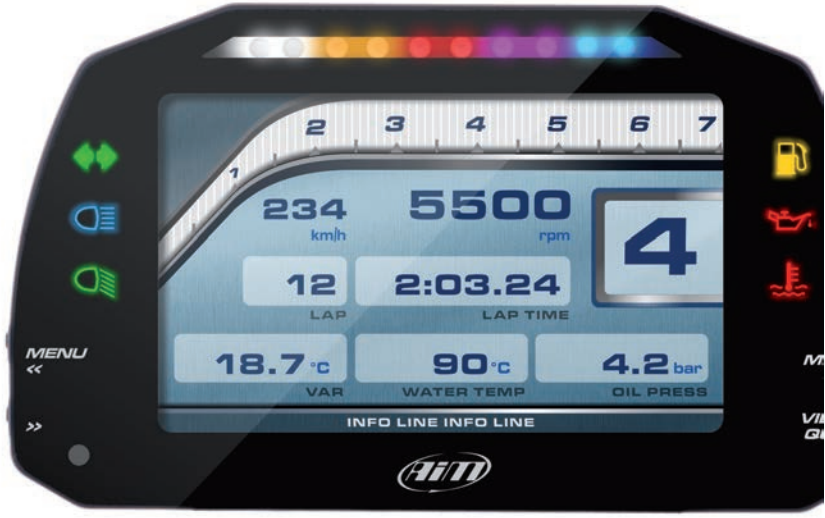
AIMSHOP.COM

• LAP TIMERS • LOGGERS • CAMERAS • DASHES • SENSORS • AND MORE

SHOP NOW

MXS Strada

USER GUIDE



VISIT SUPPORT CENTER | SOFTWARE DOWNLOADS | FIRMWARE UPDATES | PRODUCT DOCUMENTATION

MXS Strada

01. INTRODUCTION	**04**
02. WHAT IS IN THE KIT	**06**
03. LAYOUT AND PUSHBUTTONS	**08**
04. GEAR FLASHES AND ALARM LEDS	**10**
05. ECU CONNECTION	**11**
06. RPM	**12**
6.1 RPM FROM ECU	**12**
6.2 RPM VIA A 5-50 V SQUARE WAVE SIGNAL OR COIL (150-400 V)	**12**
07. SPEED	**14**
7.1 SPEED READ FROM ECU	**14**
7.2 SPEED READ FROM GPS RECEIVER (OPTIONAL)	**14**
7.3 SPEED READ FROM WHEEL SENSORS	**14**
08. ANALOG INPUTS	**15**
09. DIGITAL OUTPUT	**16**
10. RACE STUDIO 3 SOFTWARE	**18**
10.1 CONFIGURATION	**19**
10.1.1 CHANNELS CONFIGURATION	**20**
10.1.2 ECU STREAM	**21**
10.1.3 CAN2 STREAM	**21**
10.1.4 PARAMETERS	**22**
10.1.5 ALARM LEDS DIGITAL OUTPUT AND SHIFT LIGHTS	**22**
10.1.6 DISPLAY CONFIGURATION	**26**
10.1.7 CAN OUTPUT	**27**
10.1.8 MODIFY, EXPORT OR DELETE AN EXISTING CONFIGURATION	**29**
10.1.9 ON LINE VIEW AND CALIBRATION	**30**
11. DATA RECALL	**31**
12. EXPANSIONS	**32**
13. MXS STRADA PINOUT	**34**
14. MXS STRADA TECHNICAL DRAWINGS	**36**

Thanks.

Dear Customer,

First, we would like to thank you for choosing the MXS Strada dash as the tool to monitor your on-track performance.
The MXS Strada, with its compact 5”TFT display, gives you the flexibility for viewing your data in your preferred way from a variety of sensors and sources.
Please, before digging into your new dash, keep in mind that we are constantly working on bettering our software and firmware.

So, please, be sure to check our website periodically for any update.

www.aim-sportline.com

What is MXS Strada?

MXS Strada is a color, high-contrast, 5" TFT dash developed for race street and race car/bike installations. It is fully customer configurable.

Which data does it manage?

Data come from a wide range of sources, including your vehicle ECU, the analog/digital inputs, the optional GPS and external expansions as well as predefined math channels.

How many pages does it show?

You can define up to eight different fully customizable pages.

Is it possible to configure the pages?

You can choose among a wide library of page styles, defining the data to be shown. Also, end of scales and units of measure can be easily configured using the Race Studio 3 software.

How do alarm LEDs work?

You can configure alarm LEDs choosing color, blinking frequency and defining the logic for turning them on or off.

MXS Strada is available with two different layouts: race (top) and street (bottom)

2. What is in the kit

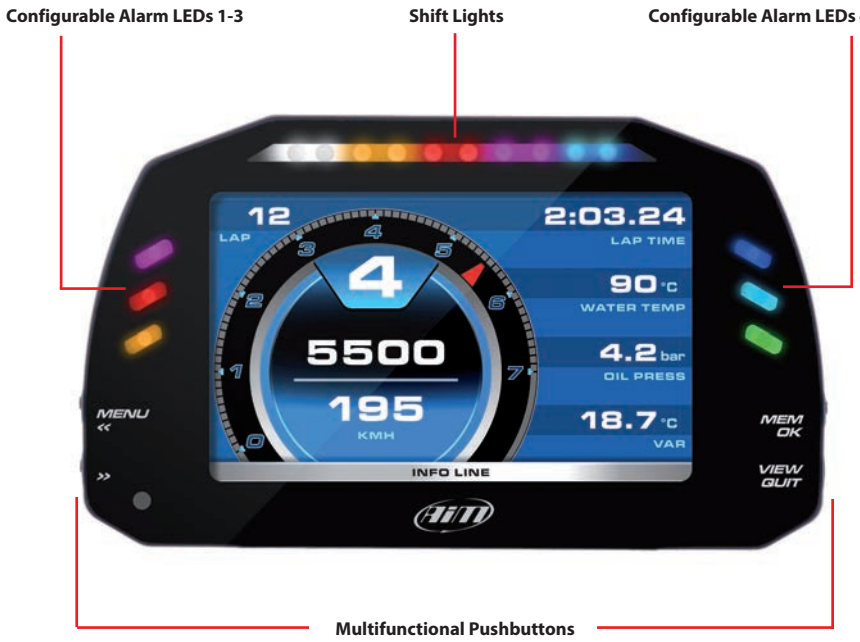
The MXS Strada kit includes:

