

# ***RTK-1010 EVK & RTK-1612 EVK***

*Simple steps to quickly complete LOCOSYS RTK software settings*

***(Base Station & Rover)***



*Version 1.1*  
*2021.4.28*

## About LOCOSYS

*LOCOSYS Technology Inc. established in 2005, a company that provide services the scope of which spans from both hardware and software in Global Navigation Satellite System (GNSS), Wireless Communication, Embedded System to Avionics, Automotive and Consumers electronics.*

*LOCOSYS Technology Came from a well-known research organization of information industry, LOCOSYS sustains a strong R&D in Software, Hardware and system integration. Through its self own (International Automotive Task Force, IATF) IATF16949 : 2016 / ISO 9001 : 2015 certified production lines in Taiwan.*

*LOCOSYS is a qualified supplier to tier 1 & tier 2 manufacture in Automotive industry (design house, EMS, OEM, ODM) and be the 2017 best partner of 'Automotive Dead Reckoning' in Global automotive industry and provides solutions and services to various market segments. Stay in a-level qualified module designer and supplier in the international market, deal the partnership with more than 20 Well-known distributors overseas, to provide our customers a complete OEM and ODM services.*

*LOCOSYS Technology Inc.*

*20F.-13, No.79, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City, 22101, Taiwan R.O.C.*

*Tel: +886-2-8698-3698*

*Fax: +886-2-8698-3699*

*Mail: [info@locosystech.com](mailto:info@locosystech.com)*

*For more information about our products, please visit:*

*<https://www.locosystech.com/en/category/Products/index.html>*

*For any technical support or others, please leave a message on below website.*

*We will contact you directly.*

*<https://www.locosystech.com/en/page/Contact-Us/contact-info.html>*

# Contents

**About LOCOSYS ..... 2**

**Contents..... 3**

**Chapter 1. Base Station setting ..... 4**

**Chapter 2. Rover setting ..... 11**

**Chapter 3. Supplement (Basic commands & Troubleshooting)..... 20**

## Chapter 1. Base Station setting

Step 1: Choose the software **“GPSFox V.099v8\_RTKonly”** and click it. Then follow up the procedures below. \*GPSFox version kindly check with our sales.

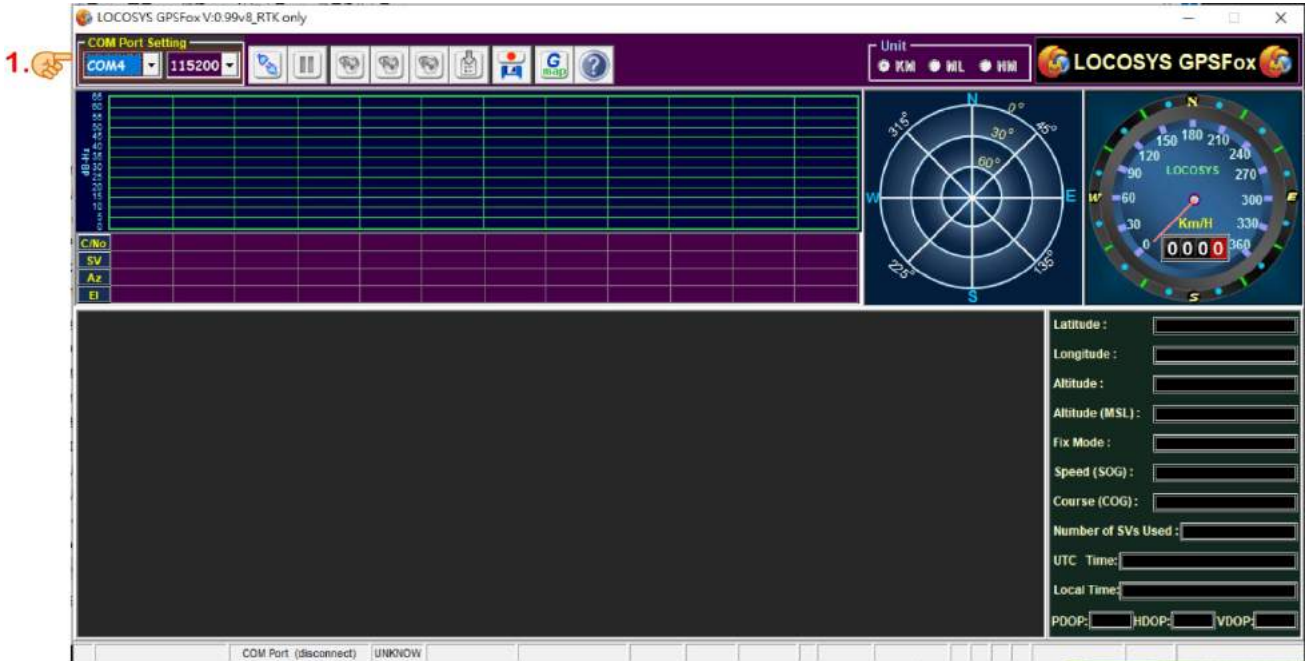


Figure 1: COM Port Setting

Step 2: Press ‘Connect’ button.

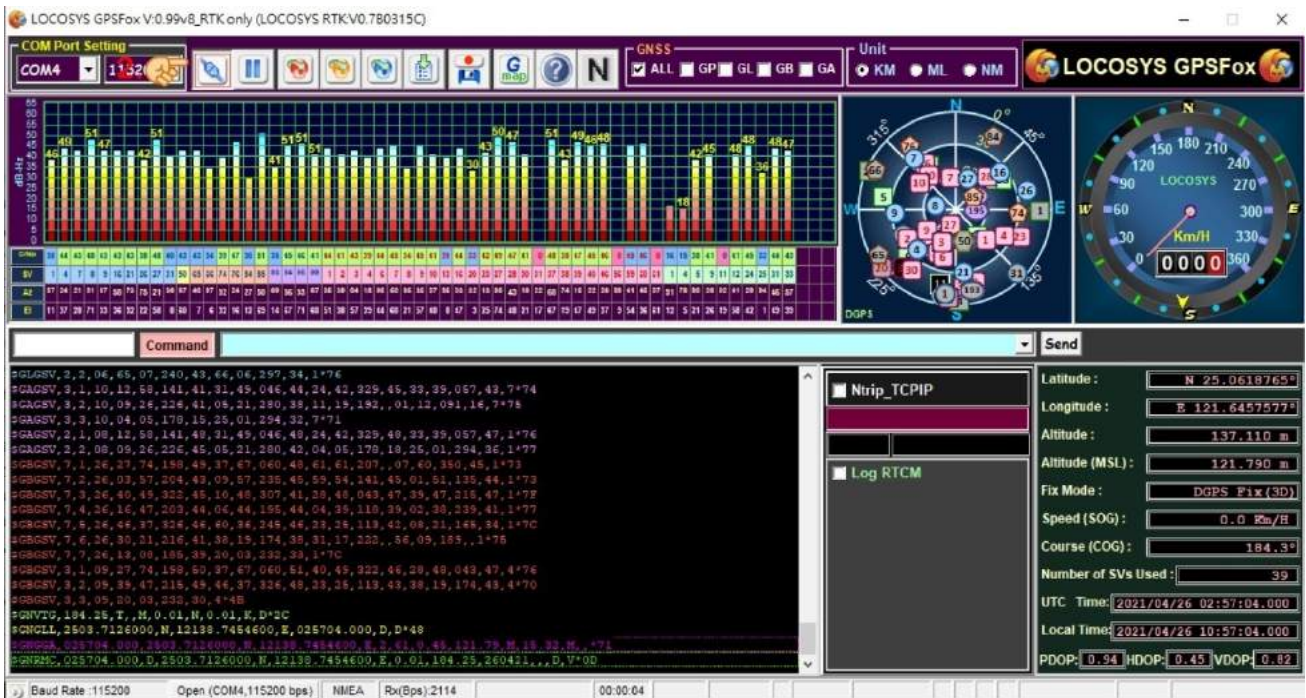


Figure 2: Connect button

Step 3: Inputs command ‘setbase’, press enter.

