GUI SOFTWARE

USER MANUAL

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UPrecise

Visualized Real Time and Playback Software

Revision History

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Foreword

This document gives an introduction of the visualized real time and playback 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.

Contents

1 UPrecise Introduction

1.1 Description of UPrecise

UPrecise is a visualized real time and playback software from Unicore. It aims to help you conveniently do operations on the receiver with graphical real-time monitoring and playback function.

Using this software, you can interact with a receiver by a serial port or Internet. After connecting the receiver, UPrecise can automatically identify the baud rates and type of the receiver, of which the positioning information is displayed visually on the screen, as well as the specific message configurations and parsed sentences.

In addition, UPrecise supports replaying the saved data, which enables you to know the signal tracking status and other information better.

1.2 Functions of UPrecise

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

- Connecting a receiver
  UPrecise can connect a receiver by serial ports or Internet. After connecting, the windows display the contents matched with the receiver.

- Choosing a language
  UPrecise supports both Chinese and English, which meets different users' needs.

- Interacting with the receiver
  UPrecise can display the raw data in real time or playback, and provides a command input box for real-time interaction with the receiver.

- 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 (Baidu map or Google map). 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 receiver's attitude intuitively.

- Showing discrete degrees

  The window "Trajectory" shows the longitude and latitude of the positioning point, as well as the horizontal discrete degree in real time or playback. This function is particularly useful for static signals, which 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 receiver.

- Configuring a receiver

  The window "Receiver Configurations" enables you to query and configure the parameters of the receiver according to its type, so that the software can interact with the receiver more intelligently.

- Upgrading a receiver

  UPrecise supports the firmware upgrade of three types of receivers, including the high precision navigation and positioning products, the standard precision navigation and positioning products, and the timing products.

- 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.

- Locking platform

  You can lock UPrecise after typing in the lock-up password to prevent other persons from operating the software.

- Setting platform

  The function is used to set the lock-up password and specify how long it takes to enter the locked state, as well as specifying the log saving path.

- Resetting layout

  The "Layout Reset" button is used to reset the layout of the software.

1.3　Preparations

You need to use UPrecise together with the products from Unicore to activate all its functions. See the following tables for UPrecise information and the supported products.

Table 1-1 UPrecise information

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

Table 1-2 Products Supported by UPrecise

High Precision GNSS Products			Standard Precision GNSS Products		Timing Products
UB4B0	UM980*	CLAP-B7	UM220-IV NV	UM220-INS NF	UT986*
UB4BM	UM981*		UM220-IV NL	UM220-INS NL	
UB482	UM982*		UM220-IV M0	UM621N*	
UM4B0	UM960*		UM220-IV S/SV	UM620N*	
UM482	UM960L*		UM220-III NF		

Before using UPrecise, you must connect the receiver, antenna and PC correctly (see Figure 1-1).
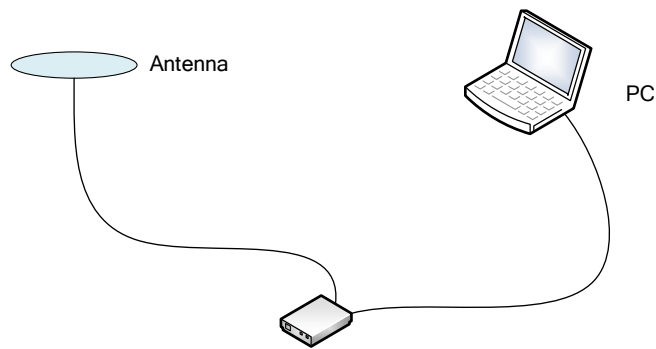

Figure 1-1 Diagram of connections

* Only supports parsing NMEA

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.
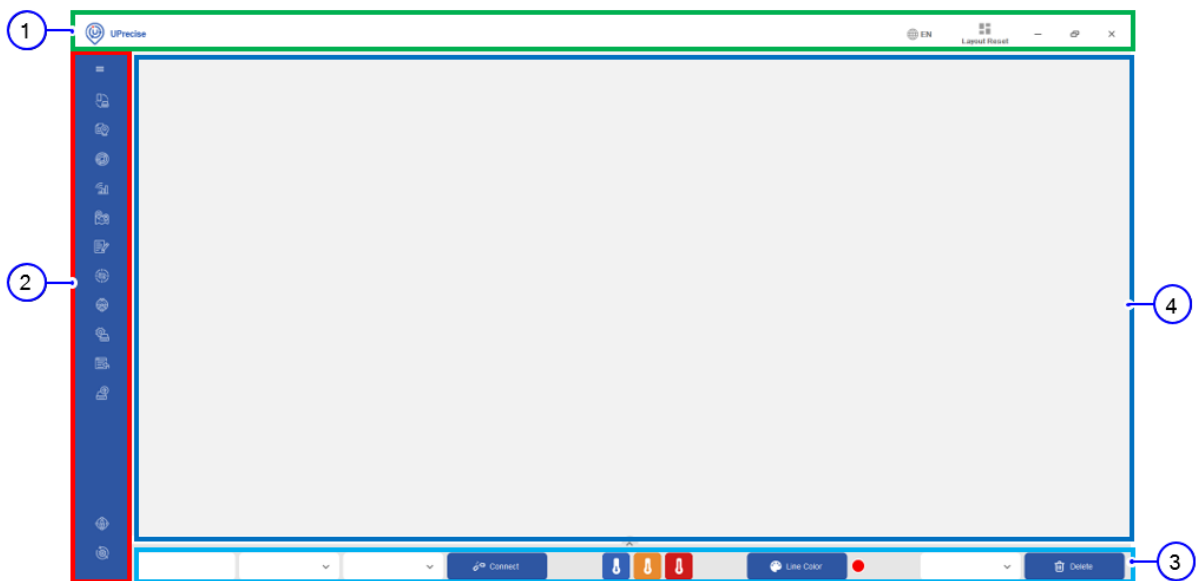

Figure 2-1 UPrecise primary layout

(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 Chinese/English and reset the layout;

● Menu bar: scalable, providing shortcuts to use the related functions;

● Status bar: able to connect, disconnect, delete the receiver;

● Working area: used to display the child windows.