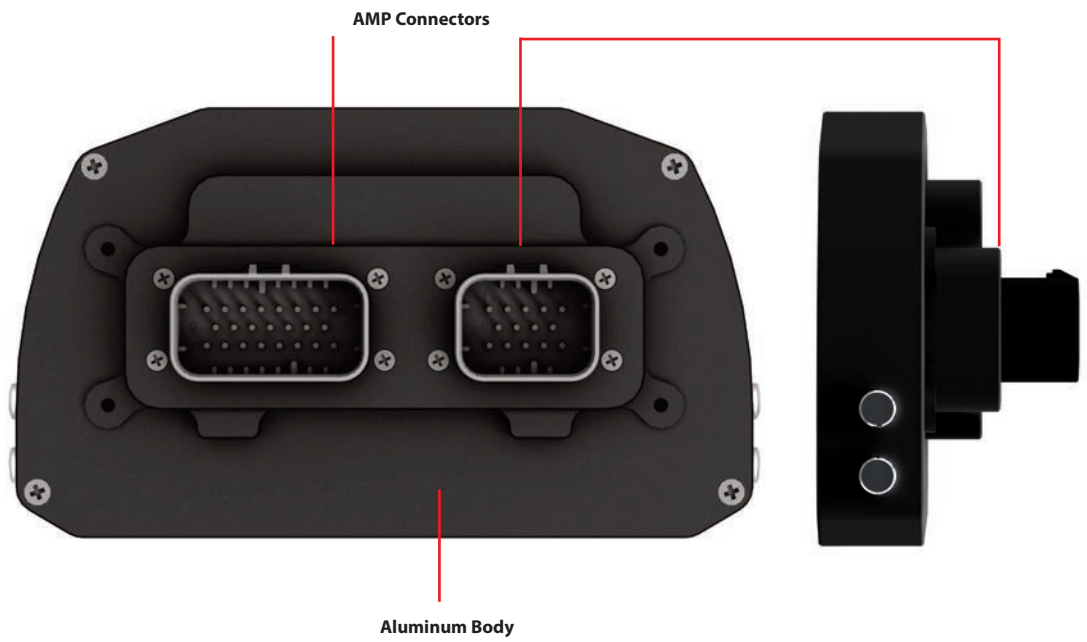
MXS Strada dash

Software

Main Harnesses

MXS Strada Dash





4. Gear Flashes and Alarm LEDs

1

MXS Strada features 10 RGB gear flash LEDs that can be freely configured in a very flexible way.

For each LED, you can define the RPM value at which to turn it on and the colour.
You can also define different RPM values per each gear number.

2

MXS Strada also has 6 different alarm LEDs that you can configure in order to turn them on or off depending on the value of the analog or digital inputs, ECU values, expansion values, GPS information or math channels.
You can configure them in order to turn them off when the condition disappears, when you push a pushbutton or when the test is finished.
You can associate an alarm LED, a message and a digital output to each event.
Please, read section 10.1.5 in order to see how to manage gear flashes and alarm LEDs.

5. ECU connection

MXS Strada can sample data from the ECU of your vehicle.
The list of the ECU available protocols is published on our site:

http://www.aim-sportline.com/eng/download/ecu-connections.htm

This list includes more than 1000 different protocols and is constantly updated with new protocols and upgrades.

When possible, documents explaining how to configure your ECU to ensure compatibility between the data flow transmitted are available, too.

From an hardware point of view, MXS Strada is compatible with all currently available connections: CAN, RS232 or K Line.

The steps to manage the data coming from the ECU are the following:

1. Determine which hardware connection is available for your ECU

2. Read the documentation about your ECU at www.aim-sportline.com and identify the name of the ECU and the proper software driver to be specified

3. Using Race Studio 3, configure MXS Strada setting that software driver with the menu shown here down.

The steps are explained in section 10.1.2

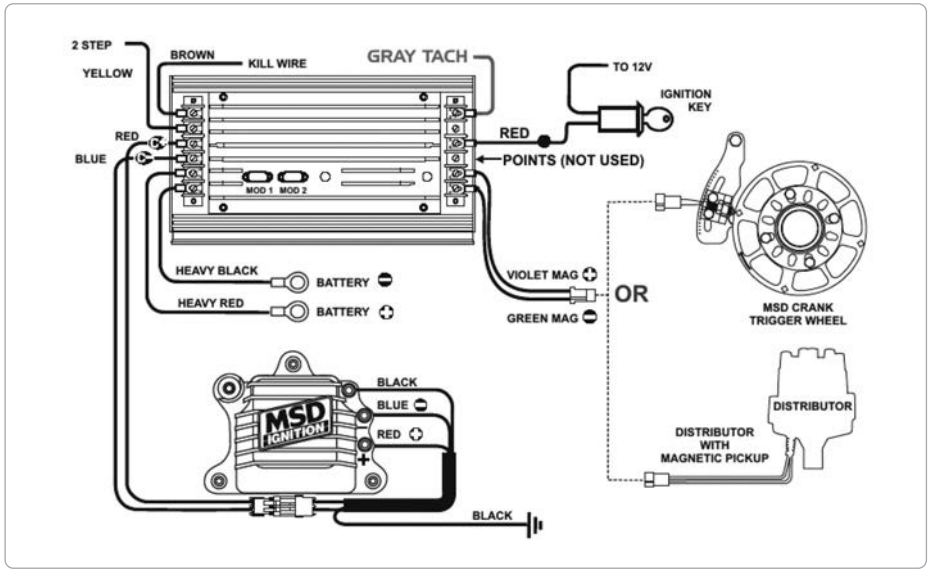
6. RPM

MXS Strada can get the RPM signal in the following ways:

- from ECU
- through a square wave signal (from 5 to 50 V)
- from the low voltage (from 150 to 400 V) of the coil

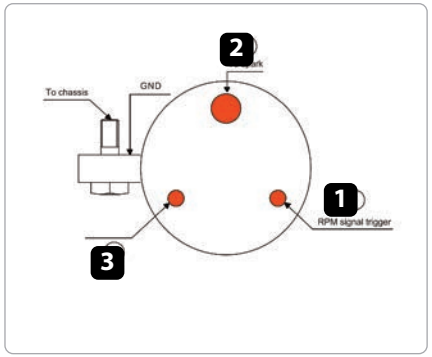
6.1 RPM from ECU
RPM is one of the many data flowing from your ECU to MXS Strada.

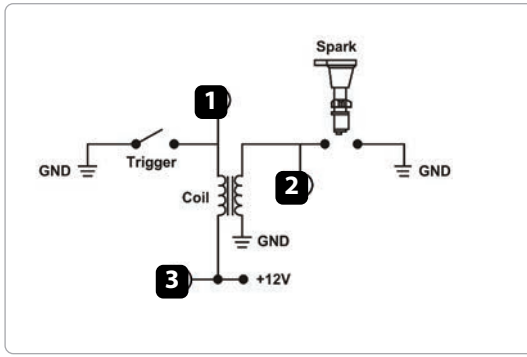
6.2 RPM via a 5-50 V Square Wave Signal or coil (150-400 V)
In case your engine is not managed by any ECU, MXS Strada can read the signal from the low voltage of the coil (whose peak can be from 150 to 400 V) or from a possible square wave (the peak can be from 5 to 50V).
The pin labelled **"RPM"** reported in appendix **"Pinout"** receives the signal:



The image shows an example of wiring for the ignition system.

The output, labelled **"GRAY TACH",** gives a 5-50V output that can be directly sampled by MXS Strada. If the output is not available from the ignition system, the system has to be connected to the low voltage of the coil, as shown in the following schematics.





