MXS 1.2 Strada

USER GUIDE 1.00

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

Made in Italy

www.aim-sportline.com

MXS 1.2 Strada

1. MXS 1.2 Strada in a few words

What is MXS 1.2 Strada?

MXS 1.2 Strada is the new AiM dash that combines small dimensions, flexibility, usability and that may manage a wide range of channel inputs.
It features:

- ECU connection (CAN, RS232 and K-Line)
- 1 speed input
- 1 RPM input
- 8 analog/digital inputs
- 2 analog video camera inputs
- up to 8 configurable display pages
- a huge tracks database to automatically select the track you are racing on
- 6 alarm LEDs
- 10 RGB LEDs that you may configure for clearly showing if you are improving or not.

What about ECU connection?

MXS 1.2 Strada manages CAN, K-Line and RS232 ECU communication lines. Its huge database including more than 1500 ECU protocols is available.

Is MXS 1.2 Strada an expandable logger?

Yes. MXS 1.2 Strada can be connected to various AiM expansions like GPS Module, Channel Expansion, TC Hub and LCU-One CAN to maximize your engine performances and to AiM SmartyCam to see your track performances on your PC with all the values you need in overlay.

Anything else?

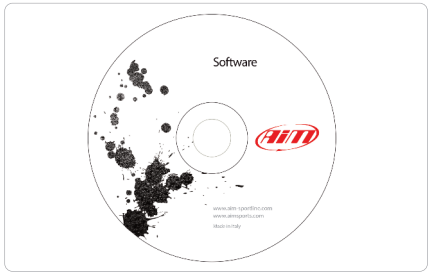
You may connect one or two stock video cameras to a dedicated input in order to show a reverse mirror image directly on its display.

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

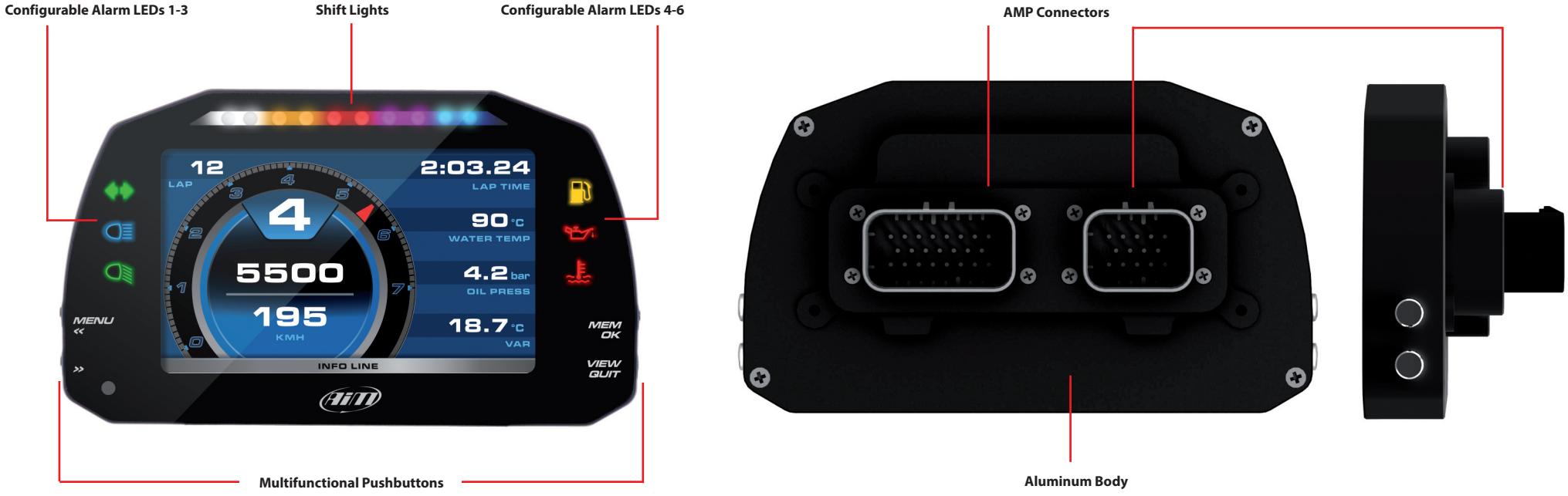
2. What is in the kit?

MXS 1.2 Strada kit includes:

- MXS 1.2 Strada standard version or with street icons as shown here below
- USB cable
- 14 pins connector harness for ECU connection and power; it is available in two versions:
  - standard for ECUs communicating
  - through CAN/RS232 protocol or with the OBDII connector for ECUs communicating with CAN/RS232 and K-Line.
- 23 pins AMP female connector with pins
- CD for software installation
- MXS 1.2 Strada user manual



MXS 1.2 Strada Dash

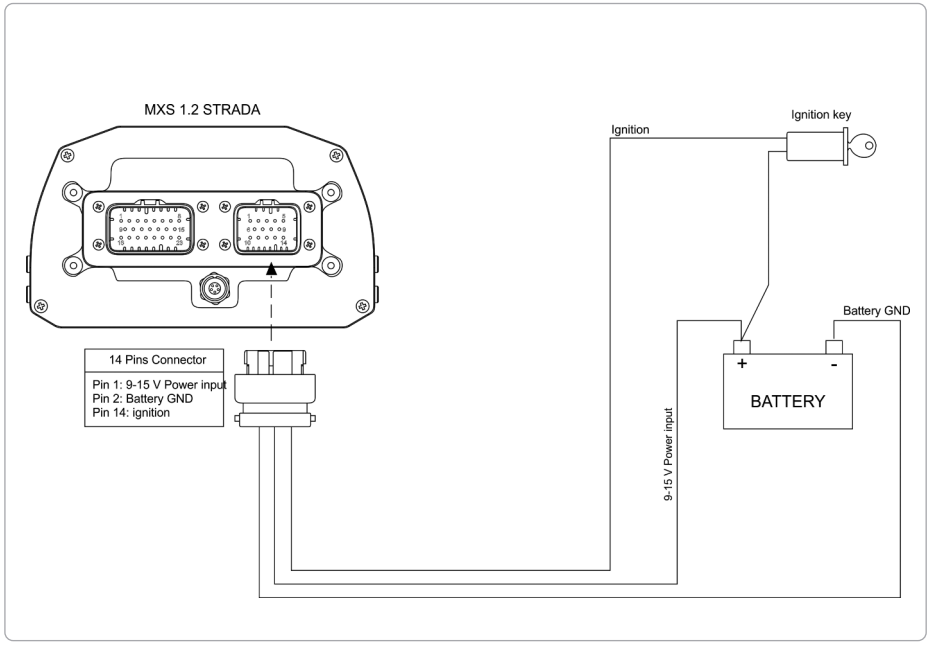


3 Powering

The power is managed by three pins of the 14 pins connector:

- Pin 1: Power (9-15 Volts)
- Pin 14: Ignition
- Pin 2: Ground

They must be connected as shown in the following diagram.



4 What you can do via keyboard

MXS 1.2 Strada needs to be configured via software but there are some functions you can manage via the device lateral buttons.

Press "Menu button and this page appears.

The icons are to manage:

Date/Time | Backlight | Counters | GPS and Tracks | System Info

4.1 Set Date/Time

Here you can:

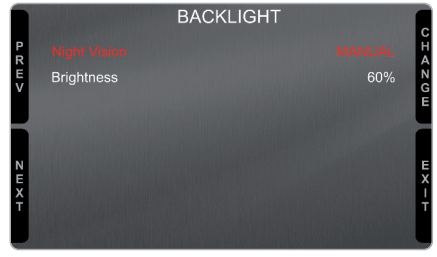
- set time zone
- enable/disable Daylight saving time
- set time and date format

Bottom of the page current time and date are shown.

4.2 Set backlight

The brightness of the display and LEDs may be adjusted in two ways, depending on the light captured by a dedicated sensor integrated in the dash

- AUTOMATIC: in case ambient light is higher than a defined threshold, the brightness is reduced
- MANUAL: you may define the brightness of the display and LEDs choosing among some values: 20%, 40%, 60%, 80%,100%



4.3 Counters management

MXS 1.2 Strada features 4 user odometers, labelled User 1 – User 4, plus a non-resettable System Odometer. All odometers are shown on the configuration software Race Studio 3 too (see chapter about MXS 1.2 Strada and the PC).
Each odometer can be activated/deactivated and/or reset. To manage an odometer select it and press "CHANGE".

4.4 GPS & Tracks management

MXS 1.2 Strada can of course be used on track thanks to the optional AiM GPS08 Module. This is used for:

- Lap time calculation
- Speed calculation
- Predictive lap time calculation

To calculate these data the system needs to know the start/finish line coordinates of the race-track where you are racing: MXS 1.2 Strada comes with a long list of the world main tracks, constantly updated by our technicians and automatically loaded to your PC when you run our Analysis Software Race Studio 3.
MXS 1.2 Strada provides two track selection modes: automatic and manual.

Automatic:

MXS Strada 1.2 automatically recognizes the track you are running on, loads the start/finish line and the possible splits coordinates and calculates lap and split times without optical/magnetic receiver.
This is the best mode in most cases.

Manual:

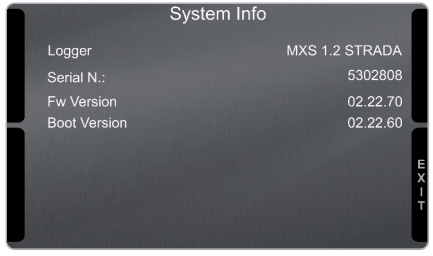
Allows to manually select the track from the internal database.
This mode is to be preferred when multiple track configurations are available nearby. In this case MXS 1.2 Strada would anyway recognize the track but would need at least one complete track lap.

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 (learning mode)

4.5 System Information

This page shows serial number as well as firmware and booter version of your MXS 1.2 Strada.



5 MXS 1.2 Strada and the PC

Using AiM Race Studio 3 software you can configure MXS 1.2 Strada, manage its tracks database as well as check other device functions through Race Studio 3 device window.

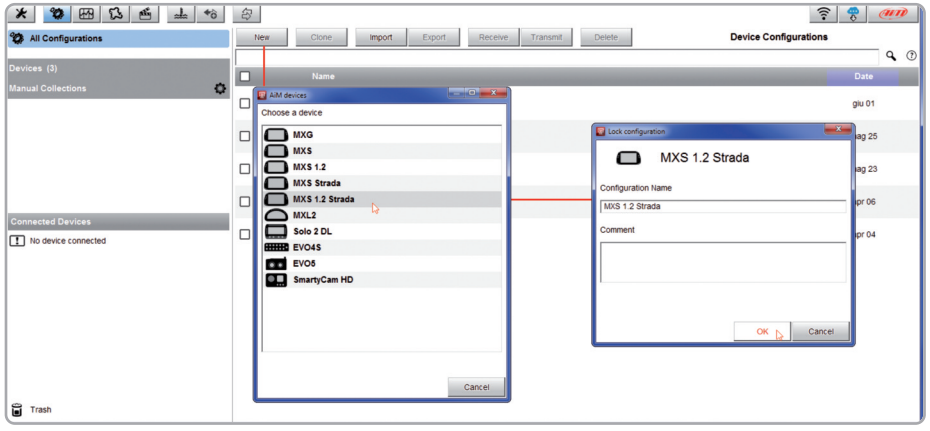
5.1 Connection to the PC

MXS 1.2 Strada can be connected to the PC using the USB cable you find in the kit: plug it in the cable labelled "USB" of MXS 1.2 Strada 14 pins connector harness and in the PC USB port.

5.2 Configuration of MXS 1.2 Strada

Once MXS 1.2 Strada connected to the PC

- click "Configurations" icon and configurations page appears
- click "New" and new configuration panel appears: select "MXS 1.2 Strada" and press "OK".

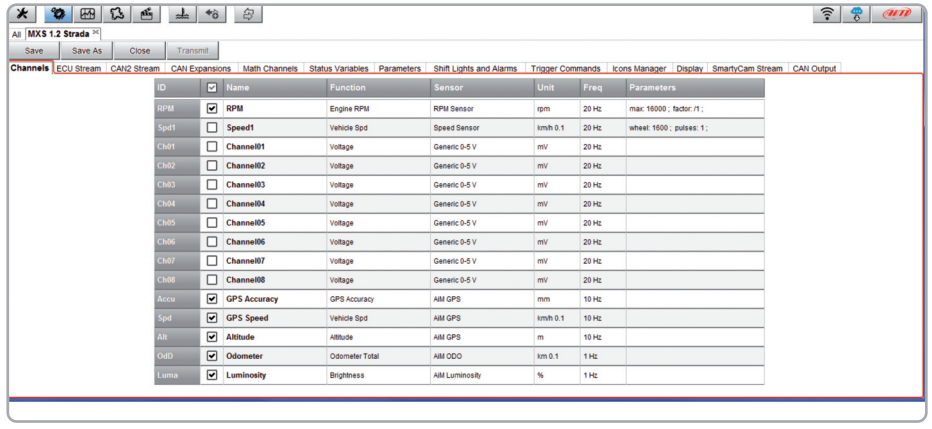


This is the list of the features you have to configure:

- Channels: analog and digital sensors that you directly connect to MXS 1.2 Strada.
- ECU: The Engine Control Unit of your vehicle. MXS 1.2 Strada manages CAN, RS232 and K-Line protocols.
- CAN2: in case the system is connected to other CAN devices, beside the ECU, they have to be connected to CAN 2 port
- CAN expansions: other AiM CAN Devices, like, for example, Lambda controller, GPS Module Channel expansions etc.
- Math channels: some calculated channels that may be helpful in some situations
- Some other calculated variables, useful for managing alarms, icons, LEDs.

