



# **DAVID** Standalone version











# USER Manual for DAVID

This User Manual was written using the following parameters:

Software version Race Studio 2:	2.20.14
Firmware version DAVID:	17.06
Firmware version MyChron 3 Dash:	15.04
Firmware version MyChron Light TG Dash:	21.01

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#### Please note:

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Aim reserves the right to update and re-issue documentation from time to time without obligation to notify any person of such changes.



# DVID

# DEAR DAVID OWNER

**DAVID** is the new *AIM* system that allows you to enter in the race movie world because with **DAVID** you are the director!

**DAVID** merges the signals of two video cameras with your dash display and you will be able to see your race together with the most important information right in front of you.

Moreover, with **ECT** (Easy Connection Technology), **DAVID** connects to the most popular ECU through a single CAN or RS232 connection and you can select your own one from a custom database.

As all *AIM* products, **DAVID** let you choose your preferred configuration through the powerful **RACE STUDIO 2** Software, that supplies you an easy data analysis instrument too. **DAVID**, in fact, has also an integrated data logger with 8Mb of non volatile internal memory and all data there stored can be downloaded to your Pc through a fast USB cable.

Thank you for your purchase of **DAVID** and... enjoy yourself!





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# 1 – DAVID IS FOR

**DAVID**, the new *AIM* Data Video recording system, merges in one only image the signals coming from up to two cameras with your dash display. This means you can see, together with the images of your race, all needed information like RPM, lap and split times, best lap time, temperature and pressure values and so on, all depending only on you. No matter what you are: a serious racer, an amateur, a race driving teacher, a consultant, a marketing manager or something else, DAVID is the tool that will make the difference between you and the others. Through this new powerful system, in fact, you can create different products you can use in different ways.

Through **DAVID** you can create video for sponsorship packages or for educational use. Moreover you can customize the video layout setting gauges style colours and inserting your logo.

**DAVID** is a very powerful communicational weapon and, further more, enjoying too.





# 2 – DAVID Standalone architecture



Figure 1: DAVID standalone architecture





# 3 – DAVID Standalone standard kit and accessories

DAVID standalone version standard kit is made of:

- DAVID video system core
- System harnesses
- Race Studio 2 software and USB data download cable
- Infrared receiver and transmitter for lap / split time
- Wheel speed sensor
- Wiring for ECU interface (via CAN or RS232)
- RPM sensor
- Lateral and longitudinal G-sensor

DAVID standalone optionals are:

- Standard NTSC or PAL cameras
- Standard NTSC or PAL video recorder
- MyChron 3 Dash or MyChron Light TG Dash
- Oil and water temperature sensors
- Oil and fuel pressure sensors
- Brake / Throttle / Steering wheel potentiometers



#### 3.1 – DAVID installation and power

Please **install DAVID** in an aerated place like in place of the passenger seat or of the rear seat. Please **do not install DAVID under any seat**. It should not be in contact with oil or fuel nor too close to heat sources. We strongly recommend to protect it from vibrations using the anti vibration mountings / silent blocks you find in the kit.

**Warning:** DAVID system warms up while working, so do not to touch it with your hands after it has been working for a while.

Please remember that your **DAVID** is not equipped with internal batteries so it need to be powered by an external 9-15 VDC **power** source.

This can be done in two ways:

- connecting it to the master switch of your vehicle (we recommend you to do so)
- connecting it directly to the battery of your vehicle.

Depending on how you decide to power it, **DAVID** works in different ways.

if you connect DAVID to the master switch of your vehicle it switches on/off when you switch on/off your vehicle. As you can see in Figure 2, on the right part of DAVID is an ON/OFF button you can use to manually switch ON/OFF the system. To manually switch OFF DAVID, please press for 3-4 seconds ON/OFF button. To switch the system on again you can both switch off your vehicle and then re-switch it on or push again ON/OFF button.





 if you connect DAVID directly to the battery of your vehicle it is always switched on. This means that to switch it OFF you need to press for 3-4 seconds ON/OFF button. Of course if you switched manually OFF DAVID you need to re-switch it ON manually.



Figure 2: DAVID front panel - video side

Please note: no matter how you decide to power your DAVID (if connecting it to the master switch of your vehicle or directly to your vehicle battery), the only power input to be used is the one labelled as *"Power"* on the front panel, video side, of DAVID (red circled in Figure 2).

Moreover if you have cameras equipped with audio channels or if you add audio channels to your system, they have to be connected to your videorecorder / video-camera and not to DAVID.



# DV/ID

#### 3.2 – DAVID LanC connection

LanC is a serial connection to a camcorder or VCR (Video Cassette Recorder) that allows a wired remote control of camera and VCR functions such as: Play, Record, Stop, Pause, Fast Rewind, Fast Forward, Search Rewind, Search Forward, Step +/-.

Our **DAVID** system uses LanC communication to start and stop recording on the connected camcorder or VCR. The trigger is the same used for data logging: RPM signal greater than 500 or wheel speed over 10km/h (6 MPH).

This is to say that with the camera powered on and connected to **DAVID**, the system controls the camera recording without any user intervention. When **DAVID** starts recording a signal is sent to the camera to start recording video; in the same way when the vehicle is stopped and the engine is off **DAVID** stops recording data and sends a "Stop" signal to the camcorder or VCR. Included with each **DAVID** systems is a LanC cable.

If you want to manually manage VCR or camcorder Start/Stop functions you only need to unplug the LanC cable form the device and you can manually manage these functions.

LanC output is blue circled in Figure 2.



#### 3.3 – DAVID maintenance

**DAVID** does not need any special **maintenance**. Provided that you take adequate care of all components, the only required maintenance is periodical software and/or firmware upgrading. To upgrade the software / firmware, please connect to our website <u>www.aim-sportline.com</u> and check in software download page if any software / firmware release has been issued. If so, please follow this procedure:

- download the software / firmware from our website and run it;
- follow the instruction prompted on your Pc monitor.

The present user manual has been written using the following parameters:

- Software: Race Studio 2 Version 2.20.12
- Firmware: DAVID Version 15.03

MyChron 3 Dash – Version 15.04 MyChron Light TG Dash – Version 21.01

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# 4 – DAVID Dash (optional)

Your **DAVID** system can also be equipped with an optional external dash. Dashes at present available for **DAVID** are **MyChron 3 Dash** and **MyChron Light TG Dash**.