You can see section 2.1 to 2.3 for the detailed functions of each area.

2.1 Title Bar

The title bar provides the functions to switch between Chinese/English and reset the layout.

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 Chinese/English.

2.1.2 Layout Reset

After connecting with the receiver, UPrecise displays the windows of "Constellations", "Data Stream", "Tracking Status" and "Map" automatically.

The other windows mentioned in section 2.2 can be opened and closed manually. When necessary, you can click the "Layout Reset" button to reset the layout.

2.2 Menu Bar

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

There are totally 14 icons on the menu bar (see Table 2-1), among which, the "Scalable Button"

provides the expand/collapse function. Clicking this button, the menu bar is expanded. Clicking again it is collapsed which can also be realized by clicking an empty space in the working area.

Hovering over the rest 13 icons displays the information of the buttons respectively. Clicking each button, the corresponding window appears which can be closed by clicking again or clicking the "Close" button directly.

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

No.	Button	Description	No.	Button	Description
1	☰	Scalable Button	8		Trajectory
2		Connections	9		Attitude
3		Data Stream	10		Receiver Configurations
4		Constellation	11		Replay
5		Tracking Status	12		Receiver Upgrade
6		Map	13		Platform Lock
7		Message	14		Platform Settings

2.2.1 Connections

Click the "Connections" button, and the following dialog box appears (see Figure 2-3).

You can connect the receiver through two ways:

- Serial Port: Types in or selects the number of the serial port and the baud rate.

  By default, the baud rate is identified automatically, which does not have to be set manually.

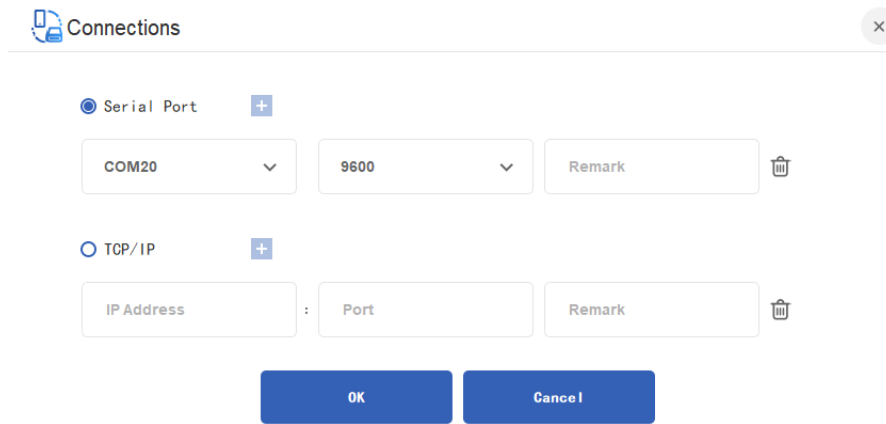- TCP/IP: Types in the IP address and the port number.

Figure 2-3 Connecting a receiver

Thereafter, click "OK" to make the connections succeed. Then the four default windows ("Constellations", "Data Stream", "Tracking Status" and "Map") appear while the port number/IP address and the remark are shown on the status bar.
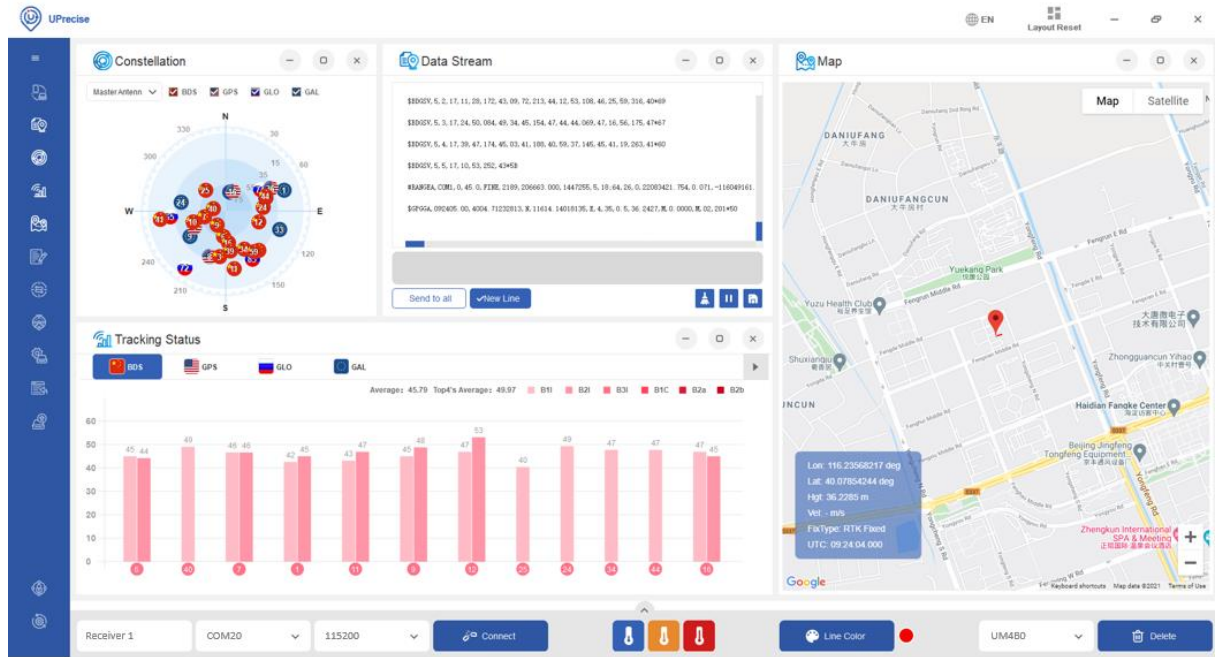
Figure 2-4 Default layout

2.2.2 Data Stream

The window "Data Stream" is opened automatically after the connections, and you can open/close it by using the corresponding icon on the menu bar.

