



RN LITE

RN LITE USER MANUAL

Handbook

RACE-NAVIGATOR.COM



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RN LITE

RACE NAVIGATOR

Thank you for choosing RN LITE!

Please read this manual before using the device for the first time.

Visit the website for more information:

www.race-navigator.com

Updated: 08-04-2021

RN LITE

The RN LITE is an autonomous, well equipped, easy to use system. With one camera for cockpit or track recording, the RN LITE renders videos in HD quality and records all relevant driving data. The data analysis is performed intuitively on the RN LITE or after data transmission to your iPad via Wi-Fi.

RN LITE set-up:

- Manual or automatic start of recording
- Creation of driver profiles with portrait photos and cars
- Event management
- Manual or automatic set-up of race track
- Date, time, time zone, video quality, microphone level, loudspeaker level
- Wi-Fi for data exchange with iPad/smartphone and Internet access (e.g. for updates)

RN LITE data recording and analysis

Videos:

- HD quality video recording of the track or driver (flexible camera set-up)

Driving parameters:

- Speed, times, lateral and longitudinal accelerations, position (GPS)
- Rotational speed, temperatures, gas pedal position (optional using RN PLUG module connected to OBDII diagnostic port)

RN LITE Display and analysis

Display options during the drive:

- Various screen modes selectable via touchscreen
- Display of speed and lap times
- Time gains and losses against reference lap

Analysis on the RN LITE:

- Quick comparison of two selected laps. Analysis based on track and speed
- Playback of recorded videos

Delivery scope

Take the Race Navigator LITE out of the box and check the content:

- RN LITE main unit
- RN LITE Camera with USB cable
- Camera holder
- 2x camera mounting screws
- External GPS antenna
- 12 V car adapter cable and 240 V charger
- Windshield suction mount or roll cage mounting



RN LITE technical parameters

- Dimensions 110 x 140 x 39 mm HxWxD
- Weight (main unit): 480 g
- Storage capacity: 64 GB

Turning on the RN LITE Main Unit

Turn the RN LITE on by pressing the Power button for at least three seconds.

Turning off

Turn the RN LITE off by pressing the Power button for a brief moment. Click YES to confirm. Wait for powering off the device.

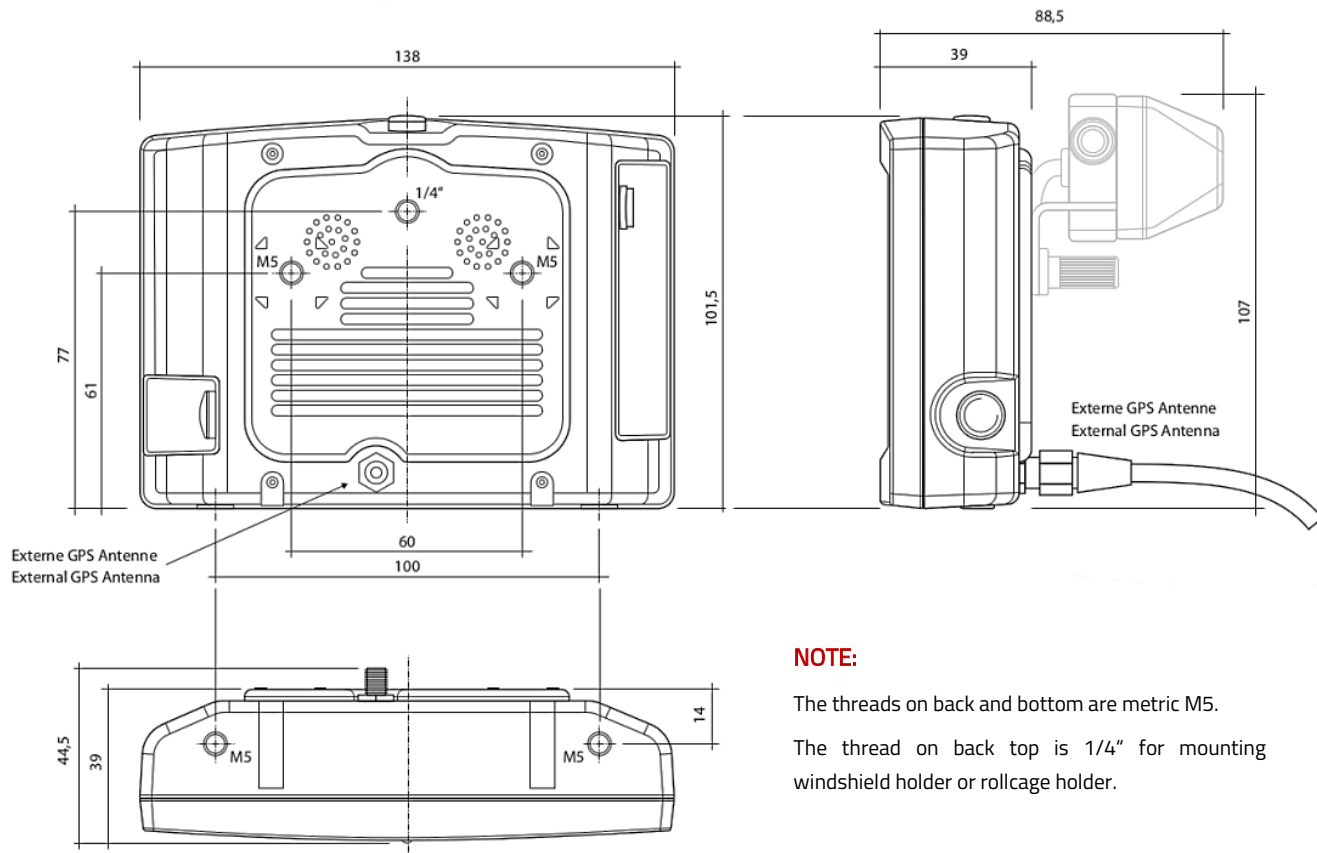
RN LITE Mounting

- A. The RN LITE can be screwed directly to the car through its integrated drill holes.
- B. Additionally, the RN LITE can be mounted onto the windscreen with an optional suction mount. Take the holder and screw it to the device. In the vehicle, put the suction mount of the holder below the rear-view mirror and fasten it tight to the windscreen with the clamping lever.
- C. A special clamp for mounting the device onto the rollover cage is also available.

NOTE: Before every ride, check the adherence of the holder. An incorrectly installed device might get detached from the windscreen and get damaged, causing damage to the car or serious injuries to the driver. Always make sure that the mounted RN LITE can record videos properly. Check if the position is suitable by recording a test video manually.

On the next page you may find a drawing with the dimensions of the assembly thread on the RN LITE. It provides you with all the necessary data for your individual mounting.

RN LITE Mounting Dimensioning



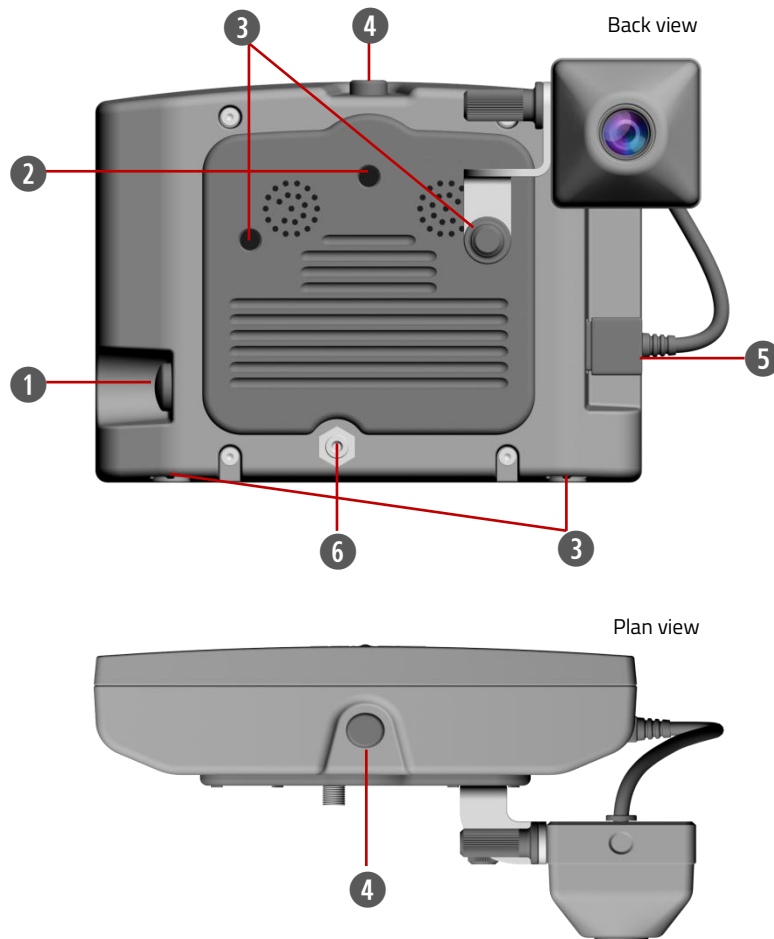
NOTE:

The threads on back and bottom are metric M5.

The thread on back top is 1/4" for mounting windshield holder or rollcage holder.

RN LITE ports and connectors

1. **Power button**
2. **1/4" thread** – for the RN Windshield Suction mount or the Roll-cage mount.
3. **M5 thread** – for RN LITE Camera mount and other mounting methods of the device.
4. **Home button**
Clicking the Home button in any location opens the main page of the RN LITE (the Home view, see 01. Home).
The Home button lights up green when the device is turned on.
5. **USB 2.0 port**
6. **External GPS Antenna**



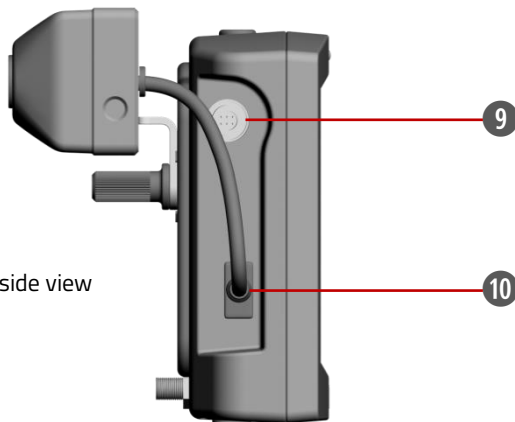
Front view



7. Control LED

8. Display

Left side view



9. Power connector

10. USB2.0 port

RN Analyzer APP

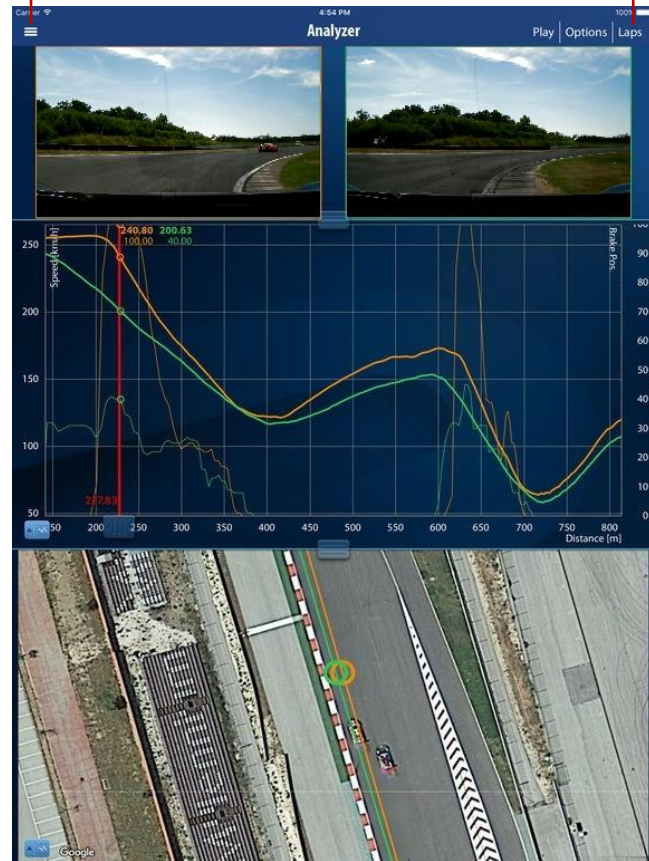
RN Analyzer is an extended analysis tool of the data from all Race Navigator devices.

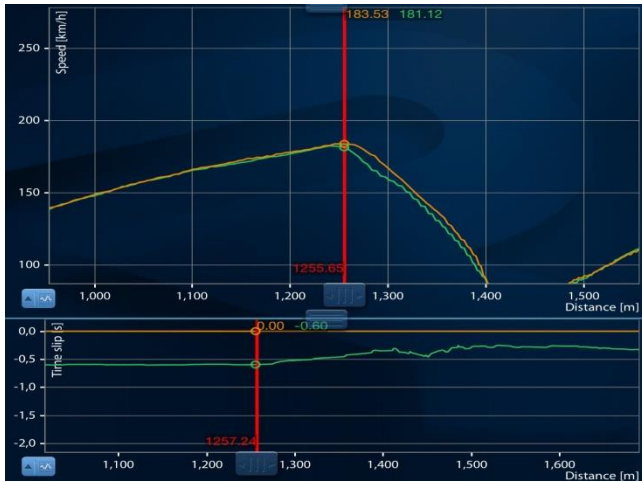
The application is very easy to use and offers a wide range of analysis options:

- The comparison of all selected laps, according to different criteria (**speed, distance, time, lap times, g-forces, OBD-II data**). You can analyze the entire track step by step by using **the red slider**. The videos and charts are immediately **synchronized** according to the slider's position.
- An aerial perspective of the race track based on Google Maps. Your driving lines are displayed with maximum precision from an overhead view.
- A video player. More than one video can be played side by side in the Analyzer view synchronously or a single video in full screen mode.
- Social-networking services. You can easily share your laps with friends on Facebook, YouTube and others.

Open to download laps from device

List of available laps





- A possibility to compare two laps (or more!) and see exactly where you are gaining or losing time.
- The section times analysis. It allows you to count your best theoretical time and best continuous time.
- Laps overview. You can compare maximum and minimum values of the data types gathered by the system.
- RN Cloud service. All laps with videos can be archived in the RN Cloud service for later use and to get more free space on your device.

The cloud is also used to share whole laps between users and to transfer data to a new iPad.

Analyzer

Best Theoretical Lap Time: 08:31.084
Best Continuous Lap Time: 08:36.050

no	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8
63	01:02.699	00:22.000	00:45.807	00:36.191	01:37.100	02:03.900	01:47.561	00:53.305
65	01:07.800	00:22.600	00:47.800	00:35.500	01:37.899	01:37.201	01:43.353	00:48.332
67	01:03.764	00:22.201	00:50.400	00:56.900	01:38.657	01:37.293	01:43.000	00:50.072
69	01:05.262	00:22.564	00:46.593	00:35.296	01:41.797	01:37.200	01:44.560	00:47.982

Google

The **RN Analyzer APP** is available for **free download** from the **iTunes App Store**. Use a QR code reader to access the iTunes App Store and download the application.



1 HOME

This page is the main page of the RN LITE and is displayed when the system starts.

This view can be opened from any location by clicking the Home button.

Dashboard

Press this button to open the Dashboard.

Laps Analysis (Analyze)

Analyze your laps directly on the RN LITE device.

Laps History (Laps)

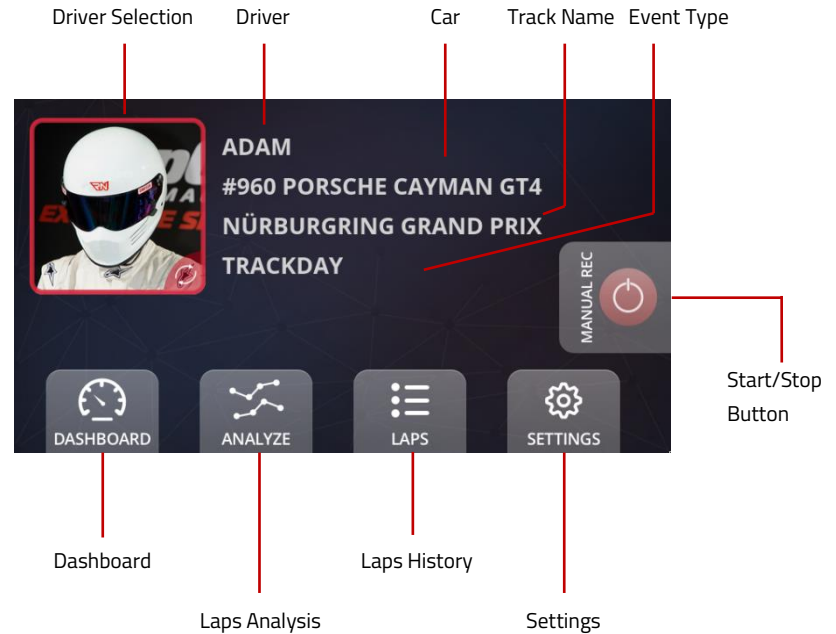
All recorded laps can be found here.

