User Manual

AiM SW4

Release 1.02







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1 - AiM SW4 in a few words

AiM SW4 is the new range of AiM steering wheel with integrated logger, properly designed and developed for professional racers; available in different models they feature:

- ECU connection
- 2 CAN
- AiM CAN Expansion
- Colour TFT display
- 10 freely configurable pushbuttons
- 3 freely configurable rotary switches
- Freely configurable alarm display icons
- 4 configurable alarm RGB LEDs
- 8 RGB LEDs configurable as shift lights or predictive time
- Internal datalogger with 4 Gb internal memory

SW4 accessories



Paddle shifts and Paddle clutches are available as option

SW4 Expansions

SW4 can be connected to AiM GPS09 Module, Channel Expansion, TC Hub, Lambda Controller, SmartyCam HD and RIO02.



2 – SW 4 models

AiM SW4 range includes different models with different characteristics as shown in the table below.

| | SW4 270 | SW4 280 | SW4 320 | SW4 350 |
|--|----------------|----------------|----------------|----------------|
| Display | 4.3″ | TFT | 5″ | TFT |
| Resolution 800x480 pixels | • | • | • | • |
| Contrast 800:1 | • | ٠ | ٠ | • |
| Brightness | 800cd/m2 – | 1,100 Lumen | 800cd/m2 – | 1,200 Lumen |
| Ambient light sensor | ٠ | ٠ | ٠ | • |
| Configurable Alarm icons | ٠ | ٠ | ٠ | • |
| 8 configurable RGB LEDs shift lights | ٠ | ٠ | ٠ | • |
| 4 configurable Alarm RGB LEDs | ٠ | ٠ | ٠ | • |
| 3 CAN connections | ٠ | ٠ | ٠ | • |
| CAN ECU connections | ٠ | ٠ | ٠ | • |
| 4 GB Internal memory | ٠ | ٠ | ٠ | • |
| Anodized Aluminium body | ٠ | ٠ | ٠ | • |
| 10 Pushbuttons* | ٠ | ٠ | ٠ | • |
| Rotary switches* | 3 | 3 | 3 | 3 |
| 22 pins Deutsch male Autosport Connector | ٠ | ٠ | ٠ | ٠ |
| Dimensions in mm | 270x183.5x42.6 | 280x183.5x42.6 | 320X183.5X42.5 | 350x183.5x45.5 |
| Weight | 2400 g | 2400 g | 2600 g | 2600 g |
| Power consumption: 500 mA | ٠ | ٠ | ٠ | ٠ |
| Waterproof IP 65 | • | ٠ | • | • |

* Please note: both pushbuttons and rotary switches have RGB backlights.



3 – LEDs, pushbuttons and rotary switches

With reference to the image below, all AiM SW4 feature:

- 2 buttons (Right and Left buttons 1): they work as free contacts, closing the circuit between two pins each in the connector
- 8 pushbuttons freely configurable using RaceStudio3 software
- 4 RGB alarm LEDs, freely configurable using RaceStudio3 software
- 8 top RGB LEDs to be used as shift lights or as predictive lap time, configurable using Race Studio 3 software
- 3 rotary switches, all with RGB backlight freely configurable using Race Studio 3 software



From 1 to 3 rotary switch(es)



3.1 - Buttons labels set

SW4 comes with a set of stickers that can be used to identify the function buttons as well as the remaining eight pushbuttons. Here below they are shown with the meaning that is typically associated to each stick.

Please note: remove the back protective film before installing any sticks.



Each button can be configured as Momentary Toggle or Multiposition and is to be configured according to the function it is associated with (see paragraph 4.1.2 for further information).



4 – SW4 Configuration

In order to configure your SW4, please execute the following steps:

- Run RaceStudio3 and press the setting icon
- "Choose your Device" window is prompted: scroll it up to SW4 icon and select it
- Press "OK"
- "Configuration name and notes" window is prompted: fill in Configuration Name and note if you wish (John Hawk in this case); if you don't the configuration is named as the device and progressively numbered if more configuration of the same devices are created
- Press "OK"





4.1 - Buttons, rotary switches and paddles

SW4 features 12 pushbuttons and 3 eight positions rotary switches.

4.1.1 – Free contact pushbuttons

Two buttons, Left Button 1, and Right Button 1, shown in the picture, simply close a free contact.



The pins of 22 pins Deutsch male connector correlated to these two pushbuttons are:

- Left button (Function button 1): pin 10 and pin 20
- Right button (Function button 2): pin 7 and pin 18

22 pins Deutsch male connector Code AS-612-35PN external view



| Pin | Signal | Pin | Signal |
|-----|-------------------|-----|-------------------|
| 1 | 9-15V Power input | 12 | USB D- |
| 2 | CAN ECU+ | 13 | CAN AiM + |
| 3 | CAN ECU- | 14 | GND |
| 4 | Left Paddleshift | 15 | CAN AIM - |
| 5 | Right Paddleshift | 16 | RPM |
| 6 | Paddleshift COM | 17 | N.C. |
| 7 | Function Button 2 | 18 | Function button 2 |
| 8 | CAN 2+ | 19 | GND |
| 9 | CAN 2- | 20 | Function button 1 |
| 10 | Function button 1 | 21 | +Vbext CAN |
| 11 | USB D+ | 22 | +Vbout CAN |







4.1.2 - CAN Output pushbuttons

The other 8 pushbuttons, which status is to be transmitted through a CAN connection, need be configured in order to be used. This is possible through our software Race Studio3, selecting "Buttons" layer. The pushbuttons may be used in the following ways:

- Momentary pushbuttons: when the button is pressed output sets to "Active" status: as soon as it is released it goes back to its "Not active" status. This working mode is to be used to enter SW4 Menu as explained in the following page. The pushbuttons may be:
 - **Time Independent:** in this case, the pushbutton may have only two statuses: "Active" when pushed and "Not Active" when released.
 - **Time Dependent:** when the button is short time pressed output sets to "Short time" status; when the button is long time pressed, output sets to "Long Time" status; as soon as it is released output comes back to its "Not Active" status
- **Toggle pushbuttons**: when the button is pressed output sets to "Active" status even after releasing the button; when pressed again output comes back to its resting "Not active" status. Here too, a pushbutton may be configured in two ways:
 - o Time Independent: in this case, the pushbutton may have only two status: "Active" and "Not Active".
 - **Time Dependent** when the button is short time pressed output sets to "Short time" status even after releasing button; when button is long time pressed, output sets to "Long Time" status even after releasing button. The pressure time allows you to switch between these 2 statuses; when pressed again using the same pressure time, it goes back to its "Not Active" status;
- **Multiposition**: each time the button is short time pressed, output sets to next status even after releasing the button; after last status it repeats the cycle starting from the first one. Here too, the actions for passing from a status to another status can be **Time Dependant**: the next status depends upon how long you push the pushbutton.

Please note: to enter SW4 Display MENU you need to associate this function to a specific pushbutton (Left button 4 in the example) setting it as Momentary as shown here below. When the pushbutton matched to this function is pressed left and right pushbuttons 2 and 3 backlight switches on white to indicate the user the pushbuttons to use for navigating SW4 Menu as shown in the image of following page.



| | V |
|--|---|
| Left Button 3' Setting | × * |
| Name Left | Button 3 |
| Work An | |
| | |
| | |
| | the threshold between short and long status sec 0.5 |
| Rest Status | Active Status Long Status |
| | |
| Label Value | Label Value Label Value |
| OFF 0 | ON 1 LONG 2 |
| | Set Trigger Comm 🗢 Set Trigger Comm 🗢 |
| | Display Page Command |
| | Enter Menu |
| | |
| | Reservarms command |
| LED Configuration | |
| Set Color Off | when following condition is verified for at least 0 sec 🙆 🕇 |
| | priority |
| Left Button 3 equal to ON | DDA |
| | |
| | |
| | |
| | |
| | |
| | |
| | Save |
| | Save Calicel |
| | |
| Buttons | |
| Available buttons and leds | |
| Left button 1 | ton 1 |
| 2 Left Bigh | |
| a Left | |
| button 3 butto | |
| 4 Left Righ button 4 button 4 | |
| 6 Left Righ | |
| Determine the second se | |
| RotaryMiddle RotaryM | DATE TIME |
| I [Ext Left Button 1] I [none] I [Interpreted by the second seco | |
| 2 Left Button 2 Toggle off 3 Left Button 3 Tongle off | |
| Image: Construction of the second s | |
| 5 Left Button 5 Toggle f 6 LEFt Platt Button 1 Legan 1 f | |
| V 7 Right Button 2 Toggle off | |
| 8 Right Button 3 Toggle | |
| 9 Right Button 4 Toggle off 10 Right Button 5 Togale off | |
| Image: Second | |
| Image: 12 RotaryMiddle Rotary steps off | |
| Image: 13 RotaryRight Rotary steps | |
| | |



As far as channels management are concerned Momentary and Toggle working modes are shown here below.

| | 'Left Button 2' Setting | — 🗆 × | |
|--|--|--|---------|
| | Button use O for Display | as Channel | |
| | | Name Left Button 2 | |
| | | WorkAs Momentary Toggle Multiposition | |
| /hen button is pressed, output s soon as it is released, output ou can edit labels for the two : | t sets to 'Active' status. c cames back to its resting 'Not active' status status. | When button is pressed, output sets to 'Active' status even after releasing When pressed again, output cames backto its resting 'Not active' status. You can edit labels for the two status. | button. |
| | | Use timing Time threshold between short and long status sec 0.5 | |
| | | Rest Status Active Status Long Status | |
| | | Label Value Label Value | |
| | | OFF 0 1 LONG 2 | |
| | | | |
| | | | |

| | 'Left Button 2' Setting | | | | | | | | | × | |
|---|---|--|---------------|---|---------------|---|--|--|--|--|---|
| | Button use O for Display | as Channel | | | | | | | | | |
| | | Name | Left Button 2 | | | | | | | | |
| | | WorkAs | Momentary | O Toggle | | osition | | | | | |
| When button is long time pressed, As soon as it is released, output car | output sets to 'Long time' status. mes back to its resting status: 'OFF' label is s | shown. | | | | When button is long t The pressure time allo | me pressed, output vs You to switch bet | sets to 'Loi ween thesi | ng time e 2 statu | e' status i us. | even after releasing button. |
| When button is long time pressed, As soon as it is released, output car You can edit labels for the short an | output sets to anot time status. mes back to its resting status: 'OFF' label is s id long pressure status and time transition. | shown. | Time threshol | ld between short : | and long stat | When button is long t The pressure time allo When pressed again u /ou can edit labels for us sec 0.5 | me pressed, output vs You to switch bet ing the same pressu the short and long p | sets to 'Loi ween these ure time, or pressure sta | ng time e 2 statu utput ca atus and | e' status us. ames ba d time tr | even after releasing button. ick to its resting 'Not active' statu ansition. |
| When button is long time pressed, As soon as it is released, output car You can edit labels for the short an | Upper sets to short time status. output sets to fong time' status. mes back to its resting status: OFF label is s d long pressure status and time transition. | shown. Use timing | Time threshol | Id between short a | and long stat | When button is long t The pressure time allo When pressed again u You can edit labels for us sec 0.5 | me pressed, output vs You to switch bet ing the same pressu the short and long p | sets to 'Loi ween these ure time, or pressure sta | ng time e 2 statu utput ca atus and | e' status us. ames ba d time tr | even after releasing button. Ick to its resting 'Not active' statu ansition. |
| When button is long time pressed, As soon as it is released, output car You can edit labels for the short an Check here to use short and long p At start, without pressing button, t | Upper sets to short time status. output sets to short time status. mes back to its resting status: OFF label is s d long pressure status and time transition. I setsure time. he resting status is with Rest label shown. | shown. Use timing Rest Status Label Va | Time threshol | Id between short a ctive Status I Value | and long stat | When button is long t The pressure time allo When pressed again u You can edit labels for us sec 0.5 | me pressed, output vs You to switch bet ing the same pressu the short and long p | sets to 'Loi ween these ure time, or pressure sta | ng time e 2 statu utput ca atus anc | e' status us. ames ba d time tr | even after releasing button. ick to its resting 'Not active' statu 'ansition. |
| When button is long time pressed, As soon as it is released, output car You can edit labels for the short an Check here to use short and long p At start, without pressing button, it When button is short time pressed When button is short time pressed | Upper sets to short time status. output sets to forg time' status: OFF label is s d long pressure status and time transition. In the status short time status and time transition. In the status short time status and time transition. In the status short time status and time status. In the status short time status. | shown. Use timing Rest Status Label Va OFF 0 | Time threshol | Id between short a ctive Status I Value | and long stat | When button is long t The pressure time allo When pressed again u You can edit labels for us sec 0.5 .ong Status Value 2 | me pressed, output : vs You to switch bet ing the same press the short and long p | sets to 'Loi ween these ure time, or pressure sta | ng time e 2 statu utput ca atus and | e' status e us. ames ba d time tr | even after releasing button. ick to its resting 'Not active' statu ansition. |



Multiposition working mode is shown here below.

| | 🚈 'Left Button 2' Setting | - 🗆 X | |
|--|--|---|-----------------------------|
| | Button use O for Display | as Channel | |
| | | Name Left Button 2 | |
| | | WorkAs O Momentary O Toggle 💽 Multiposition | |
| | | Each time button is pressed, output sets to next status even af After last status, its repeats the cicle starting from the first one You can edit all the status labels. | ter releasing button. |
| | | Use timing Time threshold between short and long status sec 0.5 | |
| | | Position Label Value Short Press Long Press leads to leads to | |
| | | 0 S0 0 S1 \$ S1 \$ | |
| | | 1 S1 1 S0 \$ S0 \$ [+ | |
| | 1 | | |
| | | | |
| | (1) 1 of Dutton 7: Sutting | | |
| | Left Button 2' Setting Button use for Display | - C X | |
| | 'Left Button 2' Setting Button use O for Display | → □ × e as Channel Name Left Buiton 2 | |
| | Left Button 2' Setting Button use O for Display | | |
| ck here to use short and long pr | Left Button 2' Setting Button use O for Display | as Channel Name Left Button 2 Work As Momentary Toggle Multiposition Letch time button is short time pressed, output sets to next status even after releasing button. After last short time pressed, its repeats the cide stating from the first one. Each time button is long time pressed, output sets to a wanted status (set by third column and For each status You can edit labels and, when long time pressed, the wanted ending status | I different from starting s |
| eck here to use short and long pre- tart, without pressing button, the en button is only time pressed, o en button is in gritten pressed, o | Left Button 2' Setting Button use for Display for Display soure time. resting status is with Rest label shown. utgut sets to "Short time" status. | as Channel Name Left Button 2 Work As Momentary Toggle Multiposition Each time button is short time pressed, output sets to next status even after releasing button. After last short time pressed, discuss the cide stating from the first one. Each time button is not time pressed, discuss the cide stating from the first one. Each time button is short time pressed, duput sets to a water defined status (set by third column and For each status You can edit labels and, when long time pressed, the wanted ending status Use liming Time threshold between short and long status sec 0.5 | I different from starting s |
| eck here to use short and long pre start, without pressing button, the ne button is on time pressed, ou uen did liabels fore the short and u can set the transition time betwee | Left Button 2' Setting Button use O for Display for Display reting tatus is with Rest label shown. uput sets to 'Short time' status. Aput sets to 'Long time' status. en short and long state. | as Channel Name Left Button 2 Work As Momentary Toggle Multiposition Each time button is short time pressed, output sets to next status even after releasing button. After last hort time pressed, its repeats the cicle stating from the first one. Each time button is long time pressed, output sets to a wanted status (set by third column and For each status You can edit labels and, when long time pressed, the wanted ending status Use timing Time threshold between short and long status sec 0.5 Position Label Value Earls to Learls to Long Press | l different from starting : |
| eck here to use short and long pre start, without pressing button, the ten button is short time pressed, or can edit labels for the short and c can edit labels for the short and c can set the transition time betwe | Image: Setting Button use for Display Sure time. resting status is with Rest label shown. upty sets to "Long time" status. inp pressure status. en short and long state. | | I different from starting s |