#### 4.1 – MyChron 3 Dash

**MyChron 3 Dash** is a complete and robust dashboard that displays lap time, lap number, RPM, speed and up to 4 analog inputs (temperatures or pressures). Moreover **MyChron 3 Dash** has a low battery warning feature and displays battery voltage.

**MyChron 3 Dash** has 10 configurable sequential shift lights, 4 alarm led for High/Low temperature/pressure alarms and a small integrated gear display.

**MyChron 3 Dash** can show the engaged gear number either sampled from an "on-board" gear sensor or calculated from RPM vs. Speed ratio.

Please refer to **Figure 3** to know which information are displayed and where.



Figure 3: MyChron 3 Dash Display



To install **MyChron 3 Dash**, we recommend you to choose a place where the logger will not be in contact with oil or fuel. Please ensure that the logger is not installed too close to heat sources and protect it from vibrations (if possible use anti vibration mountings / silent blocks).

Please remember that your **MyChron 3 Dash** is not equipped with internal batteries and is powered by your **DAVID** system so, please remember to connect **DAVID** system to an external 9-15 VDC Power source to switch the dash on.

**MyChron 3 Dash** does not need any special maintenance, provided that adequate care is taken of display unit and components.

For more information about **MyChron 3 Dash**, please refer to "<u>How to set</u> and use **DAVID** displays" chapter – "**MyChron 3 Dash** Paragraph".





#### 4.2 – MyChron Light TG Dash

**MyChron Light TG Dash** is a "pocket" dash mainly useful if you do not have a lot of space and want to immediately see some important value. It can show you lap times, split times or variation times depending on how you set it. Its display is constituted of two main lines you can configure so to show: lap time, split time and variation split and lap times.

**MyChron Light TG Dash** is settable via keyboard and you need to use **Race Studio 2** only to set the Displayed speed among these available.

For further information about **MyChron Light TG Dash** please refer to "<u>How to set and use **DAVID** displays</u>" chapter - MyChron Light TG Dash" paragraph.



# 5 – Race Studio 2 Software

Once **DAVID** installed and the sensors plugged in it, to acquire correct information you need to configure it using **Race Studio 2**, the Software developed by *AIM* to configure its instruments and analyze stored data. In **DAVID** package you find also a CD Rom containing the software. Please insert it in the CD Rom drive and, if auto-play option is enabled, the installation starts automatically, otherwise browse the CD and click twice on setup icon. Please follow the instruction that are prompted on your Pc monitor. For any doubt about Software and USB drivers installation, please refer to download page of our site: <u>www.aim-sportline.com</u>, where is a file called "Installation\_xxx.pdf".

Once the software installed, please run it. This window appears<sup>1</sup>:



Figure 4: Race Studio 2 First window

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<sup>&</sup>lt;sup>1</sup> If you notice a wrong visualization (like displaced or overlapped buttons), please see Note 1 **"Race Studio 2** visualization problems" at the end of this chapter.





Please click on DAVID Button on the left toolbar : this window appears



Figure 5: Race Studio 2 – New Configuration window

Please fill in all the fields of this window and click on *"OK"* button. System Manager window appears

and codesation	Receive								
otifiguration name 040	Data logger type Danut Standakure	Etu Partici e Rea	10-19600-19400	Vehicle name FBPO		Avaid Z.40.	de talvé 46 (humus)		Total frequency 431 (Hz)
Coording time 8	Heave Un	et jud							
(Jec.) Lap segments	Tenperatu	ana le	-						
(Jec.) Lao segments	Logger	ECUManufactu.	ECU Model	Vehicle none	00.	140-15	red Term	Doplay	Created
(Jac.) Lap segments 1 U Installation name L and	Logger DuVid Randskre	ECUManufactu. Nore	ECUTION Nove	Vehicle name ad	00.: 0	1.40 51 612	yeed tere yh ≺	Display None	Created May 31, 2005

Figure 6: Race Studio 2 – System Manager window



#### Note 1: "Race Studio 2" Visualization problems

If when you run **Race studio 2** you monitor shows you a distorted image, like the one here below reported, you need to change your screen settings. In the example below we pressed "**MXL**" button.

Mychron 3	System manager					
M3 Kart	Context configuration					
PIDB/Gold/ike	Configuration name Data logger type	514	VePack roame	Available Deve	Total Requercy	
M3 Auto-Moto Plus/Gold/X0	Terrent startigentists [ Cherweits [ System coolinguation	al I	Anno.		131.040	
MiLog/Visor XGLog	Appen ADM sensor Multiply factor Multiply factor Multiply factor 10000	• • •	Otarre Otarre Otarre	i [quand_3	3	
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	Davie() • [0]			Dave(4	31004	
				Faid 4 - page 2		
	Fett 3 - page 2					

First of all, please close all applications you are running, **Race Studio 2** included because after this operation you need to re-start your Pc.





To change your screen settings:

- ⇒ Click on "Start/Settings/Control Panel/Display
- ⇒ Display Properties windows appears



- ⇒ enable Settings layer
- ⇒ Press Advanced button



⇒ Set DPI setting on "Normal Size (96 DPI)"





#### Change DPI Setting





#### ⇒ Click on "OK" button



#### ⇒ Click on "Apply" button



⇒ If this message appears, please click on "Yes" button





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1 Paged Ry Hold or Herada 3 Small excellent Level 1990 by 10 Paged	Trusteriout. AA	*

 $\Rightarrow$  Click on "Close" button

System	Settings Change
?	You must restart your computer before the new settings will take effect. Do you want to restart your computer now?

- $\Rightarrow$  Click on "Yes" button and re-start your computer.
- ⇒ After re-start run "Race Studio 2" and all works properly.



# 6 – **DAVID** Configuration

Through **Race Studio 2** you can configure your **DAVID** system and its displays (if you bought one). This is possible through "*System Manager*" window (**Figure 6**) and its four layers.

On top of "System Manager" window are two pushbuttons



To transmit the configuration to the logger

To read the configuration from an unknown logger and store it in your configuration database

Under them is a row called "Current Configuration" (highlighted with an arrow in **Figure 6**) that is always on top to inform you which configuration you are working on.