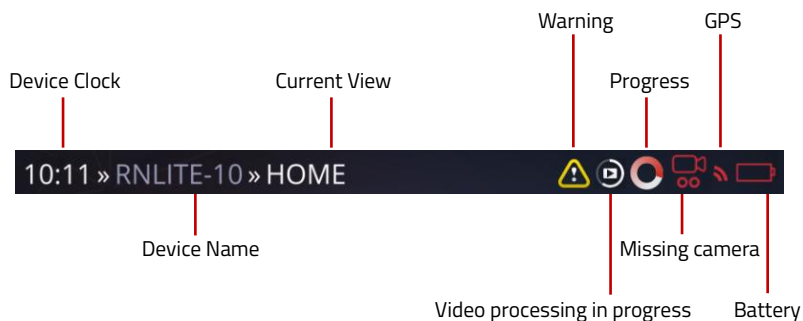
Settings

Here you can specify all the settings of the RN LITE, e.g. drivers, tracks, network, etc.

Driver Selection

The currently selected driver is displayed here. The driver can be changed by clicking on the item and choosing the desired person from the list.





2 STATUS BAR

The bar at the top of the screen contains important information about the RN LITE device and its current status.

Warning

When the icon shows up, there is not enough disc space on your device or a different issue occurred. You should check the device status by clicking on the item. You can also check the device status in the Settings > RN Device > Status.

Video processing

The icon is displayed while the recorded video file is being processed.

Progress

The animated icon shows up whenever the RN LITE device is busy.

Missing camera

The icon shows up when the camera is not connected to USB port.

GPS

The icon shows up when the GPS signal is lost.

Battery

The icon shows up when the power supply is disconnected. The color indicates the battery charging state.

3 DASHBOARD

The Dashboard consists of four panels.

3.1 DASHBOARD · Panel 1

Panel 1 presents the data for the current lap and the reference lap.

Gap to Reference

This is a time gap between the current lap and the reference lap, calculated for the current vehicle location on the track.

Gap to Reference Chart

The chart displays the gap for the last 20 seconds. The green color means the time advantage compared to the reference lap, the red one means the opposite.

Reference Lap Selection

The fastest lap is automatically selected as the reference lap. A different lap can be chosen from the laps list by clicking on the icon.





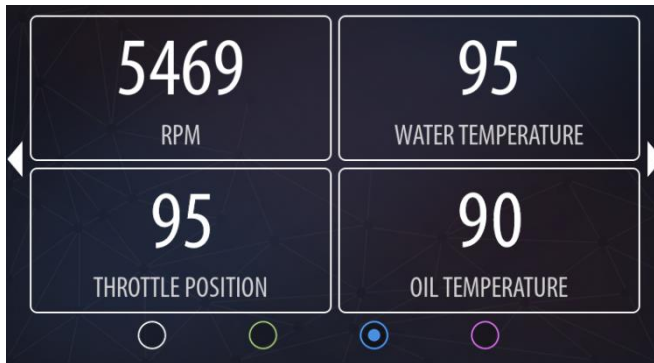
3.2 DASHBOARD · Panel 2

Panel 2 presents the laps from the current event.

The best lap of each driver is colored yellow.

Full laps are colored white, while the others are in grey.

The selected reference lap you can find in the bottom the left corner.



3.3 DASHBOARD · Panel 3

Panel 3 presents all important diagnostic information about the vehicle. The RN Plug is required to be plugged into the OBD2 port in the car.

You can find there the information about the revolutions per minute, water and oil temperatures as well as the throttle position.

3.4 DASHBOARD · Panel 4

Panel 4 presents your current speed, the time of the current lap (on the right; colored white) and the time of the reference lap (on the left, colored yellow).



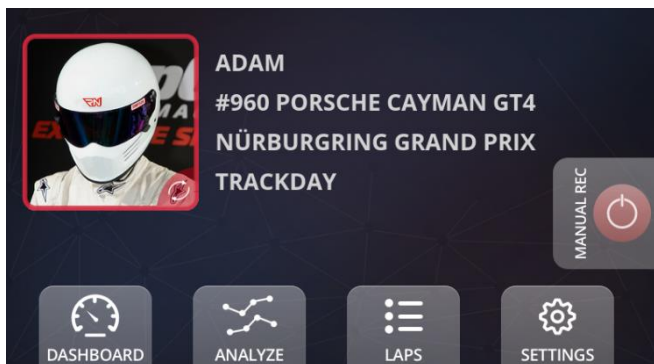
4 MANUAL RECORDING

In addition to the automatic recording possibility, you can also start and stop recording videos manually.

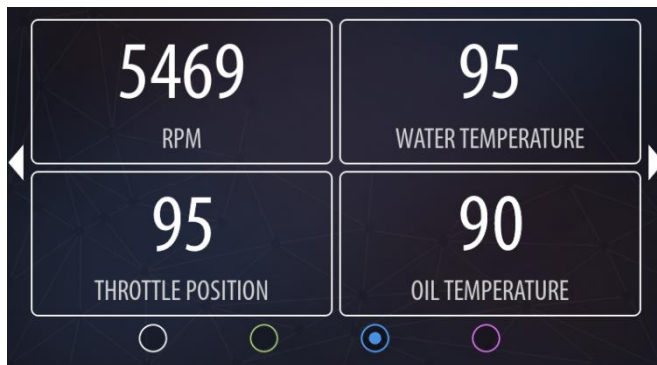
Start/Stop Button

To **start recording**, press the Start/Stop button on the right side of the Home Screen.

Press the button again to **stop recording**.



Start/Stop Button



5 RECORDING WITH OBD-II DIAGNOSTIC DATA

To extend the range of the recorded and displayed data you need to have the RN PLUG.

The RN PLUG can be purchased for an additional fee.

- Plug the **RN PLUG** into the **OBD-II diagnostic port** in your vehicle (it is usually located in the driver footwell, under the steering wheel, on the left side).
- The OBD-II data is collected from the car while recording. To verify whether your car is compatible with the RN PLUG, record two laps manually, each for at least 2 minutes. Check on Panel 3 of the Dashboard if the values are available.

If you use the **RED** version of the plug you don't need to pair it with the RN device, if you use the **BLACK** versions, please follow steps from below to pair first.

5.1 Connecting to RN OBD LINK Plug

Select OBD Connection

Go to Settings → Device → Additional Settings → OBD-II Settings.

Select the RN OBD LINK Plug, if no device is paired, a yellow text is shown.

Press the RN OBD LINK Plug image or “PAIR” button to begin pairing procedure.



Pairing steps

Get Familiar with pairing steps and press
"NEXT" button to proceed.

Proceed following steps to pair with device:

1. Plug RN OBD LINK into vehicle's diagnostic socket.
2. Turn on engine.
3. Press the button on the front of RN OBD LINK Plug.
The 'BT' light will start blinking faster.
4. Proceed to the next step and press 'Scan' button.



NEXT

Scan for OBD Plug

Press "Connect" button on the left side of front
panel of the RN OBD LINK Plug to activate the
Bluetooth discoverability.

Press "Scan" button to discover "RN OBD LINK
Plug" by RN device.

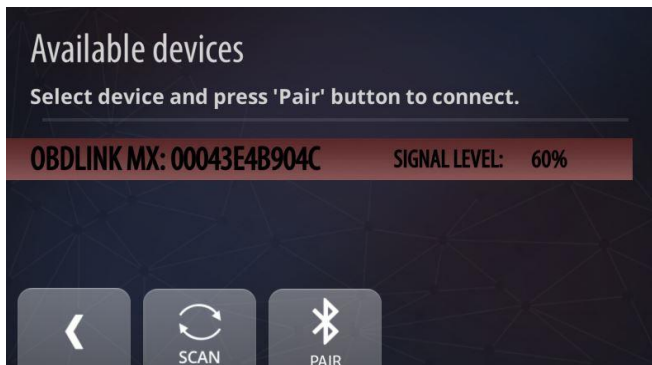
Available devices

No devices found. Press 'Scan' button to discover devices.



Pairing

Select "RN OBD LINK Plug" from the list, then press "PAIR" button.

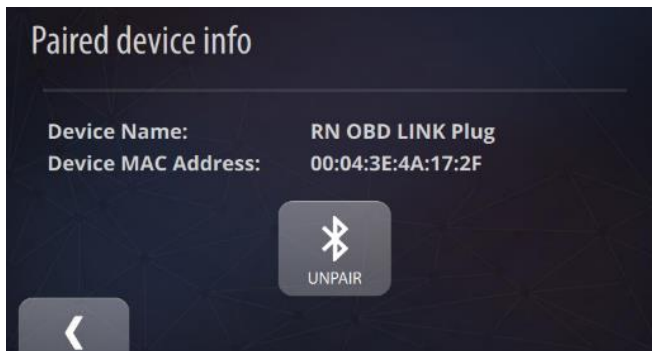


Pairing Confirmation

If device is paired successfully a popup message shows up with information about paired device. If you get a message that you should repeat pairing, please follow the steps ones again.

Reading data

The data are read from the plug every time when the recording is ongoing.



5.2 Connecting to RN Plug BT LE

Select OBD Connection

Go to Settings → Device → Additional Settings → OBD-II Settings.

Select the RN Plug BT LE, if no device is paired, a yellow text is shown.

Press the RN Plug BT LE image or “PAIR” button to begin pairing procedure.



Pairing steps

Get Familiar with pairing steps and press

"NEXT" button to proceed.

This version of RN PLUG BT don't have any button for setting pairing mode. To pair the RN PLUG just plug it into OBD Socket in car and turn power ON.

Pairing mode is automatically started and last for 5 min.

Proceed following steps to pair with device:

1. Plug the RN Plug BT LE into vehicle's diagnostic socket.
2. Turn on engine.
3. RN Plug BT LE is in pairing mode for 5 minutes now.
The 'BT' light will start blinking faster.
4. Proceed to the next step and press 'Scan' button.



NEXT

Scan for OBD Plug

Press "Scan" button to discover "RN Plug BT LE" by RN device.

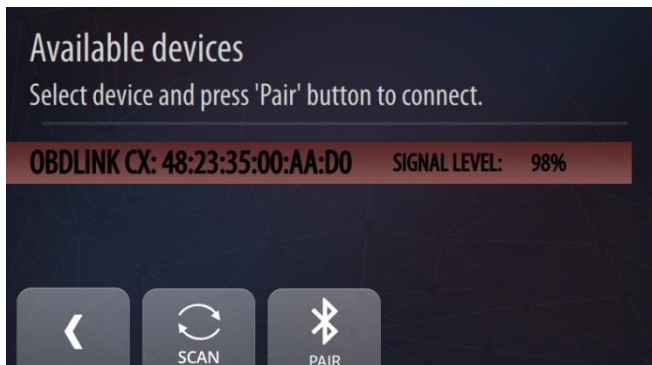
Available devices

No devices found. Press 'Scan' button to discover devices.



Pairing

Select "RN Plug BT LE" from the list, then press "PAIR" button.

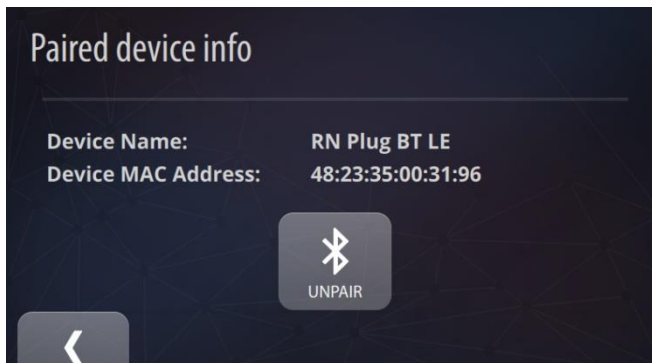


Pairing Confirmation

If device is paired successfully a popup message shows up with information about paired device. If you get a message that you should repeat pairing, please follow the steps ones again.

Reading data

The data are read from the plug every time when the recording is ongoing.



6 LAPS HISTORY (LAPS)

The laps page displays all laps in the selected event. Full laps are colored white while the others are colored grey, except for the best laps of each driver which are colored yellow.

The list can be sorted by column headers. You can change the sorting method by clicking on one of them. The current sorting column is colored red.

Clean up

There are two ways to delete laps:

1. Remove all incomplete laps.
2. Remove all laps except the top three of every driver.

Remove

Clicking the button removes the currently selected lap. If a video file exists, it is deleted as well.

Change Event

Choose the event from the list and browse through its laps.

Show Lap

Click the button to display the lap details and the video.

Lap	Lap Time	Start No.	Driver	Start Time	Ranking
7	02:33.71	#960	ADAM	14:52	3
6	02:28.60	#960	ADAM	14:49	2
5	02:10.62	#960	ADAM	14:47	1
4	02:53.50	#960	ADAM	14:44	4
3	02:07.86	#960	ADAM	14:42	-

CLEAN UP

REMOVE

CHANGE EVENT

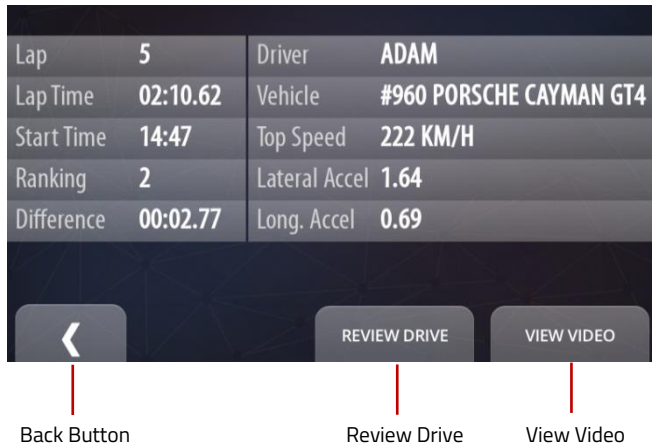
SHOW LAP

Clean up

Remove

Change Event

Show Lap



6.1 LAP DETAILS

Here you can get all lap details and view the recorded video.

Back Button

You can go one step back by clicking this button.

Review Drive

Here you can watch the animation with the lap data.

View Video

By clicking the button, you can display the video.



6.2 REVIEW DRIVE

In the Lap Review mode, all lap data is simulated so that you can observe it as it was displayed in real time during the lap.

You can stop the review by clicking the Stop Review Button on the right side of the Home screen.

6.3 VIDEO PLAYER

In the player you can watch the video of the selected lap.

A lap video contains a single camera picture from the lap. It does not contain additional data. You can use RN Analyzer app to see and analyze many different parameters like speed, G-Forces on charts.



7 EVENTS

On this page you can find all events recorded on the device.

Remove Button

With this button you can remove the selected event and all its data, including the video files and incomplete laps.



Remove Button

Lap A [Nürburgring Grand Prix 2016-03-29] | 5 | 02:10.62 | ADAM

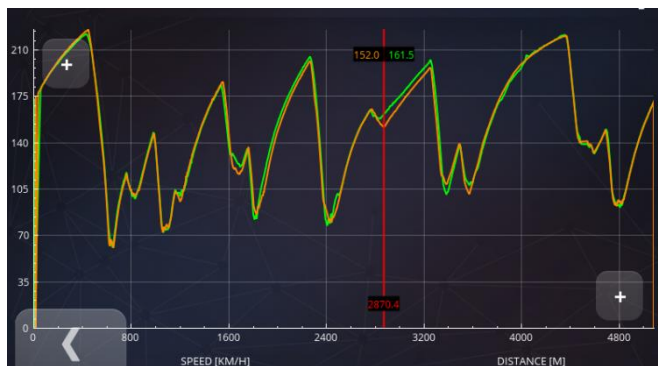
Lap	Lap Time	Start No.	Driver	Start Time	Ranking
7	02:33.71	#960	ADAM	14:52	3
6	02:28.60	#960	ADAM	14:49	2
5	02:10.62	#960	ADAM	14:47	1
4	02:53.50	#960	ADAM	14:44	4

CHANGE EVENT SET LAP A ANALYZE

Change Event

Set Lap A/B

Analyze



8 ANALYSIS

On this page you can select two laps and compare them with each other.

Full laps are colored white, while the others are in grey. The best laps of each driver are colored yellow.

Change Event

In order to select proper laps for comparison, you can change the event by clicking this button.

Set Lap A/B

This button allows for selecting laps A and B. Select lap A and click the button, then select lap B. If lap A is selected, the button shows B and vice versa. Lap A is colored green and lap B is colored orange.

Analyze

The chart displays speed series with colors corresponding to the selected laps. The red line can be moved with a finger. The chart itself can be enlarged. The Plus button on the right side zooms in on the horizontal axes, whereas the left one zooms in on the vertical axes.

9 SETTINGS

Here you can specify all device parameters.

Driver

You can select a driver.

Car

Press this button to select a specific car.

Track

You can select a track variant.

Event

Here you can select a type of event.

Network

You can connect to the network.

Camera

Here you can check the camera views.

Device

Here you can modify other device settings.

Auto Start

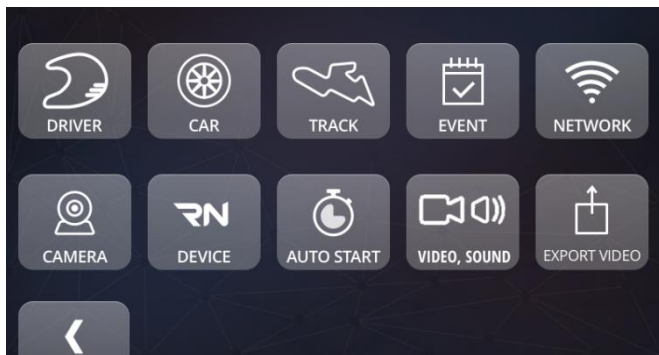
By clicking the Auto Start button, you can set manual or auto recording.

