



How to test RTK with LC29HEA & LC29HBS

Build a Smarter World

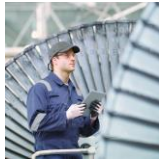
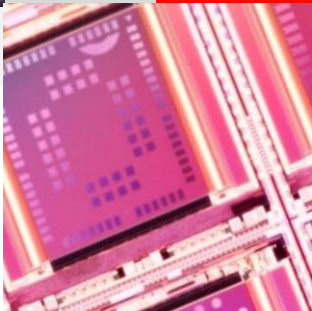


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4. Check Status on Rover

Build a Smarter World



RTK Setup Description:

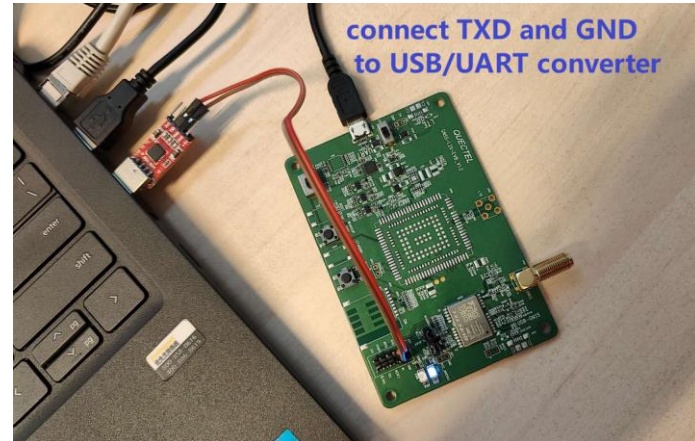


To setup the Base-Rover we need:

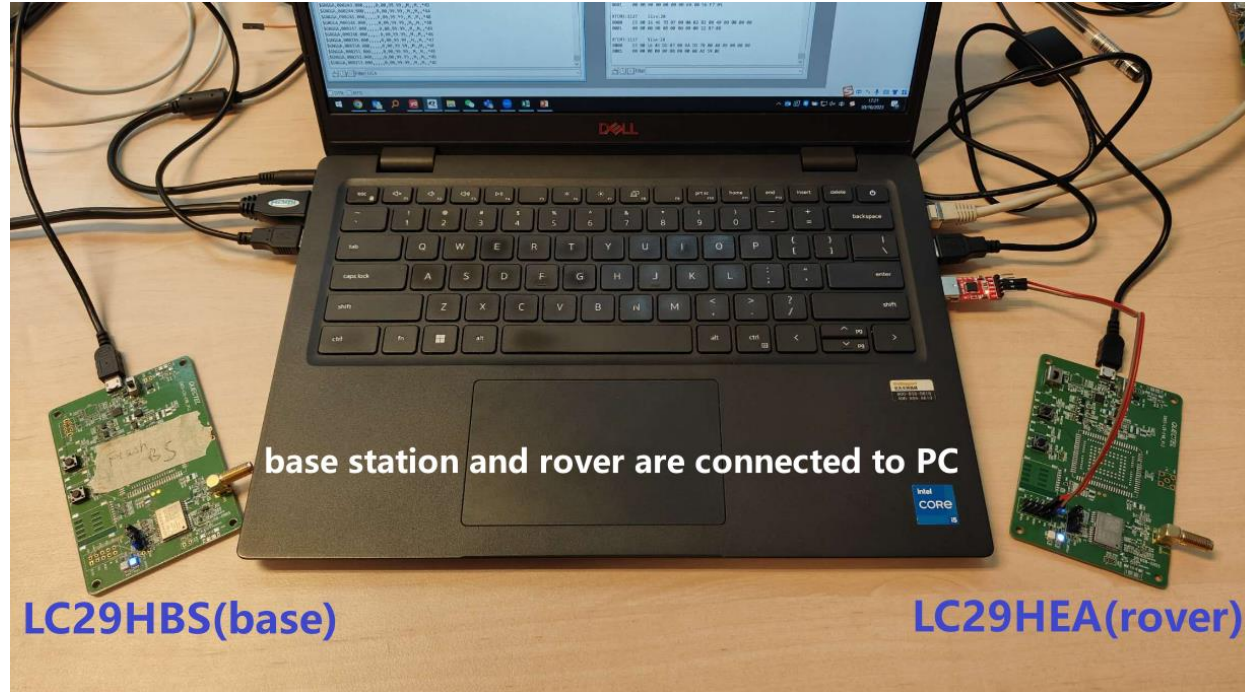
- 1 LC29HBS EVB

- 1 LC29HBE EVB

- 1 USB/UART converter (the converter is not mandatory- used to monitor the output from the rover)



