

QGNSS User Guide

GNSS Module Series

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1 Introduction

QGNSS is a tool that allows you to interact with Quectel GNSS modules quickly and easily. It enables evaluation, performance testing, development and debugging of Quectel GNSS modules. Tool features are listed below:

- Supports receivers utilizing standard NMEA strings in compliance with NMEA 0183 V4.11 and previous versions.
- Supports the parsing of RTCM3.x protocol messages.
- Supports log replay.
- Presents all the information collected by the GNSS device. All aspects of GNSS data (positioning, velocity, time, satellite tracking, etc.) can be monitored and logged under various test scenarios for receiver evaluation.
- Supports the downloading of AGNSS data.
- Supports NTRIP Client, Server and Caster.
- Supports the downloading of firmware update packet to GNSS modules.

2 User Interface Description

2.1. Main Window

The figure illustrated below is the initial window of QGNSS.

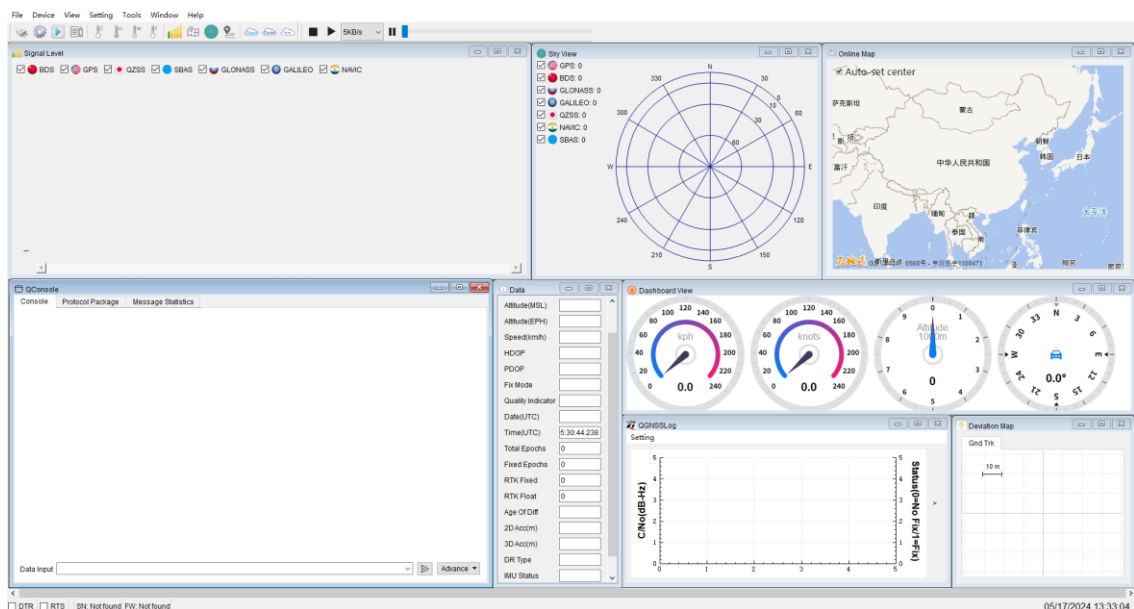


Figure 1: Main Window

2.2. Menu Bar

2.2.1. File Tab

In the “File” tab menu:

- Click “Open” to open the play dialog box. See [Chapter 3.3 Log Play](#) for details.
- Click “Show Logfile in Explorer” to open the folder of the saved log file.
- Click “Quit” to close QGNSS.

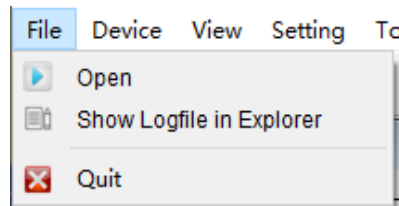


Figure 2: File Tab

2.2.2. Device Tab

In the “**Device**” tab menu:

- Click “**Connect**” to connect to the receiver.
- Click “**Set Device Information**” to configure serial port information. See [Chapter 3.1 Connect to Receiver](#) for details.

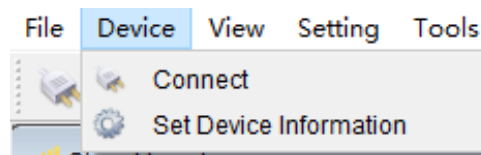


Figure 3: Device Tab

NOTE

Make sure to configure the serial port information before connecting to the receiver.

2.2.3. View Tab

The main function of all sub-windows under “**View**” is to display key data.

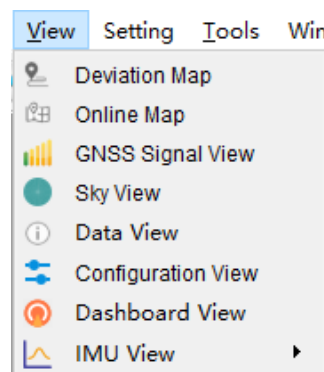


Figure 4: View Tab

2.2.3.1.Deviation Map Sub-Window

The “**Deviation Map**” sub-window displays positions in longitude and latitude relative to the initial positioning point.

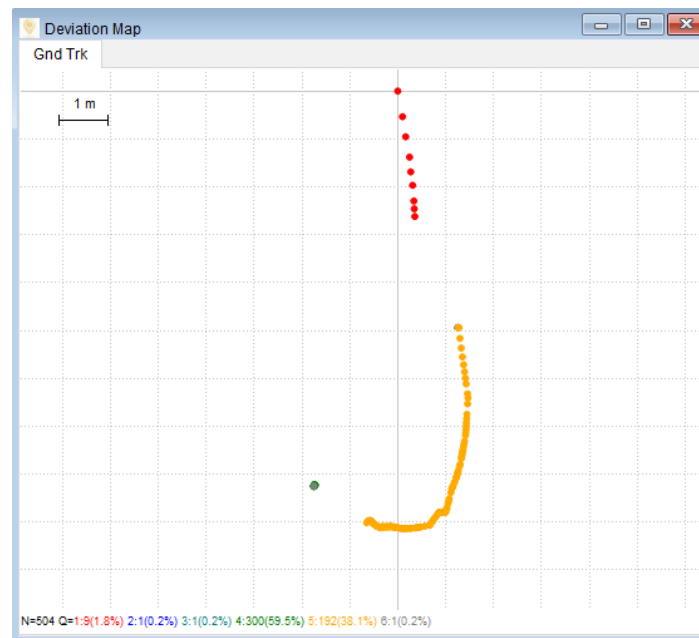


Figure 5: Deviation Map

NOTE

1. Use the mouse scroll wheel to zoom in/out on the “**Deviation Map**” and hold down the left mouse button to drag the “**Deviation Map**”. Right click the mouse button to clear the points on the “**Deviation Map**”.
2. The color of the points in the deviation map are determined by the different values of <Quality> field in the **GGA** message.

Table 1: Deviation Map Function Description

Icon	Description
N=504	Total points
1:9(1.8%)	GPS SPS Mode: 9 points in total (accounting for 1.8 % of the total points)
2:1(0.2%)	Differential GPS, SPS Mode or SBAS Mode: 1 point in total (accounting for 0.2 % of the total points)
3:1(0.2%)	GPS PPS Mode: 1 point in total (accounting for 0.2 % of the total points)

Icon	Description
4:300(59.5%)	Fixed RTK Mode: 300 points in total (accounting for 59.5 % of the total points)
5:192(38.1%)	Float RTK Mode: 192 points in total (accounting for 38.1 % of the total points)
6:1(0.2%)	Estimated (dead reckoning) Mode: 1 point in total (accounting for 0.2 % of the total points)

2.2.3.2. Online Map Sub-Window

The “**Online Map**” displays real-time location reported by the module on a map.

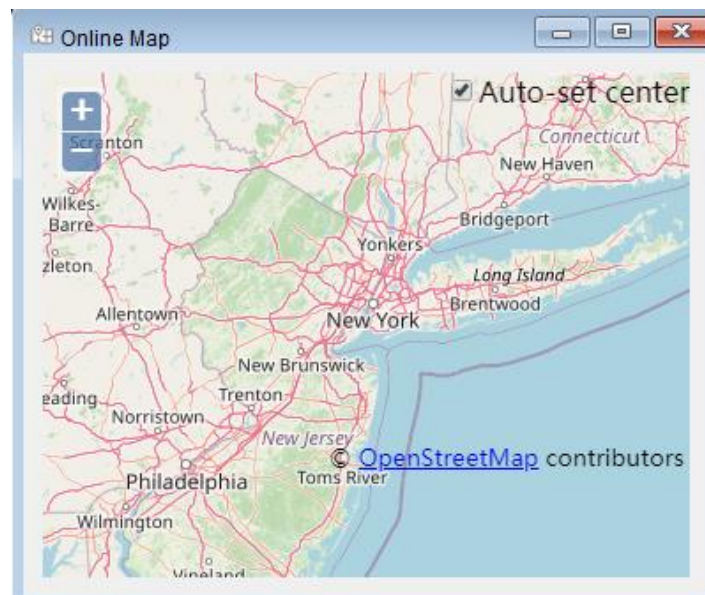


Figure 6: Online Map Sub-Window

2.2.3.3. GNSS Signal View (Signal Level) Sub-Window

The sub-window in the figure below (“**Signal Level**”) contains “**Level View**” and “**Vertical View**”.

1. Level View Introduction

“**Level View**” displays GNSS signal view. The number above the flag represents the C/N_0 value. You can use the checkbox to select the satellite system to be displayed. If the flag is transparent, it means that the receiver is not tracking this satellite and therefore there is no data available in NMEA **GSA** messages.

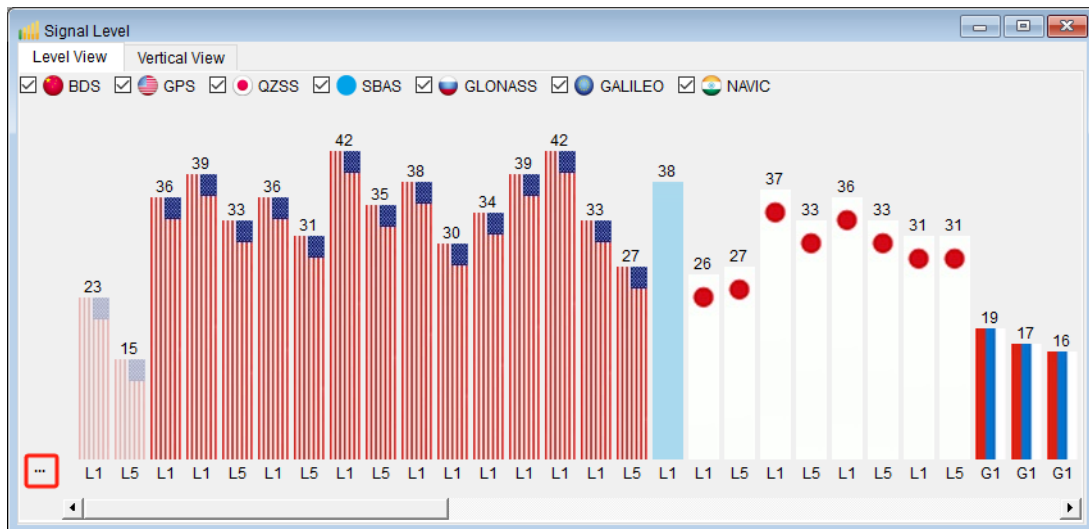


Figure 7: Signal Level Sub-Window – Level View

Click “...” to display the detailed information and click "**Band**" to hide the detailed information.

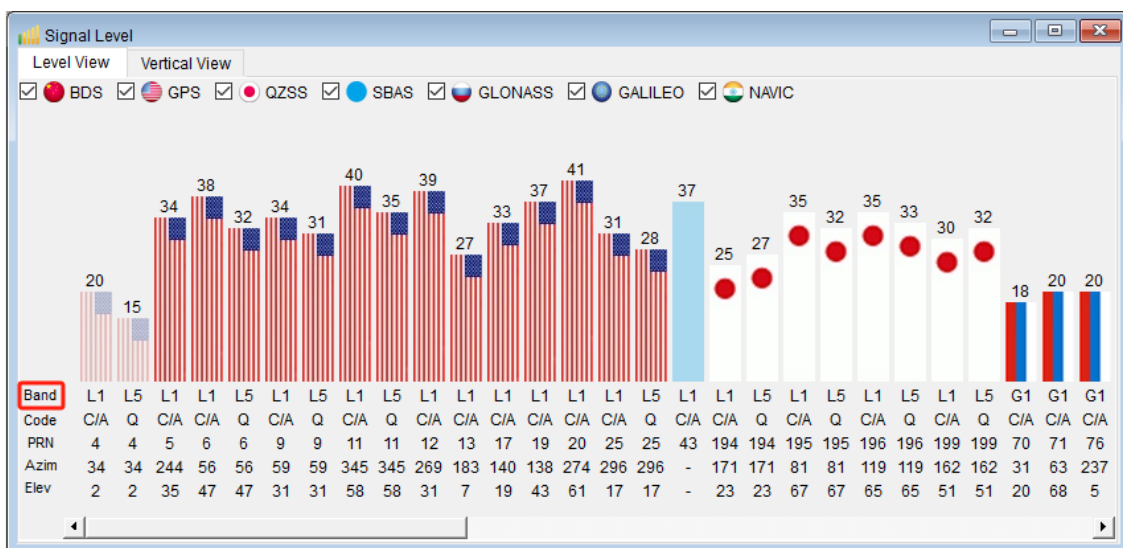


Figure 8: Level View Detailed Information

Table 2: Signal View Function Description

Button	Description
Band	Satellite frequency band.
Code	Sent by a satellite for ranging and satellite acquisition.

Button	Description
Band	Satellite frequency band.
Code	Sent by a satellite for ranging and satellite acquisition.
PRN	Pseudo Random Noise Code.
Azim	Satellite azimuth in degrees.
Elev	Satellite elevation in degrees.

2 Vertical View Introduction

Click “**Vertical View**” to open the vertical satellite signal-to-noise ratio chart, which allows for a more intuitive comparison of the trends of satellite values among different constellations.