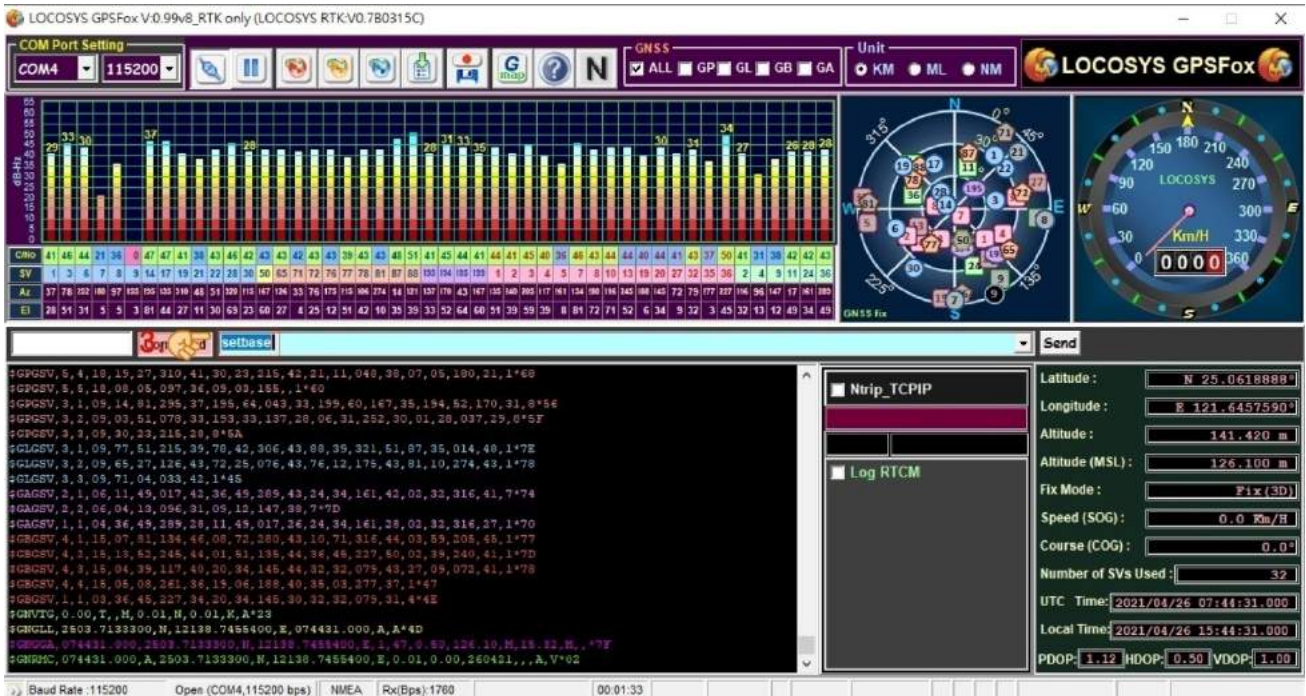


Figure3 :command

Step 4: Inputs command ‘\$PAIR436,1’, press enter.

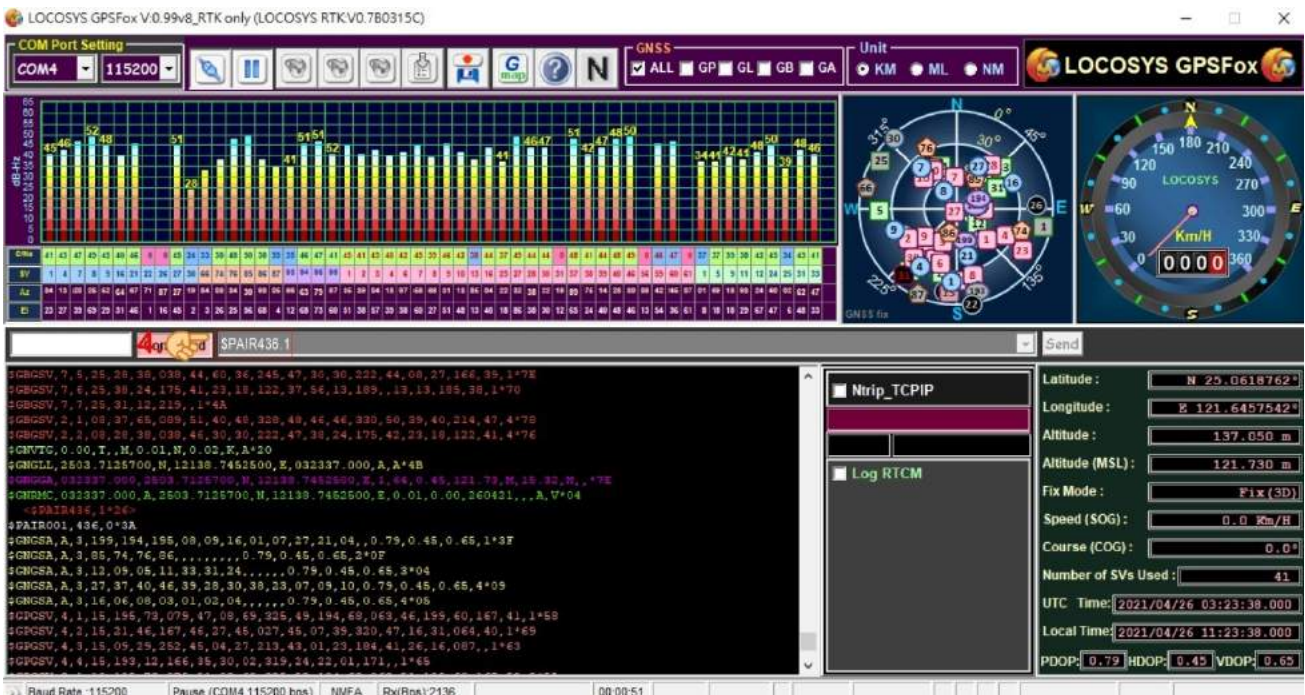


Figure4 :command

Step 5: Inputs command ‘\$PLSC,MCBASE,1’, press enter.

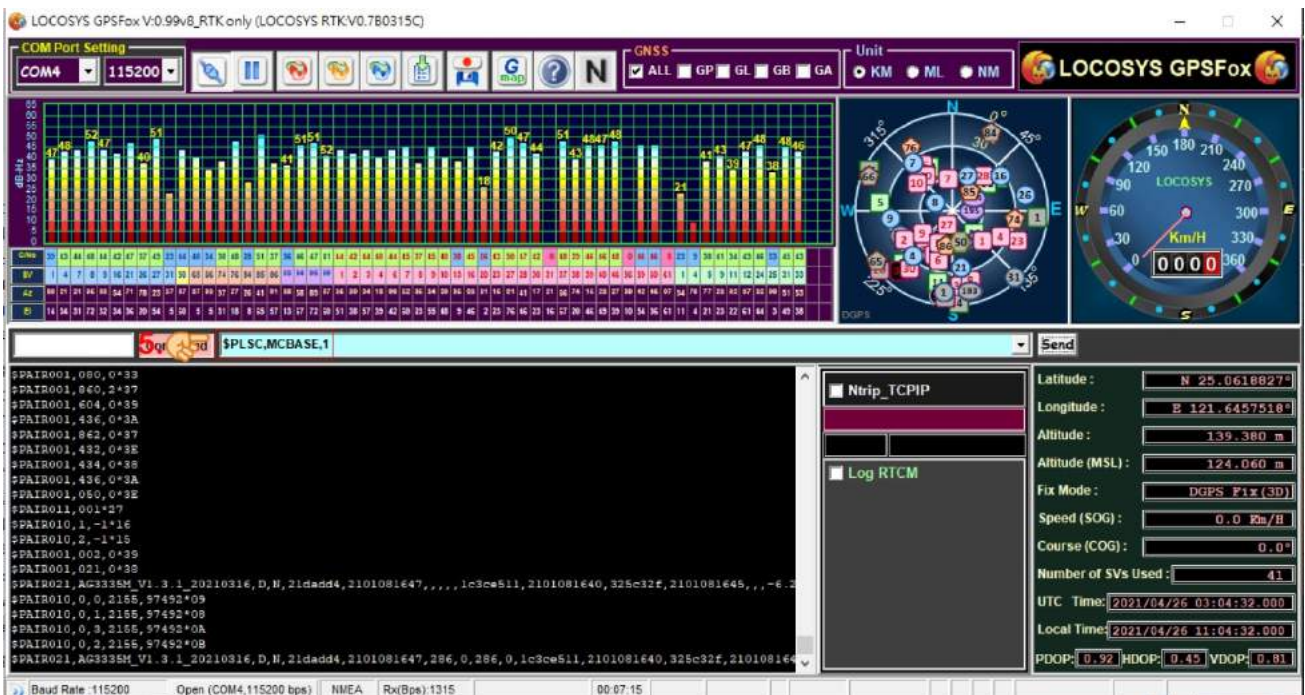


Figure5 :command

Note:

GPSFox tool will automatically add the checksum, so there is no need to include the checksum in the command.