Setup 1- Base and rover connected to the same Laptop



LC29HBS(base)

LC29HEA(rover)

Setup1: How to set up Base Station (1/4)



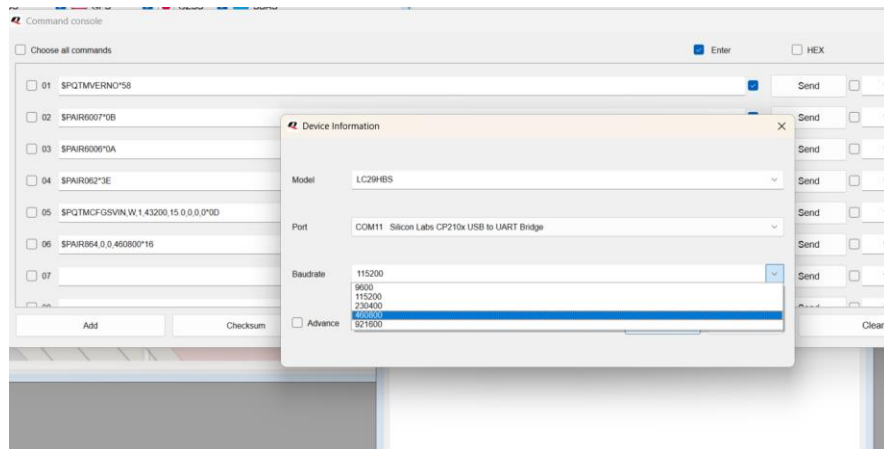
1. Connect to LC29HBS on QGNSS

LC29HBS default baud rate is 115200, but LC29HEA default baud rate is 460800(because of 10hz fix rate). You need to adjust LC29HBS to 460800 to make sure it matches with rovers:
Command to be sent to base to change the baud rate:

`$PAIR864,0,0,460800*16`

reset the module

And then change the baud rate:



Setup 1 :How to set up Base Station (2/4)



2. Set a Fixed mode or Survey-in mode

If you know the true coordinate where the base station mounted, you can set a Fixed mode to LC29HBS. Send the coordinate in ECEF format.

For example:

Send: \$PQTMCFGSVIN,W,2,0,0.0,-2472446.4619,4828304.1363,3343730.2653*34

Reply: \$PQTMCFGSVIN,OK*70

If you don't know the true coordinate, you can set a Survey-in mode (The Survey-in mode determines the receiver's position by building a weighted mean of all valid 3D positioning solutions).

For example:

- \$PQTMCFGSVIN,W,1,43200,15.0,0,0,0*
- Calculate Checksum- Press checksum button
- Press Send

With Reply from the receiver if IK: \$PQTMCFGSVIN,OK*70

Tips: For debugging, you can set shorter survey-in duration like 300 seconds. This will help you check RTK result quicker. But we suggest to set survey-in duration at least 43200(12 hours) to get a precise base coordinate.

Type:

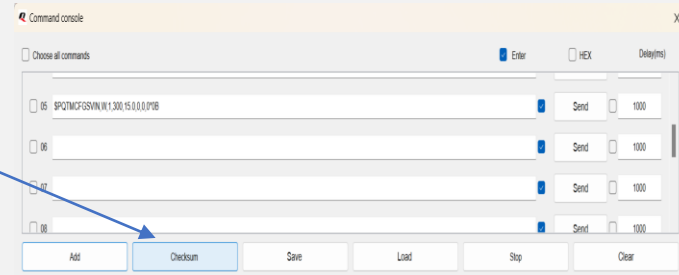
Set/Get

Synopsis:

```
//Set:
$PQTMCFGSVIN,W,<Mode>,<MinDur>,<3D_AccLimit>,<ECEF_X>,<ECEF_Y>,<ECEF_Z>*<Checksum>
><CR><LF>
//Get:
$PQTMCFGSVIN,R*<Checksum><CR><LF>
```

