User Manual

MXPS for
Suzuki GSX-R 1000 (2017-2022)
Suzuki GSX-R 1000R (2017-2022)

Release 1.02

INDEX

1 – MXPS in a few words

MXPS is an AiM dash-logger designed to be installed on:

• Suzuki	GSX-R 1000	2017-2022
• Suzuki	GSX-R 1000R	2017-2022

Please note: MXPS is compatible with Suzuki Yoshimura harness too.

MXPS is a full Plug and Play dash, completely compatible with the original connector, with the fixing points of the original bracket of your bike and with Yoshimura racing harness too.

It features:
- dedicated GPS Module
- CAN connection for getting all the data coming from the bike stock ECU (ECU logged channels are specified in Appendix 1)
- 8 alarm LEDs
- 10 RGB shift lights.

MXPS can be improved through the dedicated racing kit that include:
- dedicated harness for K-Line connections to get additional data from the ECU and to manage 4 additional freely configurable analog inputs
- K-Line extension cable

2 – What is in the kit?

MXPS can be bought alone or adding dedicated accessories. The related part numbers are:

MXPS kit including: **XA6MXPSR10G5**
- MXPS logger (**1**)
- logger fixing kit (**2**)
- dedicated GPS09 Module with 50cm cable and fixing kit (**5**)

MXPS Accessories and spare parts:
- optional racing kit for K-Line connection, four additional analog channels and K-Line extension cable (**3-4**) **XA6RKG5**
- GPS09 Module for MXPS with 50 cm cable and fixing kit (**5**) **X40GPS09005G5SR10**
- Mirror Camera **XB1ZCAMHD00**

3 – Installation

You may find a video explaining how to install MXPS on AiM website visiting MXPS page at www.aim-sportline.com

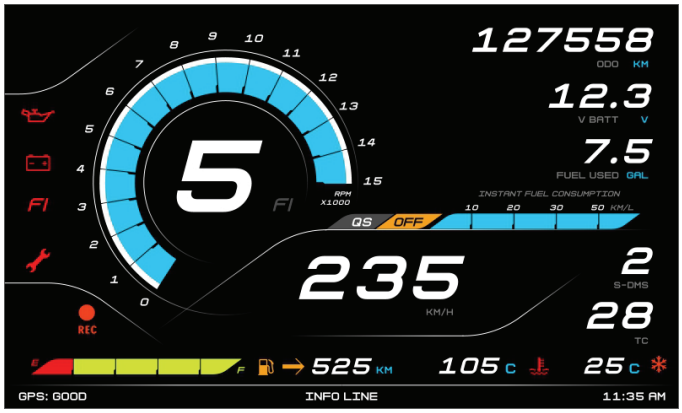
4 – MXPS Main features

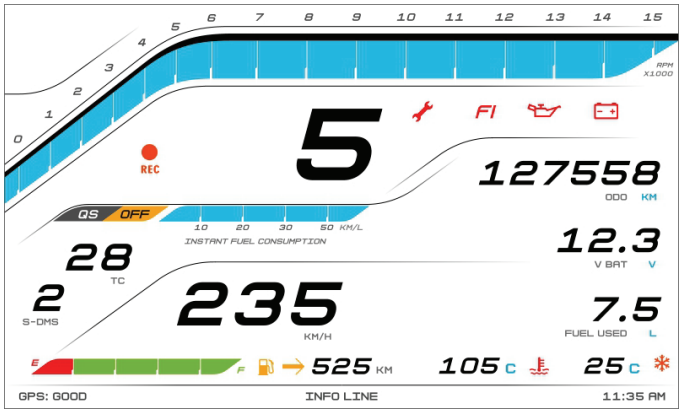
MXPS has two different working modes: **Road Mode** and **Track Mode**.
The main differences between **Road Mode** and **Track Mode** are:

- **Road Mode** is fully compatible with signals, connections and features of the original dash and offers a higher flexibility of layout, colours and information to be shown; it records data manually enabling the recording as explained in paragraph 4.1
- **Track Mode** is intended for drivers that go frequently on a track; it records using RPM or speed.

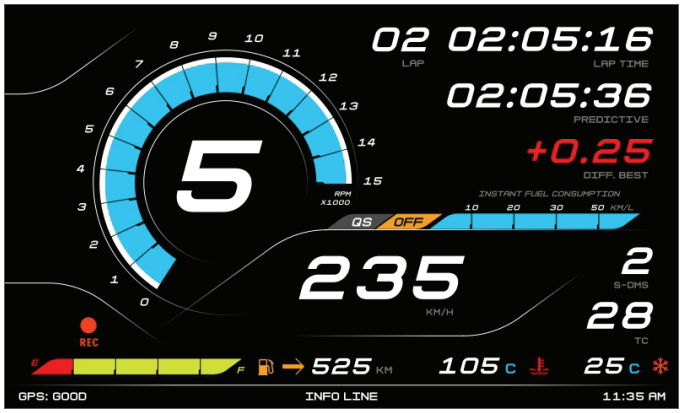
You may swap between the two modes entering "Mode" option in "Bike settings" Menu.
The images here below show some examples of possible pages layout.

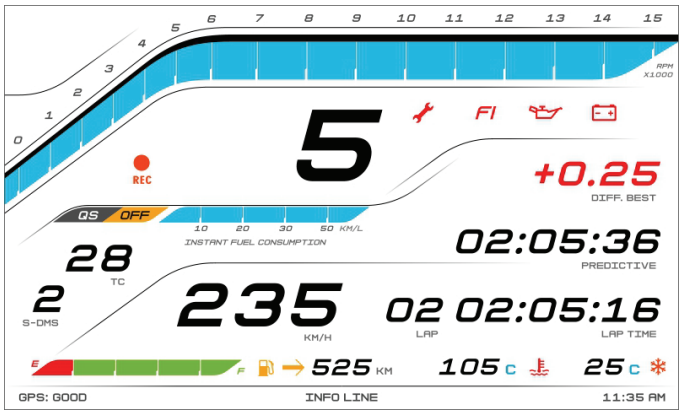
Road layout.



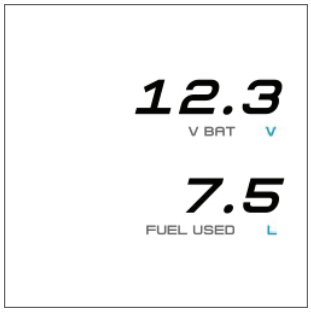


Track layout





In road pages VBattery and Fuel used are shown while in track pages all Lap information are shown.



4.1 – Lap Times

MXPS **automatically** calculates and shows lap times using GPS Module; in our track database you will find a huge number of tracks all over the world. Simply send the tracks information to your dash and it will use the coordinates to automatically recognize the track you are driving on and calculate lap times.

When you switch the bike on near a track the Module automatically recognizes it, loads the start/finish coordinates and calculates lap times when these coordinates are crossed. If your track is not in the database you may always create and load it in the database using Race Studio 3 software, freely downloadable from AiM website at:
https://www.aim-sportline.com/en/sw-fw-download.htm

4.2 – Icons

Thanks to the wide number of icons available on its display, the dash-logger shows a good amount of information. Here follows explanation of their meaning and working mode.

Service
Service needed

Fault Indicator
It warns that the bike has a problem

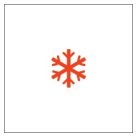
Oil pressure
It turns on when the bike engine detects a problem with oil pressure.

Battery
The battery voltage is lower than 10V

REC
The logger is recording

Water Temperature
When water temperature is over 105°C/180°F the icon switches on

Left Fuel
The number right of the icon indicates how many km/miles the bike can run with the remaining fuel



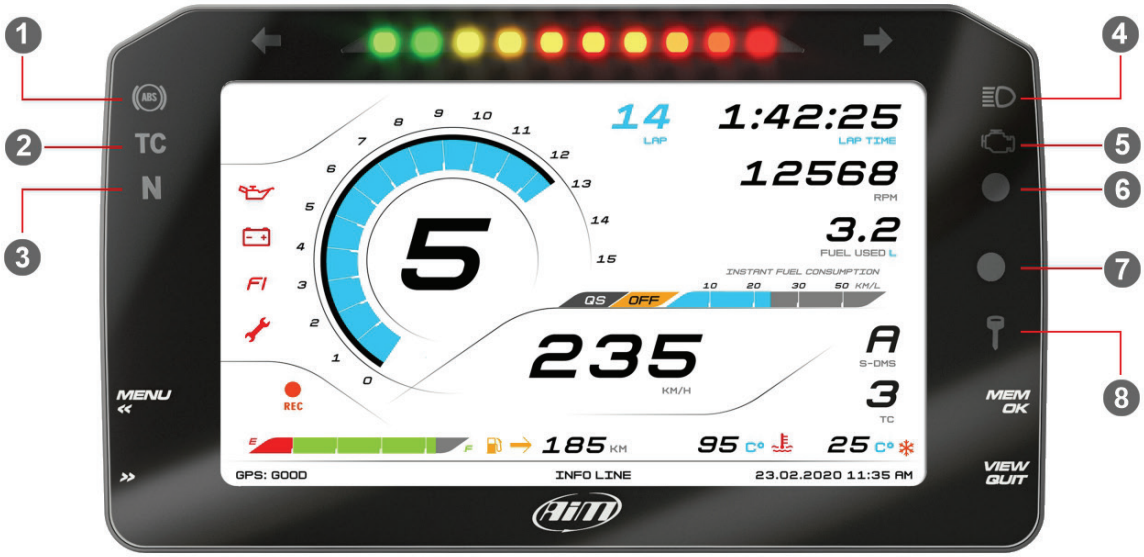
Ambient temperature
It switches on when the temperature outside is lower than 3°C/37°F.

4.3 – LEDs

With reference to the image here below MXPS features different icons and an Alarm LED that gives you these information.

- ABS active/error (**1**)
- Traction control active/error (**2**)
- Neutral gear on (**3**)
- High beam on (**4**)
- Engine MIL (Malfunctioning indicator lamp) (**5**)
- Configurable LED (**6**): the LED can have three colours that correspond to different priority levels:
    - Red: priority 1
    - Green: priority 2
    - Blue: priority 3

  Only the LED corresponding to the higher priority switches on
- Light sensor (**7**)
- Immobilizer on (**8**)



In the upper part of the dash logger are 10 LED customizable as shift lights.

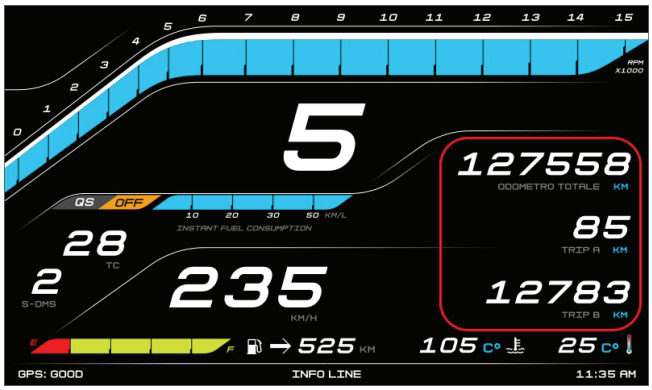
Please note: to set the configurable LEDs and the shift lights you need AiM Race Studio 3 software you can freely download from www.aim-sportline.com software/firmware download section. Please refer to paragraph 6.2.8 for further information about shift lights configuration.

4.4 – The bike keyboard

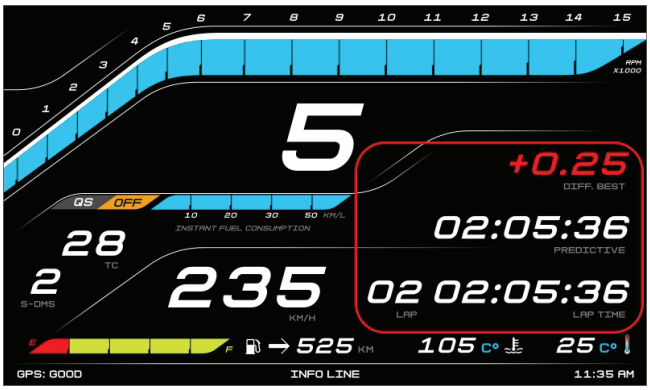
Suzuki bike features a big grey button with different icons on the left handlebar.

The grey button, shown above, can be used to change the page shown by MXPS. Click "**Down**" icon and the dash shows, in loop:

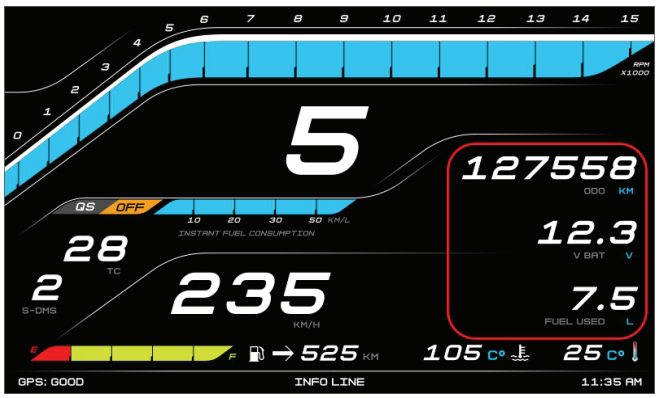
- ODOMETER page
- LAP page
- ROAD page
- USER page
- Quickshift page



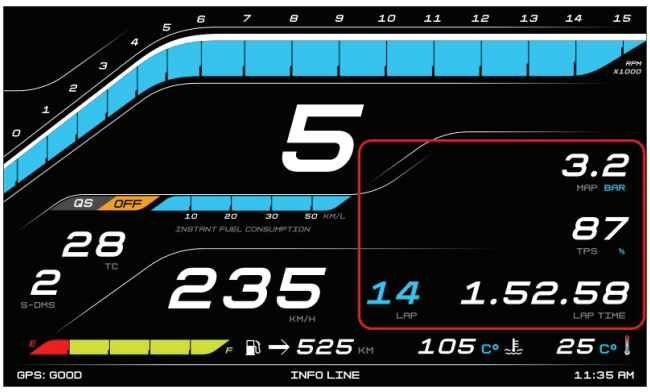
Odometer page



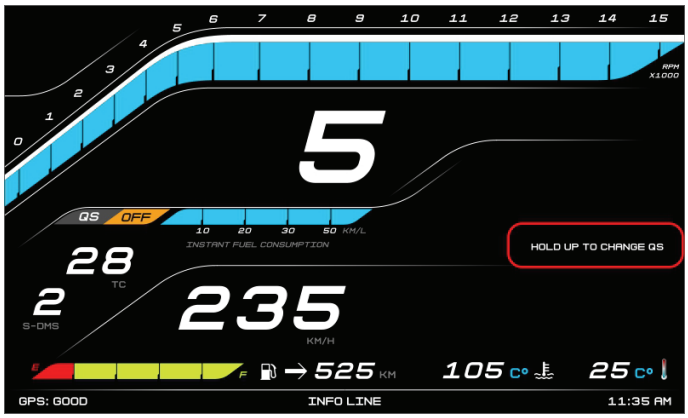
Lap page



Road page



User page



Quickshift page

Pressing "**Up**" icon it performs different operations according to the page it is showing:

- in ODOMETER page: it resets user "1" odometer
- in LAP page with the bike in "Road" mode: it starts/stops manual recording if pressed for 5"
- in "ROAD" page: it resets the fuel odometer
- in "Quickshift" page: it changes quickshift setting (if installed and configured from the menu)
- in "USER" page has no function

"**Left**" and "**Right**" icons are to activate the turning light on the bike.

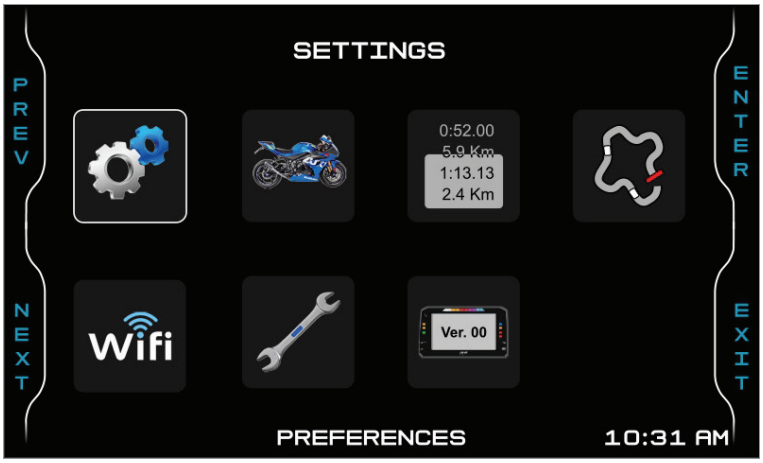
The red button on the right handlebar is not used by MXPS so please refer to Suzuki user manual to know its working mode.

4.5 – Data Recording

In **Road Mode** data recording is disabled. To enable it push for 5 seconds "UP" icon on the big grey button of the left handlebar and push it again for 5 seconds to disable it.
In **Track Mode** data recording is automatically enabled and activates when RPM reaches 1500 and speed is higher than 10 km/h.

5 – Menu

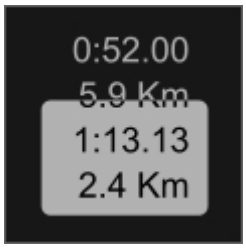
Push **MENU** to enter MXPS settings "Menu" and set some parameters. **Please note**: this is possible only if the bike is stationary.



Use "**PREV**" and "**NEXT**" buttons to scroll the options and "**ENTER**" to select the desired option. The icons stays for.

Preferences

Bike Settings



Trip

Track Manager*

WI-FI

Service

System

* **Please note: Track Manager** menu voice only is available if a GPS09 Module is connected.

5.1 – Preferences

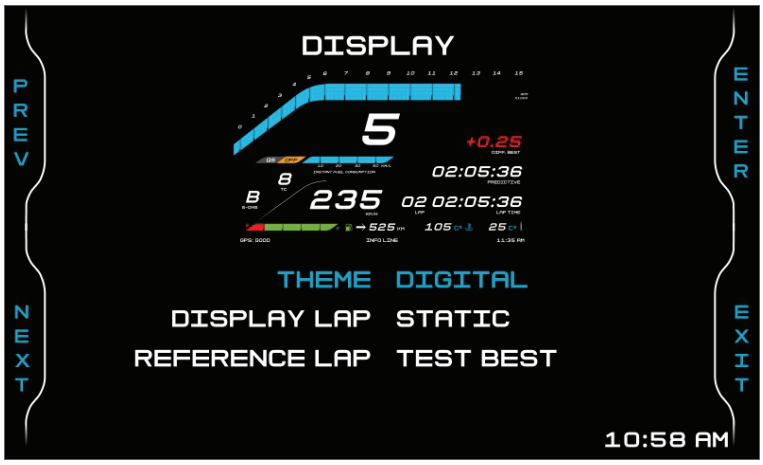
To configure the functionalities of the bike select the icon here above and press "**ENTER**" to change the selected parameters.

The parameters you may set are:

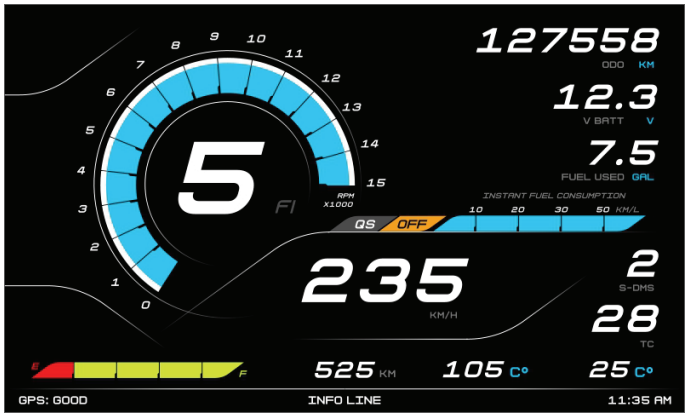
- Display
- Units
- Date Time
- Brightness
- Rear Camera (it appears only if the rear camera is enabled in "Bike settings" –> "Modules" menu (paragraph 5.2.2)

5.1.1 – Display

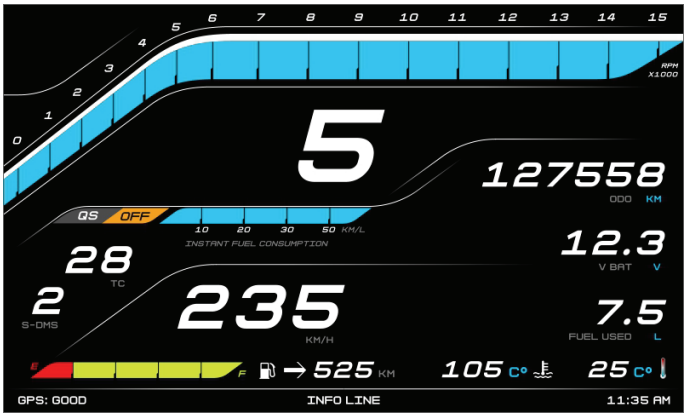
Pressing "**ENTER**" you enter "Display" page where you can select MXPS display layout.



You may choose among two different **Themes** (layouts): Analog or digital.



Analog layout



Digital layout

Lap time can be displayed (**Display Lap**) as:

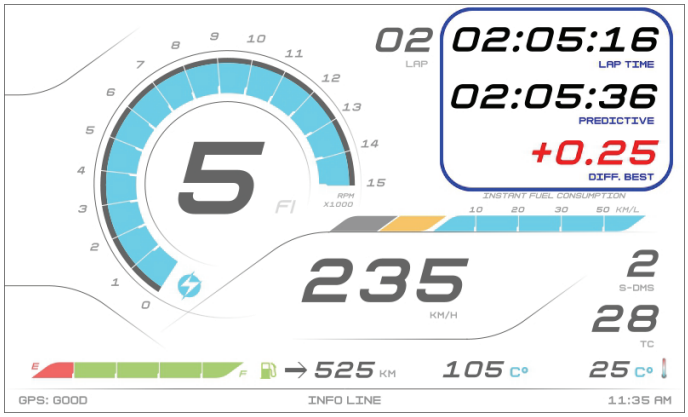
- predictive: shows predictive lap time
- session: shows the time elapsed since MXPS started recording in this session
- static: shows last recorded lap time
- best: shows best recorded lap time

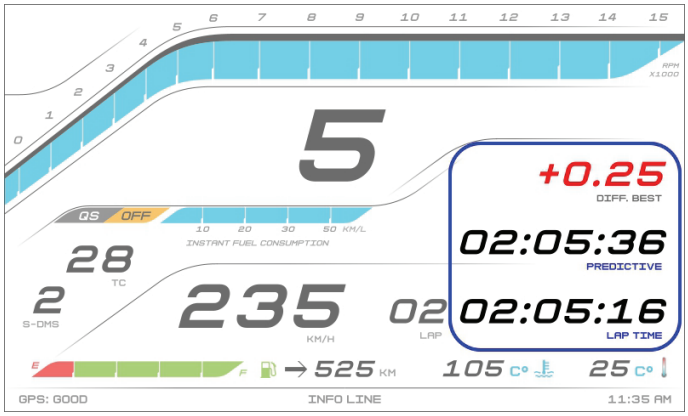
Both predictive Lap Time and best lap time need a **reference lap** and you can choose between:

- test best: the best recorded lap time of this test
- day best: the best recorded lap time of the day
- last lap: the last recorded lap time

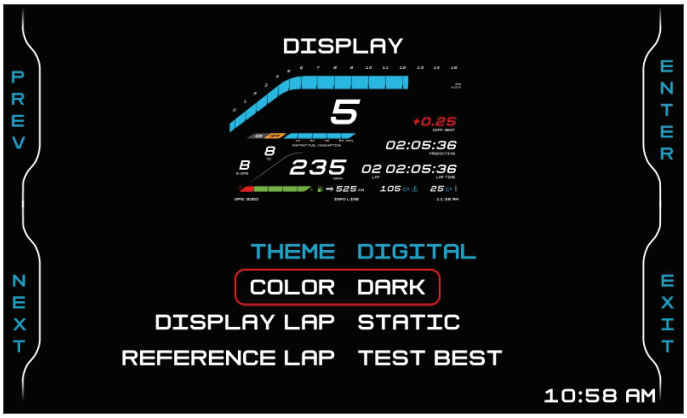
With reference to the images below MXPS display shows three different lap information:

- labelled “lap time” is rolling lap time, always available: displays rolling lap time until start/finish line is crossed; than lap time is displayed for a while before starting rolling again
- labelled “predictive”, “session”, “static” and “best” shows lap times in the different ways according to “Display Lap” setting;
- labelled “Diff best”: shows the difference between the current lap and the one set as reference lap

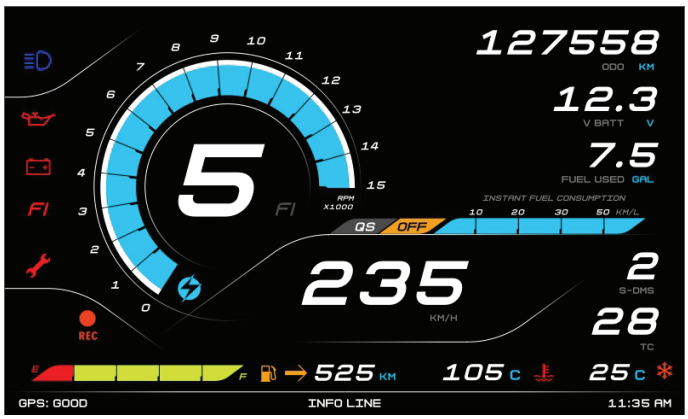




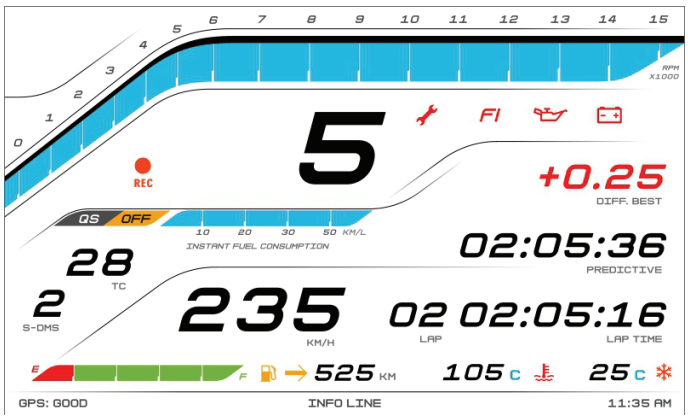
If Display brightness (paragraph 5.1.4) is set “Manual” the additional menu voice “Color” shows up as shown here below.