To fully configure your **DAVID** system you need to activate, one by one, all the layers "System Manager" window is composed of, to say:

- Select Configuration
- Channels
- Display
- Video Configuration

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# 6.1 - How to set and select a Configuration

# ⇒ activate "Select Configuration" layer (Figure 7):

Selec	t configuration Channel	Display Video configuration	n								
	New	Delete	Clone	Import	Export						
Lap		Measure Un	ts			_					
Obsi (sec Lap	aring time 0 .) segments 6	Speed Temperatu	nt imf	*							
N	Installation name	Logger	ECU Manufactu	ECU Model	Vehicle name	0b	Lap	Speed	Temp	Display	Created
1	and	David Standalone	None	None	ad	8	6	ken/h	*C	None	May 31, 2005
2	P\$PPO	David Standalone	MOTEC	M800-M600-MM00	P\$PPO	8	1	ken/h	°C	TG-dash	June 08, 2005
-14	Pippo	Datiid Standalone	805CH	MES3	Pepo	8	1	key/h	*C	TG-dash	June 10, 2005

Figure 7: Race Studio 2 System Manager window - Select layer

- ⇒ press "New" button to create a new configuration
- ⇒ press "Delete" button to delete an existing configuration
- ⇒ press "Clone" button to Clone an existing configuration
- ⇒ press "Import" button to import a configuration in your database
- ⇒ press "Export" button to export a configuration from this database and be thereby able to import it elsewhere
- ⇒ fill in "Lap" and "Unit of measure" boxes (see below);
- ⇒ Select a configuration to set it (in Figure 7 the selected configuration is the first, highlighted in yellow)





#### Lap Box:



**Obscuring time** is a period during which the receiver is blind and cannot detect lap signals (accepted values **from 3 to 100** seconds); use it if you are on a track where more than one transmitter is installed and you do not want to record split times: set it to a value lower than your best lap time and greater than the time elapsed between last split and start/Finish line

**Lap segment** is the number of split your track is divided in (accepted values are from 1 to 6).

#### Measure Units box:

Measure Units		
Speed unit	mph	-
Temperature unit	۴	•

Choose your Speed Measure Unit (km/h or mph) and your Temperature Measure Unit (°C or °F)



# 6.2 – How to set DAVID Channels

# $\Rightarrow$ activate "Channels" layer (Figure 8) and:

Select standparton	Cheven De	play [ Video configuration ].								
Part .		Seed 1	500	H12	Gener services					
Add Income of	ECU signal	Statement and		English 1	line		Collulated			
langi tete	direction of	Wheel cacandarmos (met)	3566 wh	eel cascarberence (mail 1666		14	heit gest nurder			
MAX value	Jacob	Pubers per scheel re-solution	I Put	en per oberi revolutori 🚺	Contractor		-			
Reference speed						_				
Chan	Typesd,3	2								
Durred shedline	Endin-Diffusio	Chavelines	Sanaire	Service hotel	- Phone and	Liner bard	Taken body	Parent 1	Paren 2	-
10.000	Desided	English	22.00	Engine involution intend	1100	A COLUMN TO A C	Distance of the local	1.000		
1PD 1	Evaluation	Speed 1	0.0.44	Seed	tech 1	0.0	250.0	1044 II	1.0	
100.1	English	Steed 7	11144	See.	44.0.1	0.0	200.0	Contract of	1.	
Con 1	disabled .	Channel 1	100.044	General Room (1-5 V		0.0	8.0			
24.2	fasting	Channel 2	with sold	Canada Real of R.S.M.	- 64	0.0	1.0			
04.1	fooding.	Channel 3	10.04	Generic Roser 205 9	1.4.1	0.0	8.0			
200	fasting .	Channel 4	10.00	Carpen Room 0.5 2		0.0	2.0			
24.4	English	Channel S	10.044	National Arrow Cold V	1.00	0.0	1.0			
24.5	English .	Charles d	10.00	Entrance and the second						
and a	All shares and shares	dia la		Lateral sections		1.00	1.00			
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ecue	Evalued	HEIOO_ADIA TEHE	10.46	Temperature service	5	30	100			
101.5	Disted	PRIOD_ENVIRE_HTPP	31740	Temperature sensor	- S	-30	150			
101.1	finatied	PEOD LAPECIAL	1176	Lambda sond	terbile .001	0.100	1.500			
tO)_1	Enabled	MEOO LAMEDA2	30.40	Lambde sond	latituda .001	0.500	1.500	-		
ech's	Indied	MB00_E0MUS7_METH	10.46	Pressure service	4/141	0.0	150.0			
ECH_9	Enabled	MICO_ADR_CHARGE	20.48	Percentage sensor	79	0	190			
ECU_10	truted	HEROO PLATIENA	30.90	Temperature sensis	-C	0	150	-		
#CU_11	Enabled	MEDD_PLELPRETS	10.94	Pressure service	for it.	0.0	15.0			
RCV_17	f/Miled	PEIGO_00,1899F	30.44	Temperature sensor	19C	Ø	150			
101,11	Enabled	MBDD_COLPRESS	10790	Pressure service	tor .1.	0.0	5.8			
102,14	frubled	MIND_GEARINGE?	10.441	Vultowier	- Y.A	0.0.	15-8			
803,18	Stabled	MBB0_KNOOVOLT	20.40	Vultorater	9.4	0.0	15-8			
803/_16	Enabled	MIDD_GEARSHIPTPORCE	30.Hz	Pressure sector	3Pa .1	0.0	155.0			
EC14_17	Enabled	M000_EXH18MP1	30.44	Temperature service	19C	6	1200			
ECU_18	Enabled	M8000_E10HTE94912	35.90	Temperature sensor	20	0	1000			
ECU_39	Enabled	MINO_CHANNIS	30.46	Revision			1906			
#CU_28	Enabled	HIDD_CHANNE	10016	Raw rolut		C	1000			
P(1) 11	Enstein?	NEW CHANNE	6.0.000	President .		· .	1000			

Figure 8: Race Studio 2 System Manager window - Channels layer

- $\Rightarrow$  fill in RPM box
- $\Rightarrow$  fill in Speed boxes or disable them
- $\Rightarrow$  set Gear sensor box and reference speed<sup>2</sup>
- ⇒ set channels table

<sup>&</sup>lt;sup>2</sup> The reference speed is the same set in the display configuration; this because if you do not have a display you should always be allowed to set a reference speed.





