



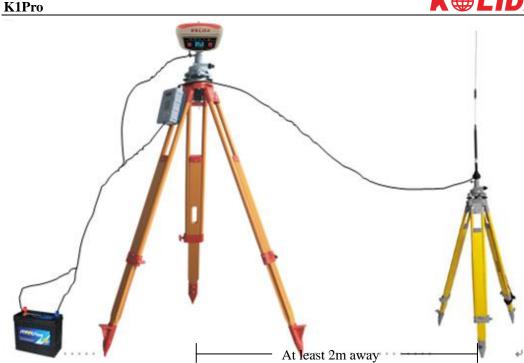


## **§6.2.2** By using radio (external radio)

### **§6.2.2.1** Base station setup

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



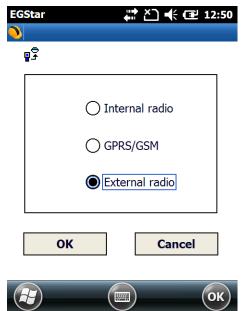




NOTE: place the 2 tripods at least 2m away from each other against signal interference.

### Using EGStar3.0

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







### **%.2.2.2 Radio settings**

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



§7.2.2.3 Start Base Station (Please refer to 7.2.1.2)

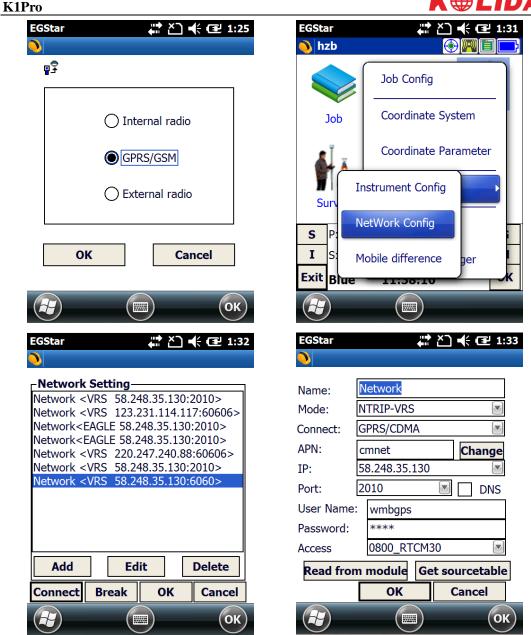
# **§6.2.3** By using internet (GPRS)

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

### EGStar3.0 settings

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





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



EGStar	••••	Č ▲ (12 4:25
♥ ┌APN		
Name:	cmnet	
UserName:		
Password:		
ОК		Cancel
		ОК

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

EGStar (1:34 0000_MSM4 0000_RTCM30	EGStar (1:34)
Name: N0000_SCMRX Mode: N0000SCMRX Connect: G0800_RTD	Name: Network
APN:         cr12345678900           IP:         52000_MSM4           2000_RTCM30	AF IP Network <vrs 58.248.35.130:2010&gt;Config ure to present receiver</vrs 
Port: <u>202000_RTD</u> User Name: 2000SCMRX CMR Password: <u>RDSD</u>	Po modul Us OK Cancel Pa
Access 0800_RTCM30 Read from module Get sourcetable	Access 0800_RTCM30  Read from module Get sourcetable
OK Cancel	OK Cancel

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





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

### Web UI settings

- 1) Login the web UI of K1Pro and go to "General Config" interface, then choose "Network" in "Datalink" option, click on "Enter" button to confirm and save the settings.
- 2) Then go to "GSM/GPRS Config" interface under "Network Config" to check if the SIM card is detected, and input the APN information at the bottom.

			Registration:
*	Status Configuration		Serial Number: SG6058117149518
	General Config		Code: E1F836BFCB6B0C8E01D4D82341EB4E304E85
	Base Setup		Expired Data: 20151109
	Antenna Setup	Ξ	Online Registration: OnlineRegi
	Satellite Tracking	Ξ	Operation Tips: Use Online Reig Function, please Make Sure Network
	Receiver Operate	Ξ	Mode setting:
	System Setup	=	
*	Satellite Information	•	Work Mode:
11	Data Record	Đ	Datalink Network
	Data Transfer		Radio Route: None 🗸
	Data Transfer	÷	RTK Record:
•	Network Config	8	1PPS:

K1Pro				<b>K</b> @ĹIDA
$\oplus$	Network Config		Connection Type:	HSDPA
	GSM/GPRS Config		connection Type.	
	CSD Config	Ξ	PPP Dial Status:	Connected
	WIFI Config	Ξ	IP Address:	10. 228. 249. 124
	Blue Tooth Config	Ξ	Bauantan Canfint	
	Port Forwarding		Parameter Config:	
	Router	Ξ	Active:	$\checkmark$
	Network Testing	Ξ	APN:	сmnet
Ĩ	Radio Config	Đ	APN User Name:	card
£	Firmware Update	•	APN Password:	card

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

	Clater.		Mtripulient:			
	Status	+	Status:	Load Success		
*	Configuration	•		0		
*	Satellite Information	•	Active:	<u> </u>		
	Data Record	÷	Authentication Mode:	✓ Eagle Mode TCP/IP Mode		
			NtripClient Address:	58. 248. 35. 130		
暴	Data Transfer		NtripClient Port:	2010		
		Ξ	Vser:	wmbgps	_	
	Serial port Config	Ξ				
	TCP/IP Config	Ξ	Password:	huli		
	NTRIP Config	Ξ	Mountpoint:	0800_RTCM30 G	et Point	RTCM23 👻
	Data Flow Config	Ξ	GetPoint Status:	Get Success		
۲	Network Config	Ð				

# **§6.2.4 By using internet (WIFI)**

WiFi datalink is a new feature and new technology adopted on KOLIDA K1Pro, it is more faster and stable in network RTK job.

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



### **Instrument settings**

 After choosing the rover mode for receiver, then press F button and get into the "Set Data Link" configure page, then move the select box to "WIFI Datalink" option and press power button to confirm.



2) Then get into the "WIFI Config" configure page to check if the WIFI connection is already established.



### Web UI settings

1) Login the web UI of K1Pro and go to "General Config" interface, then choose "WIFI" in "Datalink" option, click on "Enter" button to confirm and save the settings.

Mode setting:	
Work Mode:	Rover 💌
Datalink	WIFI -
Radio Route:	None 🗸

2) Then go to "WIFI Config" interface under "Network Config", there the option of "Client" is activated if WIFI used as datalink.



 Click on the "Scan" button to search the surrounding available WIFI hotspot, then select a proper one and input the password, click the "Enter" button at the bottom to confirm and access

K1Pro

	Status	•	Active:	<ul> <li>Image: A set of the /li></ul>			
*	Configuration	•	Work Mode:	∩ AP	Clier	it	
*	Satellite Information	•					
	Data Record	•	Client_SSID:	RSDN	_	Scan	RSDN
뮻	Data Transfer	•	Password:	1222222			
•	Network Config		Encryption Type:	WPA2			
	GSM/GPRS Config	Ξ	DHCP:				
	CSD Config	Ξ	IP Address:	192 . 168	. 253	. 53	
	WIFI Config	Ξ	Subnet Mask:	255 . 255	. 255	. 0	
	Blue Tooth Config		Default Gateway:	192 . 168	. 253	. 1	
	Port Forwarding	=		Connected to RSDN			
			Status:	Lonnected to KSDN			
		=	Signal:	¥II			
Î	Radio Config	+	Clear SSID List:	ClearSSID			

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

	Otativa		NtripClient:			
	Status	+	Status:	Load Success		
*	Configuration	÷		0		
*	Satellite Information	÷	Active:	<u> </u>		
î.l.	Data Record	•	Authentication Mode:	✓ Eagle Mode TCP/IP Mode		
			NtripClient Address:	58.248.35.130		
	Data Transfer		NtripClient Port:	2010		
		Ξ				
	Serial port Config	Ξ	User:	wmbgps		
	TCP/IP Config	Ξ	Password:	huli		
	NTRIP Config	Ξ	Mountpoint:	0800_RTCM30	Get Point	RTCM23 -
	Data Flow Config	Ξ	GetPoint Status:	Cat Succes		
	Network Config	<b>H</b>	Getroint Status:	vet Success		

# **§6.2.5 Inertial Measurement** (IMU)

Equipped with IMU sensor, K1Pro IMU' tilt survey requires no calibration and is no longer affected by magnetic environment. Just by a quick shake, IMU tilt survey function can be

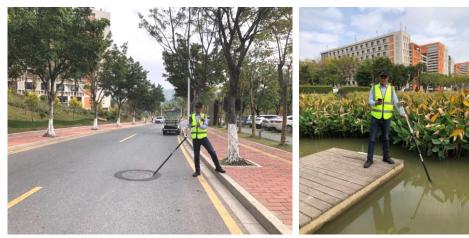


activated in a few seconds. K1Pro IMU supports tilt survey in as much as 60 degrees angle. Without leveling, K1Pro IMU' positioning efficiency has been increased by over 30%. And at the same time, the algorithm of IMU+GNSS will guarantee a stable and accurate positioning result.