Parameter:

Field	Format	Unit	Description
<Mode>	Numeric	-	Configure the receiver mode. 0 = Disable 1 = Survey-in mode 2 = Fixed mode (ARP position is given in ECEF.)
<MinDur>	Numeric	Second	Survey-in minimum duration. Range: 0-86400. Default value: 43200.
<3D_AccLimit>	Numeric	Meter	Limit 3D positioning accuracy in survey-in mode. Default value: 15.0. If this field is 0, it means there is no limit.
<ECEF_X>	Numeric	Meter	WGS84 ECEF X coordinate. Default value: 0.0.
<ECEF_Y>	Numeric	Meter	WGS84 ECEF Y coordinate. Default value: 0.0.
<ECEF_Z>	Numeric	Meter	WGS84 ECEF Z coordinate. Default value: 0.0.



Setup1: How to set up Base Station (3/4)

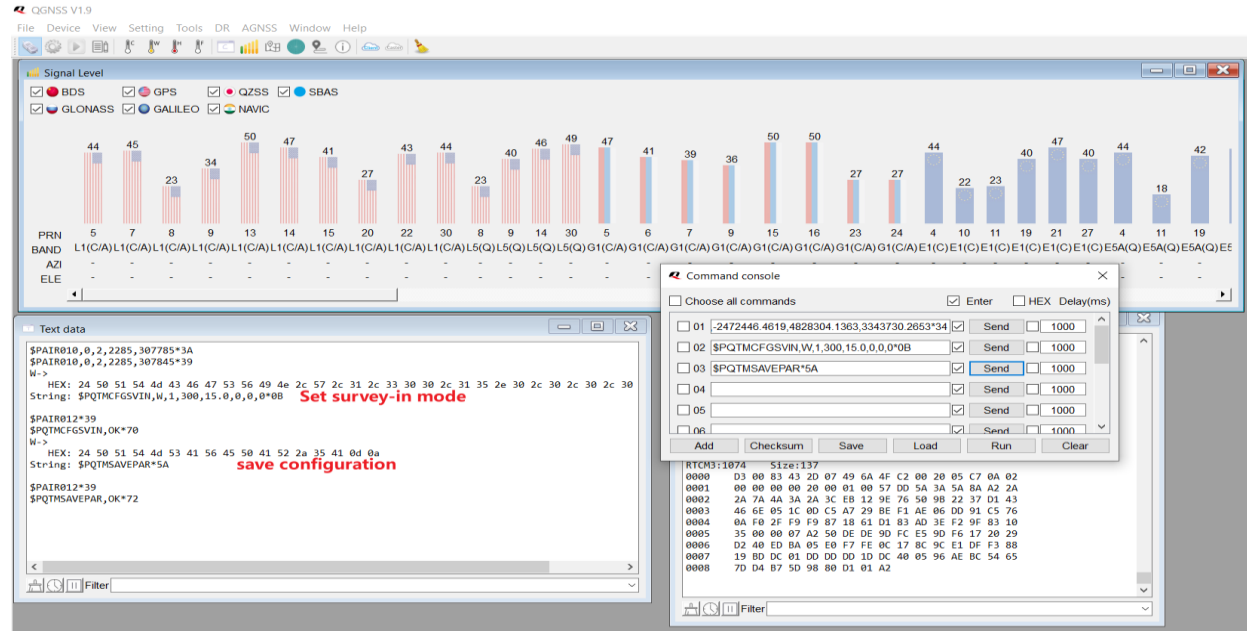


3. Save the parameters:

`$PQTMSSAVEPAR*5A`

With answer from the receiver:

`$PQTMSSAVEPAR,OK*72`



Please also remember to save `$PQTMCFGVIN` setting by sending `$PQTMSSAVEPAR*5A`.