Point 1: Low voltage of the coil
Point 2: Connected to the spark plug
Point 3: Connected to the +12V of the battery

7. Speed

MXS Strada can receive the speed signal from three different sources:

- from the ECU
- from the GPS receiver (optional)
- from the speed channel

It is, therefore, possible for MXS Strada to receive different values of speed at the same time; the more powerful ECUs transmit up to four wheel speed values.

7.1 Speed Read from ECU

If your ECU sends the value of speed in its data stream, it is obviously possible to read and show that value.
These ECU channels are enabled by default in the software Race Studio 3.

7.2 Speed Read from GPS Receiver (optional)

The GPS08 receiver is configured in order to obtain the best performance in terms of reactivity and accuracy.
For getting GPS speed, you don't need any configuration. Simply connect the GPS08 Module to your MXS Strada and, after a setup period of some seconds, the data will be shown.

7.3 Speed Read from Wheel Sensors

MXS Strada has one speed input in the 23 pins AMP connector.

The digital sensor XØ2SNVMØØ detects the presence of a metallic tooth placed at a distance between 0.5 and 2 mm.

ID	☑	Name	Function
RPM	☑	RPM	RPM
Spd	☐	Speed	Vehicle Spd

Just enter Race Studio 3 configuration panel and, after enabling the speed channel, set the wheel circumference and the number of pulses per revolution.

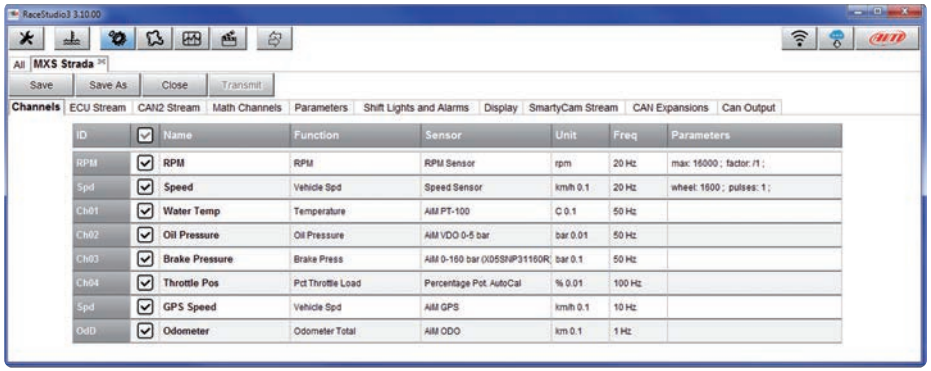
8. Analog Inputs

MXS Strada has 4 analog inputs, sampled up to 1000 times per second each.
You can connect:

- 0-5 Volt signals
- ratiometric potentiometers
- pressure sensors
- thermo-resistances
- K-type thermocouples

Please use the software Race Studio 3 as explained in section 10.1:

- connect the sensor to the desired input
- enable the channel in the Channels table
- select the proper sensor type; sensors of many different types are properly handled
- set the sampling frequency
- set the unit of measure.



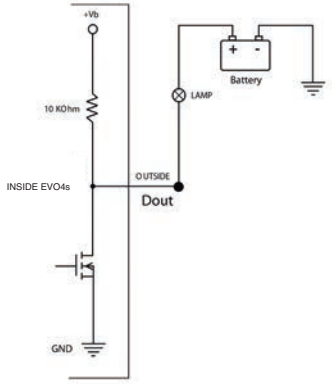
9. Digital Output

MXS Strada features one digital output of 1 Amp at 12 volts in the 23 pins AMP connector.
The digital output (Dout) is a LOW-SIDE type with internal 10 Kohm weak pull-up resistor. Here below are some connecting examples.

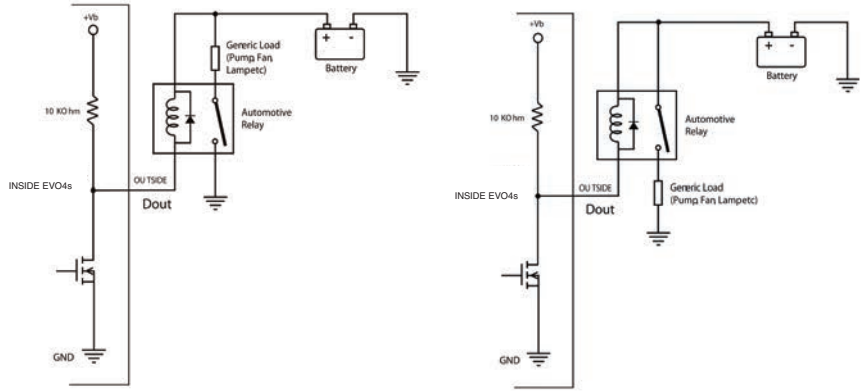
You can configure the digital output in order to turn it on according to the value of the analog or digital inputs, ECU values, expansion values, GPS information or math channels.
To each event you can associate an alarm LED, a message and a digital output.

You can configure it in order to turn them off when the condition disappears, when you push a pushbutton or when the test is finished.
Please refer to section 10.1.5 to see how to use Race Studio 3 to manage the digital output.

Connecting examples



Load up to 1 Amp directly managed by MXS Strada digital output.



Load higher than 1 Amp requires an automotive relay

10. Race Studio 3 Software

Race Studio 3 is the powerful software that you are going to use for all the activities regarding your MXS Strada.
It offers the following features:

MXS Strada configuration:
Create, modify, delete, export and import configurations of:

- channels
- ECU Stream
- math channels
- shift Lights and Alarms
- display pages
- digital outputs
- all the expansions

When you start Race Studio 3, you can see different pushbuttons in the upper left position of the screen; this lets you swap between different features:

- preferences
- custom sensors
- configurations
- tracks
- analysis
- movies
- devices

Preferences
For setting software language, measure units (pressure, speed, temperature, voltage, battery voltage, brake and oil pressure) and fixing download settings.

Custom Sensor
Creates, imports, exports and modifies custom sensor.
Configurations
Creates, imports, exports and modifies existing configurations.
Tracks
Creates, imports, exports and modifies the map of your racing tracks.
Analysis
For looking at and comparing your data.
Movies
To watch and compare up to two track laps movies.
Devices
To establish the connection with the loggers. Top right of the screen is a row of three pushbuttons.

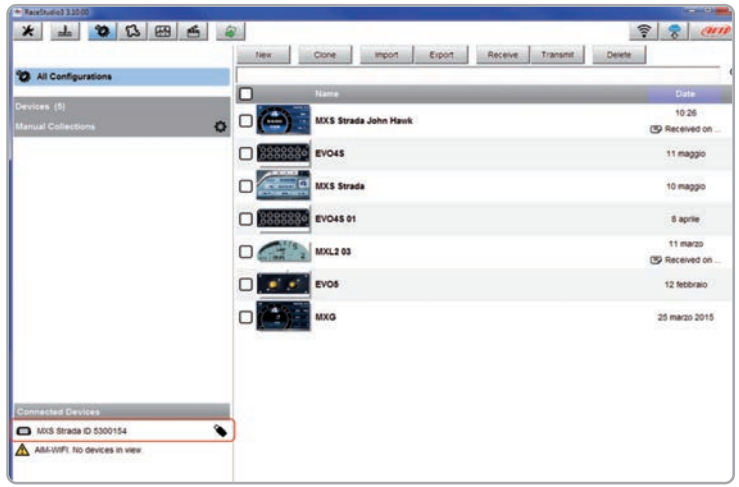
They can be used to:

See available WiFi networks
(not used by MXS Strada).