There are several disadvantages in last generation of tilt survey (with tilt sensor compensation). It takes too much time to do E-bubble calibration and magnetic calibration before work. And the earth magnetic field has a great impact on the survey result. For K1Pro IMU, we don't need to do those calibrations and after K1Pro IMU gets fixed solution, with a quick shake to activate IMU tilt survey, we can start work.

### Is there any added value of Inertial Measurement?



1. Bring more safety to your work



2. Work at Non-signaled Point



3. Conveniently Measure Inaccessible Points





SPECIAL REMIND: Please run this Website for more IMU info: https://www.linkedin.com/pulse/inertial-measurement-rtk-k5-imu-bring-your-producti vity-andy-lau/?published=t



# **§6.2.6 Star-link & Star-Fill**

### Star-Link

Built on Star-link technology, KOLIDA K1Pro provides high-accuracy GNSS positioning services via satellite or cellular delivery worldwide. It's ideal for jobs requiring the highest accuracy. Only K1pro provides accuracy of less than 2 centimeters, helping you get your job done fast with pinpoint accuracy.

After subscribing to it, surveyors can work almost anywhere in the world without a base station or VRS network. ideal solution for surveying and mapping, natural resource exploration in remote area.



### Star -Link

KOLIDA Star-Fill is a new service that extends RTK positioning for several minutes when the RTK correction stream is not available. KOLIDA Star Fill corrections are broadcast by satellite, so they are generally available within covered areas wherever the GNSS constellations are visible. This new function will surveyors to continue working a few minutes when radio or mobile signal is lost in blind area. The accuracy is down to 2cm.



SPECIAL REMIND: Please run this Website for more IMU info: https://youtu.be/VvHJN6bkUDo

# **§6.2.7 Radio Router**

This feature is used to transfer the correction which from the reference station for the other rover by radio, the rovers will have the same coordindates from the reference station. *NOTE: This function should be used under Rover+Network mode.* 

Before configuring on this function, go to "Radio Parameters" interface to check which radio channel value and what kind of protocol are being applied, please keep in mind on this channel

value and protocol that are selected to match on rovers later on.

Then choose "Network" for Datalink option and choose "internal radio" for Router option in "General Config" page, click on "Enter" button to confirm the settings.

Mode setting:		
Work Mode:	Rover -	,
Datalink	Network 🗸	-
Radio Route:	Inner Radio Route 🗸	

At this moment, configure the parameters for rover to access to the CORS server for corrections. Then the other rovers are able to connect the rover router via internal radio with the same channel value, after rovers have fixed solution, the base coordinates are same as CORS station.



# Appendix A KOLIDA K1Pro technical specifications

### **GNSS characteristics:**

- 336 GNSS channels (672 channels optional)
- GPS : L1C/A, L1C, L2C, L2E, L5
- GLONASS : L1C/A, L2C/A, L2P, L3
- BeiDou: B1, B2, B3
- Galileo: E1, E5A, E5B, E5AltBOC, E6
- IRNSS: L5
- SBAS: L1C/A, L5 (QZSS, WASS, MSAS, GAGAN, EGNOS)
- Global Correction Service (MSS L-Band)

### Initialization:

Time <10s, reliability >99.99%

### **Supported data formats:**

RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2, CMR, CMR+

### Output data formats:

NMEA 0183, PJK plane coordinates, Binary code, Trimble GSOF

### **L-band Correction Service**

- Star-fill: 5 minutes, down to 2 cm accuracy
- Star-Link: down to 2 cm accuracy (need subscription)

### **Inertial Measurement**

- Tilt Angle: up to 60 degrees
- Accuracy: down to 2cm

### **Positioning Accuracy**

### **Code differential GNSS positioning**

- Horizontal:  $\pm 0.25m+1ppm$
- Vertical:  $\pm 0.50m + 1ppm$
- SBAS positioning accuracy: Typically<5m 3DRMS