5.2.1 Channels configuration

Here you can set all the channels related to sensors directly connected to the device. RPM channel is by default enabled: since the direct RPM connection is used when the vehicle does not have an ECU, the software automatically disables it in case you select an ECU protocol. In Chapter 9 you may find some information about the hardware RPM signal connection.

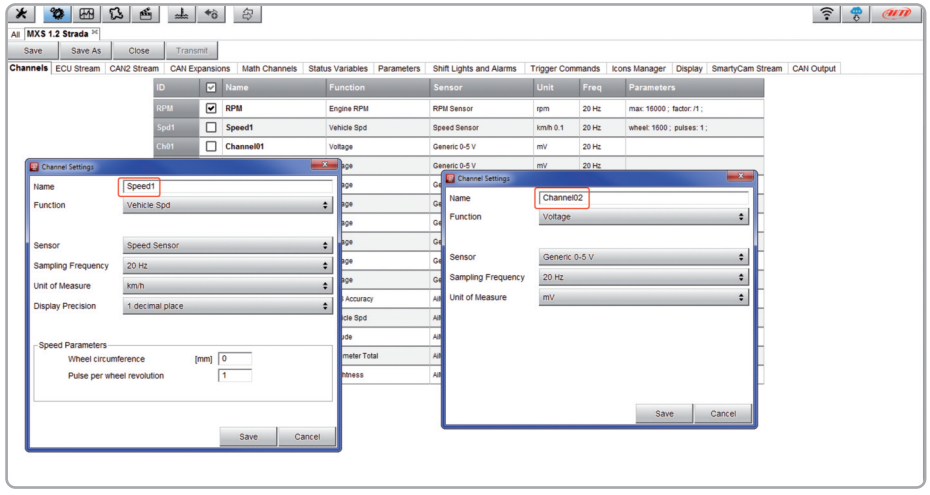


To set a channel just click on its line and the related panel shows up.

You can choose:

- Channel name
- Function
- Sensor type
- Measure unit
- Sampling frequency
- Display precision
- Specific parameters

The image below shows an example of two panels: speed panel on the left and analog channel one on the right.



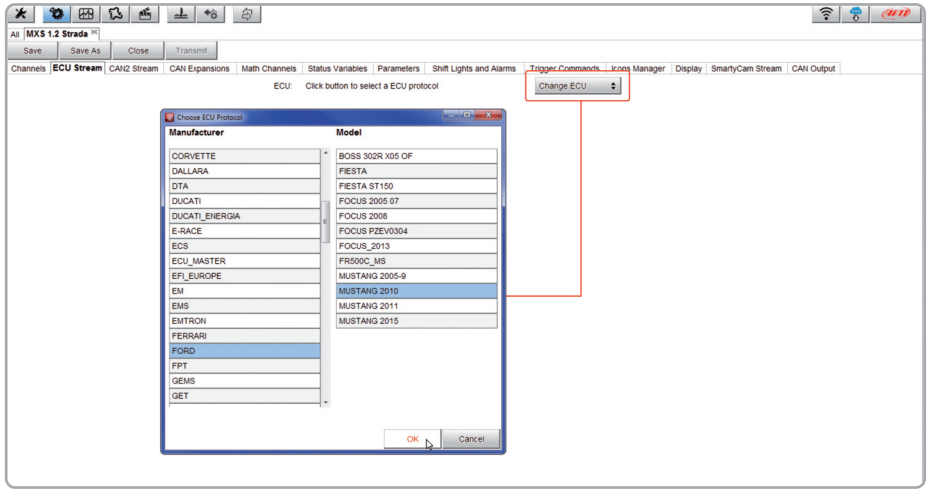
5.2.2 ECU Connection and configuration

MXS 1.2 Strada can be connected to your vehicle ECU. Documents explaining how to connect your MXS 1.2 Strada to the vehicle ECU are published on our website www.aim-sportline.com. MXS 1.2 Strada can communicates through CAN, RS232 and K-Line communication lines.

The ECU protocol includes 1500 different protocols and is constantly updated by our technicians. In case you have a CAN based ECU and its protocol is not in the database, you may anyway develop it, using the ECU Driver Builder function (see par 5.4).

To load the ECU protocol in MXS 1.2 Strada configuration:

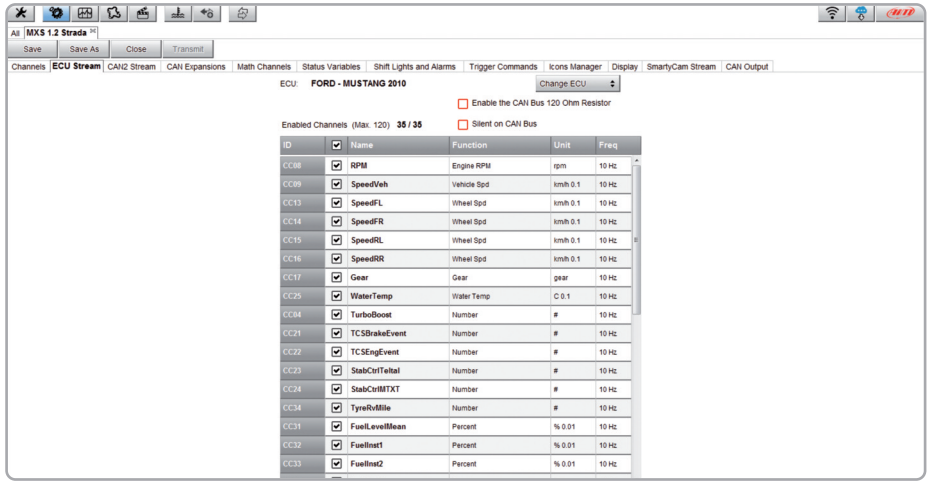
- enter "ECU Stream" tab
- press "Change ECU" button
- select "ECU Manufacturer" and "ECU Model" (in the example FORD/ MUSTANG 2010)
- press OK



After setting the protocol the system comes back to "ECU Stream" page and shows two check-box, both disabled:

■ "Enable the CAN Bus 120 Ohm Resistor": the CAN Bus needs two 120 Ohm resistors at its two extremes. In case your MXS 1.2 Strada is the only device connected to the ECU the 120 Ohm resistor should be enabled, else, very easily, it is already present in the existing network and should be disabled;

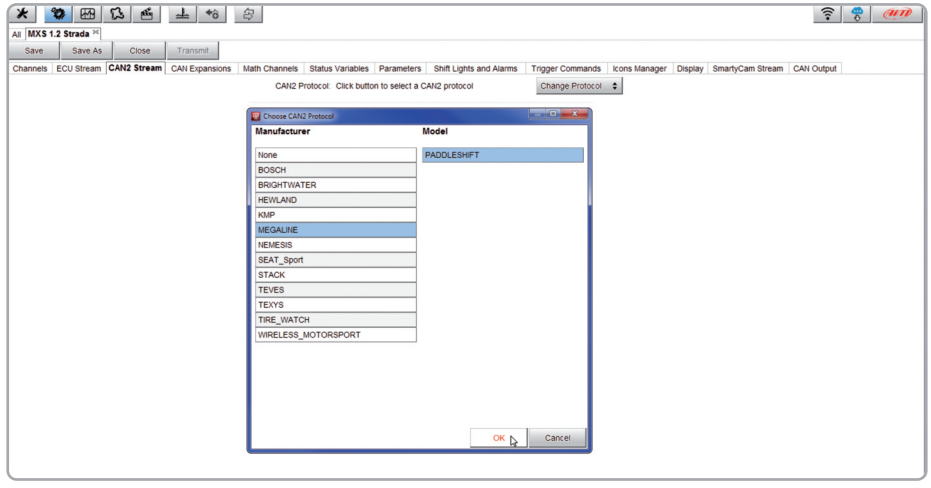
■ "silent on CAN Bus": usually the ECU aspects an acknowledge signal when transmits a message and, as default, the MXS 1.2 Strada transmits this signal. Sometimes, particularly when there are other devices in the network, MXS 1.2 Strada should not transmit it; in this case, if you enable this flag, MXS 1.2 Strada remains completely silent.



5.2.3 CAN2 Stream configuration

This page works exactly like ECU Stream one. Here you can find additional CAN modules. To load your additional module CAN protocol:

■ enter "CAN2 Stream" tab
■ press "Change protocol" button
■ select "Manufacturer" and "Model" (in the example (MEGALINE/PADDLESHIFT)
■ press OK

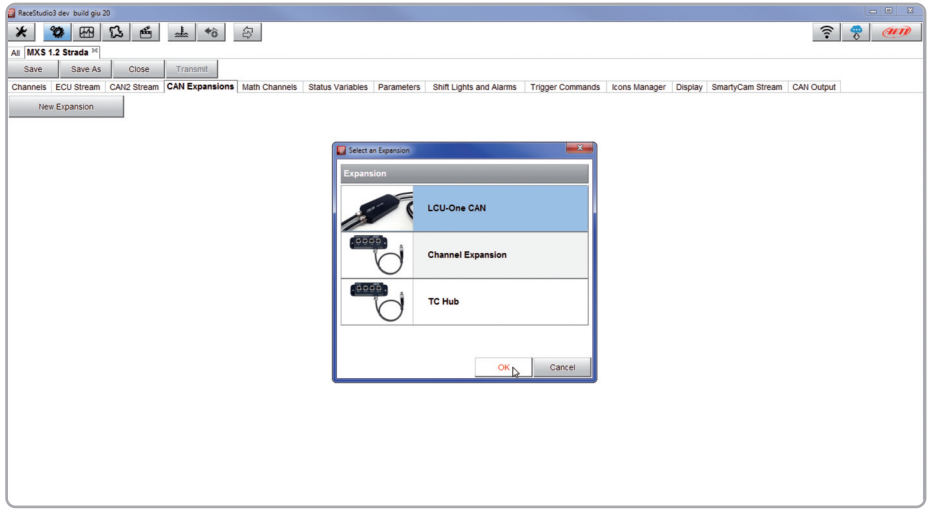


5.2.4 CAN Expansions configuration

MXS 1.2 Strada can be connected to various AiM CAN expansions:

- LCU-One CAN
- Channel Expansions
- TC Hub

At the very first MXS 1.2 Strada connection this page shows up:

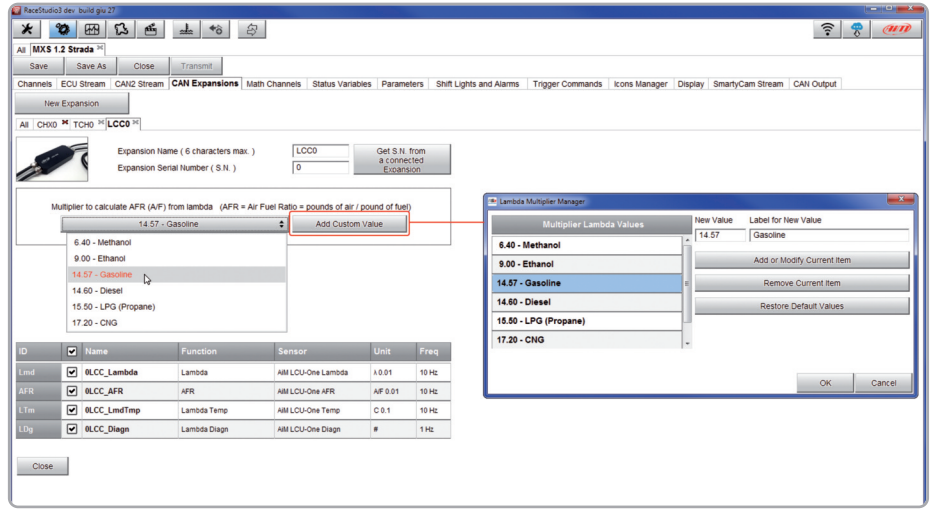


Here you can select the CAN expansion you want to set. Select it and press "OK". Each expansion needs to be set filling in the related panel.

Setting LCU-One CAN

To set an LCU-One CAN:

- press "New Expansion" button;
- select "LCU-One CAN" and press OK
- name your LCU One and fill in its serial number or press "Get SN from a connected expansion" to receive the serial number 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

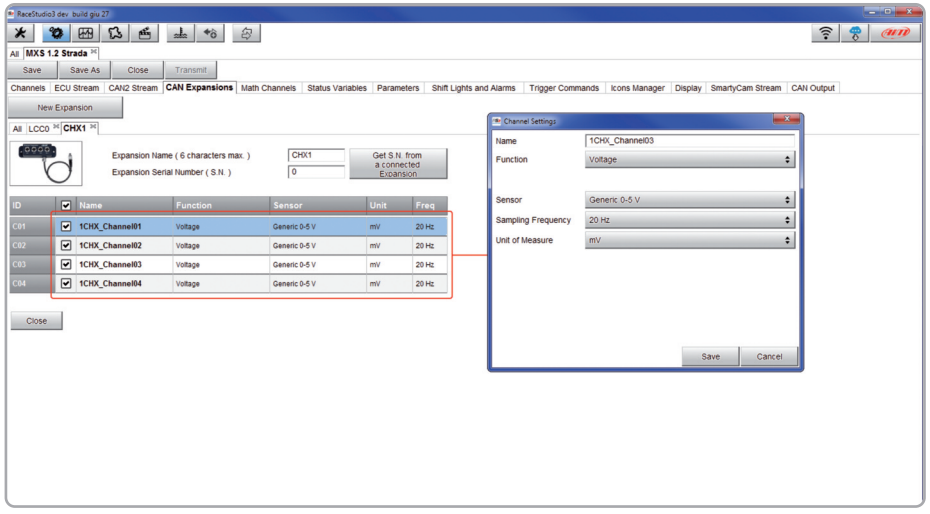


Please note: for any further information about AiM LCU-One CAN refer to the related user manual you find in the box or you can download from AiM website www.aim-sportline.com documentation area, products section.

