HPLS®-2G

HEADING, POSITIONING & LEVELING SYSTEM

Evaluation Software

VERSION 1.00

MAY 2025

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ABBREVIATIONS

Abbreviation	Description

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Ver. #	Description	Author/s	Date

1. HPLS®-2G EVALUATION SOFTWARE

1.1. Overview

The software bundled with the HPLS®-2G configures, collects, and analyzes data from the unit.

This software also features:

- real-time text monitoring
- A graph view of collected data
- A list of logged data for further analysis

The HPLS®-2G – *Evaluation Software* monitors data from the Heading Position Leveling System in real-time, via an RS 232 protocol serial communications port.

This chapter provides information on how to:

- set up a communications (comms) link.
- display, edit, and export data to other software applications.
- manage collected output, including:
    - compass and attitude information (roll, pitch, and yaw).
    - GPS information (latitude, longitude, altitude, UTC, and quality and number of satellites in view).
    - chip temperature.

1.2. Communication

The PC software communicates with the HPLS®-2G unit through a standard PC RS-232 (or Rs-422) serial port that must be configured prior to monitoring activity.

You can use a USB to RS-232 (or Rs-422) converter in the absence of an RS232 serial port.

1.2.1. Serial Port Configuration

To configure the serial port:

1. Connect the supplied harness cable from the PC to the HPLS®-2G unit.
2. Launch the Evaluation software.
3. From the main screen, select **HPLS®-2G Communication Port**.

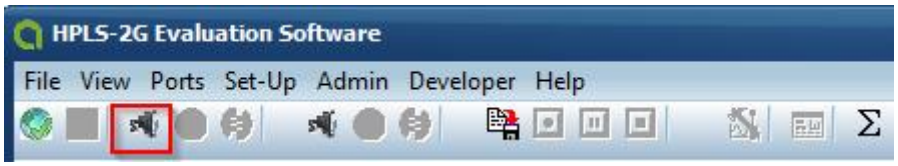

Figure 1. HPLS®-2G Communication Port

4. In the **Communication Port Dialog** box, select the communication port (the first COM port detected is the default) but do not change the baud rate (default of 115200).

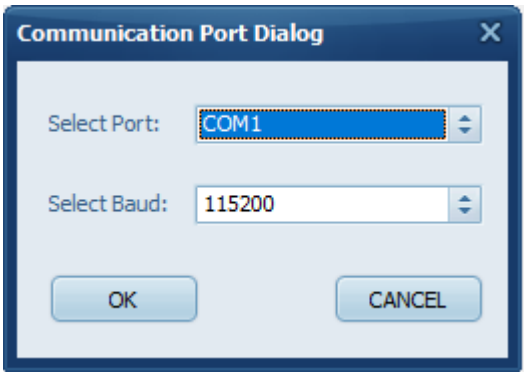

Figure 2. Port Setup

5. Click **OK** to confirm selection.

The **Open Comm Port** indicator turns on (Figure 3).

Figure 3. Open Comm Port

6. Click **Open Comm Port** on the Toolbar to initialize real-time data flow.
7. Turn On the HPLS®-2G unit.

Tip	If no data is displayed, verify that the HPLS®-2G unit is on.

The initialization notification screen is displayed.

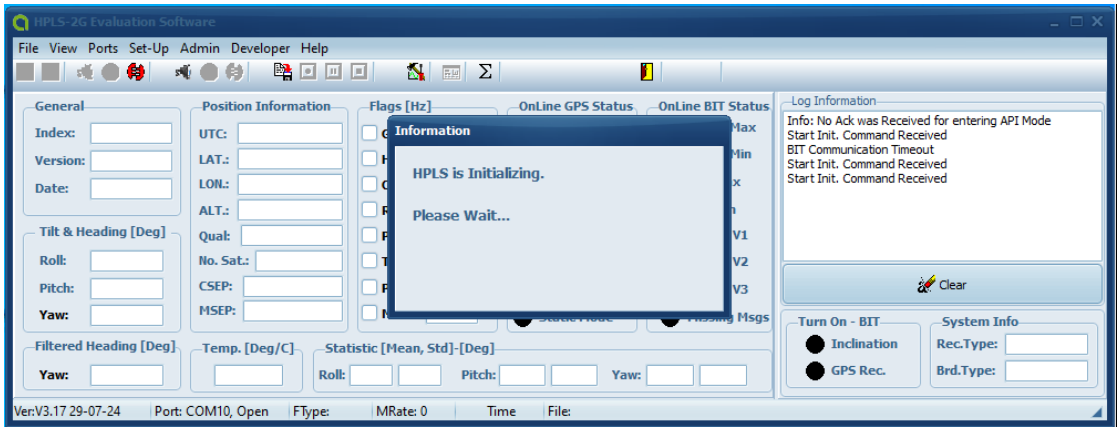

Figure 4. HPLS®-2G Initialization

After the Comm port is opened, the HPLS®-2G displays real-time information in the data view pane of the main screen.

As soon as at least four (4) GPS satellites are in view, the HPLS®-2G also displays latitude, longitude, altitude, and other information in the data view pane of the main screen.

8. To stop the display of real-time information, click **Close Comm Port**.

Figure 5. Close Comm Port

1.3. Data Views

You can view incoming data packets textually or graphically.

1.3.1. Textual View

The textual view displays incoming data packets in real-time in the data view pane of the main screen.

The data view pane displays the real-time data shown in Figure 6 and described in Table 1.

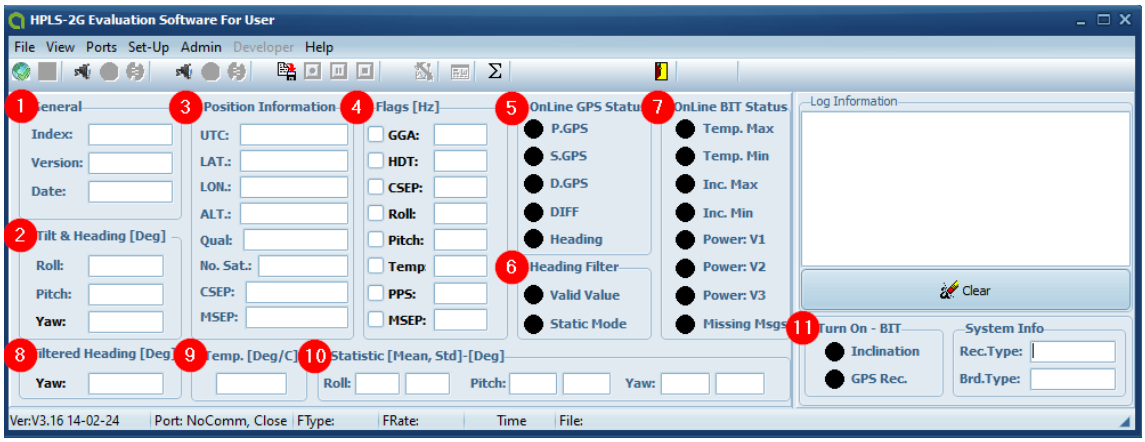

Figure 6. Data View Pane

Table 1. Real-Time Data View Pane

Ref	Section Name	Description
1	General	The fields in this section are: • Index - packet index value (numbered consecutively) The background is **red** if the value does not follow consecutively from the previous value (indicating a missing packet). • Version - version of the embedded software • Date - current date (UTC)
2	Tilt & Heading [Deg]	The fields in this section are: Roll, Pitch, and Yaw The HPLS®-2G determines these values, which are expressed in degrees.
3	Position Information	The fields in this section are: • UTC - time (in seconds) since 01 January 1970. • LAT - latitude in degrees and minutes • LON - longitude in degrees and minutes • ALT - altitude in meters • Qual - quality of GPS reception (0 = locked position, 2 = x/y axis, 3 = x/y/z axes) • No. Sat - number of satellites viewed by the GPS • CSEP - calculated distance between antennas (up to three decimal places). • MSEP - measured distance between antennas (affects the heading and the only valid value is 0.1)

Ref	Section Name	Description
4	Flags [Hz]	The fields in this section are: • GGA • HDT • CSEP • Roll • Pitch • Temp • MSEP The value of the above fields depends upon the period configuration (for example, 1, 2, 5, or 10). The field background turns **red** when the value is -1 or +1, relative to the selected frame rate. • PPS The value of the above field should be 1. The field background turns **red** when the value does not equal 1. To see NMEA messages, go to View>GPS Port-NMEA>NMEA log (enforced using the second communication port).
5	Online GPS Status	This section contains the GPS bits status information. P.GPS, S. GPS, D.GPS, and DIFF: • The circle to the left of the bit name is **green** when the GPS lock is established. • The circle to the left of the bit name is **black** when the GPS has lost lock. Heading (information supplied by Arazim) • The circle to the left of the Heading is **green** when the GPS established lock on heading calculation. • The circle to the left of the Heading is **black** when the GPS lost heading calculation lock.
6	Heading Filter	For HPLS®-2G – Multi-Freq Only, these bits indicate the Yaw filter status. See Filtered Heading [Deg] When the HPLS®-2G detects static mode: • The circle to the left of Static Mode turns from **black** to **green** once static mode is detected. • The circle to the left of Valid Value turns from **black** to **green** once static mode is detected and algorithm has determined that the filtered heading value is valid.

