



GUI SOFTWARE

USER MANUAL

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UPrecise Software

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Revision History

Revision	Revision History	Date
R1.0	First release	Sep., 2022
R1.1	Support seven satellite systems; Add 2.2.12 Tools	Mar., 2023
R2.0	Update the number of receivers that can be connected Update section 2.3.3, 2.3.4, 2.3.5 and 2.3.8 to add the messages that need to be enabled Update section 2.3.12 Tools	Jan., 2024
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Foreword

This document gives an introduction of the software UPrecise, including the operations and UI descriptions, etc.

Target Readers

This document applies to users or manufactures/companies that use the products from Unicore.

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1 UPrecise Introduction

1.1 Description of UPrecise

UPrecise is a GNSS evaluation software developed by Unicore. It aims to help you conveniently do operations on the receivers with graphical real-time monitoring and playback function.

Using this software, you can interact with receivers by serial ports or TCP/IP and see the status information. After connecting the receivers, UPrecise can automatically identify the baud rates and type of the receivers, and display the specific message configurations and parsed sentences.

1.2 Functions of UPrecise

You can see section 2 for the detailed functions and here just introduces the basic information.

- [Interacting with the receivers](#)
UPrecise can display the raw data in real time or playback, and provides a command input box for real-time interaction with the receivers.
- [Showing constellations](#)
The window "Constellation" can display a general distribution of the visible satellites in real time or playback.
- [Showing satellite tracking status](#)
The window "Tracking Status" displays the change of C/N0 and tracking status in real time or playback, which varies according to the window size (normal size or maximized size).
- [Showing the positioning information](#)
The window "Map" shows the positioning information including the positioning point and the trajectory drawn in real time or playback on the loaded map in the language you select (Google Maps or Baidu Maps). The function is particularly suitable for viewing the trajectory of the running cars.
- [Showing the attitude information](#)
The window "Attitude" displays the information of positioning and attitude, which enables you to know the receivers' attitude intuitively.

- [Showing discrete degrees](#)

The window "Discrete trajectory" shows the longitude and latitude of the positioning point, as well as the horizontal discrete degree in real time or playback. When receiving static signals, it enables you to view the degree in different scales.
- [Parsing messages](#)

The window "Message" dynamically displays the parsed NMEA and other messages according to the type of the receivers.
- [Configuring receivers](#)

The window "Receiver Configurations" enables you to query and configure the parameters of the receiver according to its type, so that you can interact with the receiver more conveniently.
- [Upgrading receivers](#)

UPrecise supports the firmware upgrade of the receivers from Unicore.
- [Replaying](#)

With the "replay" function, the software uses the saved data to show the parsed messages and draw visual graphics. Except the data saving and command interaction, other functions can work as same as those in real time.
- [Various Tools](#)

UPrecise has integrated a variety of useful tools, including the interference detection tool (CWOUT), RTCM differential data monitoring tool, log to KMZ format converter, TTF test tool, data format converter, and NtripCaster.

1.3 Preparations

To activate all the functions of UPrecise, you need to use it together with Unicore's products.

Table 1-1 UPrecise information

Name	Supported Language	Supported System (64-bit)
UPrecise	English/Chinese	Windows 7/Windows 8 /Windows 10

Before using UPrecise, you need to connect the receivers, antenna and PC correctly (see Figure 1-1).

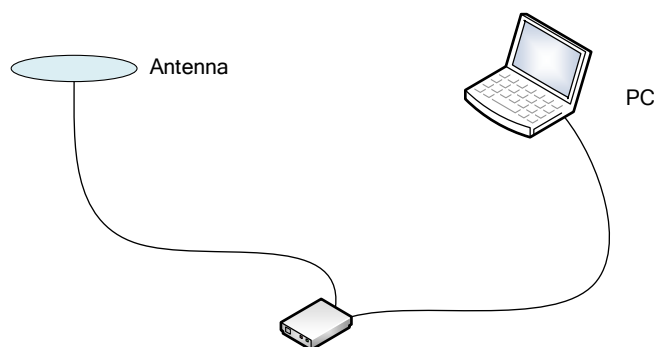


Figure 1-1 Diagram of connections

2 Using UPrecise

To use UPrecise, you can install the software with the installation package, or you can use the green package directly. The former situation can avoid file corruption, and in the latter situation, you just need to place all the files such as DLL, EXE and LIB into the same folder.

If your antivirus software identifies UPrecise as suspicious, choose to trust it.

After installation or copying, double click the icon or UPrecise.exe to run the software, and its primary layout is shown in Figure 2-1.

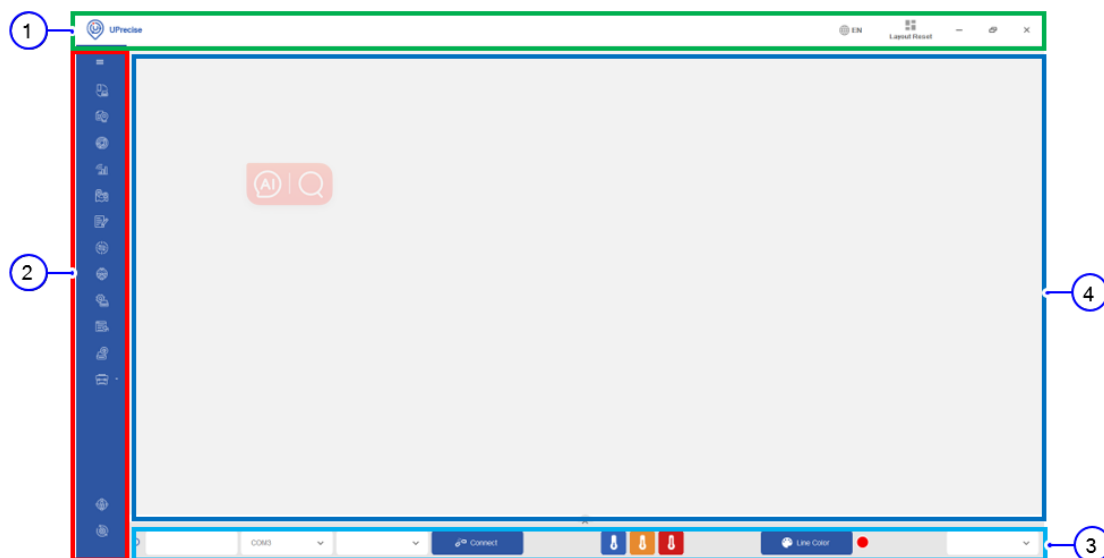


Figure 2-1 UPrecise primary layout

(1) Title bar (2) Menu bar (3) Status bar (4) Working area

The primary layout of UPrecise is divided into four areas:

- Title bar: provides the functions to switch between English/Chinese and reset the layout;
- Menu bar: scalable, providing shortcuts to use the related functions;
- Status bar: connect, disconnect and switch the receivers;
- Working area: used to display the child windows.

See section 2.1 to 2.3 for the detailed functions of each area.

2.1 Title Bar

The title bar provides the functions of language switch and layout reset.



Figure 2-2 Title bar

- (1) Language Switch (2) Layout Reset

2.1.1 Language Switch

You can use “Language Switch” to change the language used by UPrecise. Currently, it supports English and Chinese. The switch takes effect after the software restarts.

2.1.2 Layout Reset

After connecting with the receivers, UPrecise displays the windows of “Constellation”, “Data Stream”, “Tracking Status” and “Map” automatically.

The other windows mentioned in section 2.3 can be opened and closed manually. When necessary, you can click the “Layout Reset” button to reset the layout.

2.2 Status Bar

At the bottom of UPrecise, there is “Status Bar” (see Figure 2-3).