4.1.3 – Pushbutton LEDs

Every pushbutton has an associated RGB LED, used for enlightening it in night usage or even as a feedback after having required an action: you may choose the colour depending upon a single status and the logic for turning it ON. Finally, the lights may be slow or fast blinking.

| | - CL |
|--------------------------|---|
| 'Left Button 2' Setting | - 🗆 X |
| Button use O for Display | as Channel |
| • | Name Left Button 2 |
| | Work As O Momentary O Toggle O Multiposition |
| | |
| | Use timing Time threshold between short and long status sec 0.5 |
| | Rest Status Active Status Long Status |
| | Label Value Label Value |
| | OFF 0 0N 1 LONG 2 |
| | |
| | |
| Led Configuration | |
| Set Color 🗍 White 🜲 | continuously 🔶 when following condition is verified for at least 0 sec 🏟 👘 |
| | continuously |
| Red | slow blinking |
| Green | fast blinking |
| Amber | |
| Blue | Add New Output State |
| Magenta | |
| Cyan | |
| White | |
| | |
| Left Button 2 equal to O | bbA |
| | Click to add another condition |
| | |
| Condition | x |
| | |
| | vays FALSE |
| Left Button 2 | ← equal to ← constant ✓ ON ← |
| TRUE after a time of 0 | sec in which it is verified FALSE after a time of 0 sec in which it is no longer verified |
| | OK Cancel |
| | |
| | |
| | |
| | Save Cancel |
| | |



You can configure every LED in order to be turned ON in different colours in dependence upon the conditions you may describe through math channels.

| | Image: "Left Button 2' Setting - | × |
|---------------|---|--|
| | Button use () for Display () as Channel Name Left Button 2 | |
| | WorkAs 🔘 Momentary 💿 Toggle 🚫 Multiposition | |
| | Use timing Time threshold between short and long status sec 0.5 Rest Status Active Status Long Status Label Value Value Label Value [OFF] 0 1 Label Value | |
| | Led Configuration | |
| | Set Color Blue 💠 continuously 💠 when following condition is verified for at least 0 sec | riority |
| _ | Conditions - Left Button 2 equal to OFF Add | |
| | Add v | |
| | Set Color Red Continuously When following condition is verified for at least sec | |
| Output States | Conditions - Left Button 2 equal to ON Add | |
| | Add Add | |
| | Set Color Green 💠 continuously 💠 when following condition is verified for at least 0 sec | |
| | GPS Speed greater than 250 km/h Add | Add New Output State Remove This Output State |
| | | Maximize Priority for This Output State Move Up Priority for This Output State |
| | | Move Down Priority for This Output State Minimize Priority for This Output State |
| | Save Cance | |



4.1.4 – Rotary switches

The three rotary switches may be set in eight different positions, each one recognized through a numeric value and a label. The RBG LEDs colour may be defined in dependence of a freely configurable rule.



Per every position, you can:

- name each status setting the corresponding Label, for eventually show the status on your display
- set different values corresponding to different positions
- set the rotary LED colour per every position.

| RotaryLet' Setting - - × Name RotaryLet 1 1 0 - - × 1 1 0 - - × 1 1 0 - 1 × 2 12 1 - - × 4 14 3 - - × 6 16 5 - - - × 6 16 5 - - - × 6 16 5 - - - × 8 18 7 - | | | | |
|---|------------------------|---|-----------|-----------------|
| Name RotaryLeft Position Label 1 L1 0 2 2 L2 3 L3 2 L2 4 L4 3 L3 5 L5 4 L4 6 L6 7 L7 6 L8 7 L7 8 L8 7 O sct Color off when following condition is verified for at least o sec off RotaryLeft equal to L1 Add Save | 🚈 'RotaryLeft' Setting | | _ | |
| Position Label Value 1 L1 0 2 L2 1 3 L3 2 4 L4 3 5 L5 4 6 L6 5 7 L7 6 8 L8 7 | | lame RotaryLeft | | |
| 1 L1 0 2 L2 1 3 L3 2 4 L4 3 5 L5 4 6 L6 5 7 L7 6 8 L8 7 EED Configuration Set Color Off the when following condition is verified for at least 0 sec Image: month RotaryLeft equal to L1 Save | | Position Label Value | | |
| 2 L2 1 3 L3 2 4 L4 3 5 L5 4 6 L6 5 7 L7 6 8 L8 7 Set Color offiguration Set Color officient equal to L1 Add Save Cancel | | 1 L1 0 | | |
| 3 13 2 4 14 3 5 15 4 6 16 5 7 17 6 8 18 7 LED Configuration Set Color off off off off off off off off off o | | 2 L2 1 | | |
| 4 14 3 5 1.5 14 6 1.6 5 7 1.7 6 8 1.8 7 Set Color off of the set | | 3 L3 2 | _ | |
| 5 L5 4 6 L6 5 7 L7 6 8 L8 7 Set Color off sec of priority RotaryLeft equal to L1 Add Save Cancel | | 4 L4 3 | | |
| 6 6 5 7 L7 6 8 L8 7 | | 5 L5 4 | | |
| 7 L7 6 8 L8 7 LED Configuration Set Color Off when following condition is verified for at least 0 sec Image: priority priority RotaryLeft equal to L1 Add Image: Save Cancel | | 6 L6 5 | | |
| 8 L8 7 LED Configuration Set Color Off Image: Construction is verified for at least Image: Construction is verified for at least RotaryLeft equal to L1 Add Image: Construction is verified for at least Image: Construction is verified for at least Image: Construction is verified for at least Save Cancel | | 7 L7 6 | | |
| LED Configuration Set Color Off RotaryLeft equal to L1 Add Save Cancel | | 8 L8 7 | | |
| LED Configuration Set Color Off When following condition is verified for at least 0 sec Priority RotaryLeft equal to L1 Save Cancel | | | | |
| Set Color Off when following condition is verified for at least 0 sec priority RotaryLeft equal to L1 Add Save Cancel | LED Configuration | | | |
| RotaryLeft equal to L1 Add Save Cancel | Set Color Off 🜩 | when following condition is verified for at lea | ast 0 sec | © ↑ priority |
| Save Cancel | RotaryLeft equal to L1 | | Add | |
| Save Cancel | | | | |
| Save Cancel | | | | |
| | | | Save | Cancel |



4.1.5 – Gear Paddles

The two optional Gear Paddles have two contacts each. One closes a free contact, while the other is managed by the internal processor and may be transmitted to the CAN connection.



22 pins Deutsch male connector Code AS-612-35PN external view



| Pin | Signal | Pin | Signal |
|-----|-------------------|-----|-------------------|
| 1 | 9-15V Power input | 12 | USB D- |
| 2 | CAN ECU+ | 13 | CAN AiM + |
| 3 | CAN ECU- | 14 | GND |
| 4 | Left Paddleshift | 15 | CAN AIM - |
| 5 | Right Paddleshift | 16 | RPM |
| 6 | Paddleshift COM | 17 | N.C. |
| 7 | Function Button 2 | 18 | Function button 2 |
| 8 | CAN 2+ | 19 | GND |
| 9 | CAN 2- | 20 | Function button 1 |
| 10 | Function button 1 | 21 | +Vbext CAN |
| 11 | USB D+ | 22 | +Vbout CAN |



4.1.6 – Clutch Paddles

The Clutch Paddles move two internal analog potentiometers, managed by the processor and whose value may be transmitted to the external device through the CAN connection. Being SW4 clutches optional the related channels are by default disabled. To use them enable the left checkbox.

| 🕋 RaceStudio | o3 (64 bit) dev 3.00.19 - build | giovedì 24 giu | gno 2021 12:58 | | | | | | | | | | | | | | _ | ; | × |
|--------------|---------------------------------|----------------|----------------|------------|----------------|------------------|------------|-------------------------|------------|--------|----------------|--------------|-------------|-------|------------|---|-----|----|---|
| * * | | 13 E | "Ł | * ô | 4 | | | | | | | | | 👂 La | ura 竉 | • | ECU | an | > |
| All SW4 36 | | | | | | | | | | | | | | | | | | | |
| Save | Save As | Close | Transmit | | | | | | | | | | | | | | | | |
| Channels | Buttons ECU Stream | CAN2 Stre | am CAN E | xpansions | Math Channels | Status Variables | Parameters | Shift Lights and Alarms | Trigger Co | mmands | Icons Manager | Display | SmartyCam S | tream | CAN Output | | | | |
| | | | ID | V Na | ıme | Function | | Sensor | Unit | Freq | Parameters | | _ | | | | | | |
| | | | RPM | RI RI | PM | Engine RPM | | RPM Sensor | rpm | 20 Hz | max: 16000 ; 1 | factor: /1 ; | | | | | | | |
| | | | LCIh | 🗹 Le | eft Clutch | Percent | | Percentage Pot. Calib | % | 100 Hz | | | | | | | | | |
| | | | RCIh | 🗹 Ri | ght Clutch | Percent | | Percentage Pot. Calib | 96 | 100 Hz | | | | | | | | | |
| | | | LPS | 🖌 🔽 | eft PadShift | Digital Status | | Status | | 20 Hz | | | | | | | | | |
| | | | RPS | Ri Ri | ght Pad Shift | Digital Status | | Status | | 20 Hz | | | | | | | | | |
| | | | PAccu | 🖌 G | PS PosAccuracy | GPS Accuracy | | GPS | m 0.01 | 10 Hz | | | | | | | | | |
| | | | Spd | ✓ G | PS Speed | Vehicle Spd | | GPS | km/h 0.1 | 10 Hz | | | | | | | | | |
| | | | Alt | ✓ AI | titude | Altitude | | GPS | m | 10 Hz | | | | | | | | | |
| | | | OdD | V 0 | lometer | Odometer Total | | Odometer | km 0.1 | 1 Hz | | | | | | | | | |
| | | | Luma | V Lu | iminosity | Brightness | | Luminosity | 96 | 1 Hz | | | | | | | | | |
| | | | Tlog | 🖌 Lo | oggerTemp | Temperature | | Logger Temperature | С | 1 Hz | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | |

4.1.7 – Buttons/Rotary/Paddles status transmission

The status of the buttons, of the rotary switches and of the paddles are intended to be transmitted to an external device through the CAN connection: you have to create a CAN message, using the "CAN Output" layer:

| RaceStudio3 (64 bit) 3.50.83 | | | | | | | | |
|--|-------------------------|---------------------|--------------------|------------------|-------------------|-------------------|-------------------|----------------|
| 🗶 🥸 🕼 🕼 🕄 🖪 🖌 | | | | | | | | |
| All SW4 - Sample 34 | | | | | | | | |
| Save Save As Close Transmit | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions | Math Channels Status Va | ariables Parameters | Shift Lights and A | arms Trigger Com | nands Icons Manag | er Display Smarty | Cam Stream CAN Ou | Itput |
| Can 1 Can 2 | | | | | | | | |
| Bit Rate Protocol (bit/s) | 1 M bit/s ≑ | | | | | Name | | |
| CAN ID (hex) | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
| ✓ 0x100 | Left Button 2 | Left Button 3 | Left Button 4 | Right Button 2 | Right Button 2 | Right Button 3 | Right Button 4 | Right Button 5 |
| + Add New Payload | | | | | | | Export | Import |

In this example we have created a message at ID 0x100 with 8 fields, one per every pushbutton status.