Ref	Section Name	Description
7	Online BIT Status	The fields in this section are used to indicate a deviation from a predefined working range (Temp, Inclination, Voltage). • The circle to the left of an item turns **green** when the current value is within the permitted range. • The circle to the left of an item turns red when the current value exceeds the permitted threshold. Power V1 = 3.3 V Power V2 = 5.0 V Power V3 = 12.0 V Missing messages (checked every 2 seconds): • The circle to the left of Missing Messages turns **green** when there are no missing messages. • The circle to the left of Missing Messages turns red when there are missing messages.
8	Filtered Heading [Deg]	When the GPS is in static mode, Arazim filters the Yaw value to minimize the amount of noise.
9	Temp. [Deg/C]	The field in this section displays the current temperature in degrees Celsius.
10	Statistic [Mean, Std]-[Deg]	The fields in this section contain the mean and standard deviation for Roll, Pitch, and Yaw. • Click ∑ once to display the mean and standard deviation for each field. • Click ∑ again to clear the display. 
11	Turn-on BIT/ System Info	BIT (Built-in Test) upon initialization to verify that there is communication and to test communication quality. System Info: GPS receiver with which HPLS®-2G works + identification of main board

1.3.2. Graphical View

The graphical view displays incoming data packets in the **Graphical Viewer** panel of the main screen.

To select the **Graphical View**, go to **View>Full Form View** on the main screen.

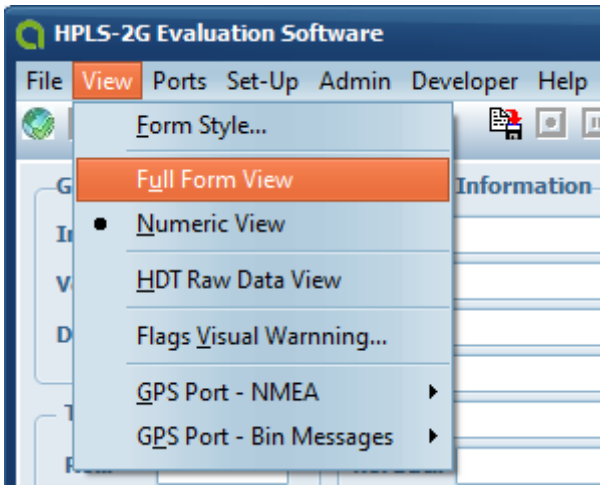

Figure 7. Selecting Full From View from Menu

The **Graphical Viewer** panel displays the options shown in Figure 8 and described in Table 2

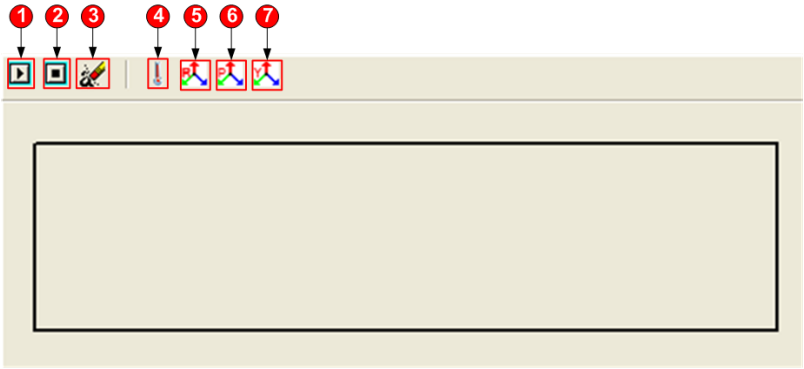

Figure 8. Graphical Viewer

Table 2. Graphical Viewer Icons

Ref	Icon Name	Description
1	Play	View incoming data.
2	Stop	Stop viewing incoming data.
3	Erase	Clear the chart view
4	View temperature	Toggle enable/disable the temperature display.
5	View Roll	Toggle enable/disable the roll display.
6	View Pitch	Toggle enable/disable the pitch display.
7	View Yaw	Toggle enable/disable the yaw display.

1.3.3. Full Form View

Full Form view displays the same information as the numeric view, with the addition of information in chart form at the bottom of the screen.

Go to **View>Full Form View** to view this information.

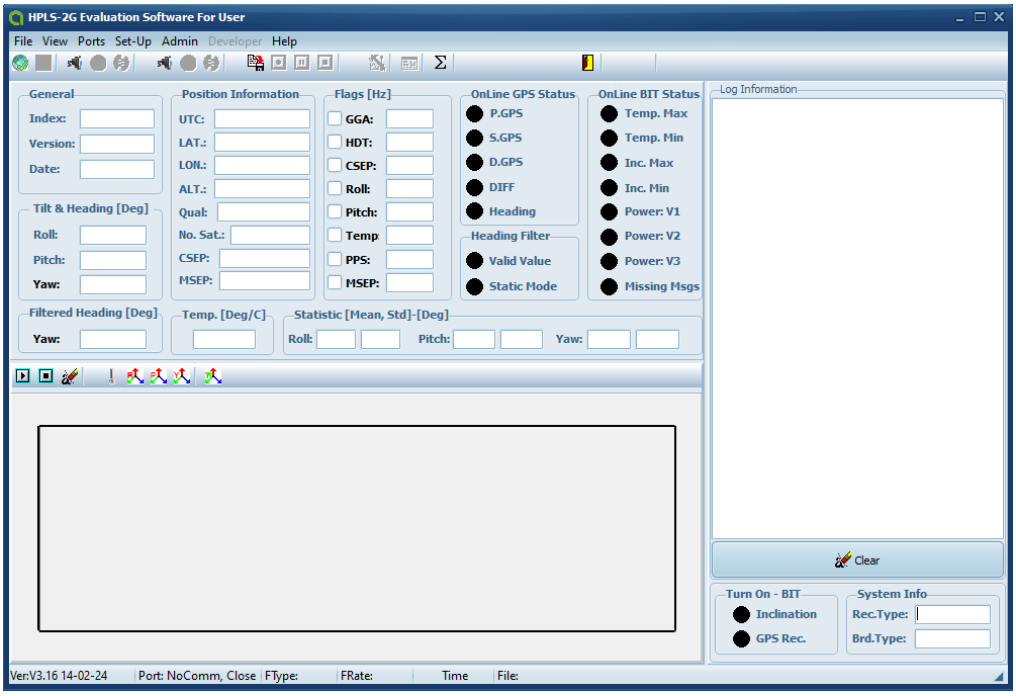

Figure 9. Full Form View

1.3.4. Numeric View

Numeric view displays the same information as the full form view but does not include information in chart form.

Go to **View>Numeric View** to view this information.

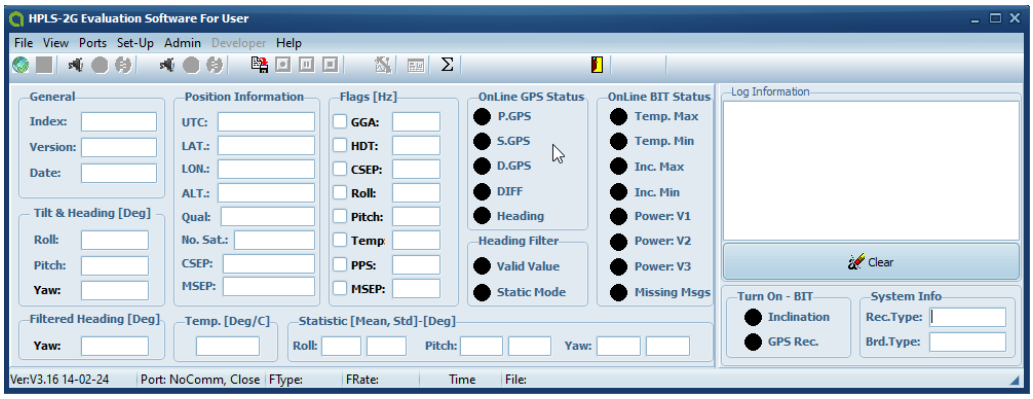

Figure 10. Numeric View

1.3.5. HDT Raw Data View

HDT raw data view includes information on the accelerometer data for the X, Y, and Z axes (measured in gs -- where 1g indicates that the device measures gravity) and rate-gyro raw data (measured in degrees per second).

Go to **View>HDT Raw Data View** to view this information.