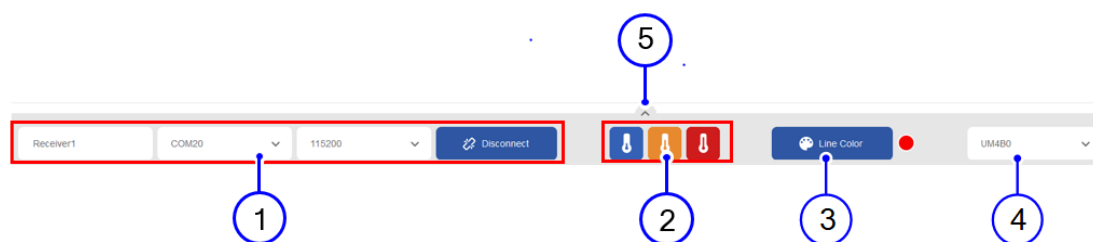


Figure 2-3 Status bar showing the selected receiver

- (1) Receiver information (2) Start mode (3) Trajectory color
(4) Type (5) Expand

- Receiver information: Related to the “Receiver Connection”. When the receivers are connected, the information of the selected receiver is automatically displayed here and it controls the disconnection/connection of the receiver;

- Start mode: Cold Start (Blue), Warm Start (Orange), Hot Start (Red);
- Trajectory color: Decides the trajectory color in the window "Map";
- Type: Related to the "Receiver Connection". When the receivers are connected, the type of the selected receiver is automatically displayed here. If the identification fails, you can disconnect the receiver and then select the type from the drop-down box manually;
- Expand: Click this button to show all the connected receivers (see Figure 2-4). Currently, it supports maximum four receivers.

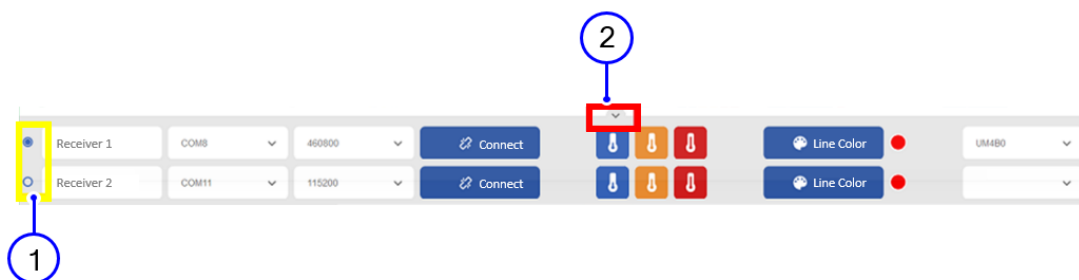


Figure 2-4 Status bar showing all the connected receivers
















(1) Switch (2) Collapse

- Switch: Select the receiver by clicking the radio button;
- Collapse: Click this button to go back to the status as Figure 2-3 shows.

2.3 Menu Bar

This section gives a detailed introduction of the functions supported by UPrecise, which can be accessed through the shortcuts.

Table 2-1 Description of the buttons on the menu bar

No.	Button	Description	No.	Button	Description
1		Expand/Collapse the Menu	12		Receiver Upgrade
2		Connections	13		Tools, including:
3		Data Stream			CWOUT
4		Constellation			RTCM
5		Tracking Status			KMZ
6		Map			TTF
7		Message			Convert
8		Discrete Trajectory			NtripCaster
9		Attitude	14		Platform Lock
10		Receiver Configurations	15		Platform Settings
11		Replay			

2.3.1 Connections

Click the "Connections" button, and the following dialog box appears (see Figure 2-5).

You can connect the receivers through two ways:

- **Serial Port:** Type in or select the number of the serial port (check in the device manager) and the baud rate.

By default, the baud rate is identified automatically, which does not have to be set manually.
- **TCP/IP¹:** Type in the IP address of the receiver and the port number.

¹ Supported by the receivers that have network functions.

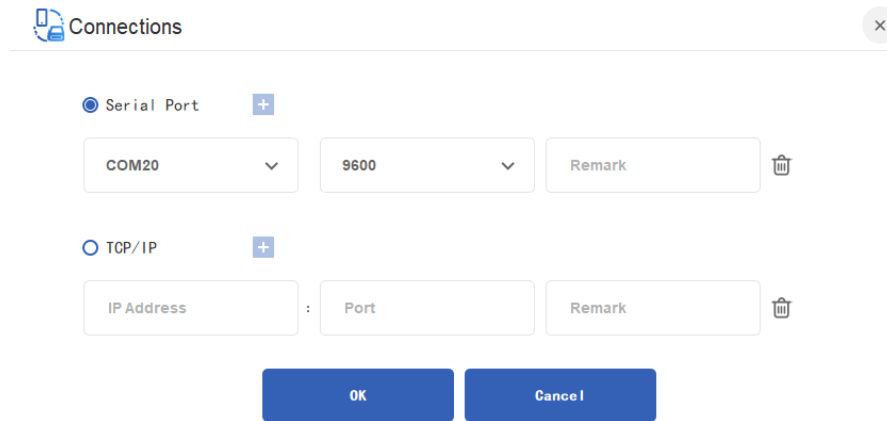


Figure 2-5 Connecting receivers

Thereafter, click "OK" to make the connections succeed. Then the four default windows ("Constellation", "Data Stream", "Tracking Status" and "Map") appear and the port number/IP address and the remark are shown on the status bar.

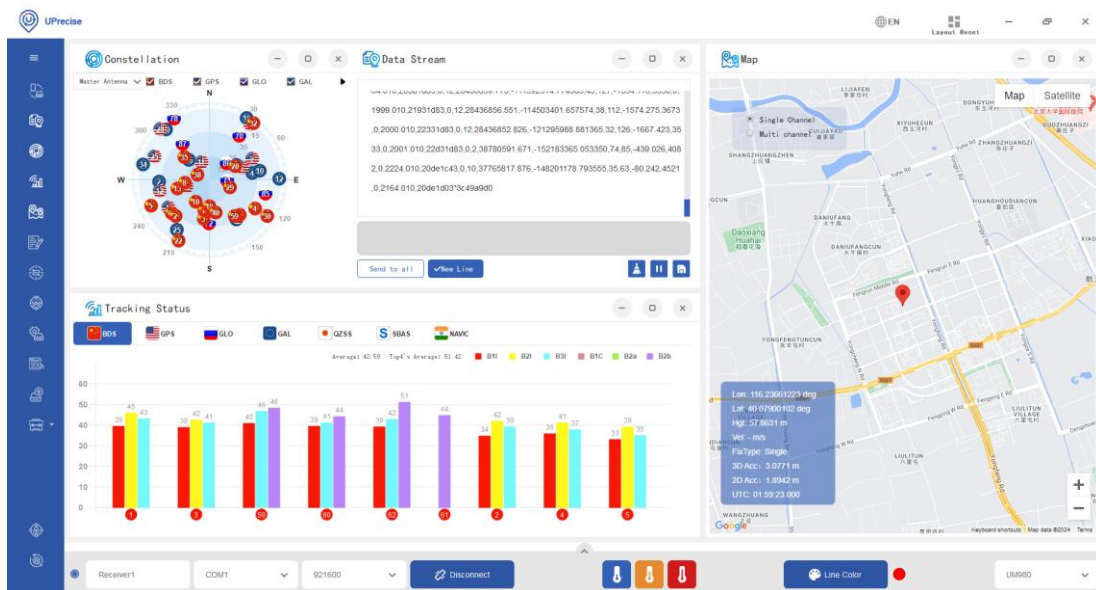


Figure 2-6 Default layout

Currently, UPrecise supports connecting one to four receivers simultaneously.

