

# RTK-M100 User's Manual





© 2020 LOCOSYS Technology Inc.



# **Document history**

| Version | Date                 | Updates   |
|---------|----------------------|-----------|
| 1.0     | May 31 <i>,</i> 2020 | Creation. |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |
|         |                      |           |



# Contents

| 1. | IN |  | 3 |
|----|----|--|---|
| 2. | FE | EATURE                                     | 3 |
| 3. | Α  | PPLICATION                                 | 3 |
| 4. | H  | ARDWARE DESCRIPTION                        | 4 |
| 4. | 1. | BLOCK DIAGRAM                              | 4 |
| 4. | 2. | ETHERNET CONNECTOR                         | 4 |
| 4. | 3. | MINI USB CONNECTOR                         | 4 |
| 4. | 4. | MICRO SD CONNECTOR                         | 4 |
| 4. | 5. | I/O CONNECTOR                              | 4 |
| 4. | 6. | SERIAL PORT CONNECTOR                      | 5 |
| 4. | 7. | RF CONNECTORS OF RTK ANTENNA               | 6 |
| 4. | 8. | RF CONNECTOR OF 4G/LTE                     | 6 |
| 4. | 9. | LED  | 6 |
| 5. | IN | ISTALLATION OF SIM CARD                    | 6 |
| 6. | G  | ETTING STARTED                             | 7 |
| 7. | C  | ONFIGURATION EXAMPLES                      | 8 |
| 7. | 1  | CONFIGURATION EXAMPLE OF THE ROVER         | 9 |
| 7. | 2  | CONFIGURATION EXAMPLE OF THE BASE STATION1 | 2 |
| 8. | R  | TK NETWORK14                               | 4 |

# LOCOSYS

# 1. Introduction

RTK-M100 system product is dual-frequency multi-constellation RTK devices, Embedded NXP<sup>®</sup> i.MX 6 (Automotive Grade) high-end processor and provides centimeter-accurate GNSS measurements. All of them can work in base station or rover. There are two communication interfaces, including Ethernet, 4G/LTE. Through these built-in communication functions for local or could data center communication with the external host.

RTK-M100 system have not only 64M bytes on-board flash memory for saving up to 7 days of RTK position data, but also a micro SD interface to log RTK position data and GNSS raw data for post processing. In addition, light weight and low power consumption make RTK-M100 product series easy to use.

### 2. Feature

- Embedded NXP<sup>®</sup> i.MX 6 (Automotive Grade) processor.
- LOCOSYS Centimeter-accurate RTK module.
- LOCOSYS RTK algorithm.
- Support Multi-frequency and Multi-constellation. (GPS, BEIDOU, GLONASS, QZSS)
- Up to 5Hz RTK position.
- Up to 2Hz simultaneous RTK position.
- Built-in RJ-45 Ethernet function.
- Built-in 3G/4G-LTE modem.
- Built-in NAND flash 、 LPDDR2 、 Power management.
- Micro-SD 

  CAN-Bus interface 
  Micro-SIM holder.
- Light weight and low power consumption.
- Embedded Linux OS.

# 3. Application

- Precision agriculture
- Environmental and structural monitoring
- Land survey, 3D mapping and aerial photography
- Base Station or Rover use



# 4. Hardware description

#### 4.1. Block diagram



#### 4.2. Ethernet connector

The product does not support the hot plug of Ethernet. If Ethernet is going to be used, please insert Ethernet cable before turning on the power of the product.

#### 4.3. Mini USB connector

The product is powered through Mini USB connector. PC's USB port, 5V power bank or 5V/1A adaptor can power the product. Mini USB connector is also used for communication with PC's software tool RTKFox. The optional internal battery of the product is charged through Mini USB connector, too.

#### 4.4. Micro SD connector

The product supports hot plug of micro SD card with FAT32, ex: FAT or NTFS file system. The user can save RTK position data and GNSS raw data to micro SD card for post processing.

#### 4.5. I/O connector

The 8-position I/O connector of the product is compatible with Hirose's DF13 series. The pin description of the connector is in the following.

Pin 1: CANL, CAN Low-Level Voltage I/O.

Pin 2: CANH, CAN High-Level Voltage I/O.

Pin 3: GND, ground.