Setting Channel Expansion

To set a Channel Expansion:

- press "New Expansion" button;
- select "Channel Expansion" and press OK
- name your Channel expansion and fill in its serial number or press "Get SN from a connected expansion" to receive the serial number from the connected Channel Expansion
- set each channel double clicking on each channel and setting the panel that shows up (it works exactly like channels configuration – see the related paragraph)
- press "Close" to save and exit



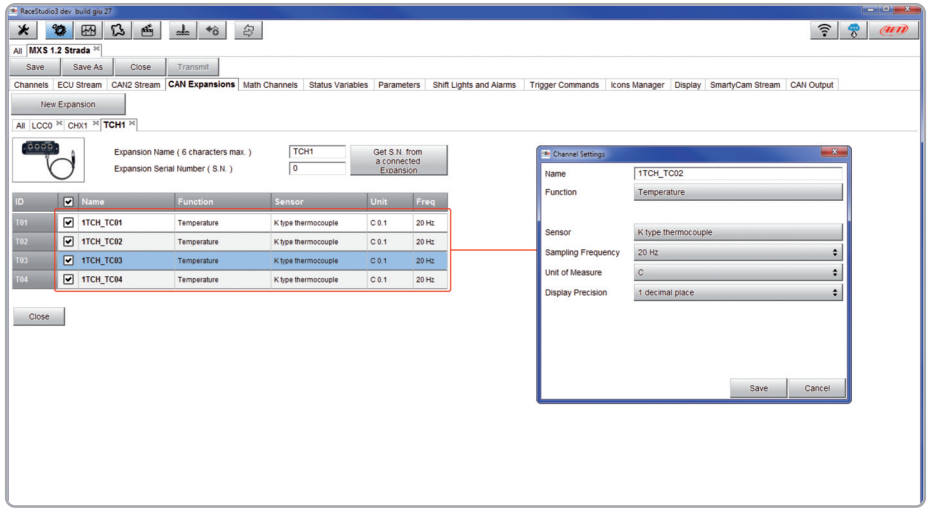
Please note: for any further information about AiM Channel expansion refer to the related user manual you find in the box or you can download from AiM website www.aim-sportline.com documentation area, products section.

Setting TC Hub

This CAN expansion only supports K type thermo-couples.

To set a TC Hub:

- press "New Expansion" button;
- select "TC Hub" and press OK
- name your TC Hub expansion 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



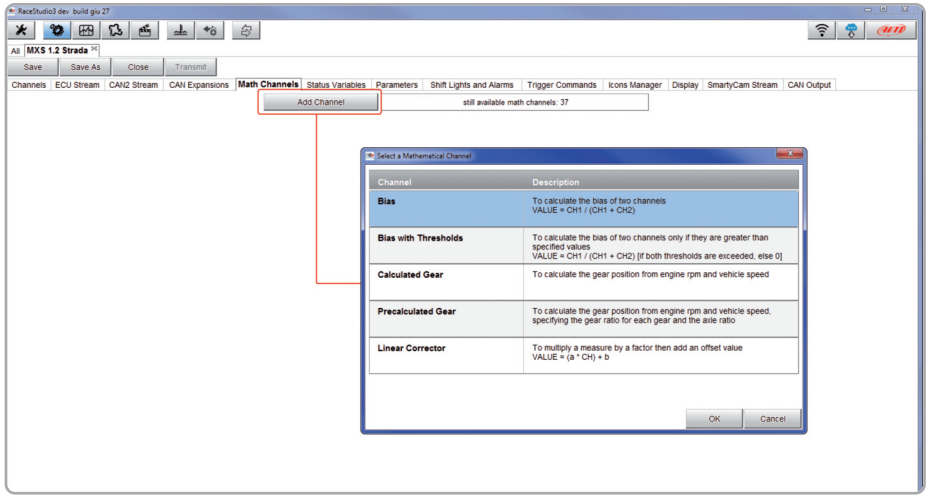
Please note: for any further information about AiM TC Hub refer to the related user manual you find in the box or you can download from AiM website www.aim-sportline.com documentation area, products section.

5.2.5 Math channels configuration

Here you can create math channels; available options are:

- Bias: considering a relation between two mutually compatible channels it computes which one is prevailing (typically used for suspensions or brakes);
- Bias with threshold: it needs the user to set a threshold value for the considered channels; once these threshold values are both exceeded the system makes the calculation;
- Calculated gear: it calculates the gear position using engine RPM and vehicle speed
- Precalculated gear: it calculates the gear position using Load/Shaft ratio for each gear and for the vehicle axle too
- Linear correction: typically used when a channel is not available in the desired format or if it is wrongly tuned and cannot be tuned again

Each option asks the user to fill in a proper panel.



5.2.6 Status variables configuration

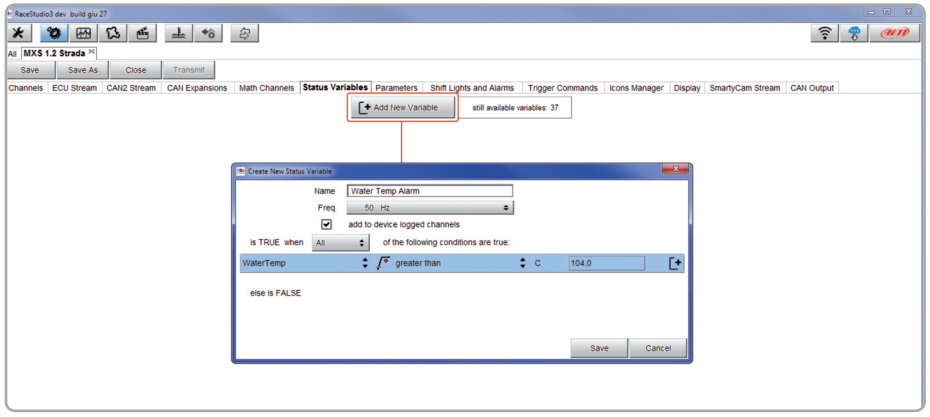
Status Variables are internal math channels that can have only two different values: 1 (TRUE) or 0 (FALSE). They may be useful for simplifying complex configurations, where it is required to evaluate if to activate alarms, LEDs, Icons etc..
Let us explain with an example: We would like to turn ON a LED and an Icon when Water temperature reaches 100°C and the RPM are higher than 2000. Instead of defining the same logic for managing the icon and for managing the LED, we could define a Status Variable, Water Temp Alarm, and link Icon and LEDs to this variable. In this case, we could define:

- Water Temp Alarm is High when:
  - Water Temp is higher than 100°C and
  - RPM is greater than 2000.

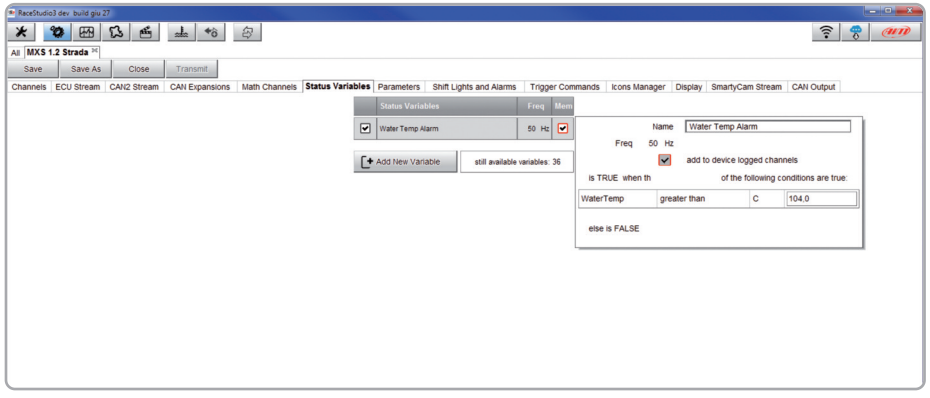
And use Water Temp Alarm for managing Icons and LEDs.

As you may see, the Status Variables are more useful when the logic to be evaluated is complex and involves different channels.

In order to define a Status Variable enter the proper TAB.



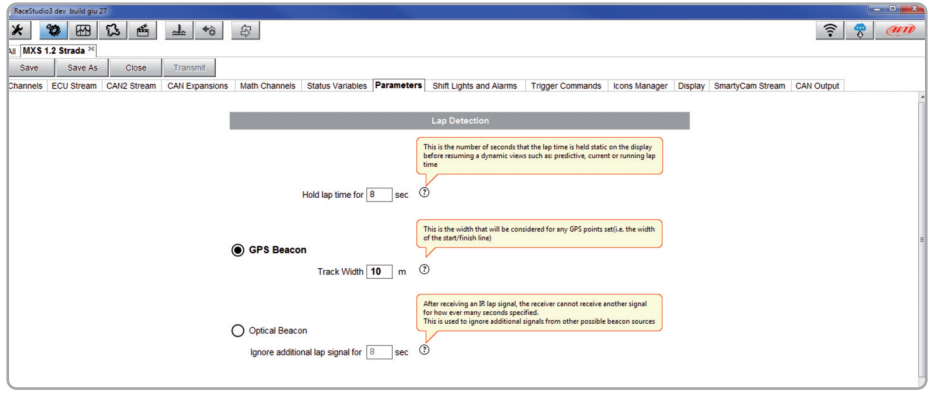
The Status variables can be used as any other channel, so they may be seen online, transmitted to the CAN stream, recorded, used for triggering a command or for turning ON a LED or an Icon.
Mousing over the Status Variable a summary panel appears on the right as shown here below.



5.2.7 Parameters configuration

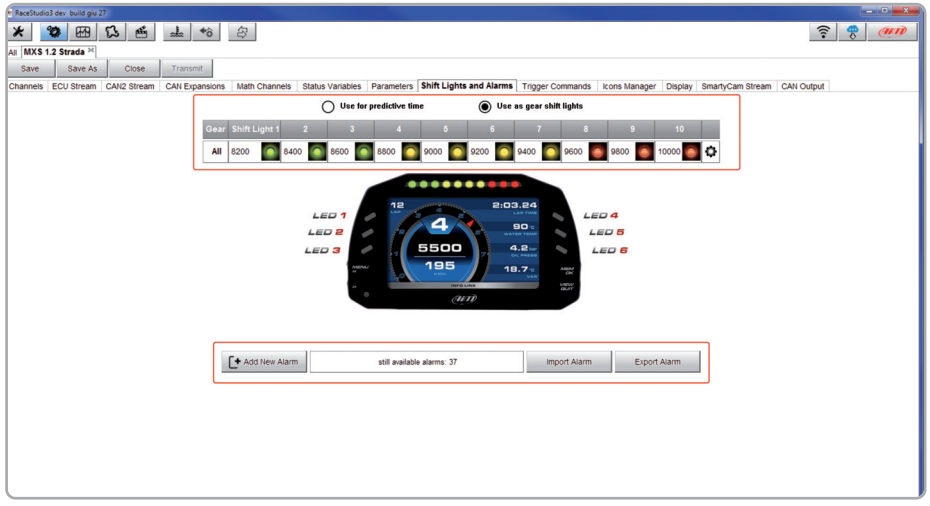
In Parameters page you can set optional GPS and/or optical beacon.
Mousing over the question marks a pop up message will explain you the working mode of:

- GPS Beacon:
  - hold lap time for: the time period for which lap time is shown on your MXS 1.2 Strada display
  - the track width: width that will be considered for any GPS point you set
- Optical beacon:
  - ignore additional lap signal for: after receiving an Infrared lap signal, the receiver does not detect another signal for the time period you fix in the related box. This is very useful if more lap transmitters are placed nearby on the side of the track.



5.2.8 Shift Lights and Alarms configuration

In this page you can set shift lights (on top) and set the alarm led (bottom) of your MXS 1.2 Strada.



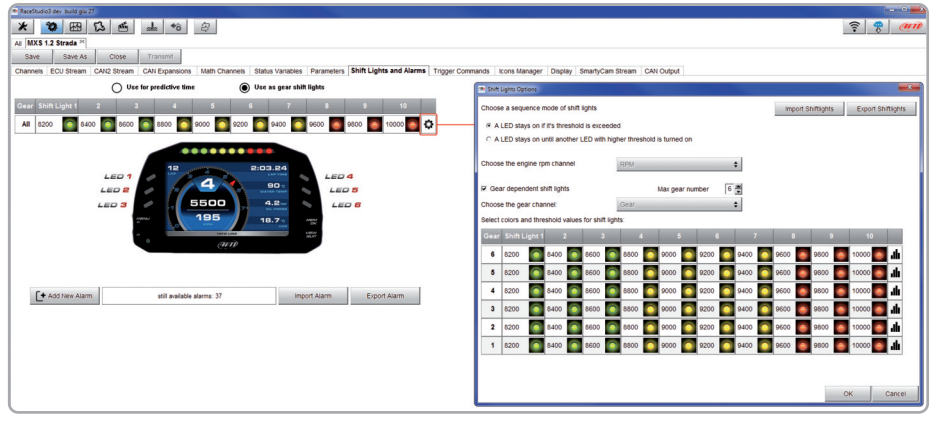
On top you can set your MXS 1.2 Strada shift lights working mode. Available options are:

- shift lights, for helping in changing gear and
- predictive time: for easily understanding if the actual lap is faster or slower than the reference lap.