This window displays the raw data in real time and playback, providing a command input box to have a real-time interaction with the receiver.
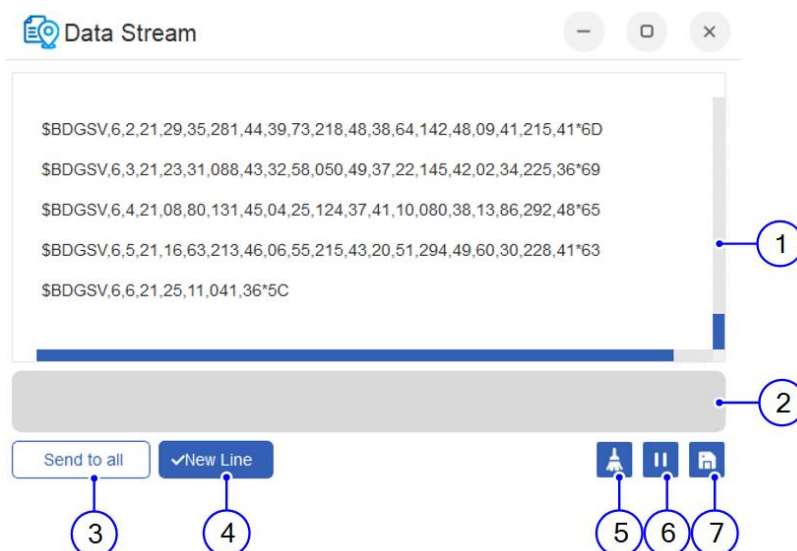

Figure 2-5 Raw data interaction

| (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 2-5 are as follows:
- Raw Data Output Window: Outputs the raw data of the receiver;
- Command Input Box: Inputs a command to interact with the receiver;
- Send to All[1]: Sends the command to all connected receiver;
- New Line: Creates a new command, where adding the CRLF automatically;
- Clear: Clears all the contents displayed in the output window;
- Pause Updating: Stops the contents updated in the output window;
- Save File: Saves the raw data of the receiver.

---

[1] Currently, UPrecise can only connect one receiver.

2.2.3 Constellation

After successful connections, UPrecise analyzes the received data and displays all satellites parsed by the receiver in the "Constellation" window (See Figure 2-6). The window is opened automatically, and you can open/close it by using the corresponding icon on the menu bar.

The window shows a general distribution of the visible satellites in real time or playback. Currently, it supports displaying four navigation systems: GPS, BDS, GLONASS and Galileo, which can be selected or deselected by clicking the national flags. The system a satellite affiliates with can be distinguished by the flag icon.

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.
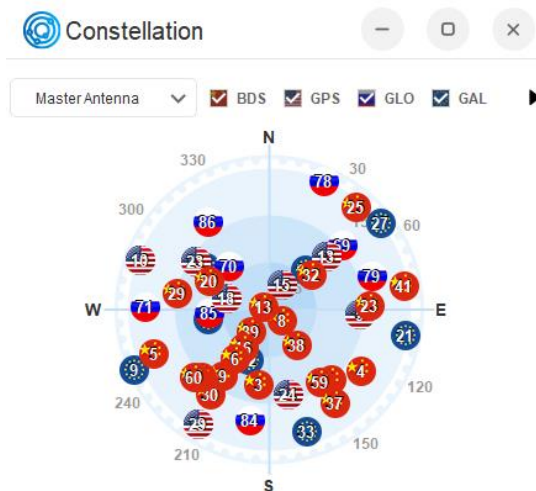
Figure 2-6 Constellation

2.2.4 Tracking Status

The window "Tracking Status" is opened automatically after the connections, and you can open/close it by using the corresponding icon on the menu bar.

This window displays the changes and tracking status of the visible satellites and C/N0 in real time or playback parsed from the sentences of GSV, OBSVM, or other sentences containing C/N0. It can display multiple frequencies of multiple systems including GPS, BDS, GLONASS and Galileo.

With the normal size, this window just displays the satellites of one system and CN0 of its frequency points, and displays the color legends of the histograms, as well as 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 2-7).

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When the window is maximized, it displays the satellites of the four systems and their frequency points C/N0 at the same time, as well as the color legend of the histograms, the average C/N0 value and the average of the top four C/N0 values (see Figure 2-8).
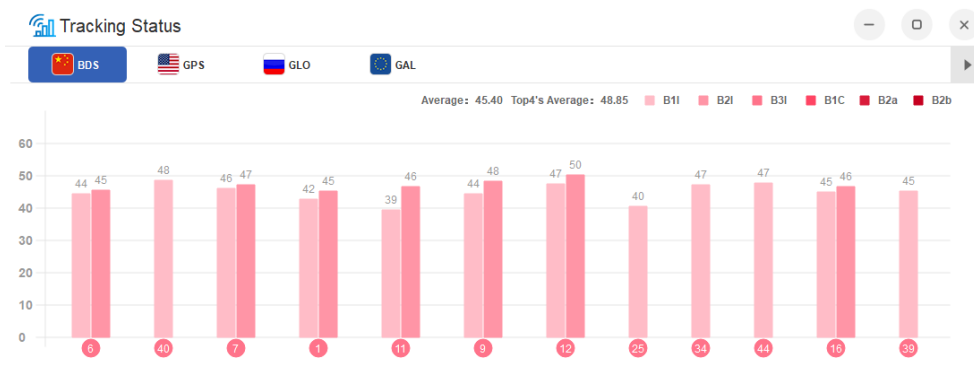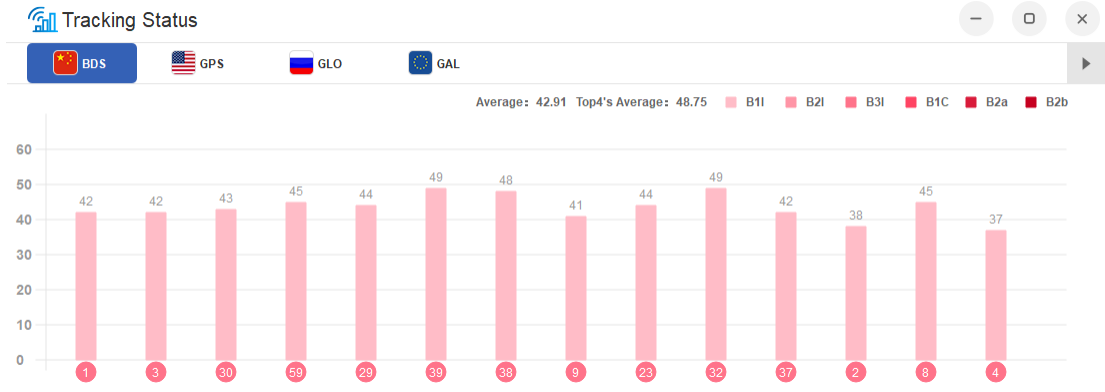