2.3.2 Data Stream

The window "Data Stream" displays the raw data in real time and playback, providing a command input box to have a real-time interaction with the receivers.

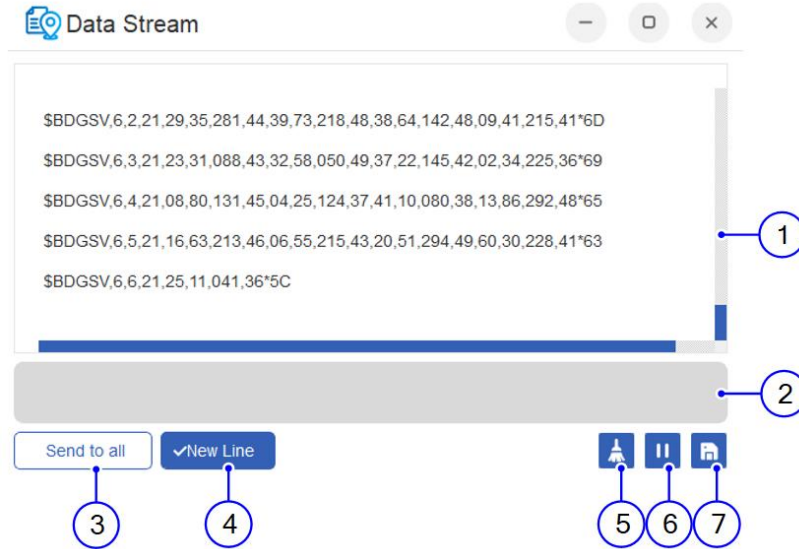


Figure 2-7 Raw data interaction

- (1) Raw Data Output Window (2) Command Input Box (3) Send to All (4) New Line
(5) Clear (6) Pause Updating (7) Save File

The descriptions of the buttons in Figure 2-7 are as follows:

- Raw Data Output Window²: Output the raw data of the receivers;
- Command Input Box: Input a command to interact with the receivers; you can use **↑** **↓** on the keyboard to check the historical commands.
- Send to All³: Send the command to all the connected receivers;
- New Line: Create a new command and add the CRLF automatically;
- Clear: Clear all the contents displayed in the output window;
- Pause Updating: Stop the contents updated in the output window;
- Save File: Save the raw data of the receivers.

Refer to the corresponding protocol specifications for the commands supported by the receivers.

² To output in Binary, you need to configure an ASCII output together.

³ Currently, UPrecise can connect at most four receivers, and "Send to all" will send the command to all of the connected receivers.

2.3.3 Constellation

After successful connections, UPrecise analyzes the received data and displays all satellites parsed by the receivers in the “Constellation” window (See Figure 2-8).

This window shows a general distribution of the visible satellites in real time or playback. Currently, it supports displaying seven navigation systems: GPS, BDS, GLONASS, Galileo, QZSS, SBAS and NavIC, which can be selected or deselected by clicking the national flags. You can distinguish the corresponding satellite systems according to different flag icons.

For the products with dual antennas, you can choose to display the information received from the master antenna (by default) or the slave antenna through the drop-down box.

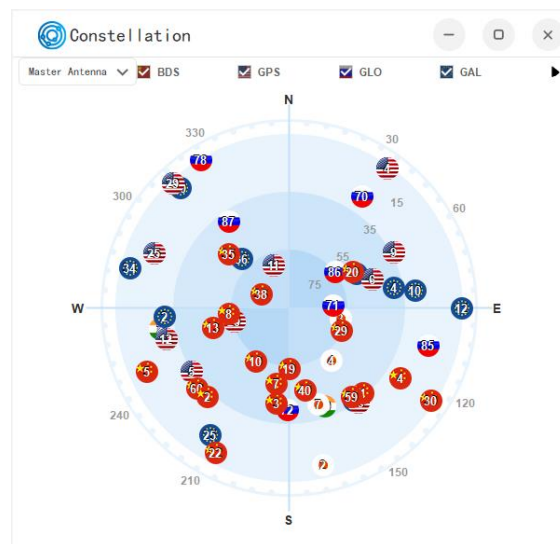


Figure 2-8 Constellation

To see the visible satellites, you must enable at least one of the following messages according to the protocols supported by the receivers.

- GSV(GSVH)⁴;
- SATVISA;
- SATVIS2A;
- SATELLITE;
- SATSINFO.

⁴ Used together with GGA or RMC.

2.3.4 Tracking Status

The window "Tracking Status" displays the changes and tracking status of the visible satellites and C/N0 values in real time or playback. It can display multiple frequencies of multiple systems including BDS, GPS, GLONASS, Galileo, QZSS, SBAS and NavIC.

With the normal size, this window just displays the satellite numbers of one system and C/N0 values at different frequencies, and displays the average C/N0 value of the current system and the average of the top four C/N0 values. You can switch between different systems by clicking the flag icons (See Figure 2-9).

When the window is maximized, it can display maximum four satellite systems and their C/N0 values at different frequencies at the same time, as well as the average C/N0 values and the average of the top four C/N0 values (see Figure 2-10).

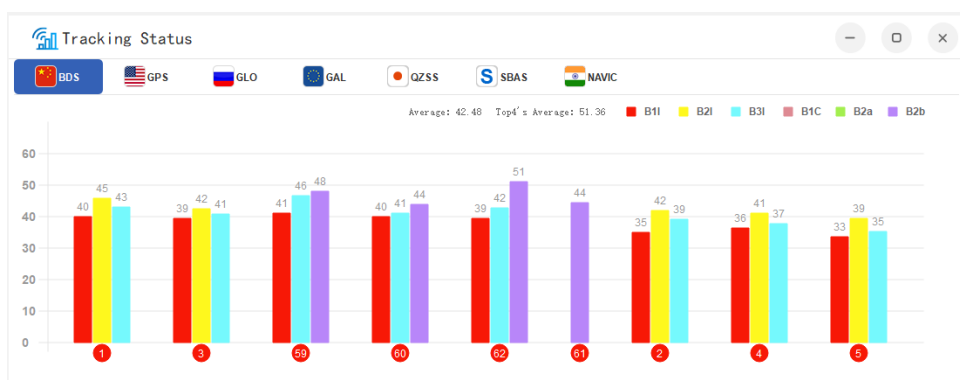


Figure 2-9 Tracking status view (1) (Abscissa: Satellite ID number; Ordinate: C/N0 value)

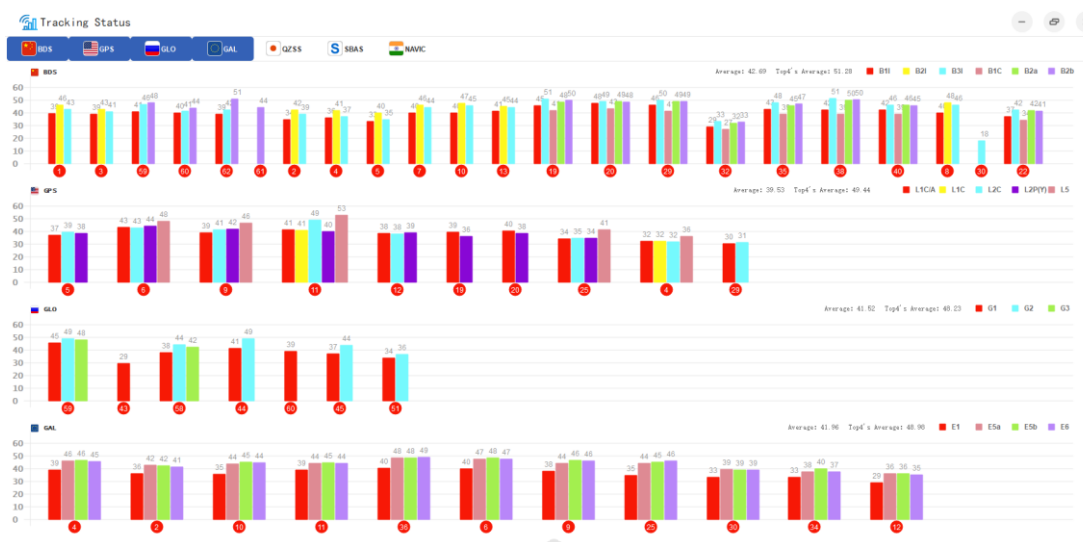


Figure 2-10 Tracking status view (2) (Abscissa: Satellite ID number; Ordinate: C/N0 value)

To see the tracking status, you must enable at least one of the following messages according to the protocols supported by the receivers.