Use as gear Shift Lights

To use the led bar as shift lights click the icon (⚙) for setting the parameters.
You may configure:

- at which RPM value the single LED turns ON
- the sequence mode of the LEDs 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
- link the shift lights to the engaged gear enabling the related checkbox;

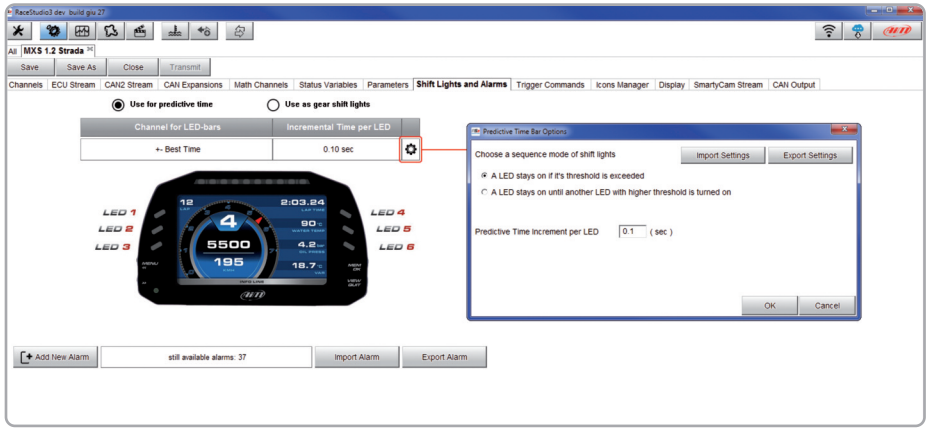


Use for predictive time
Click the icon (⚙) for setting the parameters.

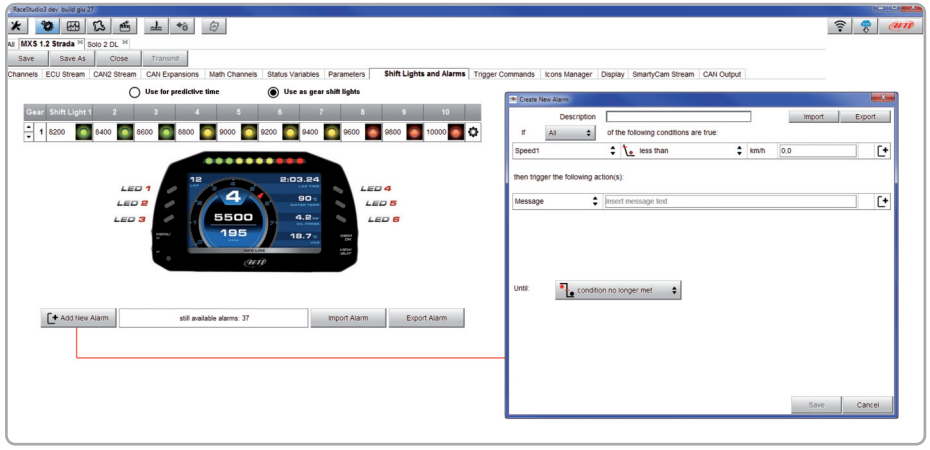
In this case the LEDs colour are fixed in:
■ Green if the lap time is improving
■ Red if the lap time is worse than the reference lap

You can define the threshold at which one LED is turned ON. Assuming you fill in “0.10 sec” and your lap time is improving of 0.30 sec toward the reference lap, your MXS 1.2 Strada will switch on 3 LEDs green; if, on the contrary, your lap time is worsening the LEDs will switch on red.

Please note: this option only works if an optional GPS Module is connected.

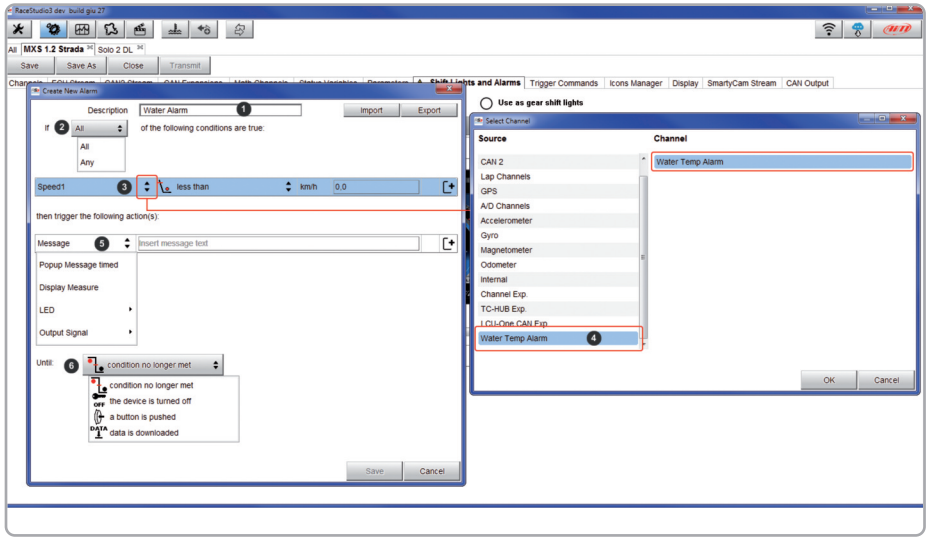


Create and set MXS 1.2 Strada alarm



To set the new alarm:

- define the Alarm name (**1**)
- you may use a combination of conditions for setting an Alarm and choose if the conditions are to be ALL valid or just one of them (**2-4**)
- decide which action is to be trigged (**5**) among displaying a message or a timed popup message, display a measure, switch a LED on or activate an output signal (CAN output page, see the related paragraph)
- decide the alarm ending condition ("Untill" – **6**) among: condition no longer met, the device is turned off, a button is pushed or data are downloaded
- "+" buttons you find right of the panel are to add new alarms (the top one) or to add new actions to an alarm (bottom one)
- when all operations have been performed press "Save" in "Create New Alarm Panel" and you will come back to "Shift Lights and Alarm" page



5.2.9 Trigger commands configuration

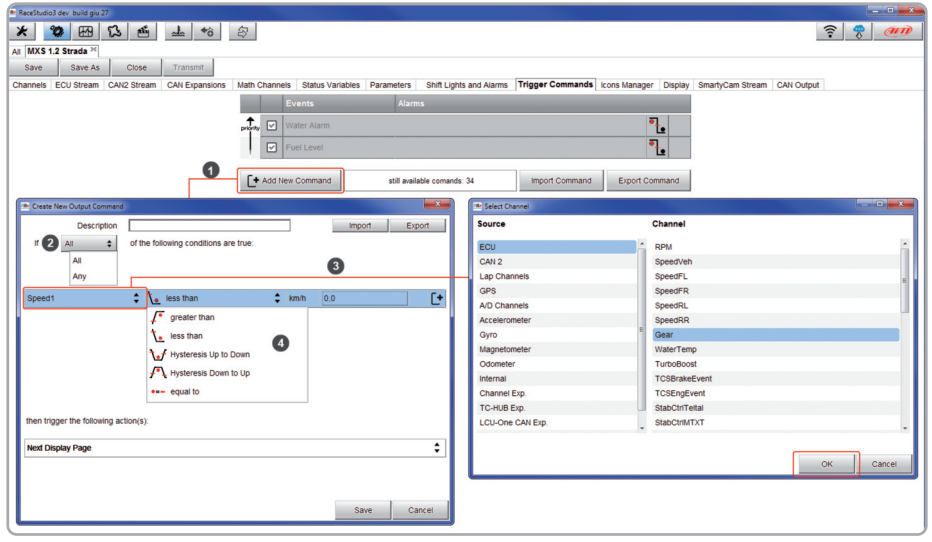
"Trigger Command" executes some specific actions on your MXS 1.2 Strada.

The commands available up to now are:
- set next/previous page
- show camera input page
- reset alarms
- activate pushbuttons 1-4

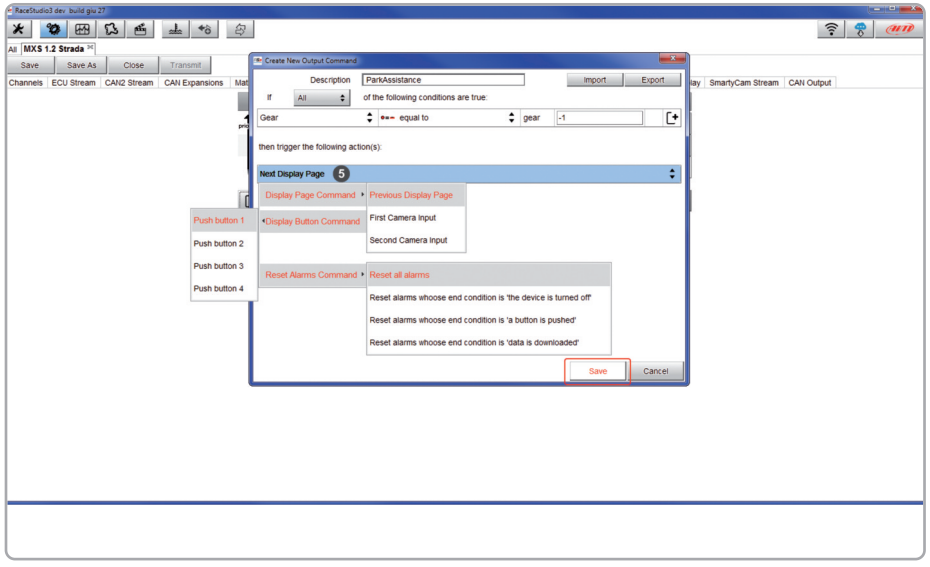
Other commands will be available in the next software/firmware releases.

You can define the condition that activates a Trigger Command.
To add a new command.

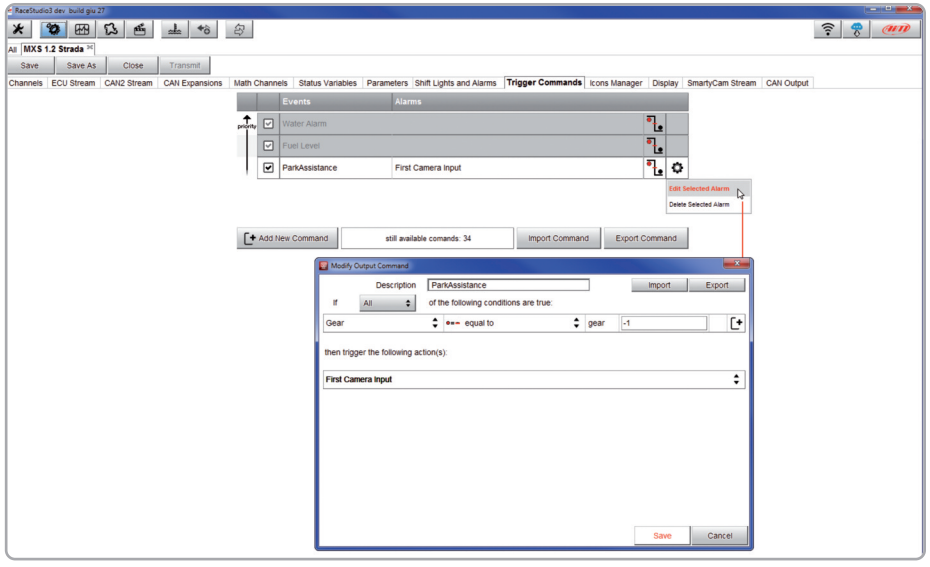
- Press "Add new Command" (**1**)
- You may use a combination of conditions for setting a Trigger Commands and choose if the conditions are to be ALL valid or just one of them (**2-4**)



■ decide the action to be performed (**5**)
■ Click "Save"

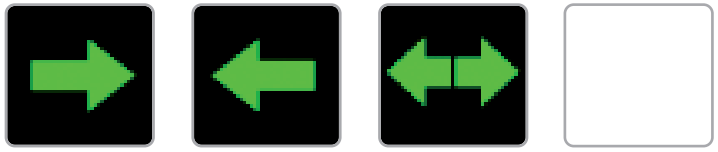


In the Trigger Commands summary page, you can modify/delete the trigger command right clicking on the setting icon placed right of the trigger row.



5.2.10 Icons manager configuration

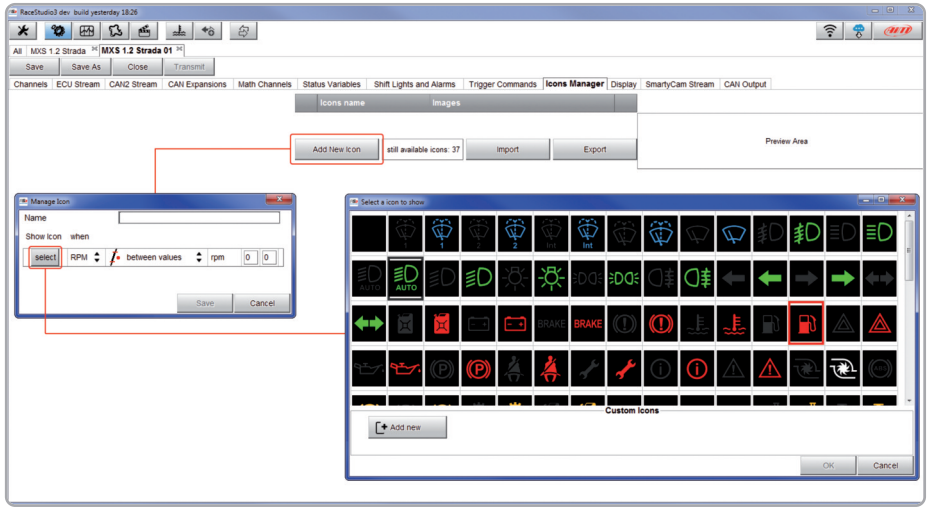
The "Icon" is a set of images, each one of them to be shown on every page is desired, depending on a fixed condition that, when exists, triggers the proper image.