In case you need to transmit the pushbutton status as bits, one bit per every pushbutton, you have to create a math channel, called Bit Composed, in which one byte is composed by 8 different bits, one per every pushbutton:

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | – 🗆 X |
|---|-----------------------------------|--|--------------|
| * 🐲 🕼 🕼 🥵 🚣 🄝 🖨 | | 👂 🎅 | 🌪 🚔 <i>@</i> |
| All SW4 - Sample 36 SW4 36 | | | |
| Save Save As Close Transmit | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters St | hift Lights and Alarms Trigger Co | commands Icons Manager Display SmartyCam Stream CAN Output | |
| Add Channel | still available math channels: 37 | r | |
| | Select a Mathematical Channel | x | |
| | Channel | Description | |
| | Bias | To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2) | |
| | Bias with Thresholds | To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0] | |
| | Calculated Gear | To calculate the gear position from engine rpm and vehicle speed | |
| | Precalculated Gear | To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio | |
| | Linear Corrector | To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b | |
| | Simple Operation | To add to or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2) | |
| | Division Integer | To get the integer part of the division VALUE = integer(CH / a) | |
| | Division Modulo | To get the remainder part of the division VALUE = CH % a | |
| | Bit Composed | To Compose 8 flags in a bit-field measure VALUE = f1 + f2*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128 | |
| | | | |
| | | OK Cancel | |
| | L | | |

You need to create a channel including the status of all the pushbuttons:

| Mathematical Channel | el Settings | × | | | Mathematical Chann | el Settings | | |
|------------------------|---|----------|---------------------------|----------------|-----------------------|--------------------------------|-----------------------|--------|
| Name | BitComposed | | | | Name | Buttons | | |
| Sampling Frequency | 10 Hz | \$ | | | Sampling Frequency | 10 Hz | | |
| Display Precision | no decimal place | \$ | | | Display Precision | no decimal place | | |
| Bit Compositing Operat | lion | | Select Channel | – 🗆 X | Bit Compositing Opera | ion | | |
| Enable | | | Source | Channel | Enable | | | |
| Flag Channel | 1 (f1) Not set | \$ | Lap Channels | Left Button 2 | Flag Channel | 1 (f1) Left Button 2 | | |
| Flag Channel | 2(12)Not set | ^ | GPS | Left Button 3 | Flag Channel | 2(f2) Left Button 3 | | |
| | | | A/D Channels | Left Button 4 | | Cell Bullon 3 | | |
| Flag Channel | 3 (f3) Not set | \$ | Buttons | Left Button 5 | Flag Channel | 3 (f3) Left Button 4 | | : |
| Flag Channel | 4 (14) Not set | \$ | Odometer | Left PadShift | Flag Channel | 4 (f4) Left Button 5 | | : |
| Elan Channel | 5(f5) Not oot | | Internal Math Channels | Right Button 2 | Elan Channel | 5(f5) Diabt Button 2 | | |
| | (15) Not set | | maul Channels | Right Button 4 | | Right Button 2 | | |
| Flag Channel | 6 (16) Not set | \$ | 101001 | Right Button 5 | Flag Channel | 6 (f6) Right Button 3 | | |
| Flag Channel | 7 (f7) Not set | \$ | | Right PadShift | Flag Channel | (f7) Right Button 4 | | : |
| Flag Channel | B (f8) Not set | ÷ | | RotaryLeft | Flag Channel | 3 (18) Right Button 5 | | |
| VALUE = f | 1 + f2*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128 | | | OK Cancel | VALUE = f | 1 + f2*2 + f3*4 + f4*8 + f5*16 | * f6*32 + f7*64 + f8* | 128 |
| | | | | | L | | | |
| | | | | | | | | |
| | Saut | Canaal | | | | | Caus | Cancel |



Finally you may transmit this channel through CAN:

| RaceStudio3 (64 bit) 3.50.83 ★ 200 1/2 1/3 1/2 4/3 4/4 4/3 4/4 4/3 | | | | | | | | |
|--|------------------------------|----------------------|----------------------|------------------|-------------------|-------------------|-------------------|----------------|
| All SW4 - Sample × | , | | | | | | | |
| Save Save As Close Transmit | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Exp | ansions Math Channels Status | Variables Parameters | Shift Lights and Ala | arms Trigger Com | nands Icons Manag | er Display Smarty | Cam Stream CAN Ou | itput |
| Can 1 Can 2 | | | | | | | | |
| Bit Rate Protocol (b | t/s) 1 M bit/s ≑ |] | | | | Name | | |
| CAN ID (he | x) Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
| ✓ 0x100 | Left Button 2 | Left Button 3 | Left Button 4 | Right Button 2 | Right Button 2 | Right Button 3 | Right Button 4 | Right Button 5 |
| + Add New Pa | load | | | | | | Export | Import |
| | | | | | | | | |



5 – Channels

Once the configuration created, the software "Channels" page is prompted. It shows the logger default channels.

They come from the paddles, clutch or gear, from internal sensors or calculations (Odometer, Luminosity and internal temperature), from the RPM connection and from the optional GPS: Accuracy, Speed, Altitude

The first channel is RPM and it is enabled by default. When you load your vehicle ECU in SW4 configuration (see paragraph 6.4) the software detects that the ECU supplies RPM channel and disables the channel. In the rare cases where RPM channel is not included in the ECU protocol the software detects it and this RPM channel stays enabled.

Left and Right clutch are disabled by default; in case please enable the corresponding channels.

| RaceStudio3 (64 bit) dev 3.00.19 - build giovedi 24 giugno | 2021 12:58 | | | | | | | | | | | | | - | • × |
|--|------------|-------|-----------------|-------------|------------------------|-------------------------|-------------|--------|---------------------------|-----------|--------|------------|---|-----|-----|
| * 🐲 🖅 🖪 🔂 🖷 | | Ô | - 4 | | | | | | | | 🗩 L | aura 🎅 | • | ECU | am |
| All SW4 [™] SW4 17 02 01 [™] | | | | | | | | | | | | | | | |
| Save Save As Close | Transmit | | | | | | | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream | CAN Exp | bansi | ons Math Chan | inels Statu | s Variables Parameters | Shift Lights and Alarms | Trigger Cor | nmands | Icons Manager Display | SmartyCam | Stream | CAN Output | | | |
| ID |) | • | Name | | Function | | | | | | | | | | |
| RF | PM | • | RPM | | Engine RPM | RPM Sensor | rpm | 20 Hz | max: 16000 ; factor: /1 ; | | | | | | |
| LC | Clh | | Left Clutch | | Percent | Percentage Pot. Calib | % | 100 Hz | | | | | | | |
| RC | Clh | | Right Clutch | | Percent | Percentage Pot. Calib | % | 100 Hz | | | | | | | |
| LP | PS | ◄ | Left Pad Shift | | Digital Status | Status | | 20 Hz | | | | | | | |
| RF | PS | ◄ | Right Pad Shift | | Digital Status | Status | | 20 Hz | | | | | | | |
| PA | Accu | ◄ | GPS PosAccurac | cy i | GPS Accuracy | GPS | m 0.01 | 10 Hz | | | | | | | |
| sp | pd | ◄ | GPS Speed | | Vehicle Spd | GPS | km/h 0.1 | 10 Hz | | | | | | | |
| All | lt | ◄ | Altitude | | Altitude | GPS | m | 10 Hz | | | | | | | |
| Od | dD | ◄ | Odometer | | Odometer Total | Odometer | km 0.1 | 1 Hz | | | | | | | |
| Lu | uma | ◄ | Luminosity | | Brightness | Luminosity | % | 1 Hz | | | | | | | |
| Тю | log | ◄ | LoggerTemp | | Temperature | Logger Temperature | С | 1 Hz | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |



5.1 – RPM Channel

As explained before once the ECU protocol loaded in SW4 configuration if, like in this case, the ECU supplies RPM channel, the similar channel in "Channel" layer is automatically disabled.

| 📓 RaceStudio3 (64 bit) 3.50.77 - build mercoledì 21 luglio 2021 | 19:32 | | | | | | | | | | - | | × |
|---|------------------------------|-----------------------------|-------------------------|-------------|--------|---------------------|----------|-----------------|------------|---------|---|----|----|
| * 🥸 🕫 🖬 🕄 🖆 🦛 | £7 | | | | | | | | 7 | <u></u> | | 20 | am |
| All SW4 ³⁴ | | | | | | | | | | | | | |
| Save Save As Close Tr | ransmit | | | | | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream | CAN Expansions Math Channels | Status Variables Parameters | Shift Lights and Alarms | Trigger Com | mands | Icons Manager Di | splay Sn | nartyCam Stream | CAN Output | | | | |
| ID | ✓ Name | Function | Sensor | Unit | Freq | Parameters | | | | | | | |
| RPN | A RPM | Engine RPM | RPM Sensor | rpm | 20 Hz | max: 16000 ; factor | r: /1 ; | | | | | | |
| LCI | h 🖌 Left Clutch | Percent | Percentage Pot. Calib | % | 100 Hz | | | | | | | | |
| RCII | h 🖌 Right Clutch | Percent | Percentage Pot. Calib | % | 100 Hz | | | | | | | | |
| LPS | Left Pad Shift | Digital Status | Status | | 20 Hz | | | | | | | | |
| RPS | Right Pad Shift | Digital Status | Status | | 20 Hz | | | | | | | | |
| PAc | GPS PosAccuracy | GPS Accuracy | GPS | m 0.01 | 10 Hz | | | | | | | | |
| Spd | GPS Speed | Vehicle Spd | GPS | km/h 0.1 | 10 Hz | | | | | | | | |
| Alt | Altitude | Altitude | GPS | m | 10 Hz | | | | | | | | |
| OdD | Odometer | Odometer Total | Odometer | km 0.1 | 1 Hz | | | | | | | | |
| Lum | na 🔽 Luminosity | Brightness | Luminosity | % | 1 Hz | | | | | | | | |
| Τιος | LoggerTemp | Temperature | Logger Temperature | С | 1 Hz | | | | | | | | |

You have two ways for getting RPM value of your engine:

RPM from ECU

To get the RPM from the ECU just connect SW4 to the ECU and it will automatically sample that value.

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

If the vehicle has no ECU, please connect pin 16 of the 22 pins connector harness to the low voltage of the coil (whose peak can be from 150 to 400 V) or eventually to a possible square wave (the peak can be from 5 to 50 V). Finally, enable the RPM channel and set its parameters in the Channels page of Race Studio.

Once SW4 connected to RPM signal enable it and set its parameters in "Channels" layer of Race Studio.

| 🔤 RaceStudio3 (64 bit) 3.50.77 - build mercoledi 21 luglio 2 | 2021 19:32 | | | | | | | | | _ | |
|--|------------|--------------------|------------------------------|------------------------------|----------------|----------------------------|---------------------|----------|----------|----|----|
| * 🐲 🕫 🕫 🕄 🖷 🚣 🔹 | ô 8 | | | | | | | | <u> </u> | | am |
| | | | | | | | | | • | EG | |
| Save Save As Close | Transmit | | | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream | m CAN Exp | ansions Math Chanr | els Status Variables Paramet | ters Shift Lights and Alarms | Trigger Comman | ids Icons Manager Disp | ay SmartyCam Stream | CAN Outp | ut | | |
| | D | ✓ Name | Function | Sensor | Unit Fre | q Parameters | | | | | |
| | RPM | ✓ RPM | Engine RPM | RPM Sensor | rpm 20 H | Hz max: 16000 ; factor: /* | | | | | |
| | LCIh | Left Clutch | Percent | Percentage Pot. Calib | % 100 | Hz | | | | | |
| | RCIh | Right Clutch | Percent | Percentage Pot. Calib | % 100 | Hz | | | | | |
| | LPS | ✓ Left Pad Shift | Digital Status | Status | 201 | Чz | | | | | |
| F | RP S | ✓ Right Pad Shift | Digital Status | Status | 20 1 | Ηz | | | | | |
| | PAccu | GPS PosAccuracy | Channel Settings | | | × | | | | | |
| | Spd | GPS Speed | Nama | RPM | | | | | | | |
| 4 | Alt | Altitude | Ivalle | 10 m | | | | | | | |
| C | DdD | Odometer | Function | Engine RPM | | ÷ | | | | | |
| | Luma | Luminosity | | | | | | | | | |
| | Tlog | ✓ LoggerTemp | Sensor | RPM Sensor | | | | | | | |
| | | | Sampling Frequency | 20 Hz | | ÷ | | | | | |
| | | | | | | | | | | | |
| | | | | _ | | | | | | | |
| | | | - RPM Parameters | | | | | | | | |
| | | | RPM Max | 1 | 6000 🜩 | | | | | | |
| | | | RPM Factor | 1* | 1 🗘 | | | | | | |
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5.2 – ECU Stream

As all AiM loggers SW4 can be connected to your vehicle ECU. Race Studio3 database includes more than 2000 ECU protocols. To set your ECU protocol in SW4 configuration press "Change ECU" and select your vehicle Manufacturer and model.

| 🕎 RaceStudio3 (64 bit) 3.50.75 - build giovedì 15 luglio 2021 17:21 | | | | | | | | | - | □ × |
|---|--------|------------------------------|----------------------|------------------|---------|------------------|-----------|-----|---------|-------|
| | | | | | | | 9 | ([: | ECU | (III) |
| Save Save Cloce Transmit | | | | | | | | | | |
| | | | Tringer Organization | Incore Manageres | Disates | 0 | 0.411.014 | | | |
| Channels Buttons ECO Stream CAN2 Stream CAN Expansions Math Channels Status variables | rame | ters Shirt Lights and Alarms | Ingger Commands | icons Manager | Display | SmartyCam Stream | CAN OUT | put | | |
| ECU: Click button to select a ECU protocol | MDIUSE | 2 | Change E | c0 - | | _ | | | | |
| Choose ECU Protocol | | | | | D X | | | | | |
| Manufacturer | | Model | | | | | | | | |
| JD Racing | ^ | F88_CAN | (v. 02.00.0 | 05) | (CAN) | | | | | |
| KAWASAKI | | MYGALE F4 | (v. 02.00.0 | 02) | (CAN) | | | | | |
| KMS | | WOLF_CAN | (v. 02.00.0 | 00) | (CAN) | | | | | |
| KTM | | | | | | | | | | |
| LAMBORGHINI | | | | | | | | | | |
| LEXUS | | | | | | | | | | |
| LIFE | | | | | | | | | | |
| LIGIER | | | | | | | | | | |
| LINK | | | | | | | | | | |
| LOTUS | | | | | | | | | | |
| MAN TRUCK | | | | | | | | | | |
| MARELLI | | | | | | | | | | |
| MASERATI | | | | | | | | | | |
| MAXXECU | | | | | | | | | | |
| MAZDA | | | | | | | | | | |
| MBE | | | | | | | | | | |
| MCLAREN | | | | | | | | | | |
| ME | | | | | | | | | | |
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| | | | | | | | | | | |





After setting the protocol the system comes back to "ECU Stream" layer and two checkbox appears:

- "Enable the CAN Bus 120 Ohm Resistor" (enabled by default and to be disabled in case SW4 logger is additional to the vehicle dash): the CAN Bus needs two 120 Ohm resistors at its two extremes. In case SW4 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" (disabled by default): usually the ECU expects an acknowledge signal when transmits a message and, as default, SW4 transmits this signal. Sometimes, particularly when there are other devices in the network, SW4 should not transmit it; enabling this flag SW4 remains completely silent.