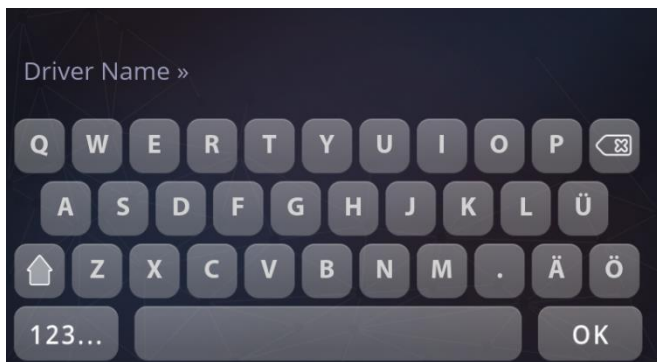
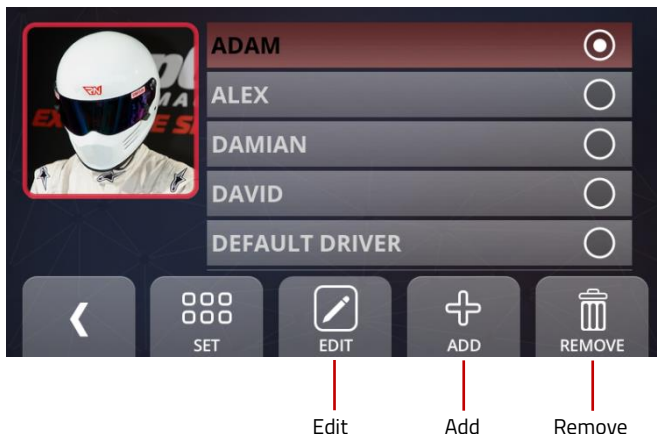
Video, sound

This button can be used to change video and sound settings.

Export Import

You can export/import your videos to/from a memory stick.





10 DRIVER

Each recorded video is associated with a driver, car, track and an event.

To select a driver, go to the Settings view and click on **Driver**. You will find there a list of existing users. Scroll down the list and select the proper one. Press **Set** to confirm your selection.

Edit

You can edit an existing driver here.

Add

In order to add a new driver, press this button.

Remove

Here you can remove the selected driver.

10.1 DRIVER · Add

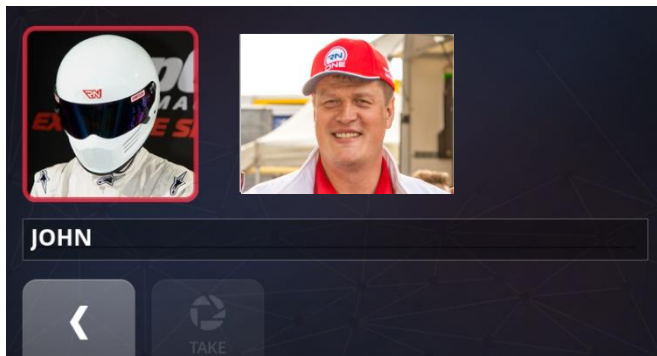
To create a new driver, click the **Add** button.

Enter the driver's name using the onscreen keyboard and confirm with **OK**.

Now you can use the cockpit camera of the RN LITE to take a photo of yourself.

Press **Take** to take a picture.

Use the Back button to complete the process.



Consequently, you can find the new driver on the list and select it. Confirm your selection by pressing the **Set** button.





CAR

To select a car, go to the Settings view and click **Car**. There will be a list of previously added cars. Scroll down the list and select the proper one. Press **Set** to confirm your selection.

Edit

Here you can edit the existing car options.

Add

To add a new car, press this button.

Remove

You can remove a car, except for the default vehicle which cannot be removed.

10.2 CAR · Add

To add a new car, click the **Add** button.

Enter the race number and the car model's name using the onscreen keyboard and confirm with **OK**. Use the Back button to complete the process.

Now, you can find the new car on the list and select it. Confirm your selection by pressing the **Set** button.



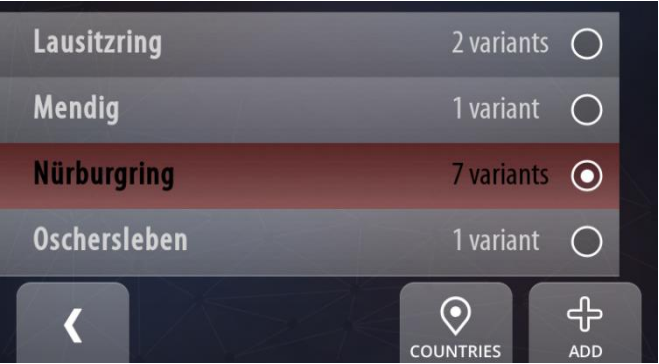
11 TRACK

All filtered tracks are displayed here.

To filter the tracks by countries, just click the Countries button.

Click on the specific track to open the Track Variants view.

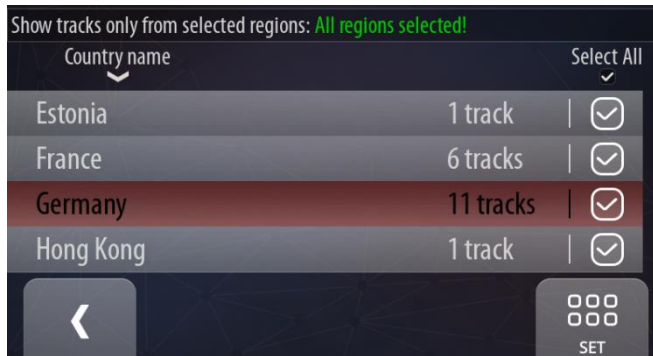
You can select one of the available track variants or create a new one (see 12.1.2).





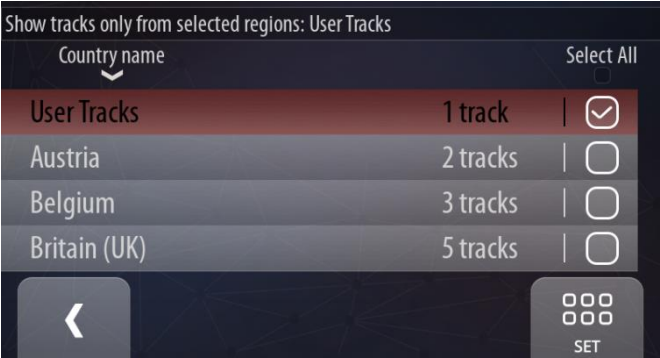
Here you can set the countries by which to filter the tracks. Select the country and click the Set button or just select the check box next to the country.

The caption on the top of the view informs about the currently selected countries.



You can quickly set (or deselect) all countries by clicking the Select All button above the check boxes.

The tracks created by the user (see 12.1.2) are listed under the 'User Tracks' filter.





Edit

Add

Remove

11.1 TRACK VARIANTS

All available variants of the selected track are listed here. Scroll down the list and select one of them. Press **Set** to confirm your selection.

Edit

You can edit a track variant.

Add

Here you can add a new track variant.

Remove

Press the Remove button, to remove a track variant.

11.1.1 TRACK VARIANTS · Edit

Here you can edit the track properties like: name, track name, total distance and track width. Enter the proper values using the onscreen keyboard and confirm with **OK**. Use the Back button to complete the process.

11.1.2 TRACK VARIANTS · Add

If you want to add a new track, you need to record the entire route.

In the first step, enter the track name and press the **Record** button.

Place the car exactly on the start line, press **Start Track Recording** and drive.

The RN LITE automatically records the new track variant route when you drive. The track variant recording stops automatically without user interaction when you cross the same line as the start line. In this case the closed track variant is recorded and stored.

If you want to record the open track variant just press the record button once again when the finish line is reached.

NOTE: Make sure that the GPS signal is strong enough and an external GPS antenna is connected properly.

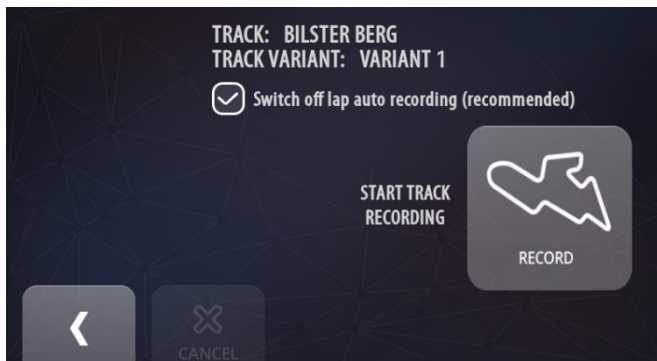


NAME:

DISTANCE [M]:

WIDTH [M]:

< RECORD

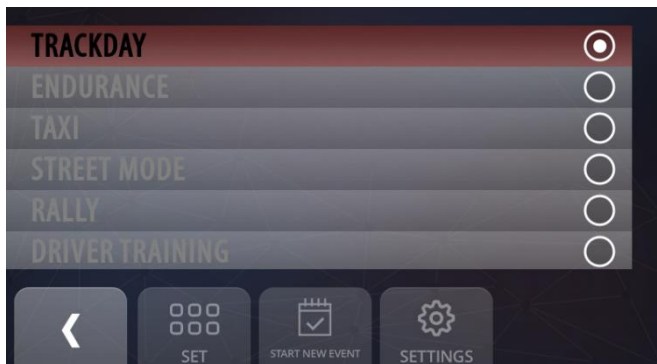


TRACK: BILSTER BERG
TRACK VARIANT: VARIANT 1

☒ Switch off lap auto recording (recommended)

START TRACK RECORDING

< CANCEL RECORD



Start New Event

12 EVENT

Here you can find all event types available on the RN LITE device:

- Trackday (default)
- Street Mode (additionally paid)
- RCN (additionally paid)
- Rally (additionally paid)

You can browse through the list and select one of them. The available types are colored white, while the ones not available are colored grey. Press **Set** to confirm your selection.

Trackday is a default event type and it is always available. The other types are optional and can be purchased for an additional fee.

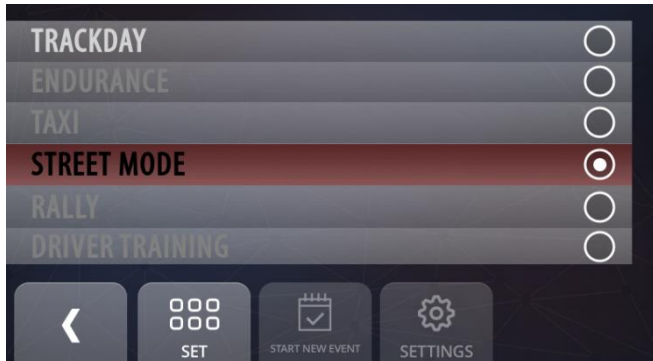
Start New Event

You can start a new event by clicking this button. Every event contains its own list of laps.

12.1 **EVENT · Trackday**

- It is a default event type.
- All data is recorded directly on the device.
- Separate videos are prepared for each lap.
- In the auto-recording mode, the recording is activated automatically and deactivated twenty seconds after the vehicle stops.





12.2 EVENT · Street Mode

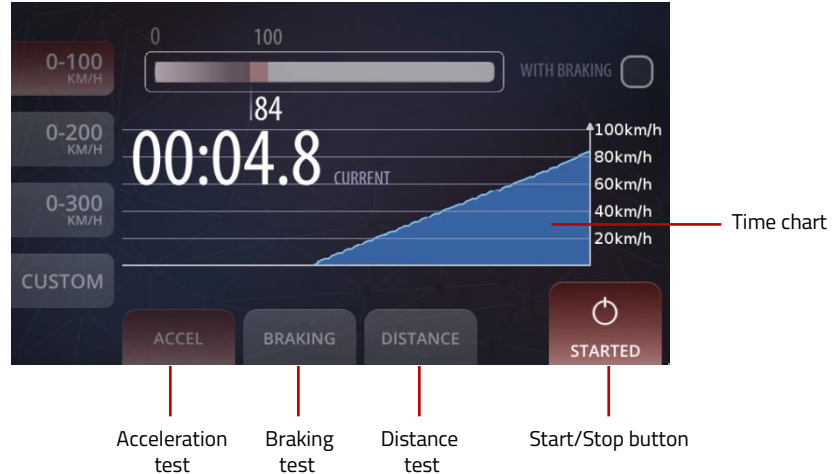
- The Street Mode is an event type designed for testing your car's performance.
- This mode allows you to measure the acceleration and deceleration of the vehicle during the drive, including the time measurement.
- The event type provides a specially customized dashboard dialog where it is possible to watch the visualization of the most important measurements.
- Three different modes are available: **Acceleration test**, **Braking test** and **Distance test**.
- For each test a separate video is recorded with a proper caption.
- The recording is a bit longer than the test so that a more suitable video is obtained.
- Your tests can be later analyzed in the **RN Analyzer app** on your iPad.

ACCELERATION TEST (ACCEL)

This option allows you to measure the acceleration of a car.

- To switch on to the Acceleration test, click the **ACCEL** button.
- Choose one of three preconfigured speed ranges: **0-100 km/h**, **0-200 km/h**, **0-300 km/h** or define **your own range** from value A to value B.
- To define your own speed range, click the **CUSTOM** button and use the slider at the top of the dialog.
- To start a test session, click the **START/STOP** button.
- When the **START/STOP** button is **highlighted in green**, the recording is activated and you are ready to go.
- The recording and measuring starts and stops **automatically** after reaching the selected speed ranges.

During the test, the **speed to current time chart** is being visualized in real time on the dashboard.





With braking

You can also do the acceleration test **with braking** (select the check box 'WITH BRAKING'). In this case, after reaching your maximal defined speed, the test is continued until the very end of braking, that is 0 km/h.

NOTE: The time spent while driving at a higher speed than the defined maximum **is not included** in the final measurement time. It means that the driver does not need to be concerned about exceeding the maximal defined speed because the system automatically includes only the acceleration time in the defined speed ranges and the braking time.

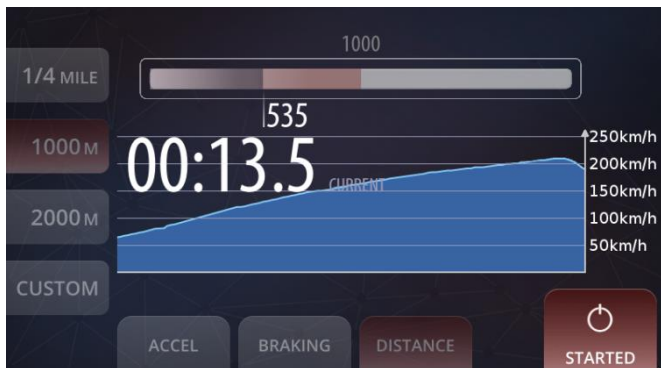
BRAKING TEST

In this mode, you are provided with the same features as in the Acceleration test but the speed range is defined as descending.

- To switch to the Braking test, click the **BRAKING** button.
- Choose one of the three preinstalled speed ranges: **50-0 km/h**, **100-0 km/h**, **200-0 km/h** or define **your own range** from the customized start speed to 0 km/h.
- To define your own range, click the **CUSTOM** button and use the slider at the top of the dialog.
- To start a test session, click the **START/STOP** button.
- When the START/STOP button is **highlighted in green**, the recording is activated and you are ready to go.
- The recording and measuring starts **automatically** after crossing the defined start speed and stops when the 0 km/h speed is reached.

The speed to current time chart is also available.





DISTANCE TEST

In this type of the Street Mode you can measure your driving time at a predefined distance.

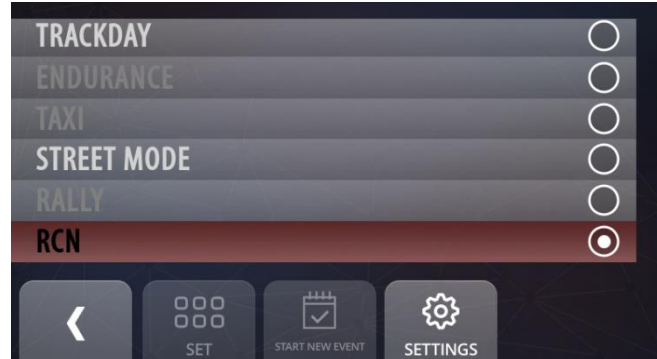
- To switch to the Distance test, click the **DISTANCE** button.
- Choose one of three predefined distance values: **1/4 MILE**, **1000 M**, **2000 M** or select **your own distance value**.
- To select your own distance value, click the **CUSTOM** button and use the slider at the top of the dialog.
- To start a test session, click the **START/STOP** button.
- When the START/STOP button is **highlighted in green**, the recording is activated and you are ready to go.
- The recording and measuring **automatically** starts when the car starts driving and stops after reaching a final distance.

During the test, the **speed to current time chart** is being visualized in real time on the dashboard. The Distance test is also adequate to be used during drag races.

12.3 EVENT · RCN Mode

The **RCN event type** is a feature prepared for the regularity driving events. There are total of 6 different racing groups predefined: the Blue, Red and Yellow defined for two track variants Nürburgring Nordschleife and Nürburgring 24H. The RCN event helps you to track your **current lap number and type**, each second calculates and displays the **time difference** to your set time, shows your performance during sprint laps and displays the **countdown timer** while fueling!