Setup1: How to set up Base Station (4/4)



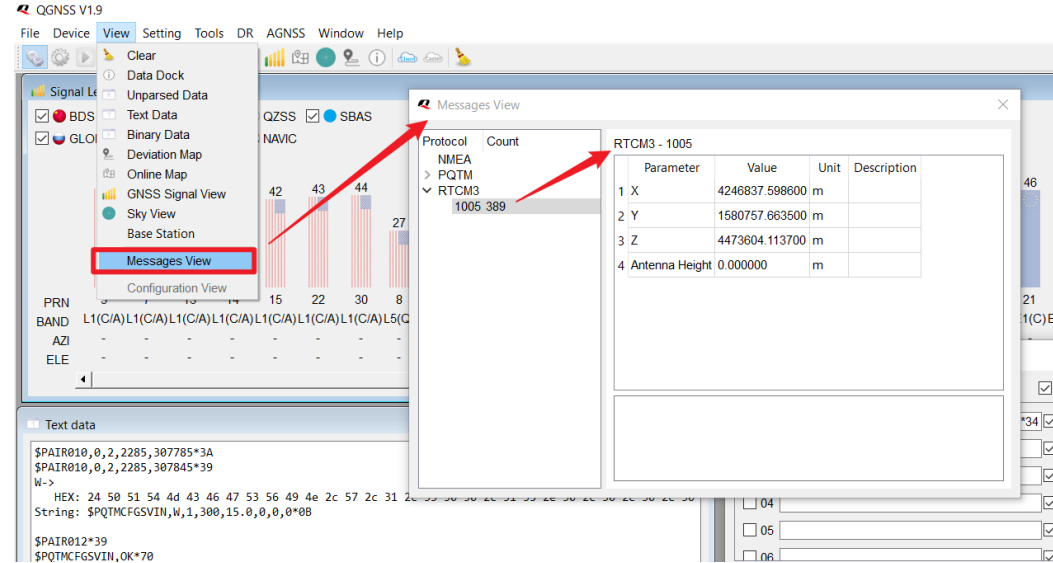
Check Base Station Status

4. Turn on Messages View window

In QGNSS tool, View → Messages View → RTCM3
→ 1005

5. Check BS status

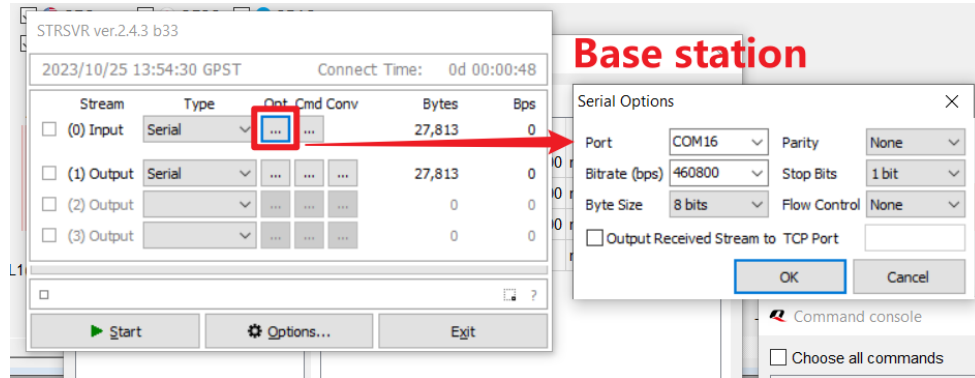
If the base station is installed in open sky environment, after the survey-in duration, the ECEF coordinate in Messages View window should be fixed. This is an indication that the BS can correctly provide RTCM differential data to the rovers.