| RaceStudio3 (64 bit) 3.50.77 - build mercoledi 21 luglio 2021 19:32 | | | | | | | | | - | - | - × |
|---|-------------|------------|----------------------------------|---------------------------|-------------------|-------------------------------------|-----------|----------|----|-----|-----|
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| | | | | | | | Ŷ | • | | ECO | |
| Save Save As Close Transmit | | | | | | | | | | | |
| Channels Buttons FCU Stream CAN2 Stream CAN Expansio | one Math Ch | annels St | Status Variables Darameters Shif | Lights and Alarms Trigger | Commands Ico | ns Manager Display SmartyCam Stream | CAN Outou | | | | |
| | | E F00 CAN | N (vor 03 00 05) 1 Mbit/see | Lights and Alarms Ingger | Change ECU | | OAN Outpu | | | | |
| | LOO. LIP | L-FOO_CAN | N (Ver. 02.00.03) T Miblusec | . 💻 U tabien 1919 | Change 200 | • | | | | | |
| | | | | Enable the CAN | Bus 120 Ohm Resis | tor | | | | | |
| | Enabled Cha | nnels (Max | ax. 120) 52 / 52 | Silent on CAN Bu | IS | | | | | | |
| | ID | 🖌 Nam | me | Function | Unit | Freq | | | | | |
| | CC01 | ✓ F88 | 8 RPM | Engine RPM | rpm | 10 Hz | | | | | |
| | CC40 | ✓ F88 | B GEAR | Gear | gear | 10 Hz | | | | | |
| | CC47 | ✓ F88 | B D SPEED | Vehicle Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC48 | ✓ F88 | 8 V SPEED | Vehicle Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC43 | ✓ F88 | 8 SPEED RL | Wheel Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC44 | ✓ F88 | 8 SPEED FR | Wheel Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC45 | ✓ F88 | 8 SPEED FL | Wheel Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC46 | ✓ F88 | 8 SPEED RR | Wheel Spd | km/h 0.1 | 10 Hz | | | | | |
| | CC02 | ✓ F88 | B LONG ACC | Inline Accel | g 0.01 | 10 Hz | | | | | |
| | CC49 | ✓ F88 | B LAT ACC | Lateral Accel | g 0.01 | 10 Hz | | | | | |
| | CC05 | ✓ F88 | 8 TRBO SPD1 | Ang Velocity | deg/s 0.1 | 10 Hz | | | | | |
| | CC09 | ✓ F88 | 8 TRBO SPD2 | Ang Velocity | deg/s 0.1 | 10 Hz | | | | | |
| | CC16 | ✓ F88 | B ECT1 | Water Temp | C 0.1 | 10 Hz | | | | | |
| | CC20 | ✓ F88 | B ECT2 | Water Temp | C 0.1 | 10 Hz | | | | | |
| | CC17 | ✓ F88 | B EGT1 | Exhaust Temp | C 0.1 | 10 Hz | | | | | |
| | CC21 | ✓ F88 | B EGT2 | Exhaust Temp | C 0.1 | 10 Hz | | | | | |
| | CC18 | ✓ F88 | B ACT1 | Air Temp | C 0.1 | 10 Hz | | | | | |
| | CC22 | ✓ F88 | B ACT2 | Air Temp | C 0.1 | 10 Hz | | | | | |
| | CC28 | ✓ F88 | B EOT | Oil Temp | C 0.1 | 10 Hz | | | | | |
| | CC29 | ✓ F88 | B FUEL T | Temperature | C 0.1 | 10 Hz | | | | | |
| | CC19 | ✓ F88 | BTMAX | Temperature | C 0.1 | 10 Hz | | | | | |
| | CC24 | ✓ F88 | B OIL P1 | Oil Pressure | bar 0.01 | 10 Hz | | | | | |
| | CC25 | ✓ F88 | B OIL P2 | Oil Pressure | bar 0.01 | 10 Hz | | | | | |
| | CC26 | ✓ F88 | BOIL P3 | Oil Pressure | bar 0.01 | 10 Hz 🗸 | | | | | |



5.3 – CAN2 Stream configuration

This page works exactly like ECU Stream one. Here you can find additional CAN modules. To load them on SW4 configuration:

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

| 😰 RaceStudio | 3 (64 b | oit) 3.50.77 · | build m | ercoled | ii 21 lug | glio 2021 | 19:32 | | | | | | | | | | | | | | | - | C | X |
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| * 0 | 72 | 3 | 13 | æ | <u>_</u> | * ô | 合 | | | | | | | | | | | | | 2 | <u> </u> | • | 2 | am |
| AIL SWA 20 | | | | | | | -v | | | | | | | | | | | | | ÷ | • | | | |
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| Channels | Bullo | ns ECU | Stream | | 142 31 | ream | CANE | xpansions | Math Channe | s Status vari | ables | arameters | Shint Lights and Alarms | ringger Commands | icons mana | ger Dis | spiay | SmartyCam Stream | CANC | utput | | | | |
| | | | | | | | | C | AN2 Protocol: 0 | lick button to sele | ect a CAN2 | protocol 1 Mb | it/sec | Change | Protocol 🗢 | | | | | | | | | |
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| | | | | | | | | 📴 Choose | CAN2 Protocol | | | | | | | | × | | | | | | | |
| | | | | | | | | Manufactu | irer | | | Model | | | | | | | | | | | | |
| | | | | | | | | None | | | | TPMS | CONTROL_UNIT | (v. 02.00.01 |) | (C/ | AN) | | | | | | | |
| | | | | | | | | AIM | | | | _ | | | | | | | | | | | | |
| | | | | | | | | BOSCH | | | | | | | | | | | | | | | | |
| | | | | | | | | BRIGHTW | ATER | | | | | | | | | | | | | | | |
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| | | | | | | | | IZZE RACI | NG | | | | | | | | | | | | | | | |
| | | | | | | | | KMP | | | | | | | | | | | | | | | | |
| | | | | | | | | MEGALINE | | | | | | | | | | | | | | | | |
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5.4 - AiM CAN Expansions

SW4 can be connected to various AiM CAN expansions:

- LCU-One CAN
- Channel Expansion
- TC Hub
- RIO_02A

At the very first SW4 configuration this panel is prompted:





5.5 – Math Channels

Race Studio 3 software supplies nine different types of math channels. At very first configuration this window is prompted. To set each available math channel click on it and the related setting panel is prompted.

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|---|-----------------------------------|---|--|----------------------|------------------------|--------|--------|---|-------|
| * 🧐 🕫 🖻 😘 🗳 📥 🖘 🕀 | | | | | | 7 | (î• | * | an |
| All SW4 »« | | | | | | | | | |
| Save Save As Close Transmit | | | | | | | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions | Math Channels Status Variables Pa | arameters Shift Lights and Alarms | Trigger Commands Icon | ns Manager Di | splay 🛕 SmartyCam Stre | am CAN | Dutput | | |
| | Add Channel | still available math ch | annels: 37 | | | | | | |
| | Select a Mathematical Channel | | | × | | | | | |
| | Channel | Description | | | | | | | |
| | Bias | To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2) | | | | | | | |
| | Bias with Thresholds | To calculate the bias of two channels of VALUE = CH1 / (CH1 + CH2) [if both the | only if they are greater than spe resholds are exceeded, else 0 | ecified values)] | | | | | |
| | Calculated Gear | To calculate the gear position from eng | gine rpm and vehicle speed | | | | | | |
| | Precalculated Gear | To calculate the gear position from eng gear ratio for each gear and the axle ra | gine rpm and vehicle speed, sp tio | pecifying the | | | | | |
| | Linear Corrector | To multiply a measure by a factor then VALUE = (a * CH) + b | add an offset value | | | | | | |
| | Simple Operation | To add to or subtract from a channel va e.g. VALUE = (CH1 + CH2) | alue a constant value or anothe | er channel value | | | | | |
| | Division Integer | To get the integer part of the division VALUE = integer(CH / a) | | | | | | | |
| | Division Modulo | To get the remainder part of the division VALUE = CH % a | n | | | | | | |
| | Bit Composed | To Compose 8 flags in a bit-field meas VALUE = f1 + f2*2 + f3*4 + f4*8 + f5*16 | sure + f6*32 + f7*64 + f8*128 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | ок | Cancel | | | | | |
| | L | | | | a | | | | |



5.6 – 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.. Entering the related layer for the very first configuration the panel red squared below is prompted and can be recalled pressing "Add status variable" button. Each status variable can also be set as to generate a square wave like if linked to widescreen wipers for example.

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| All SW4 - Sample ³⁴ | |
| Save Save As Close Transmit | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms | Trigger Commands Icons Manager Display 🛦 SmartyCam Stream CAN Output |
| Add Status Variable still available van | ables: 37 |
| | 🛐 Status Variable Settings – 🗆 X |
| | Name |
| | Record values Sampling Frequency 10 Hz |
| | |
| Same condition for activation and deactivation | - Same condition for activation and deactivation 🗢 Generate Square Wave 🖌 Duration of status On (1) (sec) 0.5 |
| Distinct conditions for activation and deactivation | Duration of status Off (0) (sec) 0.5 |
| Multiple output values each with its own condition | Work As (Momentary Toggle Multiposition |
| | Use timing Time threshold between short and long status sec 0.5 |
| | Rest Status Long Status |
| | Label Value Label Value |
| | OFF 0 ILONG 2 |
| | |
| | Activated when following condition is verified for at least 0 sec |
| | Deactivated when following condition is not verified for at least 0 sec |
| | Always FALSE Add |
| Condition X | |
| Always TRUE Always FALSE | |
| O F88 RPM | |
| TRUE after a time of 0 sec in which it is verified FALSE after a time of 0 sec in which it is no longer verified | |
| UK Cased | |
| | |
| | Save Cancel |
| | |



Let us explain with an example: we would like to turn a LED and an Icon ON when Water temperature reaches 100°C and 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
 - RPM is greater than 2000.

And use Water Temp Alarm for managing Icon and LEDs.

Here below the conditions of the example above are set.

| 📓 Status Variable Settings - 🗆 🗙 | |
|--|--|
| Name Water Temp | |
| Record values Sampling Frequency 10 Hz. | Condition × |
| Same condition for advation and deadtvation Generate Square Wave Duration of status On (1) (sec) Duration of status Of (0) (sec) Duration of status Of (0) (sec) | Aways TRUE Aways FALSE F88 RPH Constant V rpm 2000 |
| Work As Momentary Toggle Multiposition | TRUE after a time of 1 sec in which it is verified FALSE after a time of 5 sec in which it is no longer verified |
| Use timing Time threshold between short and long status sec 0.5 | OK Cancel |
| Rest Status Adlve Status Long Status | |
| Label Value Label Value Label Value [OFF 0 0 1 Label Value Label Value | |
| Activated when following condition is verified for at least 0 sec | |
| Deadivated when following condition is not verified for at least 0 sec | |
| Always FALSE Add | |
| | |
| | Condition X |
| | Always TRUE Always FALSE |
| | ● F88 ECT1 |
| Save Cancel | TRUE after a time of 2 sec in which it is verified FALSE after a time of 5 sec in which it is no longer verified |
| • • • • • • • • • • • • • • • • • • • | OK Cancel |



Once all conditions set press "Save" and the status variable is set.

| Status Variable Settings | | | \times |
|---|-----------------|--------|----------|
| Name Water Temp | | | |
| Record values Sampling Frequency 10 Hz | | | |
| Same condition for activation and deactivation Generate Square Wave Duration of status On (1) (sec) 0.5 WorkAs Momentary Toggle Multiposition Use timing Time threshold between short and long status sec 0.5 Rest Status Label Value OFF 0 1 | | | |
| Activated when following condition is verified for at least 0 sec | | | |
| Deactivated when following condition is not verified for at least 0 sec | | | |
| AND OR F88 RPM greater than 2000 rpm (TRUE after 1 sec; FALSE after 2 sec) AND = F88 ECT1 greater than 100 C (TRUE after 2 sec; FALSE after 5 sec) Add Add Click to delete this condition Click to a | dd another cone | dition | |
| | Save | Cano | el |



Once the status variable set you come back to "Status Variable" layer all set status variables are listed in the page and enabled. Mousing over any of them the related description panel is prompted right of the page and you can edit, delete and log it. To log it enable the related checkbox.

| 🔛 RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | - 🗆 X |
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| All SW4 - Sample [™] | | |
| Save Save As Close Transmit | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels | Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display 🛕 SmartyCam Stream C | CAN Output |
| | Add Status Variable still available variables: 36 | |
| Status Variable Freq Mem | | |
| V Water Temp 🚳 🗙 10 Hz | Name Water Temp | |
| | Record values Sampling Frequency 10 Hz | |
| Edit Selected Status Variable | | |
| | Same condition for activation and deactivation Generate Square Wave Duration of status Of(0) (sec) 0.5 | |
| Check to enable storage of values of this status variable | WorkAs Momentary Togale Multiposition | |
| | | |
| | Use timing Time threshold between short and long status sec 0.5 | |
| | Rest Status Active Status Long Status | |
| | Label Value Label Value Label Value | |
| | | |
| | | |
| It is activated (10) where: | | |
| | AND (F88 ECT1 greater than 100 C (TRUE after 2 sec; FALSE after 5 sec)) | |
| | is verified | |
| | It is deactivated (OFF) when: it is notverified | |
| | | |
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5.8 – Parameters

To set the optional GPS for lap detection as well as decide Sw4 start recording condition (Start Data Recording).

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Lap Detection: you may set two parameters, necessary for better managing the GPS Beacon

- hold lap time for: the time period for which lap time is shown on SW4 display
- the track width: width that will be considered for any set GPS point

Reference speed: allows to select the channel to use as reference speed among these available

Start Data Recording

- Standard conditions: the logger starts recording with RPM value greater than 850 or speed is higher than 10 km/h
- Custom conditions: to set one or more custom condition(s) to make the logger start recording. Setting more conditions, it is possible to decide whether only one of them or all need to be satisfied.



5.9 - Shift Lights and alarms

To set shift lights (top) and Alarm (bottom) of SW4.



SW4 shift lights can be set as shift lights (default) and as predictive time.

- Use as gear Shift Lights To use the led bar as shift lights click the setting icon highlighted below ad set:
- RPM value that turns the single LED on
- the sequence mode of the LEDs enabling the desired option:
 - o a LED stays on if its threshold is exceeded
 - o 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.

Shift Lights can also be imported/exported through the dedicated buttons.





Use for predictive time. Click the setting icon highlighted in red below. In this case the LEDs colour are fixed in:

- Green if the lap time is improving in relation to the reference lap
- Red if the lap time is worse

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, SW4 will switch on 3 LEDs green; if, on the contrary, the lap time is worsening the LEDs will switch on red. The LEDs colour follows the racer performance so if the lap time starts worse and afterword it improves the LEDs starts red and continues switching on red while the lap is worse. When the lap improves the LEDs comes progressively back to the first one and re-starts green.

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| All SW4 - Sample 30 | | | |
| Save Save As Close Transmit | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math C | channels Status Variables Parameters Shift Lights and | Alarms Trigger Commands Icons Manager Display 🛕 SmartyCa | am Stream CAN Output |
| Use for predictive time | O Use as gear shift lights | | |
| Channel for LED-bars | Incremental Time per LED | | |
| +- Best Time | 0.10 sec | Predictive Time Bar Options | × |
| Activate Simulation | | Choose a sequence mode of shift lights Import St | ettings Export Settings |
| EXT Left button 1 LED1 LED2 | LED3 LED4 EXT Right but ton 1 6 | ALED stays on if it's threshold is exceeded | |
| 2 Left button 2 | Right but ton 2 | C ALED stays on until another LED with higher threshold is turned on | |
| Left paddlashift | Bickt paddlephit | | |
| / 9099- 5 | BODD | Predictive Time Increment per LED 0.1 (sec) | |
| 3 Left button 3 | Right but ton 3 8 | | |
| 4 Left button 4 | Right but ton 4 (2) | | |
| S Left button 5 | Right but ton 5 10 | | |
| Left clut ch | Right clutch | | |
| 1 RotaryLeft | RotaryRight 1 | | OK Cancel |
| F 1 | | | |
| L+ Add New Alarm sti | ili available alarms: 37 | | |
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Create and set SW4 alarms

To create a new alarm press "Add New Alarm" and the related panel is prompted.