The **symbolic icon** for every lap type and the **lap number** are shown on the dashboard during the race. When driving, lap types are switched **automatically** in a rulebook order, defined for the selected racing group.





The particular setups can be previewed on the **Settings**. In the RCN mode a new lap is created only when the start line is crossed, to avoid breaking the lap sequence.

Make sure that the **new event is created** before the race begins. In the auto start mode the recording starts automatically, and stops after finalizing the last lap of the RCN race when the car stops.

Six different lap types are defined in this mode:



1. Set Time Lap – a lap for setting the time, the measured time of this lap is used as a reference when the Confirm Lap starts.



2. Sprint Lap – a lap to drive as fast as possible, a reference time for a Sprint Lap is always the fastest lap from all laps in a current event, it can be also preselected before the race.



3. Confirm Time Lap - when starting this type of lap, the Set Time Lap is selected automatically as the reference lap. The system calculates and displays each second the time difference between current lap time and set lap time.



4. Fuel Lap - is a maximum-time lap, a countdown clock appears on the dashboard to show the driver how much time is left before incurring in penalties.

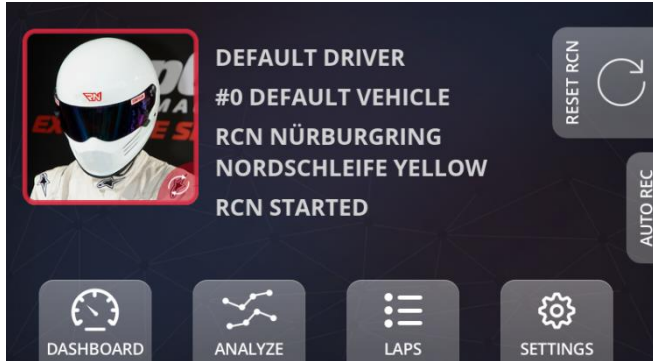


5. Out-lap - the first lap to be completed after exiting the pit lane.



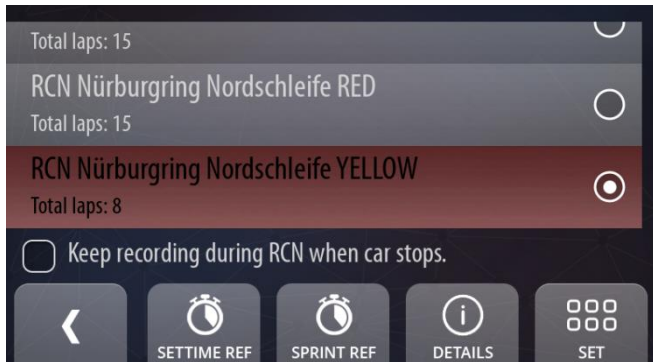
6. Finish Lap - is also a maximum-time lap with a countdown, is a race final lap.





RESET RCN button

Here you can stop current RCN Event and start a new one to begin a new RCN laps sequence.



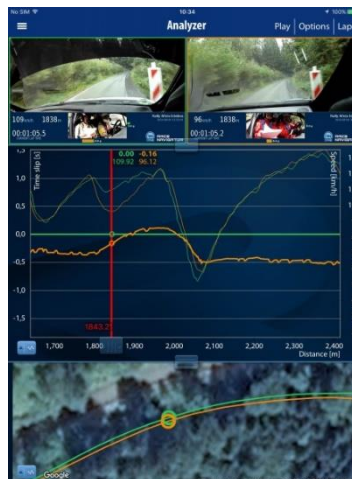
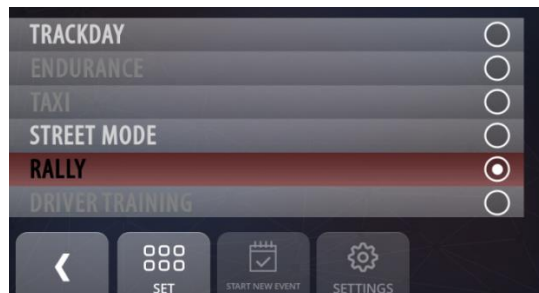
Keep recording during RCN when car stops

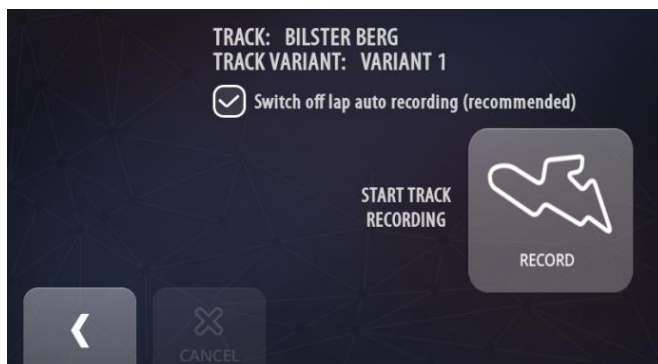
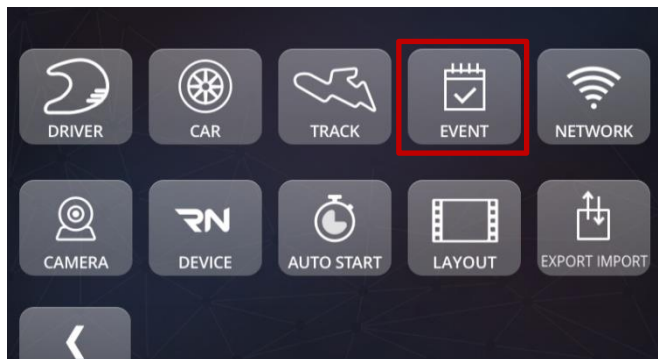
Unchecked is a recommended setting, if unchecked recording stops and starts automatically when the automatic recording start/stop is on, check it only if you need a complete video also while fueling, but then you need to wait longer after the race to download videos – it takes longer to process a recorded video.

12.4 EVENT · Rally

It is a specially-designed racing mode for the rally event, when conditions are often unpredictable and tend to change rapidly. Well-developed algorithms provide such system capabilities as:

- **Automatic start and stop of data and video recording** of stages – only stages are recorded, every stage gets its own video file and data, each stage has its own name and is easy to find,
- Data entry informing about the special stages,
- Automatic detection and switching between special stages Automatic detection of the start and end of special stages
- Automatic detection of critical situations, e.g. the stage cancelled by the organizer, the changed order of the stages, etc.,
- The possibility of analyzing data between multiple runs of special stages in the RN Analyzer app (see pictures on the right),
- Measurement tool for reconnaissance,
- HD quality video,
- Additional parameters like water temperature, speed, pressures, time difference can be displayed on a separate screen.





Special stages recording instructions

- 1) Go to **SETTINGS > EVENTS** and set the **RALLY mode**.
- 2) Go to **SETTINGS > TRACKS** and create a new rally (track). Just press the **Add** button and follow the instructions.
- 3) To previously created rally, add a **new special stage** (the first **special stage**).
 - In the Track variants view press the Add button.
 - Enter the special stage name and press the Record button.
 - Place the car exactly on the start line, press the **Record** button and drive.
The RN LITE automatically records the new special stage route when you drive.
 - Press the **Record** button once again to stop recording, when you reach the finish line.
 - The first special stage is recorded and stored.
- 4) Repeat the previous point for **all special stages**. The order of recording is not important.

Distance Measurement for Reconnaissance

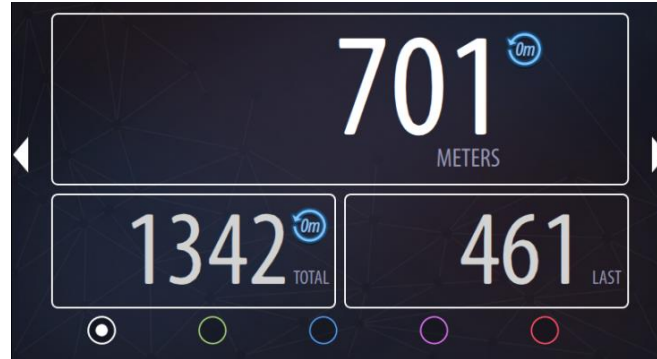
In Rally mode a specially designed **Dashboard** is available. It simplifies the measurement of distances between segments of the rally route including stages and checkpoints.

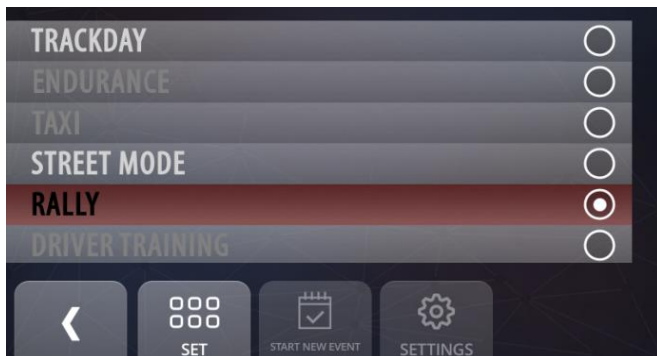
The Dashboard is divided **into three parts**:

- at the top you can see the distance travelled from the last checkpoint,
- the part on the bottom left shows you the total travelled distance,
- the part on the bottom right shows you the last saved distance.

To reset the total distance press the blue looping arrow in the bottom left part.

To reset the distance travelled from the last checkpoint press the blue looping arrow in the top part of the dashboard. The current counter value will be automatically displayed in the bottom right part.





Before the official start:

- connect your device to constant power supply for the whole rally day,
- check if you have enough storage,
- go to SETTINGS > EVENTS and set the RALLY mode,
- go to SETTINGS > AUTOSTART and set auto-recording option from 20 km/h,
- go to SETTINGS > TRACK > TRACK VARIANTS and select one of previously created special stage,
- check cameras availability and picture in camera preview.

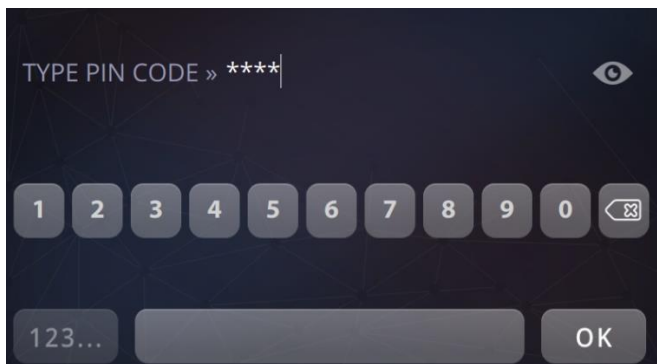
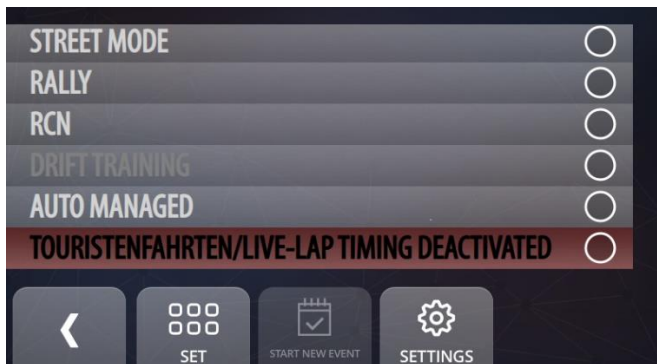
The start line and the finish line of every special stage will be detected automatically.

12.5 EVENT · Touristenfahrten/Live-Lap Timing Deactivated

The so-called Touristenfahrten-Mode temporarily deactivates all lap timing functions of the Race Navigator. This may be necessary if the use of lap timers on a specific racetrack or during specific events is not allowed. The Touristenfahrten-Mode allows you to use your Race Navigator in compliance with such regulations.

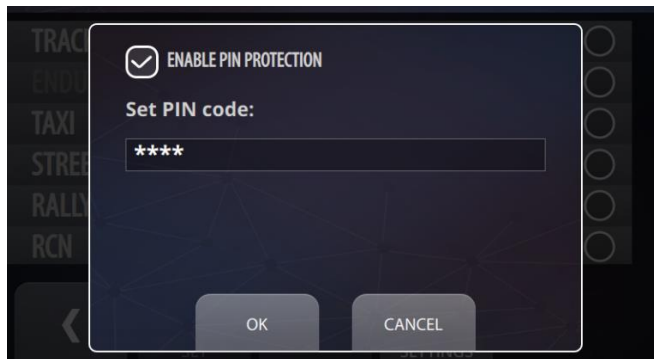
Selecting and changing of this event type is protected by a PIN code. To enable Touristenfahrten go to SETTINGS-> EVENT and select **TOURISTENFAHRTEN** from a list and click SET button.

A default PIN is "1234".





After pressing OK the event is set and active. Safety options can be changed by selecting Touristenfahrten and pressing SETTING button.

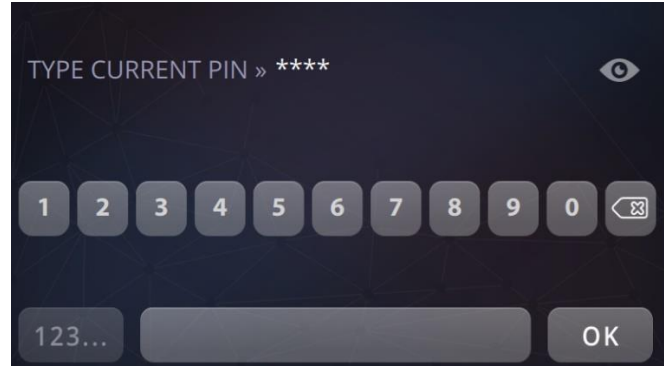


The SETTING dialog allows user to enable or disable PIN protection by selecting ENABLE PIN PROTECTION option. Changing this option also require typing the current PIN code.

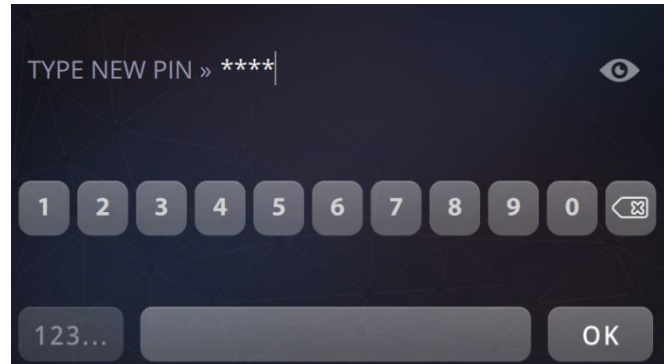
User can also change the PIN code by pressing on the text field.

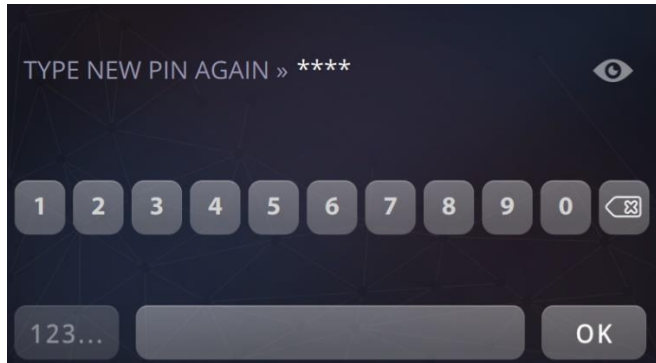
Changing PIN code requires completing 3 steps:

Step 1: Type current PIN code (when changing PIN code for the first time, a default PIN “1234” has to be used). Confirm with OK button.



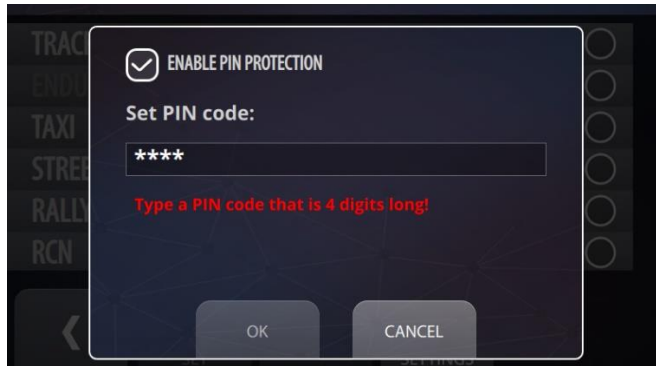
Step 2: Type new pin (must be 4 digits). Confirm with OK button.





Step 3: Confirm new PIN code by typing it again and press OK button.

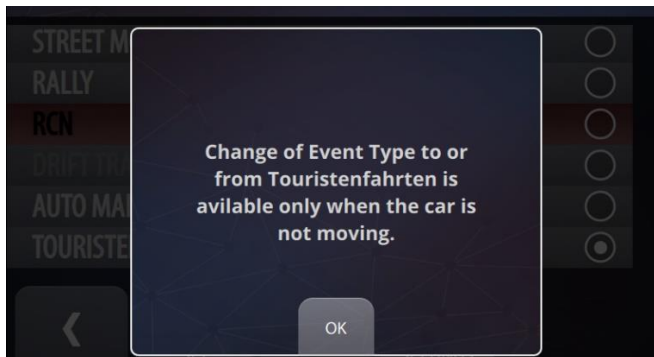
When the new PIN code is correctly set, user will see the information about it under PIN code text field. To Confirm setting new PIN code click OK button, to cancel this change click CANCEL button.