Download web ubdates
It automatically detects which new firmware and software releases are available and lets you download them from our site www.aim-sportline.com.

Connect to AiM website

10.1 Configuration



The configuration page is divided in two sections.
The left side is dedicated to the folders that you can create and manage in order to better organize your configurations.

Simply push the Setting icon in order to create a new one.

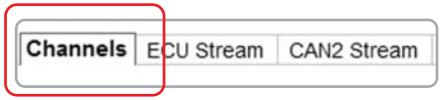
When you connect an AiM system, like your MXS Strada, its serial number appears in the left bottom side of your screen.
In the right side of the screen you can see all the configurations of the selected folder. Please click the one to be edited or push "NEW" pushbutton for creating a new one.

After having entered the MXS Strada configuration page, you can see different tabs useful to set one of the following configuration features:

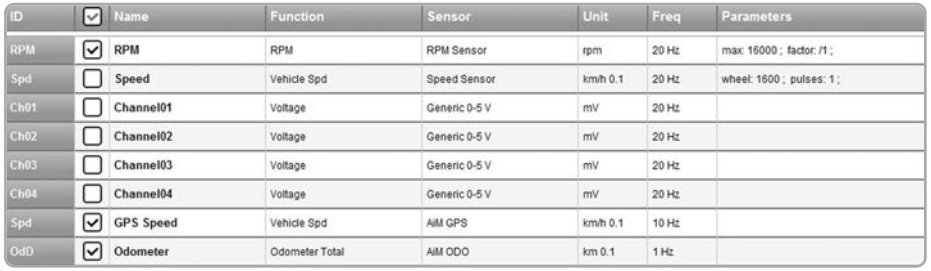
- channels
- ECU Stream
- CAN2 Stream
- math channels
- parameters
- shift light /alarms
- display
- SmartyCam Stream
- CAN Expansions
- CAN Output

10.1.1 Channels configuration

Push the tab **CHANNELS:**



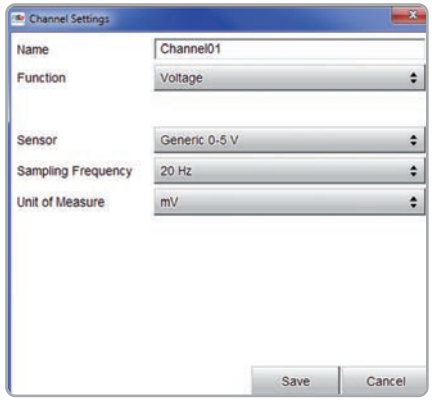
The channel configuration page will appear. With this page you can define all the parameters for your analog inputs, speed inputs and digital RPM input.



ID		Name	Function	Sensor	Unit	Freq	Parameters
RPM	☑	RPM	RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Spd	☐	Speed	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Ch01	☐	Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	☐	Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	☐	Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	☐	Channel04	Voltage	Generic 0-5 V	mV	20 Hz	
Spd	☑	GPS Speed	Vehicle Spd	AiM GPS	km/h 0.1	10 Hz	
OdD	☑	Odometer	Odometer Total	AiM ODO	km 0.1	1 Hz	

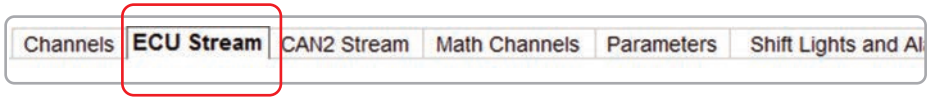
By clicking on each line, a menu appears.
You can define:

- name of the channel
- function
- sensor used
- position (if needed)
- sampling frequency
- measure unit



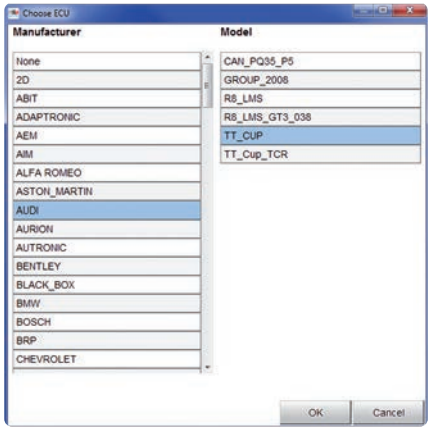
10.1.2 ECU Stream

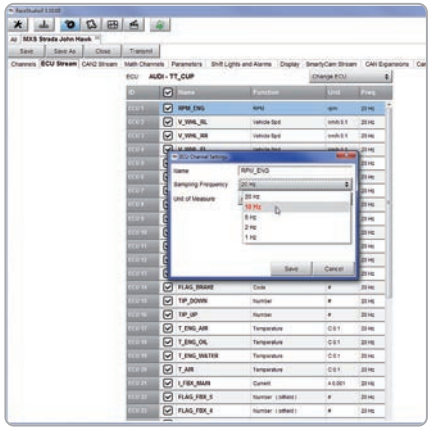
Push the tab **ECU Stream:**



Here you can select the proper ECU to which your MXS Strada is connected. At the very first configuration the panel here below appears.
Select ECU Manufacturer and Model.

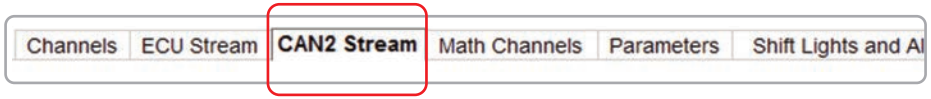
With this feature, you can enable or disable the data coming from your ECU, and you can define the frequency for each channel and change their name.





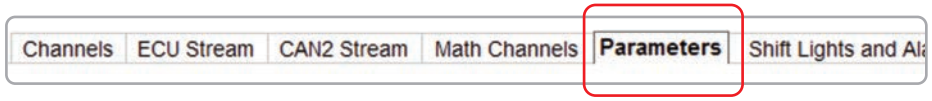
10.1.3 CAN2 Stream

Push the tab **CAN2 Stream:**



CAN2 Stream works like ECU Stream and is normally used for non engine control units like for example ABS management, suspension kits or similar.