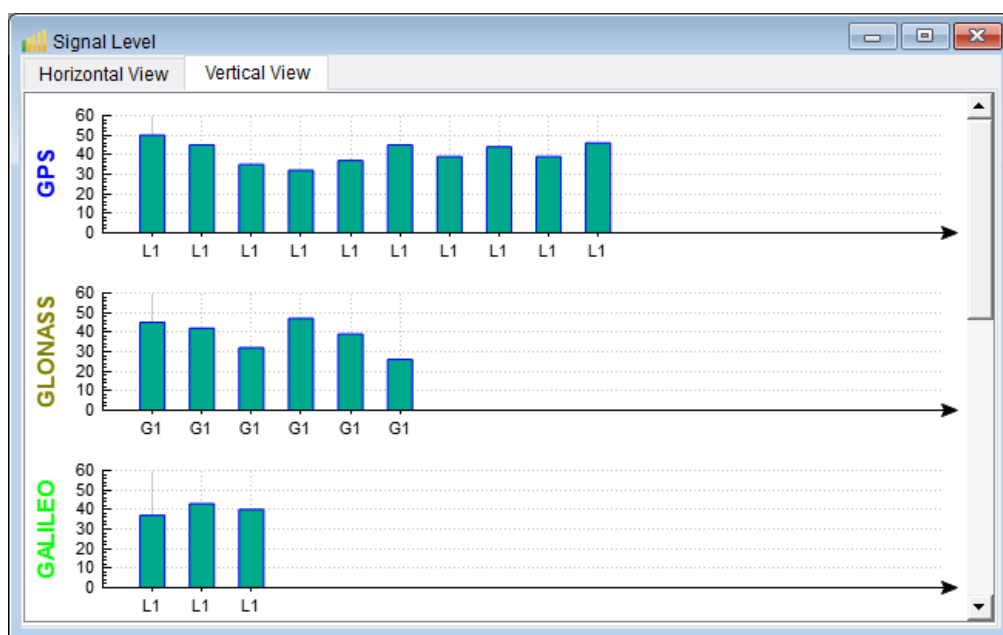


Figure 9: Signal Level Sub-Window – Vertical View

2.2.3.4. Sky View Sub-Window

The “**Sky View**” sub-window displays the azimuth and elevation angle (above the Horizon) of each visible navigation satellite per constellation and counts the number of all visible satellites of each positioning system.

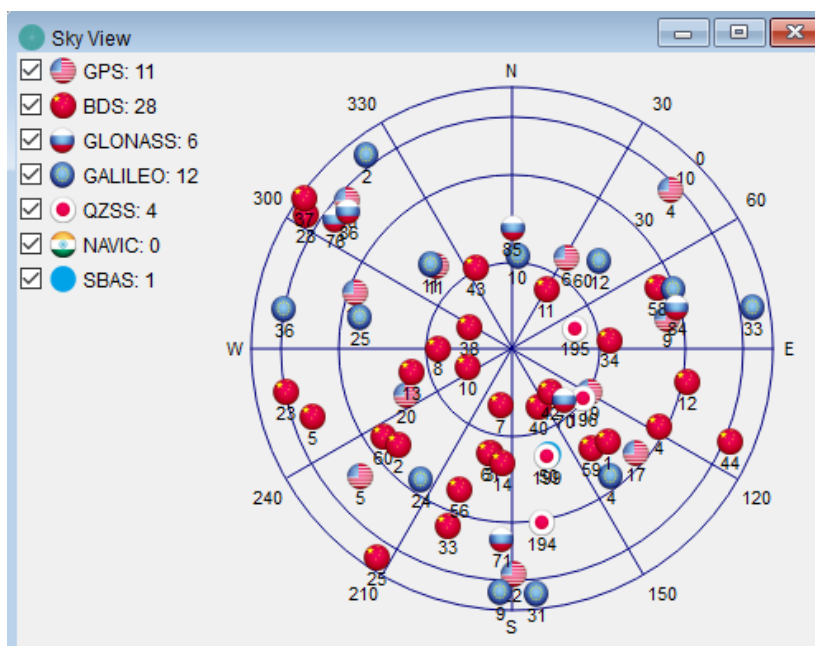


Figure 10: Sky View Sub-Window

2.2.3.5.Data View Sub-Window

The “**Data View**” sub-window displays the data information, such as longitude, latitude, altitude and fix mode.

Data	
Longitude	117.11533700
Latitude	31.82180720
Altitude(MSL)	87.40
Altitude(EPH)	87.07
Speed(km/h)	0.17
HDOP	0.60
PDOP	1.13
Fix Mode	3D
Quality Indicator	DGNSS
Date(UTC)	2024-05-17
Time(UTC)	01:52:32.000
Total Epochs	398
Fixed Epochs	398
RTK Fixed	0
RTK Float	0
Age Of Diff	
2D Acc(m)	
3D Acc(m)	
DR Type	
IMU Status	
DR Status	

Figure 11: Data View Sub-Window

2.2.3.6. Configuration View Sub-Window

The “**Configuration View**” sub-window is used to modify the receiver configuration. The configuration parameters may change depending on module type. “**Query**” button is used for querying commands in the current page. “**Setting**” button is used for generating commands and sending them to the GNSS module.

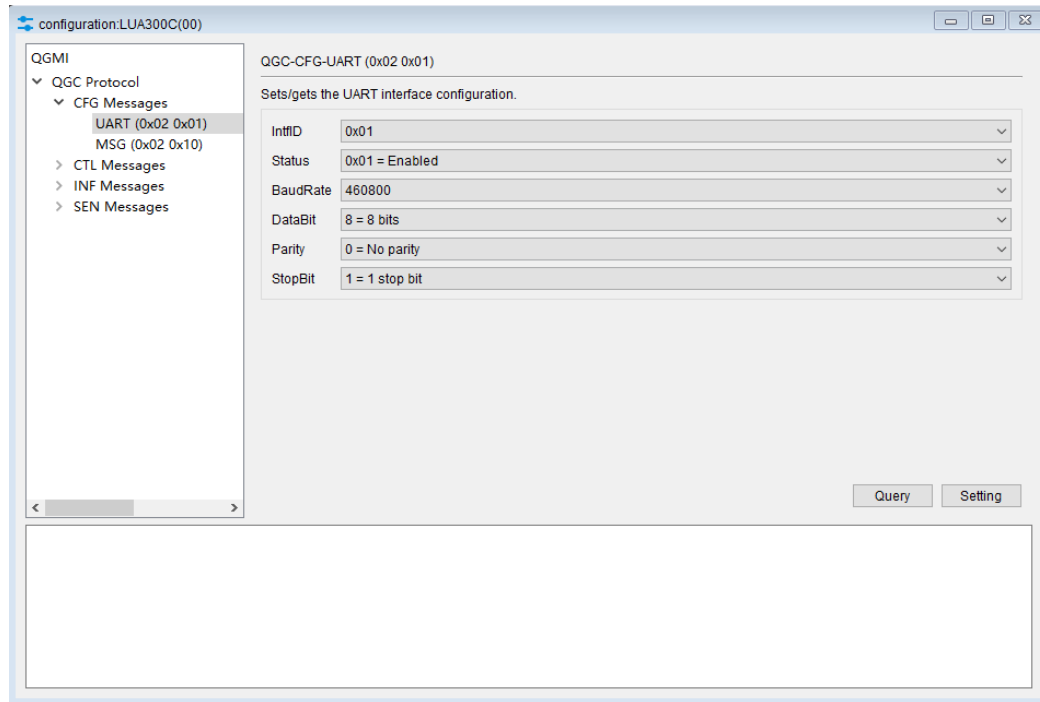


Figure 12: Configuration View Sub-Window

2.2.3.7. Dashboard View Sub-Window

The “**Dashboard View**” sub-window is composed of four instrument panels, speed instrument panel, knots indicator, altitude instrument panel and heading instrument panel, which displays relevant data in the NMEA protocol.

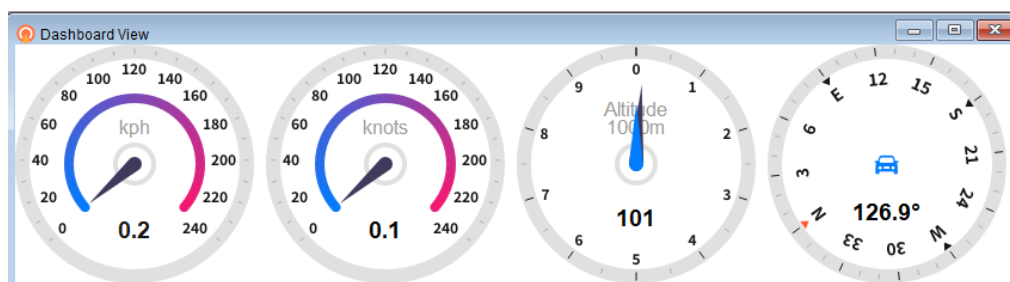


Figure 13: Dashboard View Sub-Window

2.2.3.8.IMU View Sub-Window

The “**IMU View**” is composed of three curve charts, “**IMU Output View**”, “**NotCalibrated1**” and “**NotCalibrated2**”, for a more intuitive display of the real-time data fluctuations. The presentation of those three curves are the same, yet the data sources are different. The “**IMU Output View**” is derived from calibrated IMU data, and the data sources for “**NotCalibrated1**” and “**NotCalibrated2**” are IMU1 raw data and IMU2 raw data. By checking or unchecking the relevant checkbox, those curves can be displayed or hidden.

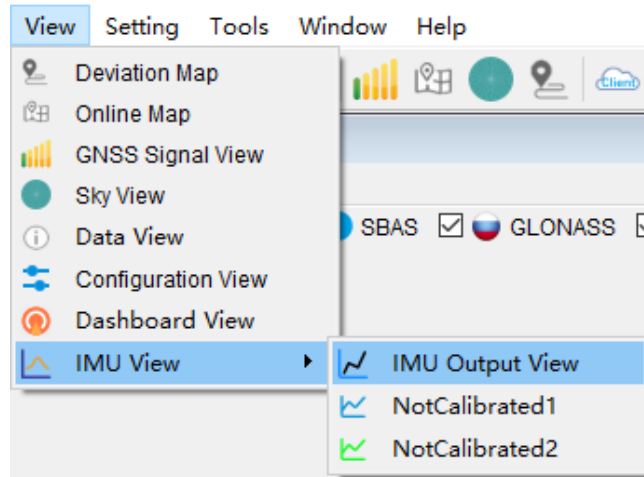


Figure 14: IMU View Menu

“**IMU Output View**” sub-window displays three-axis acceleration (ACC_X, ACC_Y, ACC_Z), three-axis angular rate (GYO_X, GYO_Y, GYO_Z), and Temperature, as well as the extreme and average values of these seven data in the form of curve charts. In addition, it also contains some user-friendly settings.



Figure 15: IMU View Sub-Window

The details on “IMU Output View” are listed below:

- **Data Point:** Range of a single curve in the curve chart, which can be set to 100, 300, 500, 1000, 2000 or 3000.
- **Reset Zoom:** Curve state restoration button. After clicking the button, the curve will be restored to its original state.
- **Pause/Running Chart:** Stop refreshing curve/refresh curve button.
 - After clicking “**Pause Chart**”, the button changes to “**Running Chart**”. At this time, the curve stops refreshing and interactive operations of the curve can be performed on the chart, such as viewing detailed data of a single point, moving and scaling the curve.
 - After clicking “**Running Chart**”, the button changes to “**Pause Chart**”. At this time, the curve is refreshing and the interactive operations of the curve is disabled.
- **Minimum:** Minimum value within the “**Data Point**” range.
- **Average:** Average value within the “**Data Point**” range.
- **Maximum:** Maximum value within the “**Data Point**” range.
- **Stdev:** Standard deviation within the “**Data Point**” range.



Figure 16: IMU Curve Menu

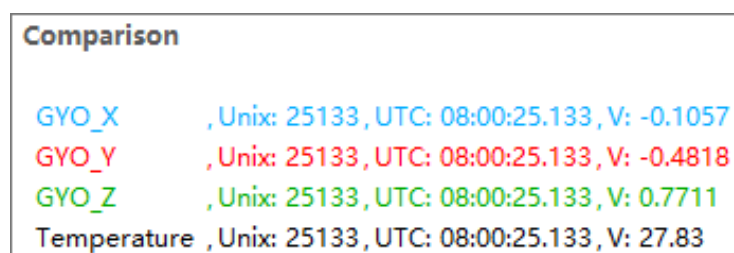


Figure 17: IMU Comparison

Right click the mouse to open the curve menu, the details are as follows:

- **Clear:** Clear all current data of the curve chart.
- **Refresh:** The function is the same as “Reset Zoom”.
- **Comparison:** Check to open the point comparison view to show data points on the Y-axis that corresponds to the points on the X-axis. Parameters, taking data in the first row of [Figure 17: IMU Comparison](#) as an example, are explained as follows:
 - **GYO_X:** Curve name
 - **Unix:** Unix time, Unit: Second
 - **UTC:** UTC time
 - **V:** Data points on the Y-axis that corresponds to the points on the X-axis

NOTE

If the IMU time is not synchronized with the time of GNSS module, Unix time and UTC time will be converted according to the IMU time instead of the actual time.

2.2.4. Setting Tab

Click “**preferences**” in the dropdown menu of “**Setting**” to enter the “**Preferences**” sub-window and set the supported protocol to parse in the “**Preferences**” sub-window.

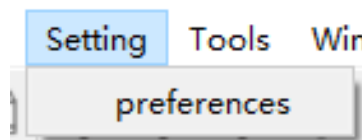


Figure 18: Setting Tab Menu

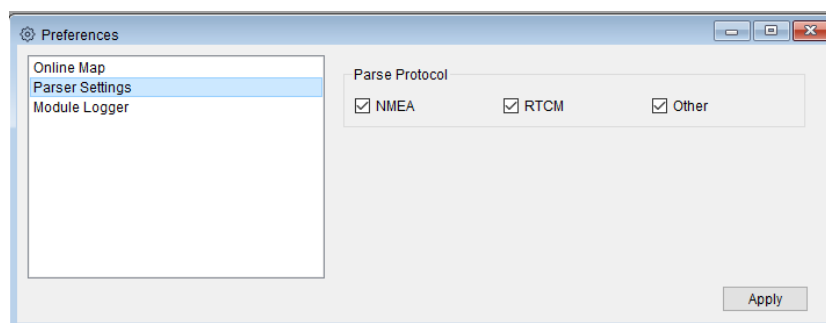


Figure 19: Preferences Sub-Window

2.2.5. Tools Tab

The sub-windows in the “**Tools**” tab are illustrated below:

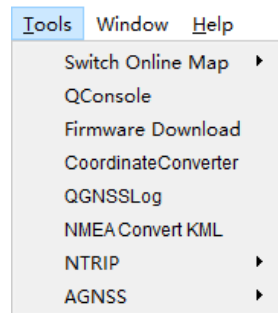


Figure 20: Tools Tab Menu

2.2.5.1.Switch Online Map

You can switch between the online maps supported by the QGNSS (“**TianDiMap**” and “**OpenStreetMap**”) via “**Switch Online Map**” dropdown menu.