This menu allows to set the display as “Dark” (black background) or “Light” (White background) for improving the visibility in any light condition.



Analog Road layout in **Dark** mode



Digital Track layout in **Light** mode

5.1.2 – Units

In this page it is possible to set the logger main measure units:

- Speed: KM/H or MPH
- Temperature: CELSIUS or FAHRENHEIT
- Volume: GAL (Gallons) or UKGAL (UK Gallons) or L (Litres)

Use:

- "**PREV**" and "**NEXT**" buttons to select an option
- "**CHANGE**" button to set the option
- "**EXIT**" to save and quit.

5.1.3 – Set Date Time

Here you can set MXPS date and time.

Use:
- "PREV" and "NEXT" buttons to select an option
- "ENTER" button to set the option
- "EXIT" to quit.

The images below show Time and Date setting page. The buttons works as follows:
- "**PREV**" and "**NEXT**" scroll the options
- "**CHANGE**" changes the format/increases the digit
- "**EXIT**" quits and save

5.1.4 – Brightness

MXPS display Brightness can be set as "AUTO" (default) or "MANUAL" as shown here below.

In **Auto** Mode you may:

- set **Day Level:** at the desired threshold the dash logger commutes the display brightness and the display background colour
- set **Night Level**: when the Light Sensor reads a brightness level higher than the threshold, the display is enlightened at the level defined in this parameter and the display background colour switches to white.

In **Manual** Mode you simply set one level of brightness and it stays regardless the external light conditions.

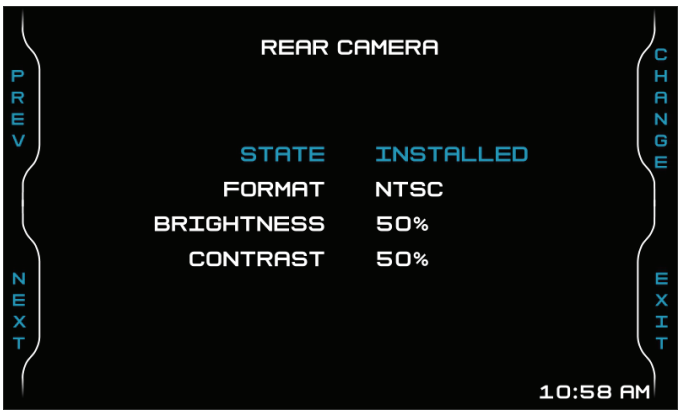
5.1.5 – Rear Camera

Once the rear camera enabled in Modules menu (Bike Settings –> Modules, paragraph 5.2.2) this menu voice shows up in Preferences menu. Pressing "**ENTER**" you enter the related page. Available options are:

- State: installed/not installed
- Format: NTSC/PAL
- Brightness and contrast: from 10% to 50%

The page is shown for a few seconds and then the message "INSTALLED" is shown steady. Use:

- "PREV" and "NEXT" to scroll the option
- "CHANGE" to change the setting
- "EXIT" to quit and save



5.2 – Bike Settings

Here you can set your bike. Use:

- "**PREV**" and "**NEXT**" buttons to scroll the options
- "**ENTER**" button to change the setting (for LOG MODE only to switch from "Track" to "Road") or enter the option
- "**EXIT**" to quit and save

5.2.1 – Modes

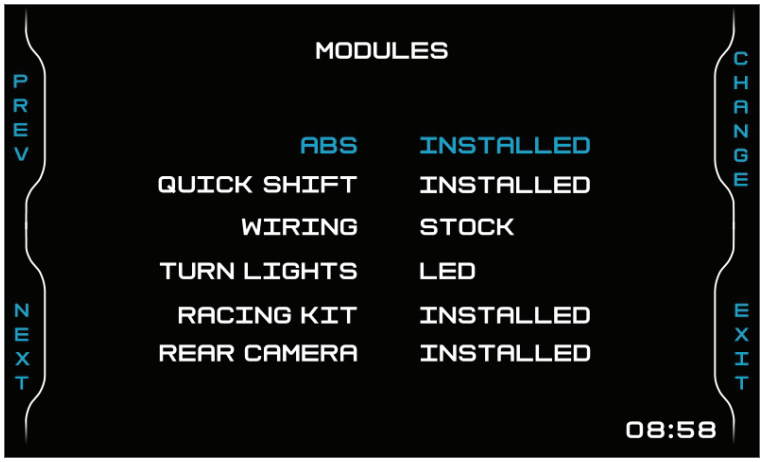
Using "ENTER" button you can switch from track (default) mode to road. They work as follows:

- **Track mode**: starts recording when RPM is greater than 1500 or speed is higher than 10km/h
- **Road mode**: automatic recording is disabled by default but can be enabled from "LAP" page pressing "UP" for 5".

5.2.2 – Modules

Suzuki bikes can feature different additional modules according to models and years. They are:

- ABS: installed/not installed
- Quickshift: installed/not installed
- Wiring:
    - Stock
    - Racing: **please take note** that setting this wiring features like side stand alarms and turning lights are disabled
- Turn Lights: Led/Bulb
- Racing kit (optional): installed/not installed
- Rear Cam(era): installed/not installed



5.2.3 – Correction factors

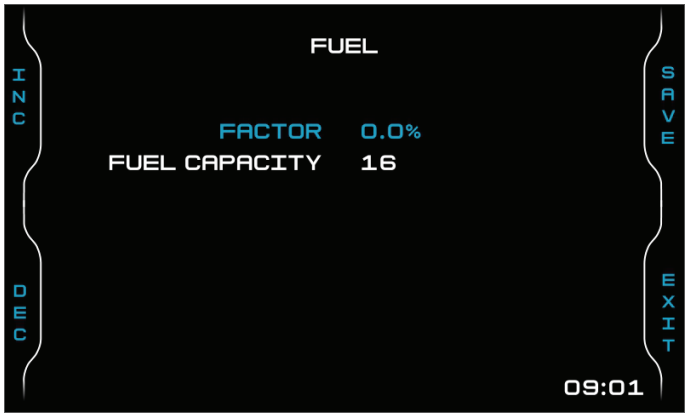
Correction factors can be applied for more precise information concerning Speed and Fuel. To set **Speed correction factor**:

- press "**ENTER**"

- use "**INC**" and "**DEC**" buttons to set the parameters (allowed values are between -15% and +15%)
- press "**EXIT**" to save and quit

To set **Fuel correction factor**, scroll to Fuel option and:

- press "SEL" button
- use "INC" and "DEC" buttons to set the parameters (allowed values are between -15% and +15%)
- press "SAVE" to save the setting and "INC"/"DEC" buttons switch to "PREV"/"NEXT"
- scroll to "Fuel capacity" and fill in the bike tank fuel capacity: allowed values are between 15 and 25 on any measure unit (see paragraph 5.1.2 for further information)
- press "SAVE" and then "EXIT" to quit and save



5.3 – Trip

MXPS offers five different odometers. One of them (labelled "System") is not resettable while the others are. The first two odometers are used to show total and partial mileage. The others are mainly used in races. To enable/disable (active/stop)/reset any odometer:

- press "**CHANGE**" button
- scroll the option up the one you want to set and press "**CHANGE**"
- press "**EXIT**" to save and quit

5.4 – Track Manager (if GPS Module is connected only)

Track Management is intended for the driver that uses his bike on a track, both for races and track days. In order to take advantage from Track management, you have to install the GPS09 Module included in the kit. This is used for:

- Lap time calculation
- Predictive lap time calculation

To calculate these data the system needs to know the start/finish line coordinates of the racetrack you are racing on: MXPS comes with a long list of the world main tracks, constantly updated by our technicians and automatically loaded to your PC when you run Race Studio 3 software and a Wi-Fi connection is available.
MXPS provides two track selection modes:

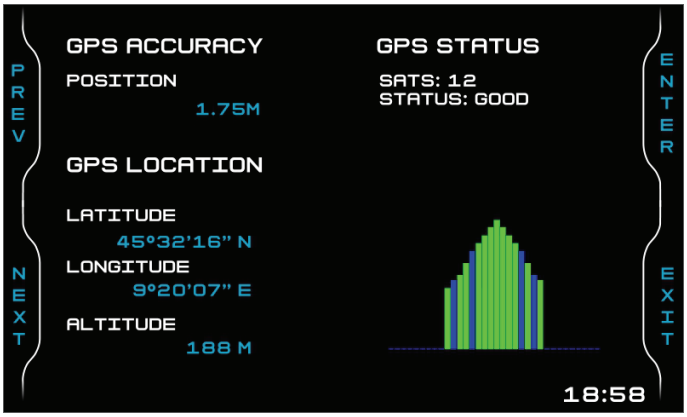
- automatic
- manual

Automatic:
MXPS automatically recognizes the track you are running on, loads the start/finish line and the possible splits coordinates and calculates lap and split times. This is the best mode in most cases.

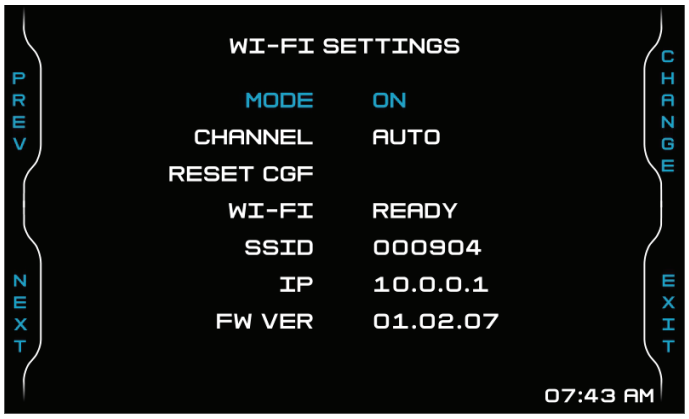
Manual:
In this mode you may select the track from the internal database. This mode is to prefer when multiple track configurations are available nearby. In this case MXPS would need at least one complete track lap to recognize the track.
You can scroll the list of available tracks choosing among these options:

- nearest: shows only tracks in a 10 km distance
- all: shows all tracks stored in the system in alphabetical order
- custom: shows only the tracks you have previously created (please refer to track manager documentation you find in documentation area, software section of www.aim-sportline.com for further information)

Scrolling the menu options you can see all information supplied by the connected GPS09 Module.



5.5 – Wi-Fi



MXPS features a Wi-Fi module to communicate with the PC. It is mainly used to:

- configure MXPS shift lights
- configure MXPS expansion modules (SmartyCam stream included)
- download data to the PC
- calibrate sensors (as explained at paragraph 6.4.2)
- download sampled data to the PC after the test

All these functionalities are explained in chapters 6 and 8.

Wi-Fi available **Modes** are:

- Auto: Wi-Fi is ON when the bike is stopped and OFF when the bike is moving
- ON: Wi-Fi is always on
- OFF: Wi-Fi is always OFF

"**Wi-Fi Reset CFG**" resets the Wi-Fi configuration and is very useful if you forget the password:

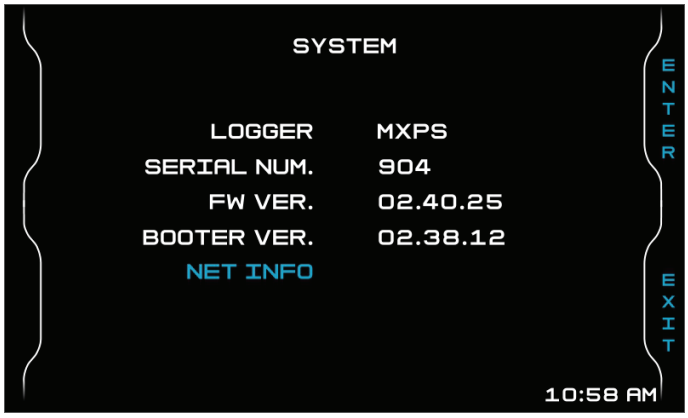
- press "SEL" to reset Wi-Fi configuration

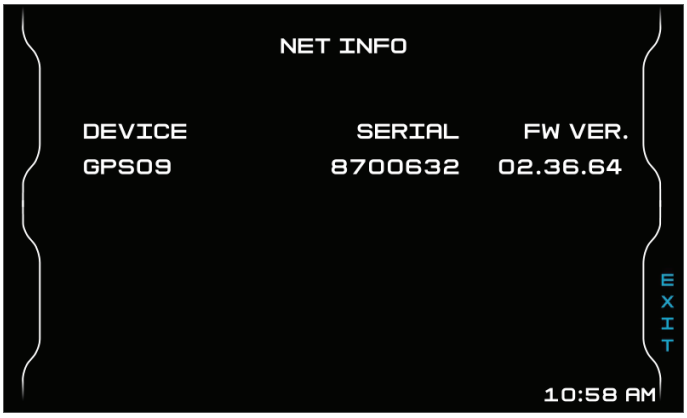
5.5 – Service

Using the Suzuki Dealer mode you can set a service warning based on a defined mileage or date. Standard users can only see the default setting. When you get the date/mileage indicated, you are informed on the display that a service is requested.

5.6 – System

This page (left image below) shows serial number, firmware and booter version of your MXPS. If any AiM expansion is connected to MXPS "Net info" option shows up. Pressing "**ENTER**" you see the network information page (right image).





6 – The optional additional harness

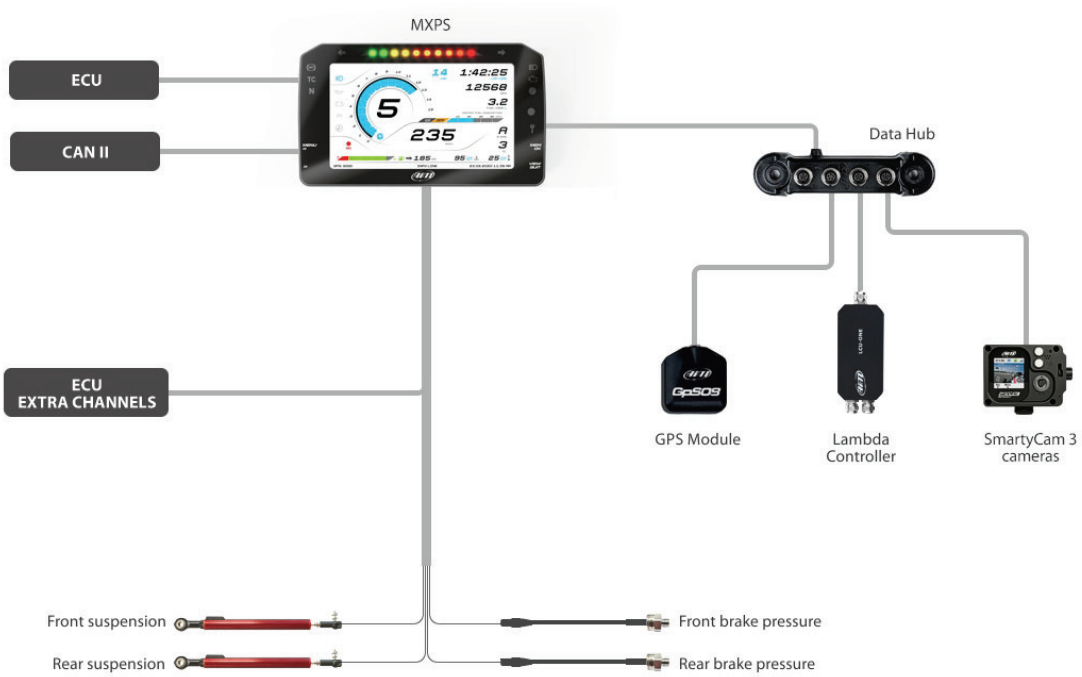
If you are going to use your bike on a track for track days or competition and wish to take the maximum advantage from your MXPS, we suggest you to install the optional harness that supplies 4 analogic channels and the K-Line.

GPS09 Module is used for:
- recognizing the Track you are running on
- calculating Lap times

Analog input and K-Line additional harness let you connect:
- four analog sensors, such as potentiometers, pressure sensors etc.
- the ECU K-Line that let MXPS receive and record additional data from the ECU. **Please note**: the additional cable needed for K-line connection is included in the optional additional harness.

The steps to follow are:
- connect the harness
- connect the sensors to the analog inputs
- connect the K-line cable to the K-line port of the harness and to the ECU
- connect MXPS to the PC
- configure MXPS according to the sensors you have installed
- calibrate the sensors
- run your test
- download the data, in order to analyse them

You may always have a quick review of your data on the display without downloading them with Data Recall (press MEM/OK button)



6.1 – Connection to the PC

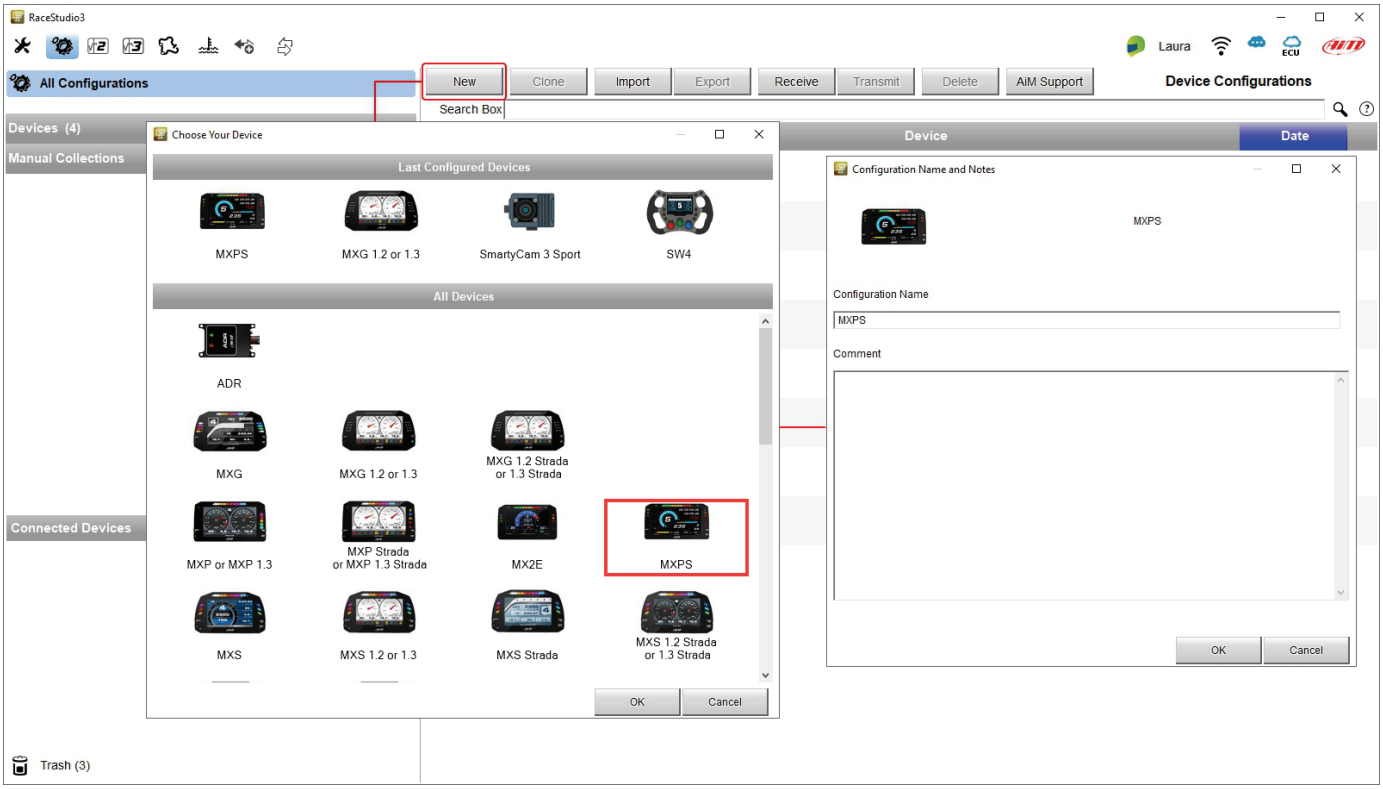
You can configure MXPS, manage its tracks database as well as check other device functions through Race Studio 3 software, freely downloadable from our web site www.aim-sportline.com.
You may connect it to the PC via Wi-Fi or using an optional USB cable (part number V02563030):

- using a Wi-Fi connection, please refer to chapter 9 where Wi-Fi configuration is explained
- using an USB connection, plug the cable in the port labelled "USB" in the back of the dash logger.

6.2 – Configuration

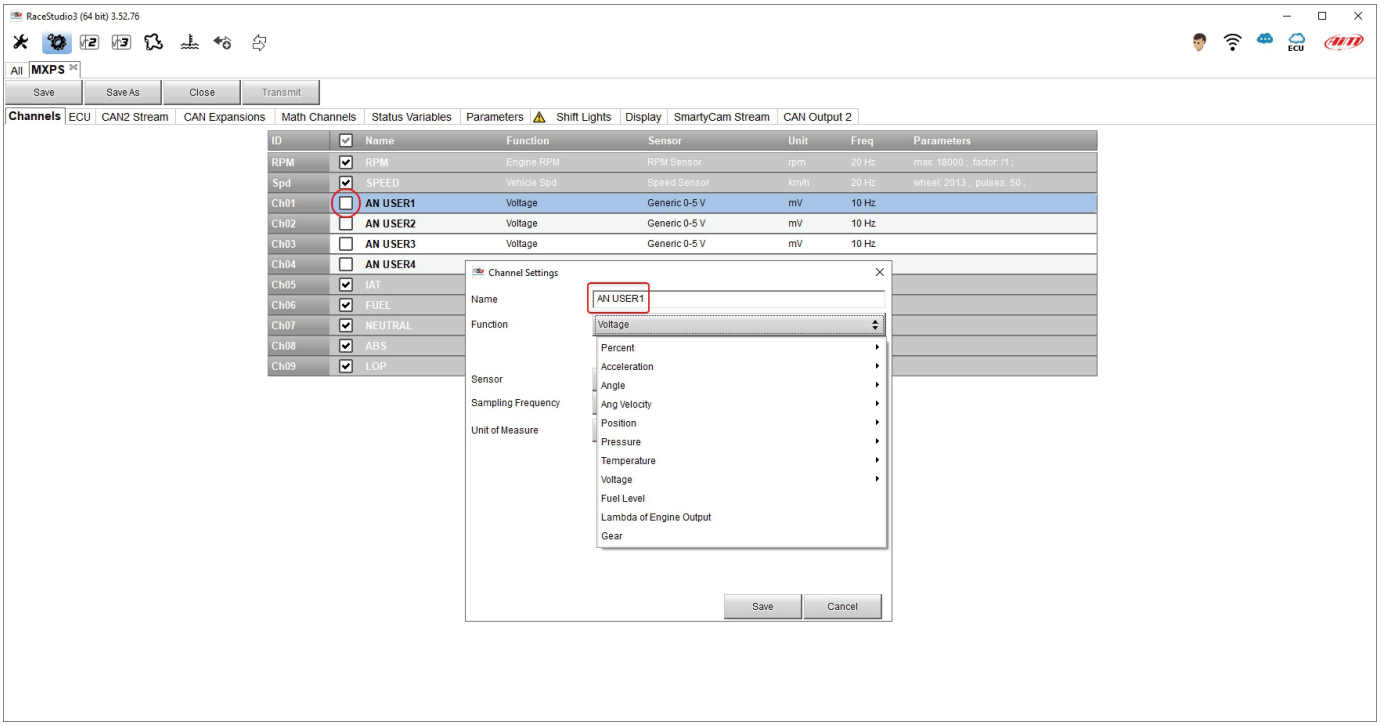
Once MXPS connected to the PC

- click "Configurations" icon and configurations page appears
- click "New" and new configuration panel appears: select an "MXPS" logger and press "OK"; when performing subsequent configurations "Select Configuration" panel will show the last four devices you configured on top.