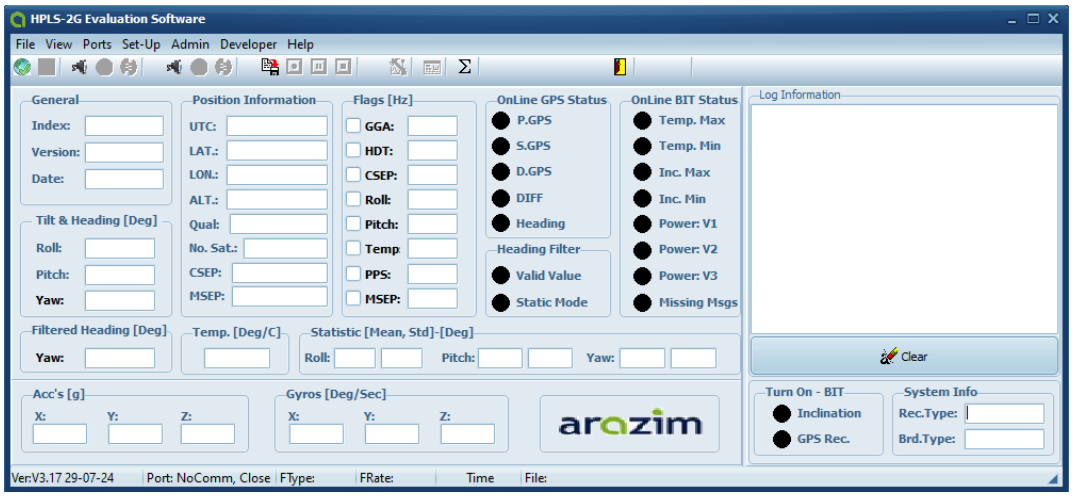

Figure 11. HDT Raw Data View

1.3.6. Flags Visual Warning

Use the Flags Visual Warning view to set message notification thresholds for one or more measurements.

To set the flags visual warning:

1. Go to **View>Flags Visual Warning**.
   Flags Proper Boundaries is displayed.
2. Check the measurement(s) desired and fill in the minimum and maximum values.
3. Click **OK**.

When a measurement goes below or above the set thresholds, the background for each measurement will turn red.

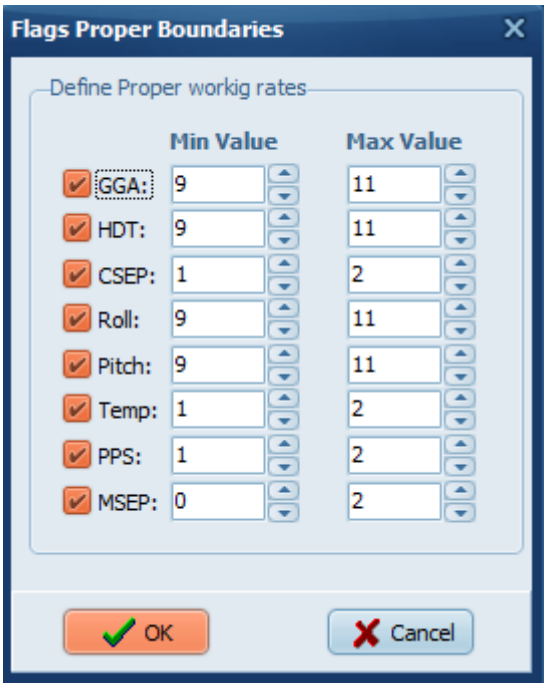

Figure 12. Flags Proper Boundaries

1.3.7. GPS Port - NMEA

Set viewing criteria to view GPS Port NMEA message notifications.

To view specific GPS Port NMEA message notifications:

1. Verify that you are connected to Port B.
2. Go to **View>GPS Port-NMEA**.
3. Select **NMEA log** or **NMEA SAT Info**.
   NMEA Messages is displayed.
4. Under **MASK**, check one or more messages to view (or click **Set All**).
5. Under **Constellation**, check one or more systems to view (or click **Set All**).
6. Click **Close**.

Note	Be sure to configure the GPS to transmit the selected messages.

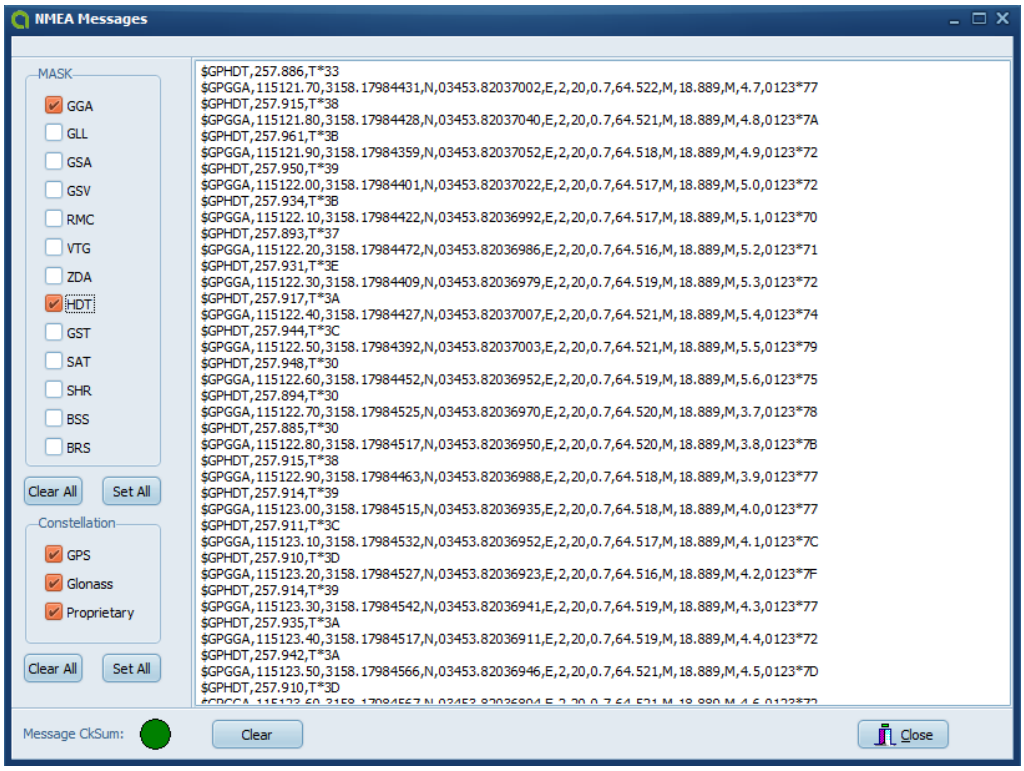

Figure 13. GPS Port - NMEA

1.3.8. GPS Port - Bin Messages

Set viewing criteria to view GPS Port Bin messages.

To view specific GPS Port Bin message notifications:

1. Verify that you are connected to Port B.
2. Go to **View>GPS Port Bin Messages**.
3. Select **GPS Port - GPS SNRs** or **GPS Port - GNSS SNRs**.
   GPS Port Bin Messages is displayed.

Figure 14 displays the position (per angle) above the observer of the primary and secondary antennas (the top graphic).

It also displays the signal noise ratio (SNR) (the bottom chart).

Note	The SNR is the ratio between the desired information or the power of a signal and the undesired signal or the power of the background noise (expressed in decibels).

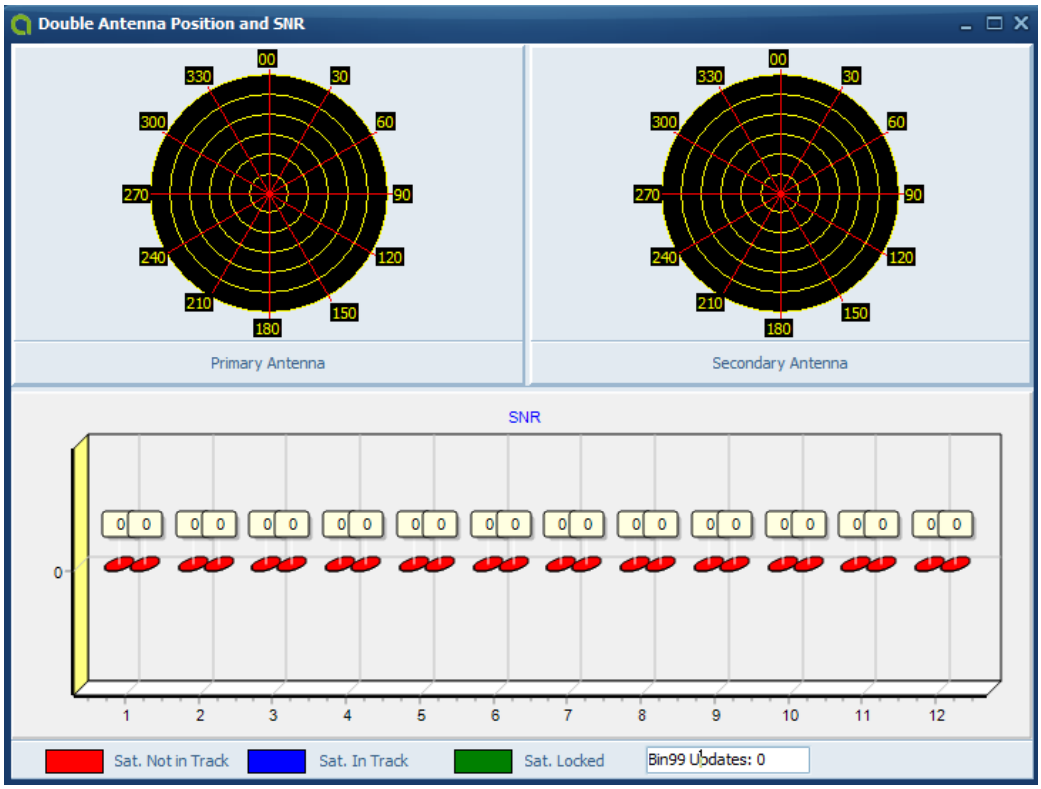

Figure 14. Double Antenna Position and SNR

Figure 15 displays the reception information of the primary and secondary antennas (both in terms of Master (Primary) vs. Slave (Secondary) and in terms of the satellite-based augmentation system (SBAS). The SBAS improves the integrity, accuracy, and availability of basic Global Navigation Satellite System (GNSS) signals by transmitting wide-area corrections for range errors.