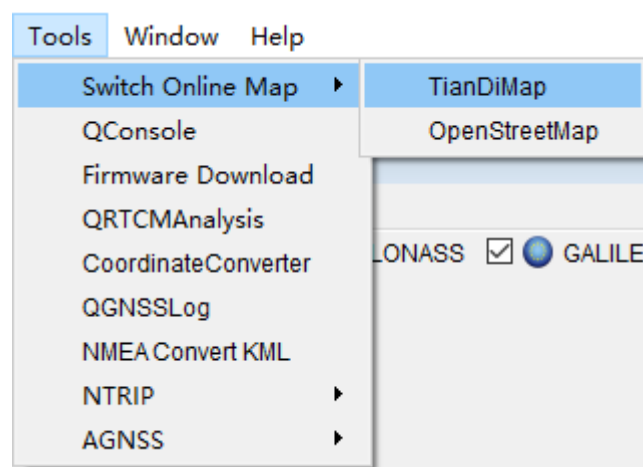


Figure 21: Switch Online Map

2.2.5.2.QConsole Sub-Window

“**QConsole**” is a multi-functional sub-window that integrates “**Console**”, “**Protocol Package**” and “**Message Statistics**”.

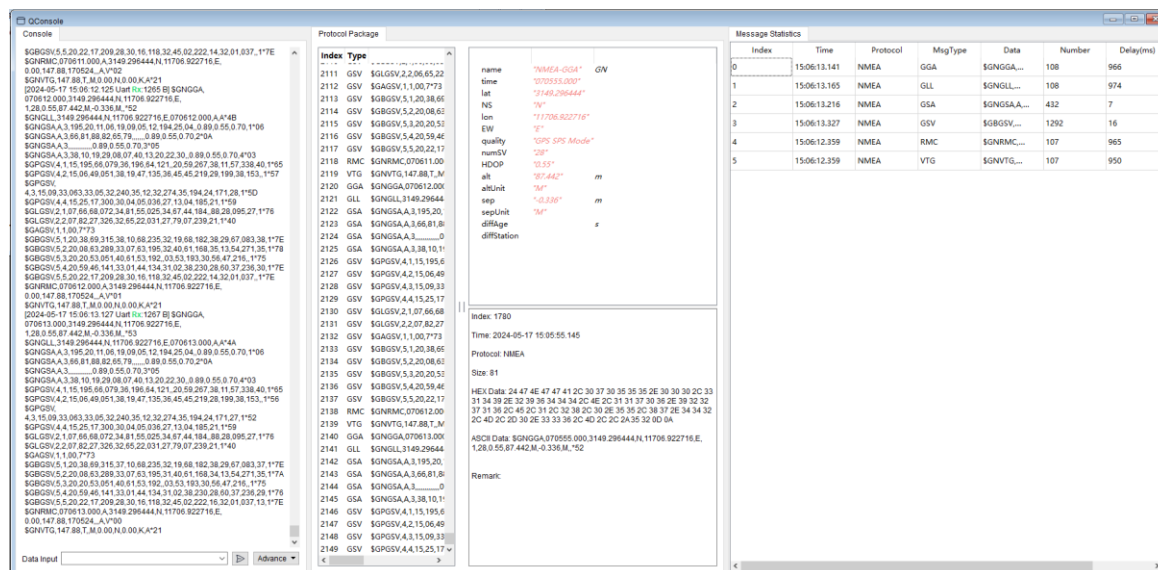


Figure 22: QConsole Sub-Window

1. Console Introduction

The “**Console**” is a debugging window for the module’s original data. Right-click the mouse to popup the context menu.

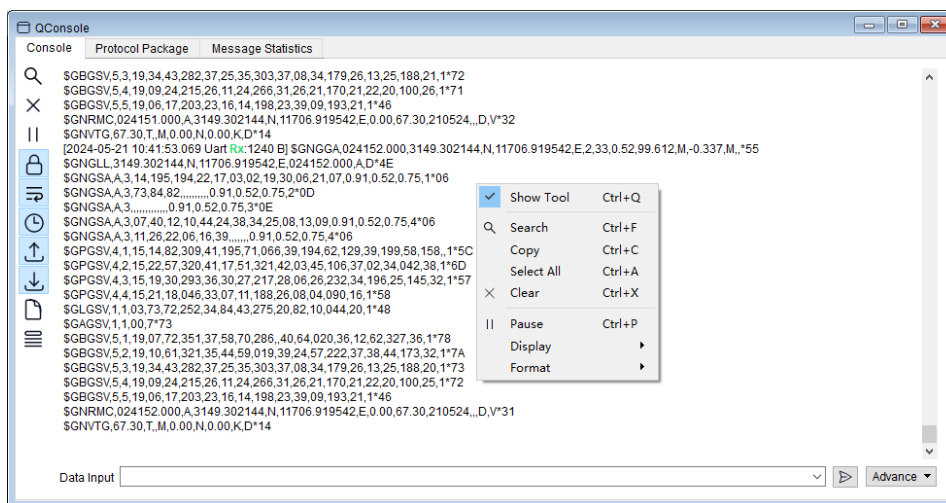


Figure 23: Console Context Menu

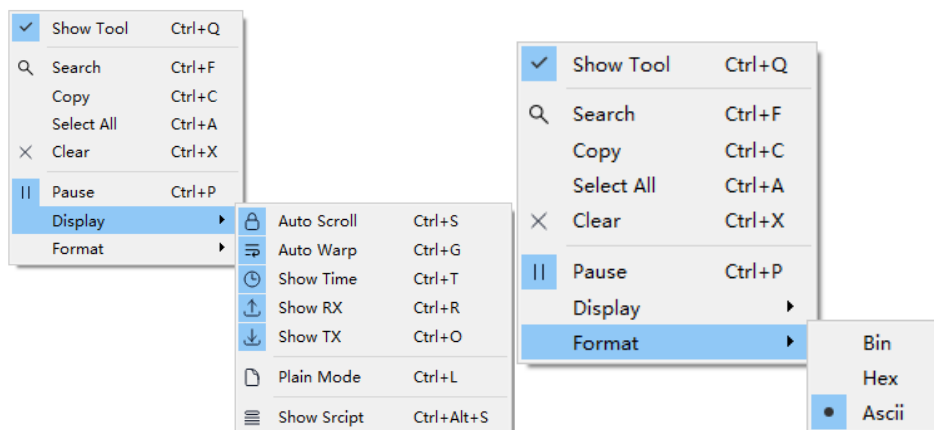


Figure 24: Details on Console Menu

The “**Console**” context menu information is as follows:

- **Show Tool**: Set whether the left sidebar is visible. Shortcut: **Ctrl+Q**.
- **Search**: Regular match filtering and highlighting. Shortcut: **Ctrl+F**.
- **Copy**: Copy selected context. Shortcut: **Ctrl+C**.
- **Select All**: Select all current context in console. Shortcut: **Ctrl+A**.
- **Clear**: Clear current context. Shortcut: **Ctrl+X**.
- **Pause**: Control whether to pause data appending. Shortcut: **Ctrl+P**.
- **Display**: Control data display.
 - **Auto Scroll**: Control whether to enable automatic data scrolling. Shortcut: **Ctrl+S**.
 - **Auto Warp**: Control whether the data automatically wraps when it exceeds the window width. Shortcut: **Ctrl+G**.
 - **Show Time**: Control whether to display the timestamp. Shortcut: **Ctrl+T**.
 - **Show RX**: Control whether to display the received data. Shortcut: **Ctrl+R**.
 - **Show TX**: Control whether to display the sent data. Shortcut: **Ctrl+O**.
 - **Plain mode**: Control whether to output raw data without adding any extra characters. Shortcut: **Ctrl+L**.
 - **Show Script**: Control whether to display the script sending window. Shortcut: **Ctrl+Shift+S**.
- **Format**: Text encoding.
 - **Bin**: Binary encoding.
 - **Hex**: Hex encoding.
 - **Ascii**: ASCII encoding.

Table 3: Description of Console Functions

Icon	Function	Description
Q	Search	Regular match filtering and highlighting

Icon	Function	Description
	Clear	Clear current context
	Pause	Control whether to pause data appending
	Auto scroll	Control whether to enable automatic data scrolling
	Auto warp	Control whether the data automatically wraps when it exceeds the window width
	Show time	Control whether to display the timestamp
	Show RX	Control whether to display the received data
	Show TX	Control whether to display the transmitted data
	Plain mode	Control whether to output raw data without adding any extra characters
	Show Script	Control whether to display the script sending window
	Send Data	Click to send input data
	Advance	Configure the data parameters to be sent
	Match Case	Control whether to enable case matching
	Enable Filtering	Control whether to enable filtering

Press the shortcut key “**Ctrl+F**” or click the button to display the search box in the upper right corner. Enter the relevant content and click the button under the search box to display the matched data in the new right box.

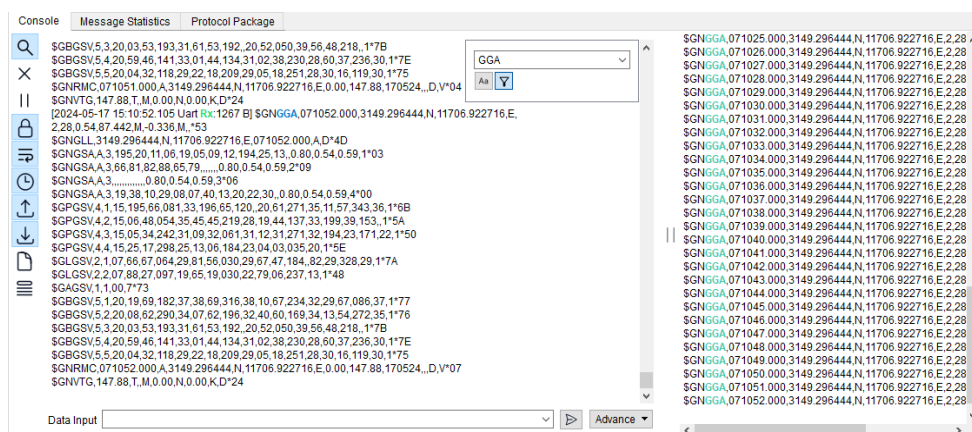



Figure 25: Console Data Filtering

Click the  button in the left column of “**Console**”, the “**Script Send**” window pops up. You can send one command at a time or enabled commands cyclically through this window, see [Chapter 3.2.2 Script Send](#) for details. Besides, the window also supports importing and exporting scripts.

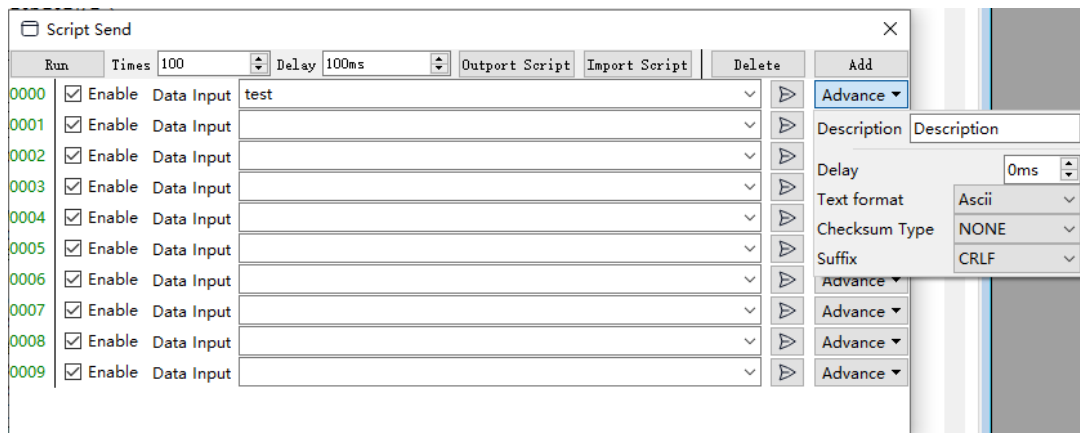


Figure 26: Script Console

Introduction on pop-up menu associated with the “**Advance**” button:

- **Description:** Input data description. Add this information to mark the purpose of the input data, which is useful when you open a previous script.
- **Delay:** Regulate the delay in milliseconds before the data is transmitted.
- **Text format:** Format of sent data, classified as:
 - **Bin:** Send binary data.
 - **Hex:** Send hexadecimal data.
 - **Ascii:** Send ASCII data.
- **Checksum Type:** Checksum types, classified as:
 - **NONE:** No checksum by default.
 - **NMEA:** Add NMEA checksum.
 - **RTCM3:** Add RTCM3 checksum.
- **Suffix:** Suffix information, classified as:
 - **None:** No suffix.
 - **CR:** Carriage return. Add suffix ‘\r’.
 - **LF:** Line feed. Add suffix ‘\n’.
 - **CRLF:** Carriage return line feed. Add suffix “\r\n”.
 - **LFCR:** Line feed carriage return. Add suffix “\n\r”.

2. Protocol Package Introduction

“**Protocol Package**” displays the parsed message. When the specific message on the left is selected, manually click on the right sidebar to support display of detailed message information.

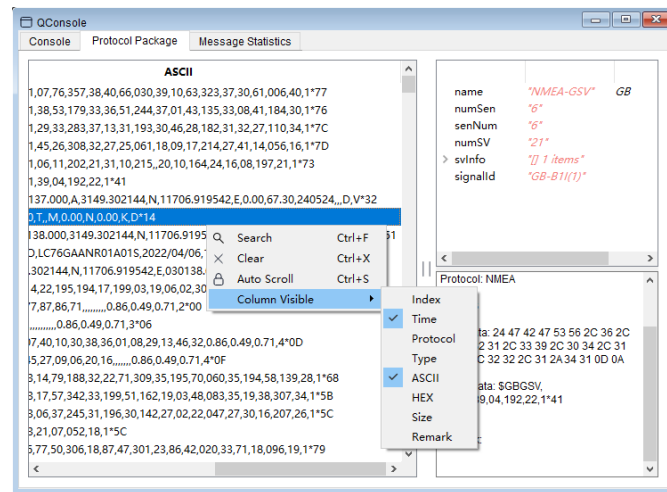


Figure 27: Protocol Package

Right-click the mouse and context menu pops up.

- **Search:** Regular match filtering. Shortcut: “**Ctrl+F**”.
- **Clear:** Clear current context. Shortcut: “**Ctrl+X**”.
- **Auto Scroll:** Control whether to enable automatic data scrolling. Shortcut: “**Ctrl+S**”.
- **Column Visible:** Control which columns are visible.
 - **Index:** Message index.
 - **Time:** Receiving time.
 - **Protocol:** Protocol type.
 - **Type:** Message type.
 - **ASCII:** ASCII encoding display.
 - **HEX:** Hexadecimal encoding display.
 - **Size:** Number of bytes.
 - **Remark:** Remark reserved for future use.