Pin 4: IO\_PWR, power input for IO pin 1 ~ 4. Input voltage range is 3.3V~5.5V. Pin 5: IO\_01, general purpose IO pin 1. Logic level is based on the voltage of IO\_PWR. Pin 6: IO\_02, general purpose IO pin 2. Logic level is based on the voltage of IO\_PWR. Pin 7: IO\_03, general purpose IO pin 3. Logic level is based on the voltage of IO\_PWR. Pin 8: IO\_PWM, general purpose IO pin 4.Logic level is based on the voltage of IO\_PWR.



#### 4.6. Serial port connector

The external host CPU can communicate with the product through the serial port. The protocol is 115200-8-N-1 (115200 baud, 8 data bits, no parity, 1 stop bit). The 6-position connector of the serial port is compatible with Hirose's DF13 series. The pin description of the connector is in the following.

Pin 1: NC, not connected.

- Pin 2: TX, transmit data to the external device. (3.3V)
- Pin 3: RX, receive data from the external device. (3.3V)
- Pin 4: NC, not connected.
- Pin 5: PPS, pulse per second.
- Pin 6: GND, ground.



TX and RX signals of the serial port and USB-UART bridge IC connect to the same UART port of the product's internal CPU module. If both serial port and Mini USB connector are connected, the serial port will dominate the communication with the internal CPU module.

# LOCOSYS

#### 4.7. RF connectors of RTK antenna

The product supplies the dedicated 3.3V power to the external GNSS antennas through RF connectors of RTK module. It has built-in antenna short circuit protection. The product can detect RTK antenna connection status. If RTK antenna is not properly connected, green LED will be always on.

#### 4.8. RF connector of 4G/LTE

Connect 4G/LTE antenna before turning on the power of the product. If the product successfully registers to the network of the telecom provider, the yellow LED will blink once every second.

#### 4.9. LED

The product has three LEDs. The colors are red, yellow and green. Detail description is in the following table.

| LED    | State                 | Description   |
|--------|-----------------------|---|
| Red    | Blink (on/off: 500ms) | The product is working.   |
|        | Blink (on/off: 500ms) | Successfully register to the network of the telecom provider  |
| Yellow | Blink (on/off:250ms)  | Not register to the network of the telecom provider through 4G/LTE  |
|        | Always on             | RTK antenna is not properly connected.  |
|        | Blink (on/off:100ms)  | Data log function has been enabled, but fails to detect the micro SD card or internal flash memory is full.   |
| Green  | Blink (on/off:300ms)  | <ul><li>Rover mode: RTK fix is not available.</li><li>Base station mode: Survey-In is not complete.</li></ul> |
|        | Blink (on/off:500ms)  | <ul><li>Rover mode: RTK fix.</li><li>Base station mode: Survey-In is complete.</li></ul>                      |

# 5. Installation of SIM card

First, power off the product and confirm the red LED is off. Then remove 8 screws of the product and pull out the PCB board. The SIM card holder is on the bottom side of the PCB board shown as below picture. Prepare a micro SIM card with no PIN lock, and insert into SIM card holder. Then put PCB board back into the metal box of the product and tighten the screws. Now SIM card is installed.





### 6. Getting started

- Install USB driver for MS Windows. It can be downloaded at <u>http://www.prolific.com.tw/UserFiles/files/PL2303\_Prolific\_DriverInstaller\_v1200.zip</u>.
- 2. If Ethernet is going to be used, plug in Ethernet cable before power on the product.
- 3. If 4G/LTE is going to be used, insert a micro SIM card with no PIN lock as described in the section 5. Attach 4G/LTE antenna.
- 4. Connect Mini USB cable to the product and the computer. A COM port will be enumerated in the Device Manager of MS Windows.





- 5. Press the red button to power on the product. The red LED of the product will be on immediately. Wait for up to 1 minute until the red LED blinks. The product starts and ready for control.
- 6. Now you can run PC software tool RTKFox to evaluate the product.

# 7. Configuration examples

RTK-M100 product series can work in three different modes, including rover, base station and sensor mode. The user can use PC software tool RTKFox to configure. After finishing the steps in section 6, RTKFox starts as below. Select COM port that the product is connected.