Setup1: Connect BS and Rover through STRSVR



Once the BS is up and running, we can proceed and connect the Rover



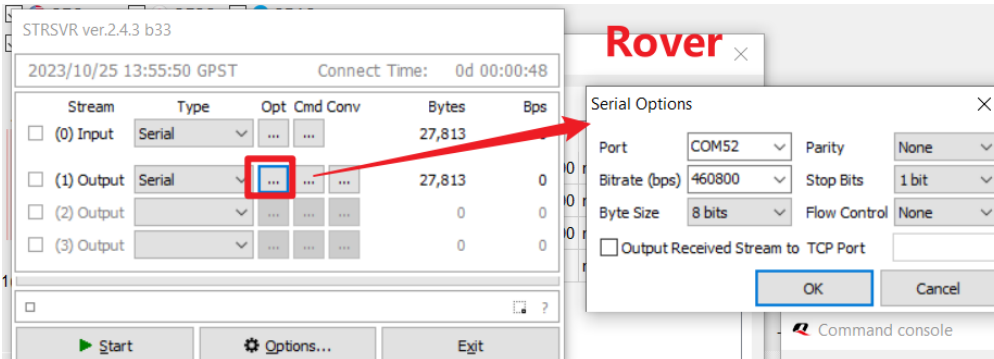
Base station

Using serial to connect the base station and rover

(1) Input: Settings on base station side – USB that comes from the base LC29HBS

COM16 is the COM Port from LC29HBS

(Before you can configure STRSVR need to disconnect the port from QGNSS)



Rover

(2) Output: Settings on rover side – USB that comes from the rover LC29HE

COM52 is the Enhanced COM Port from LC29HEA

Setup1: Connect BS and Rover through STRSVR




STRSVR ver.demo5 b33b2

2023/10/31 16:08:23 GPST Connect Time: 0d 00:00:00

Stream	Type	Opt	Cmd	Conv	Bytes	Bps
<input type="checkbox"/> (0) Input	Serial	...	...		0	0
<input type="checkbox"/> (1) Output	Serial	...	...	...	0	0
<input type="checkbox"/> (2) Output		...	...	...	0	0
<input type="checkbox"/> (3) Output		...	...	...	0	0

☐ ?

Click "Start"

When  goes green and Output side start to receive bytes, that means the connection works fine.

STRSVR ver.demo5 b33b2

2023/10/31 16:08:50 GPST Connect Time: 0d 00:00:08

Stream	Type	Opt	Cmd	Conv	Bytes	Bps
<input checked="" type="checkbox"/> (0) Input	Serial	...	...		1,485	1,313
<input checked="" type="checkbox"/> (1) Output	Serial	...	...	...	1,485	1,310
<input type="checkbox"/> (2) Output		...	...	...	0	0
<input type="checkbox"/> (3) Output		...	...	...	0	0

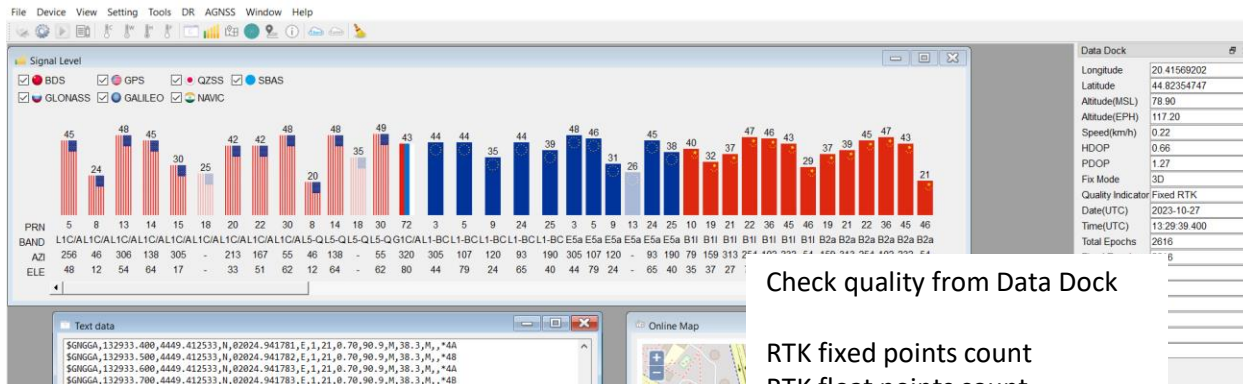
☐ (0) COM16 (1) COM52 ?

Setup1: Check Status on Rover



In case we want to check the Rover using the QGNSS, disconnect the Rover from STVR and then:

Open QGNSS connect to the USB/UART converter port. If the rover works in open sky, you can easily get RTK fix in a few seconds.