Figure 2-7 Multi-frequency view (1) (Abscissa: Satellite number; Ordinate: C/N0 value)

Figure 2-8 Multi-frequency view (2) (Abscissa: Satellite number; Ordinate: C/N0 value)

When each satellite system has only one frequency with C/N0 value, the display of the window in normal and maximum sizes are shown in Figure 2-9 and Figure 2-10 respectively.

Figure 2-9 Single-frequency view (1) (Abscissa: Satellite number; Ordinate: C/N0 value)
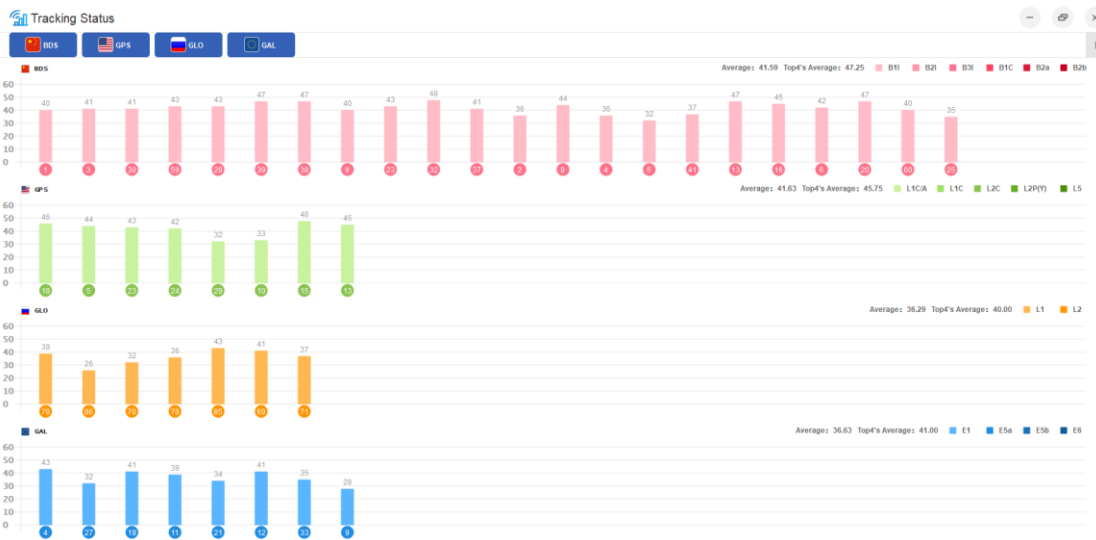
Figure 2-10 Single-frequency view (2) (Abscissa: Satellite number; Ordinate: C/N0 value)

2.2.5 Map

The window "Map" is opened automatically after the connections, and you can open/close it by using the corresponding icon on the menu bar.

This window shows the positioning information including the positioning point and the trajectory drawn in real time or playback on the loaded online map (see Figure 2-11).

The function is particularly suitable to view the positioning trajectory for the driving test, but there is a time limit when drawing the trajectory.
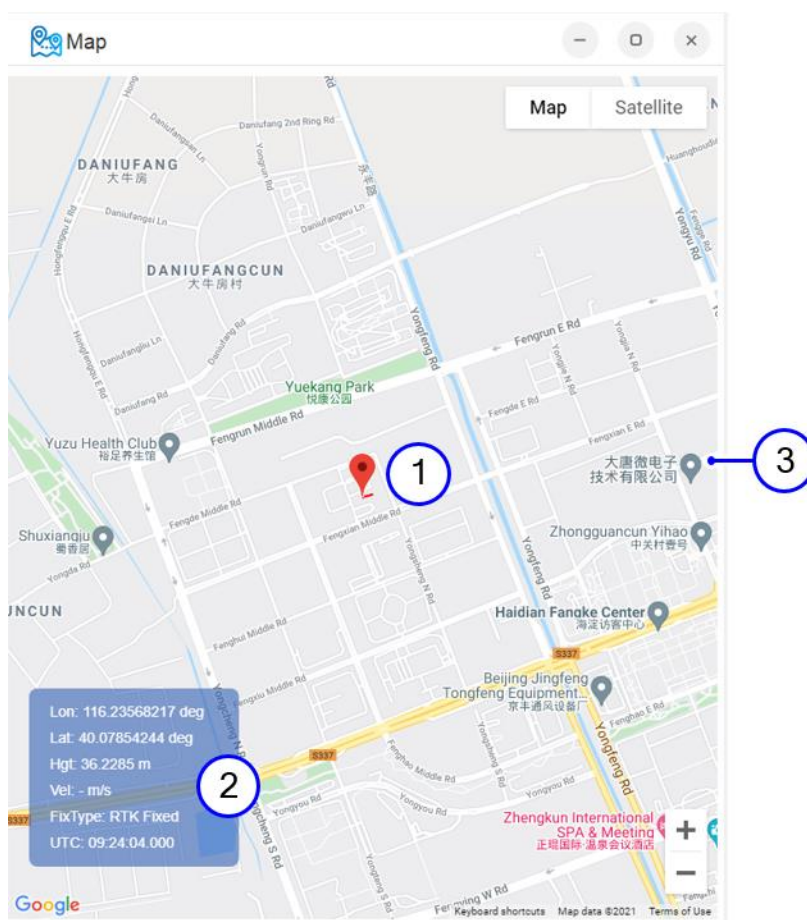
Figure 2-11 Map