To view specific criteria:

1. Select one of the constellations in the top row of tabs, and
2. Select a frequency (L1, L2, or L5).

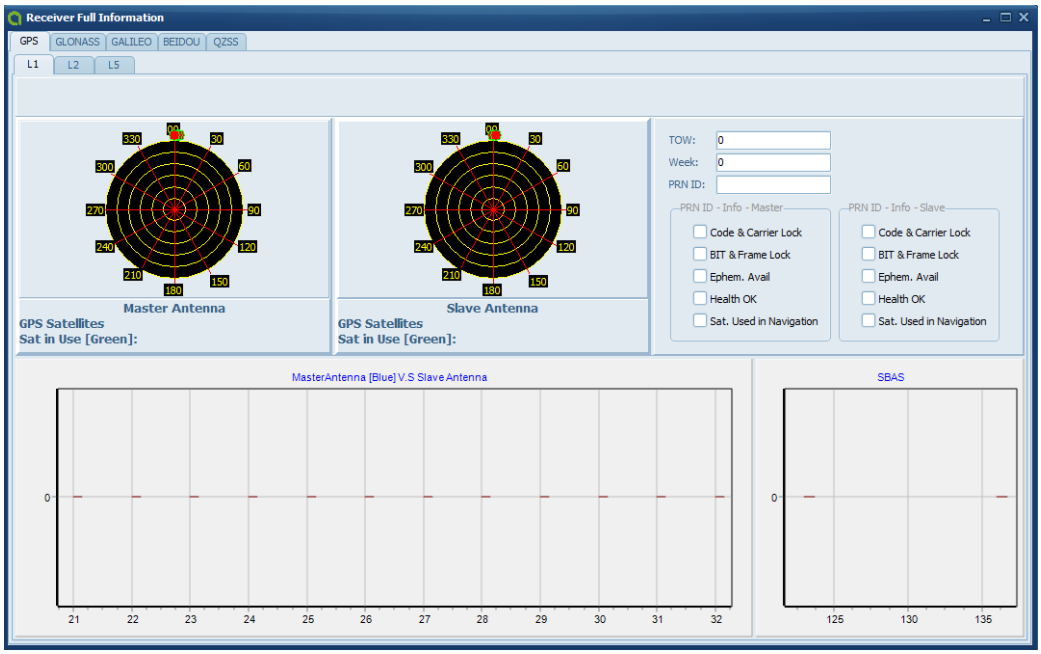

Figure 15. Receiver Full Information

Note	TOW = Time of Week - Number of seconds between Sunday at midnight and the current time Week = Number of weeks from 01 January 1980 to the current date PRN ID = pseudo-random noise identification A repeating radio signal broadcast by each GPS satellite and generated by each GPS receiver. In a given cycle, the satellite and the receiver start generating their codes at the same moment, and the receiver measures how much later the satellite's broadcast reaches it.

1.4. HPLS®-2G Configuration

The HPLS®-2G unit is configured from the HPLS®-2G Configuration screen.

To open the HPLS®-2G Configuration screen:

- Go to **Setup> HPLS®-2G Config** in the main screen.

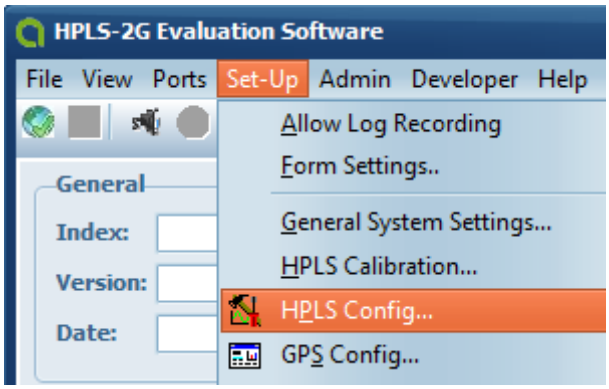

Figure 16. HPLS®-2G Configuration Menu

or

- Click the HPLS®-2G Setup icon in the toolbar. **HPLS®-2G Configuration** is displayed.

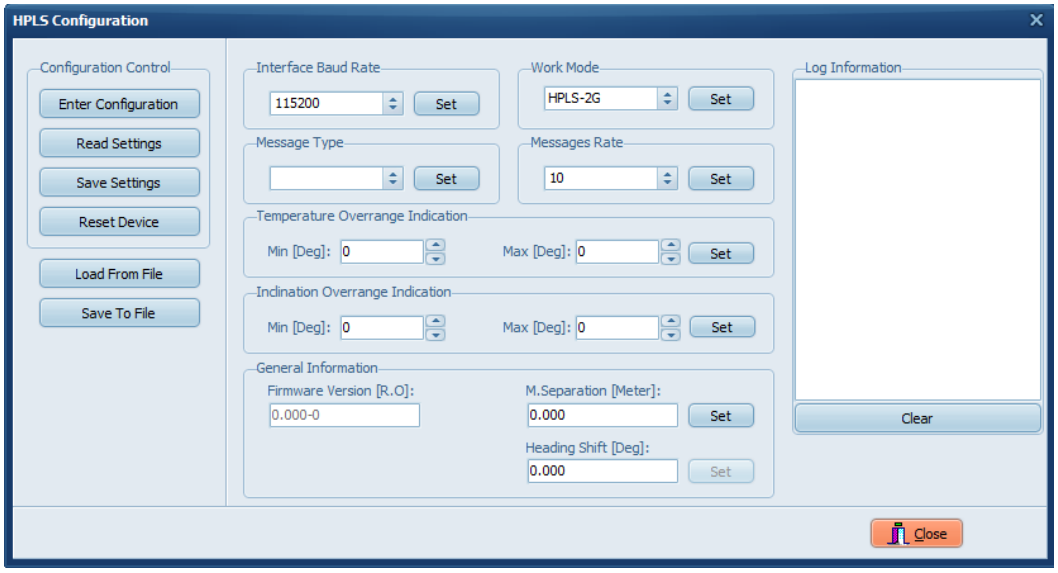

Figure 17. HPLS®-2G Configuration

The HPLS®-2G Configuration Controls are described in the following subsections.

1.4.1. Enter Configuration

Select **Enter Configuration** for the HPLS®-2G to enter the *Configuration* mode.

When **Enter Configuration** succeeds:

- The **Enter Configuration** button displays: **Exit Configuration**.
- The system receives an "Ack" message and sends a message to the HPLS®-2G to return the current settings.
- All information fields are updated with the current settings.

To enter information:

1. In each field of the HPLS®-2G Configuration screen, select (if there is a combo box) or enter information.
2. Click **Set** to save the information to RAM.
3. View the Log Information panel on the right side of the screen to see updated information for the fields for which you clicked **Set** in Step 2.

1.4.2. Read Settings

Select **Read Settings** for the HPLS®-2G to read the HPLS®-2G current settings and display the values of the information fields in the HPLS®-2G Configuration screen.

1.4.3. Save Settings

Select **Save Settings** for the HPLS®-2G to burn the current parameters to the flash memory. Do not click Save Settings if you want to retain the settings only for the current session.

1.4.4. Reset Device

Select Reset Device to reboot the HPLS®-2G system.

1.4.5. Load from File

Select **Load from File** to load a previously saved configuration.

1.4.6. Save to File

Select Save to File to save a configuration to a selected file.

1.4.7. Exit Configuration

Select Exit Configuration (after you enter the configuration, **Enter Configuration** changes to **Exit Configuration**) to exit the configuration and then click **Close** to close **HPLS®-2G Configuration**.

1.4.8. Configuration Settings

The HPLS®-2G configuration settings are listed in Table 3.