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|--|---|
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| All SW4 - Sample 📧 | |
| Save Save As Close Transmit | Alarm Settings – D X |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters S | Name |
| Use for predictive time Use as gear shift lights | Record values Sampling Frequency 10 Hz |
| Channel for LED-bars Incremental Time per LED | |
| +- Best Time 0.10 sec 🗳 | Same condition for activation and deactivation |
| Activate Simulation | Set status to ON when following condition is verified for at least 0 sec |
| EXT Left button 1 LED1 LED2 LED3 LED4 EXT Right but ton 1 | Set status to OFF when following condition is not verified for at least 0 sec |
| 2 Left button 2 Right button 2 2 | Aluens Ed. PE |
| Left paddleshift Right paddleshift | Aug |
| Left button 3 5 0000 Right button 3 | |
| 4 Left hutton 4 | |
| | |
| Right button 5 10 | |
| | |
| KotalyLert KotalyKight | when active execute the following action(s) |
| F+ Add New Alarm still available alarms: 36 | Alarm actions in SW4 |
| | Message 🛟 Insert message text |
| | |
| | |
| | |
| | |
| | |
| | Untit: |
| | Save Cancel |
| | |



Alarm setting panel allows you to add an action to the same alarm through the bottom part of the panel highlighted below.

| 🔄 Alarm Settings | | | × |
|---|------|------|-----|
| Name | | | |
| Record values Sampling Frequency 10 Hz | | | |
| - Same condition for activation and deactivation | | | |
| Set status to ON when following condition is verified for at least 0 sec | | | |
| Set status to OFF when following condition is not verified for at least 0 sec | | | |
| Always FALSE | Add | | |
| when active execute the following action(s) | | | |
| Alarm actions in SW4 | | | |
| Message 🗘 Insert message text | | | [+ |
| Until: Condition no longer met | | 1 | |
| | Save | Cano | cel |


To set the new alarm:

- Name the Alarm filling in the related box top of "Alarm Settings" dialog window and decide if log it or not and at which frequency
- Select the condition for activation/deactivation
- To fix the condition that activates the alarm click it and, as shown here below, a "Condition" dialog window is prompted; in the example we have decided to use the status variable to activate an alarm
- Select the action to execute filling in the bottom part of the dialog window





When all conditions are fixed press "Save" and the Alarm is added to "Shift Lights and Alarm" layer. Through the setting icon right of the alarm row you can edit and delete the Alarm.

| 📓 RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | - 🗆 X |
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| * 🐲 🕫 🕼 🍰 📥 🄝 🖨 | 🐬 🤶 🏀 🐠 |
| All SW4 - Sample ³⁶ | |
| Save Save As Close Transmit | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights a | nd Alarms Trigger Commands Icons Manager Display 🛕 SmartyCam Stream CAN Output |
| Use for predictive time Use as gear shift lights | |
| Channel for LED-bars Incremental Time per LED | |
| +- Best Time 0.10 sec 🖸 | Alarm Settings — — X |
| | Name Water |
| Activate Simulation | Record values Sampling Frequency 10 Hz |
| EXT Left button 1 LED1 LED2 LED3 LED4 SI3 Right button 1 Right button 2 | Same condition for activation and deactivation |
| Left paddleshift Right paddleshift | Set status to ON when following condition is verified for at least 0 sec |
| 3 Left button 3 119.29 0000. Right button 3 8 | Set status to OFF when following condition is not verified for at least 0 sec |
| 3 Left button 4 Right button 4 3 | |
| Left button 5 Right but ton 5 | Water Temp equal to ON Add |
| Left clutch Right clutch | |
| 1 RotaryLeft RotaryRight 13 | |
| | when active execute the following action(s) |
| F+ Add New Alarm still available alarms: 35 | Alarm actions in SW4 |
| Event Alarm | LED 1 Continuously Continuously Red C |
| | |
| | Until: Condition no longer met |
| | Save Cancel |
| Edit Select | ed Alarm |
| | Alarm |
| | |
| | |
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5.10 – Trigger Commands

A trigger command make SW4 executing a specific action. To set a trigger command enter "Trigger Commands" layer and press "Add new command" button. The corresponding dialog window is prompted.

| | | - | u . |
|--|----------|---|-----|
| 米 🔯 恒 回 段 凾 圭 🍕 🚽 | <u> </u> | | am |
| All SW4 - Sample Sc | | | |
| Save As Close Transmit | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display 🛦 SmartyCam Stream CAN Out | out | | |
| + Add New Command still available alarms: 35 | | | |
| | | | |
| | | | |
| | | | |
| Tigger Command Settings - 🗌 X | | | |
| Name | | | |
| | | | |
| Action to execute in swy Next Display Page | | | |
| | | | |
| when following condition is verified for at least 0 sec | | | |
| | | | |
| Aways FALSE Add | | | |
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Silve Cancel | | | |
| | | | |



The window offers different trigger commands option that can be executed when one or more condition(s) is/are verified. Let's imagine you want your SW4 goes in data recall mode at the end of the race. First of all you decide the **Action** to execute in SW4, to say: "Display Button Command -> Simulates "MEM" Button"

| Trigger Command Settings | | | | | _ | | × |
|--|----------------------|-------------|------------------------------|------|--------------------|-----|-----|
| | Name | Data Recall | | | | | |
| | | | | | | | |
| Action to execute in SW4 | Display Next Page | | | | | | ÷ |
| | Display Page Com | imand F | | Disp | olay Next Page | | |
| | Display Button C | ommand 🕨 | Simulates 'MENU / <<' Button | Disp | olay Previous Page | | |
| | Reset Alarms Com | imand 🗸 | Simulates '>>' Button | Goto | Page Number | | |
| | | | Simulates "VIEW" Button | | | | |
| Reset all alarms | | | | | | | |
| Reset alarms whose end condition is "the | device is turned off | | Simulates MEM / OK Button | | | | |
| | | | | | | | |
| Reset alarms whose end condition is 'a b | utton is pushed' | | | | | | |
| Reset alarms whose end condition is 'dat | a is downloaded" | | | | | | |
| | | | | | | | |
| when following condition is verified for a | t least 0 | sec | | | | | |
| Always FALSE | | | | Add | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | Save | Can | cel |





Once fixed the action to perform you need to decide the condition that make this action being performed. In this case you want data recall mode to be activated when Speed is lower than 50 km/h and RPM value is lower than 800 for 5 seconds. To set them:

- Press any of the button in condition panel ("Always FALSE" or "Add" in the image below)
- Select the channel to set as condition "GPS -> GPS Speed" and press OK
- Select "Less than" and fill in the GPS speed value (50kmh in the example)
- Fill in the time period for "TRUE" and "FALSE" ("5" seconds in the example)
- Press OK and the first condition is set.

| | | 📴 Trigger Command Settings - 🗆 🗆 |
|------------------|-----------------|---|
| | | Name |
| | | |
| | | Action to execute in SW4 Simulates 'MEM / OK' Button |
| | | |
| | | when following condition is verified for at least 0 sec |
| | | Always FALSE Add |
| Select Channel | | x |
| Source | Channel | Condition X |
| ECU | GPS Speed | Always TRUE Always FALSE |
| CAN 2 | Altitude | ● Left Clutch |
| Lap Channels | Latitude | |
| GPS | Longitude | ROE alter a line of 5 sec. In which it is verned PALSE alter a line of 5 sec. In which it is no longer verned |
| A/D Channels | Sats Number | OK Cancel |
| Buttons | GPS PosAccuracy | |
| Odometer | GPS SpdAccuracy | |
| internal | | |
| Channel Exp. | | |
| RIO 02a Exp. | | , √ greater than |
| C-HUB Exp. | | to less than |
| LCU-One CAN Exp. | | 🚺 between values |
| Alarms | | •== equal to |
| Status Variables | | ●≠− different from |
| | OK Cance | |
| | | Save Cancel |



Press "Add" button to set the second condition

- Select channel "ECU -> F88 RPM"
- Select less than 800 RPM
- Set a 5 seconds time period
- Press "OK"
- Decide if all the conditions are to be verified ("AND" as in the example) or if any of them is enough ("ANY")
- Press Save

| Trigger Command Settings | | | | | | × |
|--|---------------------|-----------------------------|-------|------|-----|-----|
| | Name | Data Recall | | | | |
| | | | | | | |
| Action to execute in SW4 | Simulates 'MEM / (| DK' Button | | | | \$ |
| | | | | | | |
| | | | | | | |
| when following condition is verified for a | at least 0 | sec | | | | |
| GPS Speed less than | 50 km/h (TRUE afte | r 5 sec; FALSE after 5 sec) | X Add | | | |
| AND 🗢 | | | | | | |
| F88 RPM less than 800 | 0 rpm (TRUE after : | 5 sec; FALSE after 5 sec) | 🗙 Add | | | |
| Add | | | | | | |
| Add | | | | | | |
| | | | | | | |
| | | | | Save | Can | cel |

Once all conditions fixed the Trigger command is shown with its name in the layer as shown below.

Mousing over any trigger command various tooltips are prompted while using the setting icon far right of the row you can edit to modify or delete the command. Setting more trigger commands the arrow far left of the row allows you to move them up and down changing their priority.

| 😨 RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | - 🗆 × |
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| All SW4 - Sample 🖂 | | |
| Save SaveAs Close Transmit | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands kons Manager Display 🛦 SmartyCam Stream | CAN Output | |
| + Add New Command still available alarms: 34 | | |
| Event Alarm | | |
| Drag an event upward to set a higher priority 🔽 Data Recall Simulates 14EM / OK: Button 🖣 👷 Edit. Selected Alarm | | |
| Debte Selected Alarm | | |
| Event is enabled Event name: 'Data_Recall' Output signals activated by event Alarm goes off when: condition no longer met | 1 | |
| | | |
| | | |
| | | |

5.11 – Icons Manager

The icons are images that can be shown on SW4 display when a fixed condition is true. At present they are normally placed bottom of it. Entering "Icons Manager" layer for the very first time the dialog window shown below is prompted. Race Studio 3 software provides a set of predefined icons as well as a stock of icons you can colour as you wish. It is also possible to add custom icons.

To configure the first Icon press "Select" button. Afterwards new icons will be set pressing "Add New Icon" button.

| RaceStudio3 (64 bit) 3.50.81 - build veneral 30 luglio 2021 1640 | - 🗆 X |
|---|-----------------------------|
| * 20 12 13 15 14 + 6 2 | 👂 🛜 🌪 🔒 🐠 |
| All SW4 - Sample ³ | • |
| Save Save As Close Transmit | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display A | SmartyCam Stream CAN Output |
| icon names images | |
| | |
| Add New Icon Still available Icons: 34 Preview Area | |
| | |
| | , |
| Manage Icon | |
| Name Ico_1 | |
| Image Channel Conditions | |
| select in Chutch 🗘 🖉 greater than 💠 % 0 🗇 🗇 🔶 | |
| else show; | |
| seed | |
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| Save Cancel | |
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Pressing "Select" or "add new lcon" button the corresponding dialog window is prompted. It is made up of three layers: ٠

- Coloring
- ٠ Predefined where stock icons are shown and you can select your icon and
- ٠ Custom where you can upload custom icons





By default it shows "Coloring" layer where all icons are white and you can set its colour. Once the icon selected press "OK" bottom right of the icons selection dialog window.



Available colours are shown in a panel and a dialog window is prompted to decide the colour. You can use a standard colour or a custom one as shown here below on the right. Once the colour selected press OK on the icon panel.

| | Standard Custom |
|-----------|--|
| | -÷- ⊲ |
| | Hue: 92 • Red: 19 • Saturation: 217 • Green: 235 • |
| OK Cancel | Luminence: 128 + Blue: 55 + Current |



When the icon is set you need to configure its working mode. In the example we have decided to show an icon when traction control is "OFF". To do so:

- Press "Channel box" and "Select Channel panel is prompted
- Select the right channel ("ECU -> F88 TC SWITCH" in the example and press "OK")
- Set its working condition ("Equal to 0" in the example)
- Press "Save"

| Image: Save As Close Transmit Channels Buttons CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Cons Manager Display Smart/Cam Stream CAN Output |
|--|
| All SW4 - Sample Save As Close Transmit Channels Buttons ECU Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Cons Manager Display A SmartyCam Stream CAN Output Icon names Images Add New Icon still available icons: 34 |
| Save Save As Close Transmit Channels Buttons ECU Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display SmartyCam Stream CAN Output Images Images Images Preview Area Preview Area Images |
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| else show of greater that AD Channels F88 FUEL CONS |
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| A Hysteresis Down to Up Save Cancel TC-HUB Exp. F88 TC SWITCH |
| LCU-One CAN Exp. F88 PIT SWITCH |
| Alarms F88 DBW STATUS |
| Trigger Commands F88 KNK STATUS |
| Status Variables v |
| OK Cancel |
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When the icons are set an icon summary is shown in the dedicated layer. All icons can be edited to be modified or deleted.

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | - 🗆 X |
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| Add New Icon | click here to EDIT this icon click here to DELETE this icon still available icons: 34 | Image Show when | |
| | | | |



5.12 – Display

SW4 comes with a default display but it can be changed using Race Studio 3, the software that provides a wide variety of available displays. SW4 supports up to 15 display pages. To set one enter the related layer, select the display you want and press "OK".