- GSV(GSVH)⁵;
- OBSVMA;
- OBSVHA;
- SATSINFO.

2.3.5 Map

The window “Map” shows the positioning information in real time or playback, including the current positioning point and the historical trajectory (the latest 3000 Epochs) drawn on the loaded online map (see Figure 2-11).

This function is particularly suitable for driving tests to view the positioning trajectory.

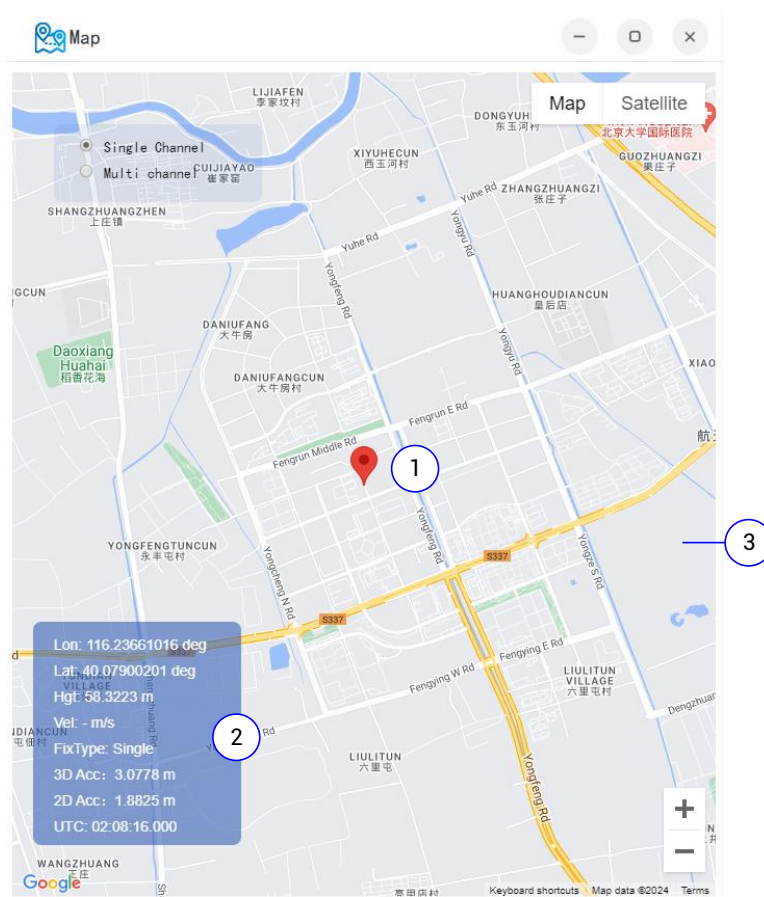


Figure 2-11 Map

(1) Positioning point

(2) Positioning information

(3) Loaded map

⁵ Used together with GGA or RMC.

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If there are more than one receivers connected, you can select the “Multi channel” to see the trajectories of all the receivers.

If Google Maps failed to load, a warning window will appear and you can choose to switch to Baidu Maps.



Figure 2-12 Google Maps Failed to Load

To see the positioning information, you must enable at least one of the following messages according to the protocols supported by the receivers.

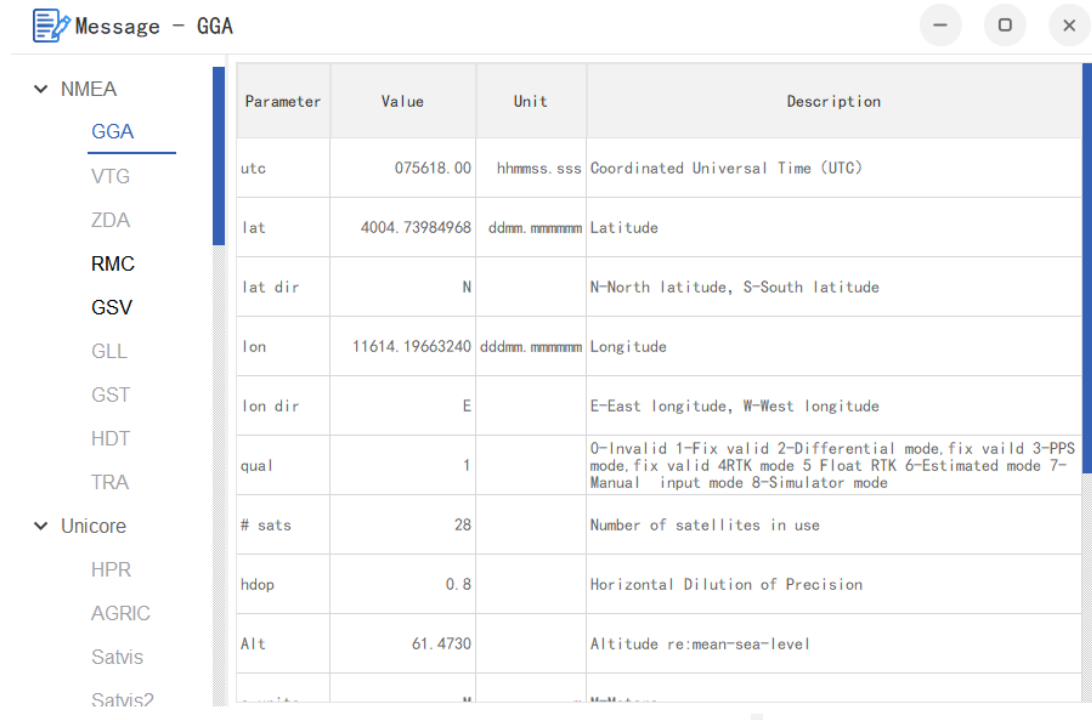
- GST (GSTH);
- GGA (GGAH);
- RMC (RMCH);

2.3.6 Message

After connections, UPrecise parses the data received by the receiver and dynamically displays the results matched with the type of the receiver in the window "Message".

UPrecise supports parsing the common messages. Refer to the related protocol manuals for the details.

Messages of NMEA h30 version are not supported.



Parameter	Value	Unit	Description
utc	075618.00	hhmmss.sss	Coordinated Universal Time (UTC)
lat	4004.73984968	ddmm.mmmmm	Latitude
lat dir	N		N-North latitude, S-South latitude
lon	11614.19663240	dddmm.mmmmm	Longitude
lon dir	E		E-East longitude, W-West longitude
qual	1		0-Invalid 1-Fix valid 2-Differential mode, fix valid 3-PPS mode, fix valid 4-RTK mode 5-Float RTK 6-Estimated mode 7-Manual input mode 8-Simulator mode
# sats	28		Number of satellites in use
hdop	0.8		Horizontal Dilution of Precision
Alt	61.4730		Altitude re:mean-sea-level

Figure 2-13 Example of parsed messages

2.3.7 Discrete Trajectory

The window “Discrete trajectory” shows the longitude and latitude of the positioning point, as well as the horizontal discrete degree in real time or playback.