6.2.1 – Channels configuration

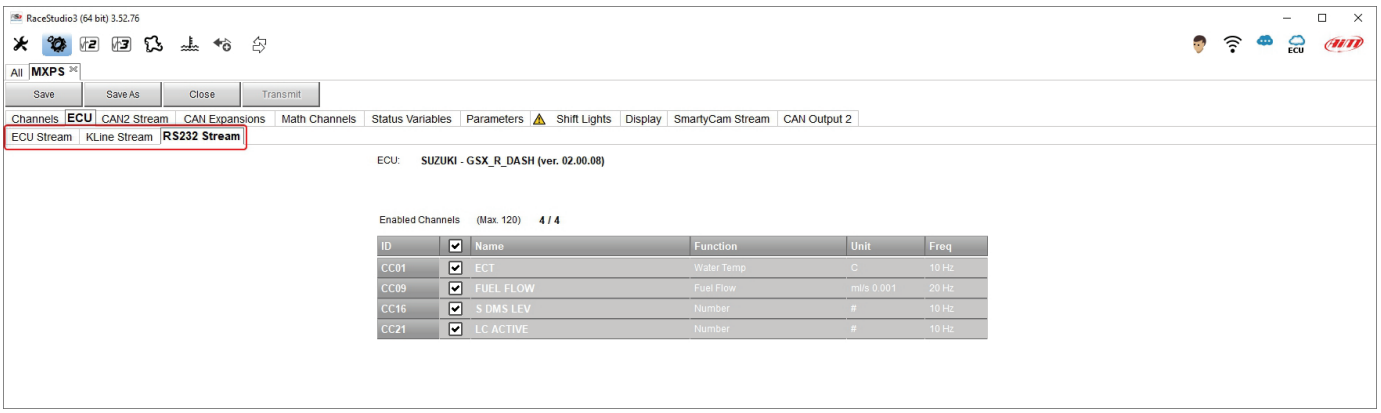
Once MXPS selected and the configuration created, Race Studio 3 enters “Channels” tab.
MXPS features four analog channels you can configure according to the sensor connected. Opening “Function” menu you can select the one that fits the sensor you connected and the required parameters are shown. Fill in the requested information and repeat the operation for all sensors you connected.



6.2.2 – ECU

"ECU" tab cannot be modified and shows all channels supplied by the bike:

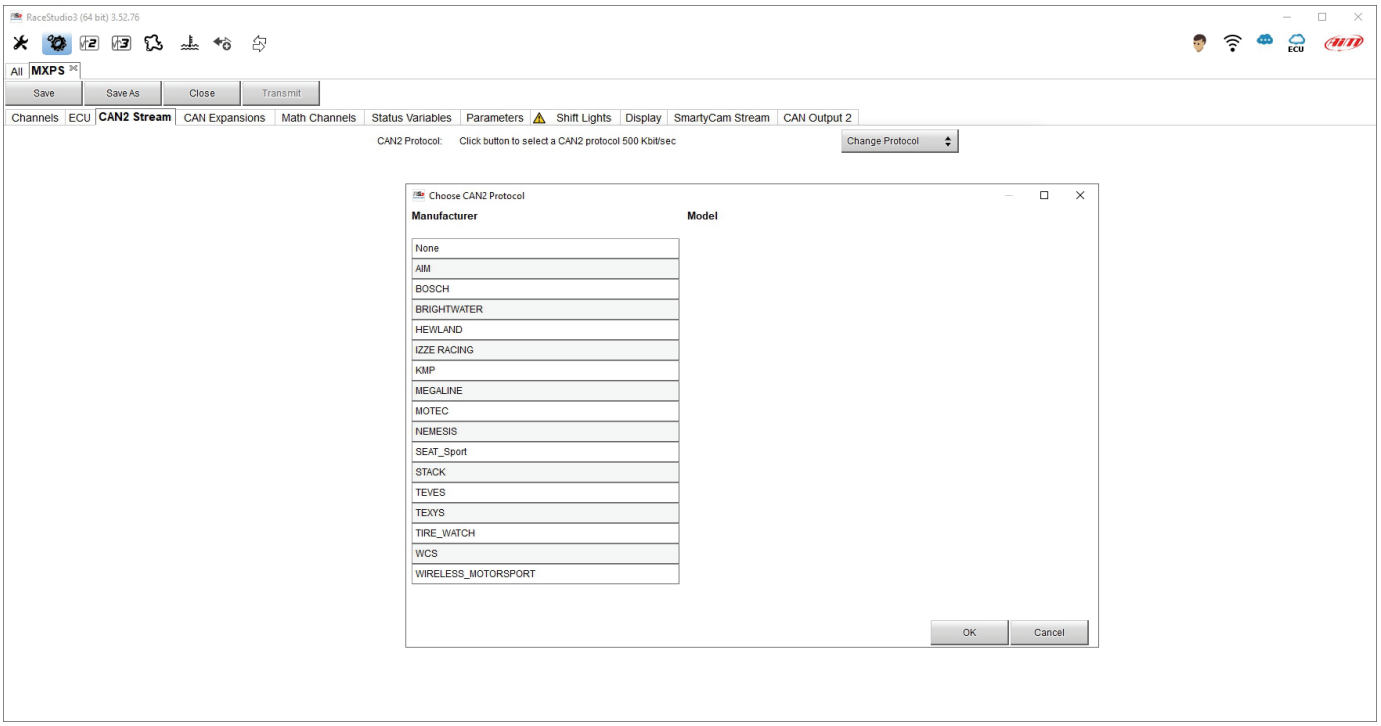
- the ECU (ECU Stream)
- the K-Line (Kline stream)
- the serial stream (RS232 Stream)



6.2.3 – CAN2 Stream

Here you can find additional CAN modules. To load additional CAN protocol modules:

- enter "CAN2 Stream" tab
- at the very first configuration a panel showing all supported non AiM external modules shows up; afterwards press "Change protocol" button
- select "Manufacturer" and "Model"
- press OK

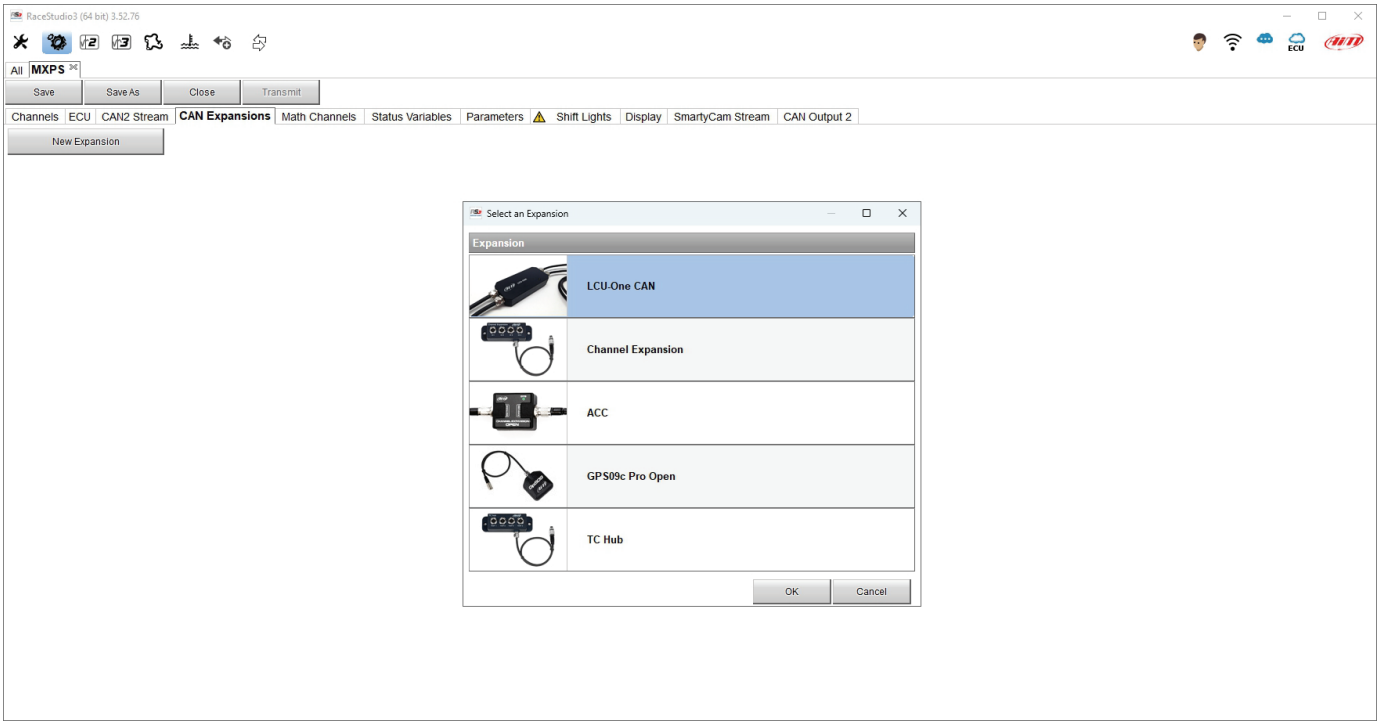


6.2.4 – CAN expansions configuration

MXPS can be connected to these AiM CAN Expansions:

- LCU-One
- Channel Expansions
- ACC
- GPS09c Pro Open
- TC Hub

To configure the expansion activate the related tab. At the very first MXPS connection this page shows up:

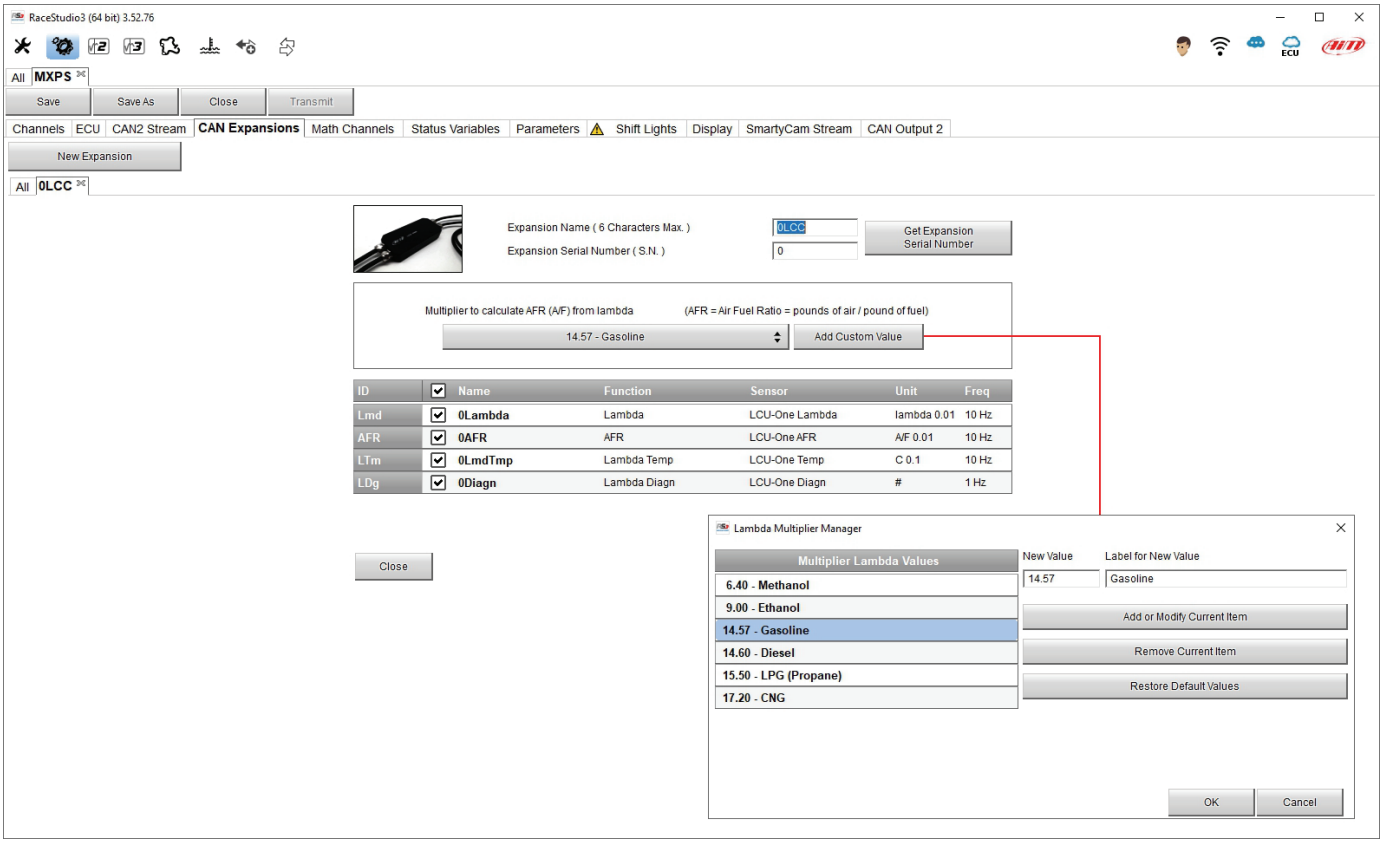


Select the CAN expansion to set and press “OK”. Each expansion needs to be set filling in the related panel.

Setting LCU-One CAN

To set an LCU-One CAN:

- press “New Expansion” button;
- select “LCU-One CAN” and press OK
- name the LCU One and fill in its serial number or press “Get SN from a connected expansion” to receive it from the connected LCU-One
- select the multiplier to calculate AFR from lambda (in the example “14.57 Gasoline”) or add a custom value pressing “Add Custom Value” (the related panel shows up)
- set the LCU One channels double clicking on each channel and setting the panel that shows up
- press “Close” to save and exit

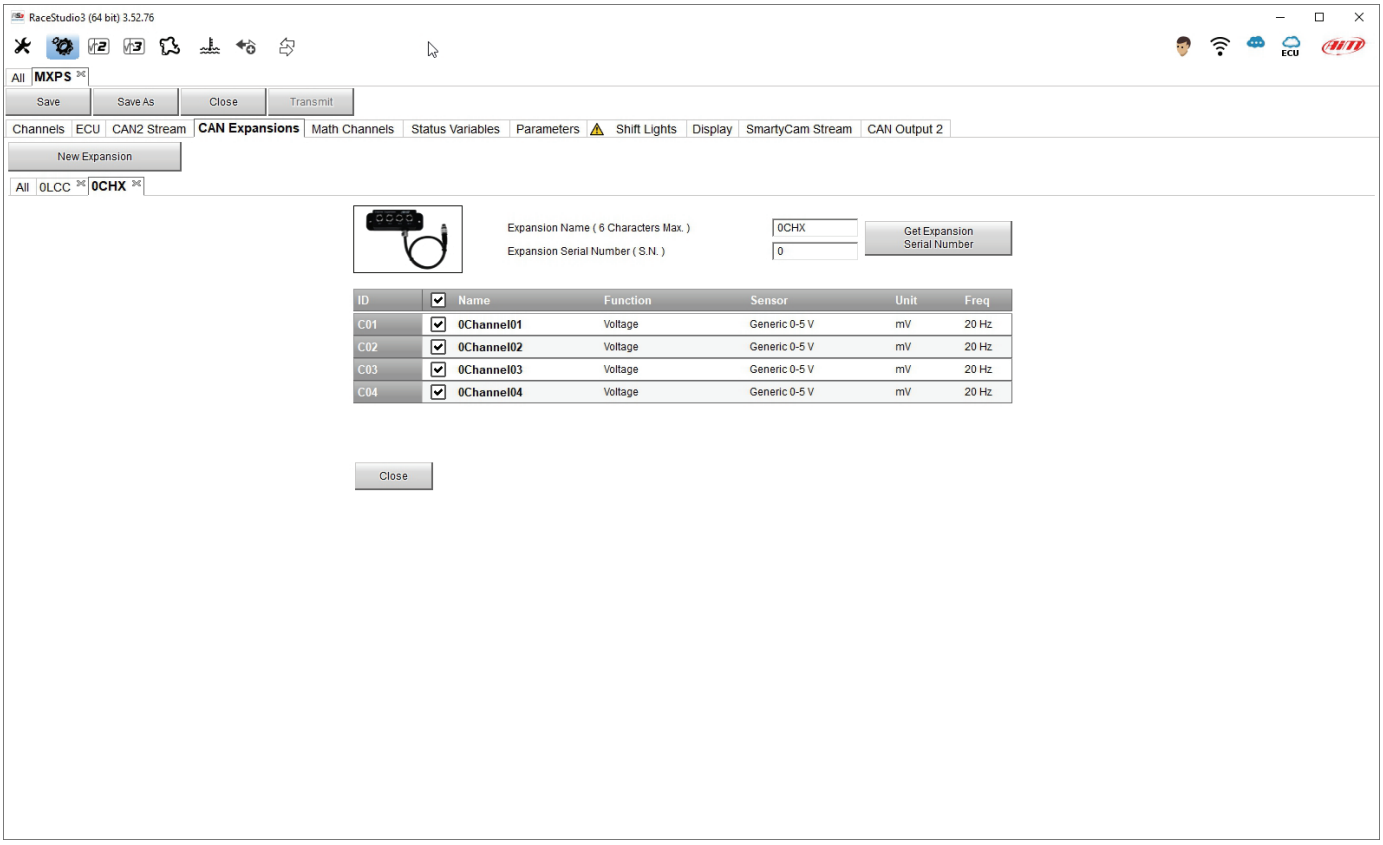


Please note: for any further information about AiM CAN Expansions refer to the related user manuals you can download from AiM website www.aim-sportline.com documentation area, products section.

Setting Channel Expansion

To set a Channel Expansion:

- press “New Expansion” button; if you have already set an LCU-One CAN Channel Expansion layer appears.
- select “Channel Expansion” and press OK
- name the Channel expansion and fill in its serial number or press “Get SN from a connected expansion” to receive it from the connected Channel Expansion
- set each channel double clicking on each channel and setting the panel that shows up
- press “Close” to save and exit

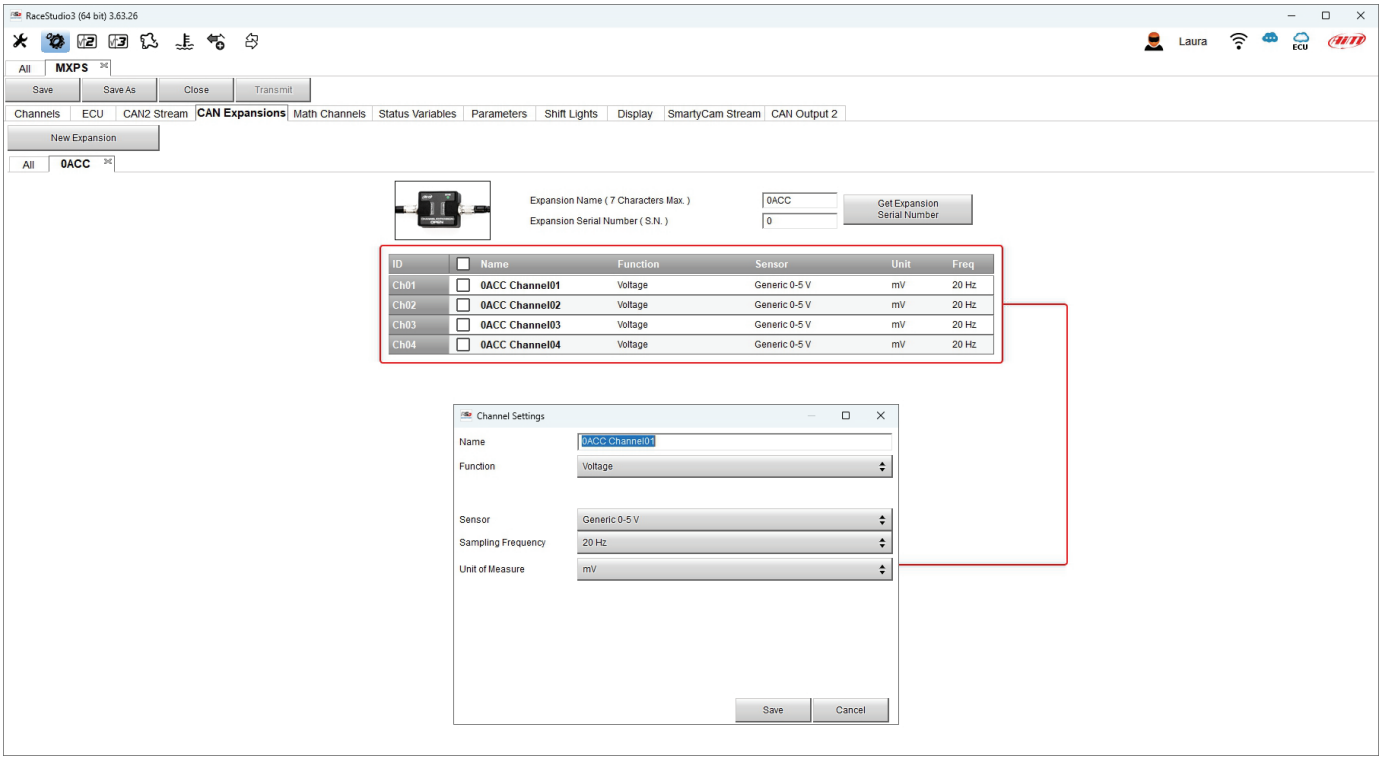


Please note: for any further information about AiM CAN Expansions refer to the related user manuals you can download from AiM website www.aim-sportline.com documentation area, products section.

Setting ACC (Analog CAN Converter)

This expansion supplies four additional channels and can support all sensors, except for thermocouples. To set an ACC:

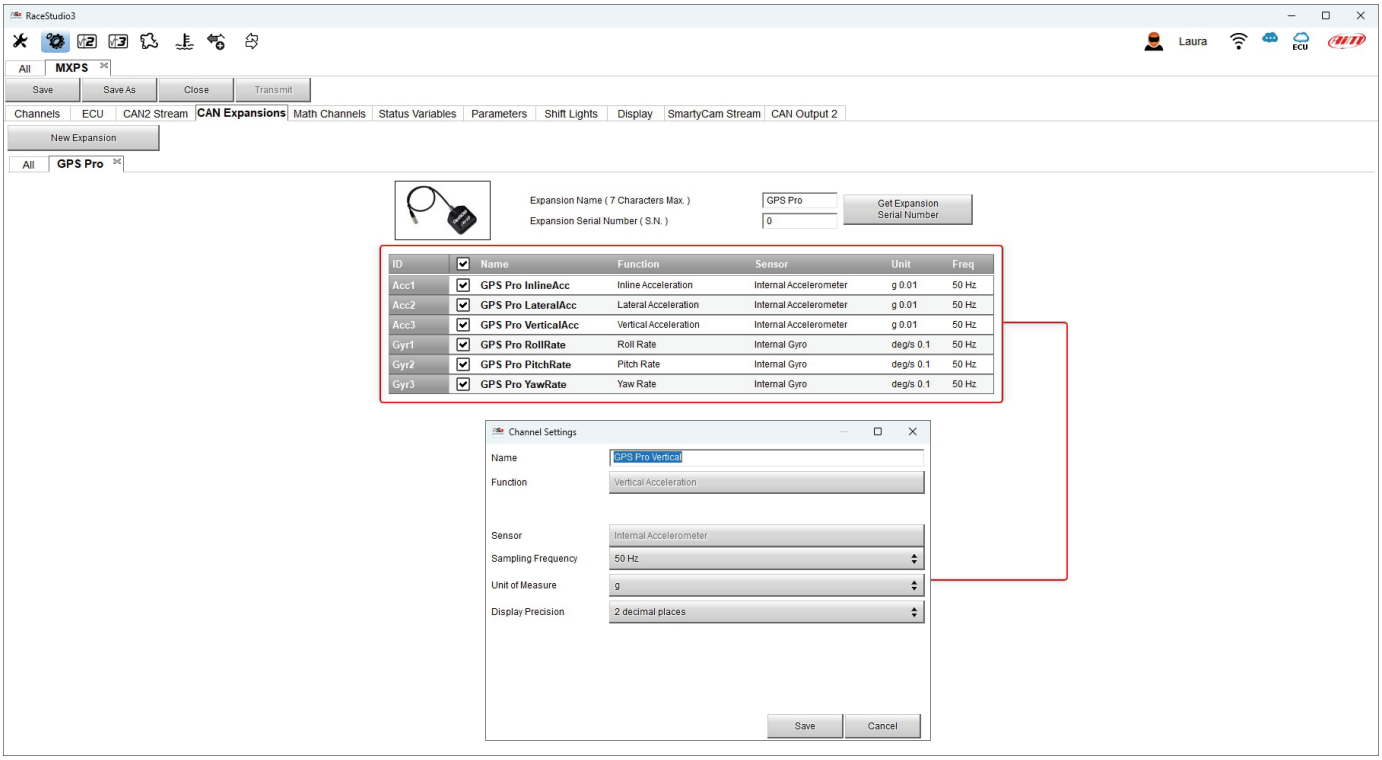
- press “New Expansion” button;
- select “ACC” and press OK
- name the ACC and fill in its serial number or press “Get SN from a connected expansion” to receive the serial number from the connected ACC
- for each channel set sensor type, sampling frequency, measure unit, display precision and any other required parameter
- press “Save” to save and exit.