3. Message Statistics Introduction

“**Message Statistics**” perform statistics on parsed messages and record the received interval.

Console		Protocol Package		Message Statistics		
Index	Time	Protocol	MsgType	Data	Number	Delay(ms)
0	14:15:35.063	NMEA	GGA	\$GNGGA,...	637	1000
1	14:15:35.063	NMEA	GLL	\$GNGLL,...	637	999
2	14:15:35.091	NMEA	GSA	\$GNGSA,A,...	3424	0
3	14:15:35.204	NMEA	GSV	\$GBGSV,...	7422	16
4	14:15:35.204	NMEA	RMC	\$GNRMC,...	637	1140
5	14:15:35.221	NMEA	VTG	\$GNVTG,...	637	1157

Figure 28: Message Statistics

2.2.5.3. Firmware Download Sub-Window

The “**Firmware download**” sub-window is used to upgrade the module firmware. See [Chapter 3.8 Firmware Download](#) for the general process of firmware upgrade. If the detailed process of firmware upgrade via QGNSS for a specified module is required, please refer to the corresponding firmware upgrade guide.

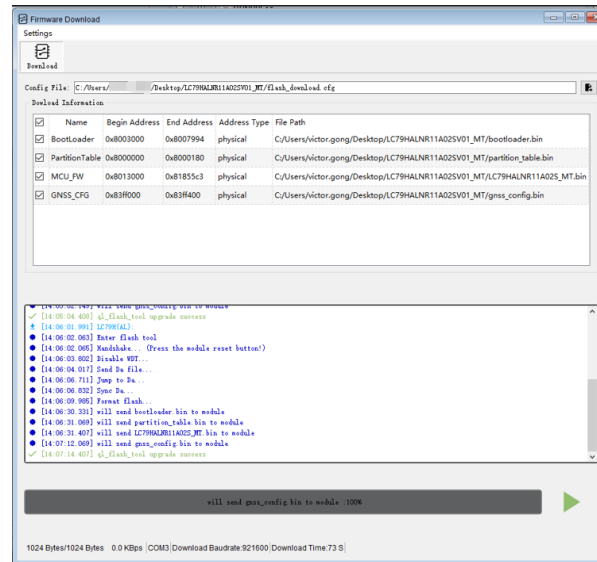


Figure 29: Firmware Download Sub-Window

2.2.5.4. Coordinate Converter Sub-Window

- In the “**Coordinate Converter**” Sub-Window:
 - Select one of the “**LLA(Deg)**”, “**LLA(Deg,Min)**”, “**LLA(Deg,Min,Sec)**”, or “**ECEF(XYZ)**” coordinate system formats, taking “**LLA(Deg)**” as an example:

The screenshot shows a software window titled "Coordinate Converter" with a sub-tab "Finding Coordinate Distance". It features four radio buttons for coordinate formats: "LLA(Deg)" (selected), "LLA(Deg,Min)", "LLA(Deg,Min,Sec)", and "ECEF(XYZ)".

Under the "LLA(Deg)" section, there are three input fields: "Lat(D)" with the value "31.82208222", "Lon(D)" with the value "1117.11633695", and "Alt(m)" with the value "129.40".

Below this, the "LLA(Deg,Min)" section has fields for "Lat", "Lon", and "Alt", each with sub-fields for "D" (Degrees) and "M" (Minutes). The "LLA(Deg,Min,Sec)" section has similar fields for "D", "M", and "S" (Seconds). The "ECEF(XYZ)" section has fields for "X", "Y", and "Z".

At the bottom right, there are two buttons: "Clear" and "Convert".

Figure 30: Coordinate Converter Sub-Window – Enter Values

- Click "**Convert**" and the tool will convert the values to other formats.

The screenshot shows a software window titled "Coordinate Converter" with a sub-tab "Finding Coordinate Distance". It contains four sections for coordinate conversion, each with input fields and a "Convert" button.

- LLA(Deg)**: Lat(D) 31.82208222, Lon(D) 1117.11633695, Alt(m) 129.40
- LLA(Deg,Min)**: Lat 31 D 49.32493320 M, Lon 1117 D 6.98021700 M, Alt 129.40 m
- LLA(Deg,Min,Sec)**: Lat 31 D 49 M 19.49599200 S, Lon 1117 D 6 M 58.81302000 S, Alt 129.40 m
- ECEF(XYZ)**: X 4325637.94, Y 3273393.56, Z 3343752.78

At the bottom right, there are "Clear" and "Convert" buttons.

Figure 31: Coordinate Converter Sub-Window– Convert Values

2. In the **"Finding Coordinate Distance"** Sub-Window:
 - Enter the latitude and longitude of starting and end points to calculate the straight-line distance between two points.

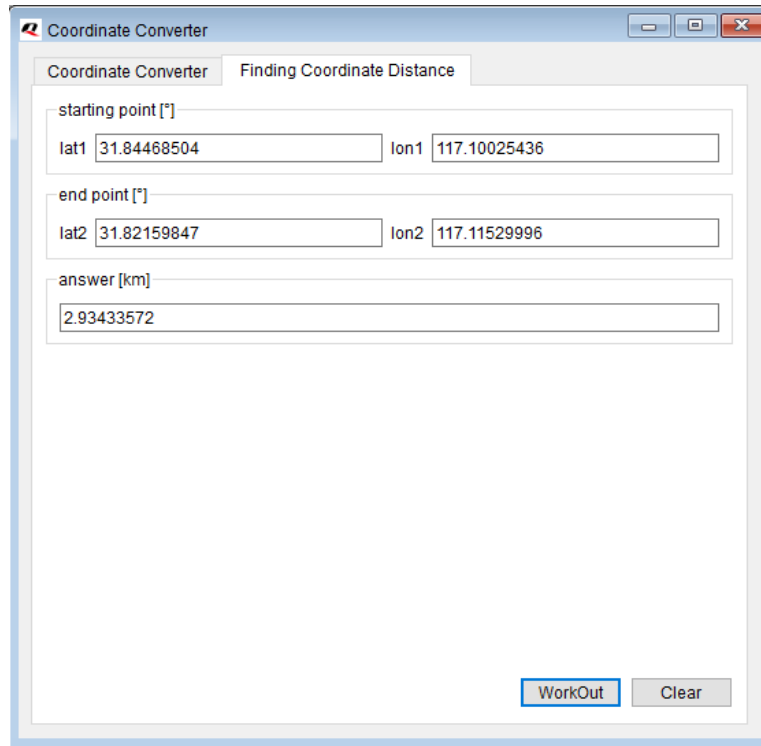


Figure 32: Finding Coordinate Distance Sub-Window

2.2.5.5.QGNSSLog Sub-Window

The “**QGNSSLog**” displays a line chart of satellite signal-to-noise ratio, number of visible satellites, and number of satellites in use, and presents satellite data in the NMEA message.

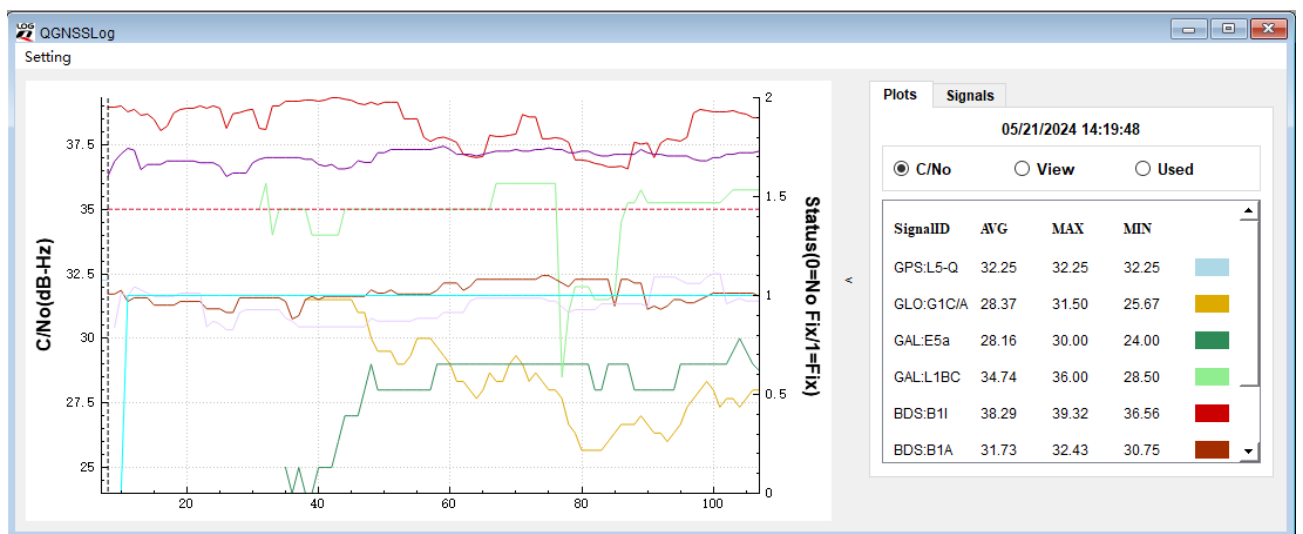


Figure 33: QGNSSLog Sub-Window

There are “**Plots**” and “**Signals**” options on the right side of “**QGNSSLog**”:

- “**Plots**” displays the current time, options of the three curve charts, i.e., satellite signal-to-noise ratio, number of visible satellites, and number of satellites in use, and the extremum and average values of the signal bands.
- “**Plots**” displays or hides the curves.

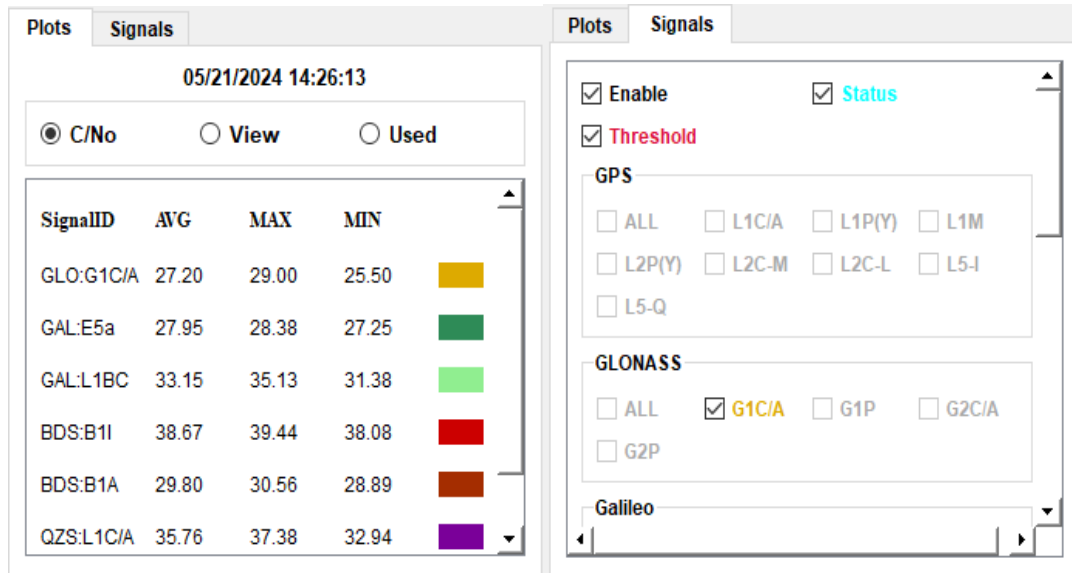


Figure 34: QGNSSLog Right Tab

Right-click to open the curve menu.

- **Clear:** clear all current data related to curve charts. Shortcut: **Ctrl+Del**
- **Refresh:** Restore curve charts to their initial state. Shortcut: **F5**
- **Comparison:** Check to open the point comparison view to show data points on the Y-axis that correspond to the points on the X-axis.