Here are more information about these items:

# **RPM Box:**

Rpm		Г	Rpm	
AIM sensor	ECU signal		AIM sensor	ECU signal
Multiply factor	/1 💌		Multiply factor	/1 -
MAX value	8000 💌		MAX value	8000 💌

 $\Rightarrow$ enable "AIM sensor" and set RPM Multiply factor and RPM Max Value if you have installed a sensor on your vehicle and you have connected it to the logger. The first row of the channels table becomes enabled.

 $\Rightarrow$  enable "*ECU Signal*" and set RPM Max factor if this signal is coming from the ECU. The first row of the channels table becomes disabled.

# Speed\_1 and Speed\_2 boxes:

Speed_1	Speed_1
Enabled	Disabled
Wheel circumference (inch) 65.590t	Wheel circumference (inch) 65.590(
Pulses per wheel revolution 1	Pulses per wheel revolution

You can decide whether enabling this channel or not.

 $\Rightarrow$ Enabling it you have to set your vehicle wheel circumference and the number of pulses for wheel revolution. The related rows of the channels table become enabled.

 $\Rightarrow$ Disabling it you do not to see this signal and the corresponding row (the second or the third) on the channels table becomes disabled.





#### Gear Sensor Box:



ECU: channel 6 of the channel table disables and the signal incomes from the ECU of your vehicle; channels 5 becomes fully configurable (you can set another sensor on it)



Potentiometer Channel 5: CH 6 of the channels tables disables and potentiometers is automatically set on CH 5 of the table.

**Please note:** Channel 5 is the only one that can manage a gear potentiometer.

None	Calculated		
ECU	Highest gear number		
Potentiometer Channel 5	6		

Calculated: this means you have not installed a gear sensor; CH 6 of the table below becomes enabled and shows "Calculated Gear" on sensor type column. Please note: channel 6 can only manage calculated gears

# **Reference speed box:**

Reference speed	
Chan	BOSCH_SPEED2
	Speed_1 Speed_2 BOSCH_SPEED1 BOSCH_SPEED2

You can set as reference speed one of the two DAVID speeds or a speed coming form the ECU





# Channels Table:

Channel clorithe	Dubled builded	Channel have	Sanakig A	Served Take	Photograph and	Laver bured	Tager Island	Parent, 2	Feet 2
EVEN.	Dealined	English	1010	Engre revolution speed	10W		30000	A DESCRIPTION OF	1 BOOM
340_3	Drafied .	Speed_2	10 Hz	figned	34ph .2	4.6	250.0	3866.2	1.8
190,1	(Dyated	Speed #	1016	Speed	tagh at	0.0	250.0	Distant in	1.8
013	Ended	Owner, 3	10.49	Garvers Ineur (15.1	14.1	8.8	8.0		
OLL .	Endled	Ourvel 1	10.46	General Insul 3-5 V	9.4	8.0	8.0		
013	Ended	(Darrel_3	10.46	General lines (3-5 V	18.4	8.8	1.0		
01.4	Studied.	Chancel, 4	1010	General Inster 0-5 Y	11.4	4.0	5.0		
CH.S.	-Ended	Charvel 5	10.16	General Inner 0-5 V	9.4	4.0	8.0		
OUL.	Divided	Charvel 5	10.76	Calificated Gene					
ACC.I	Evalued	ALC 1	1010	Later al acceleration	10.00	18.08	3.04		
ACC.2	English	Aut_2	10.00	Longitudeud accelerusation	8.00	-1.00	1.00		
106,7HP	Erabled .	Establight, New	10.10	Call part	100		.86		
DATT	Enabled	Ballery	1.14	Battery	¥.4	3.5	15.0		
800,1	Evaluat	90504,80%	10.48	Engine spread service	.09		19000		
£00_2	Enabled .	80504_998201	10.40	Bauch upweid version	high 1	8.8	1000-0		
E.(0)	Ender	00004,3PE000	10+8	Speed served	ingh.	8	306		
803.4	divalled .	poso+ op. Hepto	10.46	President metals	3ar -5		18.0		
001.5	Crubbed .	00904,FLBL FPEST	10 %	Pressan oppose	the st	8.8	75.0		
EQ. 5	Ended	BOSCH, ATM, PRESS	10 49	Pressure service	180		1230		
kitu 7	Enabled	80004 FLBL 18HP	570	Temperature censio	1	-55	225		
\$132,6	divided -	#0503H_006_110#	614	Tangenature census	1	-60	215		
800.9	English	\$0501 \$160M_10PF	1514c	Tangasi abute partech		-50	100		
601.10	Enabled.	BOSON, ADV, TEPHY	576	Temperature service	1	-44	198		
603,11	divided	ROSCH, THRUTT, ANS	1616	theothe postani sensor	5.1	8.0	100.0		
804,82°	Brvethed .	WORDY_SOUT_ANG	10.78	Angle serves	442	-90	30		
804,13	Endied	BOSON AR CHANGE	40.76	Percentage server			190		
803.14	Disting	RODOH_BARC_TER1	10.46	Sustaer dool	86 21	0.00	110.00		
801,15	divabled	8090+_BL81_TEME1	10.00	System dock	95.01	8.00	.210.00		
41,100	Enabled	BOSCH, LANSON	10 m	Leebda sind	# .001	0.000	38.000		
601,17	Dutied	BOBOH, LAMEDAU	LO HE	Lavibile sond	# 1001	0.000	38.000		
003.18	Ended	BOSD4 LAW, CONTRE	10.76	flav relation	# 301	4.000	2.000		
\$101_E9	Stabled	ROBOR LAN, CONTROL	10.46	Auto calue	# .001	0.000	1.000		
6CU 29	Ended	BOSON, FUEL LINED	10+6	Nukamethic person	9.00	8.00	000.00		
801,22	Strabled .	BODON, GEAR	3.04	Gene service					
603.25	direction d	BOSIN HEATT	514	Submitter	¥.4	4.0	18.0		
1005241	Hard Miles	0.0502000	- 14.2	THE R. MILLION	2011		117-0		