Setting GPS09c Pro Open

This Module supplies an additional inertial platform. To set a GPS09c Pro Open:

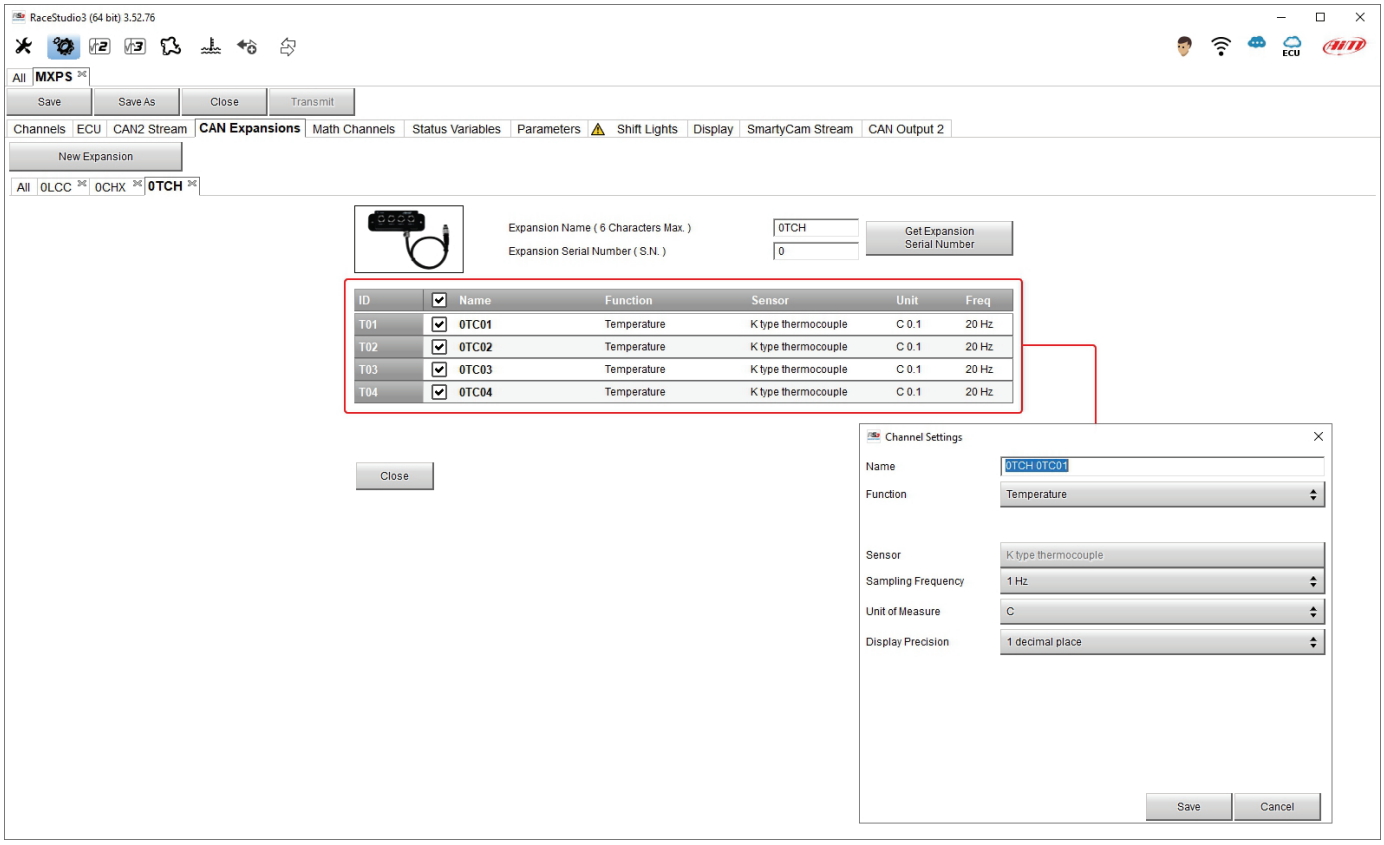
- press “New Expansion” button;
- select “GPS09c Pro Open”and press OK
- name the GPS and fill in its serial number or press “Get SN from a connected expansion” to receive the serial number from the connected GPS
- for each channel set sampling frequency, measure unit and display precision
- press “Save” to save and exit.



Setting TC Hub

To set a TC hub:

- press “New Expansion” button;
- select “TC Hub” and press OK
- name the TC Hub and fill in its serial number or press “Get SN from a connected expansion” to receive the serial number from the connected TC Hub
- for each channel set sampling frequency, measure unit and display precision
- press “Close” to save and exit.

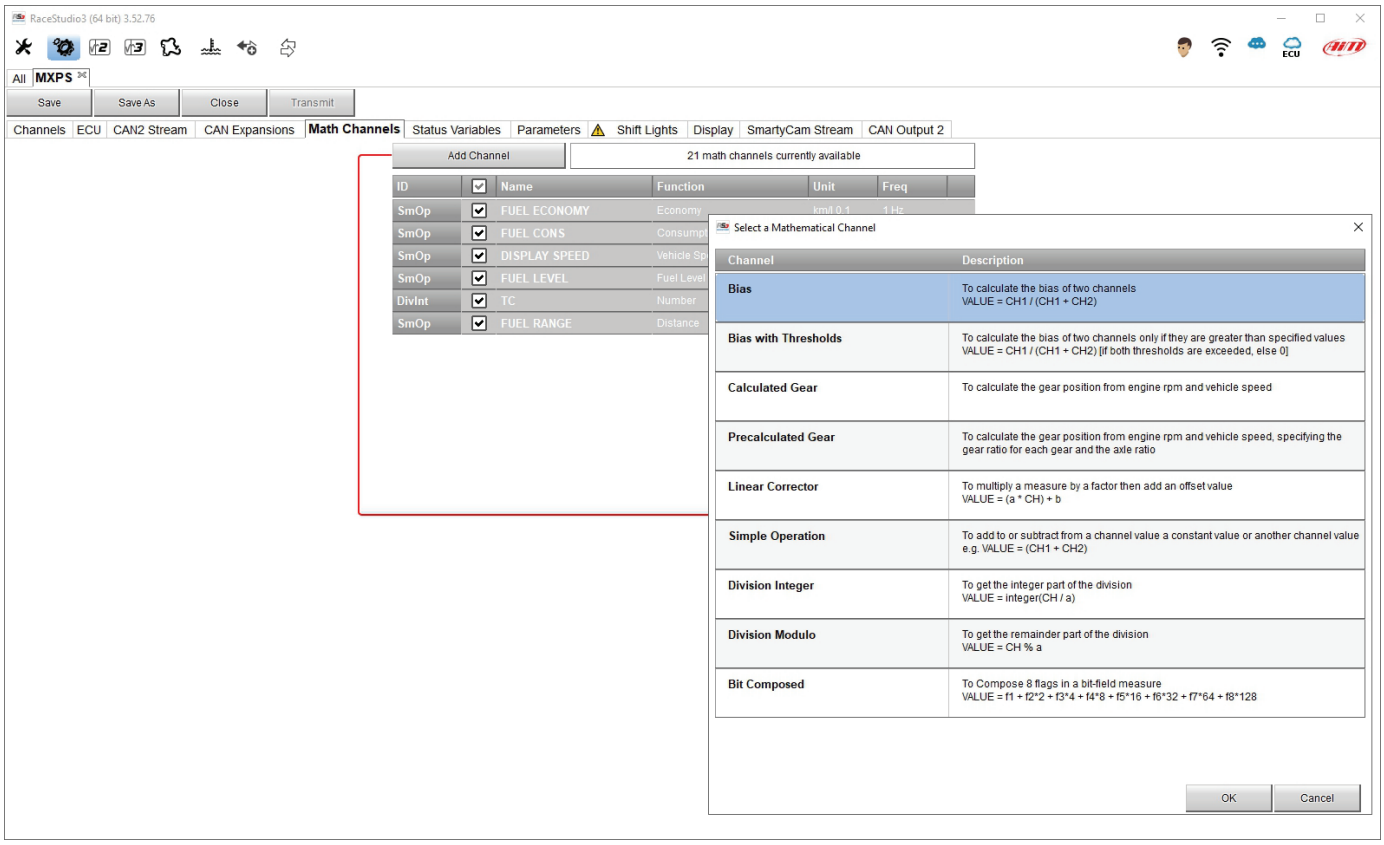


Please note: for any further information about AiM CAN Expansions refer to the related user manuals you can download from AiM website www.aimshop.com documentation area, products section.

6.2.5 – Math Channels

MXPS features a selection of pre-defined Math Channels but you can add custom math channels selecting them in the dedicated panel. To add a Math Channel press “Add Channel” and the selection panel shows up.

Each Math channel type is quickly explained and double clicking on the desired type the related setting panel shows up. You only need to fill it in and press ok.



6.2.6 – Status Variables

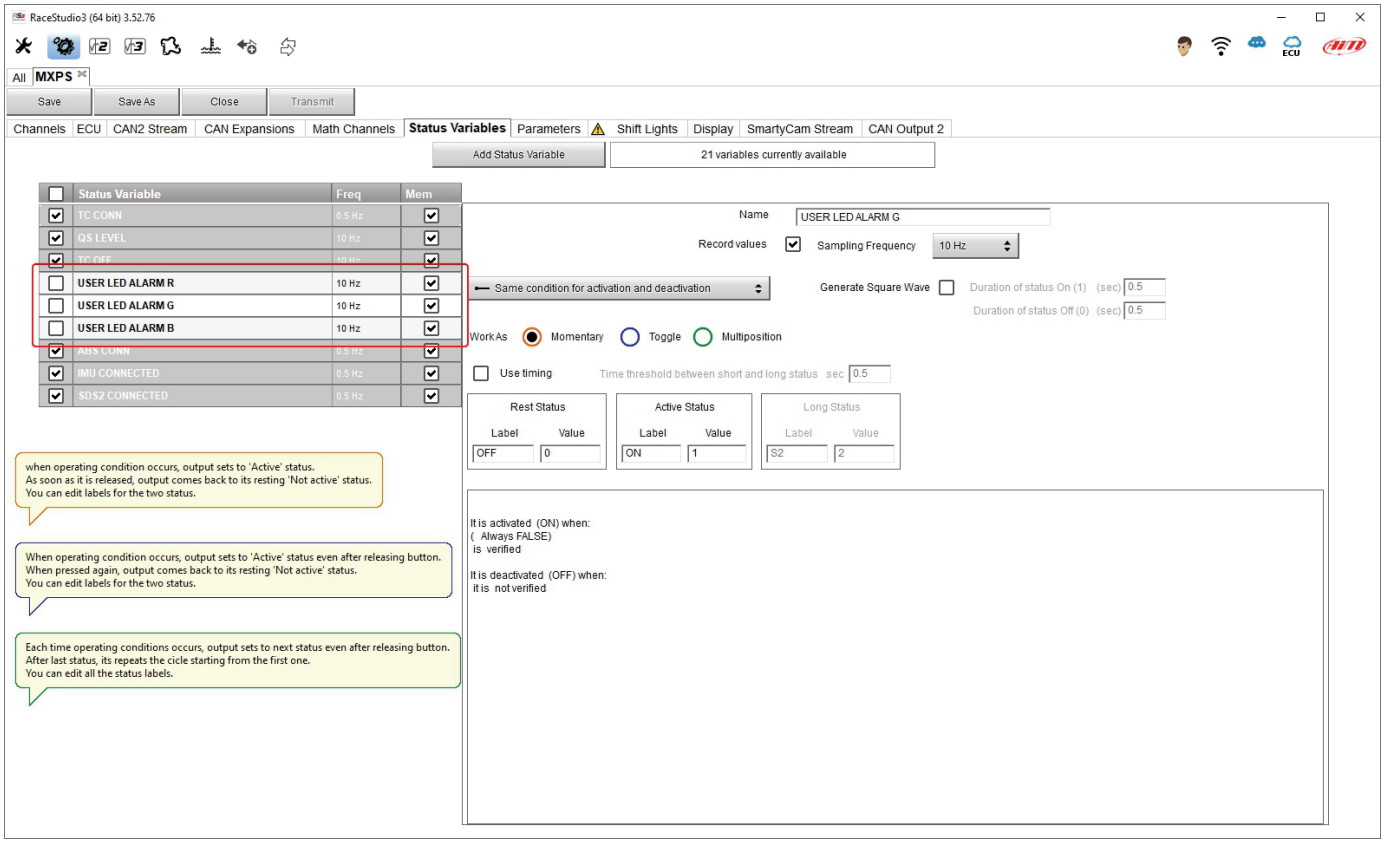
MXPS features 6 pre-defined status variables that cannot be modified and is also possible to create and add new status variables linked to the right RGB alarm LED. This feature allows you to switch the right LED in different colours (R, G, B stay for Red, Green and Blue) according to set conditions. Right of the view is the setting panel. Just click on any point of it and the panel will show up in edit mode.
The Status variable can work as Momentary, Toggle or Multiposition and mousing over each setting a tooltip explains its working mode. To say:

- **Momentary**: the channel is active when the pushbutton is pressed
- **Toggle**: the channel is activated the first time button is pressed and deactivated the second time the button is pressed
- **Multiposition**: the channel can take different status according to the number of pressures and it is possible to add status using the "+" button that appears right of the panel once "Multiposition" option is been selected.

The configurable LED can have three colours that correspond to different priority levels:

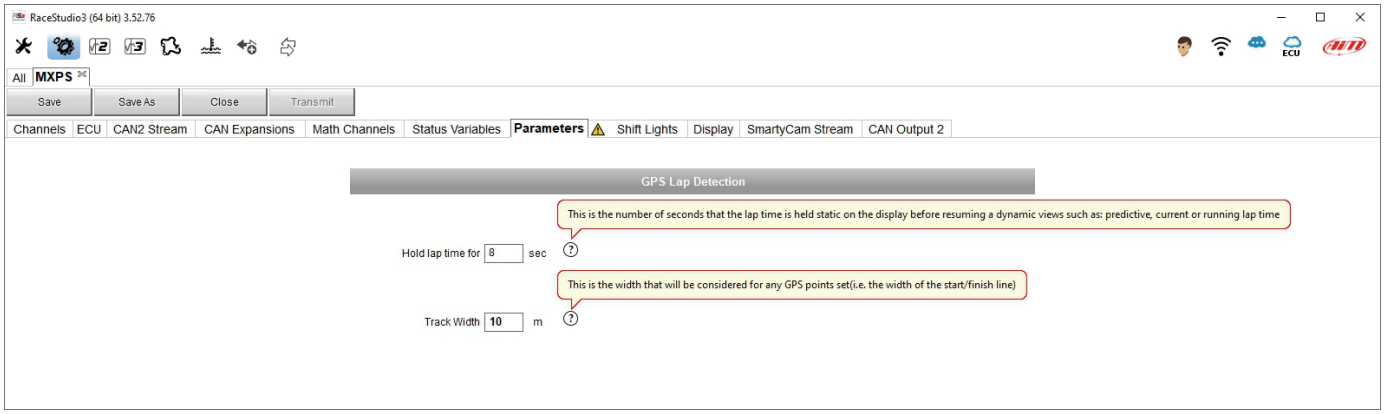
- Red: priority 1
- Green: priority 2
- Blue: priority 3

This means that you can have three alarms linked to the same LED that are shown with different colours so we recommend to link the events that switch the LED on according to their priority.



6.2.7 – Parameters

Here you can decide the time period during which the lap time can be shown on MXPS display and set the width of the track you are riding on as shown by the tooltips that appears mousing over the options.



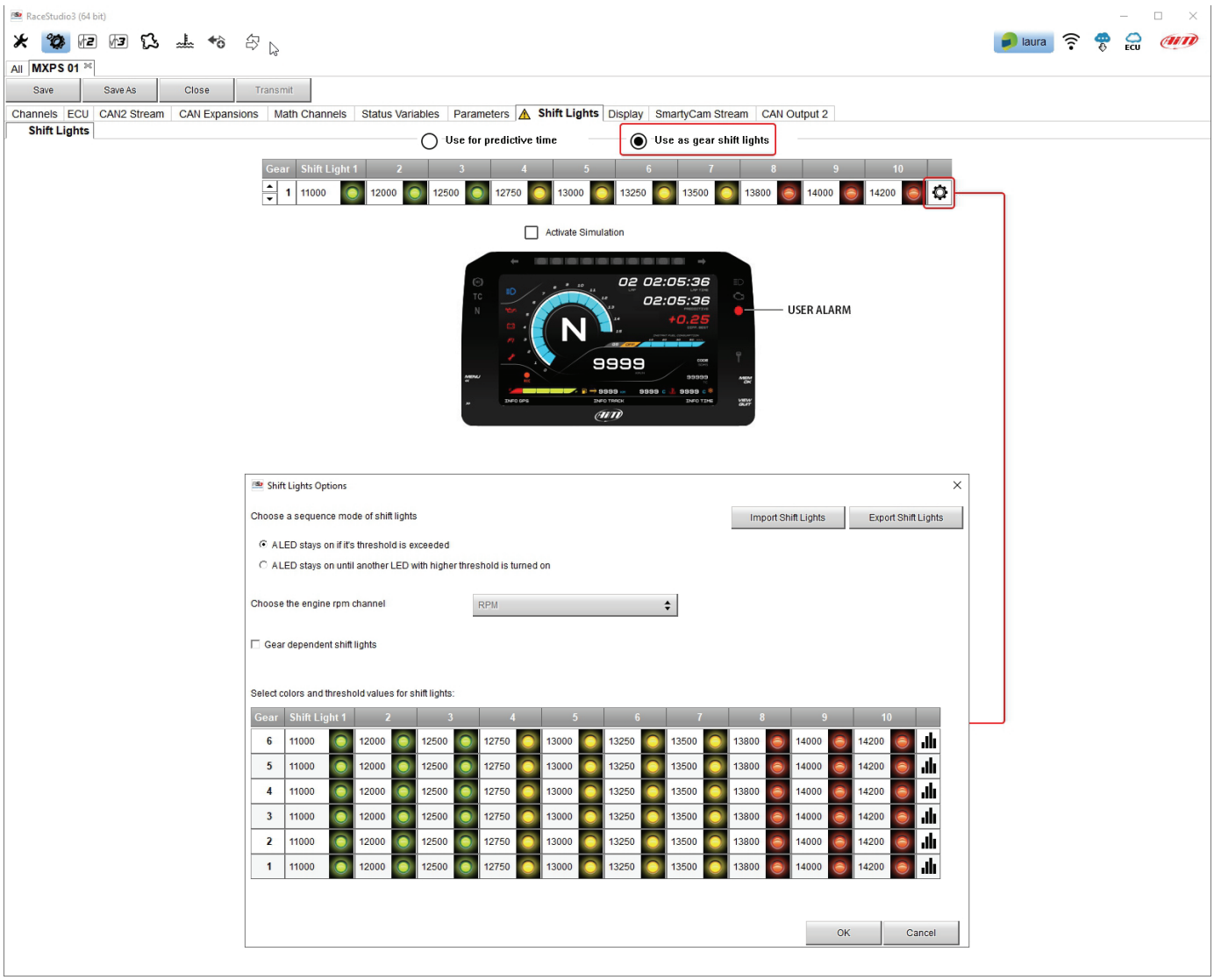
6.2.8 – Shift Lights configuration

To configure MXPS shift lights activate the related tab; this page shows up. The shift Lights can be used to help you changing the gear (use as gear shift lights – default setting) or as predictive lap time.

To use the LED bar as **gear shift lights** select the proper option, click this icon ( ) and the setting panel shows up. Configure:

- RPM value that switches the single LED on
- LED sequence enabling the desired option:
    - a LED stays on if its threshold is exceeded
    - a LED stays on until another LED with higher threshold turns on or
- connect the shift lights to the engaged gear enabling "Gear dependent shift lights" checkbox;

Once the shift lights set press "OK". The shift lights bar shows a digit left of the bar: using the arrows you will be able to see the shift lights setting for each gear.



To use the shift light as **predictive time** click the setting icon ( ) to set the parameters. Default LEDs colours are:

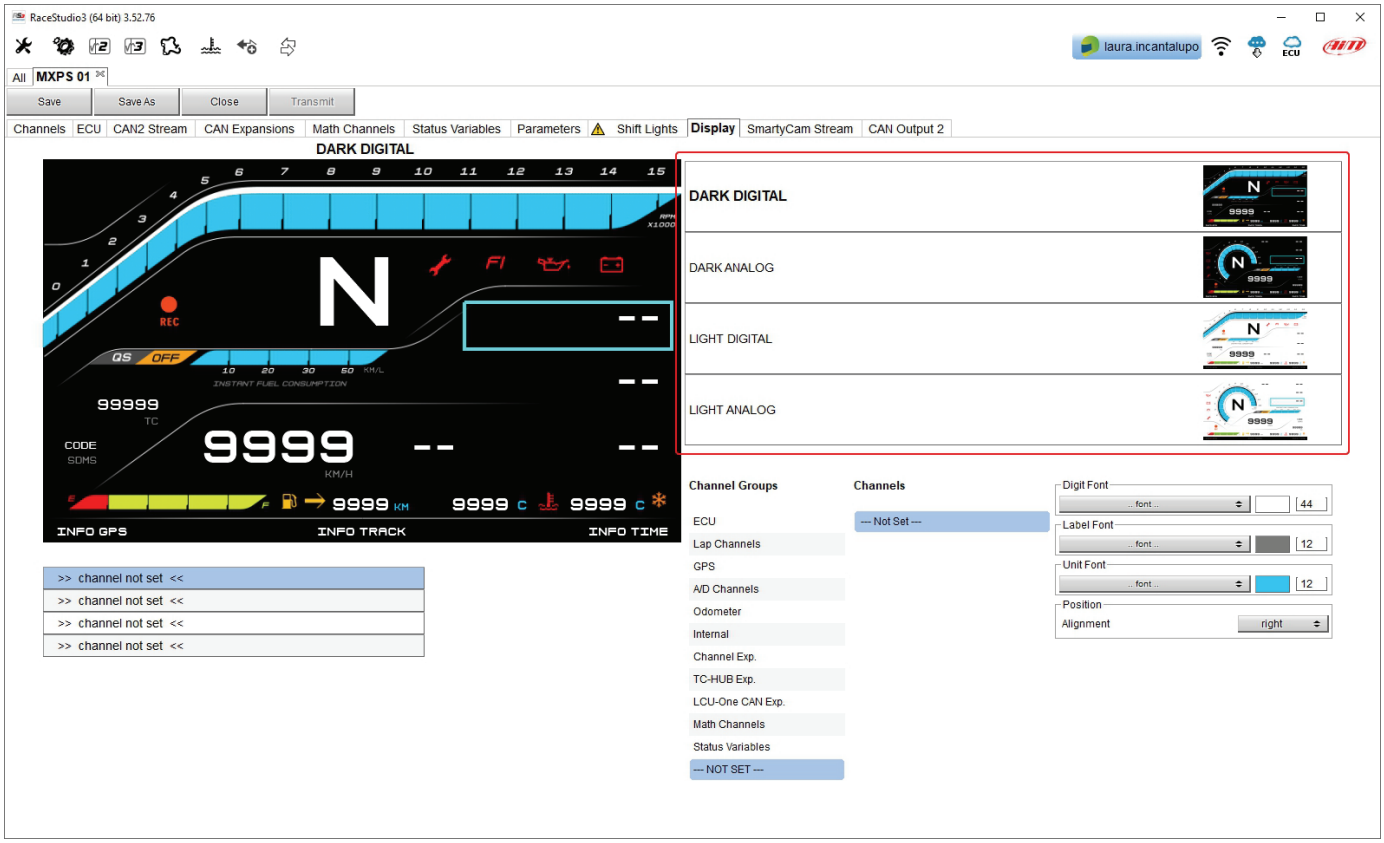
- Green if the lap time is improving
- Red if the lap time is worse than the reference lap

The threshold at which one LED is turned ON can be customized. Assuming "0.10 sec" is fixed and the lap time is improving of 0.30 sec toward the reference lap, MXPS will switch on 3 LEDs green; if, on the contrary, the lap time is worsening the LEDs will switch on red.