(1) Positioning point
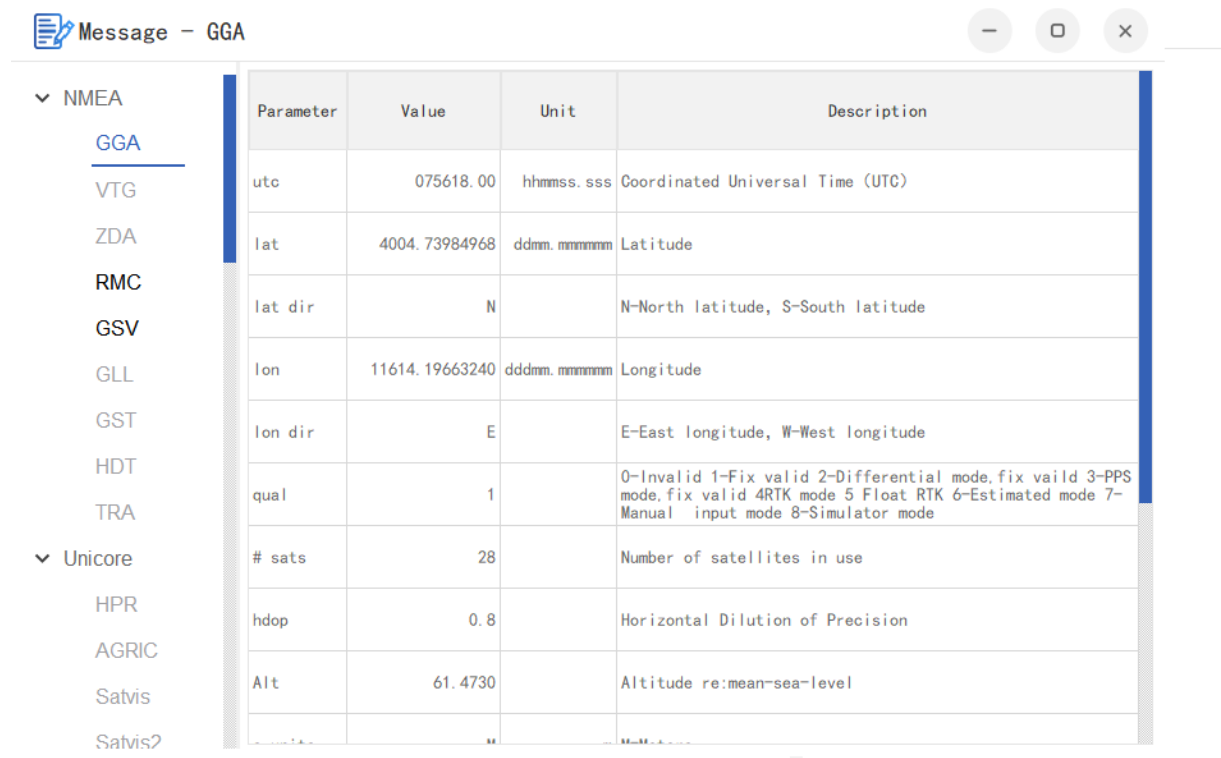
(2) Positioning information

(3) Loaded map

2.2.6 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", which is opened automatically and you can open/close it by using the corresponding icon on the menu bar (see Figure 2-12).

UPrecise supports parsing the common commands. See the related protocol manuals for the details.

Figure 2-12 Example of parsed message

Without connecting a receiver, this window just displays the parsed information of NMEA sentences.

2.2.7 Trajectory

The window "Trajectory" shows the longitude and latitude of the positioning point, as well as the horizontal discrete degree in real time or playback, which is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

This function is particularly useful for static signals, which enables you to view the horizontal discrete degree in different scales (see Figure 2-13).

The positioning points can be displayed in a view of "Center on the current point" or "Tracking the positioning points". Additionally, UPrecise supports the operations of zoom in and zoom out, and it clears all the discrete points by clicking "Clear". The drop-down box is used to change the time-interval of the discrete points.
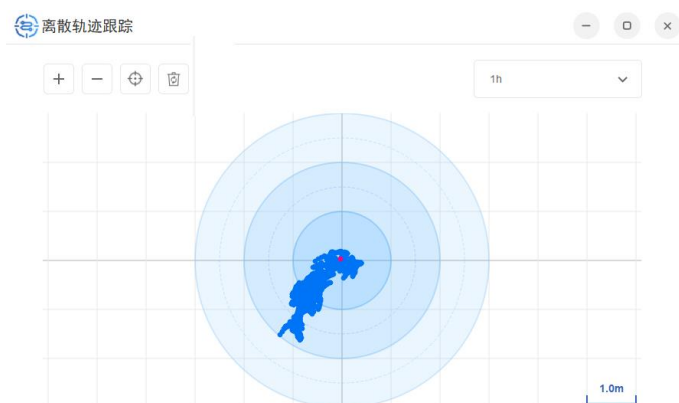

Figure 2-13 Discrete trajectory tracking

2.2.8 Attitude

The window "Attitude" displays the information of positioning and attitude, including position, velocity, angle, acceleration, angular acceleration and positioning/INS status. This window is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

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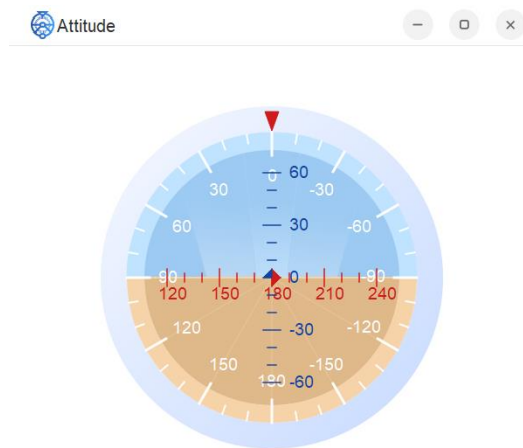

Figure 2-14 Attitude view – normal size

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 right information provides the positioning and attitude values (see Figure 2-15).