When the receiver tracks static signals, you can zoom in/out to view the horizontal discrete degree in different scales. You can also click the “Center on the current point” button or without any operations to see the position changes.



Figure 2-14 Discrete trajectory tracking

- (1) Zoom in
- (2) Zoom out
- (3) Center on the current point
- (4) Clear
- (5) Show duration

2.3.8 Attitude

The window “Attitude” displays the information of positioning and attitude, including position, velocity, angle, acceleration, angular acceleration and positioning/INS status.

In the normal size, this window just shows the attitude information, namely direction information (see Figure 2-14).

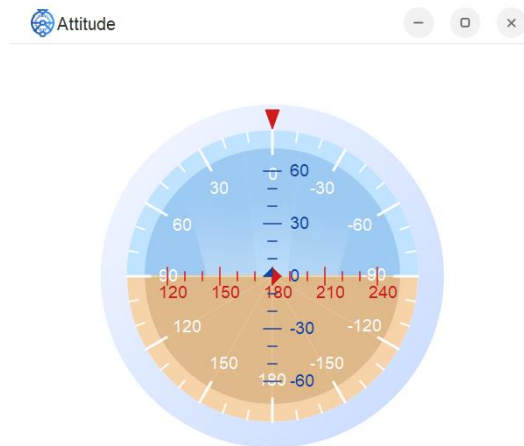


Figure 2-15 Attitude view – normal size

In the maximum size, this window displays the positioning and attitude information simultaneously. The left figure is that showed in the normal size providing the attitude information, and the information on the right provides the positioning and attitude values (see Figure 2-16).



Figure 2-16 Attitude view – maximum size

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To see the information of positioning and attitude, you must enable at least one of the following messages according to the protocols supported by the receivers.

- HDT;
- INSPVAA;
- RAWIMUXA;
- UNIHEADING.

2.3.9 Receiver Configurations

UPrecise enables you to configure the parameters of the receivers according to its type (See Figure 2-17). Different receivers have different configurations. Refer to the related protocol manuals for the configuration details.

The screenshot displays the 'Receiver Configurations' window. On the left is a sidebar menu with various configuration categories. The 'Serial port configuration' option is selected and highlighted. The main content area shows the configuration details for the selected option. At the top, it states: '*All configuration items are displayed as the configuration status of the current receiver: Instruction description: Serial port configuration'. Below this, it says 'Instruction format description: Config SerialPort Baud'. There are three rows of configuration items, each with a checkbox and a dropdown menu:

Item	Value
<input type="checkbox"/> COM1 Baud	921600
<input type="checkbox"/> COM2 Baud	115200
<input type="checkbox"/> COM3 Baud	115200

At the bottom of the main area, there is an empty input field, an 'Enter' button, and a 'Save' button. A status message at the bottom left reads 'Query succeeded'.

Figure 2-17 Example of receiver configurations

2.3.10 Replay

UPrecise can replay the saved data for Unicore products. When the receivers are connected, do the following steps to use this function:

1. Click the "Replay" icon on the menu bar, and click "Ok" in the dialog box in Figure 2-18;

Then UPrecise exits from the real-time monitoring and cuts the connection with the receivers, and the dialog box (Figure 2-19) appears.

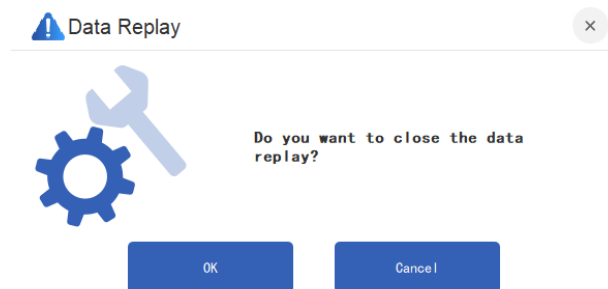


Figure 2-18 Confirmation of replay

Replay and real-time monitoring cannot operate at the same time.

2. Click "File selection", and select the file path and file name in the "Open File" dialog box (see Figure 2-19 and Figure 2-20)

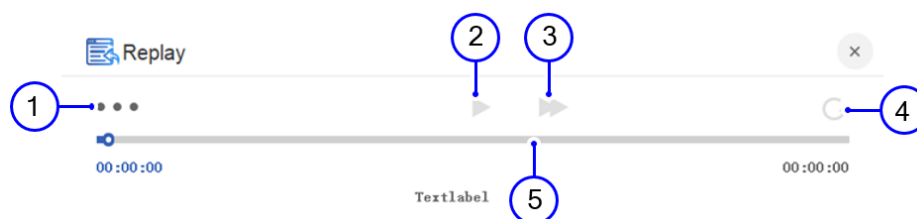


Figure 2-19 Replay

- (1) File selection (2) Start (3) Forward (4) Replay (5) Progress bar

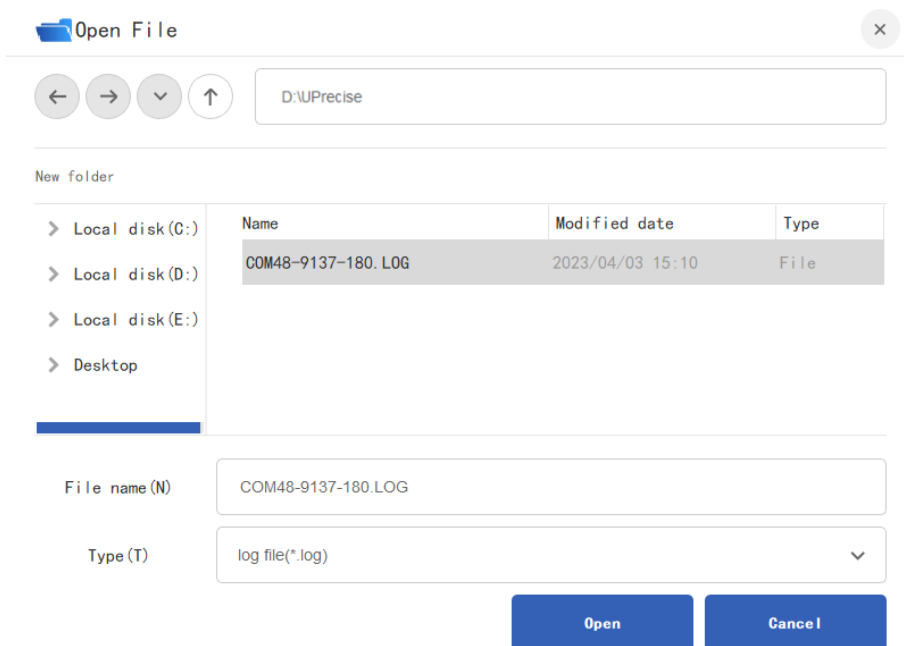


Figure 2-20 "Open File" dialog box

3. Click "Open" in Figure 2-20 to start the replay.
4. If you want to quit the replay, click "x" button in Figure 2-19 and click "Ok" in Figure 2-21.



Figure 2-21 Closing replay

2.3.11 Receiver Upgrade⁶

UPreicse provides the “Receiver Upgrade” function to upgrade the firmware of Unicore receivers.