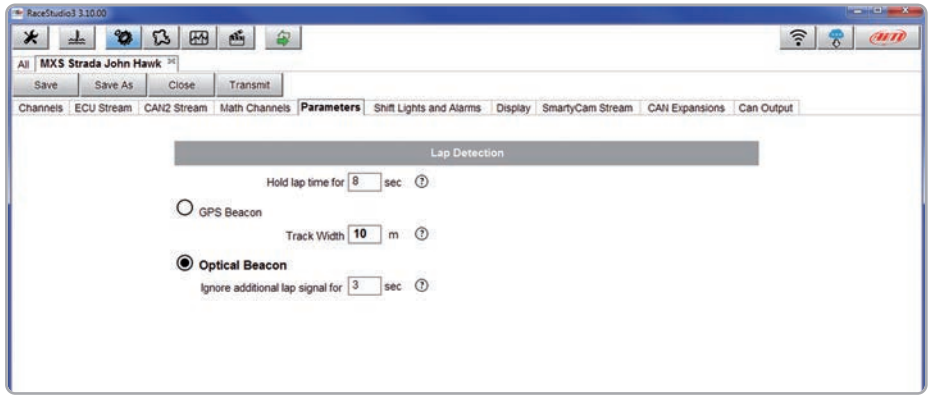
10.1.4 Parameters



Press **"Parameters"** tab to set the lap detection.

Please make sure that optical beacon is enabled. If you bought a GPS08 Module you can set **"GPS Beacon"**.

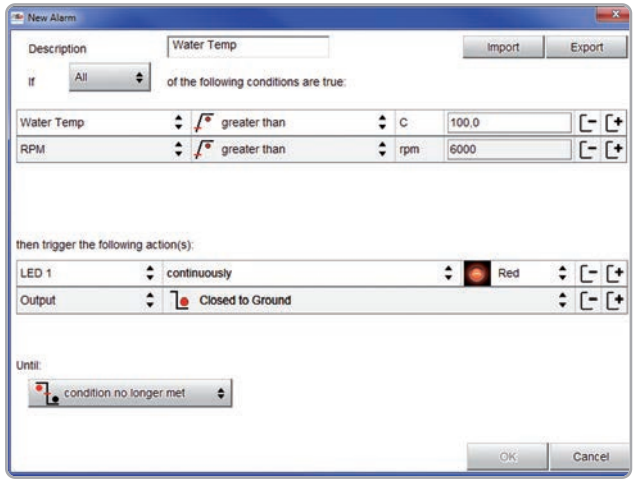
This last requires the track width.
Optical Beacon requires you to insert a time during which the system does not record additional lap signals.



10.1.5 Alarm LEDs digital output and Shift Lights

Click **"Shift Lights and Alarms"** tab to manage Shift Light LEDs, Alarm LEDs and the Digital Output.

At the very first configuration the system asks you to configure an alarm showing you this panel.



Alarms and digital output configuration

Here you can define the event the system has to check and the effect of that event.

■ Fill the DESCRIPTION field, in order to easily identify the event in the future.

■ Describe the Alarm: it can be a single event like "water temperature higher than 100°C" or a combination of events, like in the example: "water temperature is higher than 100°C" and "RPM is higher than 6000".

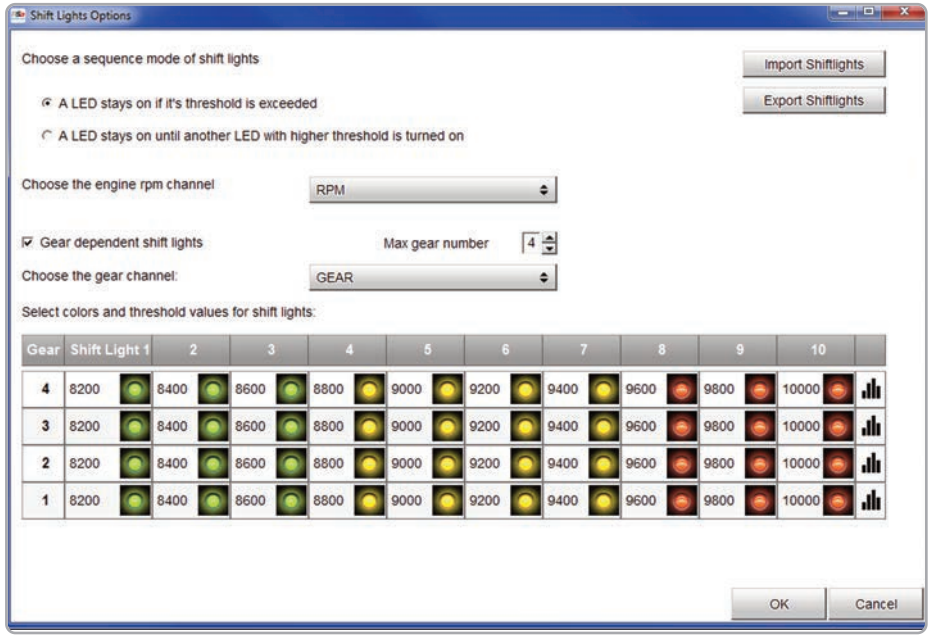
■ Describe what to do when an alarm arises. MXS Strada can:

- Turn a LED on: you have to select the colour and the behaviour: in the example a red led (LED 1) starts blinking continuously

- Turn the digital output on: you have to decide whether closing to ground or open the circuit

■ finally, you have to decide if keeping the LED on:

- until the condition remains ON
- until the power is turned OFF
- until the driver presses a pushbutton



Shift Lights Configuration

Pushing the shift lights setting icon top of the window you enter Shift Lights configuration panel. Here you can manage, for each LED, color and RPM threshold value which will turn it on.

You can decide if:

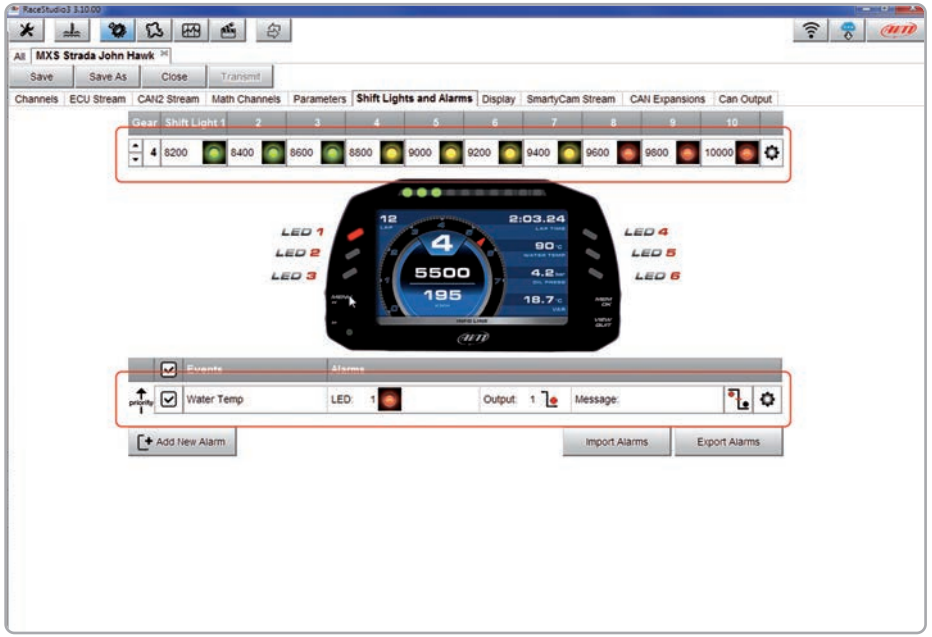
■ keeping the LED ON if its threshold is exceeded as in the example above or

■ keeping the LED ON until another LED with higher threshold is turned on.