### Static

- Horizontal:  $\pm 2.5$ mm+0.5ppm
- Vertical: ±5mm+0.5ppm



### Real-time kinematic (RTK)

- Horizontal: ±8mm+1ppm
- Vertical:  $\pm 15$ mm+1ppm

### **Network RTK**

- Horizontal: ±8mm+0.5ppm
- Vertical:  $\pm 15$ mm+0.5ppm

**RTK initialization time** 

■ 2~8s

### **Physical characteristics**

### Size

■ 16.3 x 16.3 x 9.6 cm

### Weight

■ 1.33 kg (with built-in battery)

### User interface

- Five Indicator lights, Two buttons
- OLED color screen, 1 inch, 128x64 res.
- Linux System

### I/O interface

- 5PIN LEMO external power port+RS232
- 7PIN external USB(OTG)+Ethernet
- Bluetooth 2.1+EDR standard
- Bluetooth 4.0 standard, support android connection

### Memory

- 8GB SSD internal storage
- Support external USB storage (up to 32 GB)
- Automatic cycle storage
- Changeable record interval
- Up to 50Hz raw data collection

### Operation

- RTK rover & base
- RTK network rover: VRS, FKP, MAC
- NTRIP, Direct IP
- Post-processing



### **Environmental characteristics**

- Operating temperature:  $-45^{\circ}$  to  $+75^{\circ}$  C
- Storage temperature:  $-55^{\circ}$  to  $+85^{\circ}$  C
- Humidity: 100% condensing
- IP68 waterproof, sealed against sand and dust
- Drop: 2m pole drop on concrete

### **Power characteristics**

- Built-in internal battery, 7.4 V, 10,000 mAh
- Battery life: >14h (static mode),>7h (internal UHF base mode),>8 to 14h (rover mode)
- External DC power: 9-28 V

### **UHF Radio characteristics**

- Built-in radio, 120 channels
- Frequency Range 410-470MHz
- Protocol: TrimTalk450s, TrimMark3, SOUTH (KOLIDA), Hi-target, CHC, Satel
- 1W/2W/3W switchable
- typically working range 7-8km
- "Barrier-Free" Measurement Technology: Repeater/ Router

### **Cellular module characteristics**

- WCDMA/ CDMA2000/ TDD-LTE/ FDD-LTE 4G
- Compatible with 3G GPRS/ EDGE

### WebUI

Configure and monitor receiver by webserver via Wi-Fi or USB cable

### NFC

■ Close range (shorter than 10cm) automatic pair between receiver and controller (need NFC chip in controller)

### Wifi

- 802.11 b/g standard
- Hotspot: allow device to access in
- data link: broadcast differential data

### Voice Guide

- intelligent voice technology provides status indication and operation guide
- Chinese, English, Korean, Russian, Portuguese, Spanish, Turkish and user define



### Standard system components

- K1Pro GNSS Receiver & built-in battery
- Charger and adapter
- All-direction antenna
- $\blacksquare$  30 cm pole extension (with base only)
- 7-pin to OTG cable
- Field software: Engineering Star (Windows Mobile)
- Post-processing software: KGO (Windows PC)
- 1 year warranty

### **Optional system components**

- External Radio (410-470 MHz, 5-35W)
- Battery Case SA-6003
- Data collectors
- H3 plus (Android), H5 (Android)
- T17N (Windows mobile)
- S50 (Android)
- Field software
- Field Genius (Windows)
- SurvX (Android)
- Engineering Star 5.0 (Android)
- 1-2 year warranty extension

# **Appendix C Technical Terms**

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

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

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

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

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

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

C / A code: GPS coarse / acquisition code, modulate the pseudo-random binary code

for the 1023 bit duplex, the bit rate of which is 023MHz, and code repetition period of 1ms.

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

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

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

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

 $V \quad D'$  where a, b of the semi-major axis and semi-minor axis.

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

Ephemeris: the position of celestial bodies over time parameters.

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

Flattening:

Eccentricity:

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

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

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

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

Multipath error: the positioning error caused by the interference between two or more radio signal propagation path.Observing session: the use of two or more receivers at the same time to collect GPS data period.

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

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

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

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



# FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.