Step 6: Choose the software “com2nc” and click it. Then follow up the procedures below.



Figure 6: Software 'com2nc'

Step 7: Press “Opt”.



Figure 7: com2nc: Serial Options

Step 8: It will pump up this window.

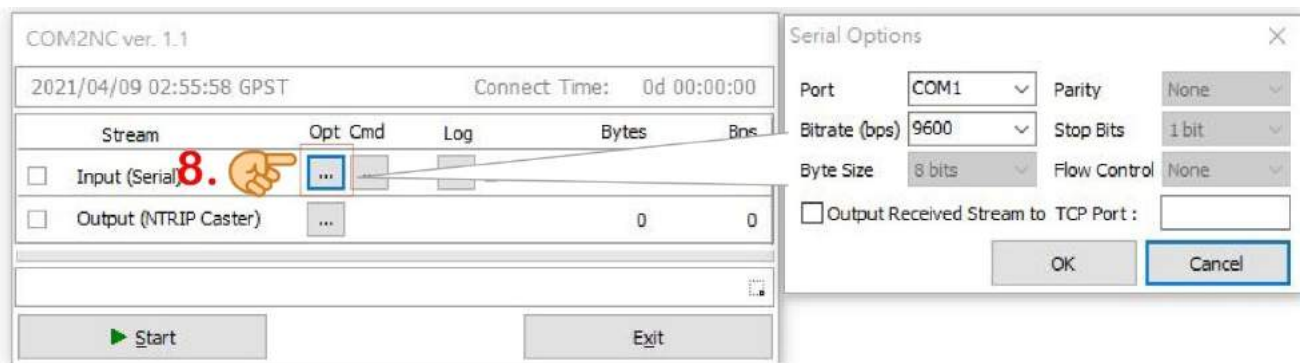


Figure 8: com2nc : Serial Options

Step 9: Setting “Com Port” and “Baud rate”

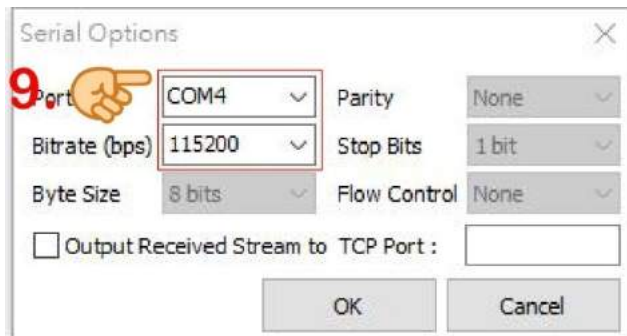


Figure 9: com2nc: Serial Options setting

Step 10~11: Click **Cmd** and input Serial Commands.

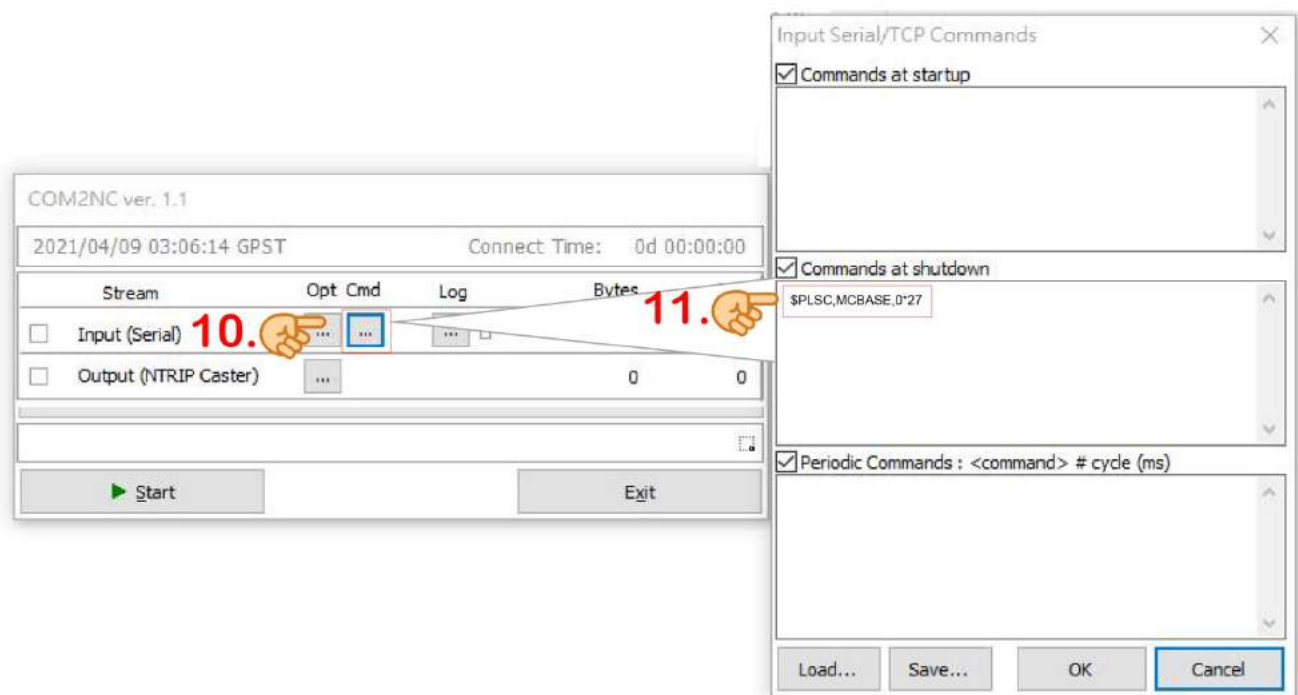


Figure 10: com2nc: Commands setting

Step 12 & 13: Click Opt (Second one) and input Port and either Mountpoint or User ID is ok.

Note: The following demonstration cases.

- (1) Please refer to “page 17” of index file, setting “Port” from 1024 to 65535 (ex: 7777).



(2) “Mountpoint” setting Customer company name (ex: LOCOSYS)

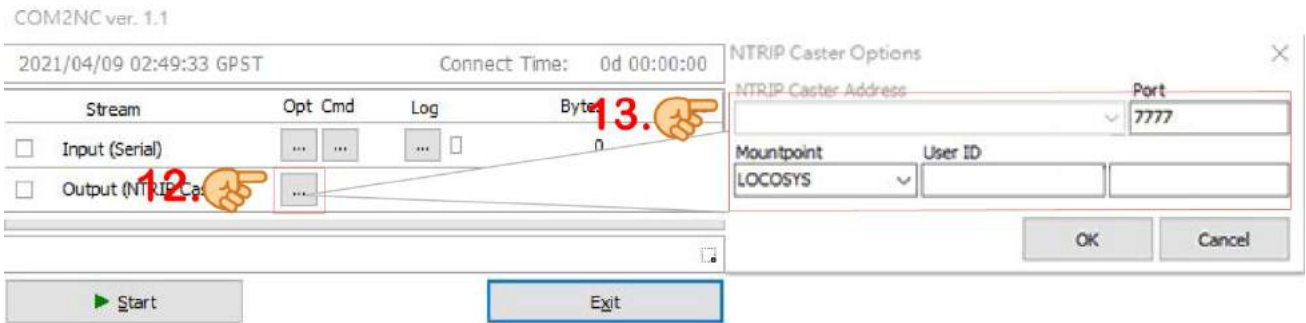


Figure 11: NTRIP Caster Options

Step 14: Press ‘Start’ button

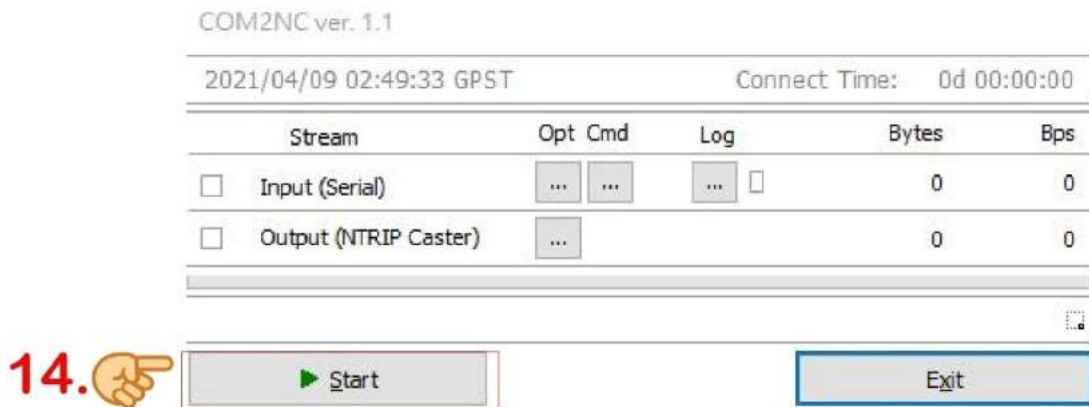


Figure 12: Start button

Step 15: It will show RTK “**Base station**” is working and receiving satellite information