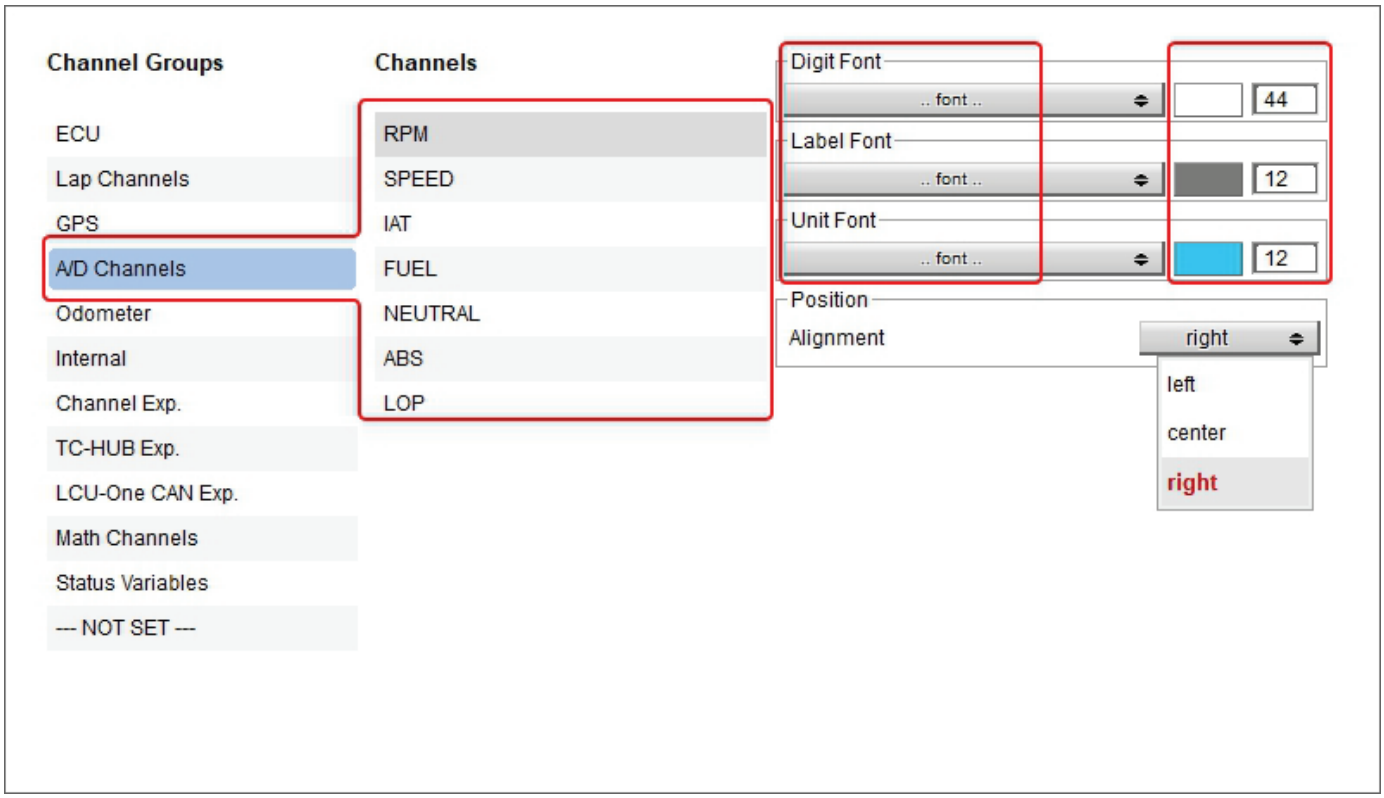
6.2.9 – Display configuration

Here you can set the four available MXPS display page. As described in paragraph 5.1.1 the display can be set:

- dark
- light
- analog
- digital



Each page features different fields than can be customized through the bottom right box. Here you can select the channel in a channel group, set the dimension and colour of the digit font, of the label font, of the measure unit font and its alignment as shown here below. Once the field set you can drag and drop it in the display preview top left of the view.

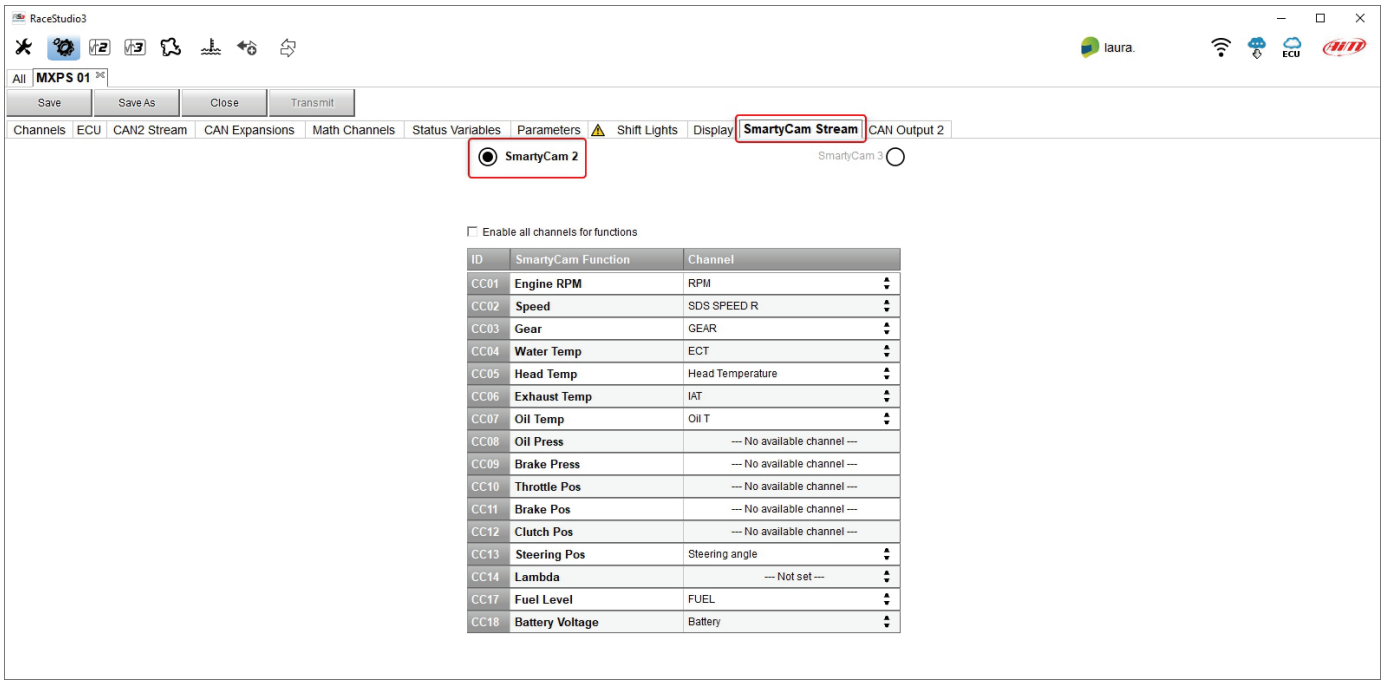


6.2.10 – SmartyCam configuration

MXPS supports both SmartyCam2 and SmartyCam 3.

To see **SmartyCam2** stream on your video you normally do not need any configuration but if additional sensors have been installed it is possible to see specific channels on SmartyCam video; to do so:

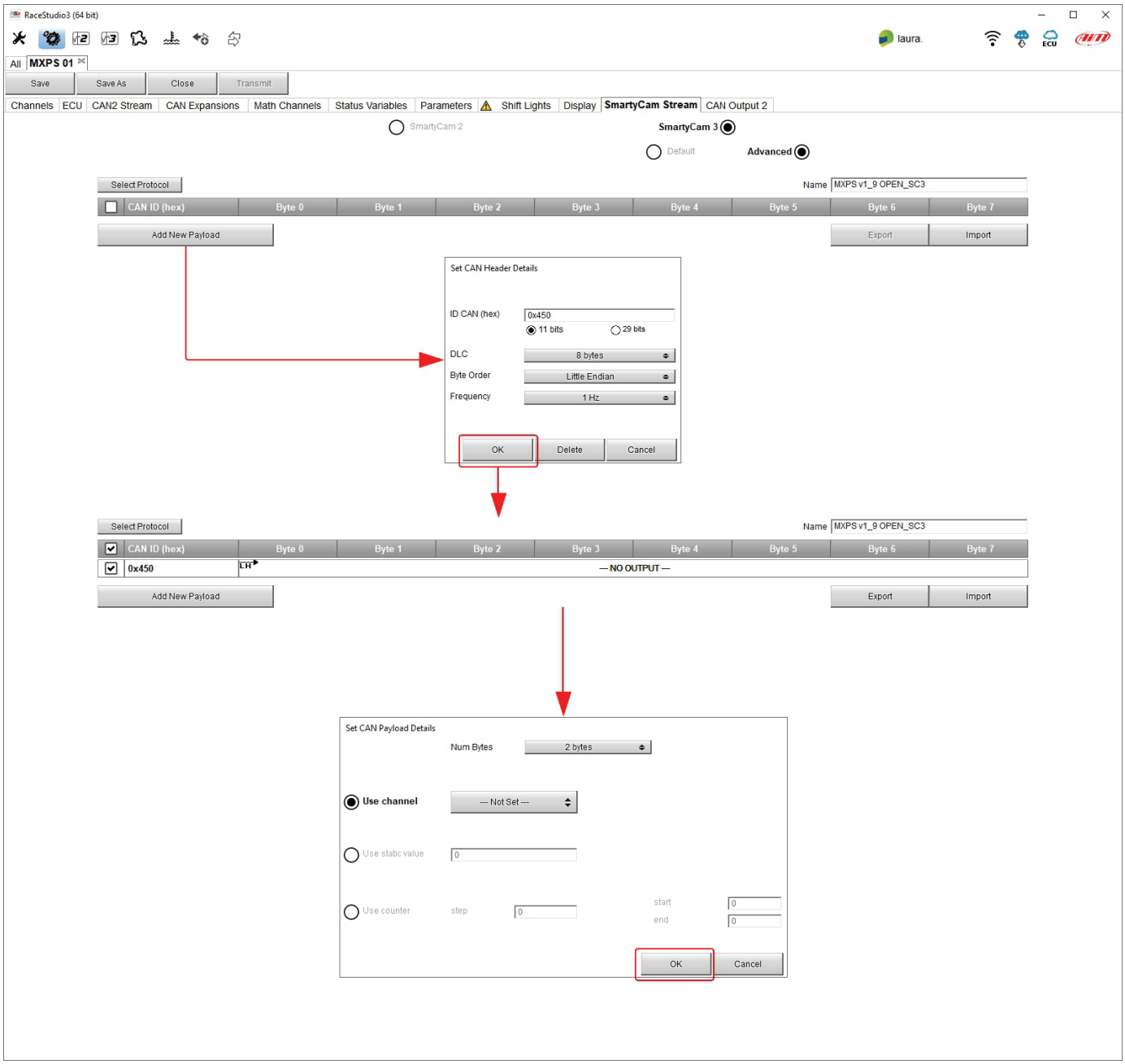
- activate the related tab
- SmartyCam2 should be selected by default
- the view shows all channel/sensors that satisfy the selected function
- if the desired channel is not in the list enable "Enable all channels for functions" checkbox and all channels/sensors are shown.



Two **SmartyCam3** stream are available to be shown on your video:

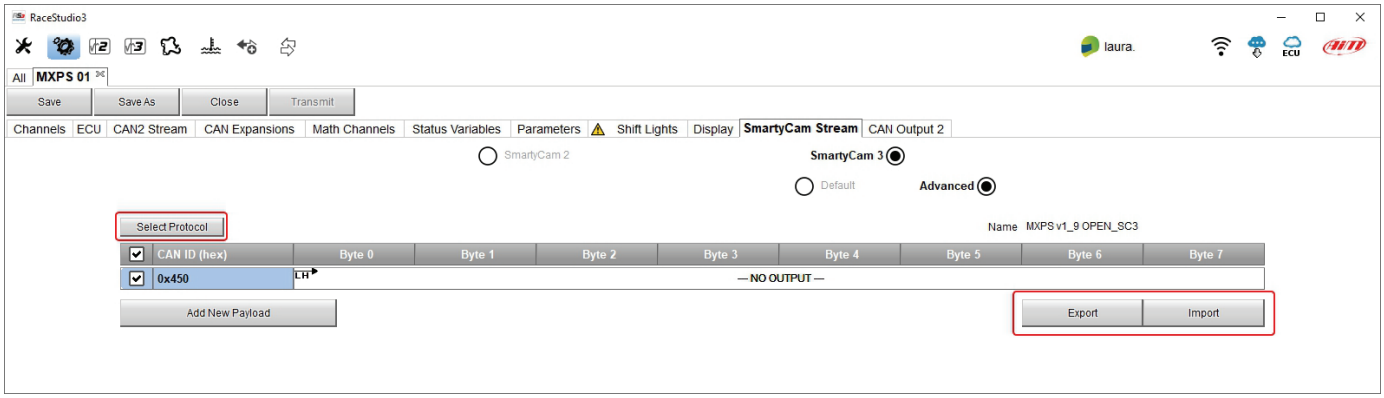
- **Default**: it works exactly like SmartyCam2 stream
- **Advanced**: it works exactly like MXPS CAN Output2 (paragraph 6.2.11) to say that you need to:
    - fill in the Stream name in the top right box
    - press "Add a new payload"
    - setup "CAN Header details" panel that shows up
    - press "OK"
    - setup "CAN Payload Details" panel that shows up

Please refer to paragraph 6.2.11 for further details.



In addition to the creation of a new payload with Race Studio 3 you can:

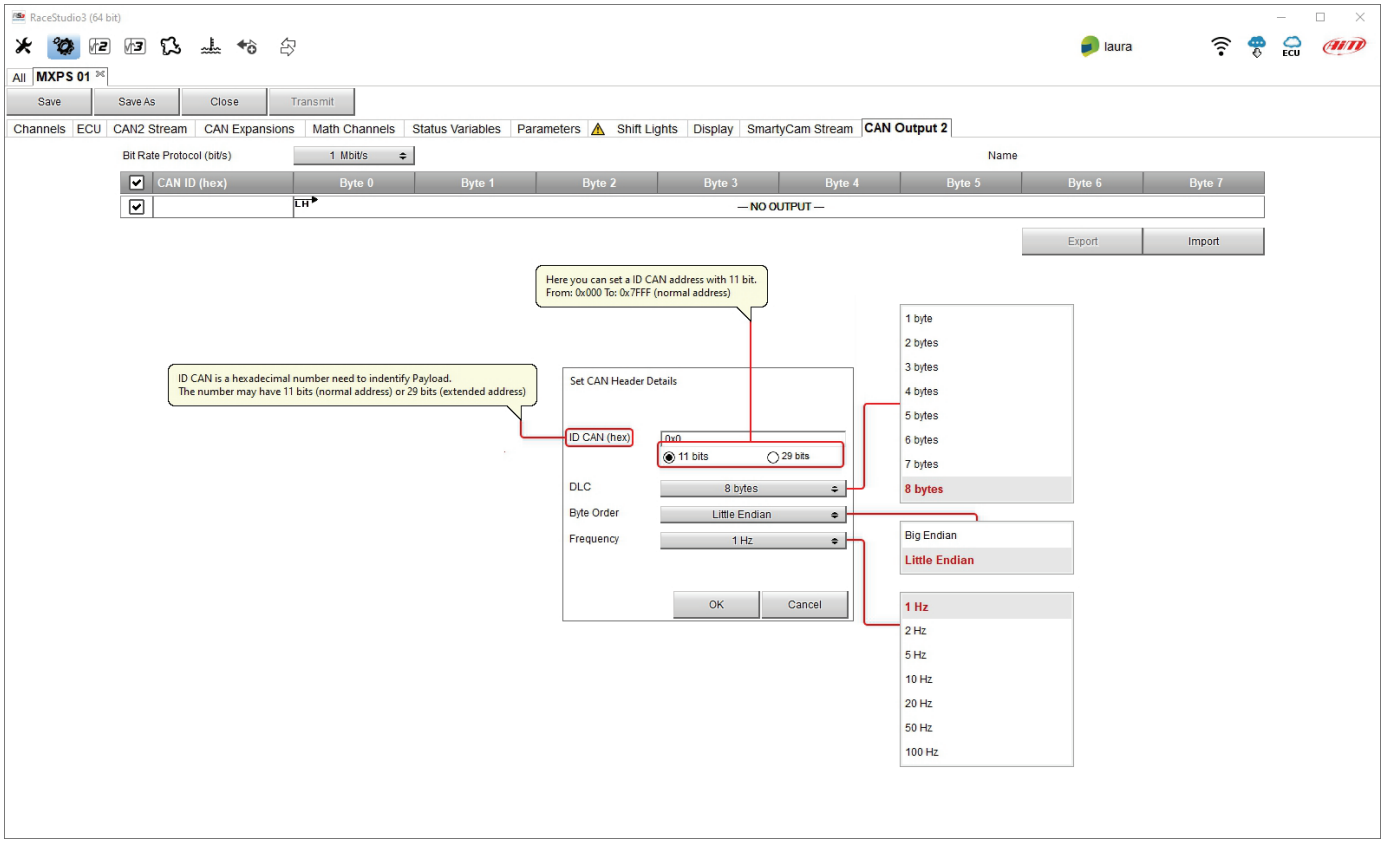
- **Select Protocol**: this function allows you to import a stream previously created for another AiM device configuration and saved in the software
- **Import** a stream previously created and exported in your PC.
- **Export** the stream you create to your PC or to another external drive so to be able to import it in a second moment.



6.2.11 – CAN Output 2

This Race Studio 3 function allows the logger to transmit a CAN data stream containing the channels. To add a payload:

- press "+Add new Payload"
- "Set CAN Header details" appears
- fill in ID CAN (hex): available options are:
    - 11 bits (normal address)
    - 29 bits (extended address)
- select the payload max bytes number (DLC)
- available options are from 1 to 8 bytes
- select the byte order according to the used processor, available options are:
    - Little endian for Intel processor
    - Big Endian for Motorola processor
- set the sampling frequency among: 1,2, 5, 10 or 20 Hz



When the configuration is finished:

- press "Save" on the page top keyboard
- press "Transmit" to transmit the configuration to MXPS

6.3 – Managing a track on MXPS with Race Studio 3

With Track Manager function of Race Studio 3 tracks can be created, deleted and modified, transmitted and received to/from MXPS. Press "Tracks" icon.

The main page is divided in three columns; on the **left**:

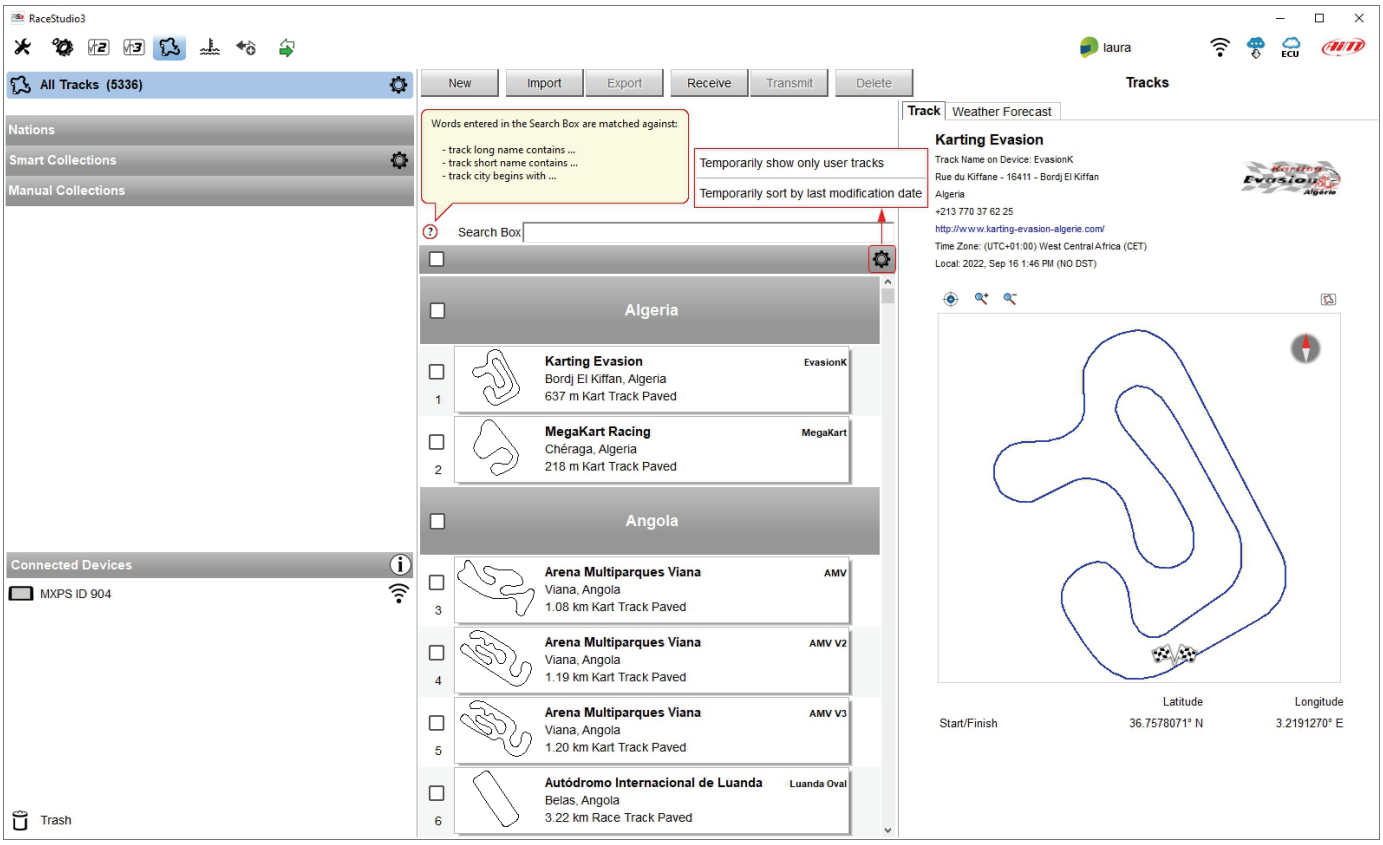
- on top, the filters that allow to collect many tracks following customized criteria; by default, all tracks are shown (light blue "All Tracks" filter in the image below).
- bottom left, the connected devices (in the image, "MXPS ID 904")

The column **in the middle** shows:

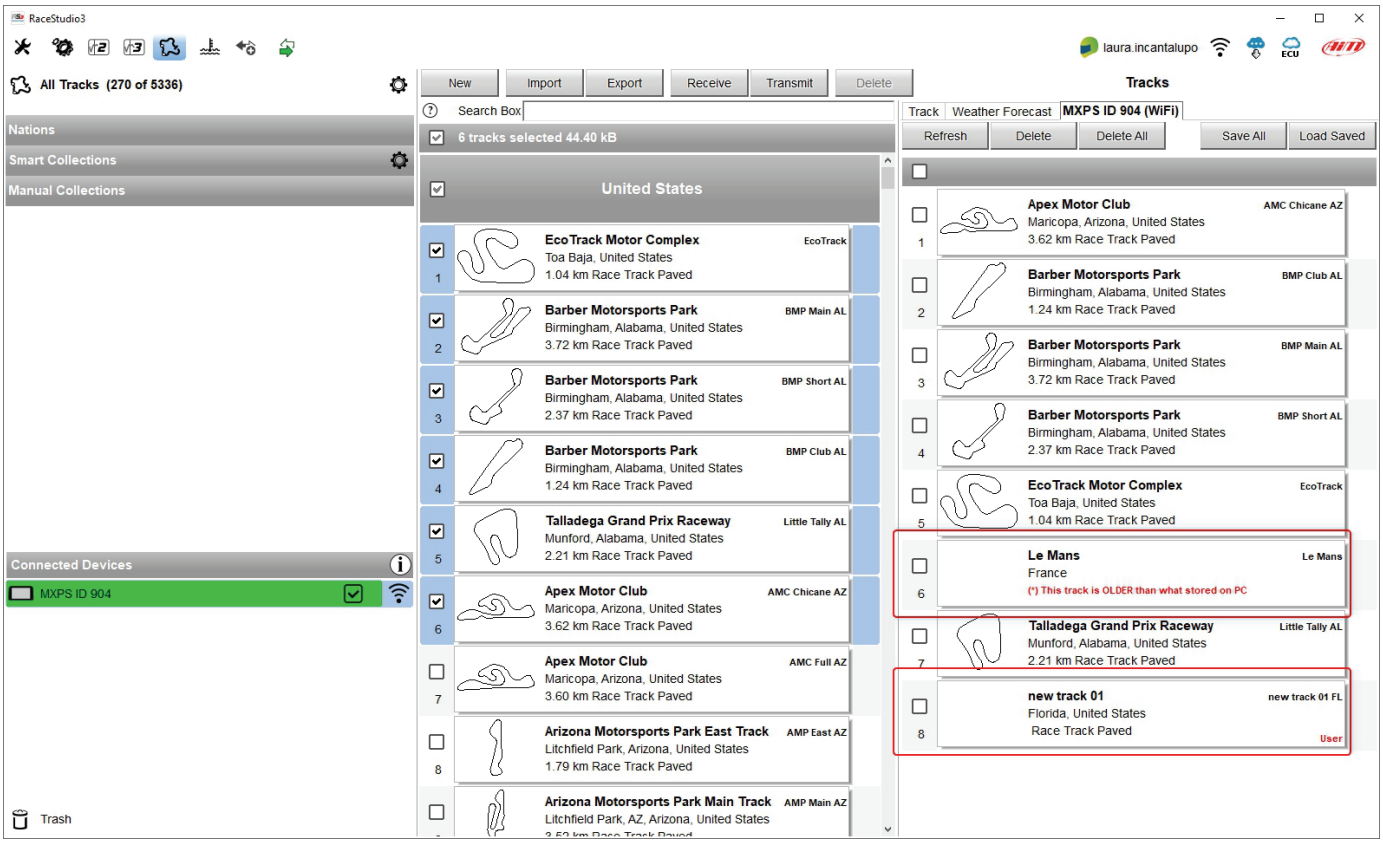
- on top a fast search bar that allows to select the tracks which satisfy personal research criteria; pressing "?" a tooltip explains research criteria (highlighted in red below), to say:
    - long name is the name in bold in each track box
    - short name is the track name shown on the display and is top right of each track box
    - track city is the name of the city the track is located in
- clicking the setting icon you can choose to temporarily see only user created tracks or to sort tracks by last modification date
- all the tracks listed in Race Studio 3 database. It automatically updates at start up if a connection to the Internet is available.

The column on the **Right** shows:

- the data sheet of the track you are mousing over.



When MXPS is connected it is shown on the left bottom part of the page. Clicking on it all the tracks it contains are shown in the right column of the page.