Table 3. HPLS®-2G Configuration Settings

Ref	Name	Description	Configurable
1	Interface Baud Rate	Communication speed between HPLS®-2G and the PC	Yes
2	Work mode	This option may be available in the future.	No
3	Message Type	System output message type	Yes
4	Messages Rate	Number of system output messages provided per second	Yes

Ref	Name	Description	Configurable
5	Temperature Overrange Indication (degrees)	Minimum and maximum temperature (typically from -20 C. to 70 C.) range. Over range will lead to alarm bit.	Yes
6	Inclination Overrange Indication (degrees)	Minimum and maximum inclination (typically from -30 C. to 30 C.) range. Over range will lead to alarm bit.	Yes
7	Firmware version	Firmware version and build (separated by a hyphen)	No
8	M. Separation (meters)	Distance that the GPS was configured to measure Enter this accurate value directly into the GPS module via the GPS Configuration screen	Yes
9	Heading Shift (degrees)	Change in heading required to match the actual heading	Yes
10	Log Information	Real-time display of configuration settings when you click **Set** after each setting.	No

Important	You can only enter the configuration screen when the COM-port is open.

1.5. Save and Record Real-Time Data

To save and record real-time data to a file:

1. From the toolbar in the main screen, click **Select Destination File Name**.

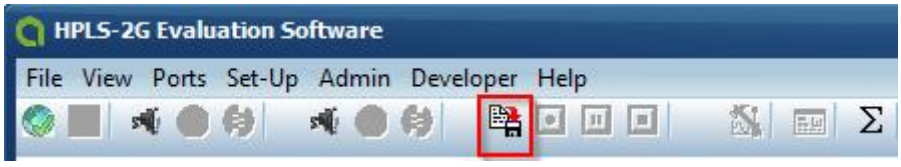

Figure 18. Save and Record Real-Time Data Button

The **Save As** dialog box is displayed.

2. Provide a file name and path in which to save the real-time data.

After the system saves the file name and path, **Record** is enabled.

3. Click **Record** to start recording.
4. Click **Stop** to stop recording.
5. When the recording is finished, click **Stop**.

Table 4. Data Recording Actions

Button	Action	Comments
Start	Starts recording	Recording only starts when there is a valid data flow. Pause and Stop buttons are enabled
Pause	Pauses recording	Recording is paused temporarily. Stop and Record buttons are enabled. The recording file remains open. Press **Record** again to restart recording and add new data to the end of the file.
Stop	Stops recording	Stop the recording process. Close the recording file. All buttons except **Select Destination File Name** are grayed out.

1.6. Export Data

Currently, you can only export data from M1 message source files.

To export data:

1. Go to **File>Export**.

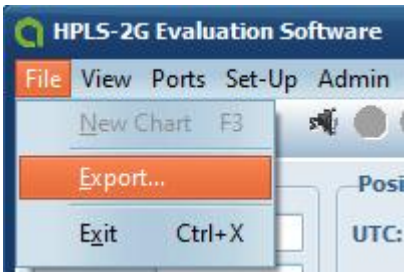

Figure 19. File Export Menu

Export Form is displayed.

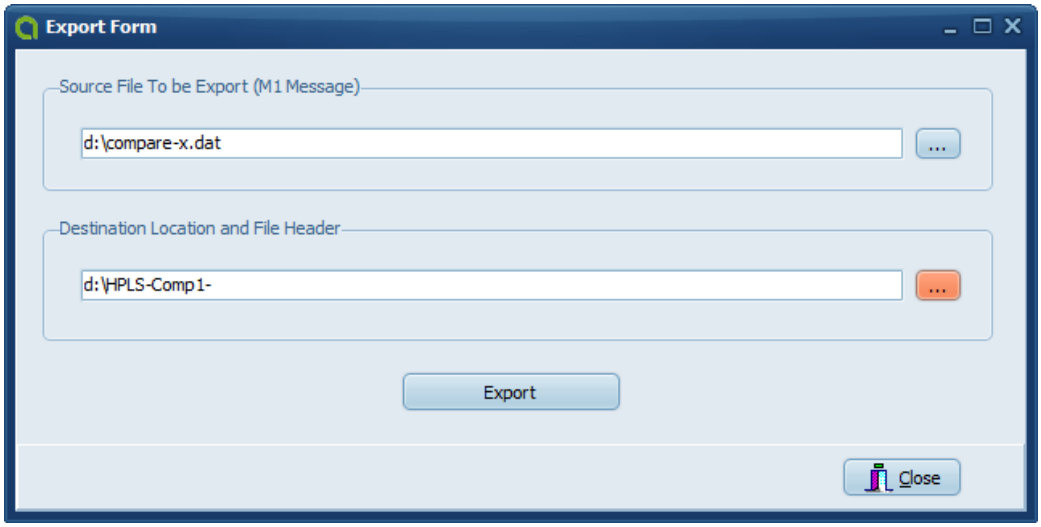

Figure 20. Export Form

2. Select the M1 Message source file location.
3. Select the destination location and file name.
4. Click **Export** to export the file to the destination.
5. Click **Close**.

1.7. Configure the GNSS Receiver

Important	Select a COM 2 port that connects to Port-B of the HPLS®-2G but retain the other settings as they are for the COM 1 port**.**

To configure the GNSS Receiver using icons:

1. Connect the supplied harness cable from the PC to the HPLS®-2G unit.
2. Launch the Evaluation software.
3. From the main screen, select **GPS Communication Port**.

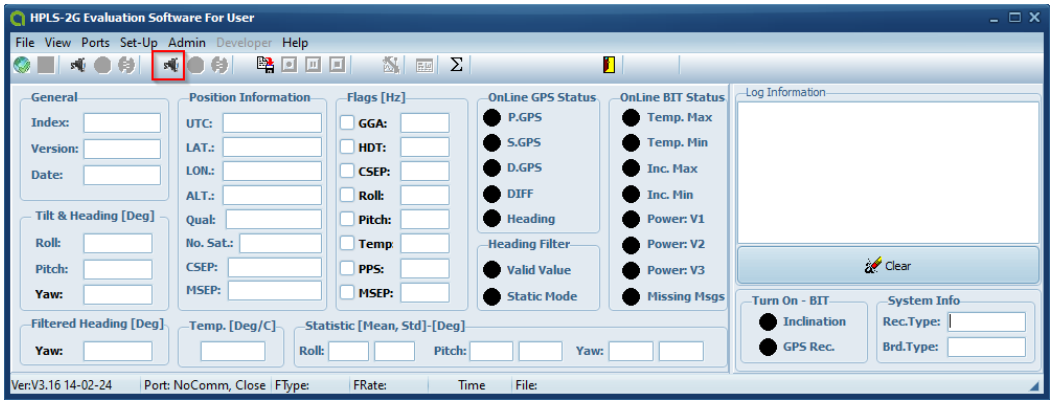

Figure 21. GPS Communication Port

4. In the **Communication Port Dialog** box, select the communication port (the first COM port detected is the default) but do not change the baud rate (default of 115200).

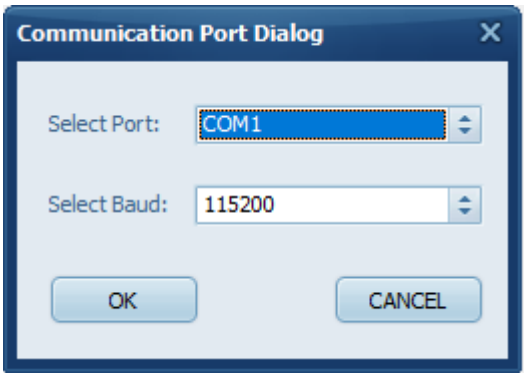

Figure 22. Port Setup

5. Click **OK** to confirm selection.

Figure 23 shows the **Open Comm Port** indicator.

Figure 23. Open Comm Port

Configure the GNSS Receiver using menus:

1. From the main screen, select **Ports>GPS Config. Port** and open the newly selected COM2 port.

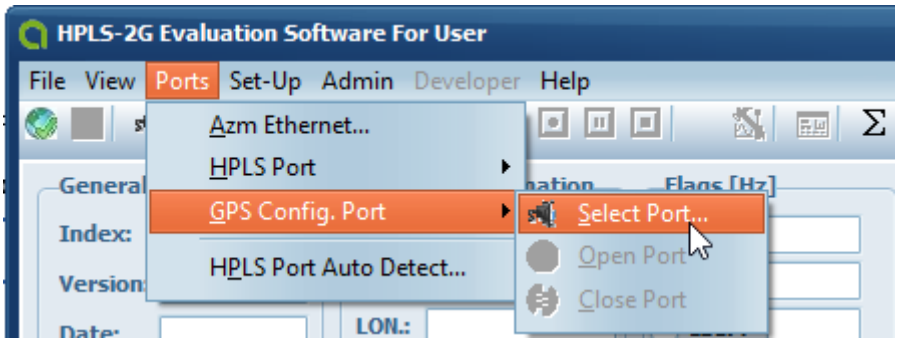

Figure 24. GPS Config. Port

2. Go to **Set-Up>GPS Config** from the main screen or

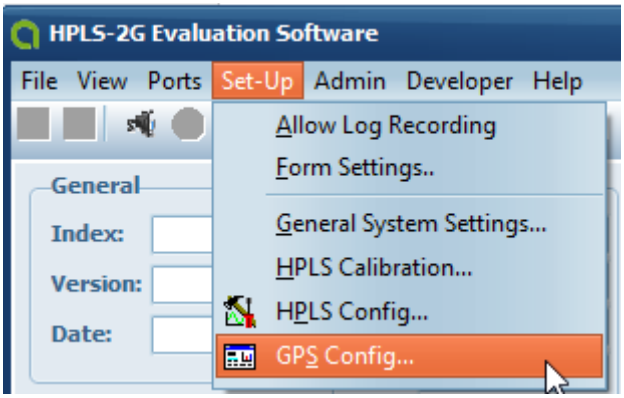

Figure 25. GPS Configuration Menu

Click the GPS Configuration button.