If RTKFox connects to the product successfully, all buttons are enabled as below.





#### 7.1. Configuration example of the rover

Click the radio button of "Rover" to show the setting page as below picture.

| Configuration<br>olber 5<br>Apply<br>le<br>D Base Station ©<br>ting  | ) Rover O                     | ) Sensor Node                              | · · · · · · · · · · · · · · · · · · ·  |  |  |   |                                       |
|--|-------------------------------|--|--|--|--|---|---------------------------------------|
| Ver<br>Option 1<br>Positioning Mode 2<br>Update Frequency 1<br>Min Elevation 15<br>SNR Mask Min C<br>Moving Baseline<br>Enable Constraint<br>Baseline Length<br>Baseline Deviation | inematic<br>Hz<br>/NO 35<br>0 | <pre>     (deg)     (dbHz)     (cm) </pre> | Data Log<br>Log Behavior Stop when full ~<br>Solution Result<br>Solution result log destination Off ~<br>Raw Data<br>Enable log Base GNSS raw data in SD card<br>Enable log Rover GNSS raw data in SD card | Stream<br>Input Stream<br>Transmit NM<br>Ntrip Caster Setti<br>Address<br>Port<br>Mount Point<br>User Name<br>Password | 3<br>NTRIP Client ~<br>IEA GGA to bese station<br>ag 4<br>60 205.8.49<br>8002<br>RTCM32_GGB<br>bocosyst<br>******* | Input Stream F<br>Rover<br>Base Station<br>GNSS Constell<br>GNSS<br>GPS<br>GLONASS<br>GALILEO<br>BEIDOU<br>QZSS | RTCM3.2<br>RTCM3.2<br>ttion<br>Enable |

- Click the selection "Position Mode". There are three options. The option "kinematic" is for RTK position. The option "Moving baseline" is for RTK heading. The option "kinematic + moving baseline" is for simultaneous RTK position and RTK heading.
- 2. Click the selection of "Update Frequency" to set the update rate of RTK.
- 3. Input the settings of NTRIP Caster.
- 4. Click the button "Apply" to take effect. The settings will be saved in the internal flash memory.
- 5. Check 4G/LTE connection by clicking "Network" button. If the product registers to the network of the telecom provider, it will show "Connected" as below picture.

| LOCOSYS RTKFox        |                 |             |                            |                    |
|-----------------------|-----------------|-------------|----------------------------|--------------------|
| Setting Help          |                 |             |                            |                    |
| ۵ [۲۰ ک               |                 | <b>3</b> 11 | ; 🖬 🏼 🕿 📎 🧕                |                    |
| Network               |                 |             |                            | 7                  |
| Network servi         | ce via: 4G      |             |                            | Network" button    |
| Network Configuration |                 |             | Network Interface          |                    |
| PDP Type              | O:IP            | ~           | Refresh                    |                    |
| Access Point Name     | Ready           | Internet    | Signal Strength            | att                |
| 4G Status             | Connected       |             | IMEI                       | 862015036491145    |
|                       | Connect Discon  | mect        | Manufacturer               | LONGSUNG           |
| 4G Status             |                 |             | Model                      | U9507C             |
| IP address            | 10.34.237.99    |             | Revision                   | LLA0029.1.4_M005   |
| Sub-Net Mask address  | 255.255.255.255 |             | Current Functionality      | Full functionality |
| Received data         | 7757776         | Bytes       | Network Operation          | AUTO               |
| Send data             | 50242439        | Bytes       | SIM presence               | READY              |
| Received packets      | 156249          |             | Network Service Type       | L TE FDD           |
| Send packets          | 310863          |             | Operation Mode             | Automatic          |
|                       |                 |             | Access technology selected | UTRAN              |
|                       |                 |             | Operator                   | "Chunghwa Telecom" |
|                       |                 |             |                            |                    |

6. Click "Satellite Info" button to check the received GNSS signal strength. Most signals should be higher than 40. If you want to see satellite information from the reference/base station, you can click "Display" button and select "Rover & Base".