For example:
- the first image has to be shown when the signal Turn Right is TRUE
- the second when the signal Turn Left is TRUE
- the third when the signal Hazard is TRUE
- the fourth when no signal is TRUE

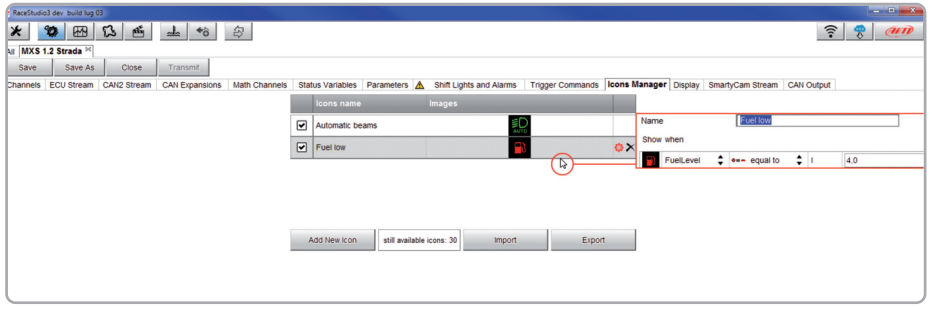
No all display pages offer the possibility to show icons but our technicians are working for offering more pages with this feature.

To configure an Icon
- press "Add New Icon"
- "Manage Icon" panel shows up
- press "Select" to see the panel showing all images
- select the image you want to set
- the software comes back to "Manage Icon" panel
- set the image conditions according to the channel they are related



It is possible to use custom images pushing the "Add New Icon" pushbutton. They have to be 64x64 pixels .png format.

Once all Icons set "Icons page" shows the icons summary and mousing over an Icon the related panel shows up on the right of the page as shown here below.
Here you can also edit and delete an icon using the related icons . 



5.2.11 Display configuration

MXS 1.2 Strada can have up to eight pages that can be set via software.

- enter "Display" tab
- a panel shows up where you can select the display page you prefer (in the example a page with icons bar has been chosen)
- select the page and press "OK"
- repeat the operation for the number of pages you want to set

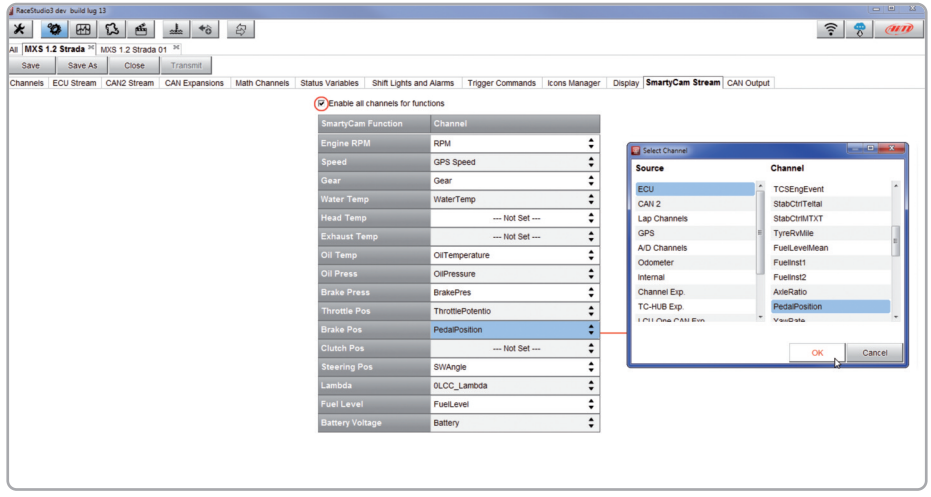
When the page has been selected two setting panels appears bottom of the page:

- on the left a panel that shows as many rows as the fields to be set
- on the right a panel shows the channels group you can set in that field and all the channels in it included; you can drag and drop the channel you want to set in the desired field or double click on it
- if you added more display pages the one you are setting is indicated top of the tab as highlighted here below.

5.2.12 SmartyCam stream setting

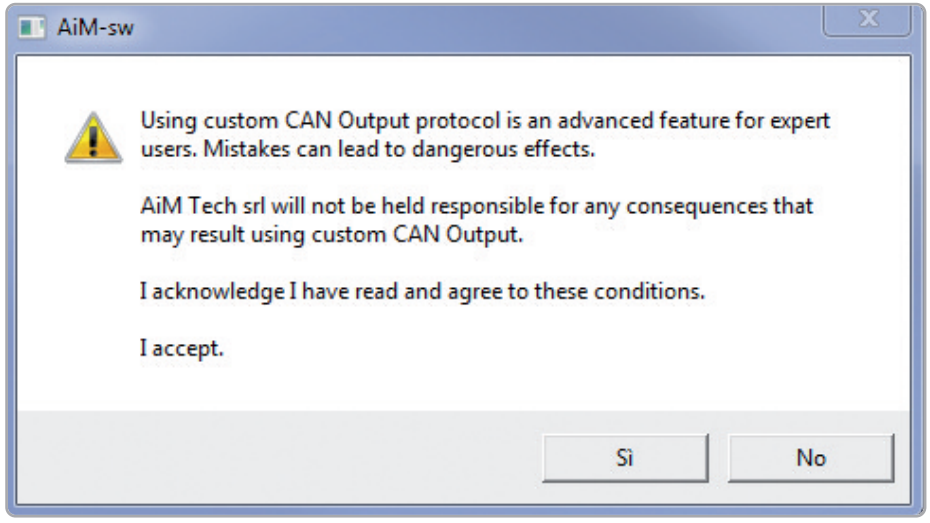
MXS 1.2 Strada can be connected to AiM SmartyCam to show the data you wish on SmartyCam video. To set each channel:

- click on it and a setting panel shows up
- t shows all channels and/or sensors that fits the selected function
- in case you do not find the channel or the sensor in the list enable “Enable all channels for functions” checkbox and all channels/sensors will be shown



5.2.13 CAN Output configuration

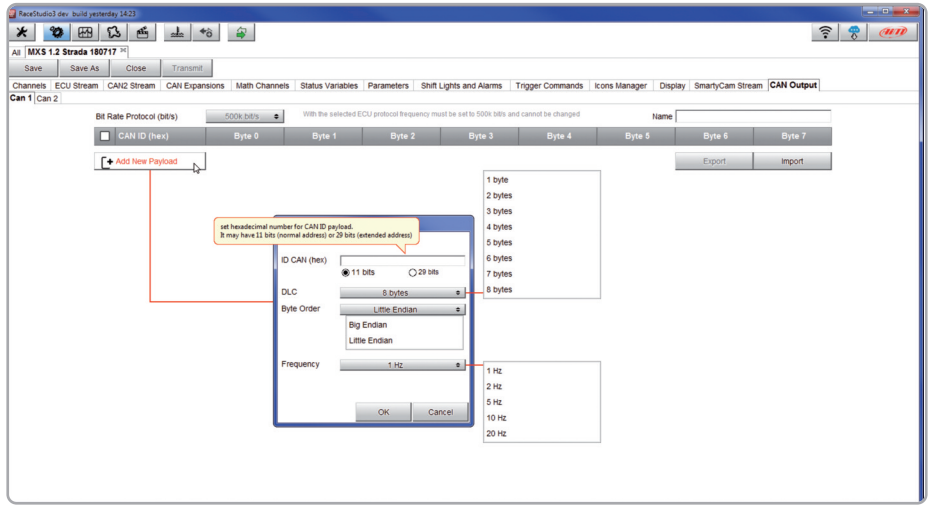
Please note: this function is for expert users only.
At very first configuration this panel shows up.

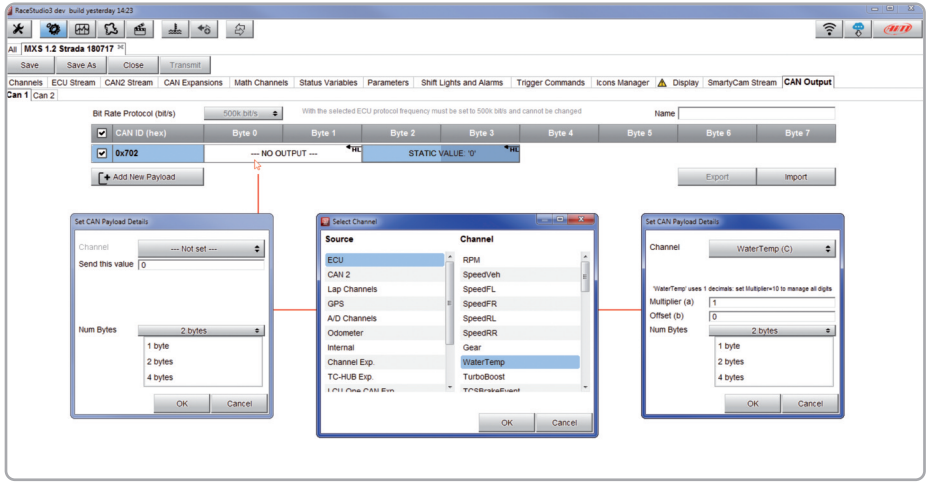


You may configure your device to transmit a CAN data stream, both on CAN1 and CAN2, containing the channels required.

To add a payload:

- press "+Add new Payload" and "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 all channels set your configuration is finished:

- press "Save" on the page top keyboard
- press "Transmit" to transmit the configuration to MXS 1.2 Strada

5.3 Managing a track on MXS 1.2 Strada with Race Studio 3

With Track Manager function of Race Studio 3 you can create, delete and modify tracks, transmit and receive them to/from your MXS 1.2 Strada. Press "Tracks" icon.
Please remember: an optional GPS08 Module is needed.

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

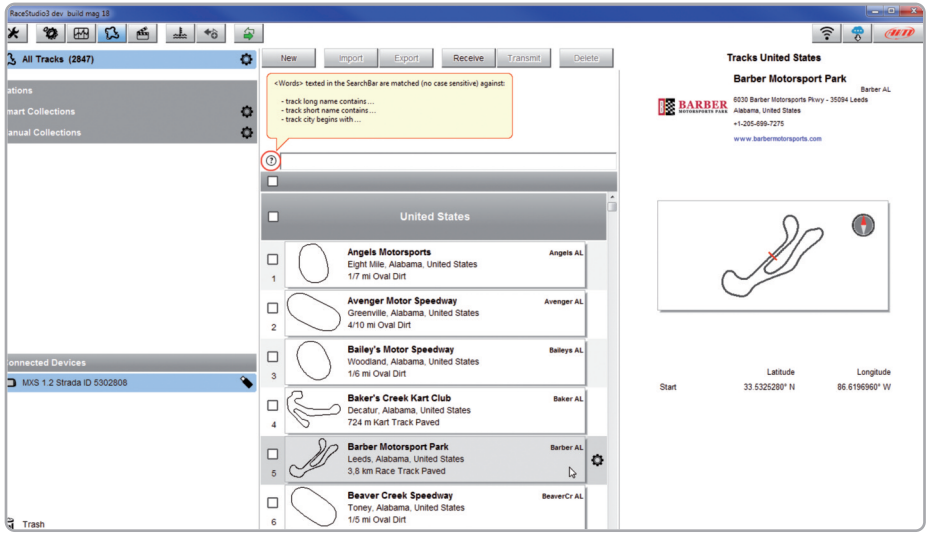
- on top, the filters that allow to collect many tracks following customized criteria; by default all tracks are shown (light blue "All Tracks" filter in the image below).
- bottom left, the connected devices (in the image, "MXS 1.2 Strada ID 5302808")

The column **in the middle** shows:

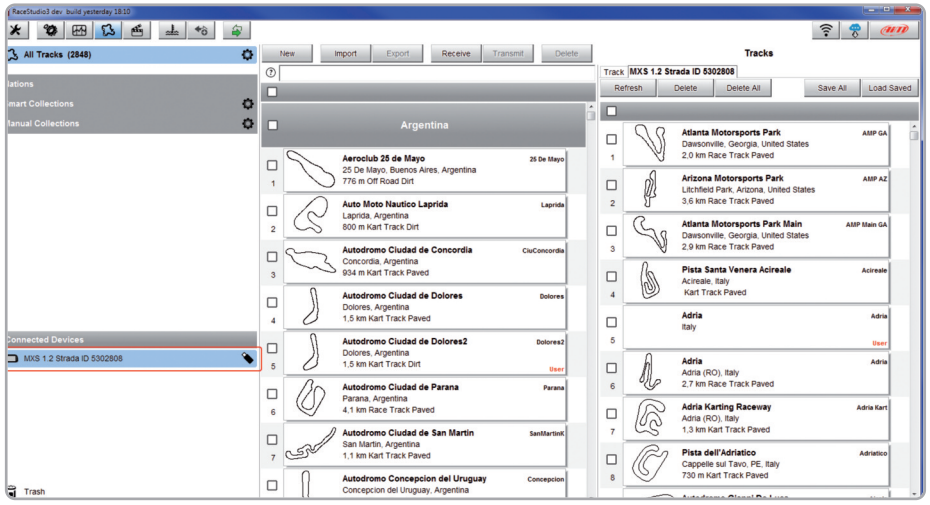
- on top a fast search bar, that allows to select the tracks which satisfy your personal research criteria; by pressing "?"a pop-up window explains research criteria (highlighted in red below), where:
  - long name is the name you see in bold in each track box
  - short name is the track name shown on the display of your MXS 1.2 Strada and is the name you find top right of each track box
  - track city is the name of the city the track is located in
- 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 your MXS 1.2 Strada is connected it is shown on the left bottom part of the page as said before. Clicking on it all the tracks it contains are shown in the right column of the page



The page keyboards are used to manage the tracks.