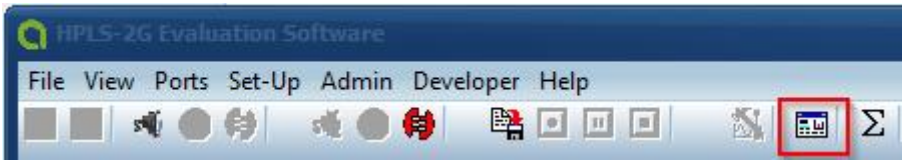

Figure 26. GPS Configuration Button

The **GPS Configuration** screen is displayed (Figure 27).

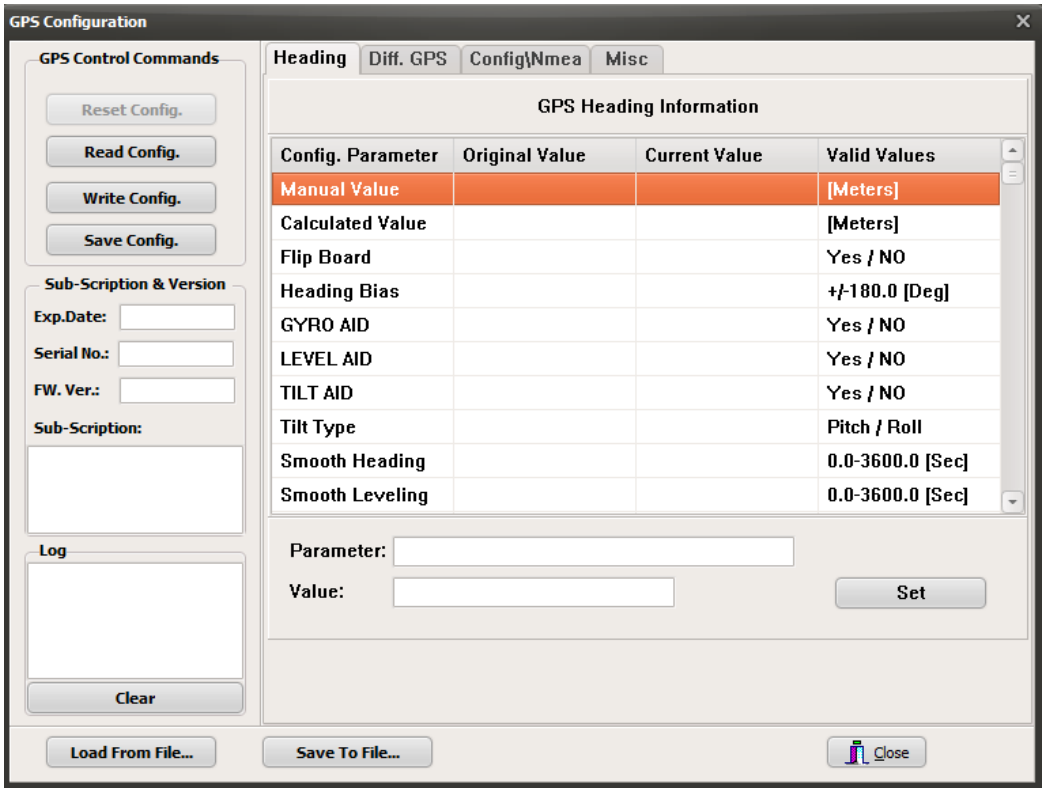

Figure 27. GPS Configuration Control Commands

Important	Check with Arazim Support before changing any GPS parameters.

The left panel contains the GPS Control commands:

- Read Config – Reads the information in the main portion of **GPS Configuration** (original and current values).
- Write Config – Writes configuration changes to HPLS®-2G RAM registers.
- Save Config – Saves the current RAM registers values to flash memory.

In addition, the left panel contains subscription and version information.

The main panel contains the types of GPS Information available to view (Figure 28 to Figure 31, inclusive).

To view information on specific GPS information:

1. Click the tab of interest.
2. Double-click an item of interest under a tab of interest to view that item's current values at the bottom of the screen.
3. If relevant, enter new values in the detailed fields.

4. Click **Set** to set the new values.
5. Click **Read Config.** to read the information in the main portion of **GPS Configuration**, as well as the latest "Sub-scription" and Log details.
6. Click **Clear** to clear the log information.
7. Click **Write Config** to save the new configurations to RAM.
8. Click **Save Config** to save the new configurations to flash memory.

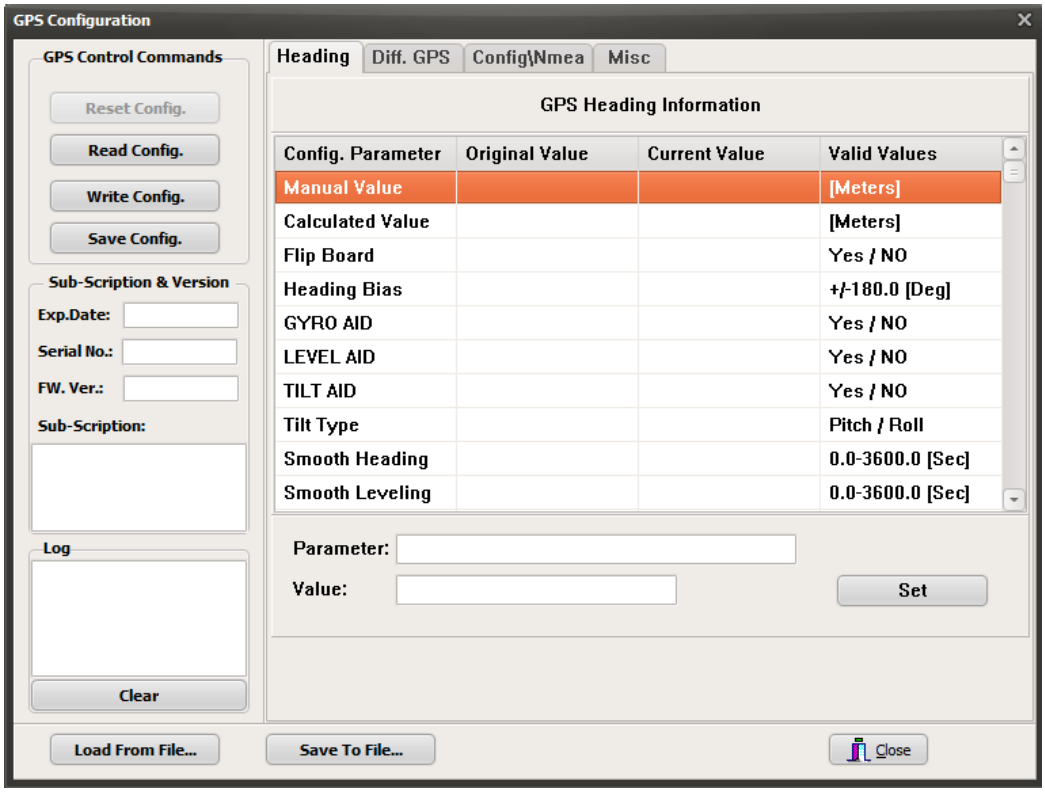

Figure 28. GPS Heading Information

- **Manual Value** - Manually measure the distance between the center of two antennas and update the **Current Value** if necessary.
- **Calculated Value** - This read-only value displays the calculated distance between the center of two antennas.
- **Flip Board** - For factory use only.
- **Heading Bias** - If the antennas are not set along the driving direction, insert the offset value between the antenna heading and the vessel platform heading.