Tracks created by the user are labelled “User” and if the track stored in MXPS logger is different from the one stored in AiM database this is notified as shown here above.

The page keyboards are used to manage the tracks.

The keyboard above the central column allows to:

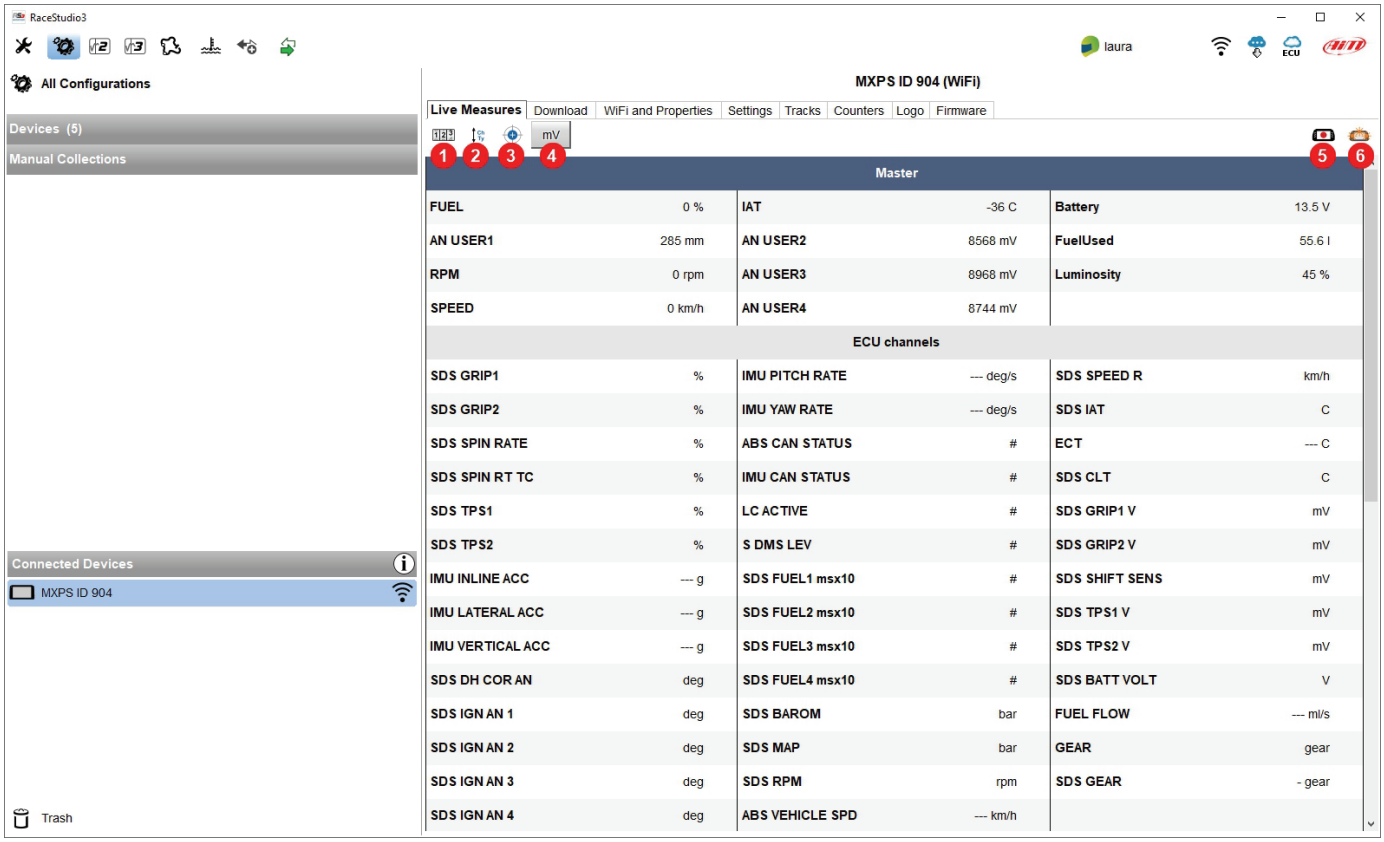
- **New**: create a new track; this can be done also filling in only start/finish line coordinates
- **Import**: import one or more tracks stored in the device or in another external drive
- **Export**: export one or more tracks to a specific PC folder or to another peripheral drive
- **Receive:** receive from the connected device tracks user created (if no device is connected the button is disabled)
- **Transmit:** transmit one or more tracks from the PC to the connected device (if no device is connected the button is disabled)
- **Delete:** delete one or more tracks from Race Studio 3 database

The keyboard above the right column allows to:

- **Refresh**: refresh the track list stored in the connected device
- **Delete**: delete one or more tracks from the device memory
- **Delete All**: delete all tracks stored in the device memory
- **Save all**: save all the tracks stored in the connected device; it creates a zip file that can be loaded to another AiM device
- **Load Saved**: load the tracks previously saved in the device memory

Since the software is constantly updated, may be other information or features will be available soon. Please check documentation area, software/firmware section “Track Manager” manual of our website www.aim-sportline.com.

6.4 – The device page



The device page is shown clicking on the device bottom left of the software in Configuration page. Here are:

- **Live Measures**: to check the logger channels and force online values to:
  - start/stop live measures (**1**)
  - decide how to show the channels: as managed by the firmware – by configuration – in alphabetical order, by channel type: they are shown by device than by channel type and then by measure type (**2**)
  - calibrate the sensors that need it pressing the related button (**3**)
  - show measure in Mv (**4**)
  - start recording (**5**)
  - make MXPS blink (**6**); this is the easiest and quickest way to test PC-MXPS communication
- **Download**: to download data stored in MXPS memory
- **WiFi and Properties**: to name the device, manage MXPS WiFi and fill in racer name, vehicle name or number, championship and venue type (generic, qualifying, test, warm up, race, test type)
- **Settings**: here you can setup some functions of MXPS that are also managed by the logger keyboard. **Please note: this setting overrides the logger keyboard as well as any other setting you can perform through Race Studio 3.**
- **Tracks**: to manage the tracks stored in the device memory
- **Counters**: to set/reset odometers; this can be made in two ways:
  - if system odometer is lower than 100km settings tab allows to set it according to the measure unit currently fixed and to fix the system odometer digit
  - pressing "ask to change odometer" button, top right of the software tab, you submit a request to set the system odometer; once received and processed the request our technical team will send you an e-mail with the instruction to perform this operation.
- **Logo**: to transmit/receive the logo that shows up at switch on; supported image formats are JPEG or BMP; always use the most recent Windows™ version (Windows8 or Windows10) whose graphical libraries are more updated
- **Firmware**: to check or update MXPS and any other connected device firmware.

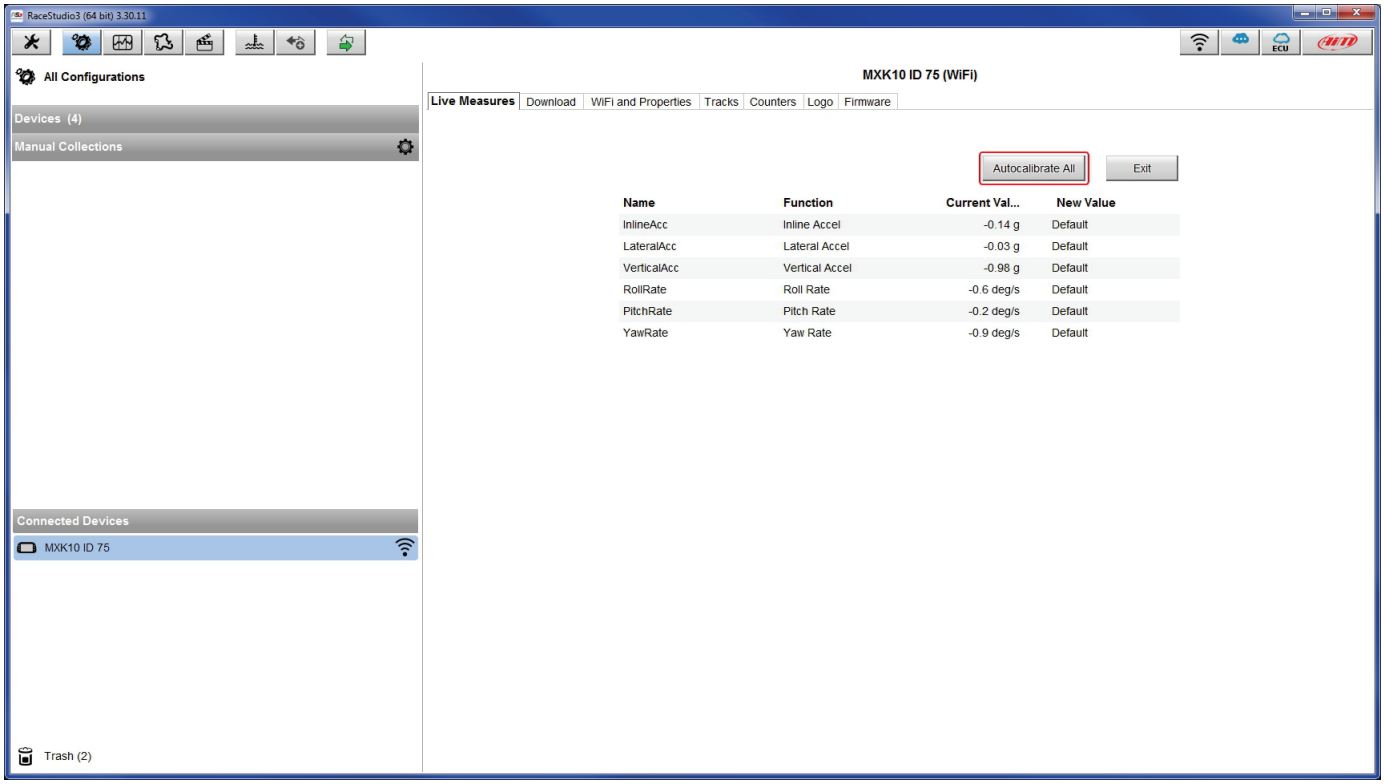
6.4.1 – Live measures page

When the configuration has been transmitted "Live Measures" page shows ECU channels too and it is possible to perform some operations, like start recording, stop live measure stream, calibrate MXPS accelerometers or other sensors that need it, make MXPS blink pressing "Blink" button (**6** in the previous image). This is the simplest way to test PC-device communication.

Please refer to Appendix 1 to know which ECU channels are sampled by MXPS.

6.4.2 – Calibration/Autocalibration

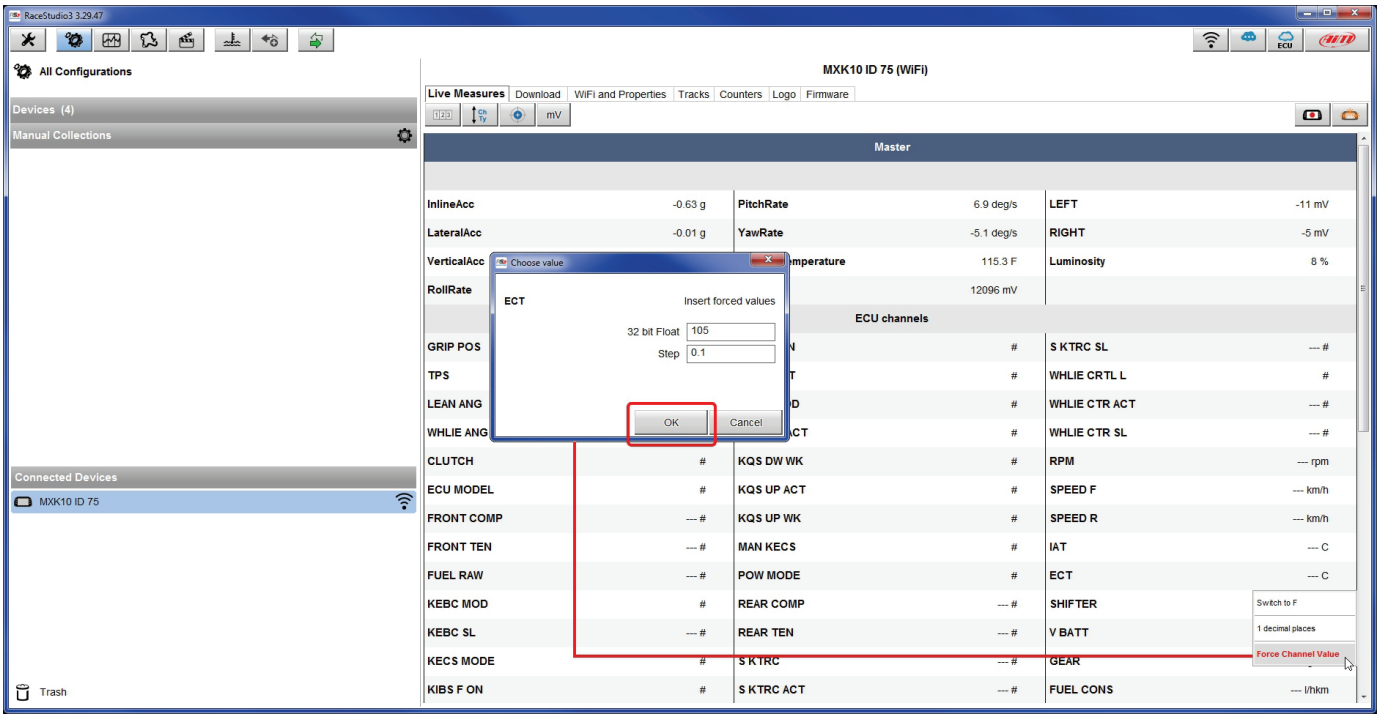
If additional potentiometers have been installed or to re-calibrate MXPS accelerometers press the related button  . Calibration page shows up. Press "Calibrate" or "Auto-calibrate" according to the sensors installed. The software only shows the buttons that are needed by the sensors installed.



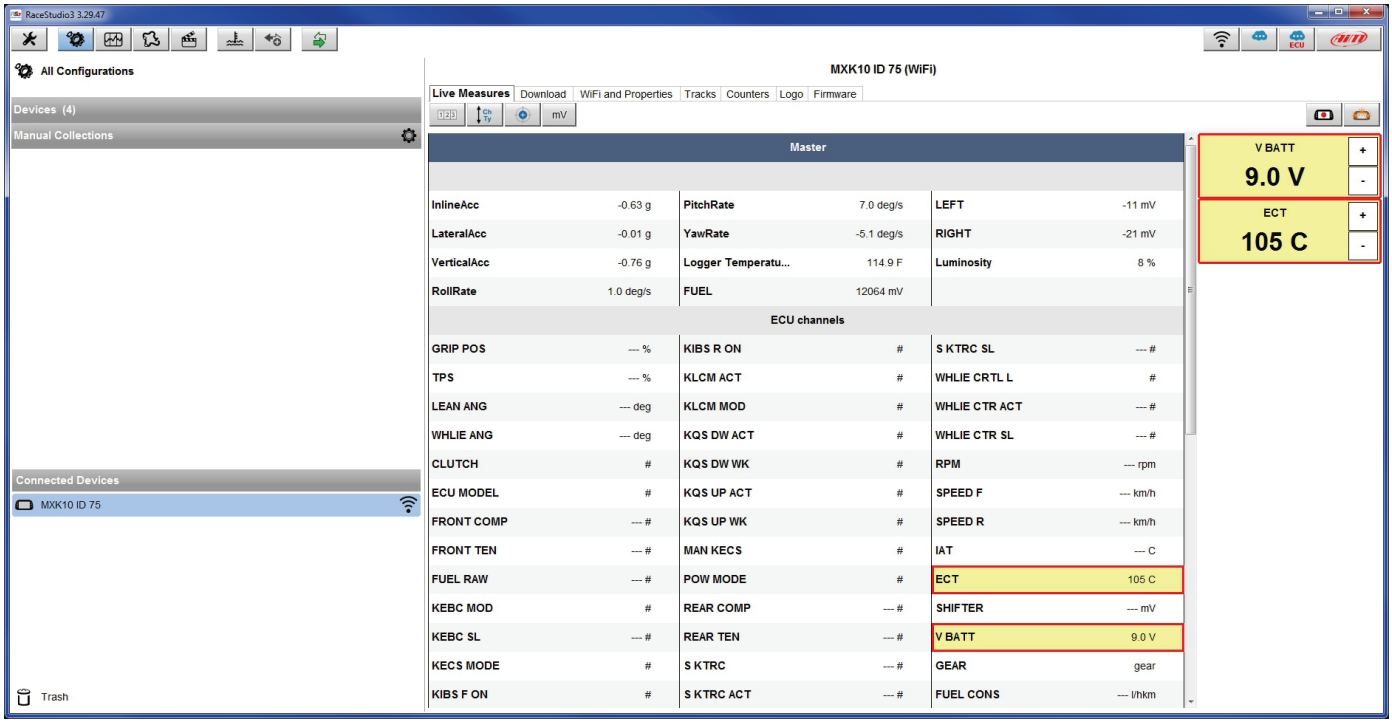
6.4.3 – Online value forcing

Live Measure tab of Device page offers a very useful function that allows you to simulate one or more channels to test icons, alarms, power output and harness behaviours.
We can for example test water alarm assuming we fixed a temperature alarm.
To force this value:

- mouse over the value to force and click the setting icon
- a popup menu shows up: select “Force Channel Value” and fill in the panel that shows up
- click “OK” and the corresponding value becomes red.



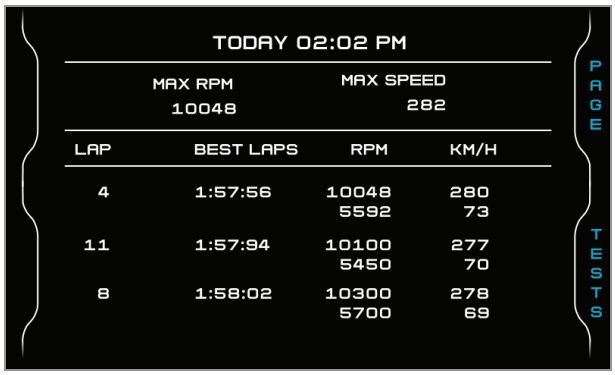
Once forced the values are shown on the right of the page red boxed. Lateral “+” and “-“ buttons allows to change the values used.



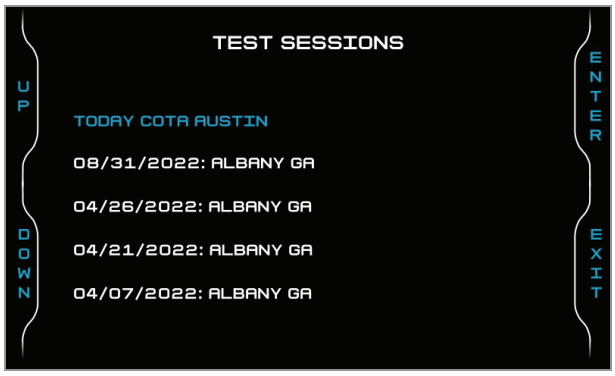
7 – Data recall

At the end of the test sampled data can be recalled pressing “LAP”.

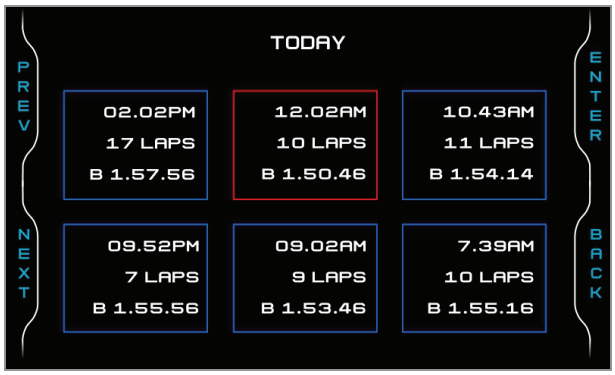
First is “Today” page.
Press “**TESTS**”



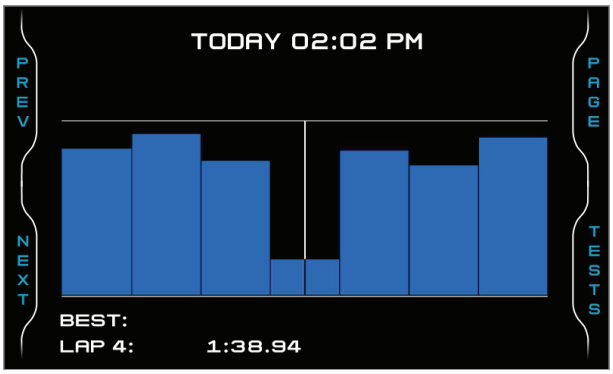
Second is “Summary” page that shows all the last tests with date and place. Select the day you want to see and press “**ENTER**”.



Third is “Day Summary” page that shows all tests in a box with time of the test, number of laps and best lap of the test.
Select the test to see and press “**ENTER**”.

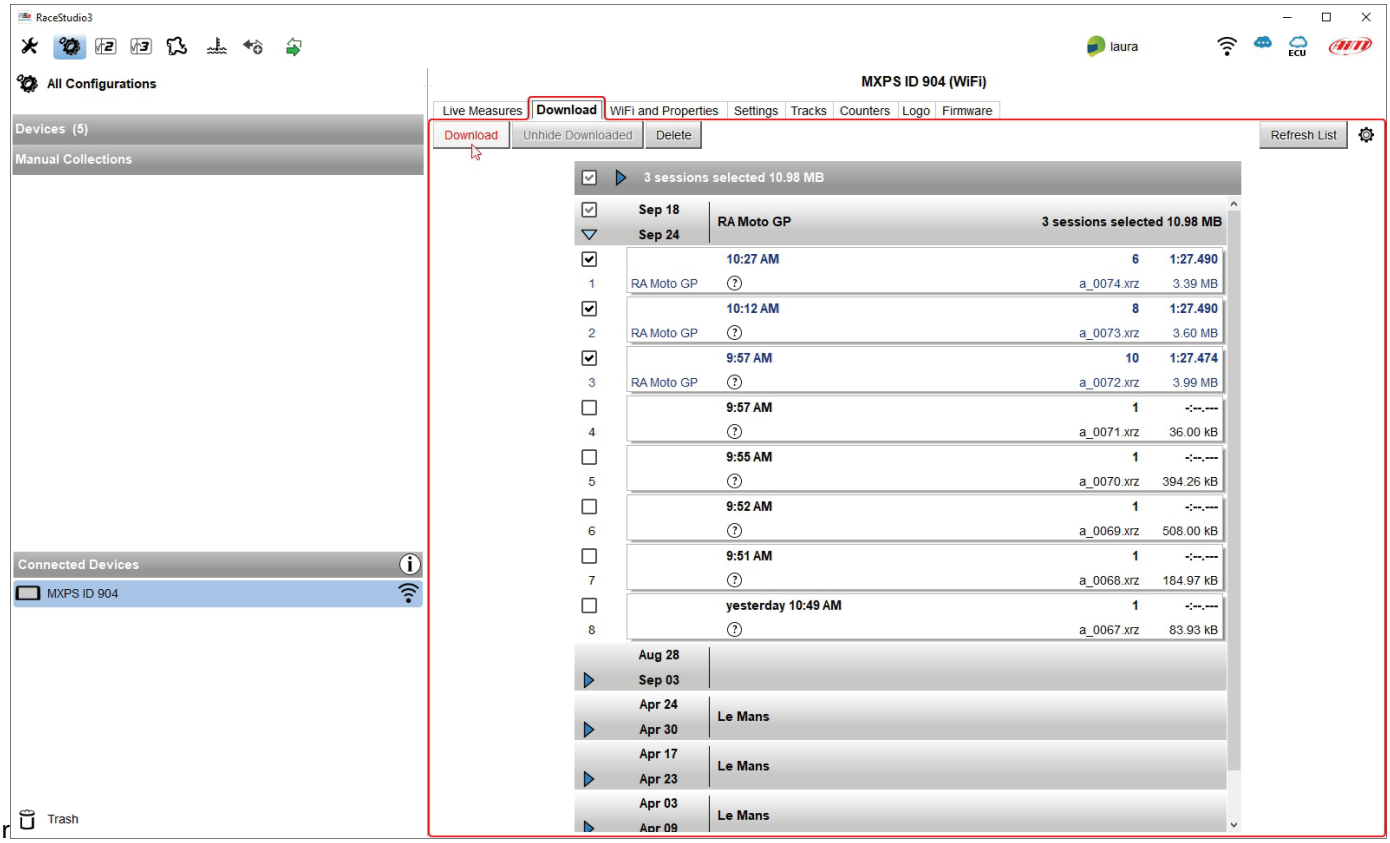


This page is a histogram test summary. Moving the cursor left and right all laps and their lap time are shown.



8 – Data download and analysis

Once the test session is over it is possible to download data sampled on a PC. Connect MXPS dash logger to a PC and click on it bottom left of the software page. Once reached the device page activate “Download” tab. It shows all the information concerning the file stored in the logger: number of laps, best lap, date/time, file dimensions. Select the file(s) to download and press “Download” button.