The keyboard you find above the central column allows you to:

- **New:** create a new track
- **Import:** import one or more tracks you stored in your MXS 1.2 Strada or in another external device
- **Export:** export one or more tracks to a specific PC folder or to another peripheral device
- **Receive:** receive from your connected MXS 1.2 Strada the tracks you created (if no device is connected the button is disabled)
- **Transmit:** transmit one or more tracks form the PC to your connected MXS 1.2 Strada (if no device is connected the button is disabled)
- **Delete:** delete one or more tracks from Race Studio 3 Database

The keyboard you find above the right column allows you to:

- **Refresh:** refresh the track list stored in your connected MXS 1.2 Strada
- **Delete:** delete one or more tracks from your MXS 1.2 Strada memory
- **Delete All:** delete all tracks stored in your MXS 1.2 Strada memory
- **Save all:** save all the tracks stored in your connected MXS 1.2 Strada; it creates a zip file you can load to another AiM device
- **Load Saved:** load the tracks you previously saved in your connected MXS 1.2 Strada memory

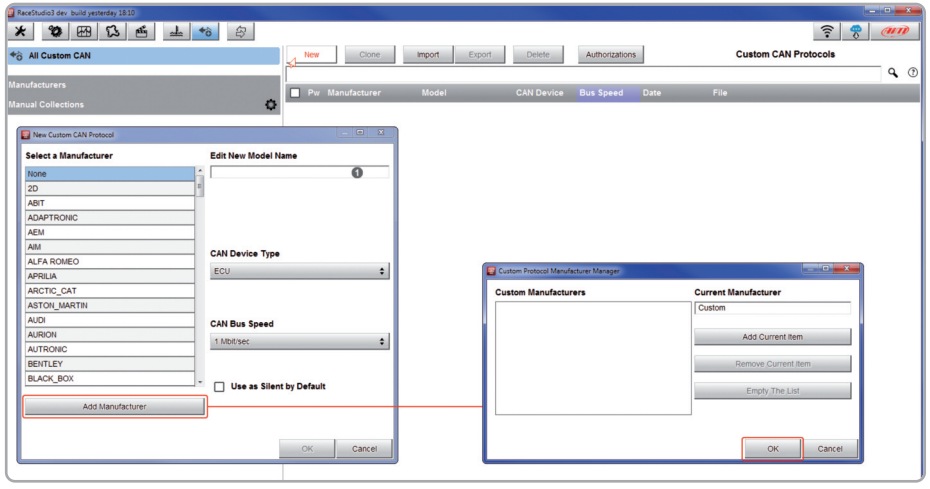
Since the software is constantly updated, may be other information or features will be available soon. Please check our website www.aim-sportline.com, documentation area, software section "Track Manager" manual

5.4 ECU Driver builder

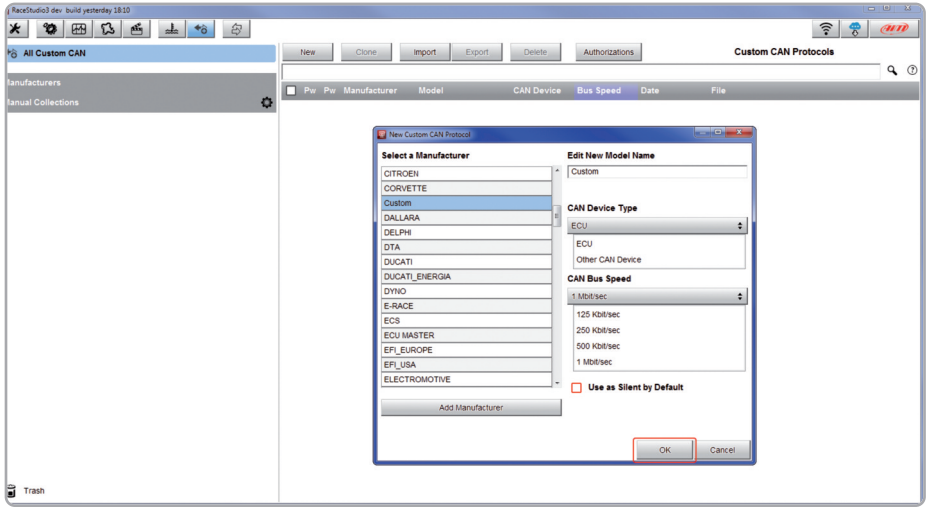
If your vehicle ECU is not included in Race Studio 3 software you can use CAN Driver builder to create your own CAN protocol.

Please note: this Race Studio function is for expert users only.

You can add a new ECU Manufacturer and/or a new ECU model. To do so:
- Press "New" on the top central keyboard
- "New Custom CAN Protocol" panel shows up
- Press "Add Manufacturer" to add a new Manufacturer and "Custom Protocol Manufacturer Manager" panel shows up
- Fill in the Manufacturer name ("Custom" in the example below)
- press "OK"
- If you want to add a new ECU Model for an existing Manufacturer just select the manufacturer and fill in "Edit new model name" box.

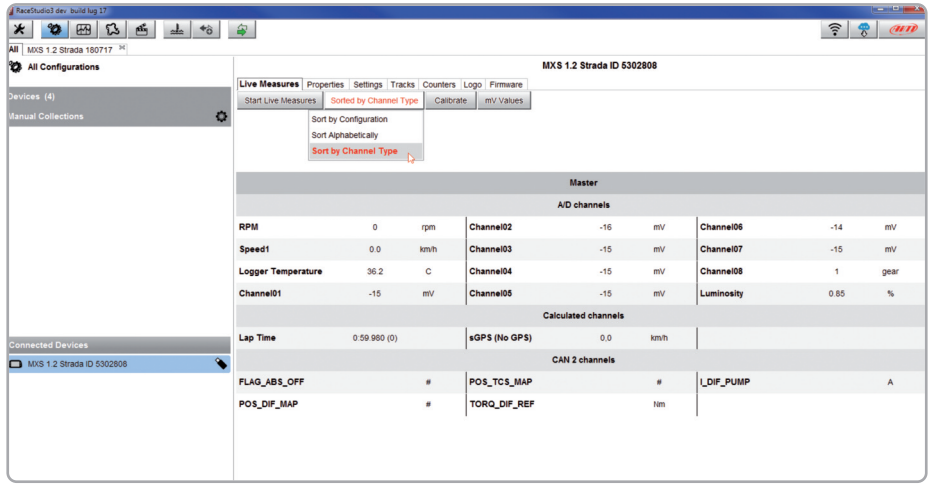


You come back to "New Custom CAN Protocol":
- select the ECU Manufacturer you created
- Fill in the Model name in the panel top right box
- Select the CAN Device type; available options are:
  - ECU
  - other CAN Devices
- select the CAN Bus speed; available options are:
  - 125 Kbit/sec
  - 250 Kbits/sec
  - 500 Kbit/sec
  - 1 Mbit/sec
- if your network features multiple devices we suggest to enable "Use a Silent by Default" checkbox
- Press "OK" and a new CAN Driver has been added



For further information about how to set the new CAN Driver refer to the CAN Driver builder user manual you can download from www.aim-sportline.com, documentation area software/firmware section

5.5 The device window



Clicking your MXS 1.2 Strada bottom left of the software page you enter the device window and have these options:
- **Live Measures:** to check all MXS 1.2 Strada channels; here you can:
  - start live measures
  - sort the channel visualization as you prefer: as managed by the firmware (sort by configuration), alphabetically, by channel type (they will be shown by device then by channel type and at the end by measure type)
  - calibrate sensors that need the calibration
  - show the measure in Mv
- **Properties:** to name your device, fill in racer's and vehicle name or number, championship and venue type (generic or qualifying testing, warm up, race, test type)
- **Settings to:**
  - set date
  - enable/disable daylight time
  - set time format and time zone
- **Tracks:** to manage the tracks stored in the device memory
- **Counters:** to set reset the device odometers
- **Logo:** transmit/receive the logo that shows up when switching MXS 1.2 Strada on; supported image format are JPEG or BMP; always use the most recent Windows™ versions (Windows8 or Windows10) whose graphic libraries are more updated
- **Firmware:** to check or update your MXS 1.2 Strada firmware version.

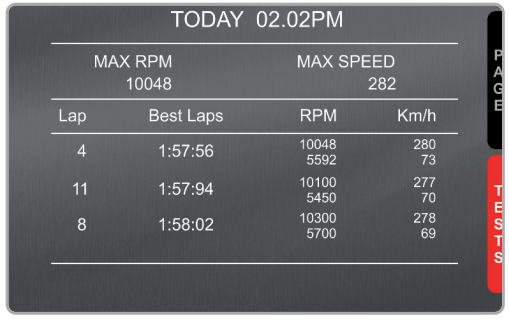
6 On the track

MXS 1.2 Strada can show up to eight pages. To scroll them press ">>" lateral button. Pages can change according to the device configuration.

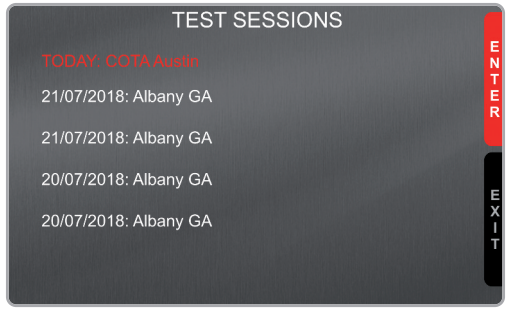
7 Data recall

At the end of the test you can recall sampled data pressing "MEM/OK".

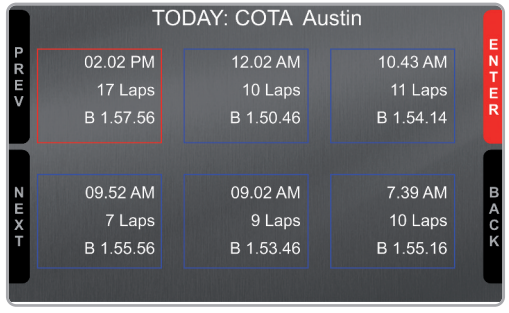
First is "Today" page.
Press "TESTS"



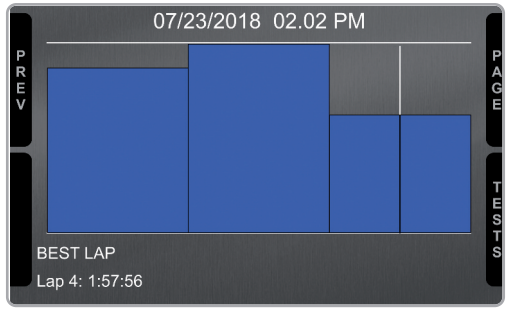
Second is "Summary" page where you see all the last tests with date and place. Select the day you want to see and press "ENTER".



Third is "Summary" page where you see all tests in a box showing time of the test, number of laps and best lap of the test.
Select the test you want to see and press "ENTER".

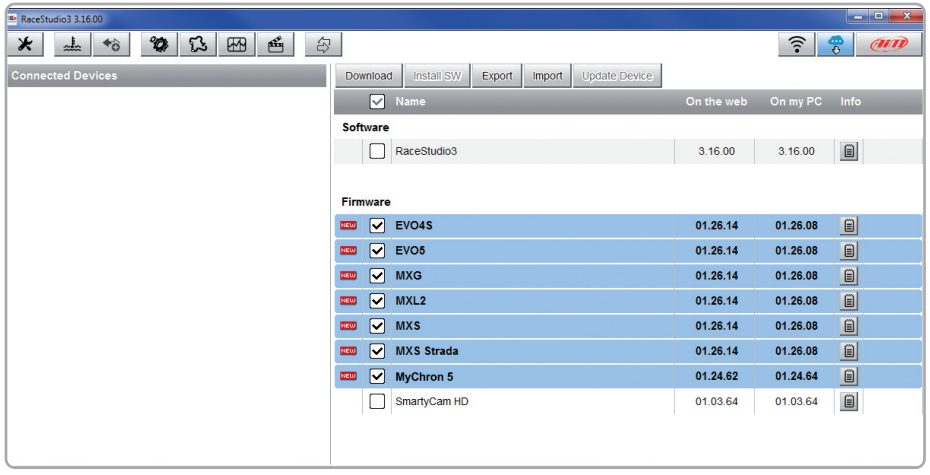


This page is a histogram test summary. Moving the cursor left and right you can see all laps and their lap time.



8 New firmware upgrade

Our technicians and engineers are constantly working to improve both the firmware (the application that manages your device) and the software (the application you install on your 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 your device to the PC via Wi-Fi to perform a firmware upgrade. In a few seconds the device is ready.