Contact Arazim Support for information on the following GPS Heading Information options:

- **GYRO AID**
- **LEVEL AID**
- **TILT AID**

- **Tilt Type**
- **Smooth Heading**
- **Smooth Leveling**

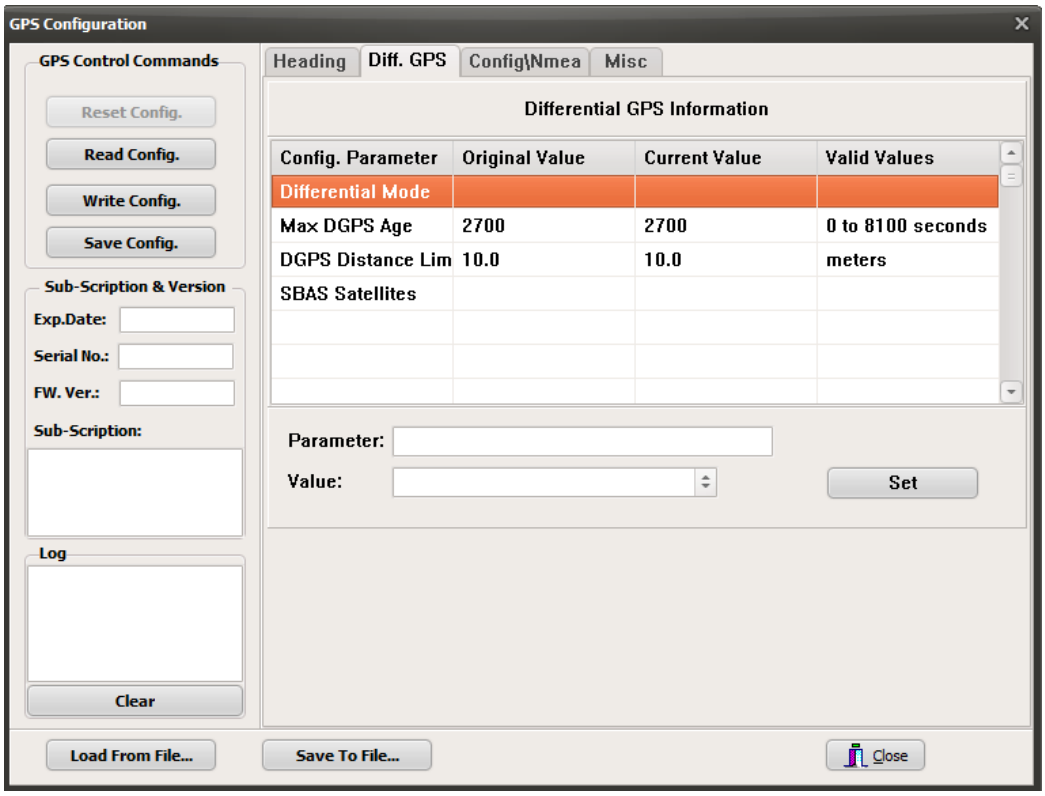

Figure 29. GPS Diff. GPS Information

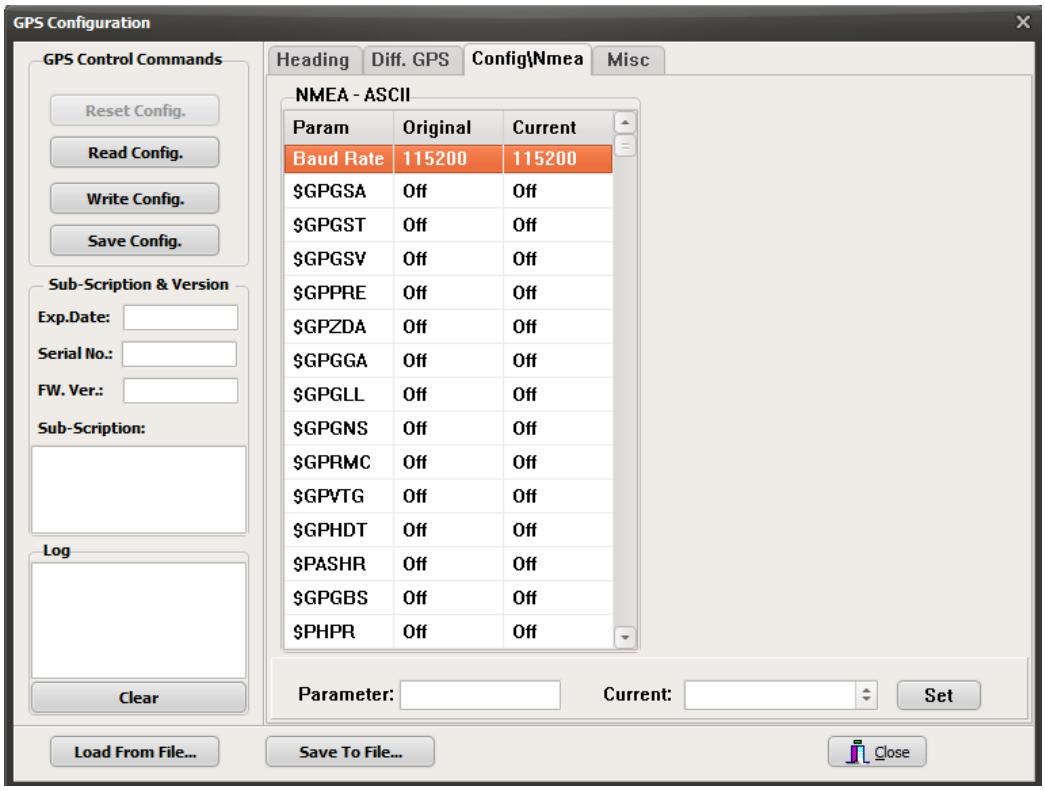

Figure 30. GPS Config/NMEA Configuration

The Config/NMEA TAB displays the message configuration for HPLS®-2G Port B.

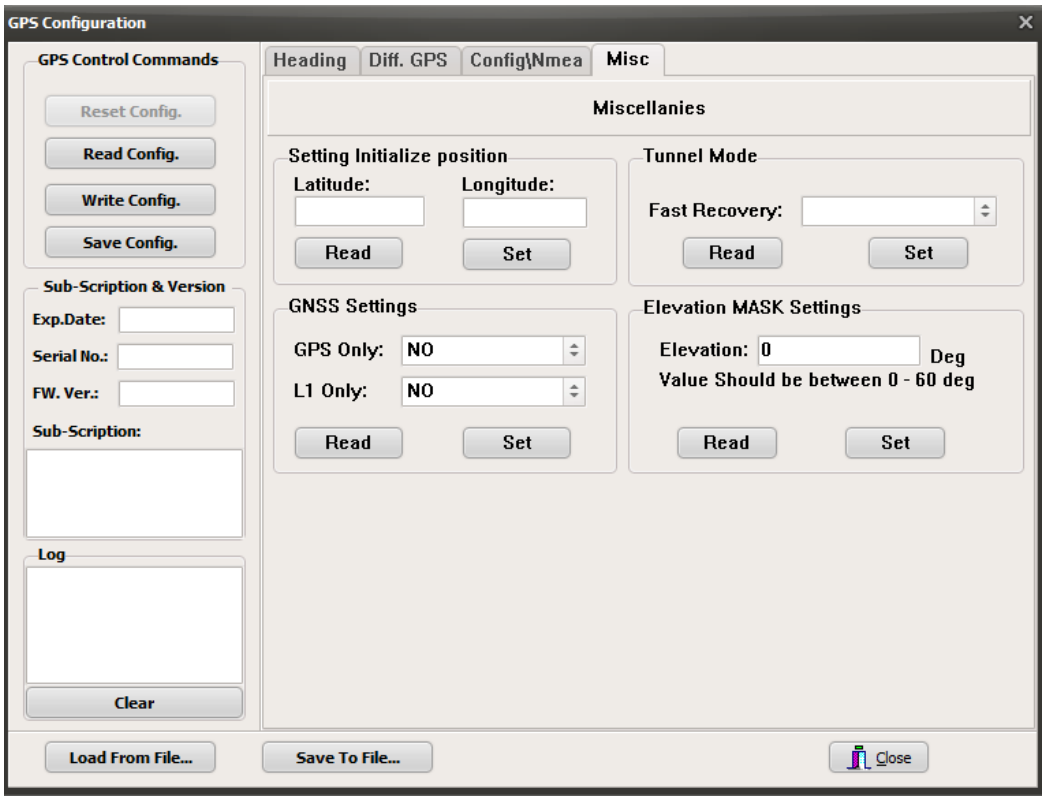

Figure 31. GPS Misc Configuration

1.8. Administration

The options available under the Administration tab assist in:

- System calibration
- Simulation
- Firmware updates

1.8.1. Burn Calibration

To burn the calibration results to flash memory:

1. Go to **Admin>Burn Calibration**.
   Burn Calibration opens.
2. Under **Calibration Result** view the sensitivity for roll and pitch and the offset for roll and pitch.
3. To update the HPLS®-2G calibration settings:
   a. Under **Control**, click **Load Cal.** to load the calibration arguments from a file.
   b. Under **Calibration Result** view the loaded calibration arguments -- sensitivity for roll and pitch and offset for roll and pitch.
   c. Click **Burn Cal.** to burn the calibration arguments to the HPLS®-2G flash memory.
4. To read and backup the current calibration arguments:
   a. Under **Control**, click **Read Cal.** to read the burned calibration result from the HPLS®-2G.
   b. Under **Calibration Result** view the loaded calibration arguments -- sensitivity for roll and pitch and offset for roll and pitch.
   c. Click **Save Cal.** to save the result.

Under **Calibration**, you can view the calibration log.