- ⇒ Channels Identifier column: some rows are labelled CH\_X, where "x" represent the channel number. These rows correspond to the configurable analog inputs. Except for CH\_5 that can also support a potentiometer, they are all fully configurable; under these rows are other rows you can partially configure clicking on the single cells and devoted to battery or to information coming form the ECU of your vehicle. You can of course enable/disable these channels.
- ⇒ Enabled / Disabled column: shows enabled / disabled channels and allows you to enable/disable any channel (except for gear, speed and RPM) with a double click on it.
- ⇒ Channel name column: you can choose the desired name for each channel
- ⇒ Sampling frequency column: you can set each channel sampling frequency. Please note: as far as RPM channel and DAVID displayed speed channel (see "Note 2" at the end of this chapter) are concerned we suggest you to set the related sampling frequency to 50Hz; this because video image is refreshed at a frequency of 50 Hz.





#### 6.3 – How to set and use DAVID Displays

⇒ activate "Display" Layer
Select configuration Channels Display Video configuration
Available displays Speed channel Displayed speed BOSCH_SPEED2

Figure 9: Race Studio 2 - System Manager - Display Layer

⇒Select the desired display. Available options are: None if you do not have a display, M3-Dash if you bought a **MyChron 3 Dash**, TG Dash if you bought a **MyChron Light TG Dash**.





#### 6.3.1 – How to configure MyChron 3 Dash

Select M3-Dash in Display Layer; this window appears:



Figure 10: DAVID Display Configuration - MyChron 3 Dash Configuration window

- ⇒ Speed: choose the speed you want to display: Speed\_1 / Speed\_2 or a speed coming from the ECU of your vehicle (as in Figure 10). This speed is the same you enabled in "Channels" layer.
- ⇒ Display Page 1 and 2 Channels and Alarm: choose which channels are displayed on field one and field two of the first and of the second page of the display (use ">>" button on MyChron 3 Dash keyboard to switch between the pages), set the related MAX and MIN treasure value and the led they are linked to.
- ⇒ Shift Light: field linked to the 10 leds on top of your MyChron 3 Dash; fill in the different boxes. When the engines reaches the RPM value corresponding to led 5 all leds start blinking warning you to shift gear;
- ⇒ Language: you can choose show messages on display in English, Italian, French, German, Spanish and Slovenian language.



# 6.3.2 – Other keyboard functions of MyChron 3 Dash

(data recall, total running, odometer, firmware, serial nr.)

#### Data Recall:

⇒"<u>MEM</u>": best lap time - RPM max value ("<u>>>/<<</u>" scrolls all laps and runs)

⇒"<u>MEM</u>"⇒"<u>MEM</u>": best lap time- RPM min value ("<u>>>/<<</u>" scrolls…)

 $\Rightarrow$  "<u>MEM</u>"  $\Rightarrow$  "<u>VIEW</u>": best lap time - Speed max value (">>/<<" scrolls...)

⇒"<u>MEM</u>"⇒"<u>VIEW</u>"⇒"<u>MEM</u>": best lap time - Speed min value ("<u>>>/<<</u>" scrolls...)

 $\Rightarrow$  "<u>VIEW</u>"  $\Rightarrow$  "<u>VIEW</u>": quit data recall and go to general display view.

# Backlight:

Press "MENU" button and you can see:

Night Vision ON/OFF: use "MEM" button to enable/disable the backlight.

# **Total Running:**

Press twice "MENU" button and you can see:

Total non resettable running on top row

Total resettable running on botton row (press MEM button to clear both this value and the resettable odometer one and OK button to confirm)

# Odometer

Press <u>three times</u> "<u>MENU</u>" button and you can see: Total non resettable odometer top row Total resettable odometer bottom row (cleared with resettable running)

# Firmware version and serial number

press <u>four times</u> "<u>MENU</u>" button and you can see: Firmware version and date on top row Logger serial number on bottom row.





#### 6.3.3 - How to configure MyChron Light TG Dash

#### Select TG-dash in Display Layer; this window appears:



Figure 11: DAVID Display Configuration - MyChron Light TG Dash Configuration window

**Speed channel**: set the speed channel you wish to display; choose between Speed\_1 / Speed\_2 or a speed coming from the ECU of your vehicle (as in **Figure 11**). The speed is the same you enabyled on "Channels" layer.

MyChron Light TG Dash is mainly configurable via keyboard and it can

manage lap and split times in different ways:

- lap time: lap counter, qualify mode and race mode
- **split time**: three different kind of variation mode, actual split time, cumulative and running time.





#### Lap time configuration:

To set this function: "MENU"  $\Rightarrow$  "Session mode".

Lap counter mode shows lap number on the top left corner, lap time central, pilot's name and track name on the top left corner

<u>Qualify</u> mode shows remaining time to the end of the session on top left corner (accepted values from 5 to 60), lap time central and pilot's and track name on top right corner.

<u>Race</u> mode shows on top left corner laps remaining to the end of the session (accepted values from 3 to 2000), lap time central and pilot's and track name on top right corner.

#### Split time configuration:

<u>None</u> The lap timer records split times, but does not show them. It shows pilot's and track name on top right corner, lap number on top left one, lap time in the central row.

<u>Elapsed Vs</u> Time elapsed from start/finish line to the current split can be compared with the same one of the best lap of the <u>session</u> or of the best lap you recorded on this same <u>track</u> (best lap in Memory).

The same comparison can be made considering the single section (<u>Section Vs...</u>) of the circuit.











In both cases you see on top left corner lap number, on top right corner lap time and central the gap you selected.

<u>+/- Prev Lap</u> The lap timer calculates the split time of current lap and shows the gap between current split time and the same of previous lap.

<u>Split Actual</u> The lap timer shows lap number on top left corner, lap time on top right corner, actual split time on central row.

<u>Split Accumulative</u> shows on top left corner lap number, on top right corner lap time and on central row the time elapsed from start/finish line

<u>Split Running Lap time</u>. The lap timer shows lap number on top left corner, running time on top right corner, lap time on central row



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**Please note**: all split visualizations above reported change when a lap time is recorded. To know what happens when a split/lap signal is recorded in the different visualization modes, refer to the following table.