In case of typing not 4 digits PIN code or typing wrong one, proper error message is displayed:

When the Touristenfahrten-Mode is enabled, lap time, reference time and time gain/loss are not shown on the display during the drive. All live-lap timing functions are disabled. In the dashboard (HOME->Dashboard) you can see current values including speed and OBD2/CAN data like RPM, water temperature and throttle position if available. After the drive, you can analyse your laps as usual with all data and times, on both the Race Navigator and using the RN Analyzer App.

Enabling and disabling of the mode is only possible when the car is at a standstill. Only a user who knows PIN code can change event type to any other that contains current lap timing and gap time to reference lap calculation.



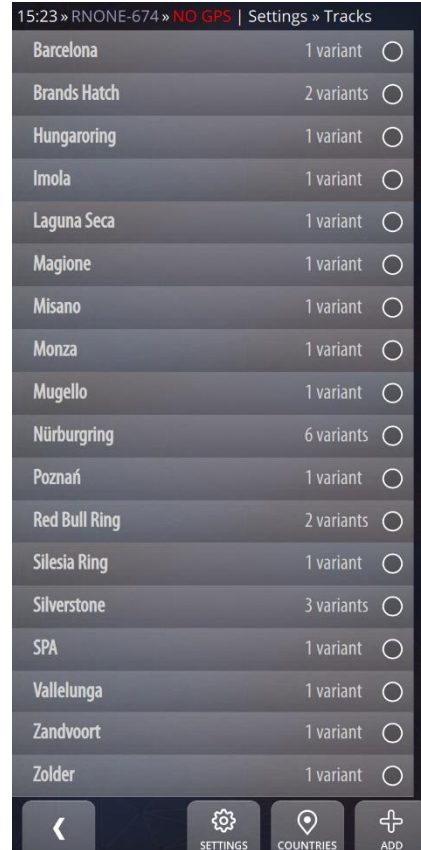
12.6 EVENT · Simulation

The RN Simulation Mode is a mode that activates a connection between your Race Navigator device with the racing game simulator. You can use your Race Navigator at home practicing with your simulator in the same way as you do on the track. Use real time gap to reference timing, record all data from the simulator on the RN system including videos from laps and compare them using RN Analyzer tools for Windows or iPad. Learn a new track or remind a track that you did not visit for a long time before you go there and save a lot of time! Right now Assetto Corsa racing simulator for PCs is supported.



LIST OF TRACKS AVAILABLE IN SIMULATION EVENT:

- Barcelona,
- Brands Hatch 2 Variants: GP, INDY,
- Hungaroring,
- Imola,
- Laguna Seca,
- Magione,
- Misano,
- Monza,
- Mugello,
- Nürburgring 6 Variants:
Bridge to Gantry, Nordschleife, GP +
Nordschleife, Grand Prix, Grand Prix
Kurzanbindung, VLN,
- Poznań,
- Red Bull Ring with 2 variants: Red Bull,
Ring, Red Bull Ring Old SL,
- Silesia Ring,
- Silverstone with 3 variants: GP,
National, International,
- SPA,
- Vallelunga,
- Zandvoort,
- Zolder.



MAJOR FEATURES:

- real time gap to reference timing,
- ideal GPS coordinates matching between the simulator and real world,
- precise comparison between Simulation laps,
- precise comparison between Simulation to real live laps,
- analysis with RN Analyzer tools the same way as real life laps,
- the videos, data charts and position on the map are immediately synchronized according to the slider's position. You can choose any laps that were recorded, compare Simulation laps with each other and real laps with Simulation laps as well,
- all data are precisely synchronized and real GPS coordinates matching Simulation positions.



SIMULATION EVENT REQUIRMENTS

In order to use Simulation mode on your device:

- Purchase and install the Simulation Event on your Device.
- Download and install our RN Sim Connector Windows Application from: race-navigator.com
- Purchase and install Assetto Corsa PC game directly from Steam client or any other store
- Steam client download:

steampowered.com

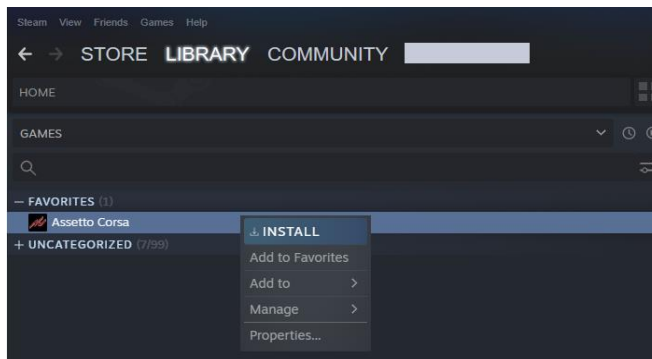
- Assetto Corsa simulator game:

Assettocorsa.net

- For more details visit:

race-navigator.com:

<https://www.race-navigator.com/en/rn-software-apps-en/>



13 NETWORK

You can select one of the two available connection modes: internet connection and RN Access Point.

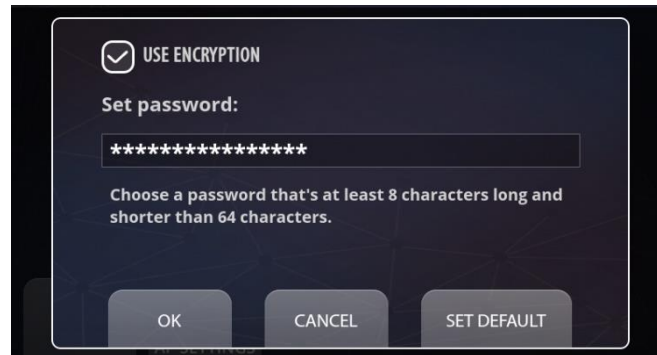
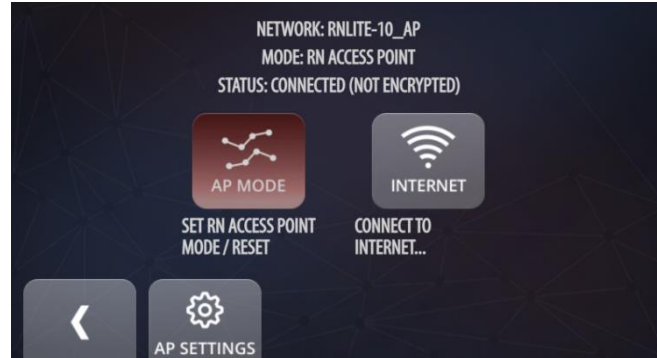
RN Access Point Mode

Click this button to create an access point for your iPad with the RN Analyzer App.

To use the encryption of the RN access point network, press the AP Settings button and select the check box at the top. The default password is: **devicename_AP_PASS**. You can also set your own password.

Internet

Click this button to open the list of available Wi-Fi networks. If you want to update your device and install the latest version of the software, you need to connect to the Internet

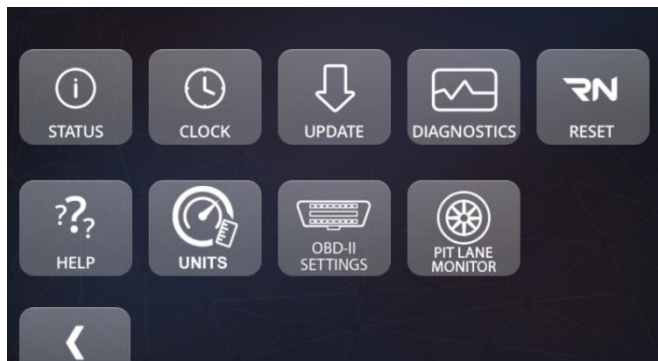


14 CAMERA

Here you can preview your camera view.

Please note that there is only one camera available for the RN Lite devices.





15 **DEVICE**

Here you can specify all device parameters.

Status

You can check the status of the device.

Clock

Here you can set date and time.

Update

Click here to install the latest version of the software.

Diagnostics

You can download the diagnostic data.

Reset

Here you can reset various device settings.

Help

Here you can read the descriptions of the RN LITE functions.

Units

Here you can change the units.

OBD-II Settings

Here you can change the OBD Plug settings.

Pit Lane Monitor

Here you can enable Pit Lane Monitor.

15.1 DEVICE · Status

The basic data of the device and its components is presented here.

Edition Name

Commercial edition name of the software.

Device Name

Unique name of the RN LITE device.

Version

The version of the installed software

Left SD/HD Video Time

Estimated remaining recording time for SD/HD quality.

Free Disk Space

Free space on the disk.

Battery Level

Here the percentage value of the battery level is displayed. When the value drops to 10%, a warning dialog pops up. When the value reaches 1%, the device shuts down.

GPS Signal Strength

The level of the GPS signal.

Video Processing

Here it is indicated whether any video files are currently being processed.


External Memory

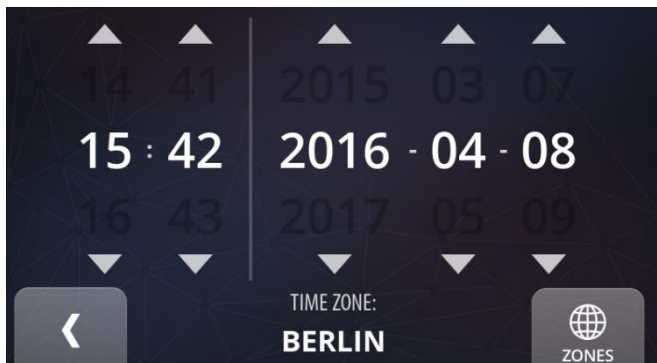
This item indicates whether the memory stick is plugged in.

10:14 » RNLITE-10 » ... DEVICE SETTINGS » STATUS

Edition Name		Track Day	
Device Name	RNLITE-10	Version	1.3.4.0
Left SD Video Time *	8:34:00	Left HD Video Time *	4:17:00
Free Disk Space	31340 MB	Battery Level	100 %
GPS Signal Strength	NO SIGNAL	Video Processing	OFF
External Memory	NOT MOUNTED		

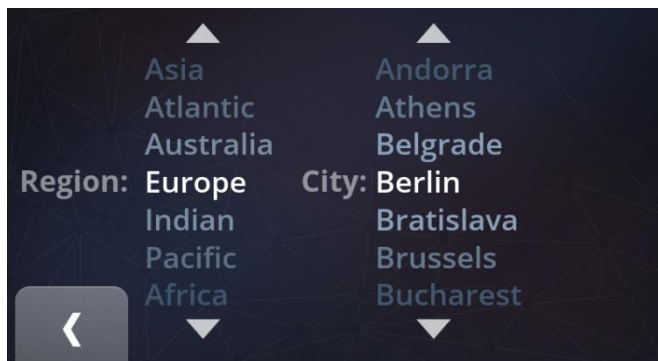
* Determines max single recording time. The value depends on the video processing state.





15.2 DEVICE · Clock

Here you can set the current date and time.



Zones

You can choose the proper time zone or set the time manually.

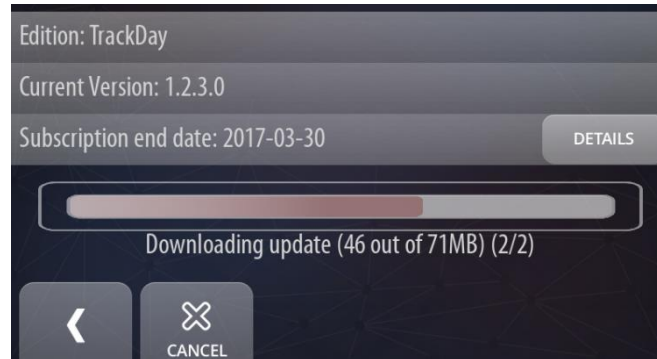
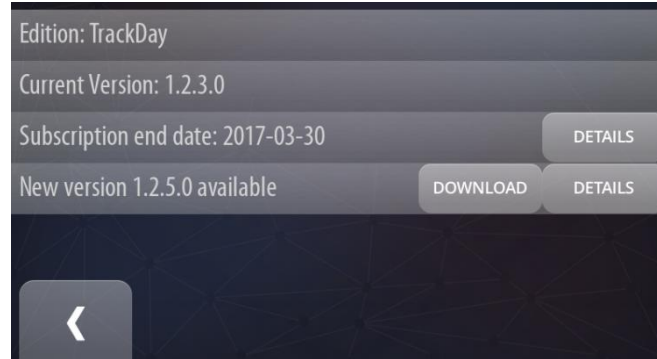
Use the Back button to complete the process.

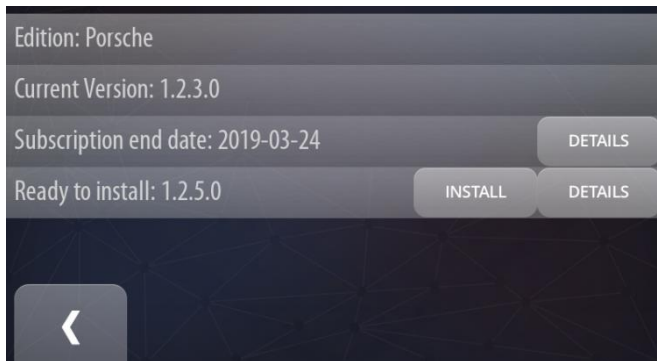
15.3 DEVICE · Update

You can install the latest version of the RN LITE software on your device. The Internet connection is required.

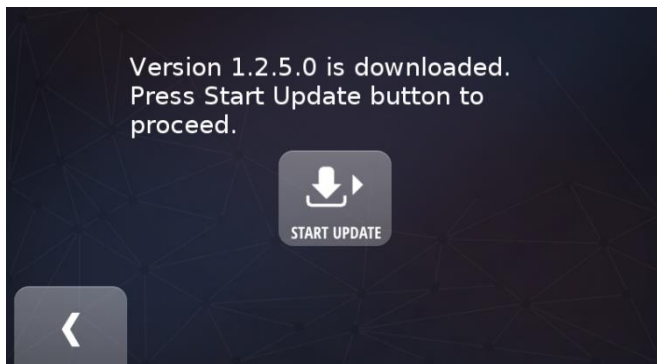
Follow the instructions below to install the latest version.

1. On the Settings page, click the **RN Device** button and then the **Update** button. Make sure that your device is connected to the Wi-Fi network (to connect, go to: Settings > Network > Internet, choose your option, and connect to your Internet network).
2. On the Updates view, click the **Download** button. The download progress is presented on the progress bar. You can also check the details of the new version by clicking the **Details** button.



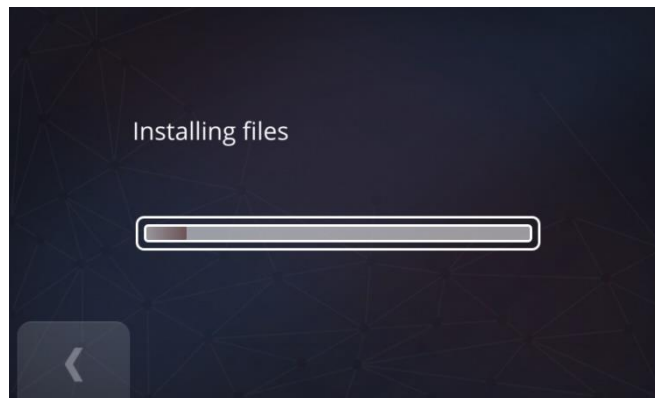


3. When the download is finished, click the **Install** button on the Updates view. Wait for the next screen.

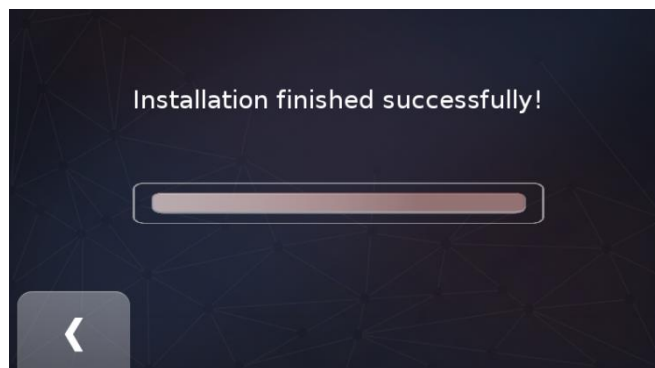


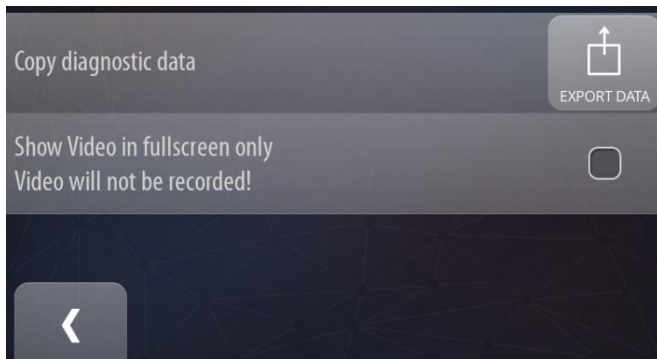
4. On the next screen, click the **Start Update** button.

5. Installing the newest version is in progress. It may take a few minutes.



6. The finished installation is marked with a proper caption. Press the **Back** button to restart your device.





15.4 DEVICE · Diagnostics

Here you can copy the diagnostic data directly to the memory stick.