You can select the Engine RPM channel to be used: tipically between Engine RPM and Analog digital (ECU) RPM.

If LEDs are managed in dependance upon the gear number like in the example above you have to fill in the Max gear number and per each gear number you have to define colours and levels at which to turn them on.

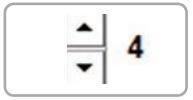
Using the top right pushbuttons you can import/export shiftlights settings.
Press **"OK"** to save and exit.



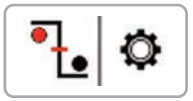
Once alarms and shift lights are set summaries appear: on top is shift lights summary while bottom is alarm led and digital output summary.

To change shift lights settings, click on the setting icon right on the shift lights summary line and proceed.

If shift lights depend upon the gear number use the arrows left of the summary bar to show set values of each gear. In the example you are showing shift lights values set for gear 4.

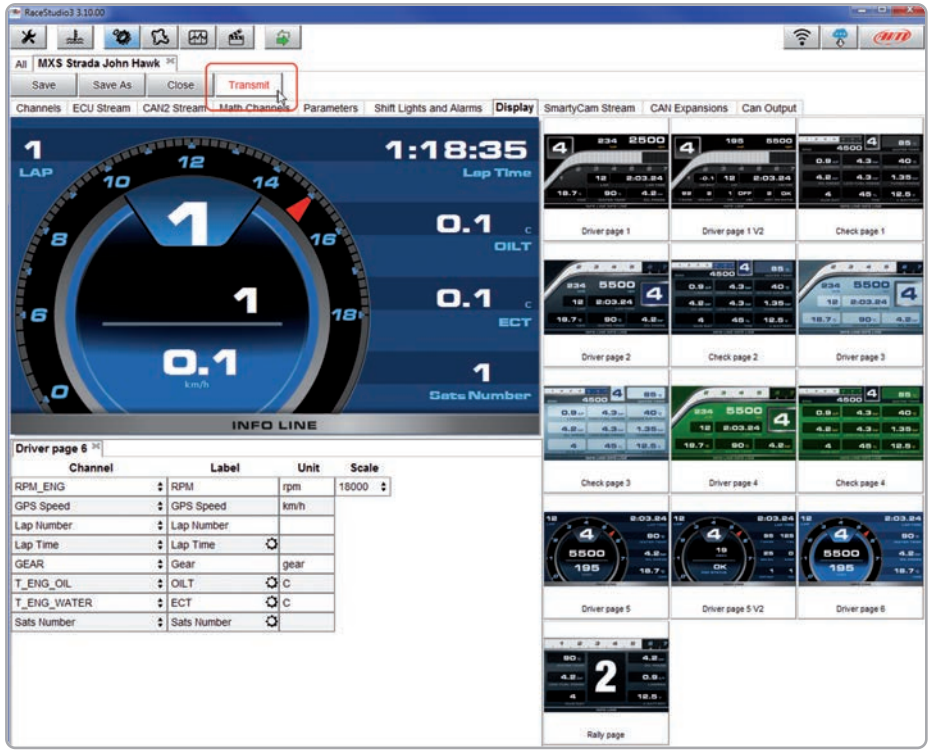


To change alarm LEDs and Digital output settings click on the setting icon right on the alarm LEDs and sigital output summary line and proceed. The icon left of it recalls the condition you chose to turn the LED off; in the example the alarm goes off when the condition is no longer met.



10.1.6 Display Configuration

Press **"Display"**tab to configure MXS Strada display.
The page is divided in two different sections. On the right you can select one among different layouts, while on the left you will manage the different fields. You can add up to eight pages.



Please use the lower left part of the display to configure each channel. You can define:

- channel
- label
- measure unit
- end of scale for each channel

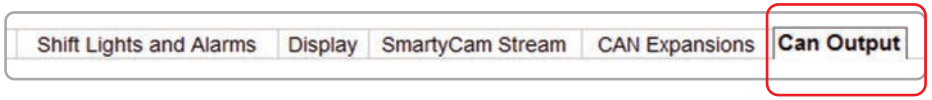
When the panel shows the desired configuration, push **"SAVE"** or **"CLOSE"** to save the configuration.

If you have connected your MXS Strada to the PC, **"TRANSMIT"**pushbutton over the tab is activated: push it to transmit the configuration to your dash.

10.1.7 CAN Output

With the CAN Output you can send messages directly to an existing CAN network in order to improve the range of vehicle control possibilities.

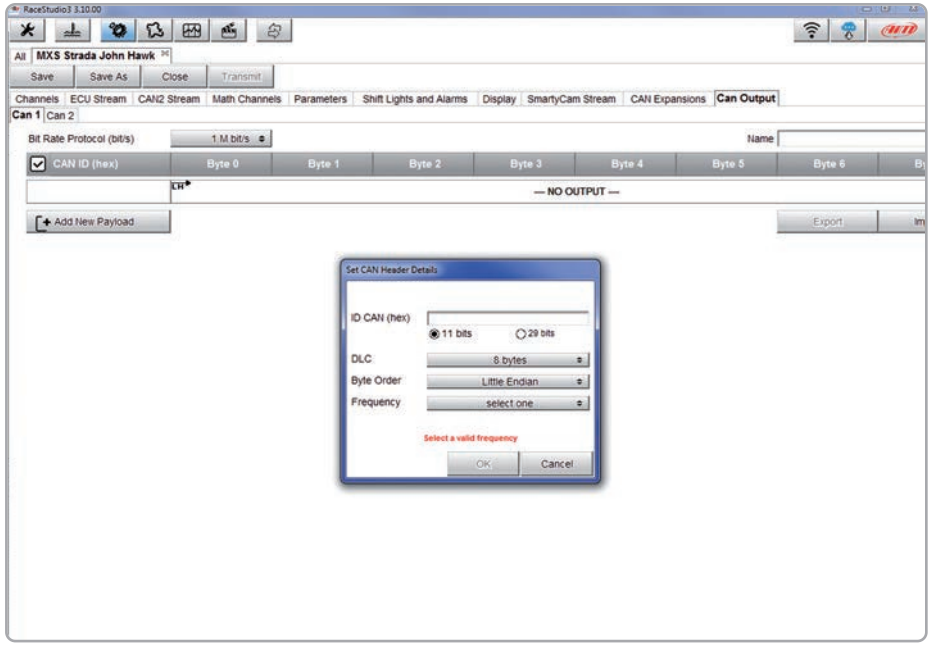
Press **"CAN Output"** tab to configure MXS Strada CAN Output.