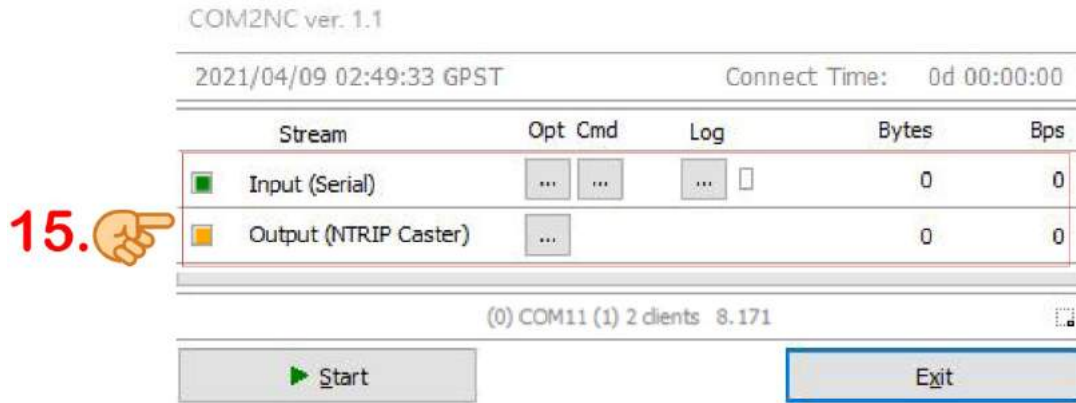


Figure 13: Waiting for client information

**In the above 1~15 steps, You have completed the “Base station” setup.**

## Chapter 2. Rover setting

**Step 1:** Please choose the software: “**rtknavi**” and double click it. Then follow up the procedures below.



名稱	修改日期	類型	大小
GPSFox-V0.99v8_RTK_only	2021/4/7 上午 11:29	應用程式	4,782 KB
GPSFox-V0.99v8_RTK_only	2021/4/9 上午 11:29	組態設定	1 KB
kinematicL1L2-2019-0130.conf	2019/1/30 下午 01:26	CONF 檔案	7 KB
<b>rtknavi</b>	2020/10/8 上午 11:50	應用程式	7,516 KB
sourcetable.dat	2021/4/7 下午 12:21	DAT 檔案	1 KB

Figure 14: Software: “rtknavi”

**Step 2:** Please press “I”

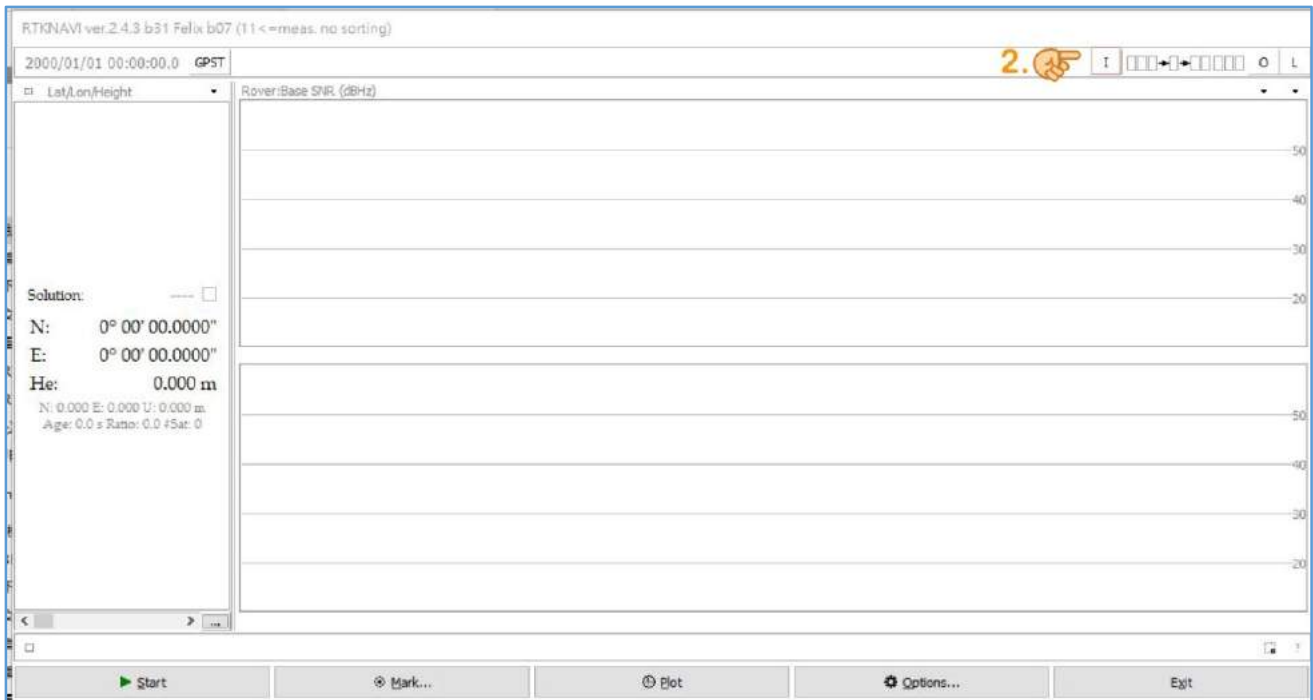


Figure 15: rtknavi –press I button.

**Step 3:** After you press ‘I’, it will jump out this and select option (2) only.

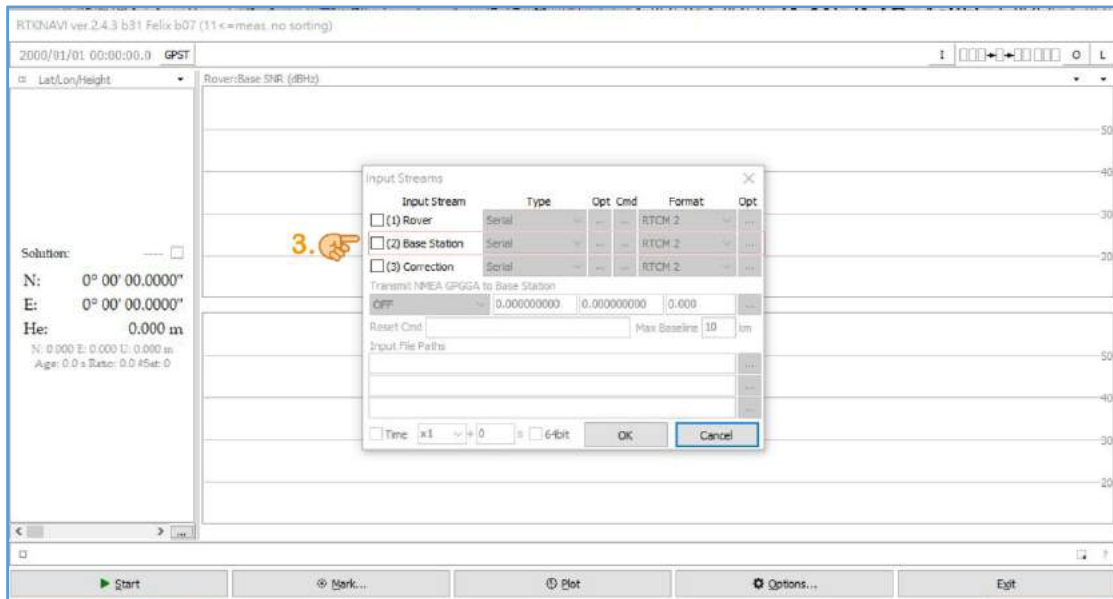


Figure 16: rtknavi – select option

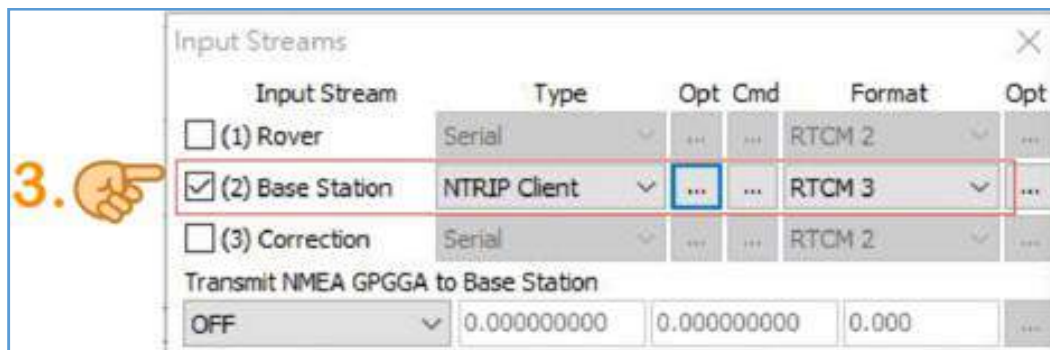


Figure 17: rtknavi – Choose **NTRIP Client** in Type and choose **RTCM3** in Format.