9 RPM

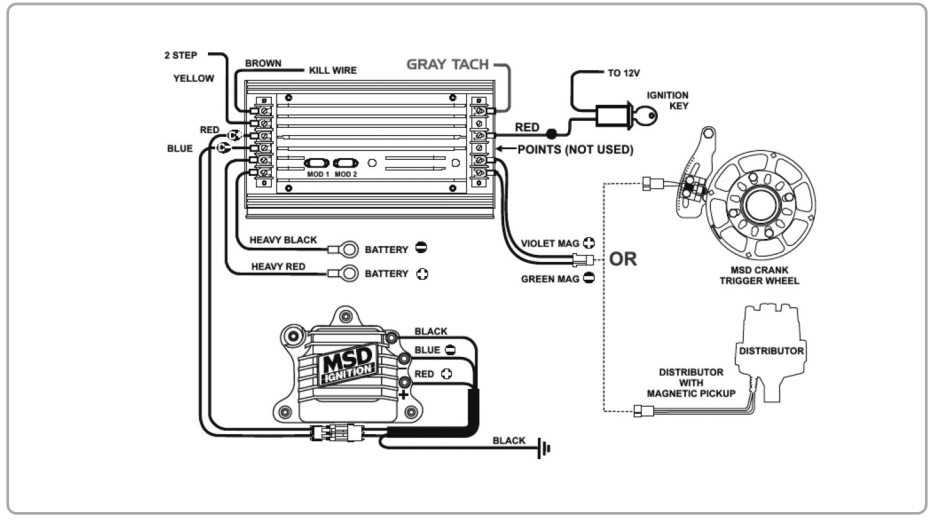
MXS 1.2 Strada can receive RPM value from the ECU. If on the contrary your vehicle does not have an ECU you can sample RPM using pin 21 of MXS 1.2 Strada 23 pins connector.

9.1 RPM from ECU

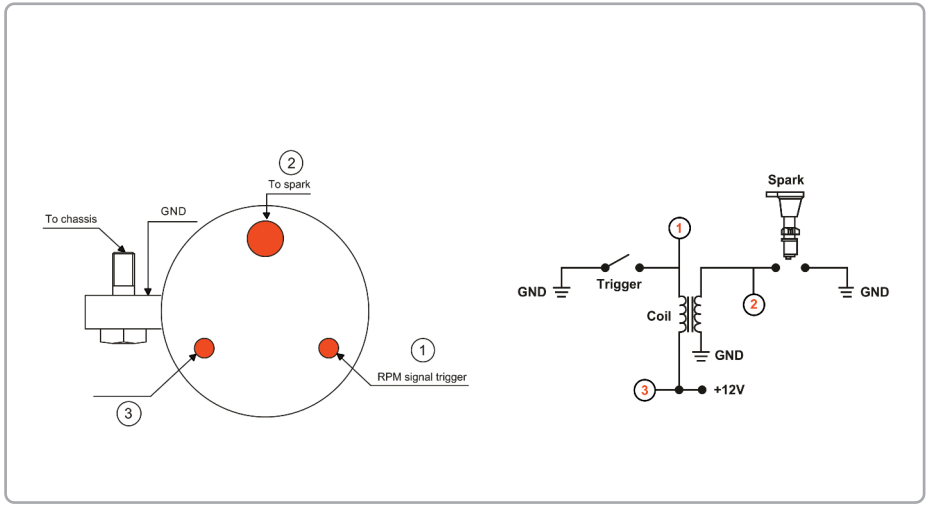
To get the RPM from the ECU you only need to connect your MXS 1.2 Strada to the ECU and it will automatically sample that value.
Please note: if your vehicle ECU can be reached through an OBDII plug, a dedicated harness for MXS 1.2 Strada AMP 14 pins connector is available, as shown at the end of this user guide.

9.2 RPM via a 5-50V square wave or coil (150-400V)

If your vehicle has no ECU you need to connect pin 21 of the device 23 pins connector harness to the ignition system. This way MXS 1.2 Strada can read the signal form 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 50 V). The image below shows an example of wiring of the ignition system.

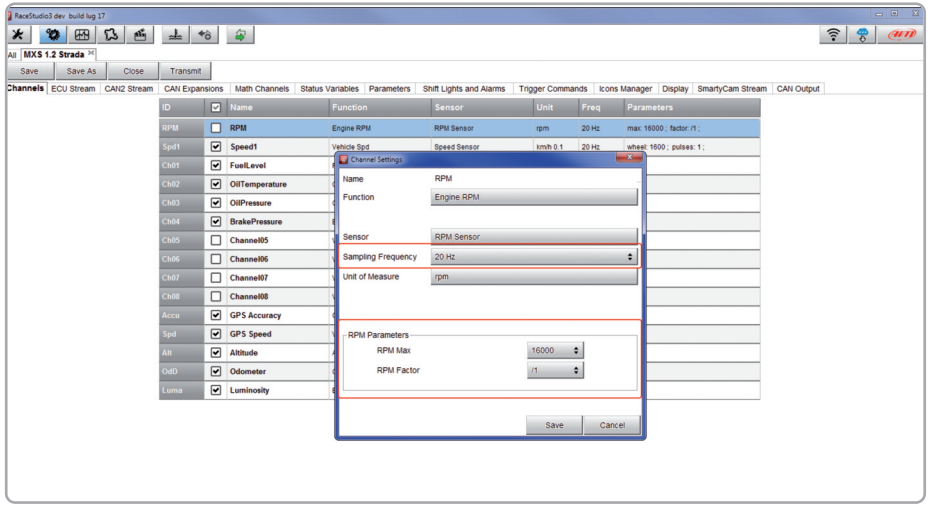


The output labelled "GRAY TACH" gives a 5-50V output that can be directly sampled by MXS 1.2 Strada.
In case the vehicle ignition system has no output you need to connect MXS 1.2 Strada to the low voltage of the coil as shown in the following images.



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

Once MXS 1.2 Strada connected to RPM signal you need to enable it and set its parameters in channels page of Race Studio 3 as explained in "Channels configuration" paragraph.

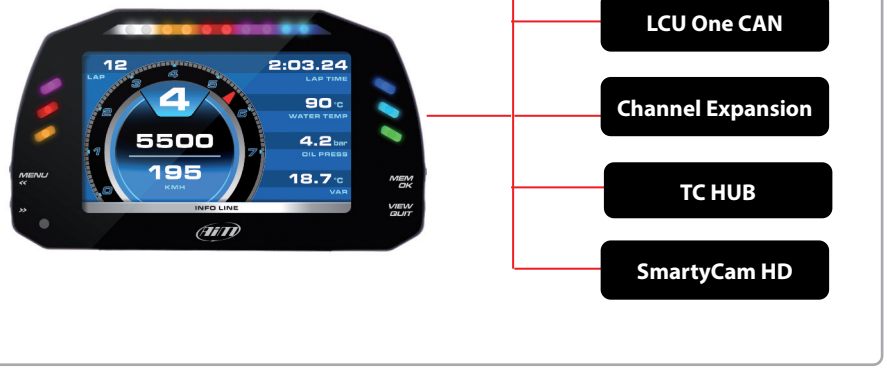


10 Connection with the expansions

Your MXS 1.2 Strada can be connected to AiM GPS08 Module, LCU-One CAN, Channel expansion, TC Hub, SmartyCam HD and SmartyCam GP HD in order to improve its functionality.

Please note that both LCU-one, Channel expansion TC HUB and Smartycam HD have to be configured with Race Studio 3 software as already explained in the related paragraphs ("CAN Expansions configuration", "Channels configuration" and "SmartyCam stream setting").

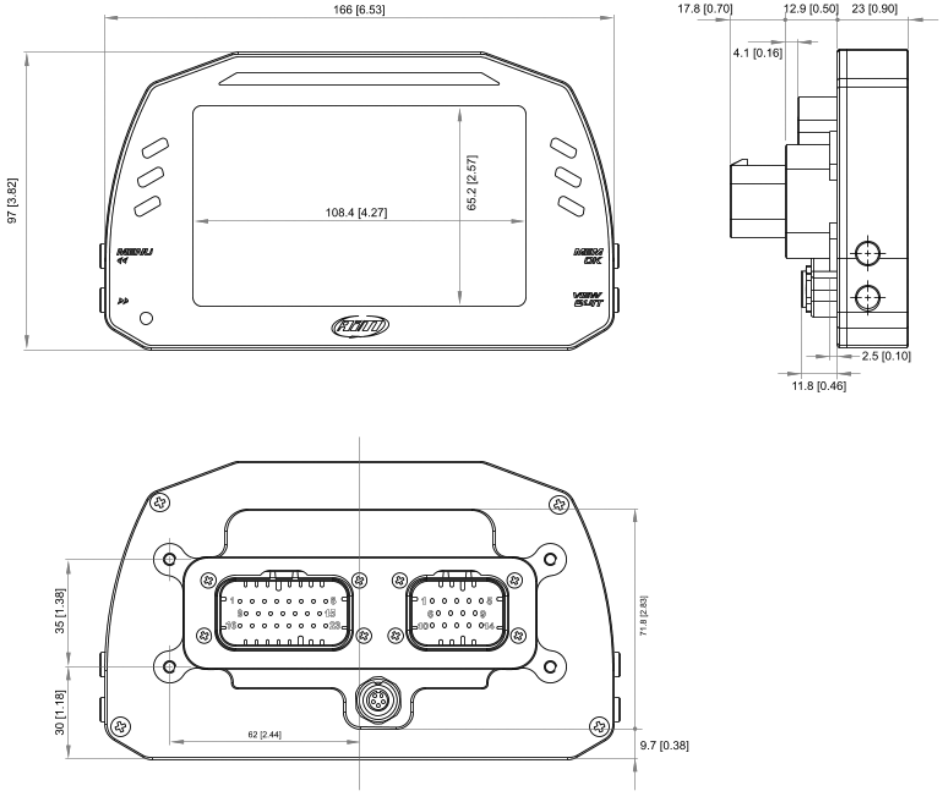
Moreover, for further information concerning AiM expansions and AiM SmartCam HD refer to the related manuals you can download from "Documentation" area of AiM website



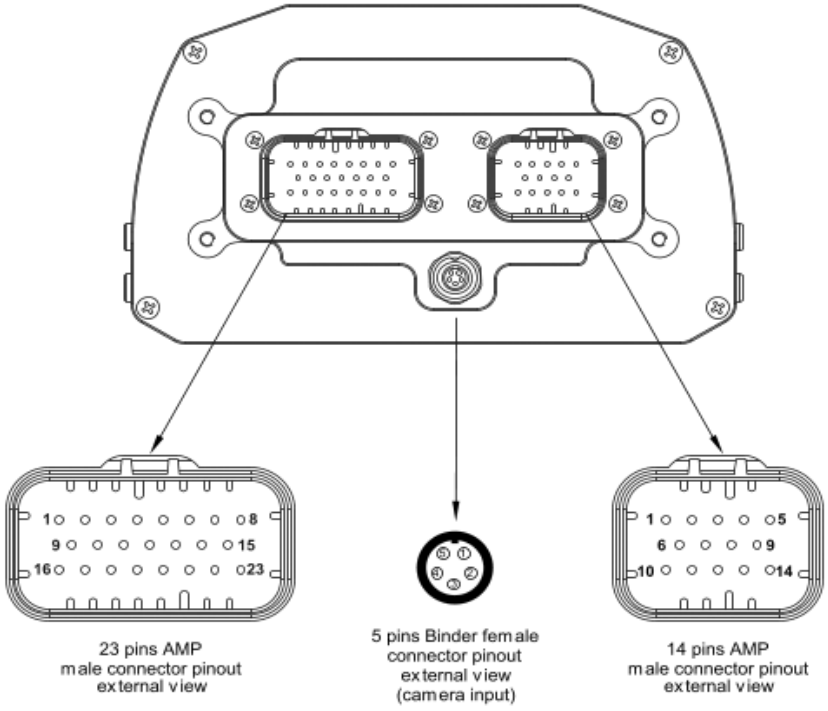
11 Technical specifications and drawings

Display dimensions	5"TFT
Display resolution	800x480 pixels
Contrast	600:1
Brightness	700cd/m^2 – 1,100 Lumen
Display pages	Up to 8 freely configurable
Backlight	Yes
Ambient light sensor	Yes
Shift lights	10 configurable RGB LEDs
Alarm LEDs	6 configurable RGB LEDs
CAN connections	2
ECU Connection	CAN, RS232, K-Line
External Modules	GPS Module, Channel Expansion, TC Hub, Lambda Controller, SmartyCam HD
Analog inputs	8 fully configurable, max 1.000 Hz each
Digital inputs	1 Speed input, coil RPM input
Digital outputs	1 (1Amp max)
Pushbuttons	Metallic
Connectors	2 AMP connectors + 1 Binder connector
Body	Anodized Aluminum
Weight	480g
Dimensions	169.4x97x23mm
Waterproof	IP65

MXS 1.2 Strada dimensions



MXS 1.2 Strada pinout



23 pins AMP male connector pinout external view

5 pins Binder female connector pinout external view (camera input)

14 pins AMP male connector pinout external view

Pin	Function
1	Analog input 1
2	GND input
3	+Vb output
4	+Vreference
5	Analog input 2
6	Analog input 3
7	GND input
8	+Vb output
9	+Vreference
10	Analog input 4
11	Analog input 5
12	GND input
13	+Vreference
14	Analog input 6
15	Analog input 7
16	+Vreference
17	Analog input 8
18	Speed input
19	GND
20	LS out digit
21	RPM input
22	CAN 2+
23	CAN 2-

Pin	Function
1	Video input 1
2	GND
3	+Vb output camera
4	GND
5	Video input 2

Pin	Function
1	9-15v Power input
2	Battery GND
3	CAN+ Exp
4	GND
5	+Vb output CAN
6	CAN- Exp
7	+Vb Ext CAN
8	CAN1+/ECU RS232TX
9	CAN1-/ECU RS232RX
10	K Line ECU
11	USB D+
12	USB D-
13	USB GND
14	Reserved