Check quality from Data Dock

RTK fixed points count
RTK float points count

The screenshot shows the Text data window with a list of GGA sentences. A red box highlights the first sentence, which is:

```
$GNGGA,132933.500,4449.412533,N,02024.941782,E,1,21.0,70.90,9,M,38.3,M,*,*48
```

You can see <Quality> parameter in GGA sentence,
Changing from "1" to "5" and to "4"

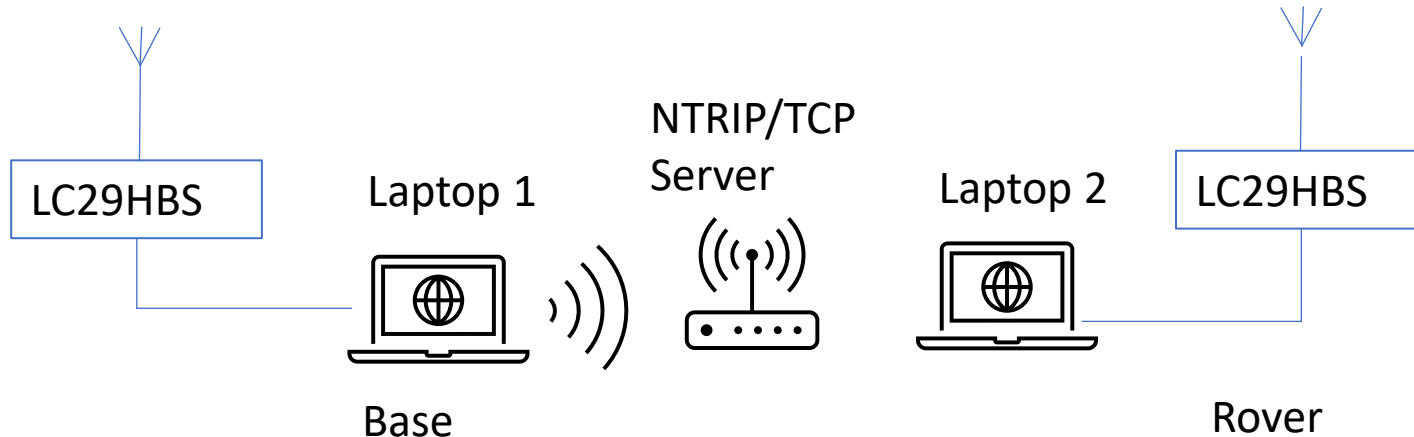
Data Dock	
Longitude	20.41569208
Latitude	44.82354740
Altitude(MSL)	79.00
Altitude(EPH)	117.30
Speed(km/h)	0.15
HDOP	0.78
PDOP	1.64
Fix Mode	3D
Quality Indicator	Fixed RTK
Date(UTC)	2023-10-27
Time(UTC)	13:29:46.100
Total Epochs	2683
Fixed Epochs	2683
RTK Fixed	114
RTK Float	5
Age Of Diff	0.1
TTFF(s)	
2D Acc(m)	
3D Acc(m)	

Setup 2: Fixed Base-Rover Setup(Wireless Solution)- Description

In the Base rover wireless Solution, the two modules are not physically connected so to transfer the corrections from the base to the rover it is required to have:

- Both base and rover connected to Internet
- An NTRIP/TCP server user account .

You can sign up (for free) on <https://emlid.com/ntrip-caster/> and apply for your own NTRIP server for testing.



Setup 2: Ntrip Server Information on Emlid



Once an account has been created you will see the base rover info as in below example:

My mount points

mount point	password	
MP14684	349vdy	<input checked="" type="checkbox"/>
MP14684 a	835crg	<input type="checkbox"/>
MP14684 b	462uju	<input type="checkbox"/>
MP14684 c	269qum	<input type="checkbox"/>
MP14684 d	477qnt	<input type="checkbox"/>

for your base station

How to connect base to a mount point

Set your base to send corrections over NTRIP and enter these credentials.