For each payload you can define:

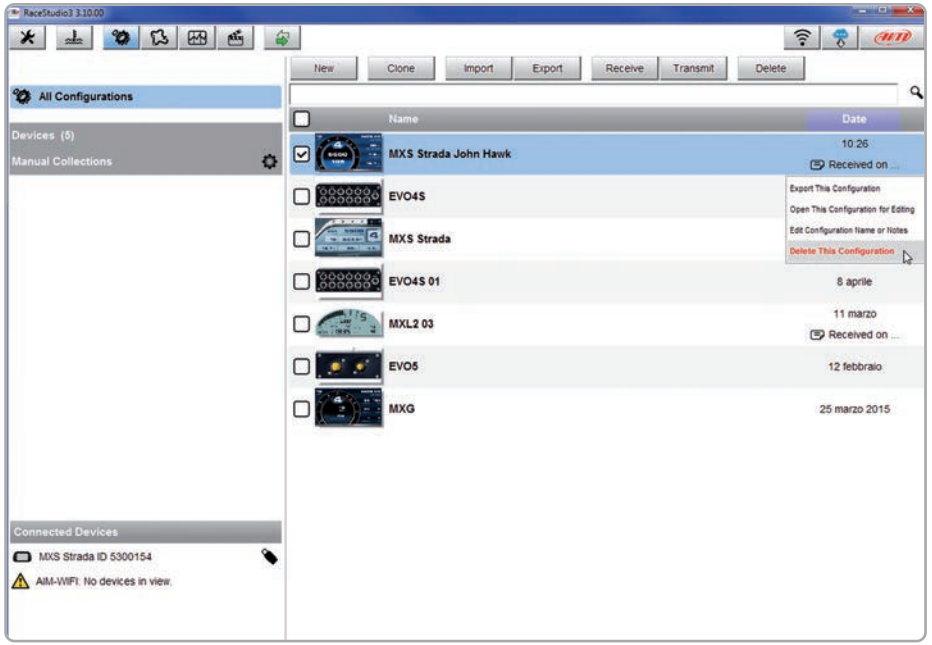
- ID CAN (Hex)
- byte number (DLC): up to 8 bytes
- byte order: little endian or big endian
- frequency up to 20 Hz

Moreover you can transmit each field coming from Analog, digital, internal channel, expansions, ECU or GPS Module.



WARNING: Please be advised that this function allows you to send messages directly to your vehicle CAN network. Sending messages that can potentially conflict with the CAN-bus frame may cause malfunction of your vehicle's safety systems, resulting in personal injury or death. It is your responsibility to fully understand your vehicles CAN-bus. AiM cannot be held responsible for any damage or injury caused by misuse of this function.

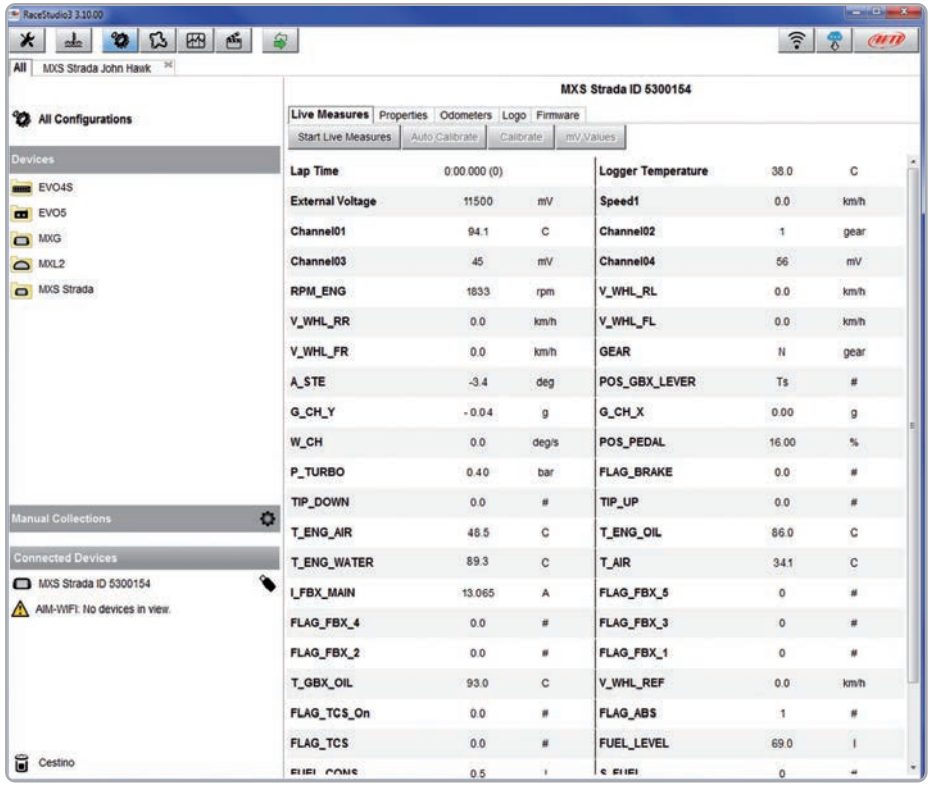
10.1.8 Modify, export or delete an existing configuration



To modify or delete an existing configuration, right click on it and select the desired option.

Selecting **"Open this configuration for Editing"** the configuration is open and you can decide where to perform modifications.

10.1.9 On Line View and Calibration



Push **"LIVE MEASURES"** to see the live data coming from your MXS Strada.
You can change the measure unit double clicking on the measure.

From the Online View, you can calibrate the channels that require calibration.

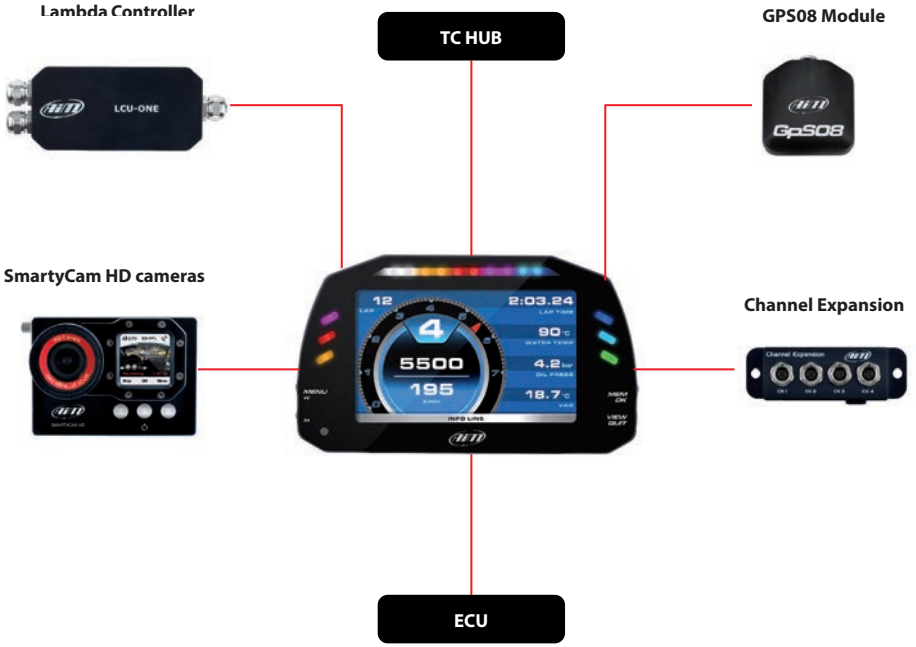
11. Data Recall

At the end of each test - clicking **MEM/OK** pushbutton you can give a glance at your Best laps with max/min speed and RPM...