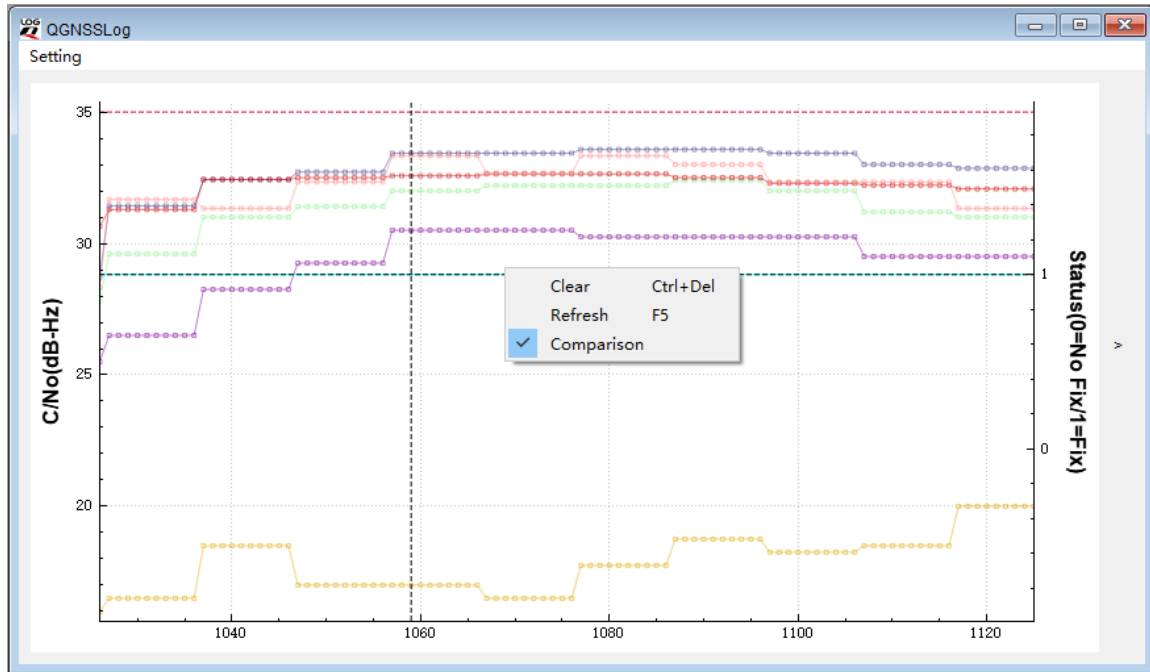


Figure 35: Curve Menu

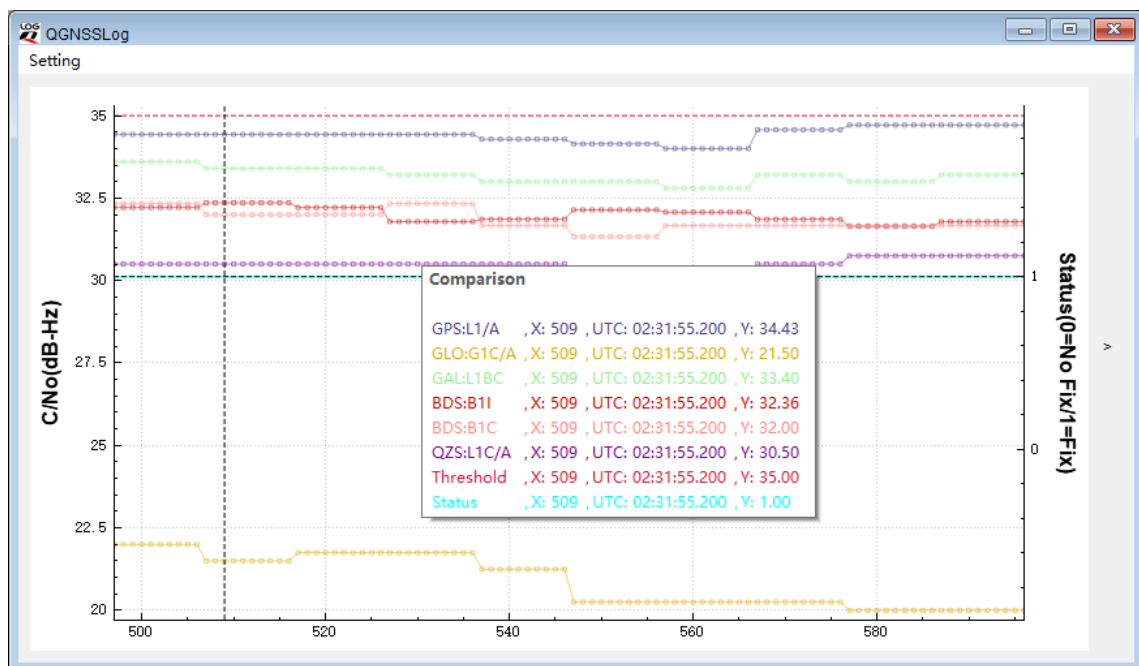


Figure 36: QGNSSLog Comparison

There will be an additional curve chart in “QGNSSLog” in the playback state, showing the CEP values of L1, L2, L5 and L6.

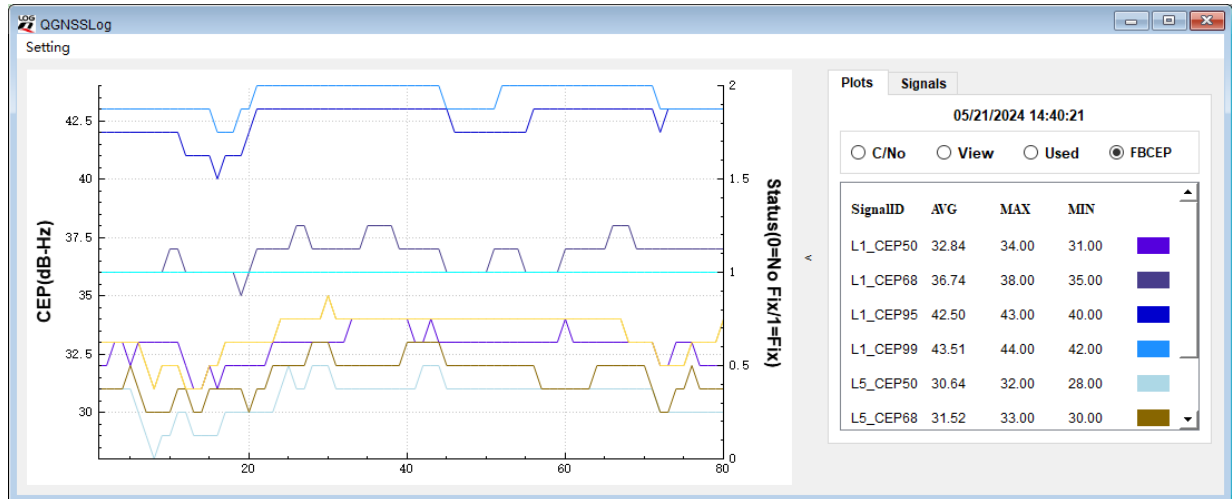


Figure 37: QGNSSLog CEP

2.2.5.6. NMEA Convert KML Sub-Window

The “NMEA Convert KML” sub-window is used for converting NMEA logs to a KML format file.

- Click “File Name(s)” to select the input NMEA file.
- Click “File Name” to select the output file location.
- Click “OK” to wait for the conversion to complete.

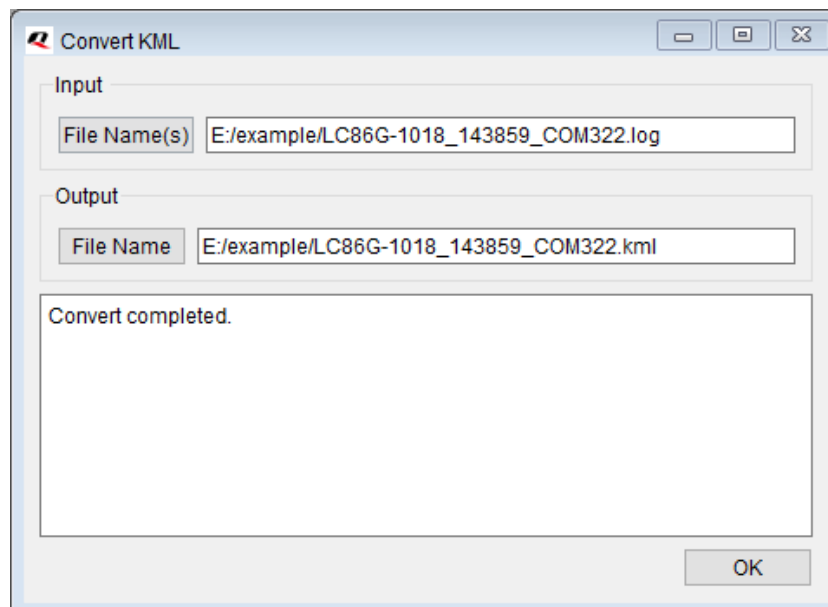


Figure 38: NMEA Convert KML Sub-Window

2.2.5.7.NTRIP Sub-Window

See [Chapter 3.7 Build NTRIP System](#) for details.

2.2.5.8.AGNSS Sub-Window

Via the “**AGNSS**”, you can download AGNSS files from the FTP server and AGNSS data to the receiver through the serial port. See [Chapter 3.6 Send AGNSS Data](#) for details.

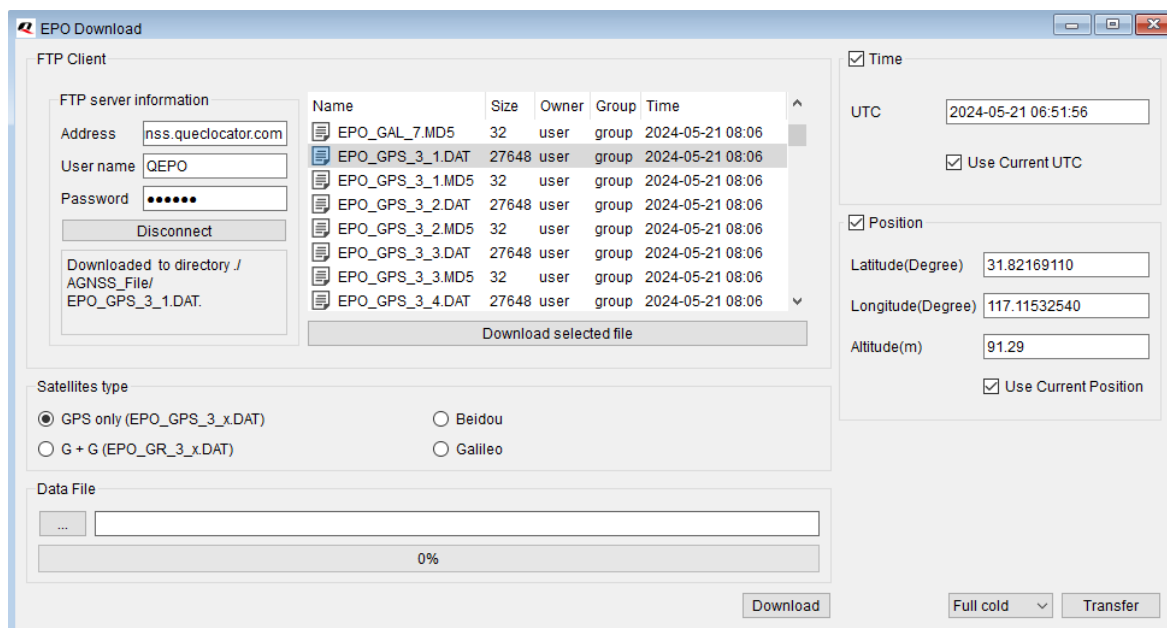


Figure 39: AGNSS Sub-Window

2.2.6. Windows Tab

In the “**Windows**” tab menu:

- Click “**Tile pattern**” to display the sub-window(s) in a tile pattern.
- Click “**Cascade**” to display the sub-window(s) in a cascade pattern.
- Click “**Close All**” to close all sub-windows.

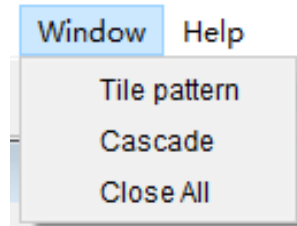


Figure 40: Window Tab Menu

Display all the sub-windows in a tile pattern.

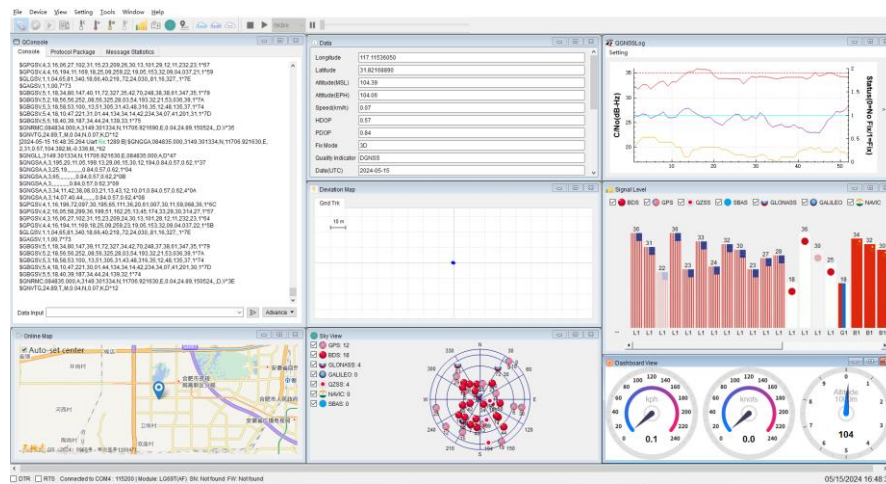


Figure 41: Tile Pattern Window

Display all the sub-windows in a cascade pattern.

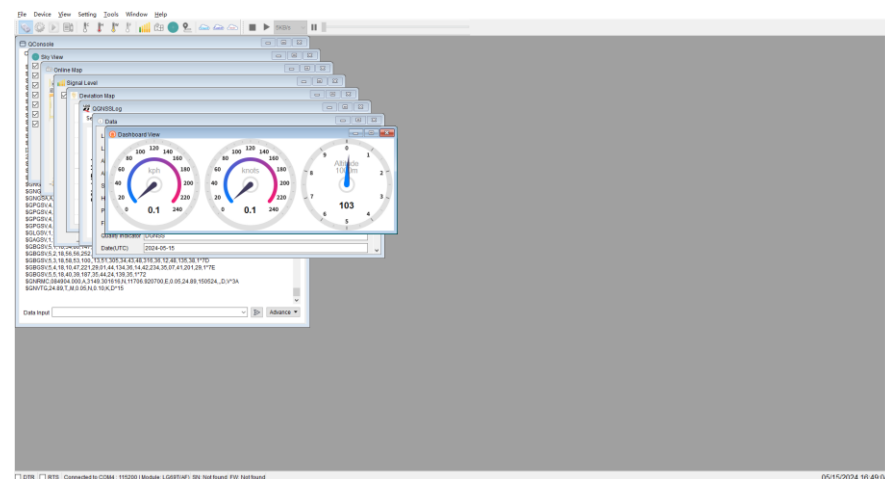


Figure 42: Cascade Window

Closes all windows.



Figure 43: Close All Window

2.2.7. Help Tab

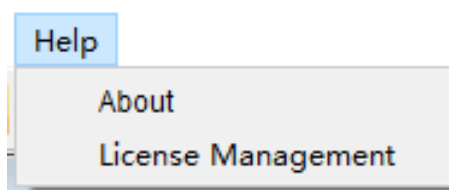


Figure 44: Help Tab Menu

2.2.7.1.About

Display QGNSS version and compile time.

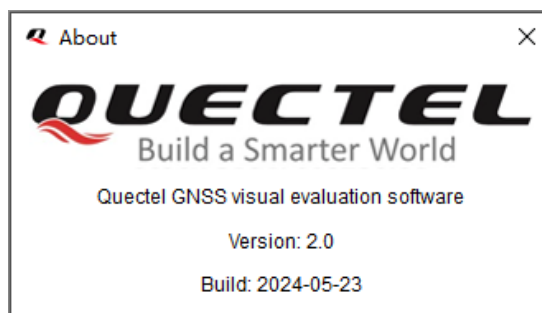


Figure 45: About Sub-Window

2.2.7.2. License Management Sub-Window

1. Generate registration code: Enter the username and email address and click the "**Generate Registration Code**" button to generate the registration code.
2. Import license management and control function: Click "**Select License**" to obtain a license.

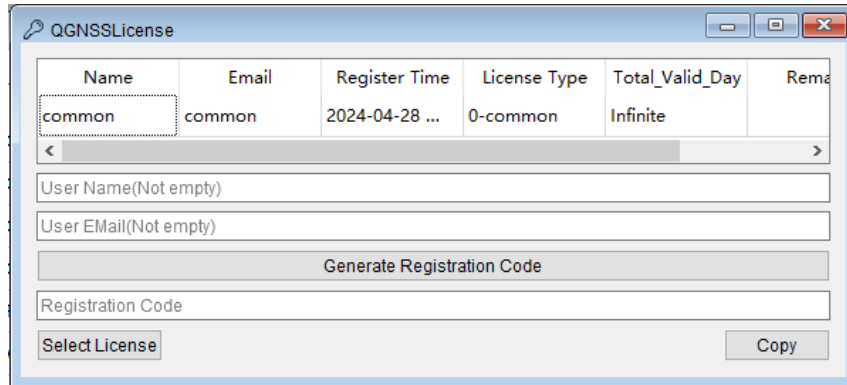


Figure 46: License Management

2.3. Tool Bar

Tool bar can be used for quick access to common operations.