The upgrade steps are as follows:

1. Click the “Receiver Upgrade” on the menu bar and the upgrade dialog box appears (see Figure 2-22).
2. Click “Select upgrade file” in the dialog box;

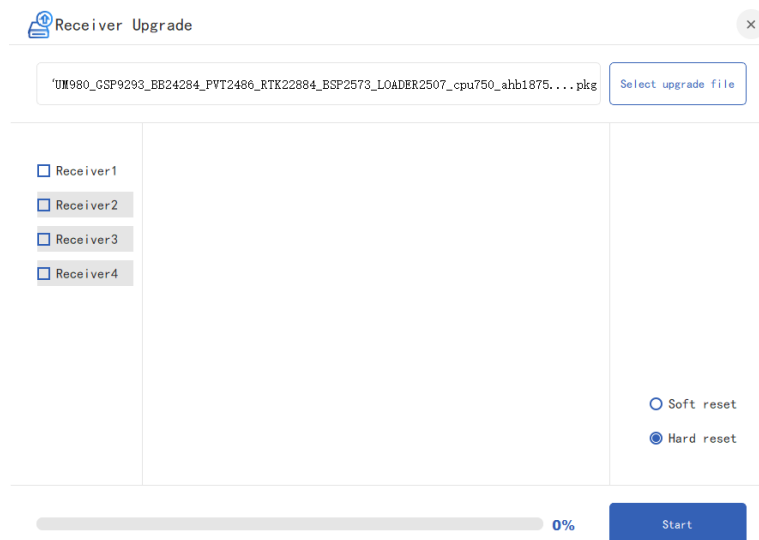


Figure 2-22 Receiver upgrade

3. Click the check box to select the receiver name in Figure 2-22;

The same type of receivers can be upgraded simultaneously.

4. Select “Soft reset” or “Hard reset”;

The receivers need to be reset during the upgrade, and the reset method is decided by your selection. The “Hard reset” needs a manual operation.

5. Click “Start”;

Pay attention to the progress bar, and do not interrupt the upgrade process as it may cause failure of the upgrade.

6. After finishing the upgrade, click the “x” button in Figure 2-22.

⁶ The receiver upgrade function does not support UM68X series products currently. If you need to upgrade UM68X series, please contact our FAE.

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If Unicore updates a product, but UPrecise is not updated in time, Unicore will provide the user with an update loader and a new config.ini file. The user can simply copy and replace the config.ini file in the installation directory, and then place the update loader in the bootloader folder to upgrade the receiver.

PC > Local Disk (D:) > Uprecise > 5.SW > release

Name	Date modified	Type	Size
bearer	7/26/2024 4:33 PM	File folder	
bootloader	7/26/2024 4:33 PM	File folder	
DAT	7/26/2024 4:33 PM	File folder	
iconengines	7/26/2024 4:33 PM	File folder	
imageformats	7/26/2024 4:33 PM	File folder	
log	8/5/2024 1:24 PM	File folder	
map	7/26/2024 4:33 PM	File folder	
MessageConfig	7/26/2024 4:33 PM	File folder	
platforms	7/26/2024 4:33 PM	File folder	
position	7/26/2024 4:33 PM	File folder	
printsupport	7/26/2024 4:33 PM	File folder	
resources	7/26/2024 4:33 PM	File folder	
styles	7/26/2024 4:33 PM	File folder	
AgnssConfig.ini	11/13/2023 9:51 AM	Configuration settings	2 KB
config.ini	8/1/2024 4:50 PM	Configuration settings	1 KB
ConfigViewModules.dll	7/26/2024 9:52 AM	Application extension	1,233 KB
Converter.exe	5/31/2024 3:59 PM	Application	1,859 KB
D3Dcompiler_47.dll	1/28/2022 2:38 PM	Application extension	4,077 KB
debug.log	8/5/2024 1:24 PM	Text Document	6 KB
GNSSDecode.dll	7/16/2024 2:27 PM	Application extension	365 KB
libEGL.dll	1/28/2022 2:38 PM	Application extension	24 KB

Figure 2-23 Receiver upgrade by replacing the config.ini & copying the update loader

2.3.12 Tools

2.3.12.1 Interference Detection (CWOUT)⁷

This tool is used to detect the interference strength at the frequencies of 1575.42 MHz (L1), 1227.60 MHz (L2) and 1176.45 MHz (L5).

The indicators are as follows:

- Green – No CWOUT
- Orange – CWOUT exists
- Red – Strong CWOUT



Figure 2-24 Interference detection

The figure above shows the real-time interference strength at the three frequencies.

The three figures below record the variation of the interference strength from the start of the detection to the current state. The abscissa is the number of detections and the ordinate is the interference strength with a range of 0 to 255.

The larger the interference is, the more effect it has on the positioning.

⁷ The receivers need to support the message FREQJAMSTATUS.

2.3.12.2 RTCM Monitoring

This tool is used to monitor the RTCM data.

The steps are as follows:

1. Set the "Input", which supports serial port, Ntrip Client and Cloud chip integration.

The Cloud chip integration service is provided by Unicore and TruePoint jointly. Through the integrated SDK, the receiver can get data from the TruePoint cloud platform, and achieve more precise and faster positioning.

Users do not need to enter the username, password and other information in Figure 2-25, and the cloud platform will automatically use the receiver's SN for authentication.

If you have any questions about the use of Cloud chip integration, you can contact Unicore FAE.

The screenshot shows a dialog box titled "RTCM Input" with a close button (X) in the top right corner. At the top, there is a dropdown menu labeled "Cloud chip i". Below this, there are two columns of input fields:

- User:** (empty text box)
- password:** (empty text box)
- DevId:** (empty text box)
- Mountpoint:** (text box containing "RTCM33AUTO")
- Freq:** (text box containing "1")
- Authtype:** (text box containing "2000")
- IP:** (text box containing "pnt.true-point.com")
- Port:** (text box containing "8801")
- BlockTime:** (text box containing "3")
- Coordsys:** (text box containing "1")

Below the input fields is a "Description" label with the text: "Description: This connection method only supports some chips. Please contact the staff for details". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

Figure 2-25 Cloud chip integration

2. Set the "Output", which supports serial port and Ntrip Server.

Table 2-2 Input/Output configuration

	Input	Output
Receiver as base station	Serial Port	Ntrip Server
Receiver as rover	Ntrip Client or Cloud chip integration	Serial Port

When the output is set as serial port, it supports a maximum of four receivers.

3. Click "Connect" to use.
4. Tick "Hex" (hexadecimal) depending on your needs. The RTCM data appears in the dialog.

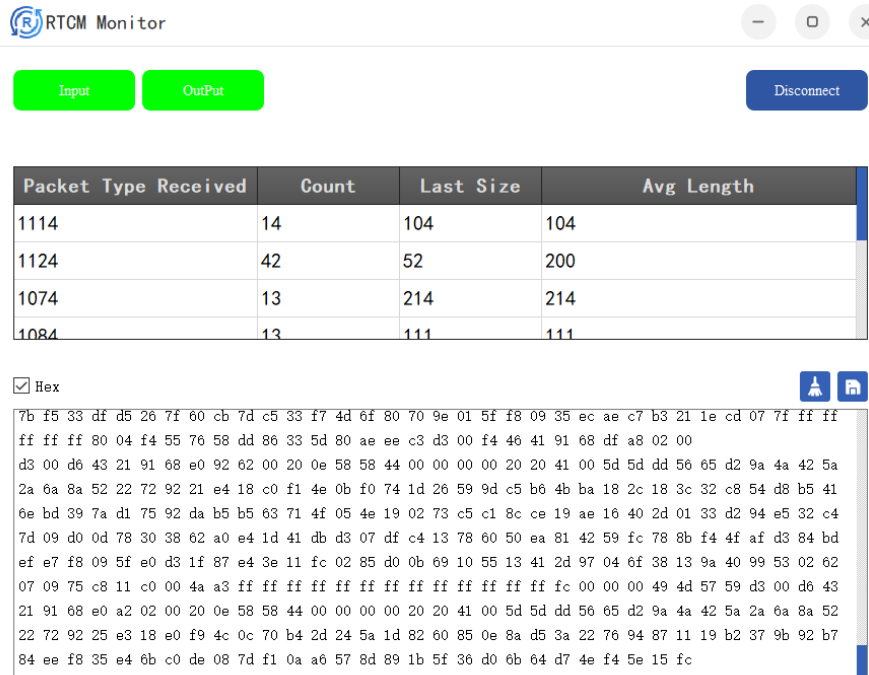


Figure 2-26 RTCM monitoring

2.3.12.3 KMZ

The KMZ tool can convert the log file into the KMZ file which can be used by Google Earth. The steps are as follows:

1. Click the "Open Log" to add the log file. It supports 16 files at most.

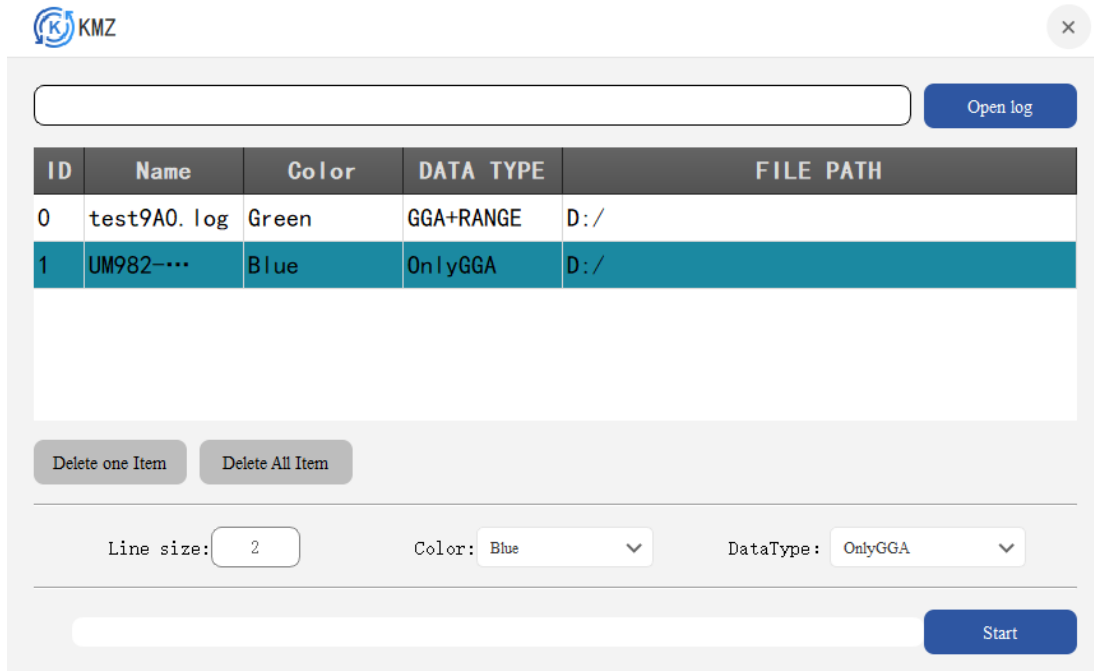


Figure 2-27 KMZ

2. Choose one of the logs, and set the line size, color and data type.

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The line size and the color decide the trajectory format shown on Google Earth.
The data type decides which kind of message in the log will be converted into KMZ.

3. Click "Start" and the progress bar shows the conversion progress.

2.3.12.4 TTFF Testing

This tool is used to test the TTFF of cold start and hot start. For the receivers supporting RTK positioning, it can also output the RTK Fix time.

Number	TTFF	RTK Fixed T
1	1.46	
2	1.52	
3	1.54	
4	1.57	
5	1.53	
6	1.50	
7	1.52	
8	1.52	
9	1.52	
10	1.52	

Figure 2-28 TTFF testing

Place the receiver at a known position.

This tool supports RX Service, Self-Built Ntrip Service and Import local ephemeris files to get Ephemeris, and it also supports No Input.

Ntrip Service only supports Version 1.0. When using this service, make sure that the uploading frequency of the source Ephemeris is 1 Hz. It does not support sending the position and TCP.

When using RX Service, you need to enable the AGNSS function. Refer to *AGNSS Instructions* for more information.

Select a serial port not used by other programs and input the true positioning information including latitude, longitude and height.

Furthermore, you can select the “Send time simultaneously” or “Send location simultaneously” to send the time or position information to the receiver. Select the “RTK” to test the RTK fix time of the receiver with RTK positioning capability.

The file path is used to save the test log, including the Ephemeris and the data sent by the receiver.

After setting, click the button “Start” to begin your test. The right area shows the test result and the indicator is blinking during the test. If an error occurs, the indicator becomes gray. After a successful test, the indicator keeps green.

If you want to stop the test in the progress, press the button “Stop” to exit.

2.3.12.5 Converter

The tool Converter supports the conversion of data between ASCII, Binary and Rinex formats.

Click “Open” and select the log to be converted. Click the target format under “Converter to” and click “Converter” to start the conversion.

Furthermore, the tool also provides the functions such as filter and message conversion. You can set it according to your needs.

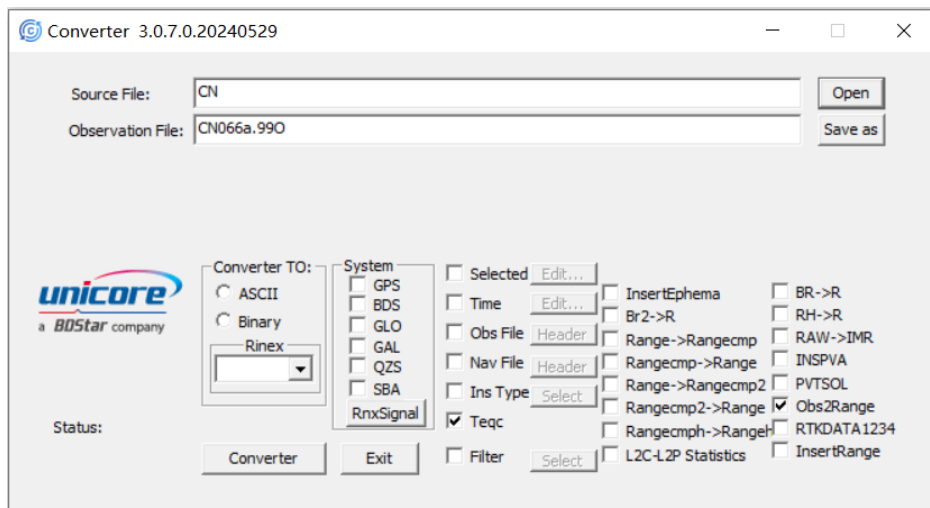


Figure 2-29 Converter

2.3.12.6 NtripCaster

UPrecise provides the function of Ntrip Caster which enables the handshake between Client and Source by configuring the idle listening port, and the upload password, the download name and password can be configured.

Click "Start", then you can find the bandwidth stream, the number of connected Source, the number of Client, and you can also "Delete" and "Disconnect" the source and Client.