7. Click "Monitor Status" button. If "bps of NETWORK" varies, the connection to NTRIP Caster is established and the correction data for RTK is received.

| I OCOSYS RIKFox       - □ ×         Setting       Help         Image: Setting       Help         Image: Setting       Image: Setting         Image: Seting       Image: Seting         <   |                  |          |          |  |  |                         |           |           |         |
|--|------------------|----------|----------|--|--|-------------------------|-----------|-----------|---------|
| Setting       Heip         Image: Construction of the set of the s   | 🏶 LOCOSYS RTKFox |          |          |  |  |                         | -         |           | ×       |
| Image: Second   | Setting Help     |          |          |  |  |                         |           |           |         |
| Monitor Status         • ×           Ingut Streams         000000000000000000000000000000000000  | 🖉 • 💽 🗧          | 🆻 🔁 📖    |          | <b>8</b> 1   |  | I III 💁 🗞 🎪 🕅 💥 📶       |           |           |         |
| Input Streams  | Monitor Status   |          |          |  |  | 1                       |           |           | ▼ ×     |
| GNSS1         207320         Bytes         4484         bys           None         249630         Bytes         6143         bys           None         0         Bytes         0         bys           Output Steems         0         Bytes         61617         bps           Rover Rew Data         194745         Bytes         6017         bps           None         0         Bytes         0         bps           Devise Info         Chip ID         C8P9460F425F         Software         BLD A0 00 B01           Firmware         DLD A0 00 B01         FirmWare         BLD A0 00 B01         FirmWare         BLS A1 00 B01           GNS21         V100C001B011         V100C01B011         COM5 UTCs/5/2019 10:0827 AM         Common Commo   | Input Streams    |          |          |  |  |                         |           |           | -       |
| NETWORK       249630       Byte:       6143       bp:         None       0       Byte:       0       bp:   | GNSS1            | 207320   | Bytes    | 4884   | bps  |                         |           |           |         |
| None         0         Bytes         0         bps of NETWORK           Output Streams         Rover Raw Data         194745         Bytes         4441         bps           Bess Raw Data         249630         Bytes         6017         bps           None         0         Bytes         0         bps           None         0         Bytes         0         bps           Device Info         Chip ID         C8F9460F425F         Chip ID         C8F9460F425F           Software         RTK:A1:00 B03 07/18/2019 17:36:44         Hexdware         HWv:1.0           Firmware         BLD: A0.90 B010<br>KNIL.A00 B01         KNIL.A00 B01         KNIL.A00 B01           ONSUL         V100C001B011         C003 UTC:9/5/2019 10:08:27 AM  | NETWORK          | 249630   | Bytes    | 6143   | bps  | "Monitor Status" button |           |           |         |
| Output Streams         Rover Raw Data       194745       Bytes       4641       bps         Base Raw Data       249630       Bytes       6017       bps         None       0       Bytes       0       bps         None       0       Bytes       0       bps         None       0       Bytes       0       bps         Device Info   | None             | 0        | Bytes    | 0  | bps  | > bps of NETWORK        |           |           |         |
| Rover Raw Data       194745       Bytes       4841       bps         Base Raw Data       249630       Bytes       6017       bps         None       0       Bytes       0       bps         None       0       Bytes       0       bps         Device Info   | Output Streams   |          |          |  |  |                         |           |           |         |
| Base Raw Data       249630       Bytes       6017       bps         None       0       Bytes       0       bps         None       0       Bytes       0       bps         Device Info  | Rover Raw Data   | 194745   | Bytes    | 4841   | bps  |                         |           |           |         |
| None       0       Bytes       0       bps         None       0       Bytes       0       bps         Device Info       0       CRF9460F425F         Chip ID       CRF9460F425F       CRF9460F425F         Software       RTK:A1.00 E03 07/18/2019 17:36:44         Hardware       HWv:1.0         Firmware       DEF :4.00 0.001         Software       REX:A1.00 E01         Firmware       DEF :A0.00 E01         Software       RX:A1.00 E01         Firmware       DEF :A0.00 E01         Software       RX:A1.00 E01         Firmware       DEF :A0.00 E01         Firmware       DEF :A0.00 E01         Firmware       DEF :A0.00 E01         Firmware       V100C001E011   | Base Raw Data    | 249630   | Bytes    | 6017   | bps  |                         |           |           |         |
| None         0         Bytes         0         bps           Device Info   | None             | 0        | Bytes    | 0  | bps  |                         |           |           |         |
| Device Info           Chip ID         C8F9460F425F           Software         RTK:A1.00 E03 07/18/2019 17:36:44           Hardware         HWv:1.0           Firmware         BLD:A0 90 E001<br>KNT: A0 90 E001<br>FSR:A1.00 E001<br>FSR:A1.00 E001<br>FSR:A1.00 E001<br>FSR:A1.00 E001<br>FSR:A1.00 E001           GNSSil         V100C001E0011   | None             | 0        | Bytes    | 0  | bps  |                         |           |           |         |
| Chip ID         C8P9460F425F           Software         RTK:A1.00 E03 07/18/2019 17:36:44           Hardware         HWv:1.0           Firmware         BLD:A0 90 E01<br>DE7:40 90 E02<br>KNL:A0 90 E01<br>FSA:A1.00 E01<br>FSA:A1.00 E01<br>FSA:A1.00 E01<br>FSU:A1.00 E01           GNS31         V100C001E011   | Device Info      |          |          |  |  |                         |           |           |         |
| Software         RTK:A1.00 B03 07/18/2019 17:36:44           Hardware         HWv:1.0           Firmware         BLD:A0.90 B01<br>DE7:A0.90 B02<br>KN1.A00.901<br>FSR.A1.00 B01<br>RSU:<br>Module           GNSS1<br>module         V100c001B011   | Chip ID          |          |          | C8F9460F   | 425F   |                         |           |           |         |
| Hardware         HWv:10           BLD:A090B01         BLD:A090B02           Firmware         BLD:A090B01           Firmware         Status           GNSS1         V100C001B011           FireAdy         COM3   | Software         | RTK:A1.0 | 0 B03 07 | /18/2019 17::  | 36:44  |                         |           |           |         |
| Firmware         BLD:A0:90:B01<br>DEF:A0:90:B02<br>KNT.A0:90:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00:B01<br>FSR:A1:00 | Hardware         |          |          | ΗW   | v:1.0  |                         |           |           |         |
| GNSS1 V100C001B011   | Firmware         |          |          | BLD:A0.90<br>DEV:A0.90<br>KNL:A0.90<br>FSR:A1.00<br>FSA:A1.00<br>FSU:A1.00 | .B01<br>.B02<br>.B01<br>.B01<br>.B01<br>.B01 |                         |           |           | _       |
| Ready COM3 UTC:9/5/2019 10:08:27 A   | GNSS1<br>module  |          |          | V100C001E  | 3011   |                         |           |           |         |
|  | 💮 Ready          |          |          |  |  | СОМЗ                    | UTC:9/5/2 | 019 10:08 | 3:27 AM |