**Note:**

- (1) After selecting option.
- (2) Choose “NTRIP Client” in Type and choose “RTCM3” in Format.
- (3) And then choose Opt in Step 4.

**Step 4~5:**

(1) Click “**Opt**”

(2) Please input data in “**NTRIP Caster Host**” IP address (ex: 192.168.98.152)

(3) “**Port**” (ex: 7777) and “**Mountpoint**” (ex: LOCOSYS).

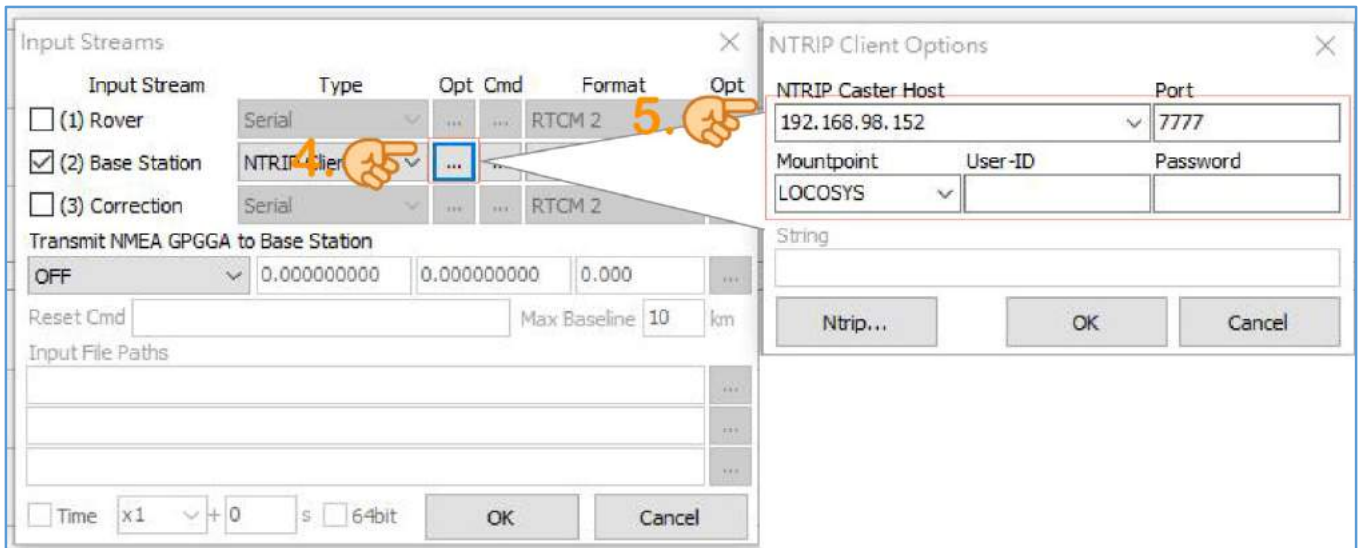


Figure 18: rtknavi – input data in **NTRIP Caster Host**, **Port** and **Mountpoint**.

**Step 6:** Press ‘L’ button.

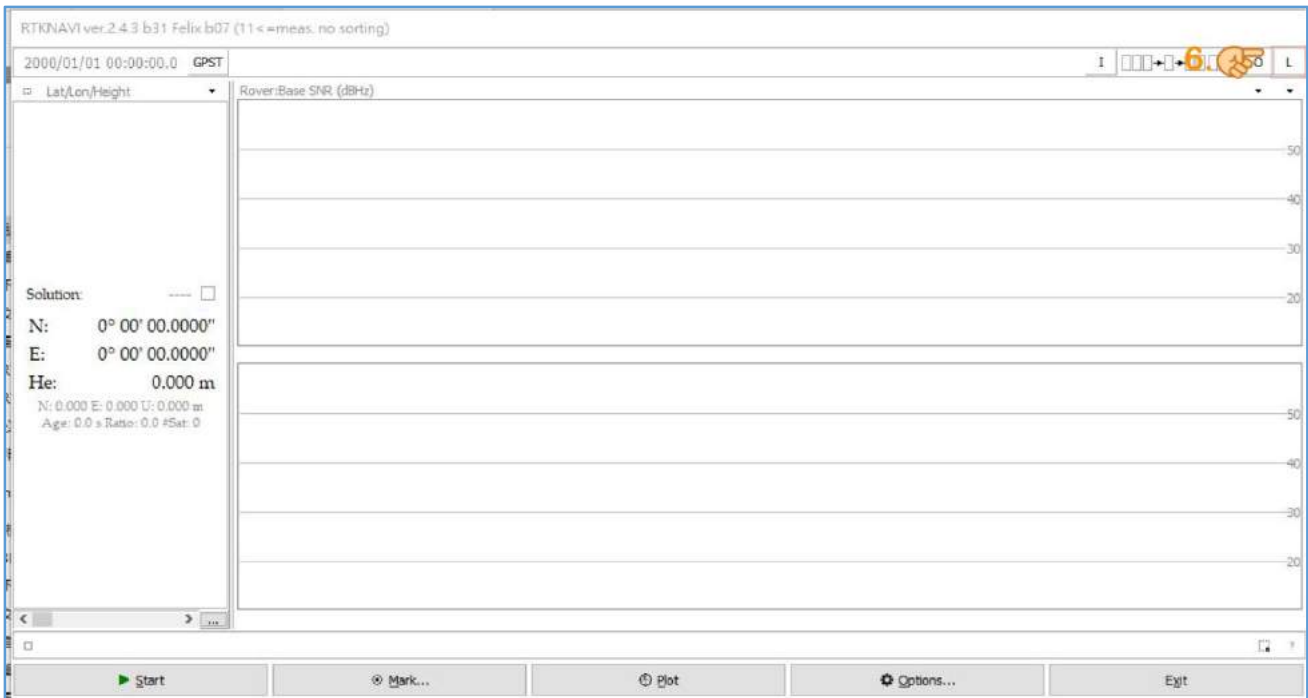


Figure 19: rtknavi – ‘L’ button.

**Step 7:** Select option (7) and choose **TCP Server** in Type and click **Opt ...**

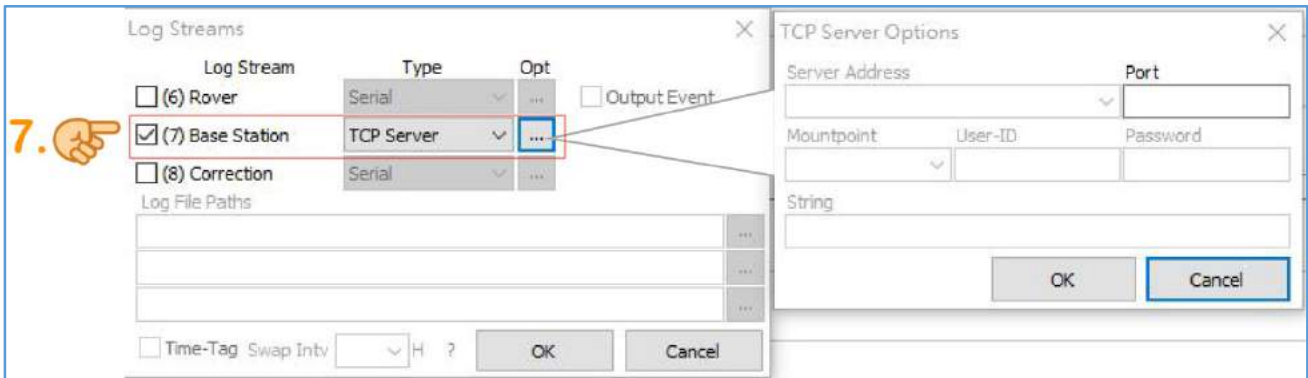


Figure 20: rtknavi - Selecting option (7) and choose **TCP Server** in Type and click **Opt**.