Figure 2-15 Attitude view – maximum size

2.2.9 Receiver Configurations

After connections, this window "Receiver Configurations" is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

UPrecise enables you to configure the parameters of the receiver according to its type (See Figure 2-16).
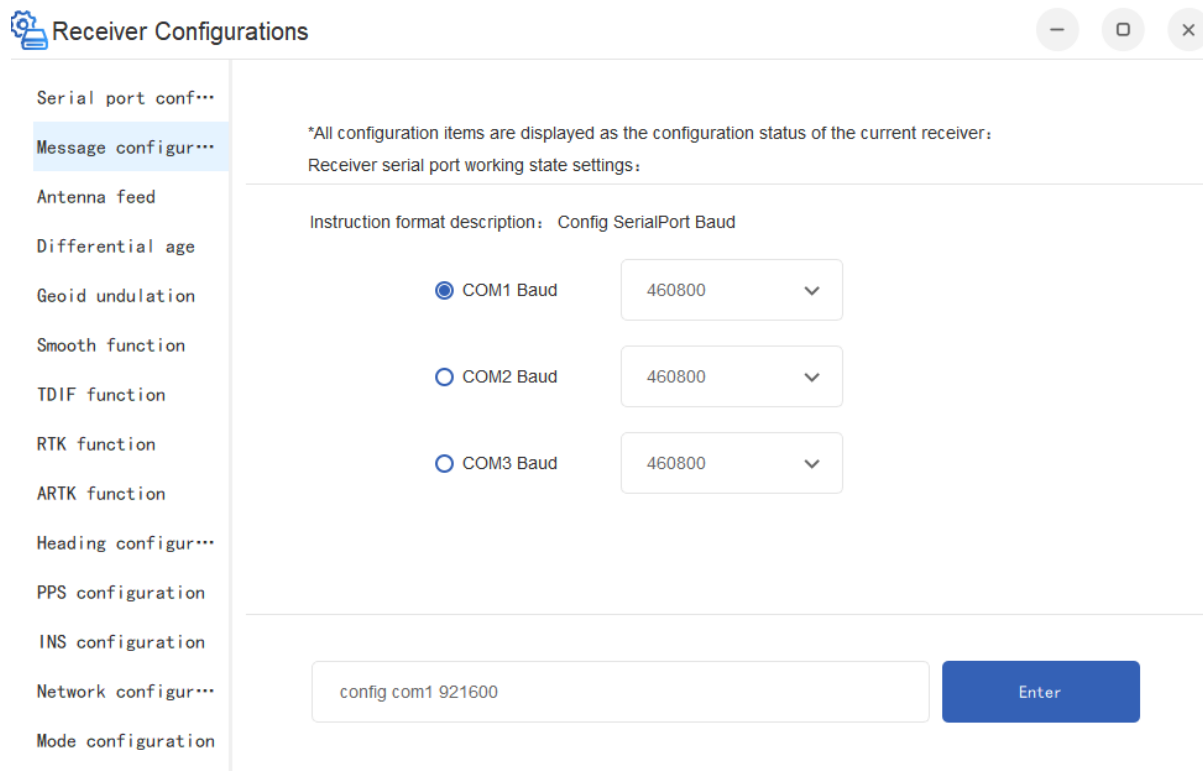

Figure 2-16 Example of receiver configurations

2.2.10   Replay

After connections, this window "Replay" is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

UPrecise can replay the saved data for products of Unicore. When the receiver is 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 2-17;
    Then UPrecise exits from the real-time monitoring and cuts the connection with the receiver, and the dialog box (Figure 2-18) appears.

Figure 2-17 Confirmation of replay

☞ Replay and real-time monitoring cannot exist at the same time.

2. Click "File selection", and select the file path and file name in the "Open File" dialog box (see Figure 2-18 and Figure 2-19)
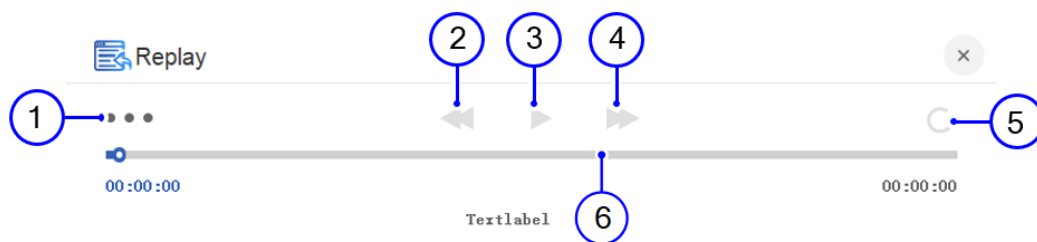