... and check the same data for all tests of your session.

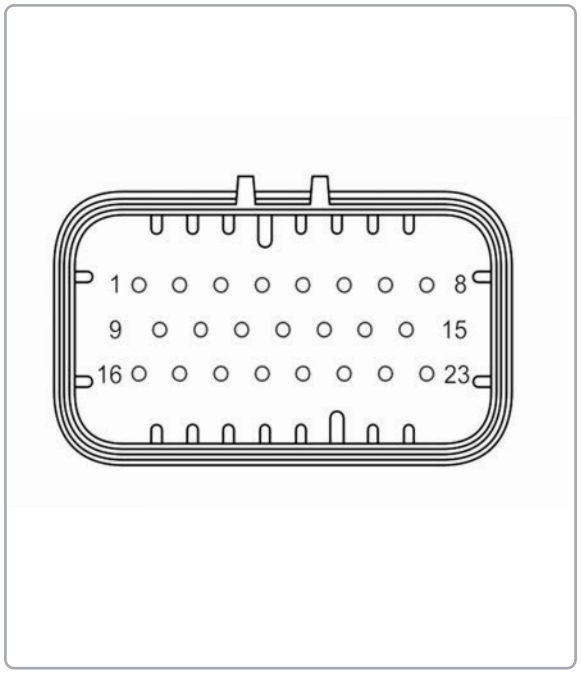
The same info can be recalled from all previous sessions of the same day or before, just clicking **BACK**.
To scroll among tests, just push **PREV** or **NEXT.**

12. Expansions

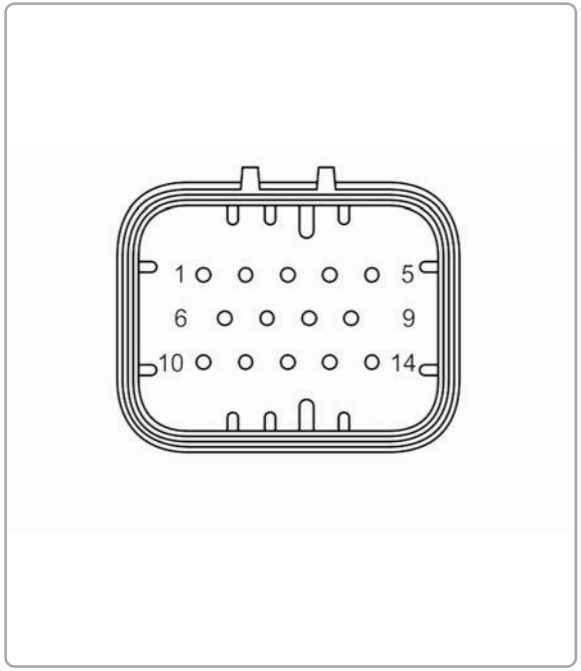


Add expansion modules via our built in CAN bus eg. channel expansions, lambda controllers and GPS. These are only some of the items that can be added to our MXS Strada range for incrementing the performance and the data sampled.

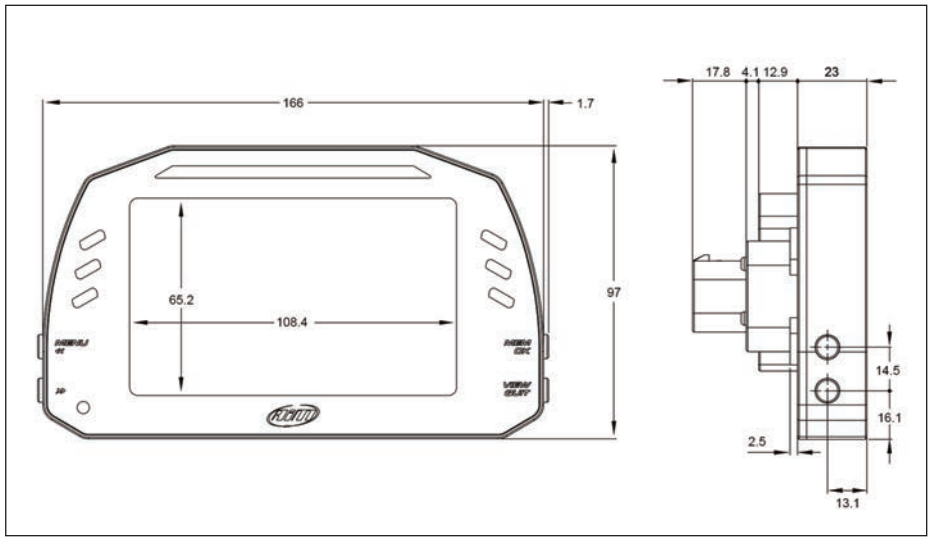
13. MXS Strada Pinout



PIN	AMP 23 pin
01	Analog input 1
02	Analog GND
03	+Vb output
04	+Vreference
05	Analog input 2
06	Analog input 3
07	Analog GND
08	+Vb output
09	+Vreference
10	Analog input 4
11	RS232TX
12	RS232RX
13	Speed
14	GND
15	+Vb output
16	Digital output
17	GND
18	CAN2+
19	CAN2-
20	GND
21	Lap input
22	GND
23	+Vb output



PIN	AMP 14 pin
01	9-15 V Power input
02	Battery GND
03	CAN+ Exp
04	GND
05	+Vb output CAN
06	CAN-Exp
07	+Vb Ext CAN
08	CAN1+ ECU
09	CAN1- ECU
10	K Line ECU
11	USB D+
12	USB D -
13	GND USB
14	RPM



- Display	5"TFT display
- Resolution	800 x 480
- Contrast	600:1
- Brightness	700cd/m2 - 1,100 Lumen
- Light sensor	Yes
- Alarm LEDs	6 RGB freely configurable
- Shift Lights	10 integrated freely configurable RGB LEDs
- CAN connections	2
- Expansion CAN connection	GPS, Channel Expansions, TC Hub, Lambda Controllers, SmartyCam HD
- ECU connections	CAN, RS232 or K Line
- Digital outputs	1 (1Amp max)
- Analog inputs	4 fully configurable, max 1,000 Hz each
- Digital inputs	1 Speed input, coil RPM input
- Connectors	2 AMP connectors
- Body	Anodized Aluminum
- Pushbuttons	Metallic
- Dimensions	169,4x97x23mm
- Weight	480 g
- Power consumption	400 mA
- Waterproof	IP65

Our web site **aim-sportline.com** is constantly updated.

Please, constantly check it and download the last versions of the firmware of your products.