**Step 8:** Input 16800 into Port. Since this is corresponding to GPSFox.

**Note:** 16800 is compulsory value

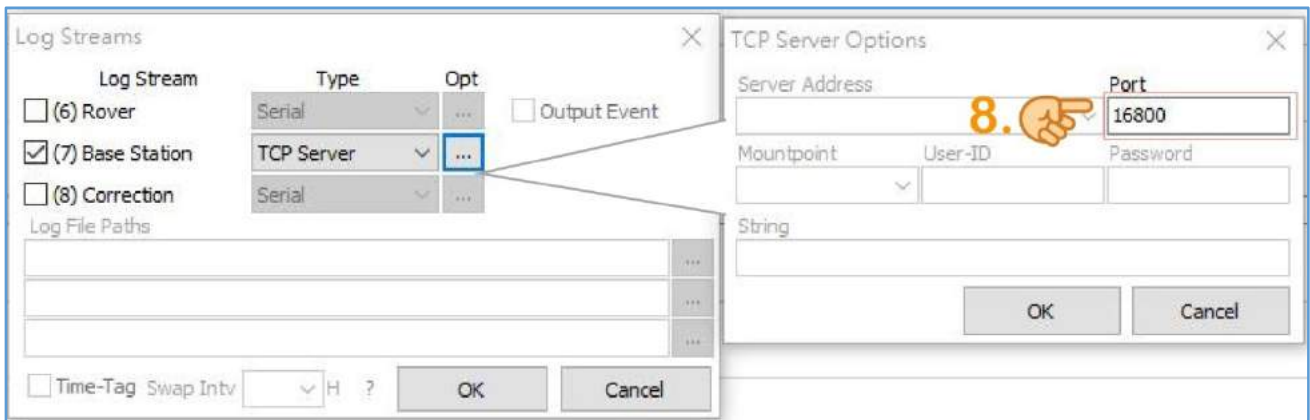


Figure 21: rtknavi - Input **16800** into Port

**Step 9:** After finished setting for 'I' and 'L'. Please press “**Start**”.

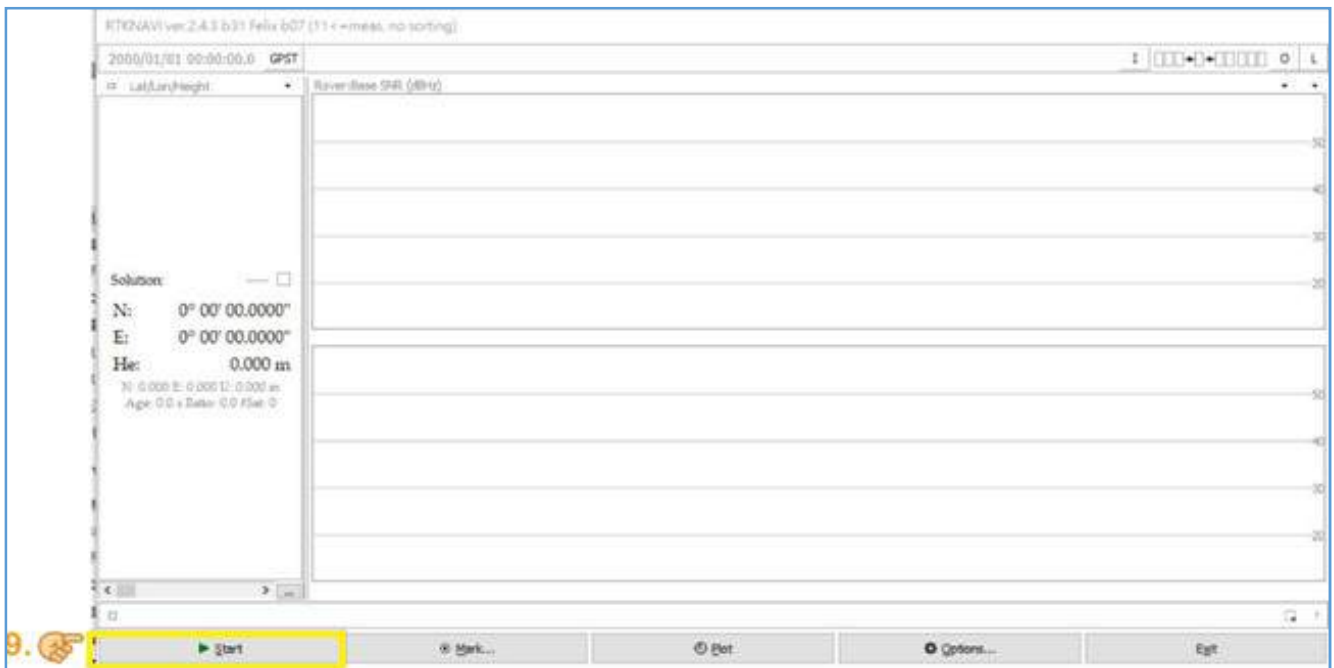


Figure 22: rtknavi – “**Start**” button.



**Step 10:** View “Green light” show up near the ‘I’ button. It means Rover station received RTCM data from “Base station”.

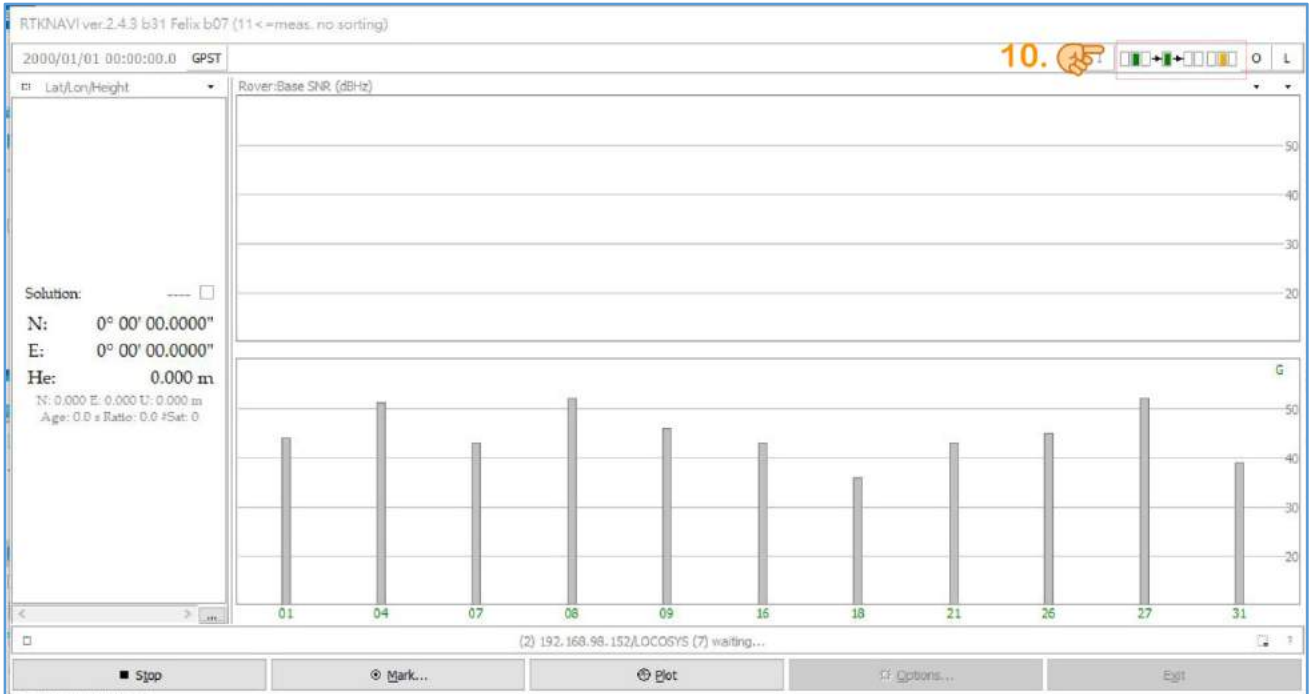


Figure 23: rtknavi – Rover station received RTCM data from Base station.