Normally RPM and Speed channels are set by default as:

- RPM from ECU and
- GPS Speed from GPS; pressing the channel you can select the speed to use





Mousing over the display the software highlights in red the selected box and in light blue the corresponding channel in the table under the display. To set any field click the box and select channel in channel groups as shown here below. You can also drag and drop a channel in the table on the left of the window.

| 🔛 RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | | | - | □ × |
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| INFO LINE | | AN 2 | F88 CEAR | Position | center | |
| | | an Channels | F88 D SPEED | Naghrien | ounter + | |
| F88 RPM F88 RPM 🗘 rpm | 18000 \$ | PS | F88 V SPEED | backgr unset | outline unset | |
| GPS Speed GPS Speed 🗘 km/h | 240 \$ | D Channels | F88 SPEED RL | anning, 111 | | |
| >> channel not set << | BI | uttons | F88 SPEED FR | preview | reset | 1 |
| >> channel not set << | 0 | dometer | F88 SPEED FL | | | |
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| >> channel not set << | T | C-HUB Exp | F88 TRBO SPD1 | | | |
| >> channel not set << | | CU-One CAN Exp. | F88 TRBO SPD2 | | | |
| | L. | ath Channels | F88 ECT1 | | | |
| | 41 | larms Y | E88 ECT2 | ~ | | |

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Once selected the channel, according to the field you are setting you can configure dimension and colour of all fonts, position of the text, background colour and outline dimensions as shown here below.

| DINOT-Bold | Digit Font |
|---|------------------------------|
| DINOT-Black | MicrogrammaDBolExt |
| DINOT-Medium | |
| MicrogrammaDBolExt | Label Font |
| Basic Sans SF | MicrogrammaDBolExt |
| Basic Sans Heavy SF | Unit Font |
| AgencyFB Bold Wide | MicrogrammaDBolEvt 22 |
| Eurostilish | |
| HandelGothic | Position |
| Soviet Program | Alignment right 🗢 |
| Raavi | 1.6 |
| Zekton Free | len |
| Prisoner SF | center |
| DejaVuSans BoldOblique | |
| MgOpen Modata BoldOblique | right |
| Impact | |
| Trebuchet MS | Mask Position (pixel values) |
| Arial Bold | backgi unset outline unset 0 |
| Bahnschrift SemiBold | |
| Arial | preview reset |
| Arial Narrow | |
| Steiner | |
| Evogria | Colors X |
| EuropeExt | |
| EuropeExt Bold | Standard Custom |
| Expansiva | Colors: OK |
| Expansiva Bold | Gaard |
| | Callee |
| Michroma | |
| Michroma Overpass | |
| Michroma Overpass EurostileExtended | Select |
| Michroma Overpass EurostileExtended EurostileExtendedBlack | New |
| Michroma Overpass EurostileExtended EurostileExtendedBlack | New Current |

Repeat the same operation for all the fields and the display preview will show you the layout of your SW4.





The image here below shows a display page configured. Clicking on the setting icon you can name, modify or delete it.



5.13 – SmartyCam Stream

SW4 can be connected to AiM SmartyCam to show the desired data on SmartyCam video. To set each channel:

- click on it and a setting panel shows up
- it shows all channels and/or sensors that fits the selected function
- in case the desired channel or sensor is not in the list enable "Enable all channels for functions" checkbox and all channels/sensors will be shown

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| All Sw4 - Sample - | | | | | | | |
| Save Save As Close Transmit | | | | - | | | |
| Channels Buttons ECU Stream CAN2 Stream CAN Expansions Math Channels | Status Variables Parameters | Shift Lights and Alarms Trigger Commands | Icons Manager Display SmartyCa | am Stream CAN Out | put | | |
| | Enable all channels for functions | 3 | | | | | |
| | SmartyCam Function | Channel | | | | | |
| | Engine RPM | F88 RPM \$ | | | | ~ | |
| | Speed | GPS Speed | Select Channel | | - L | ~ | |
| | Gear | F88 GEAR 🗘 | Source | Channel | | | |
| | Water Temp | F88 ECT1 \$ | ECU | A F88 FUEL CONS | | ^ | |
| | Head Temp | TCHUB HEAD TEMP | CAN 2 | F88 AFR 1 | | | |
| | Exhaust Temp | F88 EGT1 \$ | Lap Channels | F88 AFR 2 | | | |
| | Oil Temp | F88 EOT \$ | GPS | F88 ALS STATE | | | |
| | Oil Press | F88 OIL P1 | A/D Channels | F88 ENG ENABLE | | | |
| | Brake Press | Not Set 🗘 | Buttons | F88 CAL SWITCH | | | |
| | Throttle Pos | F88 TPS1 | Odometer | F88 TC SWITCH | | | |
| | Brake Pos | Not set 🗘 | Internal | F88 PIT SWITCH | | | |
| | Clutch Pos | Not Set 🗘 | Channel Exp. | F88 DBW STATUS | | | |
| | Steering Pos | F88 STEER ANGLE | RIO 02a Exp. | F88 KNK STATUS | | | |
| | Lambda | LCU-On Lambda 🗘 | TC-HUB Exp. | ~ | | ~ | |
| | Fuel Level | Not Set 🗘 | | OK | C | ancel | |
| | Battery Voltage | Battery 🗘 | | | | | |
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5.14 – CAN Output

Please note: this function is for expert users only. The logger can transmit a CAN data stream containing the channels required both on CAN1 and CAN2. Pressing "Add New Payload" this warning panel is prompted. Press "Yes" according to you operative system language (SI in the example below). You find an example of this function in paragraph 4.1.7.

| AiM-Rac | e Studio 3 | \times^{1} | | | | | |
|--|--|--------------|--|--|--|--|--|
| | Using custom CAN Output protocol is an advanced feature for expert users. Mistakes can lead to dangerous effects. | | | | | | |
| AiM Tech srl will not be held responsible for any consequences that may result using custom CAN Output. | | | | | | | |
| | I acknowledge I have read and agree to these conditions. | | | | | | |
| | I accept. | | | | | | |
| | | 1 | | | | | |
| | SI NO | | | | | | |





To add a payload:

•

- press "+Add new Payload" and "Set CAN Header details" dialog window is prompted;
 - 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:
 - o Little endian for Intel processor
 - Big Endian for Motorola processor
- set the sampling frequency among: 1,2, 5, 10 or 20 Hz

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| Save Save As Close Transmit | |
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| Bit Rate Protocol (bit/s) 1 M bit/s With the selected ECU protocol freq | uency must be set to 1 M bits and cannot be changed Name |
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| ✓ LH [●] | - NO OUTPUT - |
| + Add New Payload | 1 byte Export Import |
| | 2 bytes |
| | 3 bytes |
| | 4 bytes |
| Set CAN Header Details | 5 bytes |
| | 6 bytes |
| ID CAN (bex) | 7 bytes |
| 11 bits 29 bits | 8 bytes |
| DLC B https | |
| Byte Order | Big Endian |
| Energiancy Alla | Little Endian |
| | |
| | 1 Hz |
| OK Cancel | 2 Hz |
| | 5 Hz |
| | 10 Hz |
| | 20 Hz |
| | 50 Hz |
| | 100 Hz. |
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| Buttoms ECU Stream CAN2 Output 1 1 0 1 Motions File Add New Payload Name Mame Can2 1 1 1 Motions Byte 3 Byte 4 Byte 3 Byte 4 Byte 5 Byte 7 Byte 7 No OUTPUT File Add New Payload Export Export <th>ECU Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display Smart/Cam Stream CAN Output Bit Rate Protocol (bit(s) 1M bit(s) With the seleded ECU protocol frequency must be set to 1M bits and cannot be changed Name Image: CAN Output I</th> | ECU Stream CAN Expansions Math Channels Status Variables Parameters Shift Lights and Alarms Trigger Commands Icons Manager Display Smart/Cam Stream CAN Output Bit Rate Protocol (bit(s) 1M bit(s) With the seleded ECU protocol frequency must be set to 1M bits and cannot be changed Name Image: CAN Output I |
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| Use counter step 0 end 0 Channel Exp. F88 LONG ACC RIO 028 Exp. F88 LONG ACC F88 LAT ACC F88 LAT ACC F88 LAT ACC F88 LAT ACC | Use counter step 0 end 0 Field Exp. F88 LONG ACC RIO 028 Exp. F88 LONG ACC RIO 028 Exp. F88 LATACC |
| RIO 022 Exp. F88 LAT ACC OK Cancel TC-HUB Exp. F88 TRB0 SPD1 ✓ | RIO 028 Exp. F88 LATACC |
| OK Cancel TC-HUB Exp. V F88 TRBO SPD1 V | TO HIR Eve |
| OK Cancer | OFFICE DESCRIPTION OF THE OFFICE OFFI |
| OK Cancel | OK Cancel |
| | |

- When all channels set the configuration is finished:
- press "Save" on the page top keyboard
- press "Transmit" to transmit the configuration to SW4

| Save | Save As | Close | Transmit |
|------|---------|-------|----------|
| | | | |



6 – Display Menu

When the button to enter SW4 display MENU have been configured you can access the display navigation menu and this page is prompted.



The icons stays for:



Date and time setting



Ver. 00

SW4 tracks and GPS management

Backligh

Backlight: setting



Lap Time Setup (with optional AiM GPS Module connected only)



Data Recall

System information



SW4 counters management



6.1 – Setting date and time



Here you can:

- set time format: 12H or 24h; press "CHANGE" to switch among the options and "NEXT" to scroll to Date format
- set date format: MM/DD/YY or DD/MM/YY or YY/MM/DD; press "CHANGE" to switch among the options
- "GPS Date Time Sync" default setting is "Enabled" (left image below); this means that date and time can come from the optional GPS Module if connected. If no GPS Module is connected or if you prefer to set It manually press "CHANGE" to disable the synchronization
- press "NEXT" so start setting time (right image below)

| | Date Time | | | | D | ate Time | | C |
|------------------|-----------------------------|-------------------|------------|---------------|-----------------------------|----------|-------------------|-------|
| P R E V | Time Format: Date Format | 24H DD/MM/YYYY | HANGE | P R E V | Time Format: Date Format | | 24H DD/MM/YYYY | HANGE |
| | | | | | | | Disabled | |
| NEXT | 13:07 | 30/07/2020 | E X I T | NEXT | Hour | 13:15 | | EXIT |





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SW4 enters in manual date/time mode. With reference to the images below:

- press "NEXT" to start setting time -> hour becomes selected (13 in red) -> press "SELECT" and hour becomes editable (13 on red background) -> Use "DEC" and "INC" to set hour ->
- press "DESEL" and "INC" button switches to "NEXT": press it to switch to minute option: press "SELECT and set minute
- press "DESEL" and then "NEXT" and you come back to "Hour"; press "CHANGE" and "Hour" switches to "Date": press "NEXT"
- set day, month and year as for time setting and press "EXIT"; you come back to "Time Format": press "EXIT" to save and quit

| PRUV | Time Format: Date Format | Date Time | 24H DD/MM/YYYY | PREV | Da Time Format: Date Format | ate Time | 24H DD/MM/YYYY | S E L E C | Date Format: Date Format | ate Time | 24H DD/MM/YYYY | D E S E |
|-----------------|--|--|--|---------|---|-------------------|--|-------------|---|---------------------|---|------------------|
| NEXT | GPS Date Time Sy | ^{/nc:} 13:15 | Disabled | N E X T | GPS Date Time Sync: | 10:15 | Disabled | | GPS Date Time Sync: Hour | <mark>13</mark> :15 | Disabled | EX I |
| | Time Format: Date Format GPS Date Time Sy Hour | Date Time vnc: 13: <mark>15</mark> | 24H E DD/MM/YYYY E Disabled | PREV | Da Time Format: Date Format GPS Date Time Sync: Hour | ate Time 13:16 | 24H DD/MM/YYYY Disabled | SELECT EX I | Di Time Format: Date Format GPS Date Time Sync: Date: | ate Time | 24H DD/MM/YYYY Disabled 31/07/2020 | CHANGE |
| P R E V N E X T | Time Format: Date Format GPS Date Time Sy Date: | Date Time /nc: 31 | 24H B DD/MM/YYYY S Disabled 1/07/2020 | PREV | Da Time Format: Date Format GPS Date Time Sync: Date: | ate Time 31/ | 24H DD/MM/YYYY Disabled 07/2020 | SULLUCT EXT | Di Time Format Date Format GPS Date Time Sync: Date: | ate Time | 24H DD/MMYYYY Disabled 11/07/2020 | SELECT |





6.2 – Setting 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; you can set day and night brightness level as well as the brightness threshold value that switches from day to night mode (left image below)
- MANUAL: you may define the brightness of the display and LEDs choosing among some values: 20%, 40%, 60%, 80%, 100% (right image below).



Press:

- "CHANGE" button to switch from "Auto" to "Manual"
- "NEXT" to scroll the voices
- "CHANGE" button again to select your option
- "EXIT" to save and quit.





6.3 - Lap time setup (GPS09 Module needed)

To get lap times you need the optional GPS09 Module. Once connected you can decide which lap time the system takes as reference to compute predictive lap time. Available options are:

- Best Lap of Test
- Best Lap of Today

Use:

- "CHANGE" button to change the setting
- "EXIT" to save and quit





0:52.00 5.9 Km 1:13.13 2.4 Km

6.4 – Managing SW4 counters

SW4 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.

Each odometer can be activated/deactivated and/or reset. To manage an odometer select it and press "CHANGE". You enter counters management page. Press:

- "CHANGE" button to change the counter status
- "PREV" and "NEXT" button to scroll the options
- "EXIT" button to save and quit



| | | COUNTERS | | | |
|------------------|-------------------|----------|-------|----------------|-----------|
| P R E V | Usr 1: Status: | | 01:15 | 102* Active | C H A N G |
| | Usr 1: | | 01:15 | 102* | E |
| NEXT | | | | | E X I T |

6.5 – Managing GPS & Tracks (GPS09 Module needed)

Pressing the icon above GPS&TRACKS page is prompted: press "ENTER" to enter "Track Management" page. Menu options are:

- Mode: AUTOMATIC (default) or MANUAL
 - Track List Type: Nearest (default: it shows only tracks in a 10 km area), All Tracks or Custom
- The bottom line
 - warns if there are no tracks on the device or nearby
 - shows "Tracks info" if in Automatic Mode (left image below)
 - allows "Track selection" if in Manual mode (right image below)

Use:

.