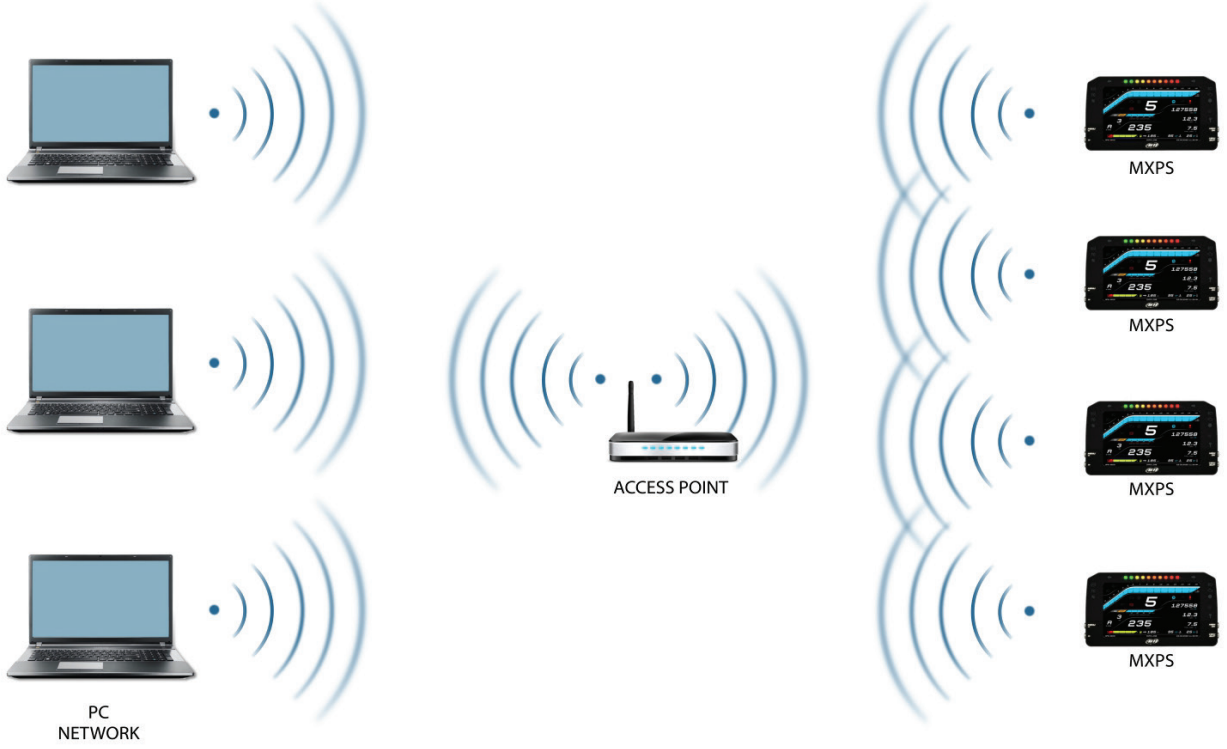
After download press Analysis Icon ( ) and Race Studio Analysis software starts showing all the files available for analysis. Double clicking on the desired one it is possible to start analysing your performance. Please refer to Race Studio Analysis 3 user manual you can freely download from www.aimshop.com Firmware download section for further information.

9 – Wi-Fi configuration

Two possible Wi-Fi connection modes are available.

1 – As an access point (AP – default)
This is the ideal configuration for one only device and one only computer. In this situation MXPS creates a Wi-Fi network and works as an Access Point the PC can be connected to.

2 – Existing network (to connect to an existing Wi-Fi network – WLAN)
This mode is complex and implies an external access point (AP) but it is also more flexible and powerful because allows the communication among more than one device and more than one computer in the same network. MXPS and the PC must connect to the same existing Wi-Fi network made by a device that works as an external access point.



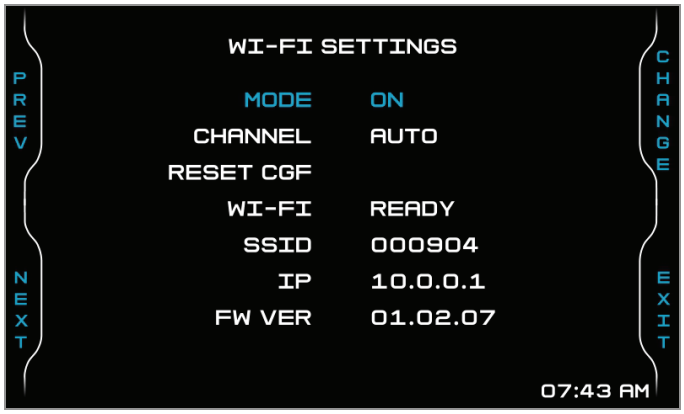
When working in WLAN mode MXPS has two available security levels:
- network authentication: network password
- device authentication: MXPS password

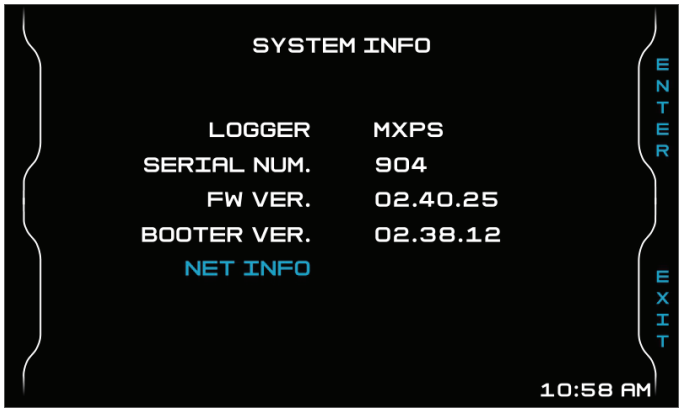
Both levels allow you the use of different strategies. A PC in WLAN, for example, can see several AiM devices but can communicate only with those he knows the password of.
Forgetting the password Wi-Fi configuration can be reset from MXPS menu as explained in paragraph 5.5.

9.1 – Configuring MXPS dash-logger as an access point (AP)

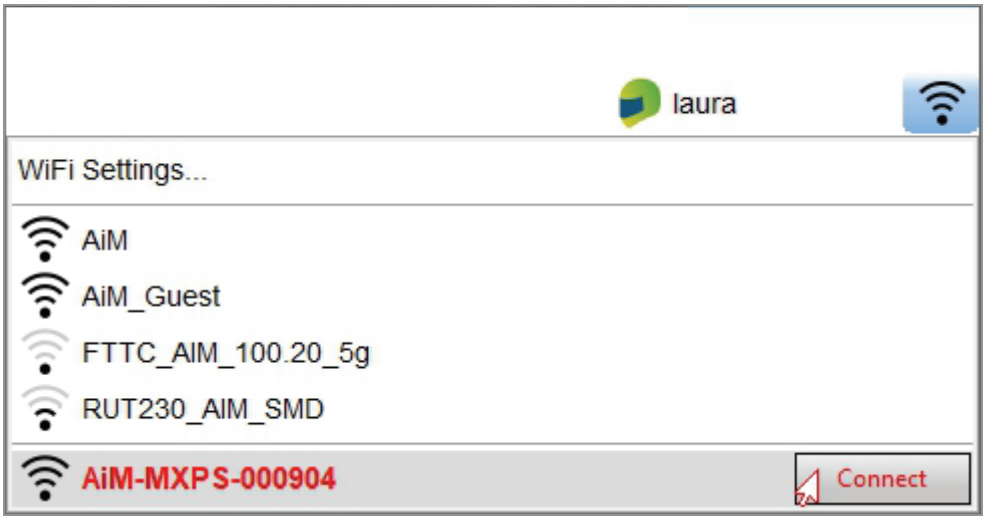
This is MXPS default configuration and is the easiest and most direct connection mode, ideal to communicate with one MXPS logger using one PC. It is free and so completely accessible by anyone. Please set an access password as soon as possible.
To establish a Wi-Fi connection:

- ensure that the Wi-Fi is enabled (set on Auto or on ON)
- read MXPS Serial number (904 in the image below)

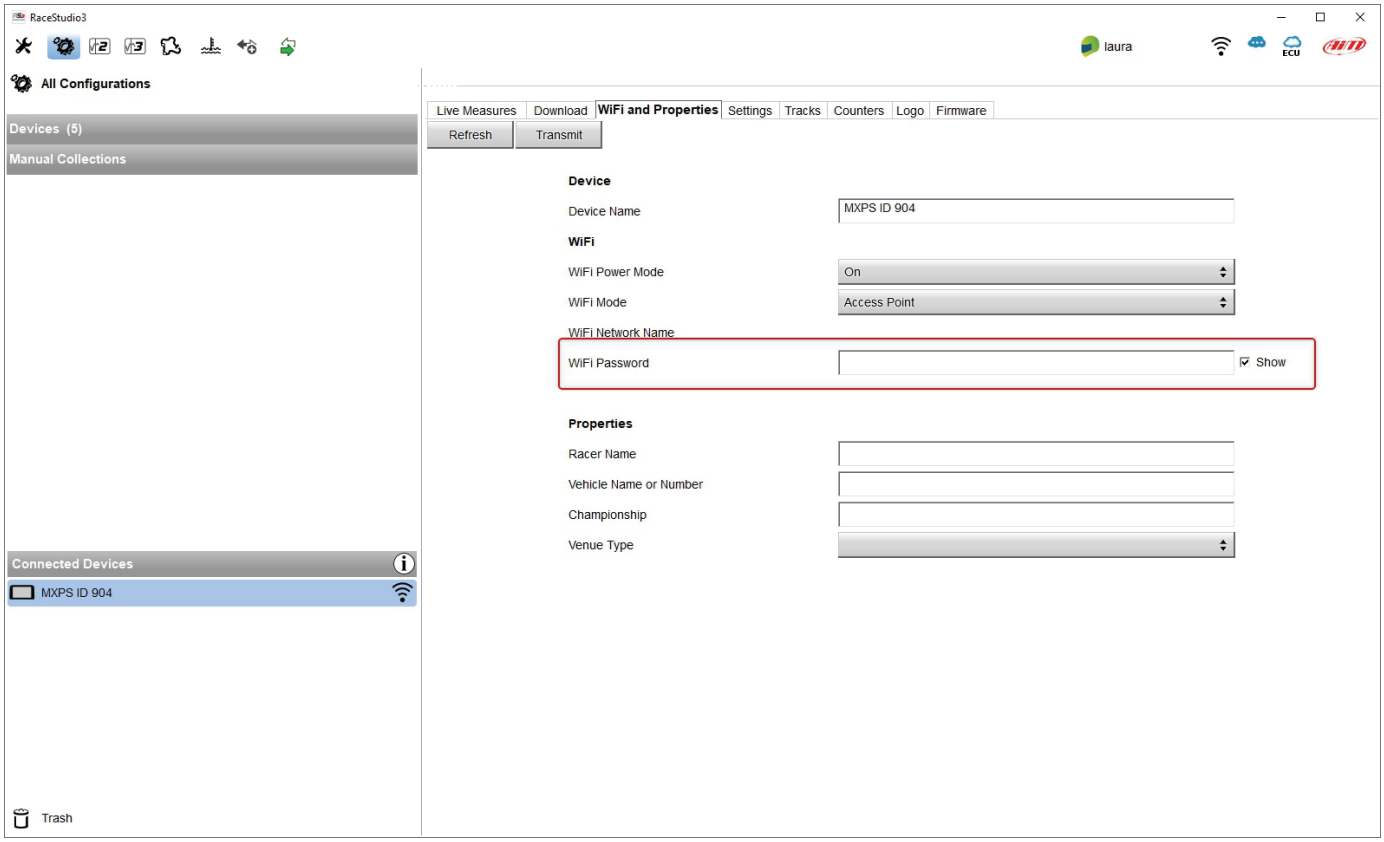




- run Race Studio 3
- click Wi-Fi icon and select your device
- in a few seconds the connection is established



To set other parameters create a unique password to protect the device/network. With a password the communication is safe and encrypted using WPA2-PSK standard.
Characters allowed in the password are all letters, also capital, all digits and these characters: '+-_()[]{}$£!?^#@*\\\"=~.:;/%"
"Space" type can be used if it is not the first one because this could cause incomprehension in some Windows™ versions.

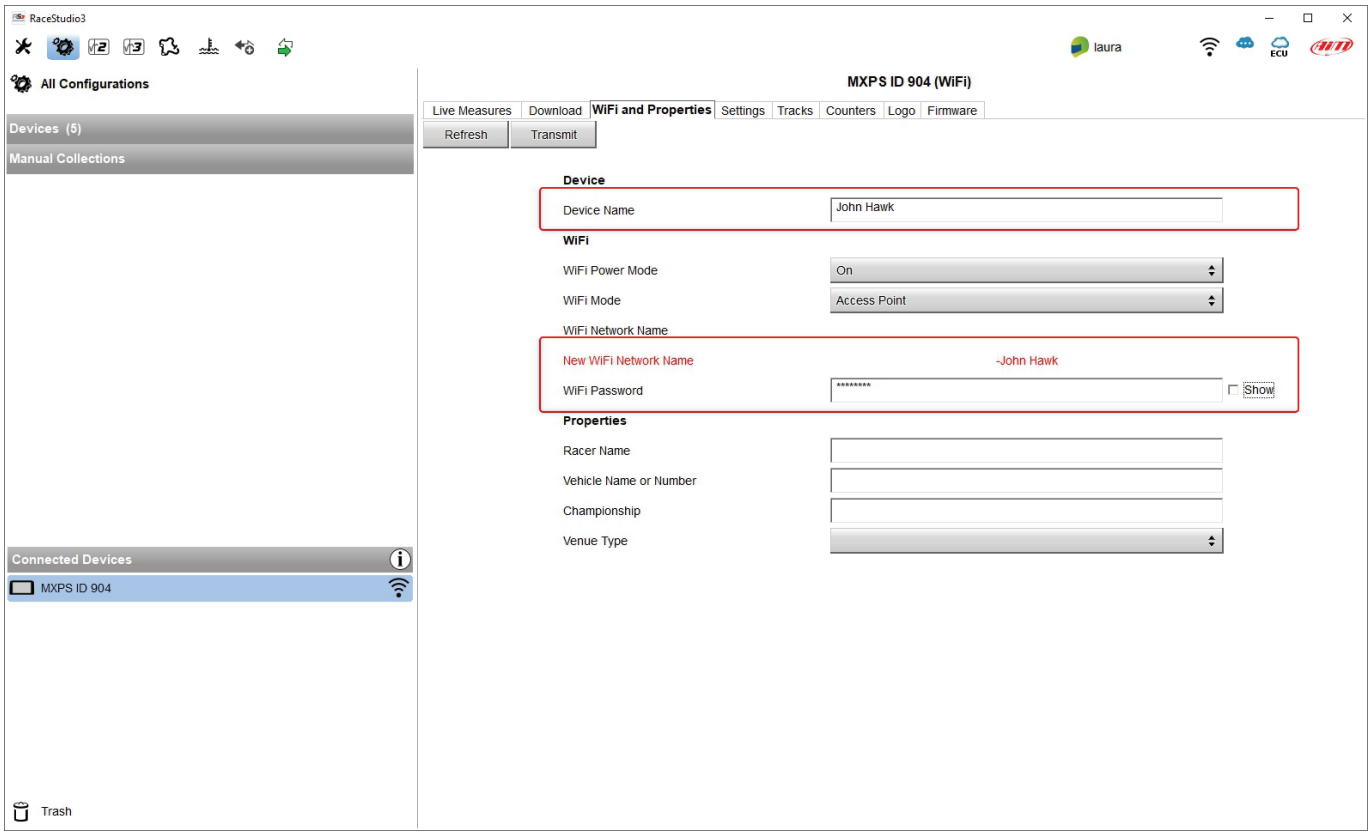


This AP or SSID name is unique for the device.
An example of name is:" AiM-MXPS-904" where:

- "AiM" is the prefix of all AiM devices
- "MXPS" is the device identifier
- "904" is device serial number assigned by the factory.

To make a device more recognizable a name can be added to the SSID with the limit of eight characters. Allowed characters are all letters, capital too, all digits and these characters: '+ - _ () [] {}!.
"Space" type can be used provided that it is not the first one because it can cause incomprehension in some Windows™ versions.
Adding, for example, the driver's name, Tom Wolf, the network name (SSID) becomes:
"AiM-MXPS-000075-Tom Wolf"

Once all parameters set click "Transmit". MXPS logger reboots and is configured with the new parameters. If MXPS logger is protected by a password, as recommended, Race Studio 3 will ask that password to authenticate.



Please Note: the same Wi-Fi connection can be created with the operative system tool.
Once the device has been authenticated in the Wi-Fi network it can communicate using Race Studio 3.

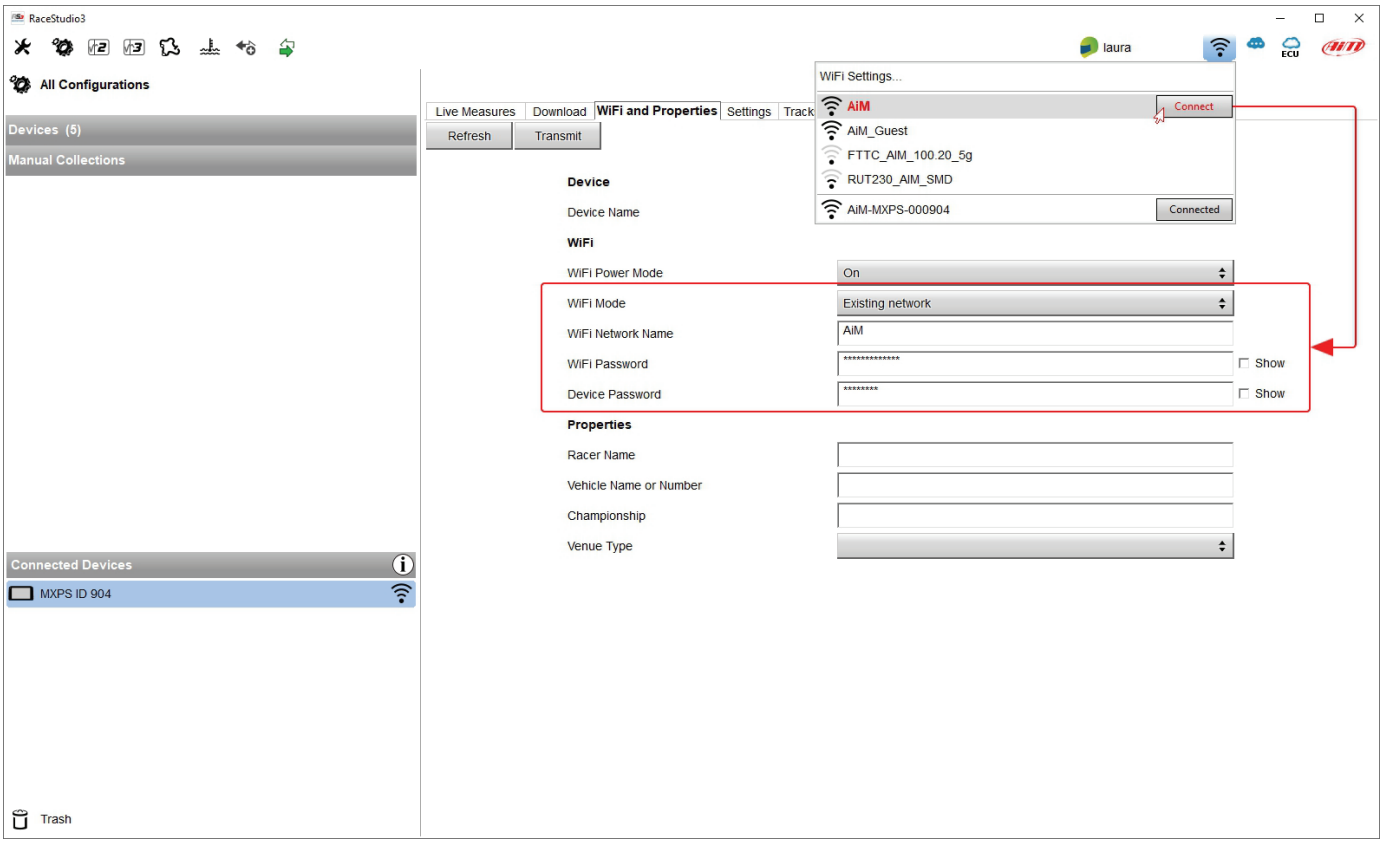
9.2 – Adding MXPS loggers to an existing network

This situation is ideal for a team with multiple drivers and staff members and is desired to communicate with one or more AiM devices using the same Wi-Fi network. Each MXPS logger can have its password that adds another security and privacy level to the network.

Race Studio 3 will show all MXPS loggers connected to the same network under “Connected devices” label, bottom left of the software page: click the device.

Enter “Wi-Fi and properties” tab and set it on “Existing Network”; fill in network name, network password and device password.

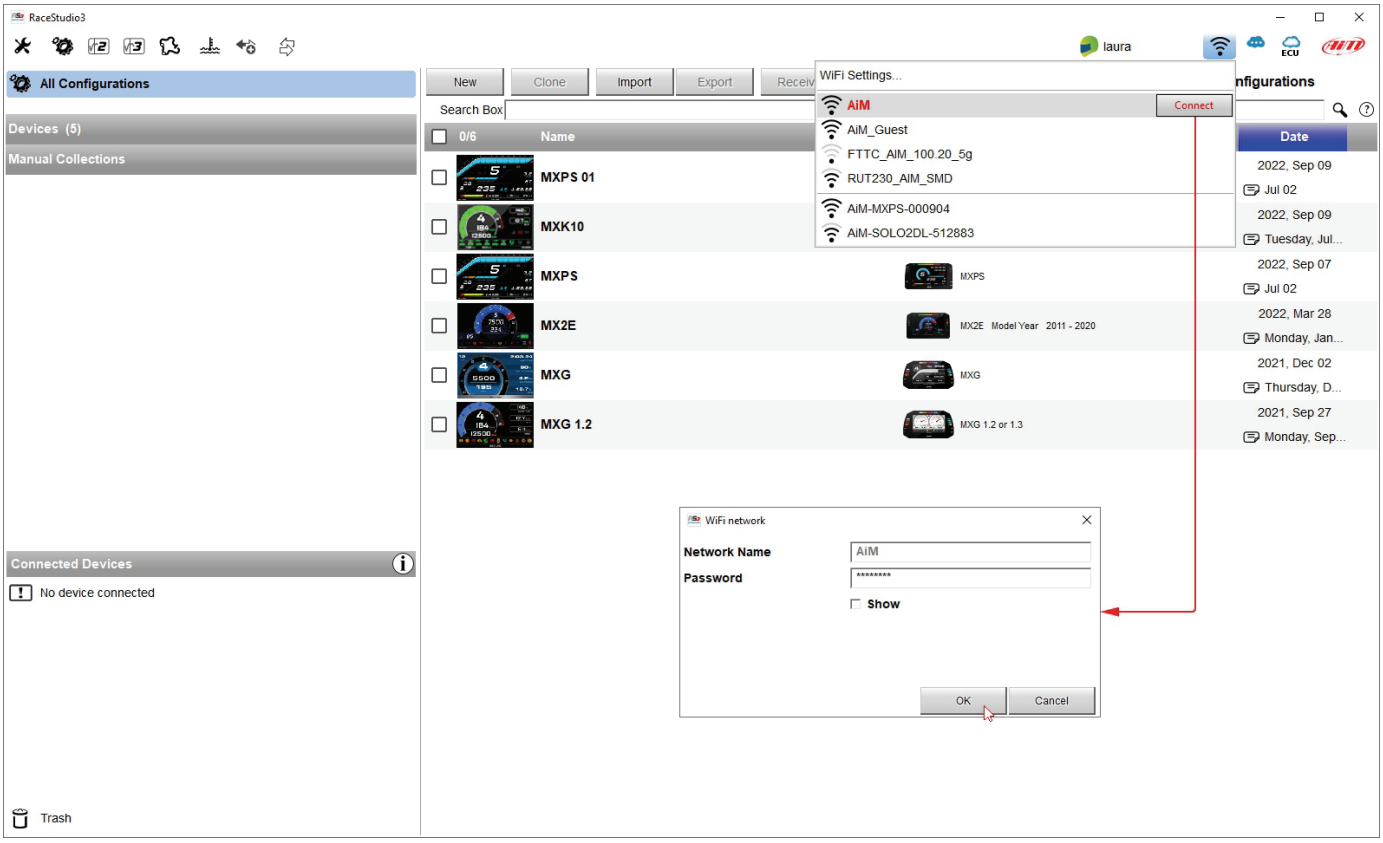
Transmit the network settings to the device clicking “Transmit”: it reboots and joins that network.
Please note: the only admitted password are those following WPA2-PSK standard.