**Step 14:** Both side show “**Green light**” which means “**Rover** ” is online and connect with “**Base station**”.

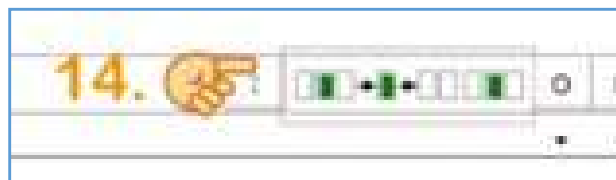
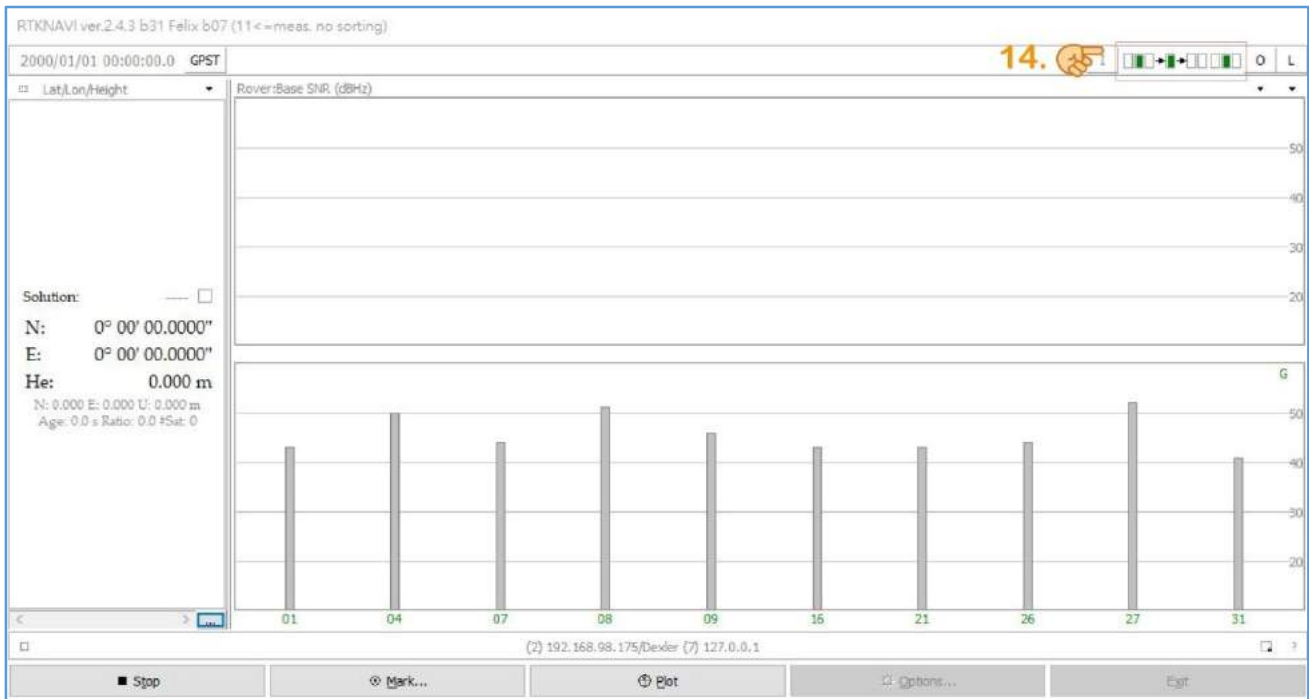
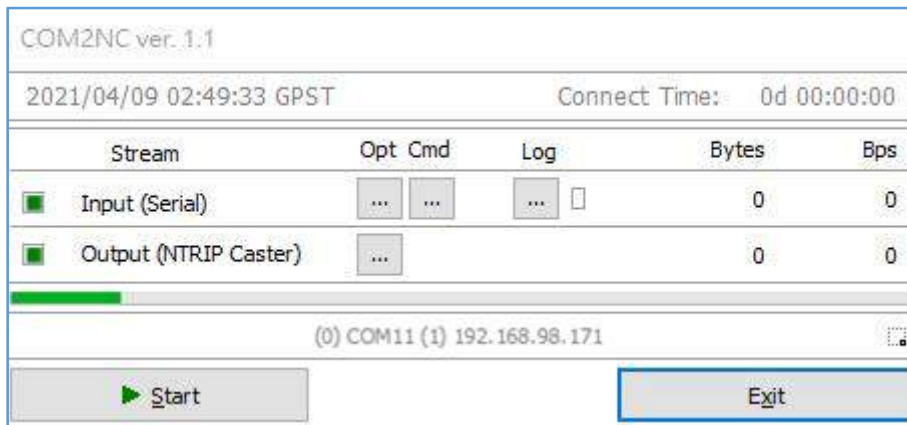


Figure 26: Rover is online

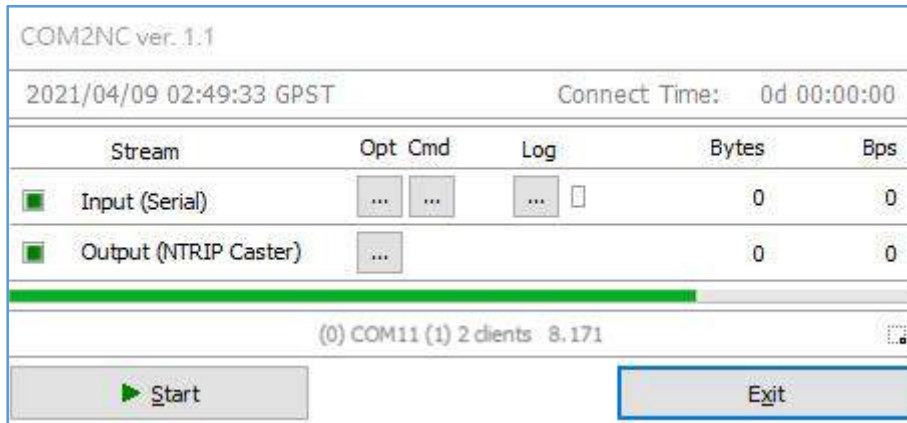
**In the above 1~14 steps, You have completed the “Rover” setup.**

### Chapter 3. Supplement (Basic commands & Troubleshooting)

1. Following screen shot is showing Base station connecting with Rover station and the Rover station (ex: IP is 192.168.98.171)



2. Following screenshot shows the RTK base station is working and two of the clients are connecting.



### 3. Following proprietary command are the most commonly used to support initial base station mode at COM2NC program

- Set the base location (reference position)

Synopsis:

```
$PLSC,SETBASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>
```

Response:

```
$PLSR,BASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>
```

Parameter	Format	Description
X	DDDDDDDD.DDD	WGS-84 ECEF X-axis coordinate (in meters)
Y	DDDDDDDD.DDD	WGS-84 ECEF Y-axis coordinate (in meters)
Z	DDDDDDDD.DDD	WGS-84 ECEF Z-axis coordinate (in meters)

Examples:

```
$PLSC,SETBASEXYZ,-3028442.081,4923062.884,2687870.875*03<CR><LF>
```

System response:

```
$PLSR,BASEXYZ,-3028442.081,4923062.884,2687870.875*50<CR><LF>
```

- Query current base location (ECEF coordinate)

Synopsis:

```
$PLSC,GETBASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>
```

Response:

```
$PLSR,BASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>
```

Examples:

```
$PLSC,GETBASEXYZ*38<CR><LF>
```

System response:

```
$PLSR,BASEXYZ,0.000,0.000,0.000*7D<CR><LF>
```

(0: Base station coordinate not set yet)

System response:

```
$PLSR,BASEXYZ,-3028442.081,4923062.884,2687870.875*50<CR><LF>
```

(Current base station's ECEF coordinate setup as X=-3028442.081 meters, Y=4923062.884 meters, Z=2687870.875 meters)

If the customer only knows the exact of WGS-84 LLA not WGS-84 ECEF coordinate, you can use <https://tool-online.com/en/coordinate-converter.php> website which supports online coordinate converter from LLA to ECEF

**Online coordinate converter**

Long =

Lat =

h =  m

WORLD

WGS 84 ( GPS )

--->

X =

Y =

Z =  m

WORLD

XYZ (GEOCENTRIC)

[Open text file...](#)

[Help and video demonstrations](#)

Angle unit:  deg  dms  gon  rad

**New !: Geocentric cartesian coordinates (X, Y, Z)**

Following a request from a visitor, I added the option to convert to and from Geocentric cartesian coordinates (X, Y, Z). Here's how:

- Long, Lat, h -> X, Y, Z: Select WGS84 left and right: WGS84\_XYZ (geocentric) under 'International' menu;
- X, Y, Z -> Long, Lat, h: Select left WGS84\_XYZ (geocentric) and right: WGS84.