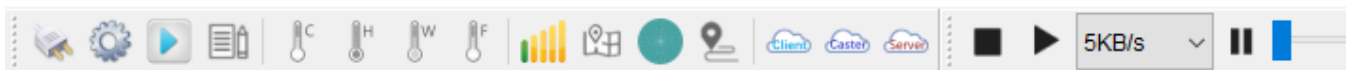






















Figure 47: Tool Bar

Table 4: Description of Tool Bar Functions

Icon	Function	Description
	Connect	Connect/disconnect serial port
	Set Device Information	Select module and set serial parameter(s)
	Open	Play log file
	Show Logfile in Explorer	Open the folder containing the saved log file(s)

Icon	Function	Description
	Cold Start	Send a Cold start command
	Hot Start	Send a Hot start command
	Warm Start	Send a Warm start command
	Full Cold Start	Send a Full cold start command
	GNSS Signal View	Open the “ Signal Level ” sub-window
	Online Map	Open the “ Online Map ” sub-window
	Sky View	Open the “ Sky View ” sub-window
	Deviation Map	Open the “ Deviation map ” sub-window
	NTRIP Client	Open the “ NTRIP Client ” sub-window
	NTRIP Caster	Open the “ NTRIP Caster ” sub-window
	NTRIP Server	Open the “ NTRIP Server ” sub-window
	Stop Play	Stop log play
	Start Play	Start log play
	Play Speed	Select different rates for log play
	Play Pause	Click to pause log play
	Play progress slider bar	Play progress bar, and click to drag the progress bar

3 Common Operations

3.1. Connect to Receiver

Follow the below steps to connect the receiver to the QGNSS software utility:

Step 1 Run the QGNSS tool.

Step 2 Click the “**Set Device Information**” button on the tool bar to open the “**Device Information**” window.

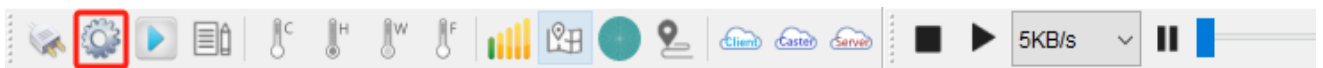


Figure 48: Open Serial Port Configuration

Step 3 Select the module and serial port parameters, and then click the “**OK**” button.

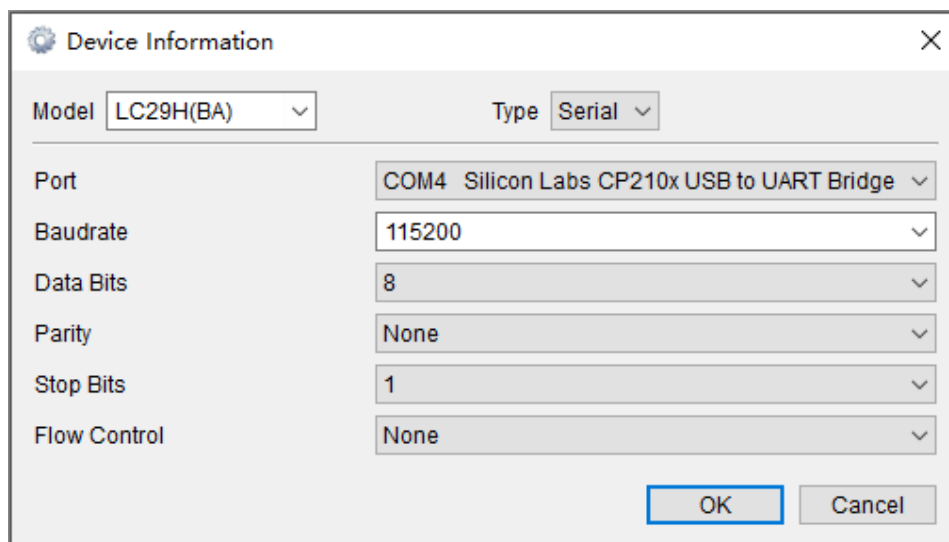


Figure 49: Serial Port Configuration Dialog

3.2. QConsole

3.2.1. Data Matching

Pressing the “**Ctrl+F**” shortcut key in “**Console**” and “**Protocol Package**” will hide or show the search widget.

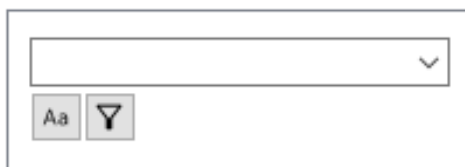



Figure 50: Search Widget

For example, input “**RMC**” and then the matched strings will be highlighted. Then click  button, the right side of “**Console**” sub-window will display the matched newline data.

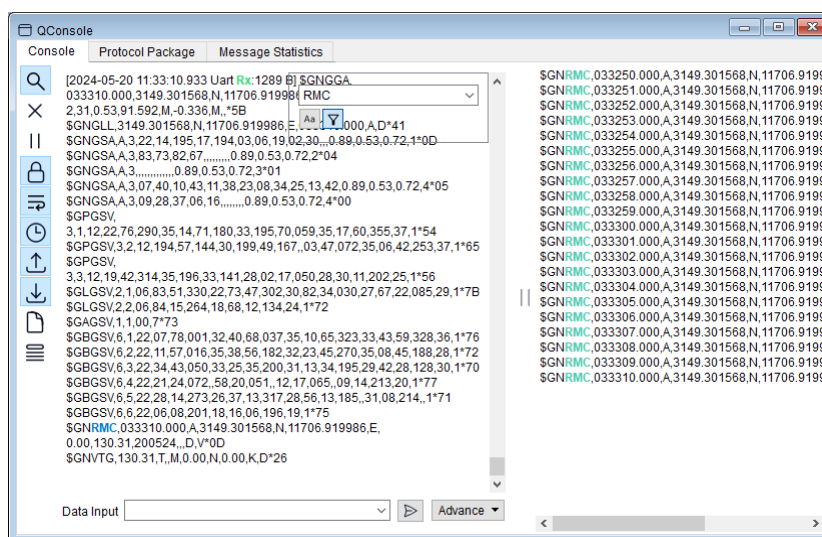


Figure 51: Console Data Matching

The tool also supports regular matching. For instance, using “**\\\$[A-Z]{2}(RMC|GGA)[,]{1}[.,A-Za-z0-9]{1,}***” to match the **RMC** or **GGA** messages.



3.2.2. Script Send

Click the  button on the left column of “Console” to pop up the “Script Send” window

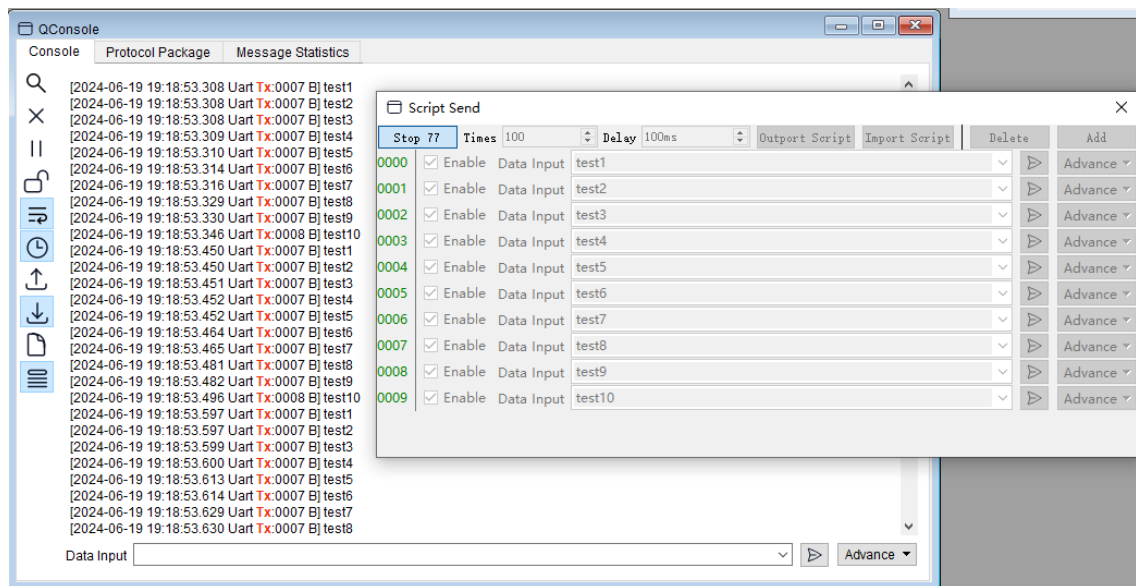





Figure 54: Send Script

Send one command at a time:

1. Enter the command to be sent in the command box.
2. Click the “**Advance**” button to configure the sending parameters in the pop-up menu.
3. Click  to send the command.

Send enabled commands cyclically:

1. Enter the commands to be sent in the command boxes one by one.
2. Click the “**Advance**” button to configure the sending parameters in the pop-up menu, as shown in [Figure 26: Script Console](#).
3. Enter the number of cycles in the box after “**Times**” and the delay time (unit: ms) of each cycle in the box after “**Delay**”.
4. Click  button, as shown in [Figure 26: Script Console](#), to send the commands cyclically. If you want to end the command sending in advance click .

3.3. Log Play

Steps to replay a recorded log file:

Step 1 Click the “**Play**” button to open the play dialog box.



Figure 55: Log Play

Step 2 Select the module and enter log file path and then click the “**OK**” button.

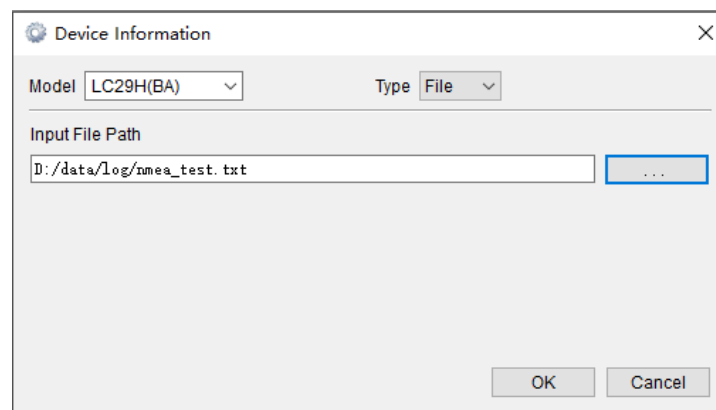


Figure 56: Select the File

Step 3 Select the Read Rate (B/s) value.

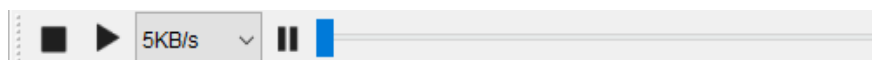


Figure 57: Play Controller

See [Table 4: Description of Tool Bar Functions](#) for the descriptions of above buttons.

3.4. Restart Receiver

Choose a restart type and click the corresponding button in the tool bar to send the restart command to the receiver. For the description of these buttons, see [Table 4: Description of Tool Bar Functions](#).

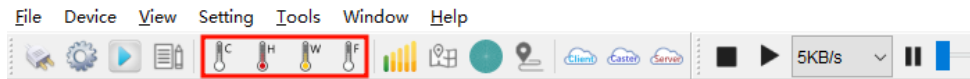


Figure 58: Restart Receiver

3.5. Configure Receiver

Click “**Configuration View**” in the “**View**” tab drop-down menu to open “**Configuration View**” window.

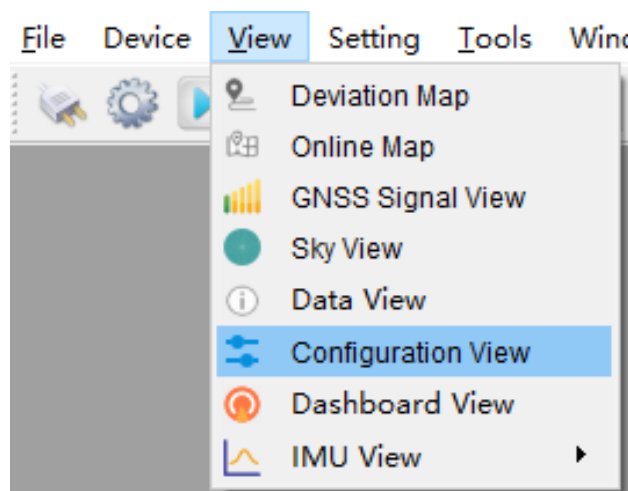


Figure 59: Open Configuration View

Step 1 Select the parameters to be configured and click “**Setting**” button.

Step 2 If the parameters support the query, click the “**Query**” button to query the configuration parameters.

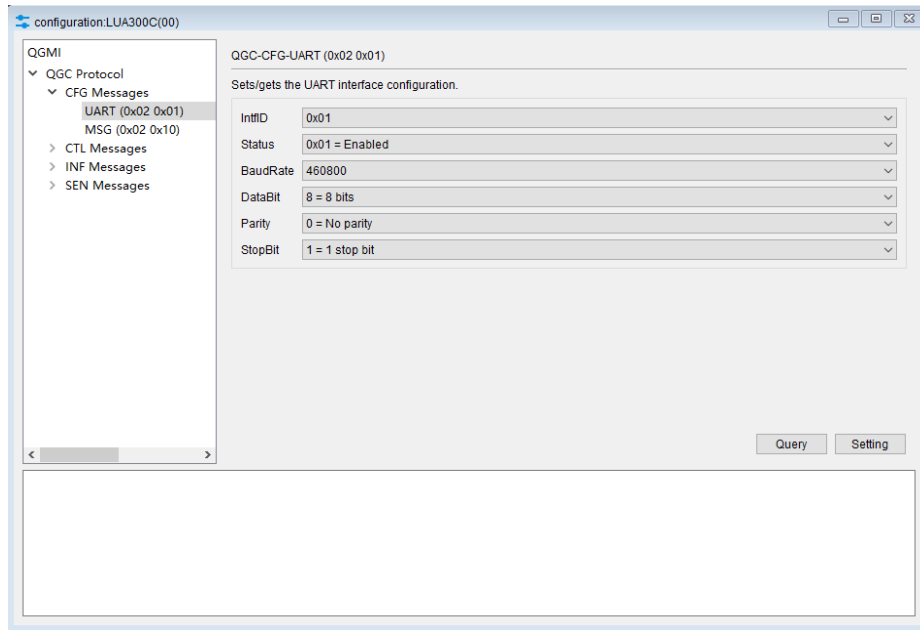


Figure 60: Configuration View

3.6. Send AGNSS Data

Click "**AGNSS**" in the "**Tools**" tab drop-down menu to open "**AGNSS**" window.