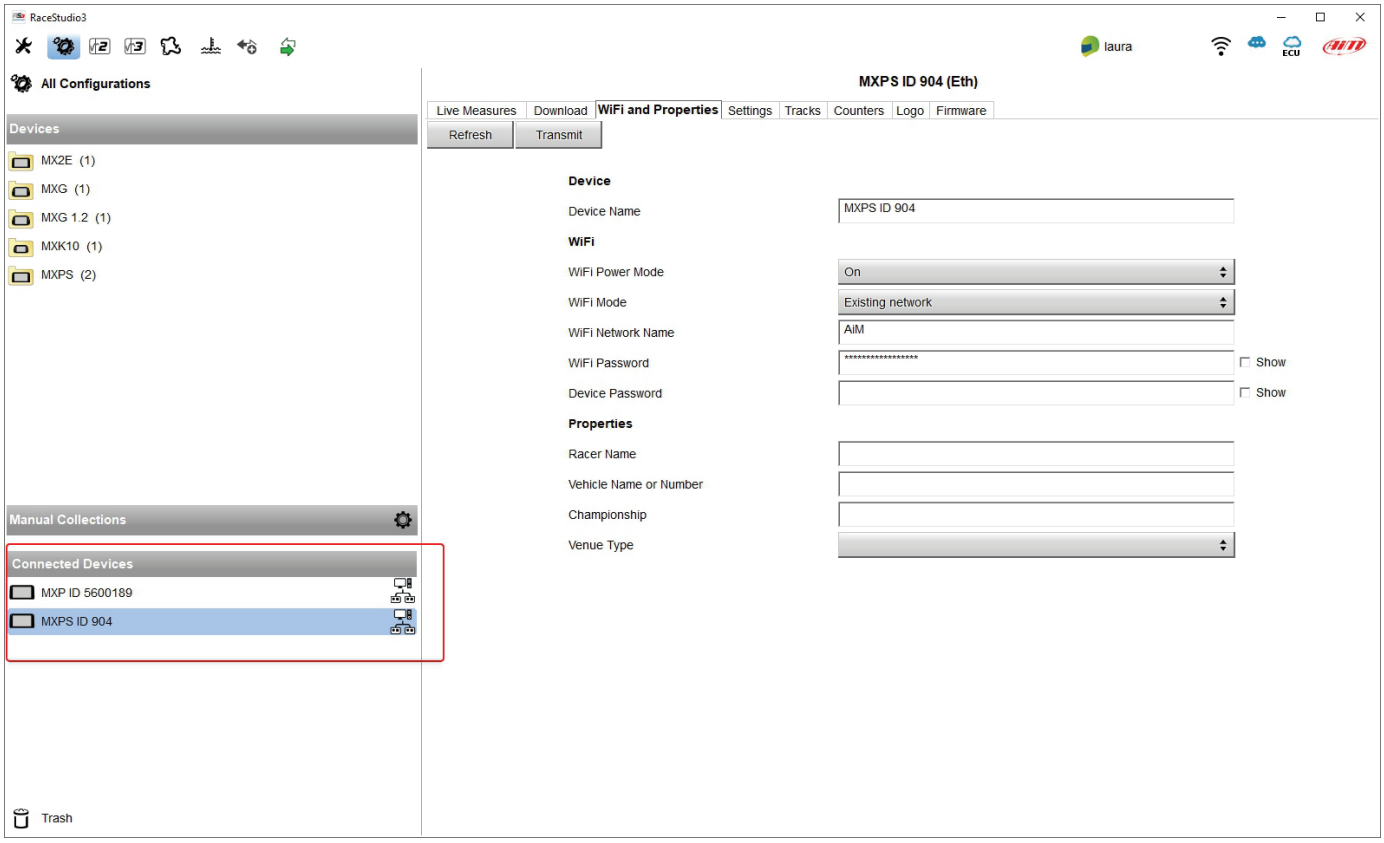
Here above is shown a device “MXPS ID 904” that switched from AP to WLAN mode (Existing Network).

Network name is “AiM” and does not work with free access because is protected by a password.

To obtain connectivity on the device the PC has to be authenticated to the same network as shown here below.



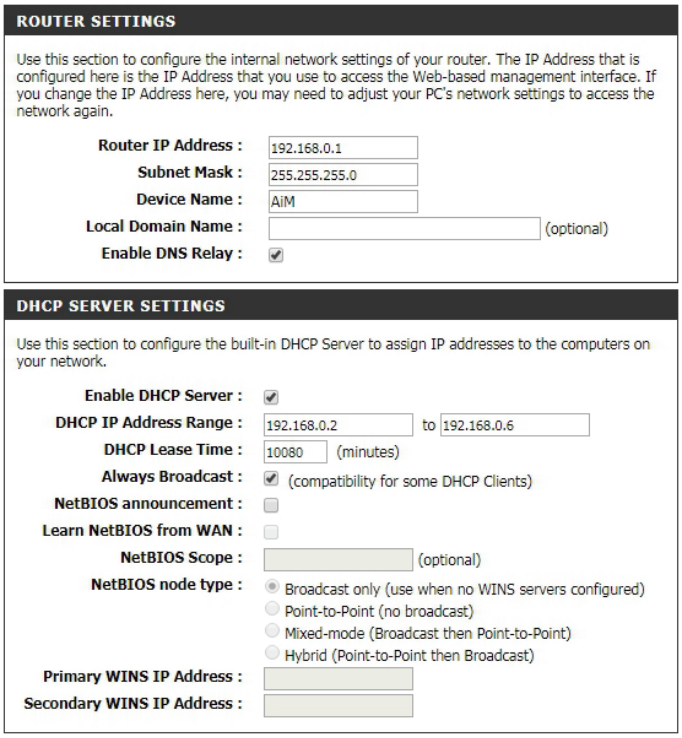
When the PC is authenticated to the network called “AiM” it can see all devices you configured to access the same network. In the image below three AiM devices are connected to the same “AiM” WLAN.



9.3 – Wi-Fi network settings

In this chapter is a short description of how to configure a WLAN including AiM devices and a PC.

Here below is an example of configuration.



For better network performances we suggest the use of a network device equipped with a DHCP server and using 3x3 MIMO technology like, for example a Linksys AS3200.

To maximize the bandwidth the Internet should not be allowed on this WLAN; this means the DHCP server should be configured without any DNS address nor gateway by default.

The parameters for the device network configuration in this example are:

- **Wireless network name: Network_2**
  It means that the WLAN network name is "AiM." A PC has to be authenticated in this network to interact with any AiM device of this network.
- **Gateway address: 192.168.0.1**
  primary DNS server: 0.0.0.0
  secondary DNS server: 0.0.0.0
  (These settings prevent Internet connectivity on this WLAN.)
- **Subnet mask: 255.255.255.248**
  Enable DHCP server: yes
  DHCP IP address range: 192.168.0.2 to 192.168.0.6

These settings enable a DHCP server running on this WLAN and provide an IP address in a 2-6 range. This means that this network allows 5 network hosts.
The number of devices on a WLAN network depends on the subnet mask. Here below are typical examples of network masks and IP addresses range.
The configuration in bold is the one we suggest (if a greater number of devices is not needed), being the one that makes it easier and quicker for Race Studio 3 the identification of the devices in the network.

Subnet mask:	**IP address range:**	**Number of devices:**
255.255.255.0	192.168.0.1 – 254	254
255.255.255.128	192.168.0.1 – 126	126
255.255.255.192	192.168.0.1 – 62	62
255.255.255.224	192.168.0.1 – 30	30
255.255.255.240	192.168.0.1 – 14	14
255.255.255.248	**192.168.0.1 – 6**	**6**

9.4 – The Internet connectivity

For an optimal speed of AiM device(s) it is recommended not to allow the Internet on the same network and to set the WLAN in the same way.

The Internet access can of course be allowed on the network but this would degrade the communication.
This slightly slower speed can be suitable but a second Wi-Fi connection through an additional hardware (NIC) is to be preferred.
This configuration would provide an optimal speed of the data network of your AiM device(s) and at the same time would provide an internet connectivity with the second NIC.

9.5 – Connection issues

It can occur that MXPS logger is correctly connected to Race Studio 3 via Wi-Fi but the user interface does not show it. This may be because Wi-Fi port setting is set with a static IP. To switch it to dynamic (DHCP):

- open "Network and sharing centre" in the Windows™ research engine
- right click on the Wi-Fi connection and a panel shows up
- select "Properties" option
- double click on "Internet Protocol version 4 (TCP/IPv4)"
- verify that option "Obtain an IP address" is active

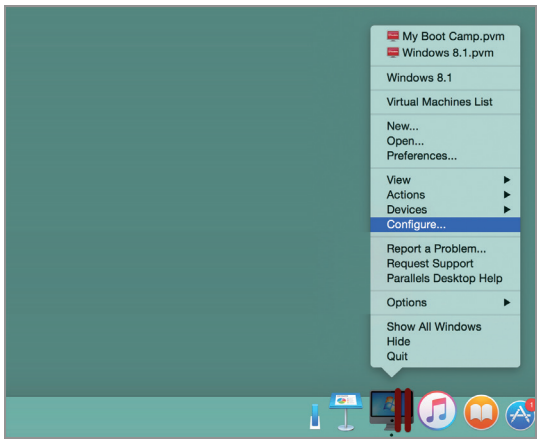
For further information refer to FAQ section, Wi-Fi of www.aim-sportline.com.

9.6 – Working on Mac™ with virtualized Windows™

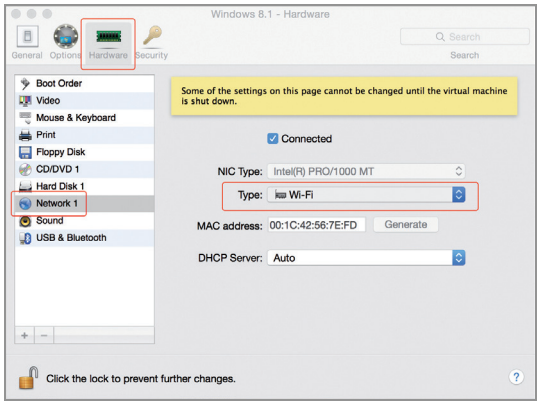
Race Studio 3 only works on Windows™ operative systems; Mac users can use a virtualized Windows™ machine.

The main problem is that the host OS (Mac) must share its Wi-Fi interface with the virtualized operative system (Windows) as Ethernet interface and not as Wi-Fi interface.

Configuring Parallels(™)
Select "Menu –> Configure…" in Parallels.

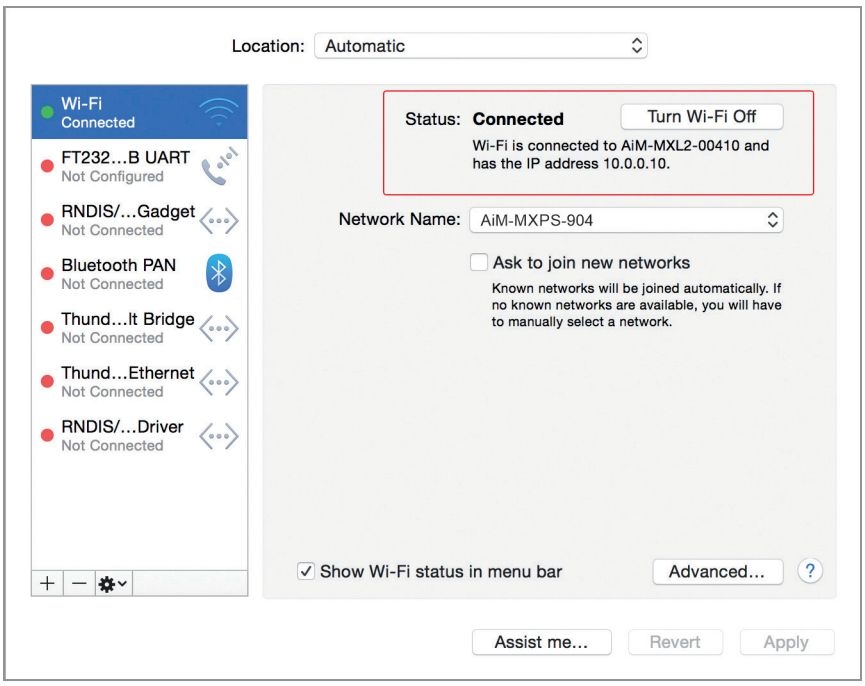


Press "Hardware" – top on the page that shows up – and select "Network" in the drop-down menu on the left.
Right on the configuration panel set "Type" field on "Wi-Fi".



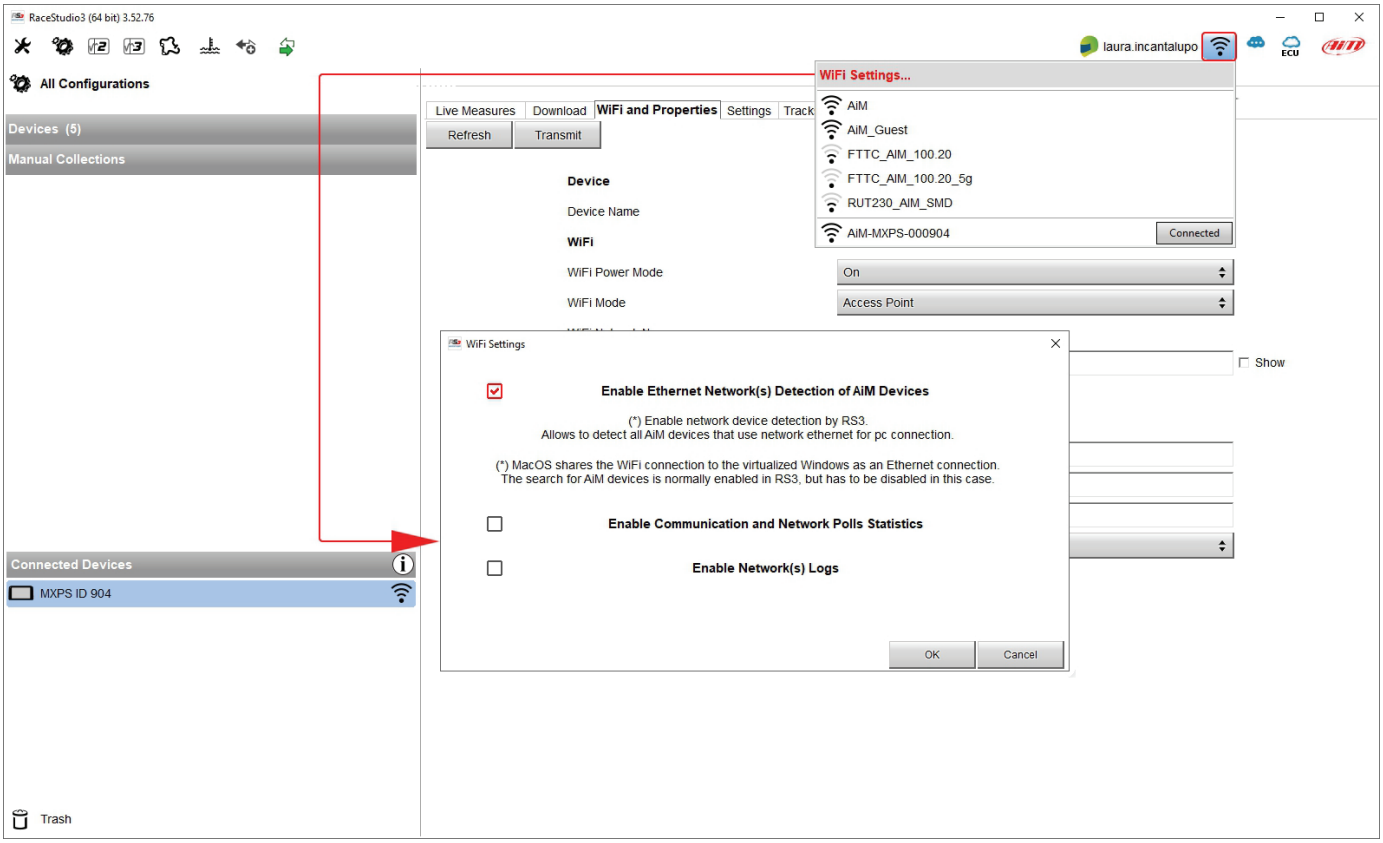
Then select the device to communicate with.

To ensure that the communication works select “Open Network preferences…” menu.
Verify that the status in the window that shows up is “Connected” and that the IP address associated is, for example, 10.0.0.10 (could be 10.0.0.11, 10.0.0.12, or generically 10.0.0.x).



To enable Race Studio 3 correctly working on a Mac with virtualized Windows™.

- press Wi-Fi icon
- select "Wi-Fi Settings" option
- enable the checkbox shown here below.



9.7 – Connected device visualization issues

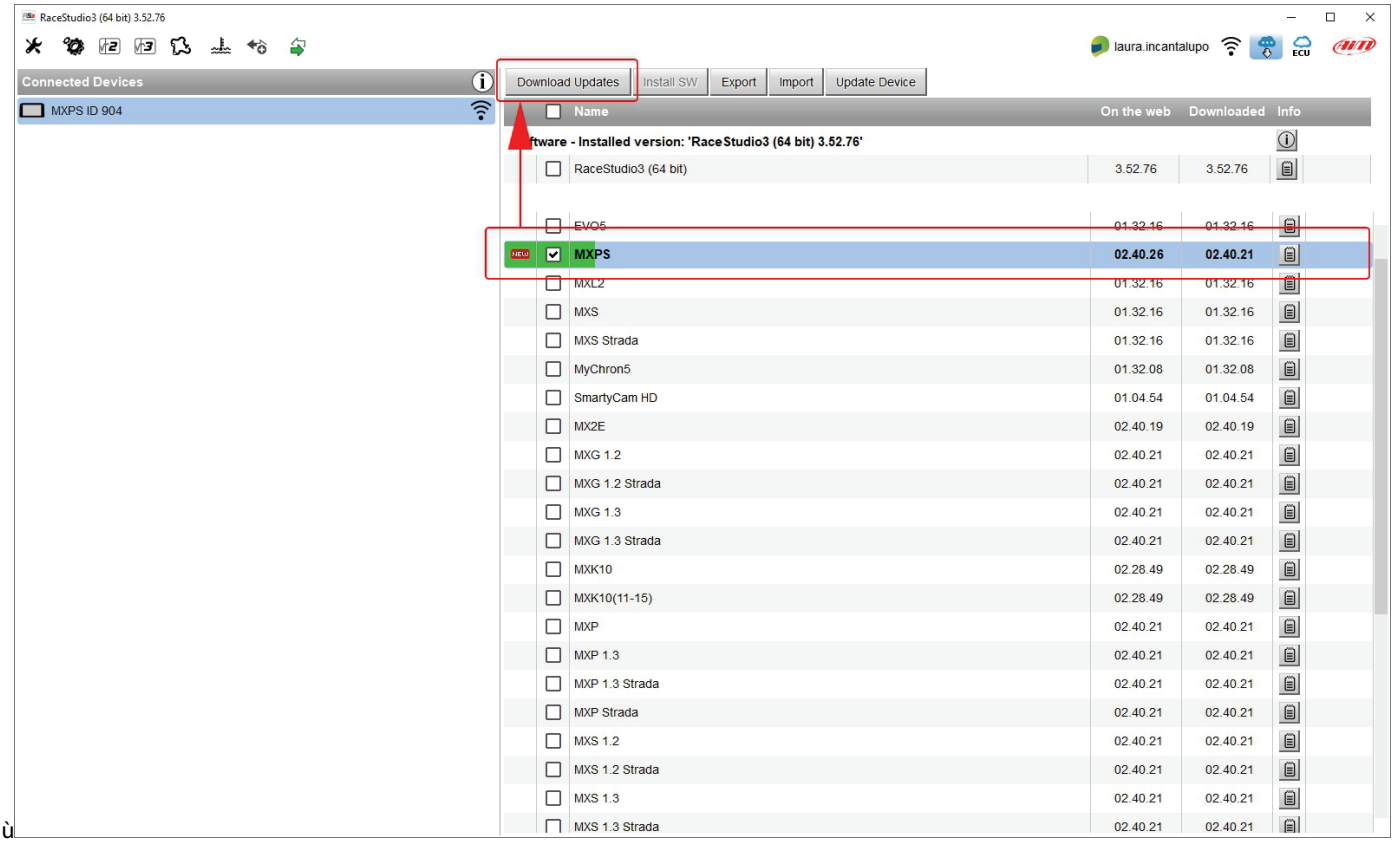
It may occur that using Race Studio 3 on an iMac with virtualized Windows the device connected via Wi-Fi takes some time to be shown in the network or is not shown at all. This is why we always suggest using an Wi-Fi (WLAN) router.
This router works as an Access Point allowing more external devices to connect to its network. MXPS logger Wi-Fi configuration is to be set on Existing Network as explained before.

10 – New firmware upgrade

Our technicians and engineers are constantly working to improve both the firmware (the application that manages the device) and the software (the application installed on the PC).

Each time a new firmware and/or software version is available the icon here above appears with an arrow indicating that something is available for download (otherwise the icon only shows the cloud).

Click it and freely download the new applications.



Once the new firmware has been downloaded connect the device to the PC to perform a firmware upgrade. In a few seconds the device is ready.

Appendix 1 - ECU channels logged by MXPS

MXPS sample and records the following channels supplied by the ECU of Suzuki GSX-R 1000 and GSX-R 100R 2017-2022 bikes.

STANDARD CHANNELS

CHANNEL NAME	SOURCE	FREQUENCY	DESCRIPTION
RPM	DIG SWITCH	20	ENGINE SPEED
Speed	DIG SWITCH	20	BIKE SPEED
IAT	ANALOG	1	INTAKE AIR TEMPERATURE
FUEL	ANALOG	2	FUEL SENSOR PERCENTAGE
NEUTRAL	DIG SWITCH	20	NEUTRAL
ABS	DIG SWITCH	20	ABS WARNING
LOP	DIG SWITCH	20	LOW OIL PRESSURE
LUMINOSITY	INTERNAL	1	
FUEL USED	INTERNAL	1	FUEL USED
ABS VEHICLE SPEED	ABS MODULE	100	VEHICLE SPEED FROM ABS
IMU ROLL RATE	IMU MODULE	100	ROLL RATE FROM IMU MODULE
IMU PITCH RATE	IMU MODULE	100	PITCH RATE FROM IMU MODULE
IMU LATERAL ACC	IMU MODULE	100	LATERAL ACC FROM IMU MODULE
IMU INLINE ACC	IMU MODULE	100	INLINE ACC FROM IMU MODULE
IMU YAW RATE	IMU MODULE	100	YAW RATE FROM IMU MODULE
IMU VERTICAL ACC	IMU MODULE	100	VERTICAL ACC FROM IMU MODULE
ECT	ECU	10	ENGINE COOLANT TEMPERATURE
GEAR	ECU	10	GEAR
FUEL FLOW	ECU	20	FUEL FLOW
S_DMS LEV	ECU	10	SDMS MAP
LC ACTIVE	ECU	10	LAUNCH CONTROL ACTIVE
FUEL ECONOMY		1	FUEL ECONOMY
FUEL CONS		1	FUEL CONSUMPTION
DISPLAY SPEED		20	SPEED SHOWN ON DASH

FUEL LEVEL		1	FUEL LEVEL
TC		10	TC LEVEL
FUEL RANGE		1	RANGE
USER LED ALARM R		10	
USER LED ALARM B		10	
USER LED ALARM G		10	
ABS CONN		0,5	DATA OK FROM ABS
IMU CONN		0,5	DATA OK FROM IMU
SDS2 CONN		0,5	DATA OK FROM SDS2
LED_TC		50	TC LED IS ON
LED_TC_BLINK		50	TC LED IS BLINKING

RACING KIT ONLY CHANNELS

CHANNEL NAME	SOURCE	FREQUENCY	DESCRIPTION
AN USER1	ANALOG	USER DEFINED	ANALOG CHANNEL1
AN USER2	ANALOG	USER DEFINED	ANALOG CHANNEL2
AN USER3	ANALOG	USER DEFINED	ANALOG CHANNEL3
AN USER4	ANALOG	USER DEFINED	ANALOG CHANNEL4
SDS SPEED R	ECU	10	REAR WHEEL SPEED
SDS SPEED F	ECU	10	FRONT WHEEL SPEED
SDS BATT VOLT	ECU	10	BATTERY VOLTAGE
SDS CLT	ECU	10	COOLANT TEMPERATURE
SDS IAT	ECU	10	INTAKE AIR TEMPERATURE
SDS MAP	ECU	10	MANIFOLD AIR PRESSURE
SDS BAROM	ECU	10	BAROMETRIC PRESSURE
SDS FUEL1	ECU	10	FUEL INJECTOR1
SDS FUEL2	ECU	10	FUEL INJECTOR2
SDS FUEL3	ECU	10	FUEL INJECTOR3
SDS FUEL4	ECU	10	FUEL INJECTOR4
SDS IGN ADV AN 1	ECU	10	IGNITION ANGLE1
SDS IGN ADV AN 2	ECU	10	IGNITION ANGLE2
SDS IGN ADV AN 3	ECU	10	IGNITION ANGLE3

SDS IGN ADV AN 4	ECU	10	IGNITION ANGLE4
SDS TPS1 V	ECU	10	TPS VOLTAGE1
SDS TPS2 V	ECU	10	TPS VOLTAGE2
SDS GRIP1 V	ECU	10	GRIP VOLTAGE1
SDS GRP2 V	ECU	10	GRIP VOLTAGE2
SdS SHIFT SENS	ECU	10	GEAR SHIFT SENSOR
SDS TPS1	ECU	10	THROTTLE POSITION1
SDS TPS2	ECU	10	THROTTLE POSITION2
SDS GRIP1	ECU	10	GRIP POSITION1
SDS GRIP2	ECU	10	GRIP POSITION2
SDS SPIN RATE	ECU	10	WHEEL SPIN RATE WITH TC OFF
SDS SPIN RT TC	ECU	10	WHEEL SPIN RATE WITH TC ON
SDS DH COR AN	ECU	10	DASHPOT CORRECTION ANGLE
SDS CONN	ECU	10	SDS DATA OK