Split mode	Central Row		Top right row		
	Split Recorded	Lap Recorded	Split Recorded	Lap Recorded	
None	Shows Lap	Shows Lap	Best Lap	Best Lap	
Elapsed Vs.	Shows Split	Shows Lap	Shows Lap	Shows Split	
Section Vs.	Shows Split	Shows Lap	Shows Lap	Shows Split	
Plus/Minus	Shows Split	Shows Lap	Shows Lap	Shows Split	
Actual	Shows Split	Shows Lap	Shows Lap	Shows Split	
Accumulative	Shows Split	Shows Lap	Shows Lap	Best Lap	
Running Time	Shows Lap	Shows Lap	Running	Running	

#### Set date and time

"MENU"  $\Rightarrow$  "Configure"  $\Rightarrow$  "Set Time/ Date": choose Time format (12h or 24h) and Date Format (YY/MM/DD - American format - MM/DD/YY – Japanese format DD/MM/YY – Italian format).

#### Set the display

"MENU"  $\Rightarrow$  "Configure"  $\Rightarrow$  "Display Setup". Available options are: reverse, set contrast (from -10 to +10), rolling number and Screensaver (activates after 1 minute of inactivity and run the lap timer in demo mode).




6.3.4 – Other keyboard functions of MyChron Light TG Dash

(data recall, data clear, obscuring time, track options, firmware, serial nr.)

## Recall recorded data:

Press "MEM" button. Following this sequence of buttons you see:

⇒ "MEM" Best Lap time of each run on central row with track name and run and lap number on top left row.

 $\Rightarrow$  "MEM"  $\Rightarrow$  "VIEW": Histogram of the run.

 $\Rightarrow$ MEM"  $\Rightarrow$  "VIEW"  $\Rightarrow$  "VIEW": Details of the run with track name, date and time of the run.

⇒ "MEM" ⇒ "VIEW" ⇒ "VIEW" ⇒ "VIEW" Best Rolling lap time and Best Theoretical lap time (functions explained here below).

Best Theoretical Lap time



This lap time is calculated adding all best split times you made during your run on the same track. This Lap time is only theoretical, because is made calculating the best recorded split times of different laps.

Best Rolling Lap Time

This Lap time is obtained adding all best consecutive split times you really obtained. This means that this lap can also not begin at start finish line nor ending there.

Here follows an example that helps you understanding this option.





Best Lap Time: Lap 3 = 1'21" Best Theoretical Lap Time = 1' 18" Best Rolling Lap Time = 1'20"

### **Clear Test Data**

"MENU"  $\Rightarrow$  "Clear Test Data"  $\Rightarrow$  "YES".

### **Obscuring time:**

"MENU"  $\Rightarrow$  "Min Lap Time": set obscuring time (accepted values are from 3 to 180 seconds).

<u>Obscuring time</u>: time period when the receiver is obscured and cannot detect lap/split signal. Use it if you do not want to record split times on tracks where more split transmitters are installed. Set it at a time lower than your best lap time and higher than the time elapsed between last split and Start/Finish line.



### **Track options**

- <u>select</u> a track name: "MENU" ⇒ "Track" ⇒ "Select" ⇒ select the track name you want to set ⇒ "OK".
- <u>enter</u> a track name "MENU" ⇒ "Track" ⇒ "Enter names" select a free position and enter track name.
- see/ delete <u>best</u> Track <u>Laps</u> "MENU" ⇒ "Track" ⇒ "Best Laps"; all best laps of that track are shown; to **delete** one select it ⇒ "OK" ⇒ "YES"
- to <u>clear all times</u>  $\Rightarrow$  "MENU"  $\Rightarrow$  "Track"  $\Rightarrow$  "Clear all times"  $\Rightarrow$  "YES".

### Firmware version / serial number

"MENU"  $\Rightarrow$  "Configure" " $\Rightarrow$  "System Information".

Firmware version: second line Serial number: third line.





# 6.4 – How to configure DAVID Video

⇒activate "Video Configuration" layer:



Figure 11: Race Studio 2 System Manager – Video Configuration Layer

**DAVID** Video Configuration sets the bottom part of the video image red circled in **Figure 12**:



Figure 12: DAVID Video image





### Video Configuration Manager box:



This box is used to:

- ⇒ Manage Logos (see below)
- ⇒ Reset the default Video configuration
- ⇒ Add a new object to DAVID Video (see below)
- ⇒ Delete an object from DAVID Video (see below)
- ⇒ Set Video Background (available backgrounds are: carbon, black, dark grey)

Here follows more information about Logos Management Adding/Deleting

object to/from DAVID Video





### Logos Setup:



Press "Logos Setup" button and the window upon appears; it allow you to:

- ⇒ Select one logo between these shown in the lower part of the window through the slide bar.
- $\Rightarrow$  Add a logo to the configuration
- ⇒ Delete a Logo from the configuration
- $\Rightarrow$  Resize logos.

**Note:** when you act on a logo, this one is highlighted with an yellow line in the lower part of the window.

If you click on "Add Logo", the window below appears. It allows you to:



- ⇒ Select one logo between these imported in the resources
- $\Rightarrow$  Import up to 25 logos in the resources
- $\Rightarrow$  Delete a logo from the resources
- ⇒ Add a selected logo to the configuration-





### Please note: supported Logo are:

Logo Format: Bitmap 24 or 32 bit

Logo **Dimensions** (in pixels): 64 x 64 pixels

128 x 128 pixels

128 x 64 pixels and vice-versa

If you try to import wrong format or dimensions logos the following warning messages appears:

📫 Race	StudioConf 🛛 🔀
⚠	Bitmap Dimensions Not Supported
	ОК







# New/Delete Object:

Video Conf. Manager		Visualization
Logos Setup	New Object	🗖 Draw Grid 👘 Video Objects On
Reset Video Conf.	Delete Object	2.0 Enlarge
Background	Carbon 💌	TV Standard
Number Of Video Obj.	13	C NTSC(USA)       PAL
Speed Speed Shift Light	Accelerometer Throttle	Lap Time
40 120 20 140 0 mph 160	Channel BOSCH_SF	Upper Bound Measure Unit EED1  210  (km/h)

Figure 13: Race Studio 2 - System Manager window - Particular of Video Configuration Layer

To **add** an object to **DAVID** Video:

- ⇒ click on "New Object" button and a new object appears in the part of the window that shows the system configuration.
- ⇒ scroll the slide bar red circled in Figure 13 and select the desired video object between these you have in the list. The added object can be positioned as liked just displacing it with the mouse. Please pay attention not to overlap video objects.
- ⇒ select the channel you want to show with the selected video object if this is configurable; for those objects that need it you have to set some more parameters like scaling, threshold value, label etc...