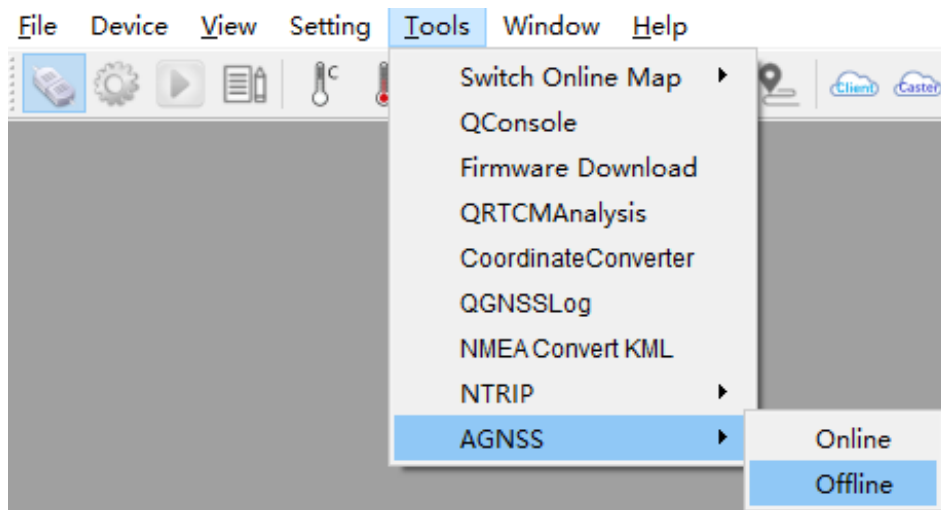


Figure 61: Open AGNSS Window

Step 1 Get AGNSS file:

1. Click **“Connect”** to connect to the FTP server.
2. Select the AGNSS file to be downloaded and click **“Download selected file”**.

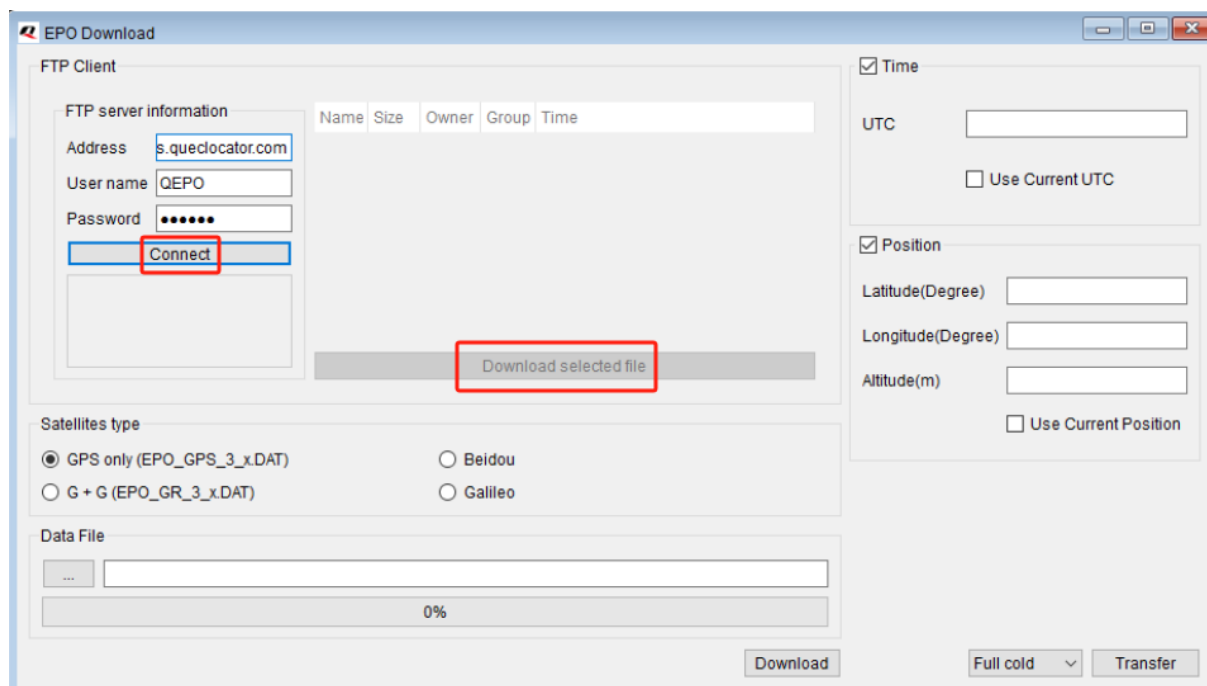


Figure 62: AGNSS Sub-Window

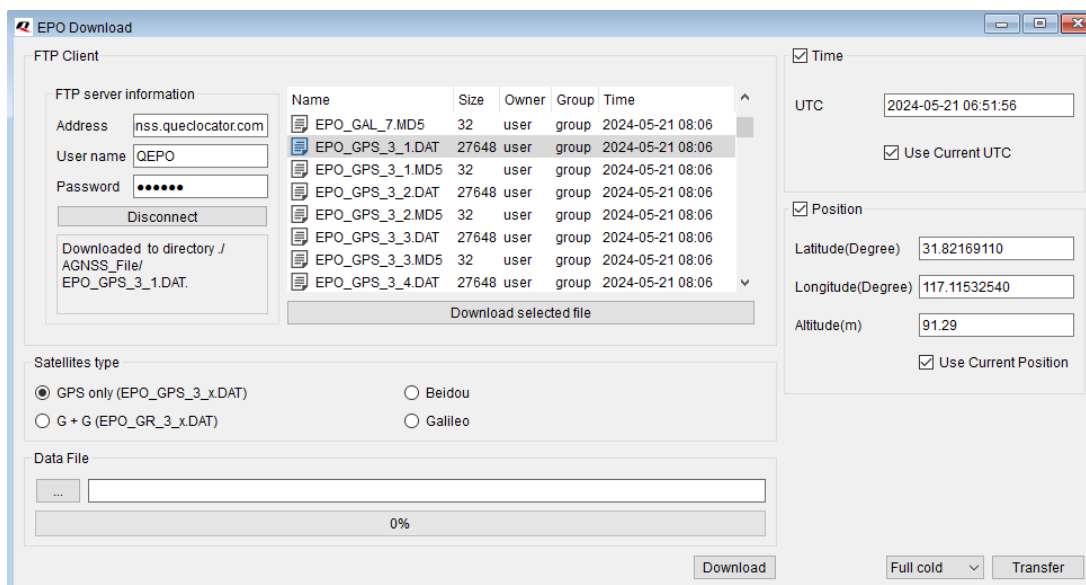


Figure 63: Connect to FTP Server

NOTE

AGNSS file is used to improve the TTFF duration by providing long duration Ephemeris to the receiver.

Step 2 Send AGNSS data to the receiver:

1. Enter the file path (file local path).
2. Click “**Download**” and wait for the data transmission to complete.

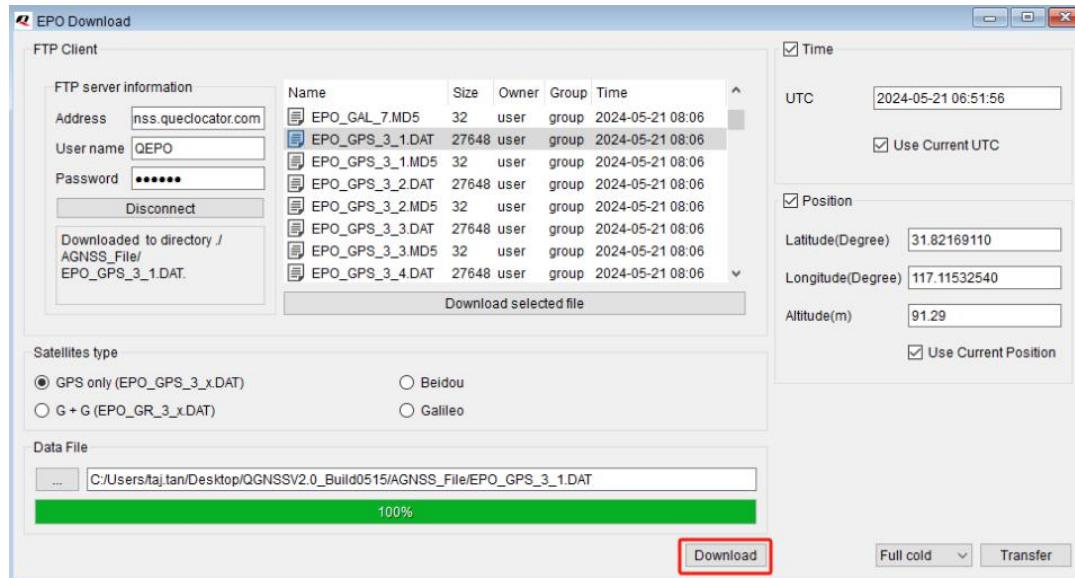


Figure 64: Send AGNSS Data

3.7. Build NTRIP System

“Networked Transport of RTCM via Internet Protocol” (NTRIP) stands for an application level protocol streaming “Global Navigation Satellite System (GNSS)” data over the Internet. This section will overlook the NTRIP system supported by the QGNSS. Currently the QGNSS supports “**NTRIP Caster**”, “**NTRIP Server**” and “**NTRIP Client**” functions. For more detailed information on NTRIP, see [document \[1\] RTK application note](#).

3.7.1. NTRIP Caster

The QGNSS tool has implemented the “**NTRIP Caster**” function, which can deploy “**NTRIP Caster**” through the QGNSS tool to receive and send GNSS data streams. The detailed steps are as follows:

Step 1 Open the QGNSS tool, click the “**NTRIP**” option in the dropdown menu of “**Tools**”. Then click the “**NTRIP Caster**” option, as shown in the figure below.

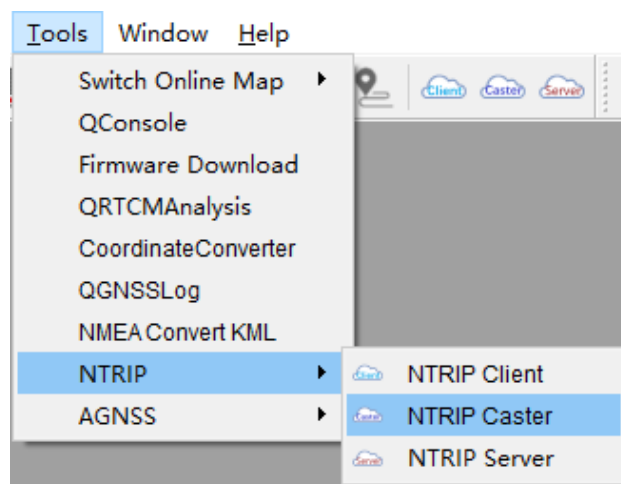


Figure 65: Open NTRIP Caster

Step 2 Enter the Address, Port, User, and Password of “**NTRIP Caster**”. If the Internet is required, make sure that the IP and ports can access to the Internet.

Step 3 Check the checkbox next to the “**Start/Stop**” and start the “**NTRIP Caster**”, as shown below.



Figure 66: Start NTRIP Caster

NOTE

Quectel provides temporary “**NTRIP Caster**” to facilitate testing, the detailed information are listed below:

Address: 172.29.104.32

Port: 7990

User: QL_NTRIP

Password: 123456

3.7.2. NTRIP Server

Quectel not only has GNSS high-precision positioning modules, but also GNSS modules with original observation data, such as LC29H (BS) and LG69T (AS). This section introduces how to build “**NTRIP Server**” via the QGNSS using LC29H (BS) as the base station.

Step 1 Open the QGNSS tool and connect the LC29H (BS) module.

Step 2 Set the LC29H (BS) module as a Fixed mode or Survey-in mode.

1. If you know the true coordinate where the base station mounted, you can set the LC29H (BS) to Fixed mode and send the coordinate in ECEF format. For example:

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

Module Response: \$PQTMCFGSVIN,OK*70

If you don't know the true coordinate, you can set the LC29H (BS) to Survey-in mode which determines the receiver's position by building a weighted mean of all valid 3D positioning solutions. For example:

Host Send: \$PQTMCFGSVIN,W,1,43200,15.0,0.0,0.0,0.0*13

Module Response: \$PQTMCFGSVIN,OK*70

2. Save the parameters:

Host Send: \$PQTMSAVEPAR*5A

Module Response: \$PQTMSAVEPAR,OK*72

Step 3 Click the “**NTRIP**” in the dropdown menu of “**Tools**”. Then click “**NTRIP Server**”, as shown below.

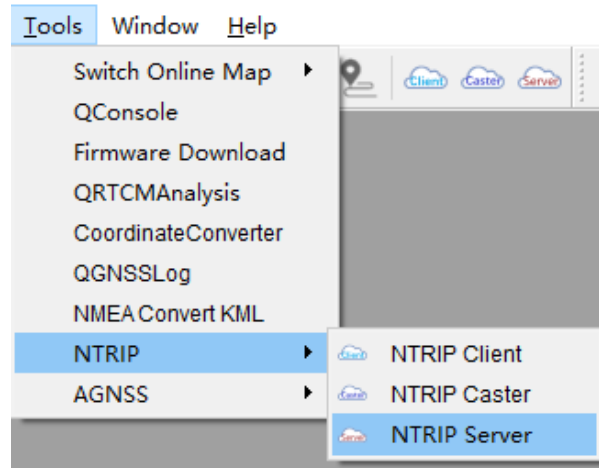


Figure 67: Open NTRIP Server

- Step 4** Enter Caster Address, Port, User, Password and Mountpoint. Ensure Caster Address, Port, User and Password are correspond to the “**NTRIP Caster**” to be connected. Mountpoint is the mount point to distinguish different NTRIP Source, and the input value is determined by the user. “**NTRIP Client**” obtains the correction data through the corresponding mountpoint.
- Step 5** Check the checkbox next to the “**Start/Stop**” and start “**NTRIP Server**”, as shown in the figure below. After the “**NTRIP Server**” function is started, the original observation data of LC29H (BS) will be transmitted to “**NTRIP Caster**”.