- "CHANGE" to switch the options
- "PREV"/"NEXT" to scroll the options
- "EXIT" to save and quit

0



When in "MANUAL" mode setting the track list type on "All tracks" you can choose the track to set also if you are not nearby. To do so:

- Scroll the menu up to "Track selection"
- Press "ENTER" (left image below)
- Use "PREV"/"NEXT" buttons to scroll the tracks and "ENTER" to select the desired track. It appears bottom of the page (right image)

In "AUTOMATIC" mode, pressing enter the system shows the tracks it detects in a 10 km distance if available or "NO TRACKS FOUND YET" if there are no tracks in a 10 km area.

| | Track Management | t | |
|------------------|---|----------------------|-----------|
| P R E V | Mode Track List Type Tracks Selection | MANUAL All Tracks | E N T E R |
| NWXT | | | E X - T |





6.6 – System Information



Pressing the icon above "SYSTEM INFORMATION" page is prompted. It shows:

- Logger name (SW4)
- Serial number (7700133)
- Firmware version (02.36.57)
- Boot version (02.24.00)
- Net Info option; pressing "ENTER" "Net Info" page is prompted. It shows all connected devices with the related serial number and firmware version (0926677 and 35.65.00 respectively).

| | System Info | | | | Net Info | | |
|------------------------------------|-------------|----------------------------|---------|-----|----------|---------|----------|
| Logger Serial N.: Fw Version | | SW4 7700133 02.36.57 | ENTER | gps | | 0926677 | 35.65.00 |
| Boot Version Net Info | | 02.24.00 | E X - T | | | | W X - T |





6.7 – Data Recall

Pressing the icon above "Data Recall" page is prompted. It shows:

First is "Today" page. Press "TESTS"

| MA | X RPM 10048 | MAX SPEED 282 | | | | |
|-----|----------------|------------------|-----------|--|--|--|
| Lap | Best Laps | RPM | Km/h | | | |
| 4 | 1:57:56 | 10048 5592 | 280 73 | | | |
| 11 | 1:57:94 | 10100 5450 | 277 70 | | | |
| 8 | 1:58:02 | 10300 5700 | 278 69 | | | |

| TEST SESSIONS | |
|----------------------|---|
| | E |
| 21/08/2021: 3SC Var3 | |
| 21/08/2021: 3SC Var3 | |
| 20/08/2021: 3SC Var3 | |
| 20/08/2021: 3SC Var3 | 2 |
| | ٦ |

| | TC | DAY: 3SC Var3 | | |
|------------------|----------------------------------|----------------------------------|----------------------------------|------------------|
| P R E V | 02.02 PM 17 Laps B 1.57.56 | 12.02 AM 10 Laps B 1.50.46 | 10.43 AM 11 Laps B 1.54.14 | U N T U R |
| NEXT | 09.52 AM 7 Laps B 1.55.56 | 09.02 AM 9 Laps B 1.53.46 | 7.39 AM 10 Laps B 1.55.16 | B A C K |



Second is "Summary" page that shows all the last tests with date and place. Select the day you 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.



7 – Managing a track on SW4 with RACE Studio 3

With Track Manager function of Race Studio 3 tracks can be created, deleted and modified, transmitted and received to/from SW4. 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 top left in the image below).
 - bottom left, the connected devices (in the image, "SW4 ID 7700133")

The column **in the middle** shows:

- on top a fast search bar that allows to select the tracks which satisfy personal research criteria; pressing "?" tooltip explaining research criteria (highlighted in red below) is prompted, to say:
 - long name is the name in bold in each track box
 - o short name is the track name shown on the display of SW4 and is the name shown top right of each track box
 - $\circ \quad \mbox{track city is the name of the city the track is located in }$
 - all the tracks listed in Race Studio 3 database.

The column on the **Right** shows:

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





When SW4 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.

| RaceStudio3 (64 bit) 3.36.14 | | | | | | | | | | | - 0 |) × |
|------------------------------|------|--|----------------------|----------------|-------------|-------|--|------------------------------------|--|-----------|-------------|----------|
| * 🔯 🖻 🔂 🖆 🚣 🕫 🖨 | | | | | | | | | | ê | ECU | am |
| | N | v Import Export | Receive T | ransmit Delete | | | | | Tracks | | | |
| | 0 | earch Box: | | | | Track | Invalid FW | SW4 ID 77 | 00133 | | | |
| Nations | | | | | | Ret | fresh | Delete | Delete All | Save All | Loa | d Saved |
| Smart Collections | | | | | ^ | | | | | | | |
| Manual Collections | | United | d States | | | | 0~~ | | | | | |
| | | | | | | | 197 P | Adams M Riverside | CA. California. United States | | AMP C. | A |
| | | EcoTrack Motor Com | nplex | EcoTrack | | 28 | \gg | 943 m Kart Track Paved | | | | |
| | 2084 | Toa Baja, United States | s aved | | | _ | 1 | Arizona | Motorsports Park East Track | , | MP East A | z |
| | 2004 | | | | | | - 25 | Litchfield | Park, Arizona, United States | | | |
| | | Ponce International S Ponce, United States | Ponce, United States | | | | | 1,79 km | Race Track Paved | | | |
| | 2985 | 902 m Kart Track Paved Puerto Rico International Speedwav - Salinas Sp., Salinas | | | | | RP | Atlanta I | Notorsports Park | | AMP G | A |
| | _ | | | | | 30 | \mathbb{V} | 1,97 km | ille, Georgia, United States Race Track Paved | | | |
| | | Salinas, United States | | | Atlanta Mot | | | Antonio anto Danka Mantina | | | | |
| | 2986 | 420 m Drag Sinp Paver | d | | | | $\langle \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$ | Dawsonv | ille, GA, Georgia, United States | AMP Ka | | IT GA |
| | | Angels Motorsports Park Angels MP AL | | | | 31 | ß | 1,24 km | Kart Track Paved | h | | _ |
| | 2987 | 1/7 mi Oval Dirt | lited States | | | | ୍ୟ | Arizona Motorsports Park Main Trad | | А | MP Main A | z |
| | | | | | - 1 | | (1) | Litchfield | Park, AZ, Arizona, United States | d States | | |
| Connected Devices | | Atmore, Alabama, Unite | ed States | Atmorebrag AL | L | 32 | | 5,52 Mil | Ace mack Paved | | Use | # |
| 🖼 SW4 ID 7700133 | 2988 | 217 m Drag Strip Pave | d | | | | Ga | Atlanta I | Notorsports Park Main | A | MP Main G | A |
| | | Avenger Motor Spee | edway | Avenger AL | | 33 | V | 2,92 km | Race Track Paved | | | |
| | | Greenville, AL, Alabama | a, United States | | | | \sim | Adams | lotorsport Park | | ID Short C | 1 |
| | 2989 | | | | | | $\langle \rangle$ | Riverside | , California, United States | A | ir short c. | |
| | | Bailey's Motor Speedway BaileysMS AL Woodland, Alabama, United States 1/6 mi Oval Dirt | | BaileysMS AL | | 34 | $\overline{}$ | 422 m Ka | art Track Paved | | | |
| | 2990 | | | | | 0 | Arizona | Motorsports Park West Track | А | MP West A | z | |
| | | | Park | BMP Main AL | | 25 | 5 | Litchfield 1.82 km | Park, Arizona, United States Race Track Paved | | | |
| | | Birmingham, Alabama, | United States | UMP Mail AL | | 35 | CI . | (*) This track | is NEWER than what stored on PC | | | |
| Trash | 2991 | 3,72 km Race Track Pa | aved | | L | - | | Atlanta I | Antor Speedway | | AMS C | ÷, |
| | | 0 | | 1 | ¥ | | () | - unarrea I | | | Am3 0 | <u> </u> |

Tracks created by the user are labelled "User" and if the track stored in SW4 is different from the one stored on AiM database this is notified as shown here above.

To upload tracks to SW4 select them in the central column and drag and drop them in the right column:

- a green waiting bar appears bottom left of the window on the connected SW4
- when the operation is finished a confirmation panel will be prompted.

| Connected I | Devices | | | |
|-------------|--------------------------------|-------------|-----------------------|--|
| 💭 SW4 ID | 7700133 | | Cancel | |
| | | | | |
| 💭 SW4 ID | 7700133 | | • | |
| | | | | |
| | AiM-Race Studio 3 | × | | |
| | Track(s) has been successfully | transmitted | | |
| | | ОК | | |



The keyboard above the central column allows to:



- New: create a new track ("Custom"). To create a custom track:
 - o press "New" and fill in the panel that is prompted (you can also fill only the start/finish coordinates) or
 - \circ edit an existing track
 - press "Save"
- Import: import one or more tracks stored in the device or in another external device
- Export: export one or more tracks to a specific PC folder or to another peripheral device
- **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 our website www.aim-sportline.com, documentation area, software section "Track Manager" manual.

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8 – ECU Driver builder

If the vehicle ECU is not included in Race Studio 3 software a specific CAN protocol can be created using CAN Driver builder. **This Race Studio function is for expert users only** as for the panel that is prompted pressing the related button.



It is possible to 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 is prompted
- press "Add Manufacturer" to add a new Manufacturer and "Custom Protocol Manufacturer Manager" panel is prompted
- fill in the Manufacturer name ("Custom" in the example below)
- press "OK"
- to add a new ECU Model for an existing Manufacturer just select the manufacturer and fill in "Edit new model name" box (1).

| 😰 RaceStud | dio3 (64 bit) 3.50.81 - E | uild venerdî 30 lug | lio 2021 16:40 | | | | | | | | | | | | | | | - | |
|------------|---------------------------|---------------------|----------------|-----|----------------|----------------|-------------|----------|--------|---------|---------------|---|--------|---------------------------|-------------------|----------|--------|---|--------------|
| * 2 |) /2 //3 { | 3 🖷 🚽 | * * 4 | 2 | | | | | | | | | | | | 7 | (î• | | am |
| +all C | ustom CAN | | | | | New | Clone | | Import | Export | Delete | Authorizations | ; | C | ustom CAN Pr | otoco | s | | |
| | | | | | | Search Box: | | | | | | | | | | | | | _ ♀ ⑦ |
| Manufactu | urers | | | | _ | Pw Ma | anufacturer | Mod | lel | CAN Dev | vic Bus Speed | Note Date | File | | DE | C File | | | |
| Manual Co | ollections | | | | | | | | | | | | | | | | | | |
| | - | | | | | | | | | | | | | | | | | | |
| | 😰 New Custom C | AN Protocol | | | | | | \times | | | | | | | | | | | |
| | Select a Manufa | cturer | | | Edit New Model | Name | | | | | | | | | | | | | |
| | None | | | ^ | | | 0 | 1 | | | | | | | | | | | |
| | 2D | | | - ' | | | - | | | | | | | | | | | | |
| | A-RACER | | | | | | | | | | | | | | | | | | |
| | ABIT | | | | | | | | | | | | | | | | | | |
| | ADAPTRONIC | | | | | | | | | | | | | | | | | | |
| | AEM | | | | CAN Device Typ | ie. | | | | | | | | | | | | | |
| | AIM | | | | cou | • | | | | | Custom Pr | tocol Manufacturer Ma | anager | | - | - [| - × | 1 | |
| | ALFAROMEO | | | | ECU | | | Ŧ | | | - | na internet en el secondo e | | A state to a state of the | Sec. 1. (1. () | | | | |
| | APRILIA | | | | | | | | | | Custom Ma | nufacturers | | Current Mar | ulacturer | | | | |
| | ARCTIC_CAT | | | | | | | | | | | | | Custom | | | | | |
| | ASTON_MARTIN | | | | CAN Bus Speed | | | | | | | | | | And Oursest line | - | | | |
| | AUDI | | | | 1 Mbit/sec | | | \$ | | | | | | | Add Current iter | 1 | | | |
| | AURION | | | - ' | | | | | | | | | | | Remove Current If | em | | | |
| | AUTRONIC | | | _ | | | | | | | | | | | | | | | |
| | BENTLEY | | | _ | Use as Sil | ent by Default | | | | | | | | | Empty The List | | | | |
| | BLACK_BOX | | | | | | | | | | | | | | | | | | |
| | (| | | | | | | | | | | | | | | | | | |
| | | Add Manufactur | er | | | | | | | | - | | | | | – | | a | |
| | | | | | | OK | Cano | el | | | | | | | ОК | | Cancel | | |
| | | | | | | | | | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| - | | | | | | | | | | | | | | | | | | | |
| Trash | h | | | | | | | | | | | | | | | | | | |



The software comes back to "New Custom CAN Protocol":

- select the ECU Manufacturer previously created
- fill in the Model name in the panel top right box
- select the CAN Device type; available options are:
 - o ECU
 - o other CAN Devices
- select the CAN Bus speed; available options are:
 - o 125 Kbit/sec
 - o 250 Kbits/sec
 - o 500 Kbit/sec
 - 1 Mbit/sec
- if the network features multiple devices we suggest to enable "Use a Silent by Default" checkbox (please refer to paragraph 5.2 for further information concerning this option)
- press "OK" and a new CAN Driver has been added

| 📓 RaceStudio3 (64 bit) 3.30.81 - build venerdi 30 luglio 2021 16:40 | | | | | | | | | | | | - | |
|---|-------------|------------------|-------------|------------------|----------------|--------|-------------------|----------------|----------|--------------|----|---|------|
| * 🍄 🖅 🕰 🏡 🖆 🖨 | | | | | | | | | | 7 | (• | | AID |
| ◆ All Custom CAN | New | Clone | Import | Export | Delete | Autho | orizations | | Custom (| CAN Protocol | s | | |
| | Search Box: | | | | | | | | | | | | ٩ () |
| Manufacturers | Pw Ma | inufacturer | Model | CAN Dev | ic Bus Speec N | ote Da | ite | File | | DBC File | | | |
| Manual Collections | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | S New Ci | istom CAN Protoc | ol | | | | - n × | 1 | | | |
| | | | Colored a 1 | | | | Edia Marca Mardal | M | | | | | |
| | | | Select a | vanutacturer | | • | Custom | Name | | | | | |
| | | | ASTON_M | ARTIN | | | Custom | | | | | | |
| | | | AURION | | | | | | | | | | |
| | AUTRONIC | | | | | | | | | | | | |
| | BENTLEY | | | | | | | | | | | | |
| | BLACK_BOX | | | | CAN Device Typ | e | | | | | | | |
| | | | BMW | | | | ECU | | ÷ | | | | |
| | | | BOSCH | | | | | | • | | | | |
| | | | BRIGHTW | ATER | | | | | | | | | |
| | | | CAPPOT | | | | CAN Due Court | | | | | | |
| | | | CATERHA | м | | _ | CAN Bus Speed | | | | | | |
| | | | CHEVROL | ET | | | 1 MDIVSec | | ÷ | | | | |
| | | | CITROEN | p | | | | | | | | | |
| | | | CORVETT | E | | | Use as Sile | ent by Default | | | | | |
| | | | Custom | | | | | | | | | | |
| | | | DALLADA | | | | | | | | | | |
| | | Add Manufacturer | | | | | | | | | | | |
| | OK Cancel | | | | | | | | | | | | |
| | | | L | | | | | _ | | | | | |
| | | | | | | | | | | | | | |
| Trash | | | | | | | | | | | | | |

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



9 – The device window

The device window is shown clicking the device bottom left of the software page.