Figure 2-18 Replay

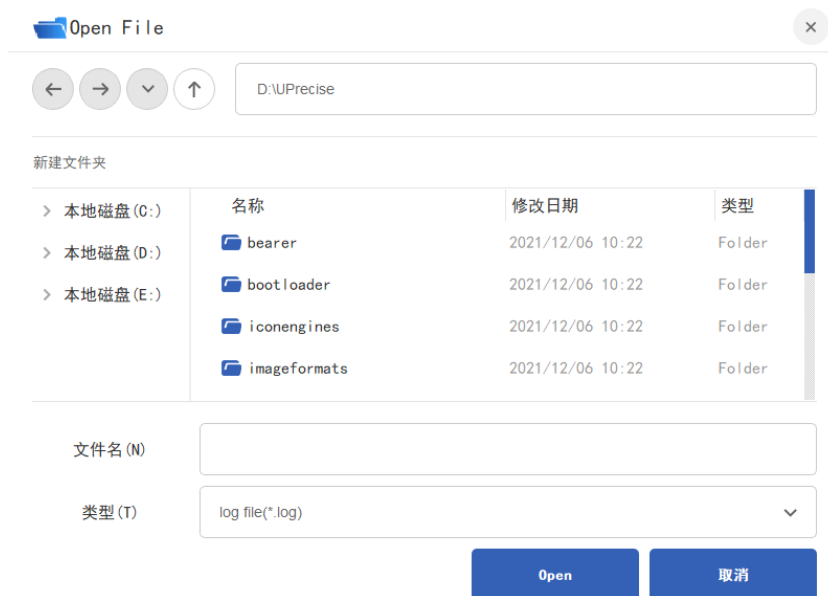| (1) File selection | (2) Backward | (3) Start | (4) Forward | (5) Replay | (6) Progress bar |

Figure 2-19 "Open File" dialog box

3. Click "Open" in Figure 2-19 to start the replay.

   During the replay, UPrecise displays the satellites in view, positioning information, parsed messages, satellite distribution etc.

4. If necessary, click "×" button in Figure 2-18 and click "Ok" in Figure 2-20 to quit from replay.
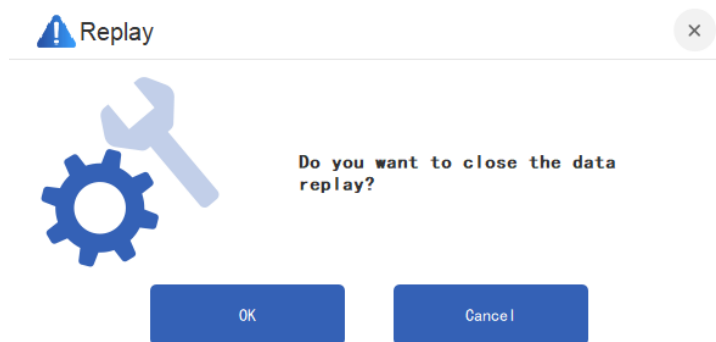

Figure 2-20 Closing replay

☞ After the replay, you need to click "Connections" again on the menu bar to activate other functions (see Section 2.2.1).

2.2.11 Receiver Upgrade

UPreicse provides the "Receiver Upgrade" function for the boards/modules from Unicore (see Table 1-2 for the supported products). This window is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

The upgrade steps are as follows:

1. Click the "Receiver Upgrade" on the menu bar and the upgrade dialog box (see Figure 2-21) appears.
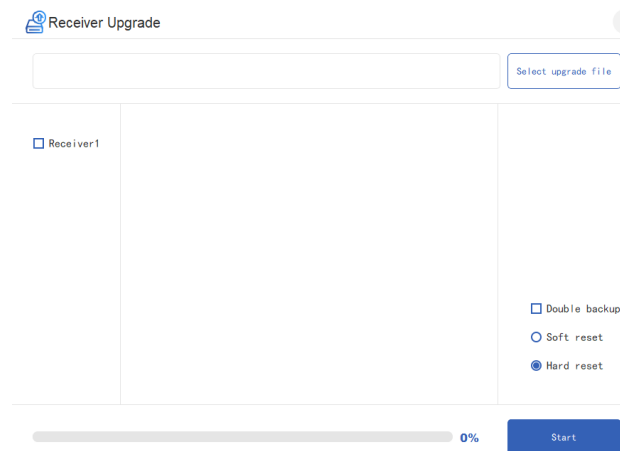2. Click "Select upgrade file" in the dialog box;

Figure 2-21 Receiver upgrade

3. Select the check box about receiver name in Figure 2-21;
4. If necessary, select the "Double backup";
   When the main partition finishes the upgrade, it makes a backup in the backup partition. This is called "Double backup". If the main partition collapses, the module boots from the backup partition.
5. Select "Soft reset" or "Hard reset";
   The receiver needs to be reset during the upgrade, and the reset method is decided by what you select.
6. Click "Start";

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

7. After finishing the upgrade, click the "×" button in Figure 2-21.

2.2.12   Platform Lock

Considering the information security, UPrecise provides "Platform Lock" function. When the platform is locked, any operation to the software is not allowed. This window is opened automatically but you can open/close it by using the corresponding icon on the menu bar.

To use this function, you need set a password first (see Section 2.2.13), and then just click the "Platform Lock" icon on the menu bar.
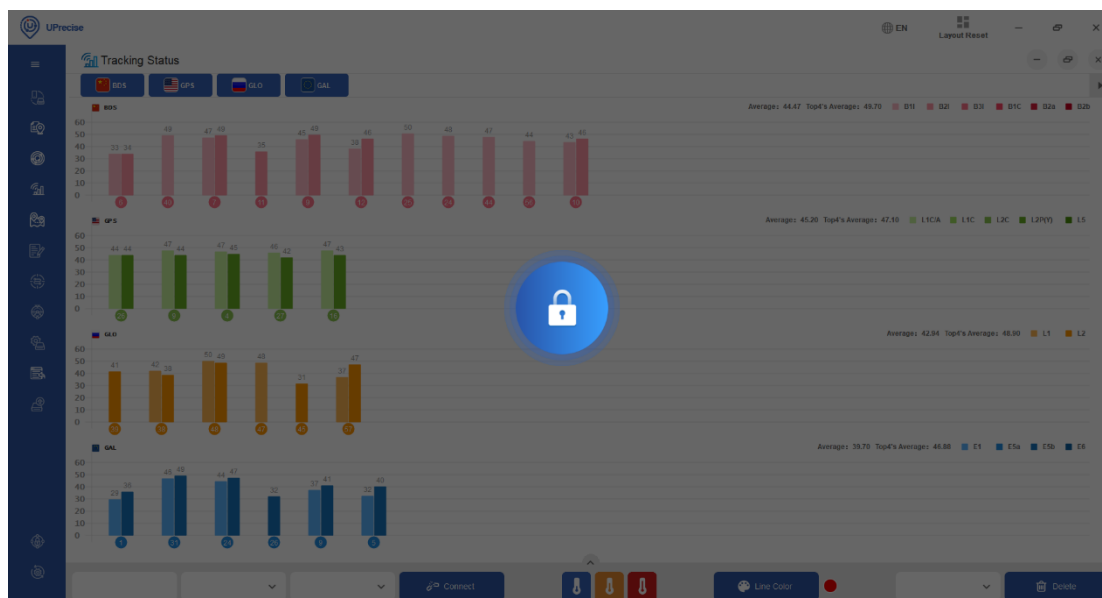