To know how many objects you can show and why, please see Note 3 "Video Objects limits" at the end of this chapter.





To **Delete** an Object from **DAVID** video:

- ⇒ select the object you want to delete (clicking on it or selecting the related layer<sup>3</sup>);
- $\Rightarrow$  click on "Delete Object" button.

<sup>&</sup>lt;sup>3</sup> The layers corresponding to the different video object are highlighted with a red arrow in **Figure 13**.



#### Visualization box:

-Visualiz	ation	
🔽 Dra	w Grid	Video Objects On
2.0	•	Enlarge

Through this box you can:

- ⇒ Draw a grid on the bottom part of Video Configuration Layer so to make easier the video objects placement.
- ⇒ Makes a preview of how the video objects are shown on DAVID Video
- ⇒ Enlarge the bottom part of Video Configuration Layer, always to make it easier the realisation of the video configuration.

**Please note:** all these functions **affects only Race Studio 2**; they do not affect the aspect of the real Video (the part red circled in **Figure 12**). In **Figure 14** you see the bottom part of video Configuration layer with the grid drawn, video objects on and at 2.0 size



Figure 14: Race Studio 2 – System Manager window – Video Configuration layer with grid and video objects on





### **TV Standard Box:**

TV Standard		
O NTSC (USA)	PAL	

To know which TV Standard is your video camera, please refer to its user manual. In any case we can assume that NTSC TV Standard is mainly used in the USA while PAL TV standard is mainly used in Europe.



#### Note 1: "Graphic object visualization".

If your Pc monitor shows you the greyscale of graphic object not homogeneous (exactly as shown in **Figure 14**), you can try to solve this problem operating on the properties of your video card.

First of all, please close Race Studio 2 and click on "Start / Settings / Control Panel / Monitor / Settings / Advanced Options" and a panel concerning your video card properties appears. This panel can be different on different cards. You have to operate on "OpenGL" settings. These settings can also be found in 3D layer on these Pc that do not have a specific "OpenGL" layer. What is necessary to do is raising the rendering quality of 3D in the "OpenGL" settings. This operation can solve the problem, also if not always it does.

Another suggestion we can give you is to check that the video card driver you have installed on your Pc is the last available. In case it is not, please try updating your video card driver. We always suggest to update it.



#### Note 2: "Sampling Frequency"

In **Race Studio 2** System Manager Window – Channels Layer, you can set Sampling frequency of each channel. As far as RPM and displayed speed channel are concerned we suggest you to set them to 50 Hz because this is the screen image refresh frequency. Here below you see how to set these channels:





RPM	Disabled	Engine	10.107
SPD_1	Enabled	Speed_1	50 Hz
SPD_Z	Enabled	Speed_Z	10 Hz
CH_1	Disabled	Channel_1	10 Hz
OH_2	Enabled	Channel_2	10 Hz
CH_3	Enabled	Channel_3	10 Hz
CH_4	Enabled	Channel_4	10 Hz
CH_5	Enabled	Channel_5	10 Hz
CH_6	Disabled	Channel_6	10 Hz
ACC_1	Enabled	Acc_1	10 Hz
ACC_2	Enabled	Acc_2	10 Hz
LOG_TMP	Enabled	Datalogger_Temp	10 Hz
BATT	Enabled	Rattery	1.60
ECU_1	Enabled	BOSCH_RPM	50 Hz
ECU_2	Enabled	BOSCH_SPEED1	10 Hz

- ⇒ Select RPM Object you want to display and verify the associated channel.
- ⇒ Select Speed Object you want to display and verify the associated channel.
- ⇒ Activate Channels Layer in Race Studio 2 System Manager Window and set the sampling frequency of RPM and shown speed to 50 Hz as in the figure on the left.



Note 3: "Video objects limits"

For all these objects whose refresh is at 50Hz (typically RPM and speed, those with the pointer) the maximum number of showing number is two. Some objects, like the accelerometer or the lap box etc. are considered as one object, but with more active parts.



The accelerometer is indicated as one object, but has two active parts,

that allows you to see, for example lateral and longitudinal acceleration.



The Lap box is indicated as one object, but is made up of **six** active **parts**:

- 1. Lap number
- 2. Lap time
- 3. Split number
- 4. Split time
- 5. Best lap number
- 6. Best lap time



The total number of object you can show in the video is 16.

The **total** number of **active parts** you can show in the video is **16**. This information is written in Video configuration Manager box and is red circled in the figure below:



If you exceed the number of active parts, Number of Video Objects on value becomes red and a warning message appears when you try to transmit the configuration to **DAVID** system.



# 7 – Sensors management

Your **DAVID** system can manage both on board and custom sensors. Moreover some sensors, like potentiometers and accelerometers, need to be calibrated / auto-calibrated.

# 7.1 – How to configure a custom sensor (expert users only)

To configure a "custom" sensor (not included in the default sensor list), press *Custom sensor* button in the top toolbar: this window appears:



Figure 15 – Race Studio 2 – Customize Sensor window

This window is composed as follows:

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- <u>First column</u>: enter the instrument's output voltage in mV (the *abscissa* values of the calibration curve).
- <u>Second column</u>: enter the temperature/pressure value corresponding to the output voltage (the *ordinate* values of the calibration curve). These values are interpolated using a polynomial.
- <u>Third column</u>: "Curve Error" (the difference between the computed curve and the experimental values). This is useful to verify that the curve computed by the software is faithful to experimental values.