Press **Export Data** button to start the process.

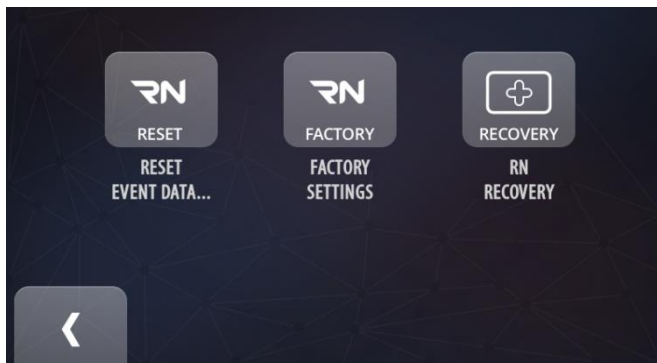
The memory stick is required to be plugged in. Otherwise, the Export data button will be disabled and you will be notified about the missing memory stick.

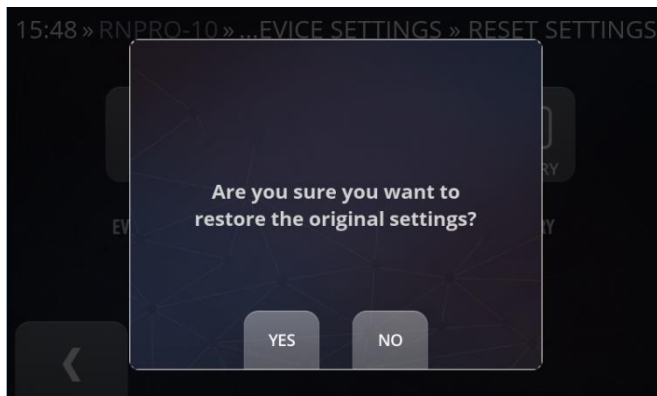
15.5 DEVICE · RN Reset

Here you can reset various RN LITE settings and restore the device to the basic installation.

15.5.1 RN Reset · Reset Event Data

Press the **RN Reset** button to display the list of events. Select a particular event and press the **Remove** button to reset the event data. The operation cannot be undone.



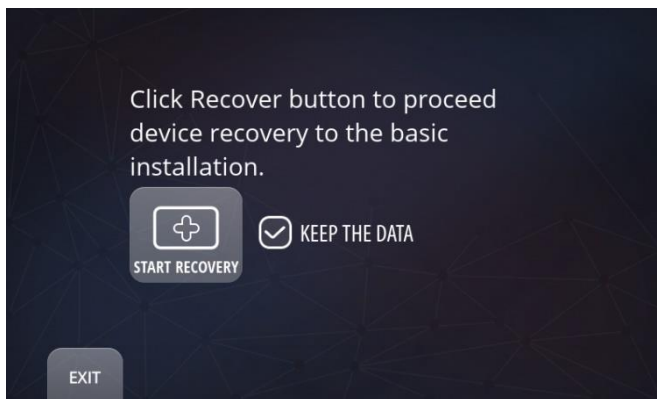


15.5.2 RN Reset · Factory Settings

Press the **RN Factory** button to restore the device's software to its original settings.

In the next dialog, click YES to confirm or NO to abort the operation.

The operation cannot be undone.



15.5.3 RN Reset · RN Recovery

Press the **RN Recovery** button to proceed with the device recovery to the basic installation. Confirm the operation by clicking the **Start Recovery** button. You can keep the data.

15.6 DEVICE · Help

The Race Navigator Help Content is presented here. You can read the basic descriptions of your device functions.



15.7 **DEVICE · Units**

Race Navigator system provides 2-unit types

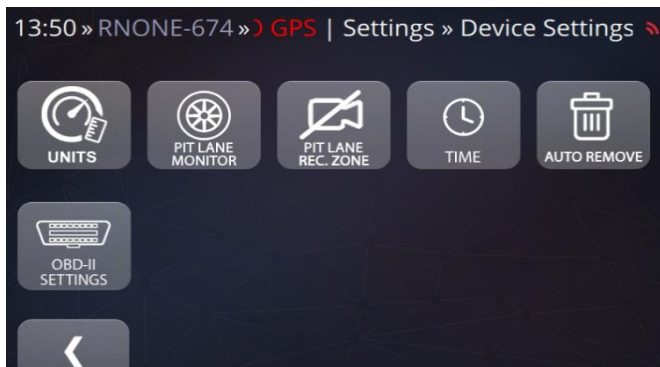
for displaying current speed:

- **KM/H**
- **MPH**

Select this option by pressing a chosen unit type.

Use the Back button or Home button to complete the process.





15.8 Device · OBD II Settings

OBD-II Menu is accessible from:

Home View→Settings→Device→Additional Settings→OBD-II Settings

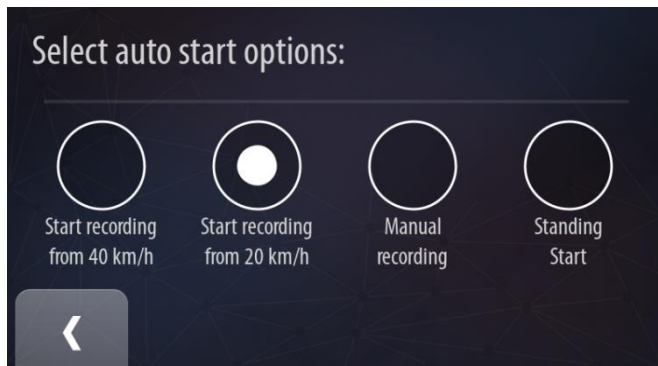
More details about OBD-II Settings can be found here: **RECORDING WITH OBD-II DIAGNOSTIC DATA**

15.9 Device · Pit Lane Monitor

Pit Lane Monitor functionality is accessible from:

Home View→Settings→Device→Additional Settings→Pit Lane Monitor

More details about Pit Lane Monitor can be found here: **PIT LANE MONITOR**



16 AUTOSTART

Different video recording modes are available. You can start recording manually which activates automatically after exceeding the required speed of 20 km/h or 40 km/h, or you can select the Standing Start mode.

Standing Start automatically starts recording the video without any time and data when the vehicle is near the tracks start line. The data measurements are stored when the vehicle starts to drive and the G-force has exceeded a certain level. The lap recording finishes twenty seconds after the vehicle stops.

Select the mode by clicking on the proper element. Use the Back button to complete the process.

17 VIDEO, SOUND

Video

Click the Video button to set the video recording quality.

Different video quality options are available. The video can be recorded in:

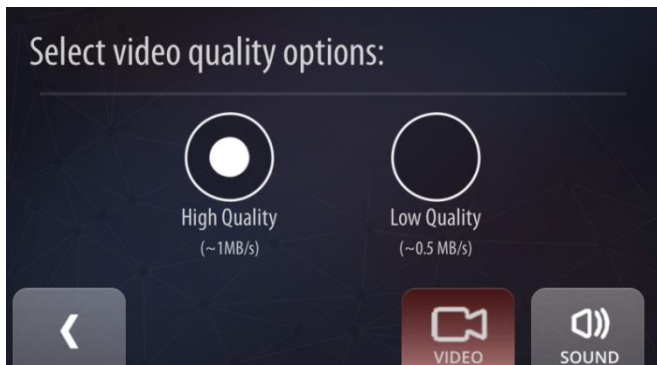
- Low quality (1280x768, ~0,5 MB/s)
- High Quality (1280x768, ~1 MB/s)

Select the option by clicking on the proper element. Use the Back button to complete the process.

Sound

Click the Sound button to set the sound level of the microphone and speakers.

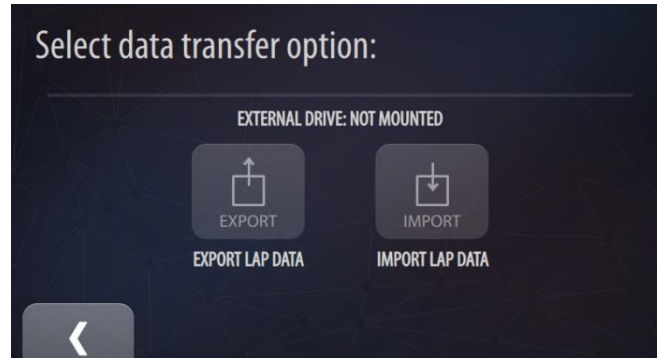
You can adjust the sound level of the microphone and speakers by clicking the '+' and '-' buttons. The default values are marked by the white line on the adjustment bars.



18 EXPORT IMPORT

In order to import or export data to an external drive, enter "EXPORT IMPORT" in "Settings".

The memory stick must be plugged in. Otherwise, the both buttons will be disabled and you will be notified about the missing memory stick.



12:59 » RNPRO-10 » ...ULT TRACK 2016-04-11]

Missing external media. Copying disabled.

Lap	Lap Time	Driver	Start Time	Ranking	Select All
↓ 3	00:47.49	MIKE	12:58	-	<input type="checkbox"/>
↓ 2	01:16.99	MIKE	12:57	-	<input type="checkbox"/>
↓ 1	01:03.91	MIKE	12:55	-	<input type="checkbox"/>

Navigation buttons: < SET CHANGE EVENT COPY

12:59 » RNPRO-10 » ...ULT TRACK 2016-04-11]

Free space: 4076 MB Requested space: 0.0MB

Lap	Lap Time	Driver	Start Time	Ranking	Select All
↓ 3	00:47.49	MIKE	12:58	-	<input type="checkbox"/>
↓ 2	01:16.99	MIKE	12:57	-	<input type="checkbox"/>
↓ 1	01:03.91	MIKE	12:55	-	<input type="checkbox"/>

Navigation buttons: < SET CHANGE EVENT COPY

18.1 Export Video

Here you can export the video and data directly to the memory stick.

The memory stick is required to be plugged in. Otherwise, the Copy button will be disabled and you will be notified about the missing memory stick.

Change Event

Change the event to select specific laps for exporting.

All laps from the selected event are listed. Full laps are colored white, while the others are colored grey, except for the best laps of each driver which are colored yellow.

The list can be sorted by the column headers. You can change the sorting method by clicking on one of them. The current sorting column is colored red.

You can find the laps on the list and select them. Confirm your selection by pressing the **Set** button. Press the **Copy** button to start the process

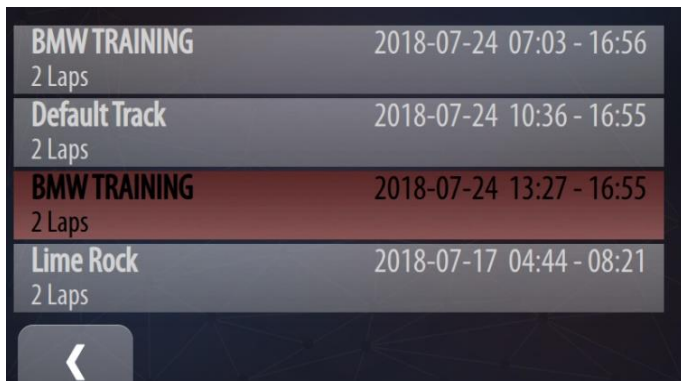
18.2 Import Video

Here you can import videos and data from memory stick to Race Navigator device.

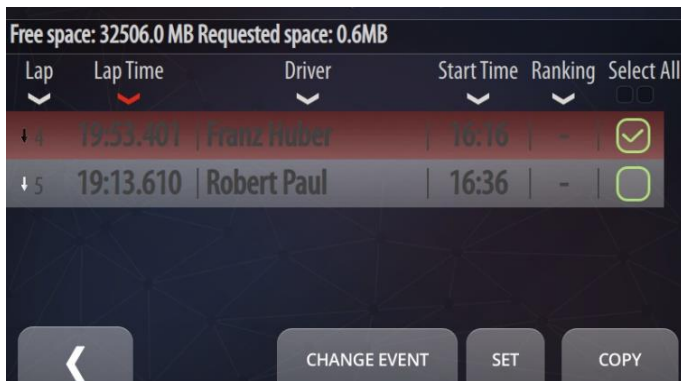
Select desired event and go back. All laps from the selected event are listed. Full laps are colored white, while the others are colored grey, except for the best laps of each driver which are colored yellow.

The list can be sorted by the column headers. You can change the sorting method by clicking on one of them. The current sorting column is colored red.

You can find the laps on the list and select them. Confirm your selection by pressing the **Set** button. Press the **Copy** button to start the process.



BMW TRAINING	2018-07-24 07:03 - 16:56
2 Laps	
Default Track	2018-07-24 10:36 - 16:55
2 Laps	
BMW TRAINING	2018-07-24 13:27 - 16:55
2 Laps	
Lime Rock	2018-07-17 04:44 - 08:21
2 Laps	



Free space: 32506.0 MB Requested space: 0.6MB

Lap	Lap Time	Driver	Start Time	Ranking	Select All
↓ 4	19:53.401	Franz Huber	16:16	-	<input checked="" type="checkbox"/>
↓ 5	19:13.610	Robert Paul	16:36	-	<input type="checkbox"/>

19 PIT LANE MONITOR

The Pit Lane Monitor functionality can be activated from: HOMEVIEW → SETTINGS → DEVICE → ADDITIONAL SETTINGS → PIT LANE MONITOR.

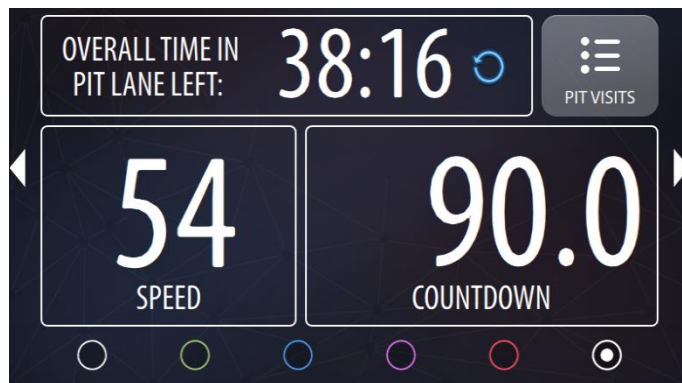
The Pit Lane Monitor allows you to achieve the optimum pit stop time thanks to automatic timers. Unnecessary time penalties due to badly timed pit stops are a thing of the past!

The Pit Lane Monitor includes the following features:

- **Overall Pit Lane Time in Race** - the system automatically records the total time spent in the pit lane during the race (all pit stops) and displays the remaining time.
- **Pit stop countdown** - the countdown is activated automatically and displayed when the car passed the pit lane entry line. The timer counts down to the optimum moment for leaving the pit box.
- **Time monitoring** - after the car starts from the pit box, the gap compared to the minimum pit lane time will be displayed. Time gain means that the car will leave the pit lane too early, while time loss

indicates a delayed exit. This allows the driver to correct his pace in the pit lane to achieve an optimum pit stop time.

- **Speed monitoring** - the display automatically shows the current speed of the car in the pit lane. Different colors warn the driver when he is coming close to or exceeding the speed limit.
- **Pit Lane Visits** - if Pit Lane Monitor is activated, the system is saving Pit Lane Visits with their times in a table that is accessible by pressing the PIT VISITS button.
- The system automatically detects entry and exit lines of many available track variants, manual corrections or new definitions by the user are possible.
- The regulatory minimum overall pit lane time, pit lane minimum time, pit box to end line time and maximum pit lane speed can be set by the user.



19.1 Setting up Pit Lane Monitor

The Pit Lane Monitor Functionality is an additional feature that is activated for a selected device after purchasing.

When Pit Lane Monitor is activated a user can set it up.

After entering Settings, at first it is checked if currently selected Track Variant has pit lane start and end lines defined. A proper notification is shown at the top of a setting. If this is missing there is a possibility to add Pit Lanes manually, directly setting them in a device or importing a pit lane definition from the RN Connect app.

Adding Pit Lane Manually

For more information about adding / Editing existing Pit Lane start and end lines please refer to: **Modify Pit Lane Start/End**

Currently selected track variant has a pit lane definition. Pit Lane Monitor will work correctly.

Currently selected track variant has no pit lane definition. Pit Lane Monitor will not function correctly.



19.2 Pit Lane Monitor Settings

Pit Lane Monitor Settings are split between 3 independent sections. Each of these features will be displayed on the sixth dashboard screen. Only selected features will be displayed on dashboard screen. This approach gives user opportunity to personalize The Pit Lane Monitor to its own needs. If at least one feature is enabled, then the pit lane monitor dashboard is automatically activated and shown to a driver when a pit entry line is crossed. When a car exits pit lane, a previously used dashboard is shown back.