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | SW4 ID 7700133 | | • | | | | × |
|---|--------------------------|----------------------|-------------------------------|--------|----------------|---|------|--------|-----|
| | Live Measures Download P | roperties Settings T | Fracks Counters Logo Firmware | | ₩. | ÷ | € EC | .u 🧶 | |
| Utilities Connected Devices | 1 2 3 4 | | | | | | | • 5 | 6 |
| 🕞 SW4 ID 7700133 💊 | | | Master | | | | | | î î |
| Click to stop live measure stream from device | Left Clutch | 2 % | LoggerTemp | 46 C | Luminosity | | | 0 % | |
| 2 Now sorted by channel type, click to change | Right Clutch | 1 % | Battery | 12.4 V | | | | | |
| Sort by Configuration | | | ECU channels | | | | | | |
| Sort Alphabetically | ECU PPS | % | ECU USER06 | # | ECU FUEL T | | | C | |
| Sort by Channel Type | ECU SLIP ANG | % | ECU USER07 | # | ECU GEAR BOX T | | | C | |
| | ECU TPS | % | ECU USER08 | # | ECU INT AIR T | | | C | |
| 3 Click to select a channel and perform its calibration | ECU ACC LONG | g | ECU BARO | bar | ECU LAMB T1 | | | C | |
| 5 Click to invoke logger START recording | ECU ACC LAT | g | ECU BOOST | bar | ECU LAMB T2 | | | C | |
| 6 Click to make my device blink | ECU IGN ANG1 | deg | ECU CLUCH P | bar | ECU OIL T | | | C | |
| | ECU SPARK ADV1 | deg | ECU INJ P1 | bar | ECU ENG T | | | C | |
| | ECU SPARK ADV2 | deg | ECU INJ P2 | bar | ECU GEAR TIME | | | ms | |
| | ECU SPARK ANG1 | deg | ECU MAN AIR P | bar | ECU INJ TIME1 | | | ms | |
| | ECU SPARK ANG2 | deg | ECU BRK P | bar | ECU INJ TIME2 | | | ms | |
| | ECU STEER POS | deg | ECU BRK P FL | bar | ECU ENG TORQ | | | Nm | |
| | ECU GYRO | deg/s | ECU BRK P FR | bar | ECU THRT VOLT | | | mV | |
| | ECU STEER SPD | deg/s | ECU BRK P RL | bar | ECU V BATT | | | mV | |
| | ECU IGN ANG2 | # | ECU BRK P RR | bar | ECU FUEL LEV | | | 1 | |
| | ECU LAMB1 ERR | # | ECU FUEL P | bar | ECU FUEL USE | | | 1 | ~ |

Top of the window (red hedged in the image below) are 8 layers used to:

- Live Measures: check device channels and force online values; the buttons of the top keyboard are to:
 - start live measures (1)
 - sort the channel visualization as preferred: 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 (**2**)
 - o auto-calibrate sensors that need it (3)
 - show the measure in Mv (4)
 - start recording (5)
 - make the device LEDs blink (6); this is the easiest way to test PC-logger connection
- **Download**: download data stored in SW4
- **Properties**: name the device fill in racer's and vehicle name or number, championship and venue type (generic or qualifying testing, warm up, race, test type)
- Settings:

٠

- set date
 - o enable/disable daylight time
 - \circ set time format and time zone
- Tracks: manage the tracks stored in the device memory
- **Counters**: set/reset the device odometers
- Logo: transmit/receive the logo that shows up when switching the device on; supported image formats are JPEG or BMP; always use the most recent Windows[™] versions (Windows8 or Windows10) whose graphic libraries are more updated
- **Firmware**: check or update SW4 firmware version.



9.1 – Online value forcing

Device page Live measures layer features a very useful option: online measure value forcing that allows the user to simulate one or more channels value to test icons, alarms, power output and harnesses behaviour.

With reference to the configuration we created it is possible to verify if Water Alarm status variable works.

- The set conditions (paragraph 5.6) are: water Temperature greater than 100 +RPM greater than 2000. To force these values:
- mouse over the value to force and click the setting icon
- a popup menu appears: select "Force Value" option and fill in the panel that appears
- click "OK" and the LED blinks continuously as set in the device configuration.

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | | - 0 |
|---|-----------------------------|---|-----------------|----------------------|
| * 🏘 🖻 🖪 😘 🍝 📥 🕫 😝 | | | | 👂 🎅 🈤 🖨 🐲 |
| O Utilities O | | SW4 ID 7 | 7700133 | |
| | Live Measures Download Prop | erties Settings Tracks Counters Logo Firm | ware | |
| Connected Devices | 123 💱 🥜 mV | | | |
| 🕞 SW4 ID 7700133 💊 | | Mast | er | |
| | Left Clutch | 1 % LoggerTemp | 39 C Luminosity | 0 % |
| | Right Clutch | 1 % Battery | 12.7 V | |
| | | ECU cha | nnels | |
| | F88 ETOH CONT | % F88 COOL PRESS | bar F88 V SPEE | D km/h |
| | F88 PPSA | % F88 CRANK1 PR | bar F88 BTMAX | C |
| | F88 PPSB | % F88 GEAR PRESS | bar F88 FUEL T | C |
| | F88 WHEEL SPIN | % F88 MAP1 | bar F88 ACT1 | C |
| | F88 TPS1 | % F88 MAP2 | bar F88 ACT2 | C |
| | F88 LONG ACC | g F88 OVERBOOST | bar F88 EGT1 | C |
| | F88 LAT ACC | g F88 FUEL PR1 | bar F88 EGT2 | C |
| | F88 STEER ANGLE | deg F88 FUEL PR2 | bar F88 EOT | C |
| | F88 TRBO SPD1 | lue X | bar F88 ECT1 | C 🔇 |
| | F88 TRBO SPD2 F88 ECT1 | Insert forced values | bar F88 ECT2 | Switch to F |
| | F88 CAL SWITCH | 32 bit Float 105 | bar F88 GEAR V | OLT 0 decimal places |
| | F88 DBW STATUS | Step 0.1 | bar F88 VBATT | Force Channel Value |
| | F88 ENG ENABLE | | rpm F88 FUEL C | :ONS I |
| | F88 KNK STATUS | OK Cancel | km/h F88 AFR 1 | A/F |
| | F88 PIT SWITCH | # F88 SPEED FL | km/h F88 AFR 2 | A/F |



As shown in the image below, once the values have been forced they are shown right of the page red hedged. With the two "+" and "-" lateral buttons it is possible to change the forced values.

| SaceStudio3 (64 bit) 3.50.81 - build venerdî 30 luglio 2021 16:40 | | | | | | | - | |
|---|---------------|---------------------|-----------------|-------------------|---------------|---------|----------|-----|
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| ② Utilities | | | | SW4 ID | 7700133 | | | |
| | Live Measures | Download Properties | Settings Tracks | Counters Logo Fin | mware | | | 4 > |
| Connected Devices | 123 💱 🧬 | mV Stop Forcing | | | | | | 🕒 🝅 |
| 🕞 SW4 ID 7700133 💊 | | | ECU o | channels | | | F88 ECT1 | + |
| | F88 ETOH CO | % | F88 COOL PR | bar | F88 V SPEED | km/h | 105.0 C | |
| | F88 PPSA | % | F88 CRANK1 | bar | F88 BTMAX | C | F88 RPM | |
| | F88 PPSB | % | F88 GEAR PR | bar | F88 FUEL T | C | 2500 rpr | n 🗄 |
| | F88 WHEEL S | % | F88 MAP1 | bar | F88 ACT1 | C | 2000 101 | |
| | F88 TPS1 | % | F88 MAP2 | bar | F88 ACT2 | C | | |
| | F88 LONG ACC | g | F88 OVERBO | bar | F88 EGT1 | C | | |
| | F88 LAT ACC | g | F88 FUEL PR1 | bar | F88 EGT2 | C | | |
| | F88 STEER A | deg | F88 FUEL PR2 | bar | F88 EOT | C | | |
| | F88 TRBO SP | deg/s | F88 OIL P1 | bar | F88 ECT1 | 105.0 C | | |
| | F88 TRBO SP | deg/s | F88 OIL P2 | bar | F88 ECT2 | C | | |
| | F88 CAL SWIT | # | F88 OIL P3 | bar | F88 GEAR VOLT | mV | | |
| | F88 DBW STA | # | F88 OIL P4 | bar | F88 VBATT | V | | |
| | F88 ENG ENA | # | F88 RPM | 2500 rpm | F88 FUEL CO | 1 | | |
| | F88 KNK STA | # | F88 D SPEED | km/h | F88 AFR 1 | A/F | | |
| | F88 PIT SWIT | # | F88 SPEED FL | km/h | F88 AFR 2 | A/F | | |
| | F88 TC SWITCH | # | F88 SPEED FR | km/h | F88 GEAR | gear | | |
| | F88 ALS STATE | # | F88 SPEED RL | km/h | | | | |
| | F88 BARO PR | bar | F88 SPEED RR | km/h | | | | |
| | 1 | | | | | | | |



10 – Data download and analysis

Once the test session is over it is possible to download data sampled on a PC. Connect SW4 logger to a PC using the USB cable and click on it bottom left of the software page. Once reached the device page activate "Download". layer 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.

Through the setting icon far right of the page you can merge sessions of the same day, merge all sessions, change data download settings and format of SW4 thereby erasing all data.

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | | | | - 🗆 X |
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| All Configurations | | | SW4 ID 7700133 | | | |
| Devices (2) | Live Measures Download Prop | erties Setting | s Tracks Counters Logo Firmware | | | |
| Manual Callestiane | Download Unnide Downloaded | Delete | | | | Refresh List |
| Manual Conections | | 7 | | | | |
| | | ano 29 | 1 | - | Merge sessions of t | he same day |
| | | set 04 | 3SC Var3 | | Merge all sessions | 2 |
| | | | 01:56 | | Settings | |
| | 1 | 3SC Var3 | 0 | a_0008 | Format Data Memor | ry |
| | | | 01:19 | | 1 | |
| | 2 | 3SC Var3 | 0 | a_0001. | xrz 708.00 kB | |
| | | mar 14 | 350 1/2 | | | |
| | \bigtriangledown | mar 20 | SSC Vars | | | |
| | | | mar 14 08:42 | | 1 | |
| | 3 | 3SC Var3 | 0 | a_0005. | xrz 414.42 kB | |
| | | | mar 14 08:42 | | 1 | |
| | 4 | 3SC Var3 | 0 | a_0010. | xrz 1.74 MB | |
| | | | mar 14 08:42 | | 1 ***** | |
| Connected Devices | 5 | 3SC Var3 | 0 | a_0003. | xrz 414.52 kB | |
| | | | mar 14 08:40 | | 1 | |
| SW4 ID /100135 | 6 | 3SC Var3 | 0 | a_0006. | xrz 44.00 kB | |
| | | | mar 14 08:40 | | 1 | |
| | 7 | 3SC Var3 | 0 | a_0009. | xrz 845.58 kB | |
| | | | mar 14 08:39 | | 1 | |
| | 8 | 3SC var3 | U | a_0002. | xrz 198.47 kB | |
| | | 200 1/02 | mar 14 00:39 | 0.0004 | 1 | |
| | 9 | SSC Var3 | | a_0004. | 1 200.08 KB | |
| | 10 | 39C \/ar3 | (2) | 2 0007 | 526.09 kB | |
| Trash | 10 | 000 4410 | | a_0007. | | |

After download press Analysis Icon () and Race Studio Analysis 3 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 3 Analysis user manual, that can be freely downloaded from www.aim-sportline.com, download area, software/firmware section, for further information about its working mode.


11 – 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). They are identified by a red "NEW" label.

Click it and freely download the new applications.

| RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40 | | | | | | – 🗆 × |
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| Connected Devices | Dow | nload | I Install SW Export Import Update Device | | | |
| 💮 SW4 ID 7700133 | | V | Name | On the web | Downloaded | Info |
| | Soft | ware | - Installed version: 'RaceStudio3 (64 bit) 3.50.81 - build venerdi 30 luglio 2021 16:40' | | | |
| | | | RaceStudio3 (64 bit) | 3.50.81 | 3.50.81 | |
| | | | | | | |
| | NEW | • | SmartyCam HD | 01.04.44 | 01.04.42 | |
| | | | MX2E | 02.32.79 | 02.32.79 | |
| | | | MXG 1.2 | 02.36.65 | 02.36.65 | |
| | | | MXG 1.2 Strada | 02.36.65 | 02.36.65 | |
| | | | MXK10 | 02.28.43 | 02.28.43 | |
| | | | MXK10(11-15) | 02.28.43 | 02.28.43 | |
| | | | MXP | 02.36.65 | 02.36.65 | |
| | | | MXP Strada | 02.36.65 | 02.36.65 | |
| | | | MXS 1.2 | 02.36.65 | 02.36.65 | |
| | | | MXS 1.2 Strada | 02.36.65 | 02.36.65 | |
| | | | MX UTV | 02.32.40 | 02.36.18 | |
| | NEW | • | MXm | 02.36.71 | 02.36.65 | |
| | | | MXsi | 02.36.65 | 02.36.65 | |
| | | | MyChron5-660 | 02.36.55 | 02.36.55 | |
| | NEW | ✓ | MyChron5S | 02.36.71 | 02.36.55 | |
| | | | PDM32 | 02.36.51 | 02.36.51 | |
| | | | PDM08 | 02.36.51 | 02.36.51 | |
| | | | Solo 2 | 02.36.65 | 02.36.65 | |
| | | | Solo 2 DL | 02.36.65 | 02.36.65 | |
| | NEW | • | SW4 | 02.36.66 | 02.36.71 | |
| | | | | | | |



12 – Technical specification and drawings

- TFT Display dimensions
- Resolution
- Contrast
- Brightness
- Ambient light sensor
- Configurable Alarm icons
- Shift lights
- Alarm RGB LEDs
- CAN connections
- CAN ECU connections
- Internal memory
- Body
- Pushbuttons
- Rotary switches
- Connector
- Dimensions in mm
- Weight
- Power consumption
- Waterproof

4.3" TFT (SW4 270 and SW4280) 5" TFT (SW4 320 and SW4 350)

800x480 pixels 800:1

800cd/m2 – 1,100 Lumen (SW4 270 and SW4280) 800cd/m2 – 1,200 Lumen (SW4 320 and SW4 350)

YES YES 8 configurable RGB LEDs 4 configurable 3 YES 4 GB Anodized Aluminium 10 with RGB backlight 3 with RGB backlight 22 pins Deutsch male Autosport

270x183.5x42.6 (SW4 270) 280x183.5x42.6 (SW4280) 320X183.5X42.5 (SW4 320) 350x183.5x45.5 (SW4 350)

2400 g (SW4 270) 2400 g (SW4 280) 2600 g (SW4 .320) 2600 g (SW4 350)

500 mA IP 65



SW4 270 Dimensions in mm [inches]



SW4 280 Dimensions in mm [inches]









SW4 320 Dimensions in mm [inches]



SW4 350 Dimensions in mm [inches]





SW4 Pinout



All other push buttons and all rotary switches on CAN Bus