Figure 2-22 Platform lock

To unlock the software, click the "Lock Button" in Figure 2-22 and type in the correct password, and the software is operational and configurable again.
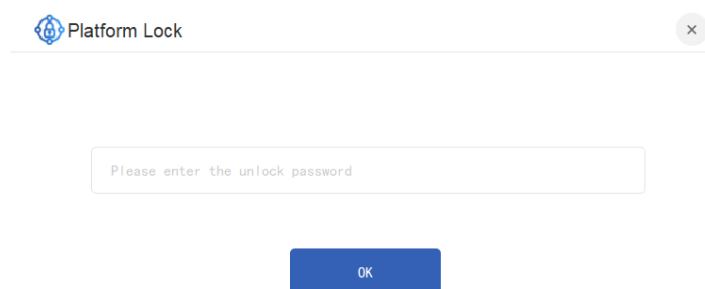

Figure 2-23 Platform Unlock

2.2.13　Platform Settings

The window "Platform Settings" is not opened automatically but you can open/close it by using the corresponding icon on the menu bar.

This window is used to set platform lock and the save path of the operating log, as well as displaying the version information (see Figure 2-24).
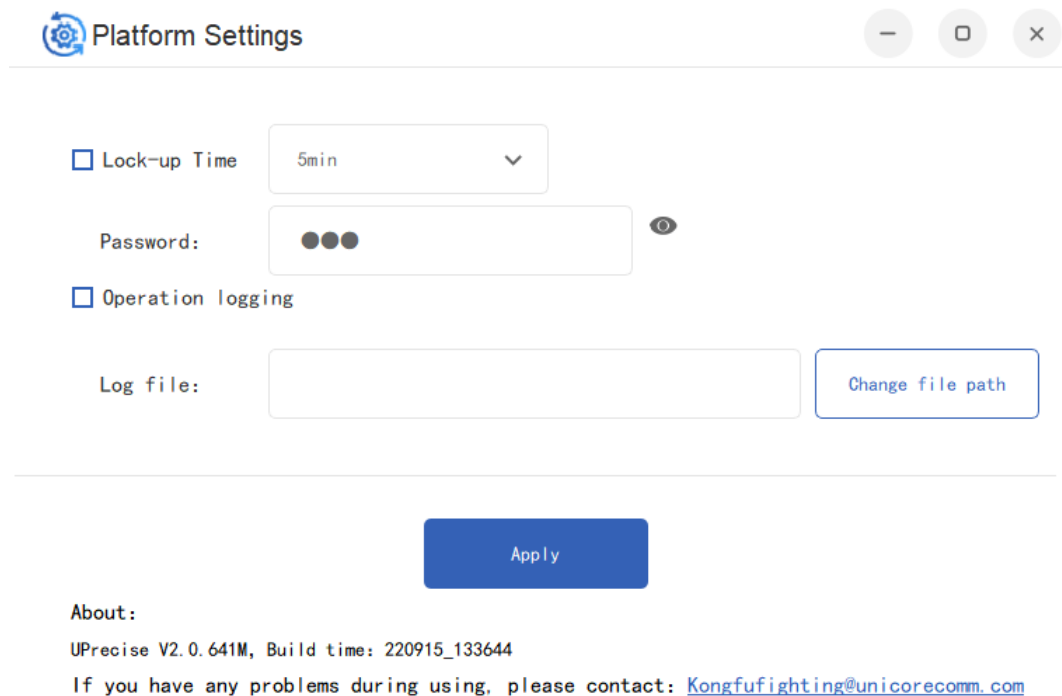

Figure 2-24 Platform Settings

- Platform lock: Sets the password and specifies how long it takes to enter the locked state. After setting, if you click the "Platform Lock" button on the menu bar, the software enters the locked state directly. Otherwise, it waits until the specified time to enter the locked state.

☞ There is no limit 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.

- Operating log save: Selects the "Operation logging", and further specifies the save path.

2.3 Status Bar

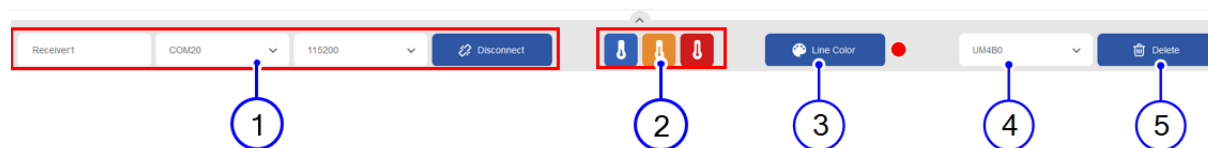At the bottom of UPrecise, it is "Status Bar" (see Figure 2-25).

Figure 2-25 Status bar showing the selected receiver

(1) Receiver information   (2) Start mode   (3) Trajectory color

(4) Type   (5) Delete

● Receiver information: Linked to the "Receiver Connection". When the receiver is connected, the information of the 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: Linked to the "Receiver Connection". When the receiver is connected, the type of the 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;

● Delete[2]: After clicking this button, UPrecise disconnects with the receiver and deletes all the basic identified information;

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[2] Supported later

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