Pit Lane Monitor sections:

- Pit Lane Monitor Countdown:

More details: **Pit Lane Monitor Countdown**

- Pit Lane Maximum Speed Warning:

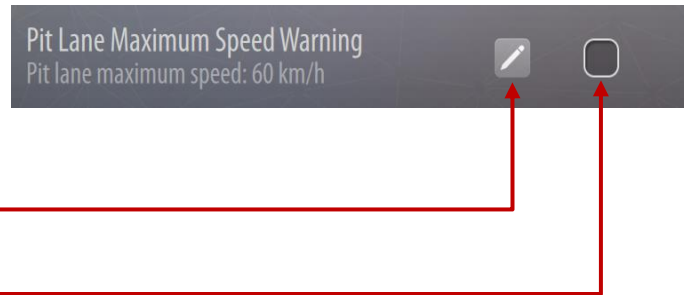
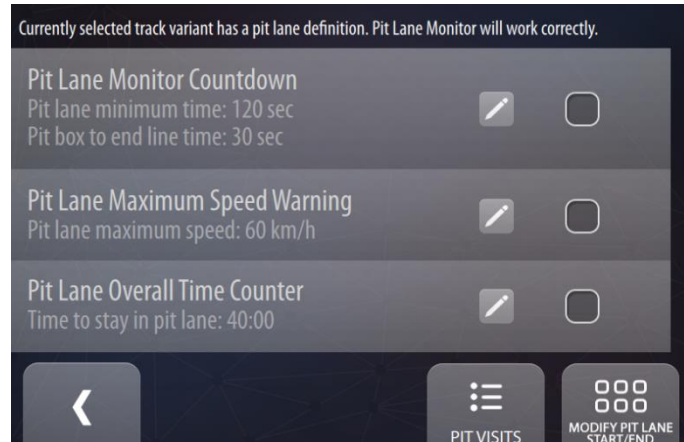
More details: **Pit Lane Maximum Speed Warning**

- Pit Lane Overall time Counter:

More details: **Pit Lane Overall time Counter**

For settings press on Edit button

To Enable / Disable specific functionality use this checkbox



19.3 Pit Lane Monitor Countdown

The Pit Lane Monitor Countdown can be activated from: HOMEVIEW → SETTINGS → DEVICE ADDITIONAL → SETTINGS → PIT LANE MONITOR → Pit Lane Monitor Countdown.

Pit Lane minimum time:

Defines the time, that driver must spend in pit lane, before leaving it. Adjust by using text box.

Pit Box to end line time:

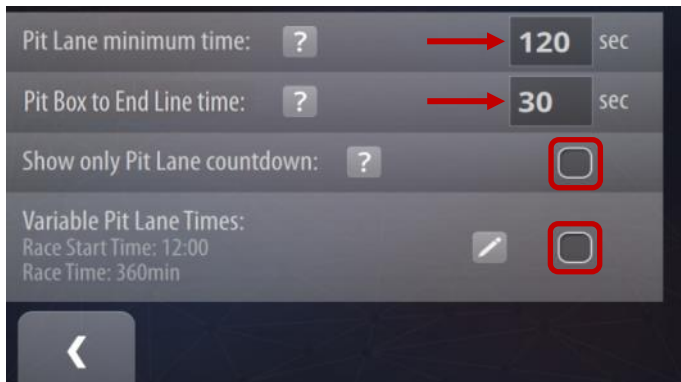
Pit Box to end line time is defined by a driver or team. This value determines the time that is needed by driver to drive from pit lane box position to end pit lane. Adjust by using text box.

Show only Pit Lane countdown:

Enable this option to just show a pit lane time countdown between pit lane entry to exit lines. A timer that informs you when to exit your pit box position won't be displayed and a gap time to reach pit lane end line won't be calculated.

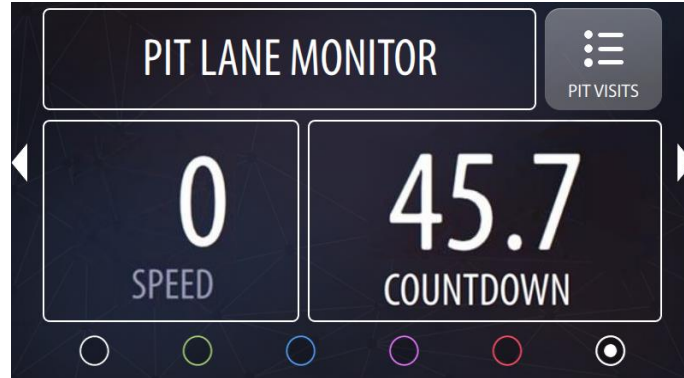
Enable / Disable by checkbox.

For explanation press the  icon.



Pit Lane Monitor Countdown Operation:

After arriving in Pit Box, countdown continue to display the timer.



When the time is closer to 0, it warns by coloring the value in yellow (below 20 secs), orange (below 5 secs) and then red (after passing 0).

When the time reaches 0, it is the signal to leave the Pit Box. Time that is still left is the Pit Box to End Line time.



After start from Pit Box, countdown, instead of pit Box to End Line time, displays the Gap Time - real time difference between time left and estimated time, calculated using current speed and distance to Pit Lane End Line.

If the current speed is too high, driver will leave the Pit Lane earlier than expected. Gap Time is colored red and a value in seconds is negative. It is the signal to slow down and adjust the speed to displayed time.

After slowing down, the real time calculated Gap Time changes, and should be getting close to 0. When Gap Time is higher than 0, Pit Lane will be left after regulatory time that was set in Pit Lane Monitor settings (Pit Lane minimum time). After crossing Pit Lane End Line Gap Time pauses for 5 seconds and (if other dashboard panel was visible before entering Pit Lane) dashboard changes back to previously selected one.

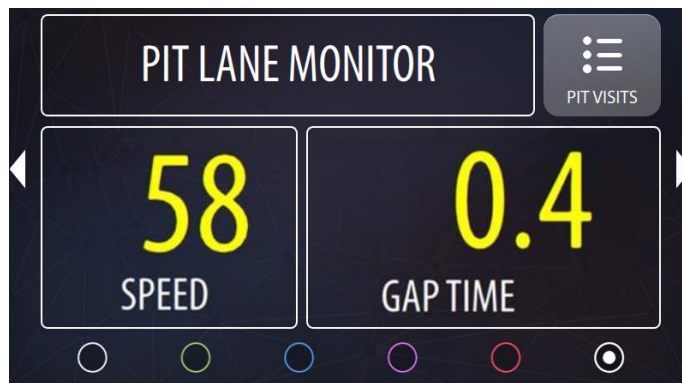
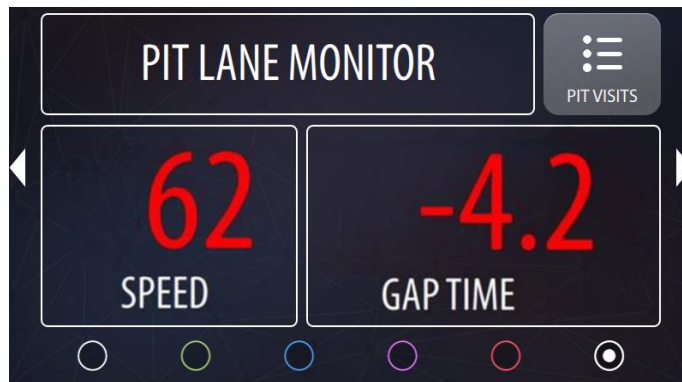
Pit Lane Monitor colors description:

Red – limit is crossed

Orange – very close to limit

Yellow – close to limit

White – timing is OK



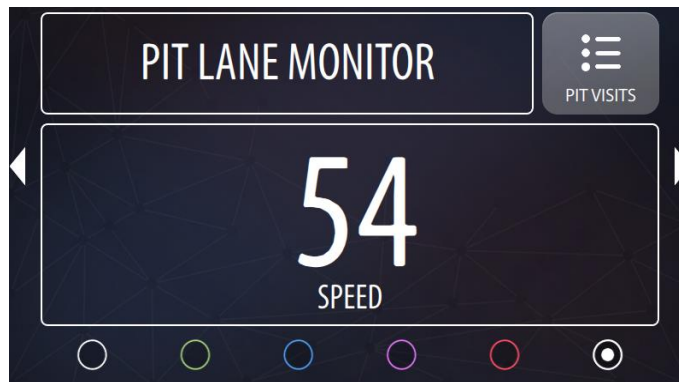
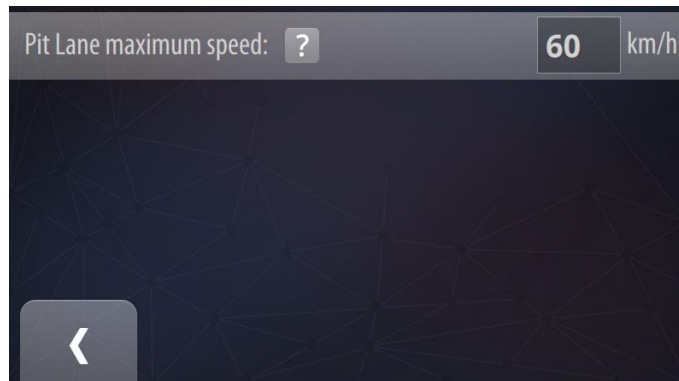
19.4 Pit Lane Maximum Speed Warning

The Pit Lane maximum speed Warning can be activated from: HOMEVIEW → SETTINGS → DEVICE ADDITIONAL → SETTINGS → PIT LANE MONITOR → Pit Lane Maximum Speed Warning.

For explanation press the  icon.

Pit Lane maximum speed:

Pit Lane maximum speed is used to display warnings on a speedometer when the driver is close or exceeds it. When a speed is close to the speed limit, the speed value turns yellow, when it is crossed it turns red as shown below:



19.5 Pit Lane Overall time Counter

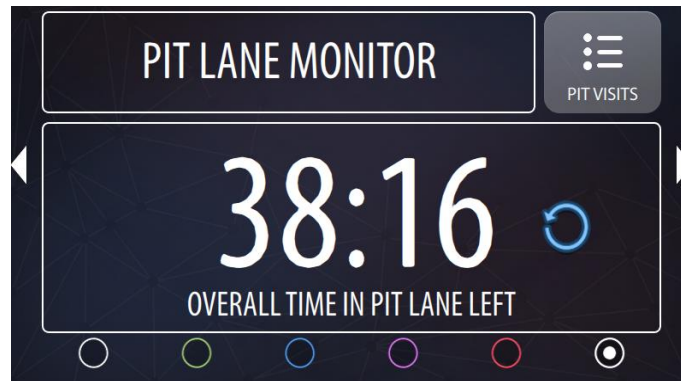
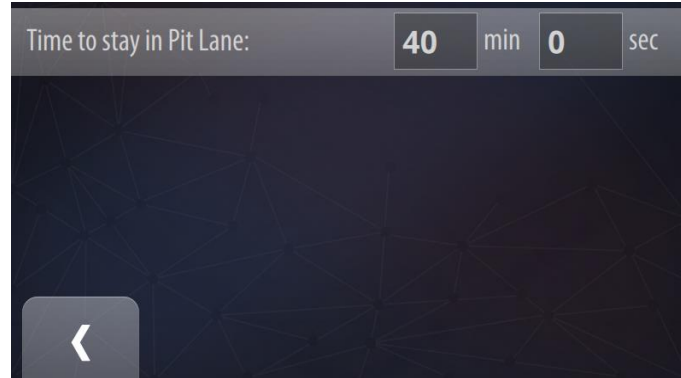
The Pit Lane Overall time Counter can be activated from: HOMEVIEW → SETTINGS → DEVICE ADDITIONAL → SETTINGS → PIT LANE MONITOR Pit Lane Overall time Counter.

Time to stay in Pit Lane:

Defines the time, that a driver have to spend in pit lane during a whole competition.

The system automatically records the total time spent in the pit lane during the race and displays the remaining time. This function is perfectly prepared for the total pit time rules, for example in the in the Nürburgring Langstrecken Serie (NLS / VLN)

Overall time in pit lane: the countdown is activated automatically and displayed when the car passed the pit lane entry line. The timer counts down only in the pitlane (separately defined for each track variant) and displays remaining time.



Pit Lane Overall Time Counter Reset

Overall Time in Pit Lane Left counter can be reset in any moment. It is necessary to remember to reset the counter before the race. It can be done by **starting a new event**:

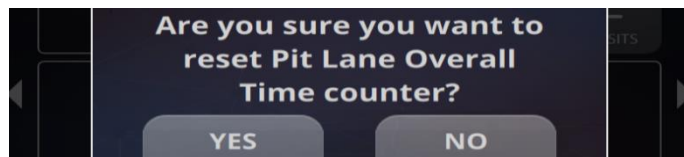
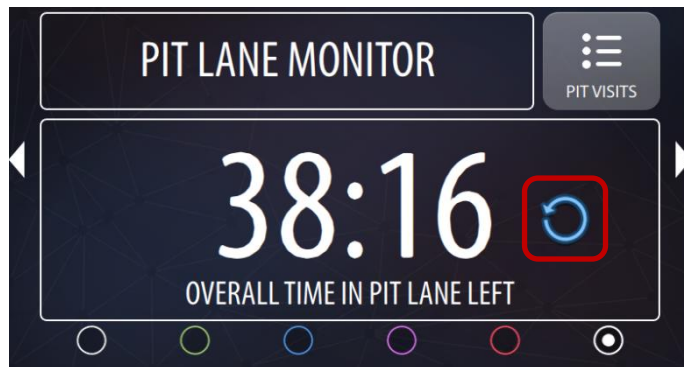
SETTINGS→EVENT→START NEW EVENT

Or by using a reset button:

(blue counterclockwise arrow) on the pitlane dashboard (last panel).

After pressing the reset button it is necessary to choose between two options:

- **NEXT PIT LANE VISIT** – Counter is reset and will restart with the next visit in the pit lane.
- **CURRENT PIT LANE VISIT** – if a car is in the pit lane during the reset, counter will start with a value that is result of a subtraction of the overall pit lane time and current pit lane stay time. This option is useful if you forgot to reset this counter before the race and notice a wrong value during the first pit stop.



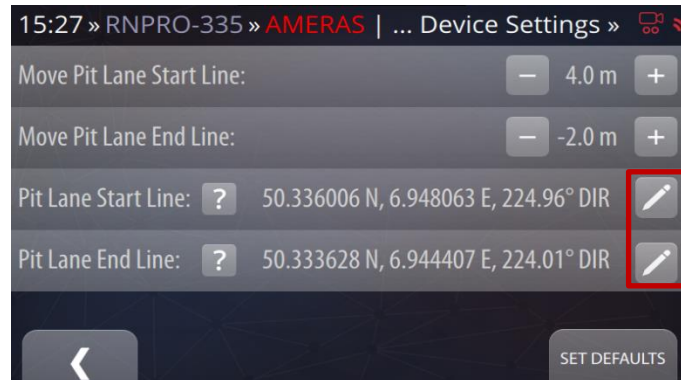
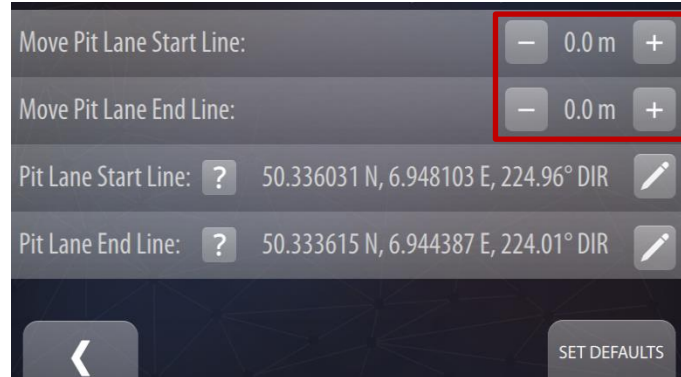
- **PLEASE NOTE** – The Pit Lane Overall Time Counter can only calculate the remaining time if the RN device is turned on while entering and exiting the pit lane. The remaining pit lane time calculation is correct if the device is turned off and turned on again during the same pit stop. It is only necessary to make sure that the device is running when the car enters and exits the pit lane. If the device turned off in the pit lane, please remember to turn it on again at least 1 minute before exiting from the pit box, so that GPS signal is available again on the pit lane exit line.

19.6 Modify Pit Lane Start/End

Pit Lane Monitor has additional setting accessible through the **MODIFY PIT LANE START/END** button on the bottom right corner. This dialog informs user about Pit Lane Start and End Line positions with its coordinates. Displayed values can be copied to any map browser in order to check its position. If the line position is not correct, user can adjust it by moving the line in direction of driving by giving the positive value in meters, and in the opposite direction of driving by giving the negative values in meters. After changing the values, new coordinates will be displayed. Again, these can be checked in any map browser.

In order to edit start or end of pit lane tap “edit” button on the right side of the corresponding values.


For explanation press the  icon.




Tap on one of the text boxes to edit either line's latitude, longitude, or direction. Coordinates must be between -180° to 180° and direction between 0° and 360° where:

- North = 0
 - East = 90
 - South = 180
 - West = 270
-
- Moving the pit lane by offset is now disabled. It works only for preinstalled pit lane definitions.
- Please note:**
- The pit lane start and end lines can be also changed using the **RN Connect app**. Check the RN Connect manual for more information.

Start Line latitude:	50.3360313240574	°
Start Line longitude:	6.94810266398447	°
Start Line direction:	224.9619003731	°



End Line latitude:	50.3336152526933	°
End Line longitude:	6.94438748431168	°
End Line direction:	224.0113864404	°



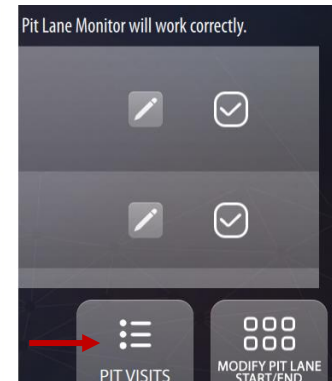
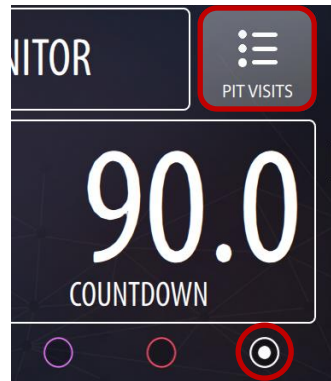
19.7 Pit Lane Visits

When Pit Lane Monitor is activated in Pit Lane Monitor settings the Race Navigator system is detecting crossing of the Pit Lane Start Line and End Line. Based on that every pit stop visit is saved.