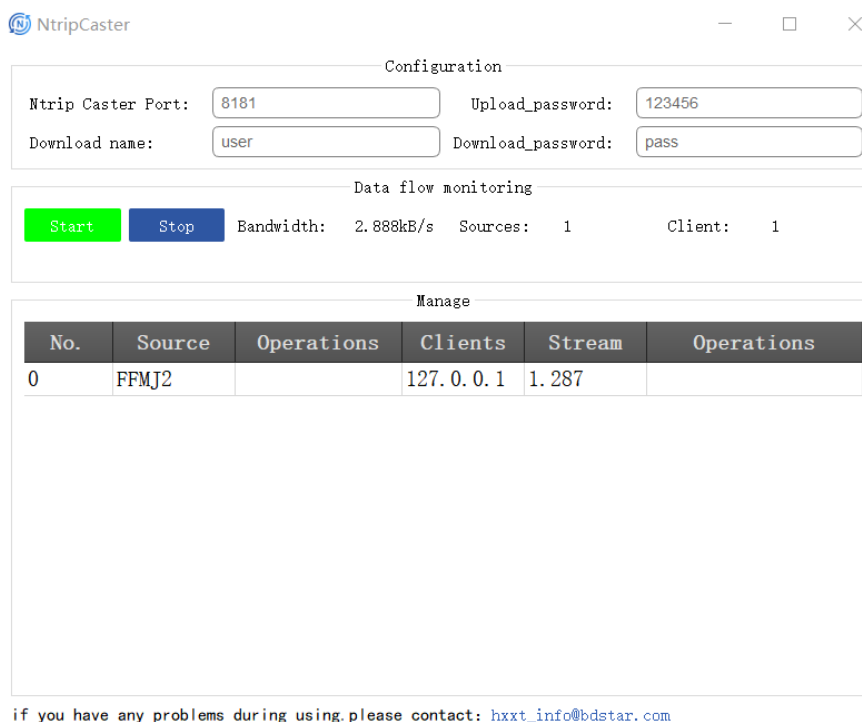


Figure 2-30 NtripCaster

After the configuration, the Ntrip Caster can be connected in the section 2.3.12.2 RTCM Monitoring.

2.3.13 Platform Lock

For information security, UPrecise provides the “Platform Lock” function. When the platform is locked, any operation to the software cannot be performed.

To use this function, you need to set a password first (see Section 2.3.14), and then click the “Platform Lock” icon on the menu bar.

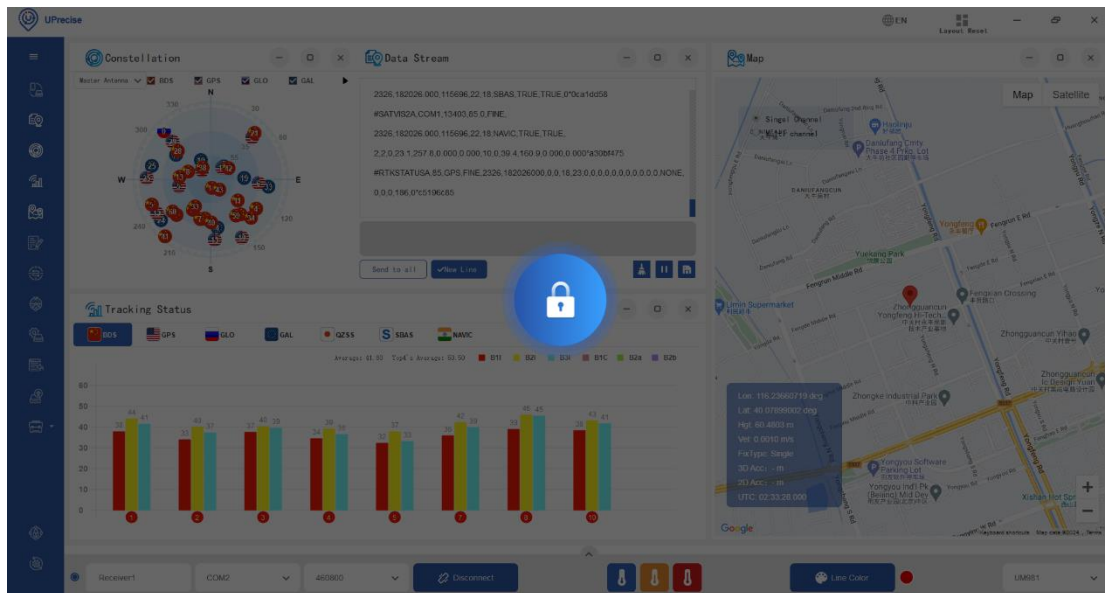


Figure 2-31 Platform lock

To unlock the software, click the lock button in the middle of the screen (see Figure 2-31) and type in the password, then the software is operational and configurable again.

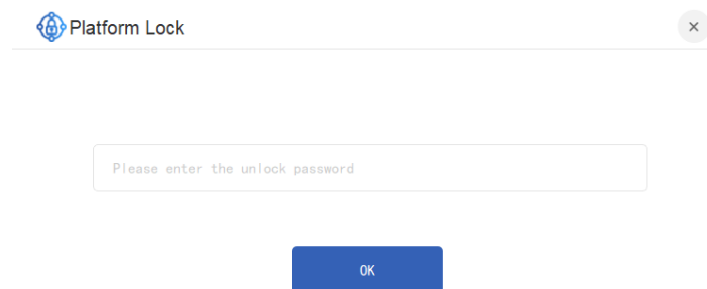


Figure 2-32 Enter the password to unlock the platform

2.3.14 Platform Settings

The window “Platform Settings” is used to set the platform lock and the path to save the log file, as well as displaying the version information (see Figure 2-33).

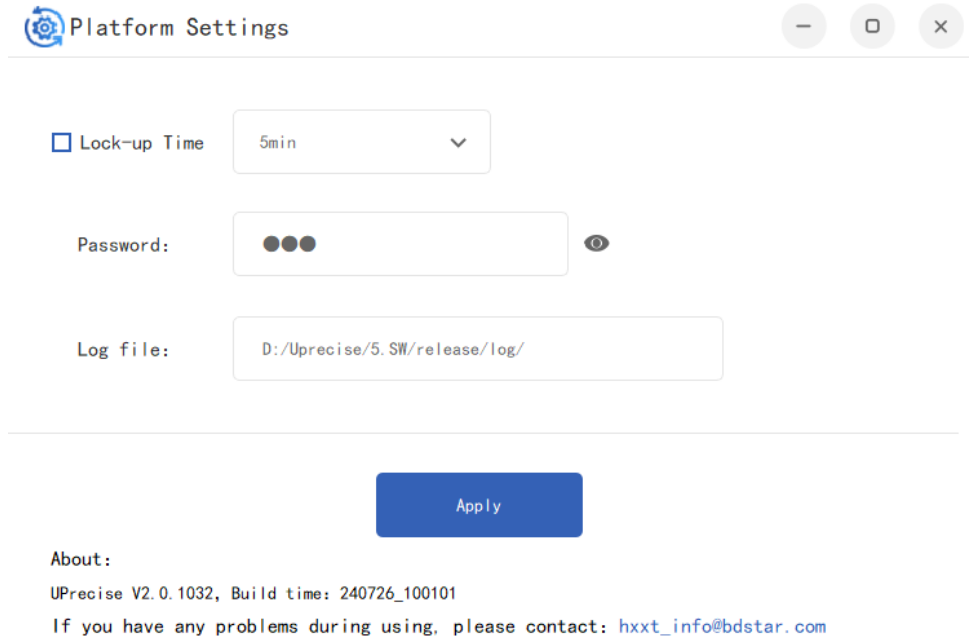


Figure 2-33 Platform Settings

- Platform lock: Set the password and specify how long it takes to enter the locking state. After setting, if you click the “Platform Lock” button on the menu bar, the software is locked directly. Otherwise, it waits until the specified time to lock the software.

There are no requirements on the setting of the password. The password is automatically invalid after UPrecise is closed. To lock the platform in your next open, you need to set the password again.

- Save the log files: Choose a path to save the log files and click “Apply”.

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