ADDRESS	PORT
caster.emlid.com	2101
164.90.243.252	
PASSWORD	MOUNT POINT
349vdy	MP14684

My rovers

OFFLINE 0/10

Up to 10 connected rovers at the same time.

for your rover

How to connect rover to a mount point

Set your rover to receive corrections over NTRIP and enter these credentials.

ADDRESS	PORT	USERNAME
caster.emlid.com	2101	u98295
164.90.243.252		
PASSWORD	MOUNT POINT	
726fea	MP14684	

Setup 2: Set up the base station LC29HBS



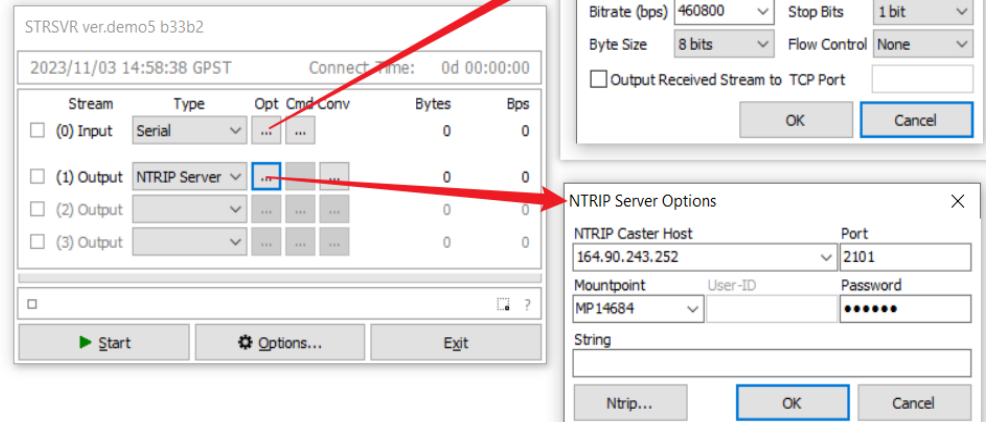
Step 1: Using the QGNSS tool, setup the base station (step 1-3)

Once completed disconnect QGNSS

Step2: Start STRSVR, connect to Base serial port and provide the NTRIP Server information as in the Emlid web page.

Step3: Press Start

**LC29HBS inputs data from serial
and transmit to Ntrip server
through laptop**



Setup 2: Set up the rover LC29HEA using QGNSS

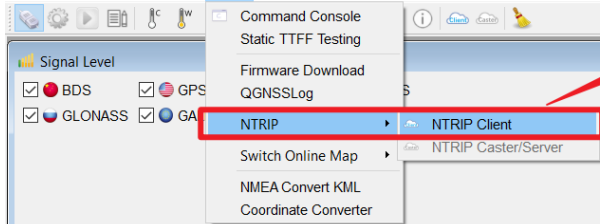
Step 1: Connect rover to QGNSS tool. And open NTRIP Client.

Step 2: Fill rover information.

Step 3: Then click “Connect to Host”.

QGNSS V1.9

File Device View Setting Tools DR AGNSS Window Help



**Rover is a client. QGNSS NTRIP client
can receive RTCM data from the server.
And then transmit them via serial.**

PRN
BAND
AZI
ELE

Text data

```
$GNGLL,001924.412,V,N*6D  
$GNTVG,T,M,N,K,N*32  
$GNGGA,001924.512,0,00,99.99,M,M,*40  
$GNRMC,001924.512,V,,,,,060180,,N,V*2E
```

NTRIP Client

Client QuecRTK

Caster settings

Address: 164.90.243.252
Port: 2101
Username: u98295
Password:

NTRIP caster mount point configuration

Update NTRIP source table Mount point details

NTRIP mount point:
MP14684

Request Interval (sec): 1

☐ Use manual position

Connect To Host OFF Monitor

My rovers

OFFLINE 0/10

Up to 10 connected rovers
at the same time.

How to connect rover to a mount point

Set your rover to receive corrections over NTRIP
and enter these credentials.