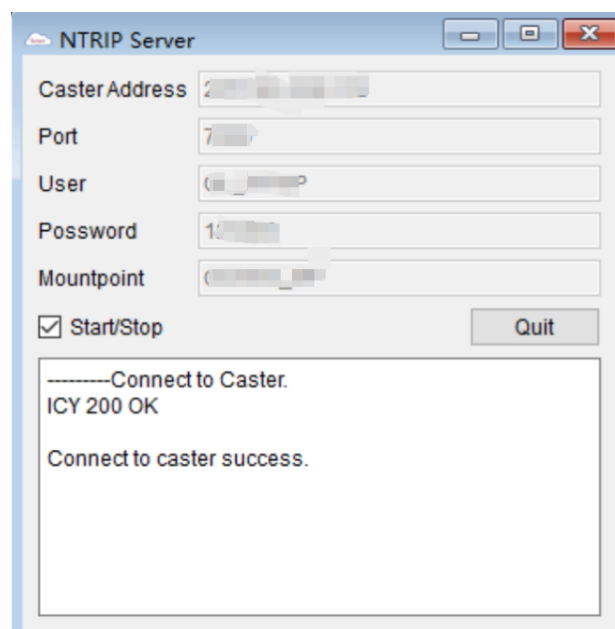


Figure 68: Start NTRIP Server

NOTE

In the **Step 2**, you can set a lower number of positioning in Survey-in mode, such as 300, facilitating a rapid examination of the RTK outcomes. Nonetheless, for the acquisition of an accurate base coordinate, it is advised to extend the number of positioning to a minimum of 43200.

3.7.3. NTRIP Client

The NTRIP is a gateway for GNSS modules to receive RTK corrections, which can effectively improve the positioning accuracy. Click **“NTRIP Client”** in the **“Tools”** tab drop-down menu to open **“NTRIP Client”** window.

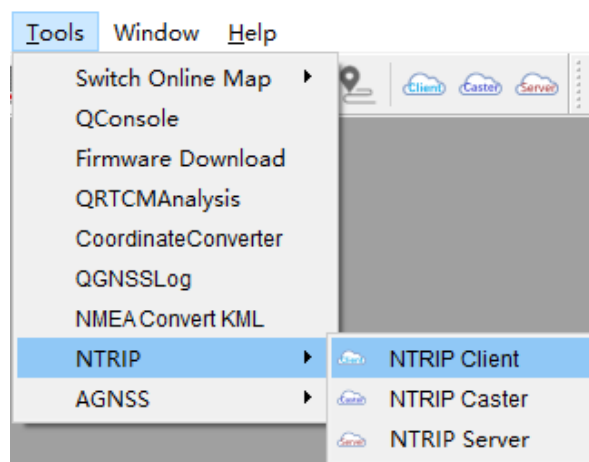


Figure 69: Open NTRIP Client

3.7.3.1.NTRIP Client

Use an NTRIP (V1.0) Client to connect to a standard **“NTRIP Caster”**, and follow these steps:

- Step 1** Enter the Address, Port, User and Password as shown in [Figure 71: NTRIP Client](#). Contact Quectel Technical Support to get the username and password if necessary.
- Step 2** Click **“Update NTRIP source table”** and wait for the server to return mount point information.
- Step 3** Select **“NTRIP mount point”**.
- Step 4** Enter **“Request Interval”**.
- Step 5** Tick the checkbox next to **“Use manual position”** and a window as shown in figure below pops up for entering the relevant position data. If the checkbox of **“Use manual position”** is unticked, the module will use the data of **<Quality>** parameter of the **GGA** message in Fixed mode.

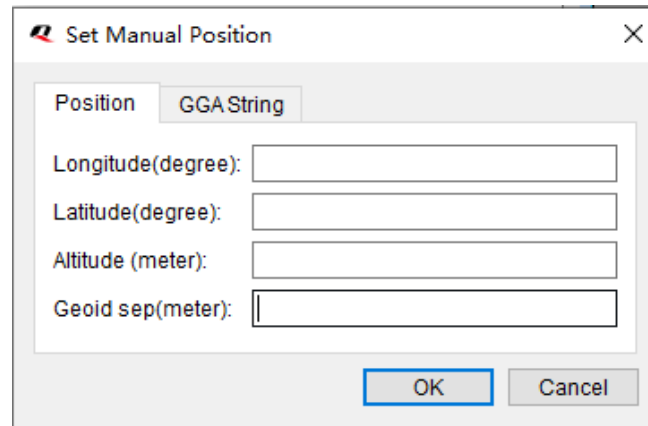


Figure 70: Set Manual Position

Step 6 Turn on the “**Connect to Host**” switch.

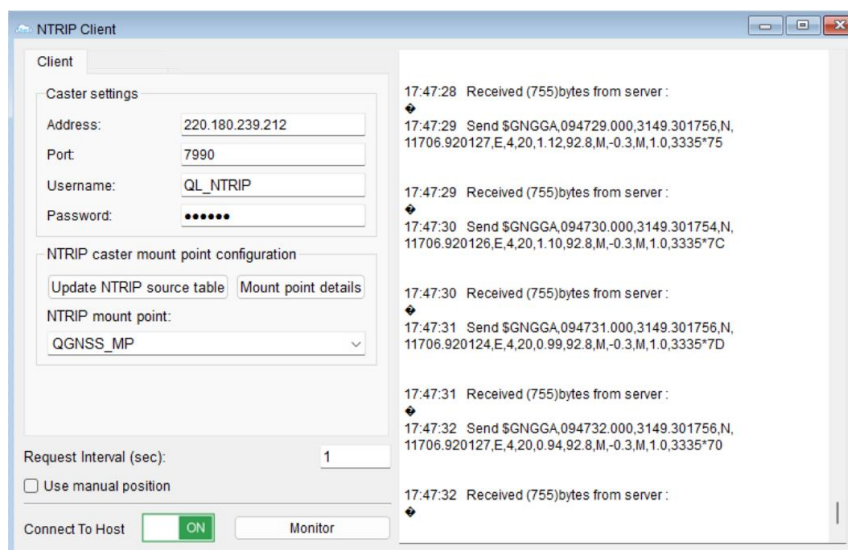


Figure 71: NTRIP Client

Step 7 Check whether the GNSS module receives the differential correction data. After receiving the differential correction data, check whether the value of parameter **<Quality>** in the **GGA** messages is 4 (4 corresponds to the fixed RTK mode), as shown in [Figure 72: The Module Enters the Fixed RTK Mode](#).

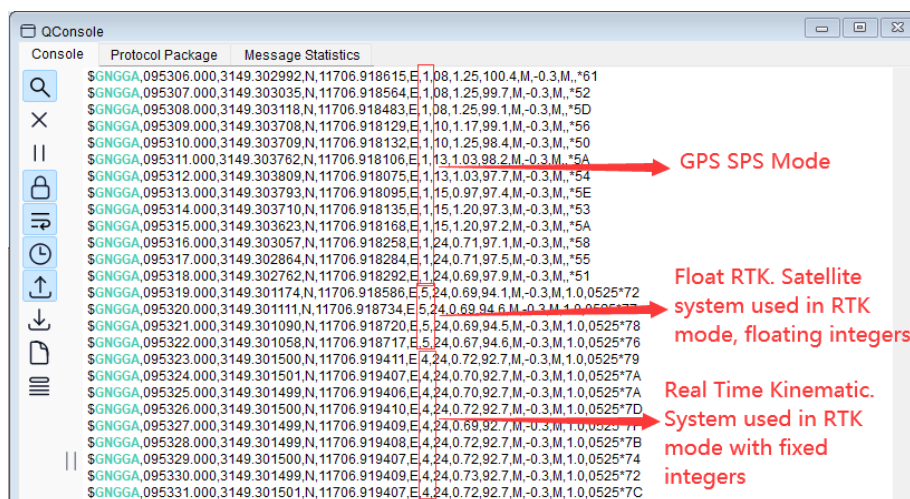


Figure 72: The Module Enters the Fixed RTK Mode

3.7.3.2.Data Monitor

Click “**Monitor**” to open the Data Monitor dialog box where you can view the differential correction data sent by the server.

NTRIP Client: Data Monitor

Basic Data	
Parameter	Value
1 Message Time	2024/05/21 05:42:49.000
2 Station Pos X/Y/Z (m)	-2471936.524,4828785.859,3343359.092
3 Station Lat/Lon/Height (deg,m)	31.81845445,117.10866863,31.007
4 MSM Signals for GPS	L1C,L2W,L2X,L5Q
5 MSM Signals for GLONASS	L1C,L2P
6 MSM Signals for Galileo	L1C,L7Q,L5Q
7 MSM Signals for QZSS	L1C,L2X,L5Q
8 MSM Signals for SBAS	
9 MSM Signals for BeiDou	L2(L6),L5P,L1P
10 Station ID	525
11 Station Health	0
12 Sequence No	0
13 ITRF Realization Year	0
14 Antenna Delta Type	E/N/U

Figure 73: RTK Data Monitor

3.8. Firmware Download

Connect to the receiver as explained in [Chapter 3.1 Connect to Receiver](#). Click “**Firmware Download**” in the “**Tools**” tab drop-down menu to open “**Firmware Download**” window.

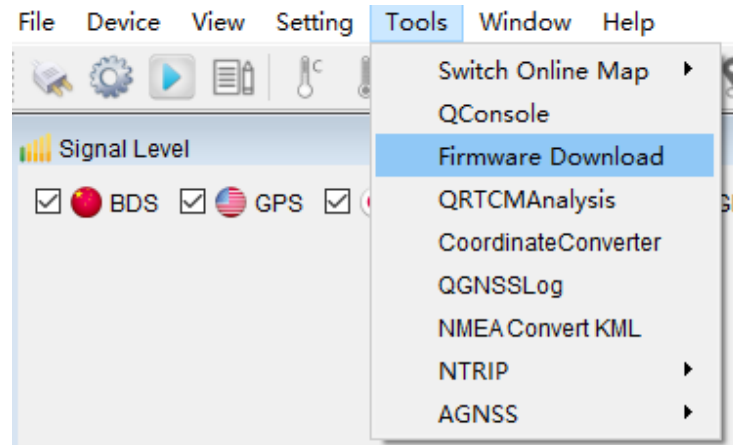





Figure 74: Open Firmware Download

- Step 1** Click  to select the receiver firmware.
- Step 2** Click  to select download baudrate.
- Step 3** Click  to start the firmware download process and wait for the process to complete.
- Step 4** Reset module.

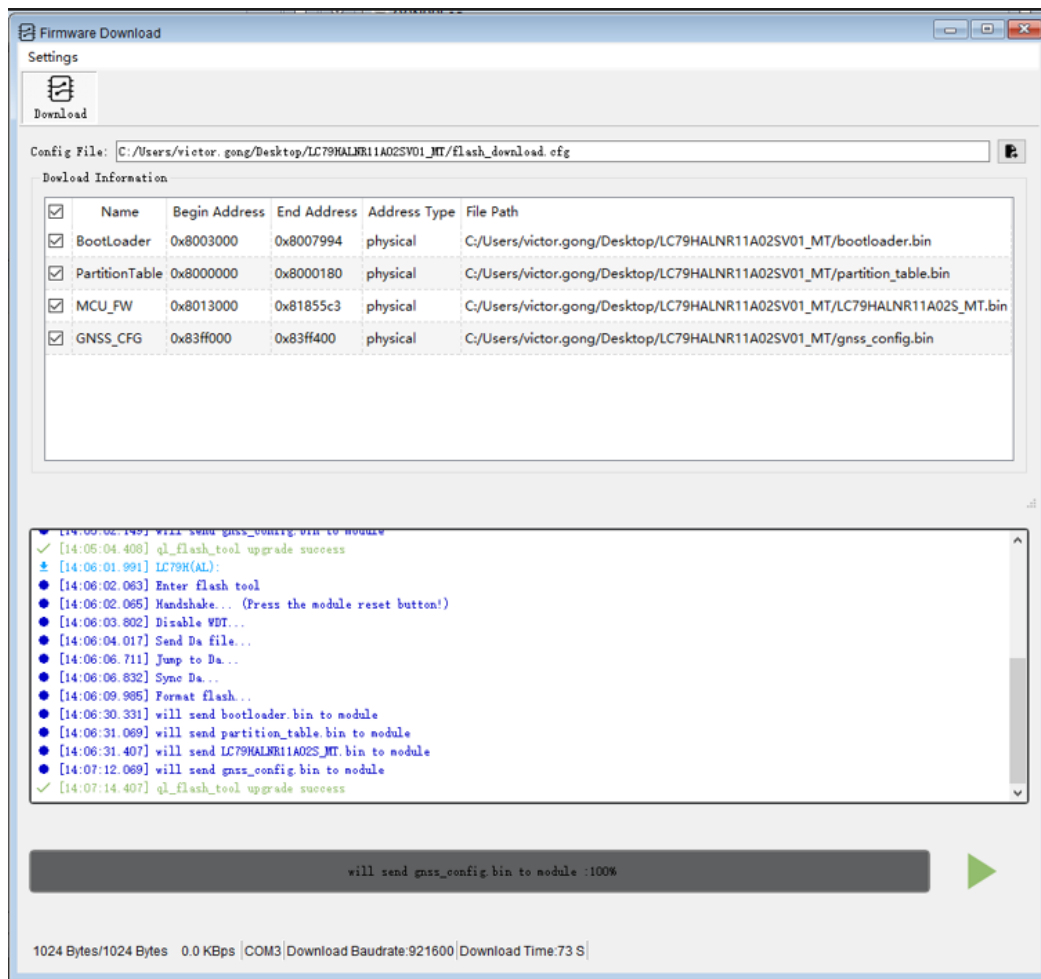


Figure 75: Firmware Download Process

NOTE

The steps for downloading the firmware via QGNSS tool may vary from module to module. See firmware upgrade guide of specific module for details.

4 Appendix References

Table 5: Related Document

Document Name
[1] Quectel_GNSS_RTK_Application_Note

Table 6: Terms and Abbreviations

Abbreviation	Description
AGNSS	Assisted GNSS
BDS	BDS Navigation Satellite System
C/N ₀	Carrier-to-Noise-Density Ratio
CEP	Circular Error Probable
DR	Dead Reckoning
EPH	Ellipsoid Height
Galileo	Galileo Satellite Navigation System (EU)
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
IRNSS	Indian Regional Navigation Satellite System (NavIC)
KML	Keyhole Markup Language
MSL	Mean Sea Level
NTRIP	Networked Transport of RTCM via Internet Protocol
PRN	Pseudo Random Noise Code
QZSS	Quasi-Zenith Satellite System

Abbreviation	Description
RTK	Real-time Kinematic
SBAS	Satellite-Based Augmentation System
TTFF	Time to First Fix