We take an example. The absolute LLA of the LOCOSYS RTK's roof antenna is 25.06186550 N, 121.64574778 E, and 136.969 height (WGS-84) to converter get ECEF coordinate as following

**Online coordinate converter**

Long =

Lat =

h =  m

WORLD

WGS 84 ( GPS )

--->

X =  m

Y =  m

Z =  m

WORLD

XYZ (GEOCENTRIC)

[Open text file...](#)

[Help and video demonstrations](#)

Angle unit:  deg  dms  gon  rad

To get ECEF coordinate as following

X=-3033218.180 meters

Y=4921616.337 meters

Z=2685341.889 meters

To set the base location as **\$PLSC,SETBASEXYZ,-3033218.180,4921616.337,2685341.889\*0C**

- Set up the module as a reference station or as a rover

Synopsis:

```
$PLSC,MCBASE,<MODE>*CK<CR><LF>
```

Response:

```
$PLSR,MCBASE,<MODE>*CK<CR><LF>
```

Parameter	Format	Description
MODE	Decimal	0: Set up the board as a rover (default) 1: Set up the board as a reference station (Output RTCM3.3 1005, 1074, 1084, 1094, 1124 messages)

Examples:

```
$PLSC,MCBASE,1*26<CR><LF>
```

Set the base location (reference position)

```
$PLSC,MCBASE,0*27<CR><LF>
```

Disable base station mode

- PAIR\_RTCM\_SET\_OUTPUT\_EPHEMERIS

[Packet Type]

436

[Command]

PAIR\_RTCM\_SET\_OUTPUT\_EPHEMERIS

[Description]

This command is to set enable/disable RTCM output with satellite ephemeris.

[Data Field]

```
$PAIR436,<ENABLE>*CS<CR><LF>
```

ENABLE:

0: Disable

1: Enable

[Return]

1. PAIR\_ACK for send result.

[Example]

1 Send:

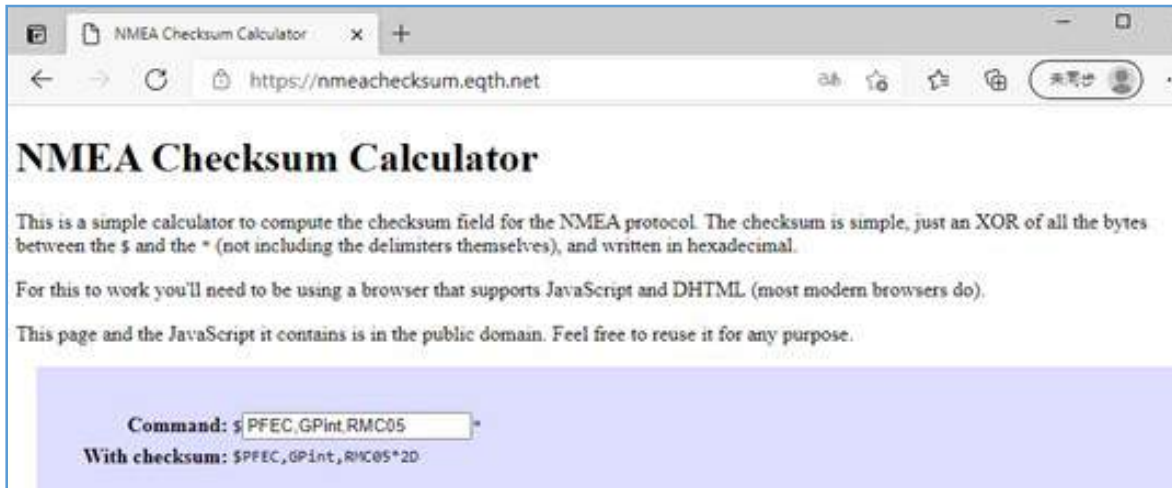
2 `$PAIR436,1*26\r\n` ==> set RTCM3.x output with satellite ephemeris

3 Response:

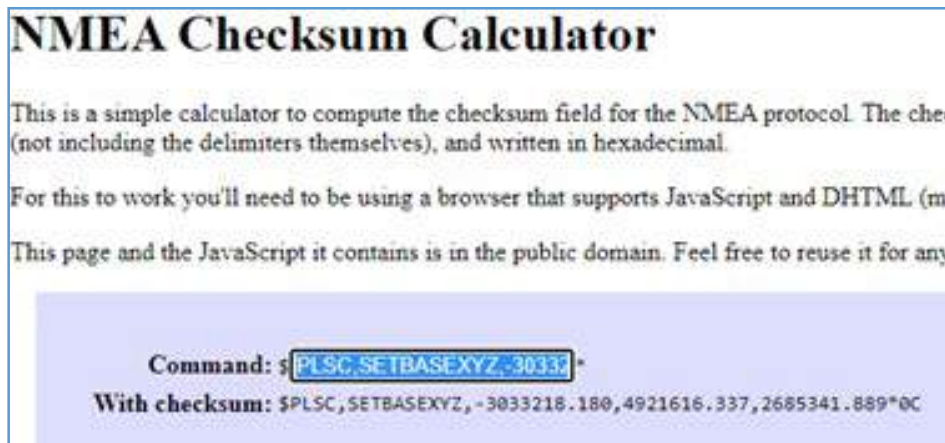
4 \$PAIR001,436,0\*3A\r\n ==> Success

Regarding how to calculate the checksum value for the command? Take 8 bits EX-OR of all characters between '\$' to '\*' in the sentence (not including '\$' to '\*').

Customer also can use <https://nmeachecksum.eqth.net/> website which supports the NMEA Checksum Calculator to get the values of checksum.

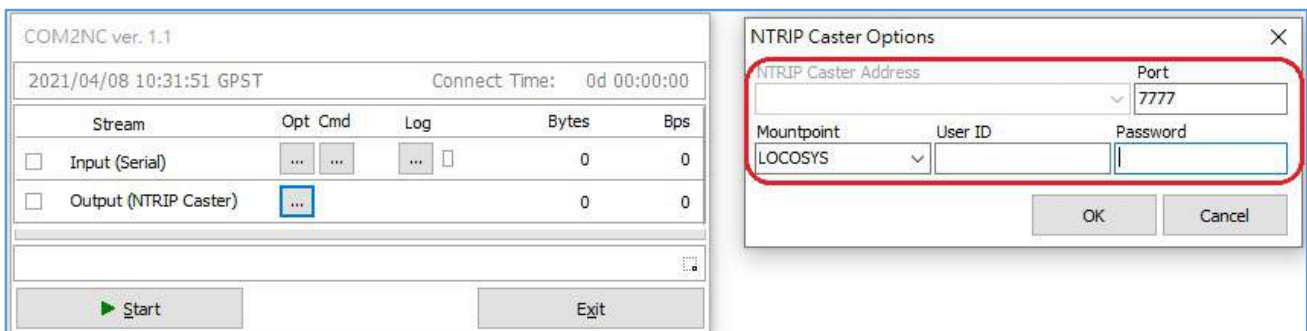
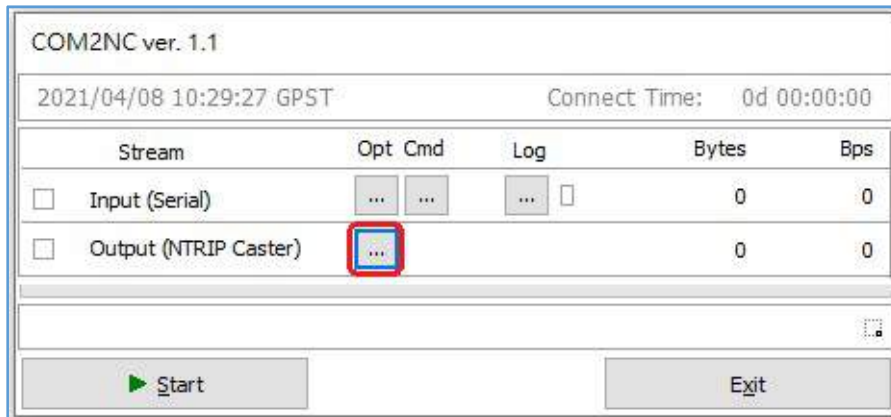


The following screenshot shows our typing input has added with Checksum.



To configure COM2NC output (Ntrip Caster) options





- a. Customer needs fill to put following account information to let the Clients for connection using Ntrip Caster address: It shows the reverse type for using a fixed network IP
- b. Port: filled in 7777 or It can set using Dynamic Ports (1024 to 65535). Ntrip client AP should set the same as port for getting the connection.
- c. Mountpoint: filled in LOCOSYS or customer can type he wants to. Ntrip client AP should select the same as Mountpoint name for getting the connection.
- d. User ID: It can be ignored for every client can logging in.
- e. Password: It can be ignored for every client can logging in.
- f. After finished Output options, you can click Start button to start the RTK Ntrip server & caster service

**End of above**