MXS 1.2 Strada 14 pins AMP connector harness standard version

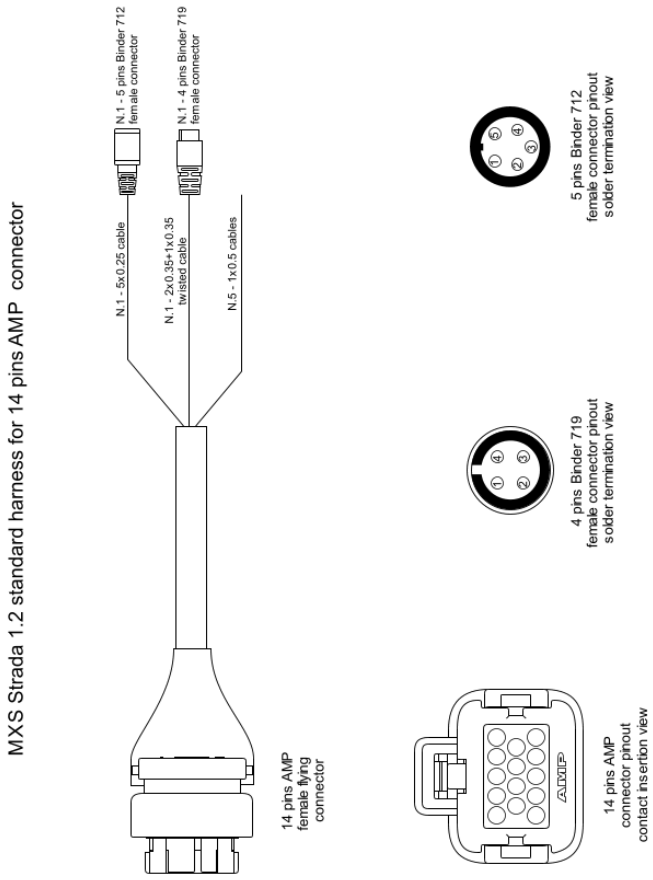


Table of cables ending with 4 pins Binder 719 female connector						
14 pins AMP connector	Cable colour	Destination connector pin	Cable type	Length	Channel	Label
11 13 12	White twisted Black Blue twisted n.c.	1 2 3 4	twisted 2x0.35+1x0.35	1100mm	USB D+ USB GND USB D- n.c.	USB

Table of cables ending with 5 pins Binder 712 female connector						
14 pins AMP connector	Cable colour	Destination connector pin	Cable type	Length	Channel	Label
3 4 5 6 7	White Black Red Blue Orange	1 2 3 4 5	5x0.25 mm²	350mm	CAN+ Exp GND Vb out CAN CAN- Exp Vb ext CAN	Exp

Table of not cabled cables				
14 pins AMP connector	Cable colour	Cable type	Length	Label
2 1	Black Red	1x0.5 mm² 1x0.5 mm²	550mm	Battery GND 9-15V Power input
8 9	White Blu	1x0.5 mm² 1x0.5 mm²	550mm	CAN1+ /ECU RS232TX CAN1- / ECU RS232RX
14	Yellow	1x0.5 mm²	550mm	RESERVED

MXS 1.2 Strada 23 pins AMP connector harness

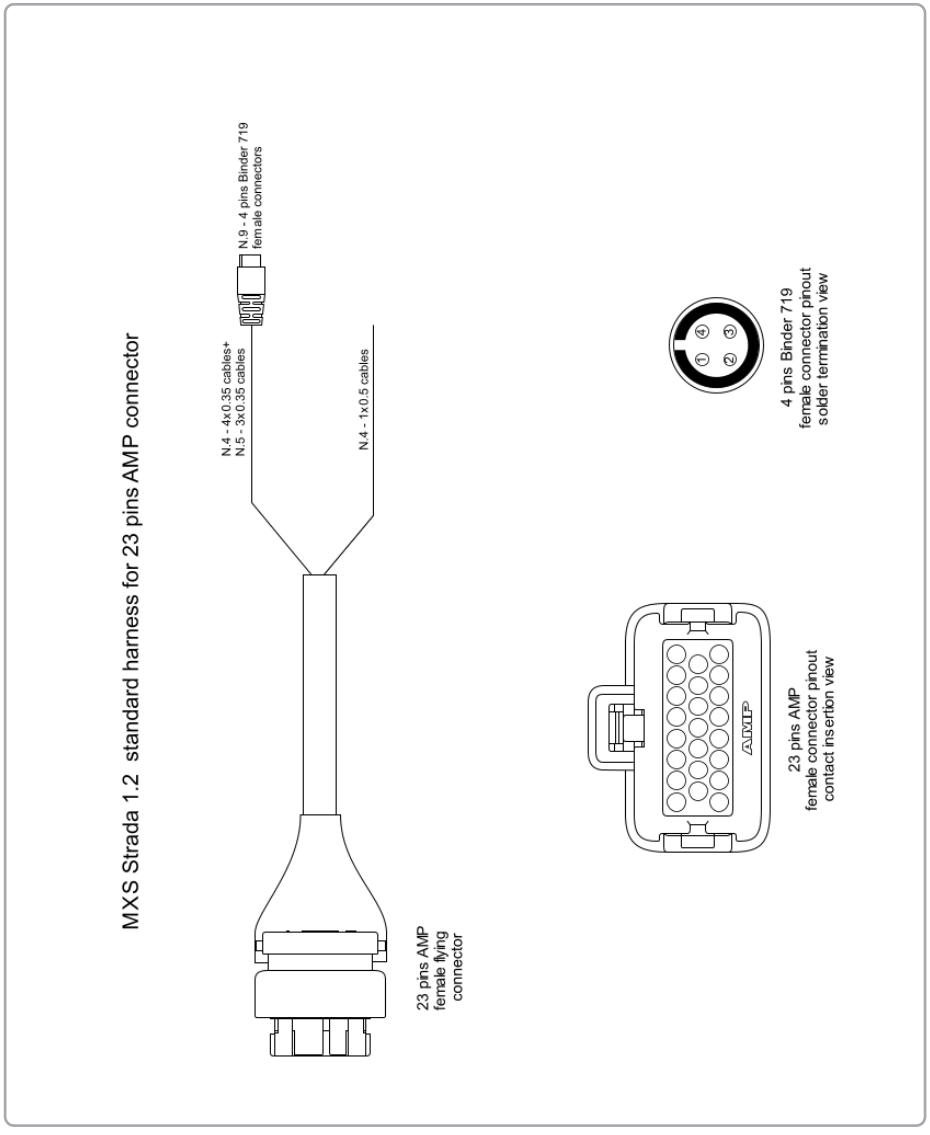


Tabella dati cavi terminati con connettori Binder 719 - 4 pin femmina						
23 pins AMP Connettor pin	**Cable colour**	**Destination connector pin**	**Cable type**	**Length**	**Channel**	**Label**
1 2 3 4	White Black Red Blue	1 2 3 4	4x0.35mm²	340mm	+Analog channel 1 Analog GND +Vb output +Vreference	Channel 1
5 2 3 4	White Black Red Blue	1 2 3 4	4x0.35mm²	340mm	+Analog channel 2 Analog GND +Vb output +Vreference	Channel 2
6 7 8 9	White Black Red Blue	1 2 3 4	4x0.35mm²	360mm	+Analog channel 3 Analog GND +Vb output +Vreference	Channel 3
10 7 8 9	White Black Red Blue	1 2 3 4	4x0.35mm²	360mm	+Analog channel 4 Analog GND +Vb output +Vreference	Channel 4
11 2 nc 13	White Black n.c. Blue	1 2 3 4	3x0.35mm²	380mm	+Analog channel 5 Analog GND nc +Vreference	Channel 5
14 12 nc 13	White Black n.c. Blue	1 2 3 4	3x0.35mm²	380mm	+Analog channel 6 Analog GND nc +Vreference	Channel 6
15 12 nc 16	White Black n.c. Blue	1 2 3 4	3x0.35mm²	400mm	+Analog channel 7 Analog GND nc +Vreference	Channel 7
17 12 nc 16	White Black n.c. Blue	1 2 3 4	3x0.35mm²	400mm	+Analog channel 8 Analog GND nc +Vreference	Channel 8
18 19 3	White Black n.c. Blue	1 2 3 4	3x0.35mm²	320mm	Speed 1 GND +Vb output nc	Speed

Table of not cabled cables				
23 pins AMP connector pin	**Cable colour**	**Cable type**	**Length**	**Label**
20 21 22 23	Red White White Blue	1x0.5 mm² 1x0.5 mm² 1x0.5 mm² 1x0.5 mm²	550mm	Low Side digital output RPM Input CAN2+ CAN2-

MXS 1.2 Strada 14 pins AMP connector harness with OBDII connector

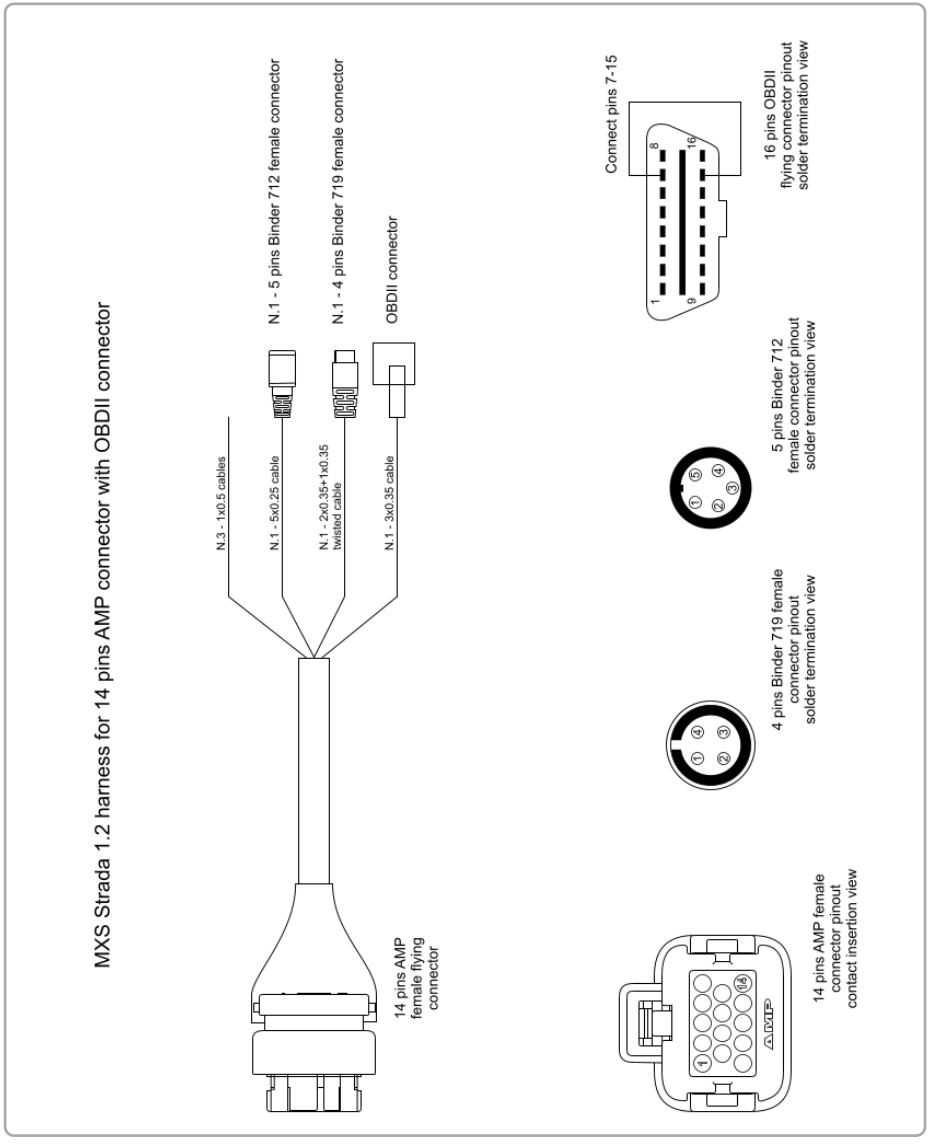


Table of cables ending with 4 pins Binder 719 female connector						
14 pins AMP connector pin	**Cable colour**	**Destination connector pin**	**Cable type**	**Length**	**Channel**	**Label**
11 13 12	White twisted Black Blue twisted n.c.	1 2 3 4	twisted 2x0.35+1x0.35	1100 mm	USB D+ USB GND USB D- n.c.	USB

Table of cables ending with 5 pins Binder 712 female connector						
14 pins AMP connector pin	**Cable colour**	**Destination connector pin**	**Cable type**	**Length**	**Channel**	**Label**
3 4 5 6 7	White Black Red Blue Orange	1 2 3 4 5	5x0.25 mm²	350 mm	CAN+ Exp GND Vb out CAN CAN- Exp Vb ext CAN	Exp

Table of cables ending with OBDII male connector						
14 pins AMP connector pin	**Cable colour**	**Destination connector pin**	**Cable type**	**Length**	**Channel**	**Label**
8 9 10	White Black Blue	6 14 7	3x0.35 mm²	1200 mm	CAN1+ ECU CAN1- ECU K-Line ECU	OBDII

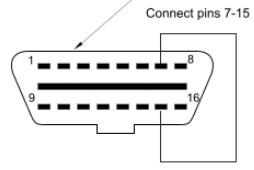


Table of not cabled cables				
AMP 14 pins connector pin	**Cable colour**	**Cable type**	**Length**	**Label**
2 1 14	Black Red Yellow	1x0.5 mm² 1x0.5 mm² 1x0.5 mm²	550 mm	Battery GND 9-15V Power input RESERVED