8. Click "Solution Result" button. You can see RTK fix or not and the other information of RTK position.





#### 7.2. Configuration example of the base station

Click the radio button of "Base Station" to show the setting page as below picture.

| <ul> <li>LOCOSYS RTKFox</li> <li>Setting Help</li> <li>Configuration</li> <li>Toolbar</li> <li>Apply</li> <li>Role</li> <li>Base Station</li> <li>Setting</li> </ul> | Rover O Sensor Node  | 2<br>1   |  | × |
|--|--|--|--|---|
| Position 1<br>Source LLH<br>Lat 25.0618655'<br>Lon 121.6457471<br>Height 137.1721  | 73 (deg)<br>097 (deg)<br>(m)<br>Stream<br>Output Str<br>Addre<br>Port<br>Moun<br>User I<br>Passw | 2           seam         NTRIP Caster           ster Setting | Option<br>Data-Log<br>Log Behavior Recursive (FIFO)<br>Raw Data<br>Enable log GNSS raw data in SD card |   |

- 1. If the position of the product is known, select "LLH" and input its latitude, longitude and height. If the position is unknown, select "Survey In" to let the product get its own position that accuracy is 2~5 meters depending on the received GNSS satellite signals.
- 2. Click the button "Apply" to take effect. The settings will be saved in the internal flash memory.