PIT VISITS are accessible in Pit Lane Monitor Settings or directly from the Pit Lane Monitor Dashboard Screen (last panel of Dashboards). Every event has its own list, same as it is available for list of laps.

Entry Lap	Time in Pit	Entry Time	Exit Time	Driver
4	00:22.6	09:55:54.9	09:56:17.6	KEVIN
5	01:34.9	09:56:52.5	09:58:27.5	KEVIN
6	01:08.1	10:01:59.5	10:03:07.6	KEVIN
7	02:07.2	10:03:57.3	10:06:04.6	KEVIN
Pit Lane Overall Time Counter Reset				
8	01:08.1	10:08:23.3	10:09:31.4	KEVIN

Navigation: Back arrow, Forward arrow, CHANGE EVENT

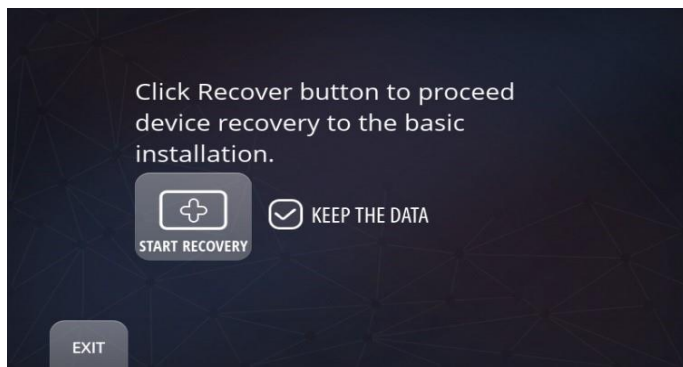


20 Troubleshooting/Recovery

The recovery mode was developed for system emergency situations that happen when a faulty state is detected. This faulty state can occur when the device lost power unexpectedly during an update process or while saving critical data or when unexpected data were stored by the system.

Recovery Procedure

In case your device is not starting properly, the Recovery screen will appear. On this screen, you can start the recovery process. Confirm the operation by clicking the Start Recovery button, with or without keeping your data (mark the checkbox if you want to keep it). This process will restore the device's software to the last valid version. You can start by using the recovery process with keeping data enabled. The system will try to reset itself to the last valid software version. If the recovery process did not fix the issue, please contact the RN Vision team for further support



21 More Information and Safety Precautions

The Race Navigator is the electronic device containing electronic boards, with different sensors, cameras, and a built-in battery. The device consumes electrical power and generate heat in usage.

General notices

- For your own safety and a passengers' safety, do not operate the device's touch screen and buttons while driving,
- When a window suction mount is used, make sure that it is securely connected and that the device is in an appropriate place, so that it is not obstructing the driver's view or deployment of airbags,
- The device can become hot during usage. Be careful with the heatsink and other metal parts of the housing because they warm up to

high temperatures (more than 40°C),

- Do not expose the device for an extended period of time to direct sunlight, when a too high internal temperature is reached, the device can malfunction,
- Keep the lens of the cameras clean and make sure that no objects are blocking the camera lens.

Safety Precautions

Charging additional notes

- Use only the charger supplied with your device, usage of a different type of charger may result in malfunction and/or danger,
- Do not temper with the charging unit or internal battery
- Do not use the charger in a high moisture environment, and do not use the charger when your hands or feet are wet,
- Allow adequate ventilation around the charger when using it to

operate the device or charge the battery, do not cover the charger with any objects that will reduce cooling,

- Connect the charger to a proper power source, the voltage requirements are found on the charger or in this manual,
- When using a charging cable to use a device or charge the battery, please make sure that the power source has proper parameters as specified in the requirements you can find in this manual,
- Do not use the charger or a charging cable if the cord becomes damaged,
- Do not attempt to service the unit by your own, or by a not accredited service. There are no serviceable parts inside, replace the unit if is damaged or exposed to excess moisture.

Battery additional notes

- **Caution:** this device contains a non-replaceable internal Lithium Ion battery, the battery can burst or explode, releasing hazardous chemicals. To reduce the risk of fire or burns, do not disassemble, crush, puncture, or dispose of in fire or water,
- This device needs to be recycled or disposed properly according to local law.

Caring for the device

Taking good care of your device will ensure trouble-free operation and reduce the risk of damage.

- Keep your device away from excessive moisture and extreme temperatures,
- Avoid exposing your device to direct sunlight or strong ultraviolet light for extended periods of time,
- Do not place anything on top of your device or drop objects on your device,
- Do not drop your device or subject it to severe shock,
- Do not subject your device to sudden and severe temperature changes - this could cause moisture condensation inside the unit, which could damage your device. In the event of moisture condensation, allow the device to dry out completely before use.
- The screen surface can easily be scratched. Avoid touching it with sharp objects. Non- adhesive generic screen protectors designed specifically for use on portable devices with LCD panels may be used to help protect the screen from minor scratches.
- Never clean your device with it powered on Use a soft, lint-free cloth to wipe the screen and the exterior of your device. Do not use paper towels to clean the screen,
- Never attempt to disassemble, repair or make any modifications to your device. Disassembly, modification or any attempt at repair could cause damage to your device and even bodily injury or property damage and will void any warranty,
- Do not store or carry flammable liquids, gases or explosive materials in the same compartment as your device, its parts or accessories,
- To discourage theft, do not leave the device and accessories in plain view in an unattended vehicle.
- overheating may damage a device.

22 Regulatory Information

The Race Navigator PRO device complies with the Electromagnetic Compatibility Directives.

CE Regulatory Information

This device complies with the Electromagnetic Compatibility Directive (2014/30/EU) issued by the Commission of the European Community. The compliance with this directive implies conformity to the following European Standards:

- PN-EN 55032:2015-09,
- PN-EN 55035:2017-09.

The manufacturer cannot be held responsible for modifications made by the User and the consequences thereof, which may alter the conformity of the product with the CE Marking.

EU Declaration of Conformity

Hereby, RN Vision GmbH, the producer, declares that this device (Race Navigator PRO) is in compliance with the essential requirements and other relevant provisions of Directive 2014/30/EU.

Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Regulatory Information USA

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A device notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

RF exposure safety

This device is a radio transmitter and receiver.

It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission.

The antenna (a built-in and external) must be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Regulatory Information Canada

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorisation de l'utilisateur d'utiliser l'équipement.

This device complies with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR de l'ISDE applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter

tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RN exposure safety

This device is a radio transmitter and receiver.

It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the ISSED.

The antenna (a built-in and external) must be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est un émetteur et un récepteur radio.

Il est conçu pour ne pas dépasser les limites d'émission pour l'exposition à l'énergie radiofréquence (RF) établie par l'ISDE.

L'antenne doit être installée de façon à garder une distance minimale de 20 cm entre la source de rayonnements et votre corps.

L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur.

CAN ICES-3 (A)/NMB-3(A)

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de classe A est conforme à la norme Canadienne ICES-003.

RN VISION ONE (1) YEAR LIMITED WARRANTY

ABSTRACT

RN VISION company guarantees, that during one year since the purchase of Race Navigator, the product (hardware) and its accessories are free from material and production flaws. RN VISION warranty does not include flaws, that are the result of normal usage and damages caused by incorrect use of the device or as a result of an accident. In case of a repair, please contact RN VISION or an authorized RN VISION service.

CAUTION: This product complies with EMC directives and contains components compatible with peripheral devices, and tested screen cables used to connect the Race Navigator with peripheral devices. Make sure that you exclusively use compatible peripheral devices and screen cables used to connect the elements of the system, in order to avoid disruptions of radio or TV sets, and other electronic devices.

Declaration of compliance with EU norms

Hereby RN VISION confirms, that Race Navigator meets the requirements laid down by the R & TTE directive.

WARRANTY

The object of the warranty is a product named RACE NAVIGATOR, manufactured by RN VISION GmbH, located in Mönchengladbach in the Federal Republic of Germany. RN VISION GmbH provides warranty for Race Navigator branded products and accessories, secured in original "Race Navigator" packaging, including material and quality flaws appearing during normal usage in accordance with the instructions published by RN VISION, the technical data and other instructions concerning the Race Navigator product (see also: www.race-navigator.com). The warranty is in force for a period of ONE (1) YEAR since the date of original retail purchase, made by the purchaser being the end user ("Warranty period"). Within this warranty, the user can lay claims to RN VISION company, even in case where he bought the Race Navigator product from another seller than the RN VISION company.

Consumer protection laws

RN VISION's one year warranty is a service provided voluntarily by the manufacturer. The rights that are the result of the RN VISION's one year warranty, supplement (and do not substitute) the rights that are the result of consumer law. If the product is flawed, the consumers can choose if they want to return the product to the service within the RN VISION's one year warranty, or

within the rights that are the result of consumer law.

Important: Resolutions of the RN VISION's one year warranty do not apply to claims resulting from consumer laws. More information on the consumer law can be obtained in the Office of Competition and Consumer Protection.

OBJECT OF THE WARRANTY

RN VISION company's RACE-NAVIGATOR, located at RN VISION GmbH's address in Mönchengladbach in Germany, provides warranty for the device and Race Navigator branded products and accessories, secured in original "Race Navigator" packaging, including material and quality flaws appearing during normal usage in accordance with the instructions published by RN VISION, the technical data and other instructions concerning the Race Navigator product (see also: www.race-navigator.com). The warranty is in force for a period of ONE (1) YEAR since the date of original retail purchase, made by the purchaser being the end user ("Warranty period"). Within this warranty, the user can lay claims to RN VISION company, even in case where he bought the Race Navigator product from another seller than the RN VISION company.

Caution: any claims concerning the RN VISION's one year warranty are subject to the resolutions of this warranty.

Service options depend on the country, where the service is supposed to be performed. Services for the Race Navigator ONE can be limited to the country where the device was purchased. Phone charges and international shipping charges depend on the country, where such services are performed.

Warranty resolutions and detailed information on the service are also available on the website: www.race-navigator.com.

In case of reasonable warranty claims concerning the Race Navigator, RN VISION can fix the device, replace it or reimburse the customer as the RN VISION company wishes.

The rights resulting from the RN VISION's warranty are in force, except for the cases of rights resulting from laws on consumers protection, enclosed in the civil code.

If you file a warranty claim, you'll need an application with a proof of purchase.

WHAT IS COVERED BY THIS WARRANTY?

RN VISION warrants the Race Navigator-branded hardware product and accessories contained in the original packaging ("Race Navigator") against defects in materials and workmanship when used

normally in accordance with RN VISION's published guidelines for a period of ONE (1) YEAR from the date of original retail purchase by the end-user purchaser ("Warranty Period"). RN VISION's published guidelines include but are not limited to information contained in technical specifications, user manuals and service communications.

WHAT IS NOT COVERED BY THIS WARRANTY?

This warranty does not apply to any non-Race Navigator branded hardware products or any software, even if packaged or sold with Race Navigator hardware. Manufacturers, suppliers, or publishers, other than Race Navigator, may provide their own warranties to you but Race Navigator, in so far as permitted by law, provides their products "AS IS". Software distributed by RN VISION with or without the Race Navigator brand (including, but not limited to system software) is not covered by this warranty. Please refer to the licensing agreement accompanying the software for details of your rights with respect to its use. RN VISION does not warrant that the operation of the Race Navigator Product will be uninterrupted or error-free. RN VISION is not responsible for damage arising from failure to follow instructions relating to the Race Navigator Product's use.

USER'S RESPONSIBILITIES

IF SOFTWARE, DATA OR OTHER INFORMATION CAN BE STORED IN A PRODUCT OWNED BY THE USER, THEN FOR SECURITY MEASURES AND AS A PROTECTION AGAINST POSSIBLE FAILURES, THE USER SHOULD PERIODICALLY CREATE BACKUP COPIES OF SUCH INFORMATION STORED ON THE RN VISION PRODUCT'S DATA STORAGE.

Before submitting a RN VISION product to warranty repair, the user should create a backup copy of the data stored on the data storing device, delete all personal data and disable all security passwords. During the repair, the contents of the data storage of the RN VISION product can be removed, overwritten or formatted.

After completing a warranty service, a user's RN VISION product, or a replacement product will be returned to the user configured in the same way as it was configured when being purchased by the user, including proper updates. Within the warranty service, RN VISION can install software updates in the RN VISION product, that will make it impossible to restore the previous version of the software. As a result of such update, the third party software installed in the RN VISION product might not be compatible with the RN VISION product, or might not work with the RN VISION product. The responsibility of reinstalling all the remaining software and restoring the data and

information lies on the user's side. This warranty does not include recovery of data or information, or reinstalling software.

The user can submit the product for repair in a country different than the country of purchase, but the country needs to obey all necessary import and export laws and pay all the custom duties, VAT tax and all necessary taxes and charges.

CONSIDERATION OF WARRANTY CLAIMS BY RN VISION

If during the Warranty Period you submit a valid claim to RN VISION, RN VISION will, at its option, (I) repair the RN VISION Product using new or previously used parts that are equivalent to new in performance and reliability,

(II) replace the RN VISION Product with a product that is at least functionally equivalent to the RN VISION Product and is formed from new and/or previously used parts that are equivalent to new in performance and reliability, or

(III) exchange the RN VISION Product for a refund of your purchase price.

When a product or part is replaced or a refund provided, any replacement item becomes your property and the replaced or refunded item becomes RN VISION's property.

A replacement part or product, or a repaired RN VISION product, assume the remaining warranty

of the RN VISION Product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you.

If the product is submitted in a country different than the country of the RN VISION product's purchase, the RN VISION manufacturer can repair or replace products or parts with comparable products or parts, consistent with the standards of the country.

HOW TO OBTAIN WARRANTY SERVICE

Please contact a RN VISION representative or an authorized RN VISION service provider. They will help determine whether your RN VISION Product requires service and, if it does, will inform you how RN VISION will provide it.

Before providing warranty services, RN VISION or RN VISION representatives may require detailed information from the user, including information on a proof of purchase, answering questions facilitating the diagnosis of possible issues, and complying with RN VISION's procedure concerning warranty services, for example acting according to an instruction concerning packaging and shipping RN VISION products, in case of a carry-in service, according to the description below.

In order to use the service and support based on this RN VISION warranty, the user does not have to prove, that the issue was present on the day of

delivery, unless it's inconsistent with the issue's character.

WARRANTY SERVICE OPTIONS

RN VISION will provide warranty service as they wish and depending on circumstances, especially depending on the type of the RN VISION product, through one or more of the following options:

1) Mail-in service.

If RN VISION determines that your RN VISION Product is eligible for mail-in service, RN VISION will send you prepaid waybills and if applicable, packaging material, so that you may ship your RN VISION Product to RN VISION. Once the service is complete, RN VISION will return the RN VISION Product to you. RN VISION will pay for shipping to and from your location if all instructions are followed.

2) Do-it-yourself (DIY) parts service.

Within the DIY parts service, RN VISION will provide the user with spare product, parts or accessories, such as external GPS antenna, 12V cable – car adapter, that can be easily replaced without using tools.

CAUTION: RN VISION is not responsible for any labor costs you incur relating to DIY parts service. Should you require further assistance, contact RN VISION at the telephone number listed below. RN VISION reserves the right to change.

If DIY parts service is available in the circumstances, the following process will apply:

(a) Service where RN VISION requires return of the replaced product or part.

RN VISION may require a credit card authorization as security for the retail price of the replacement product, accessory or part and applicable shipping costs. RN VISION will ship a replacement product or part to you with installation instructions, if applicable, and any requirements for the return of the replaced product or part. If you follow the instructions, RN VISION will cancel the credit card authorization, so you will not be charged for the product or part and shipping to and from your location. If you fail to return the replaced product or part as instructed or return a replaced product or part that is ineligible for service, RN VISION will charge your credit card for the authorized amount. If you are unable to provide credit card authorization, DIY parts service may not be available to you and RN VISION will offer alternative arrangements for service.

(b) Service where RN VISION does not require return of the replaced product or part. RN VISION will ship you free of charge a replacement product

or part accompanied by instructions on installation, if applicable, and any requirements for the disposal of the replaced product, accessory or part.

PRIVACY

RN VISION will maintain customer information and use it according to RN VISION Customer Privacy Policy, available at: www.race-navigator.com.

GENERAL

No RN VISION reseller, agent, or employee is authorized to make any modification, extension or addition to this warranty.

If any term is held to be illegal or unenforceable, the legality or enforceability of the remaining terms shall not be affected or impaired.

This warranty is governed by and construed under the laws of the country in which the RN VISION product purchase took place.

BATTERY

The lithium-ion battery in Race Navigator should be replaced only by RN VISION or a RN VISION

Authorized Service Provider. The batteries should be recycled, or utilized separate from the domestic waste.

For more information about recycling and battery replacement services, go to: www.race-navigator.com.

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