5. Click **Clear Log** to clear the calibration log.
6. Click **Close** to close the **Burn Calibration** dialog.

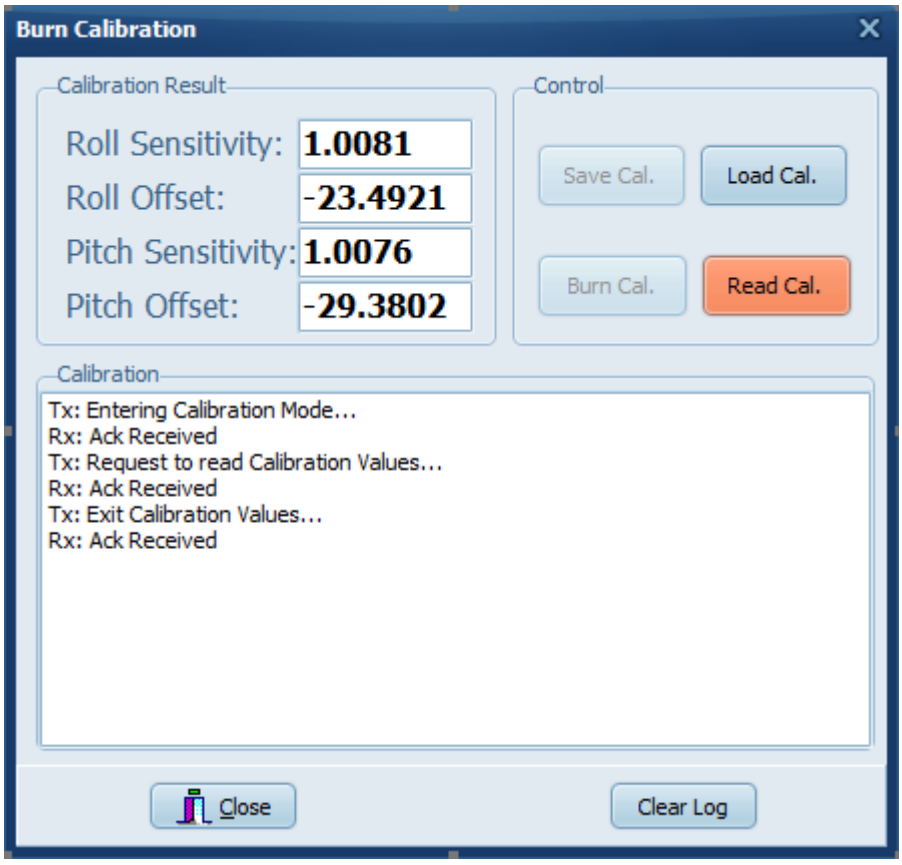

Figure 32. Burn Calibration

1.8.2. File Player Simulator (M1)

You can use the file player simulator to check that the software and the serial port are working properly.

To start the file player simulator:

1. Perform the following in parallel:
   a. Connect the cross-serial port cable.
   b. Activate two HPLS®-2G applications, one to receive data, and another to transmit data
2. On the receiving application, select and open the communication port according to Section 1.2.1 (Figure 1 to Figure 3).
3. On the transmitting application, go to **Admin>File Player Simulator (M1)**.
   The **HPLS®-2G Simulator** opens.

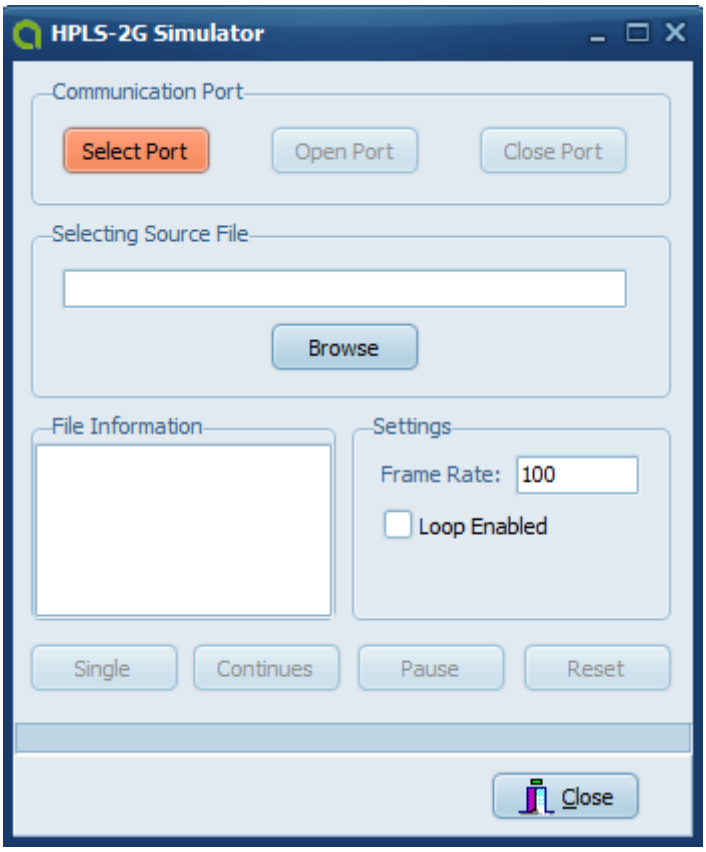

Figure 33. HPLS®-2G Simulator

4. Under **Communication Port**, click **Select Port**.
   The **Communication Port Dialog** opens.

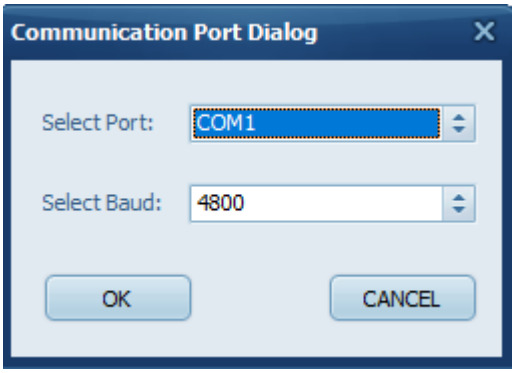

Figure 34. Communication Port Dialog

5. Select a port and a baud value (115200, HPLS®-2G default).
6. Click **OK**
7. Under **Communication Port**, click **Open Port**.
8. Under **Selecting Source File**, click **Browse**, then select the simulation file from the list of files displayed.
   The file information is displayed in the **File Information** section.
9. Under **Settings**, select a frame rate.

10. [Optional] Click **Loop Enabled** to have the frame rate repeat in a loop.
11. Use the following buttons to control the simulation play:
    a. Single - Play a single message at a time.
    b. Continuous - Play messages continuously until end of the file (if you left **Loop enabled** unchecked).
    c. Pause - Pause the message play.
    d. Reset - Reset the simulator -- reset the simulation file to the beginning.
12. To finish the simulation:
    a. Click **Pause**.
    b. Under **Communication Port**, click **Close Port** to close the port.
    c. Click **Close** to close the simulator.

1.8.3. FW Update

To update firmware:

1. Be sure that the HPLS®-2G device interface harness is connected (from Port A) to the PC
2. Go to **Admin>FW Update**.
   Firmware Upgrade opens.
3. Under **Firmware File**, click the menu button (three dots to select a valid binary file.
   A file browser opens.
4. Click **Select Port** to select a port (Figure 35).

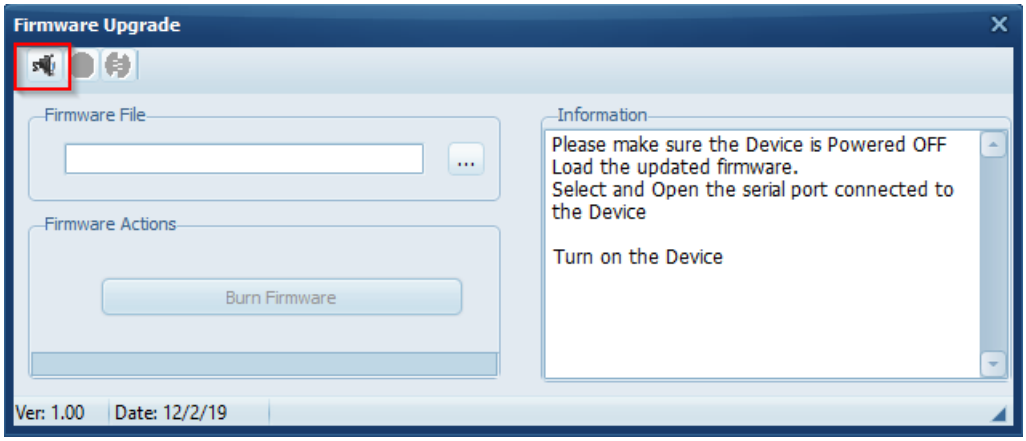

Figure 35. Firmware Upgrade - Select Port

5. Click **Open Port** to open the port (Figure 36).

Figure 36. Firmware Upgrade - Open Port

6. Turn On the HPLS®-2G device.
7. Verify that the **Firmware Upgrade** application and the device are connected.

   Burn Firmware is active.
8. If the application and device are not connected, verify that you have selected the correct port and baud-rate, then recycle power to the HPLS®-2G device.

9. Press **Burn Firmware** to begin uploading the new firmware to the device.

   If the process succeeds, the bar graph will be full and a message indicating that the upgrade has ended will be displayed.

10. Recycle power to the HPLS®-2G device before working with it.