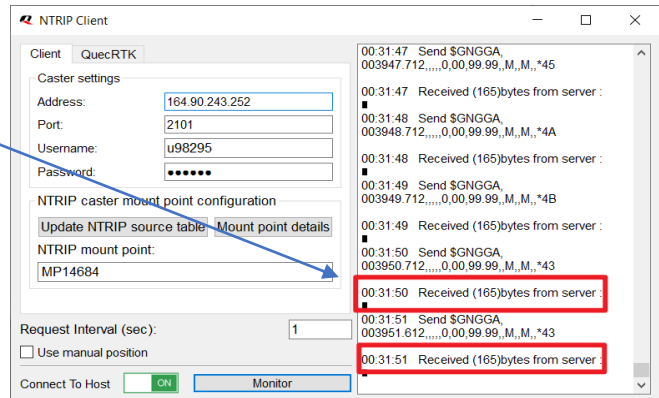
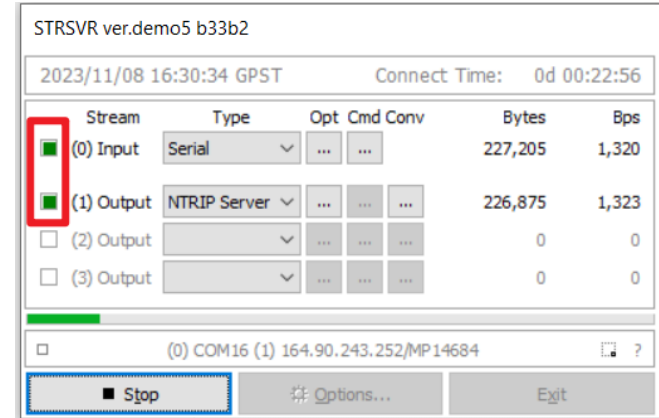
ADDRESS	PORT	USERNAI
caster.emlid.com	2101	u98295
164.90.243.252		
PASSWORD	MOUNT POINT	
726fea	MP14684	

Setup 2: Successful Ntrip Connection

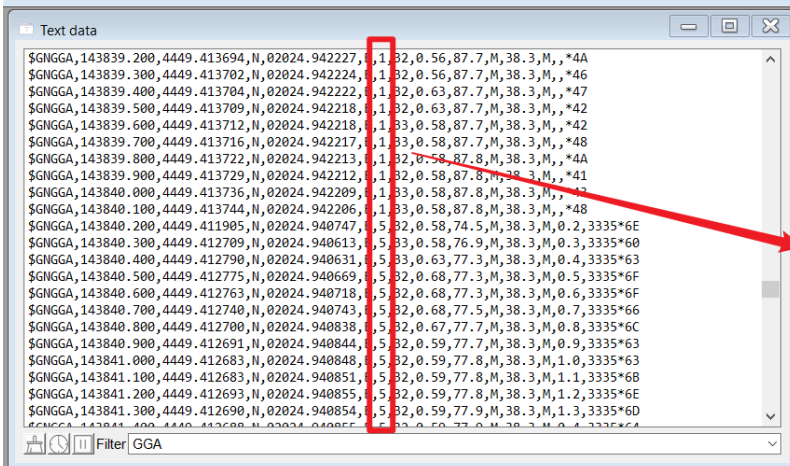


1. On the base station, you will see green bar progressing. This is an indication that RTCM data are uploaded to the server.

2. On the rover, you will see the data received



File Device View Setting Tools DR AGNSS Window Help



Data Dock	
Longitude	20.41569030
Latitude	44.82353440
Altitude(MSL)	81.80
Altitude(EPH)	120.10
Speed(km/h)	0.23
HDOP	0.57
PDOP	1.18
Fix Mode	3D
Quality Indicator	Fixed RTK
Date(UTC)	2023-11-02
Time(UTC)	14:39:00.700
Total Times	307
Fixed Points	307
RTK Fixed	156
RTK Float	48
Age Of Diff	0.7
TTFF(s)	
2D Acc(m)	
3D Acc(m)	

Observe RTK fixed number keeps rising

<Quality> in GGA changes from "1" to "5"(float) and finally to "4"(RTK fixed)

☐ DTR ☐ RTS Disconnected



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Thank You

Build a Smarter World

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236 Sales Support: sales@quectel.com

Technical Support: support@quectel.com General: info@quectel.com