3. Check 4G/LTE connection by clicking "Network" button. If the product registers to the network of the telecom provider, it will show "Connected" as below picture.

| 🟶 LOCOSYS RTKFox                     |                 |          |                            |                    |
|--------------------------------------|-----------------|----------|----------------------------|--------------------|
| Setting Help                         |                 |          |                            |                    |
| 🖉 • 💽 🞯                              | E 😳 💿 🚺         | 8        | i 👬 🎆 🕿 📎 🧕                |                    |
| Network                              |                 |          |                            | <b>N</b>           |
| Network server                       | ice via: 4G     |          |                            | Network" button    |
| Network Configuration                |                 |          | Network Interface          |                    |
| PDP Type                             | 0:IP            | $\sim$   | Refresh                    |                    |
| Access Point Name<br>Sim Card Status | Ready           | Internet | Signal Strength            | atl                |
| 4G Status                            | Connected       |          | IMEI                       | 862015036491145    |
|                                      | Connect Discor  | mect     | Manufacturer               | LONGSUNG           |
| 4G Status                            |                 |          | Model                      | U9507C             |
| IP address                           | 10.34.237.99    |          | Revision                   | LLA0029.1.4_M005   |
| Sub-Net Mask address                 | 255.255.255.255 |          | Current Functionality      | Full functionality |
| Received data                        | 7757776         | Bytes    | Network Operation          | AUTO               |
| Send data                            | 50242439        | Bytes    | SIM presence               | READY              |
| Received packets                     | 156249          |          | Network Service Type       | L TE FDD           |
| Send packets                         | 310863          |          | Operation Mode             | Automatic          |
|                                      |                 |          | Access technology selected | UTRAN              |
|                                      |                 |          | Operator                   | "Chunghwa Telecom" |
|                                      |                 |          |                            |                    |

4. Click "Satellite Info" button to check the received GNSS signal strength. Most signals should be higher than 40.





5. Click "Monitor Status" button. If "bps of Output Streams" varies, the data is successfully transmitting to NTRIP Caster.

| EUCOSYS RTKFox |           |             |   |  |                       | <u>}:-</u>  |            | ×    |
|----------------|-----------|-------------|---|--|-----------------------|-------------|------------|------|
| Setting Help   |           |             |   |  |                       |             |            |      |
| 🖉 🔘 🗧          | 9 🔁 👳     |             | 81  |  | 1 🎟 🗖 💊 🏟 🖄 📶         |             |            |      |
| Monitor Status |           |             |   |  |                       |             |            | •    |
| Input Streams  |           |             |   |  |                       |             |            |      |
| GNSS1          | 211054111 | Bytes       | 3800  | bps  |                       |             |            |      |
| None           | 0         | Bytes       | 0   | bps  |                       |             |            |      |
| None           | 0         | Bytes       | 0   | bps  |                       |             |            |      |
| Output Streams |           |             |   |  |                       |             |            |      |
| NETWORK-1      | 60543004  | Bytes       | 2211  | bps  |                       |             |            |      |
| Rover Raw Data | 164264533 | Bytes       | 2754  | bps  | bps of Output Streams |             |            |      |
| None           | 0         | Bytes       | 0   | bps  |                       |             |            |      |
| None           | 0         | Bytes       | 0   | bps  |                       |             |            |      |
| Device Info    |           |             |   |  |                       |             |            |      |
| Chip ID        |           |             | C8F9460F  | 4270   |                       |             |            |      |
| Software       | RTK:A1.00 | D B03 07/10 | 3/2019 17:  | 36:44  |                       |             |            |      |
| Hardware       |           |             | ΗW  | v:1.0  |                       |             |            |      |
| Firmware       |           | I<br>I<br>I | BLD:A0.90<br>DEV:A0.90<br>KNL:A0.90<br>FSR:A1.00<br>FSA:A1.00<br>FSA:A1.00<br>FSU:A1.00 | ).B01<br>).B02<br>).B01<br>).B01<br>).B01<br>).B01 |                       |             |            |      |
| 🔴 Ready        |           |             |   |  |                       | COM3 UTC-9/ | 5/2019 6·4 | 6:10 |

6. The configuration of the base station is done.

# 8. RTK network

Most countries have Continuously Operating Reference Stations (CORS) operated by the government or enterprises. The standard protocol called NTRIP is adopted to access these RTK differential corrections. RTK-M100 product have 4G/LTE modem and support NTRIP that can access these corrections to achieve centimeter RTK accuracy.