The calibration curve can be set using more experimental values: enable the checkbox on the left of the abscissa value(s) you wish to use.

- <u>Central part</u>: sensor calibration curve on top and 5 coefficients (from a<sub>0</sub> to a<sub>4</sub>) of the interpolation polynomial on bottom.
- Use button "<u>Compute Curve</u>" to refresh the calibration curve or to apply changes.
- <u>Select Sensor box</u>: shows some default "custom" sensors; to load one click twice on the sensor's name.
- <u>Sensor name box</u>: loads another sensor: fill in "Sensor name" box, the corresponding measure units ("<u>Sensor unit</u>" box) and "<u>Sensor type</u>" box

(Temperature, Pressure or Other type).

Below these boxes are some pushbuttons which allows You to <u>save</u>, <u>delete</u>, <u>import</u>, <u>export one or all customized sensors</u> and <u>exit</u>.

#### To create a new custom sensor:



- $\Rightarrow$  Fill in the three columns on the left following what before explained.
- $\Rightarrow$  Click on "Compute Curve" button.
- ⇒ Insert the sensor name and select the related unit of measure
- ⇒ Choose the type of sensor you want to create
- $\Rightarrow$  Click on "Save Sensor" button.

### To modify a custom sensor:

- ⇒ Select a sensor in "Select Sensor" box
- ⇒ Modify the values inserted in the three left columns
- ⇒ Click on "Compute Curve" button;
- ⇒ Insert a new sensor name
- $\Rightarrow$  click on "Save Sensor" button.



#### 7.2 - How to calibrate a sensor

After having transmitted the configuration o the logger you have to calibrate / auto-calibrate the sensors. Internal lateral g-sensor and "potentiometer distance" need to be auto-calibrated, while "mid zero potentiometer", "zero based potentiometer" and gear sensor need to be calibrated. To calibrate/auto-calibrate sensors, press "Calibrate" button on the top toolbar: this window appears:

	Configuration run		System have	
_	FROM_LOGGES		EV03 - 8 channels -	32.946
errents to	adocabrate			
Own.	Channelmane	Contract Service type	The Street of Street St	
ACC_3 ACC_1	Acc_2 Acc_1	Longitudinal accelerometer Lateral accelerometer	To calificate To calificate	Click here to autocalibrate all sensors in the list
enante Den	calizes Dametrane	Serut bpe	The state	Clot. here to calibrate
머금 머금	Channel_3 Channel_5	Nid zero potentionotes Nid zero potentioneter	To calibrate To calibrate	Caldente Caldente

Figure 16 - Race Studio 2 - Sensor Calibration window

 <u>Sensors to be autocalibrated box</u>: (potentiometer distance and internal lateral g-sensor) press "Click here to auto-calibrate all sensors in the list": "calibration status" turns from "To calibrate" in "Calibrated". Please



keep the car as horizontal as possible and place the potentiometer distance in its "0" position.

 <u>Sensor to calibrate box</u>: (mid zero potentiometer, zero based potentiometer and gear sensor) click on "Calibrate" button corresponding to the channel you wish to calibrate and follow the instructions prompted on your PC's monitor.

Once all the sensors have been auto-calibrated / calibrated, transmit the calibration to the logger pressing "Transmit" button.

Please note that the calibration / auto-calibration procedure is fundamental to acquire correct data.



## 8 – How to download a test

Once a test session has finished you can download data stored in **DAVID** memory. To correctly download these data, please follow carefully this procedure.

The best way to make a correct download is to have Pc and DAVID switched off. Please connect the USB cable to the Pc and to DAVID USB port and switch on before the Pc and after DAVID.

If, on the contrary, you happen to have your Pc already switched on please:

- $\Rightarrow$  Ensure that USB cable is disconnected from DAVID
- $\Rightarrow$  Switch DAVID off
- ⇒ Connect USB Cable to the Pc USB port
- ⇒ Connect USB Cable to DAVID USB port
- ⇒ Switch DAVID on





#### 8.1 – Downloading a test

To download data, please run **Race Studio 2** and, click on *"Download"* button, (on the commands toolbar): file download starts automatically and the following screenshot appears:

		Operation in progress		
				16
)	lear logger memory after t	aving data		
	Browne F VProgram	WAIM\DATA\NU0V0.DRK		See
eifi	Name (necessary)	NUOVO		
r.	Vehicle	Norm		Add / Modily
•	Driver.	None	•	Add / Modity
e	Track:	None		Add / Modity
P	Championship:	Noné	•	Add / Modily
٦	Test type:	Generic testing		
2	Test conments:			
		1		1

Figure 17: Race Studio 2 – Data download window.

- ⇒ In the window's upper part you can see a "wait-bar" which informs you on the download percentage status.
- ⇒ Below the download wait-bar, is a box (circled in Figure 21) that allows you to *Clear* the logger memory after saving data or to leave data in the instrument memory; to clear the memory after saving data, please enable the cell; we suggest you to do so.



- ⇒ Once downloaded all data, "Save" button, located under the download waiting bar, enables. If you press this button without specifying file name and download folder, the file is saved in the default folder "X:\Program files \ AIM \ DATA" (where "X" is the hard disk where you have installed Race Studio 2) with the default name "new.drk".
- ⇒ If you wish to save the file with another name or in another folder please insert the file name in the "Name" box, press "Browse" button and choose the desired destination folder.

Salva con nome	2 🛛
Salva jn: 🗀 DATA	
ESKE FORMULE CARTING NUOVO.DRK	
Nome file: NUOVO.DRK	Salva
Salga come: File DRK (.dik.)	Annulla

Figure 18: Race Studio 2 - Save as window

 If you disabled "Clear logger memory after saving data" option, once you press "OK" button to exit download, the dialog box in





Figure 19 appears. Please, select the desired option and exit download.



Figure 19: Clear logger Memory window

We strongly recommend you to clear logger memory after each download to avoid logger memory to fill up and the system to stop recording.



#### 8.2 – Inserting the test in a database

**Race Studio 2** has a tests storing system based on databases that allows you to save files specifying 5 characteristics, such as vehicle name, driver, track, championship and test type. Such information are saved with the test file and are very useful, because you can group files into self-defined categories, each one characterized by 5 properties (vehicle, driver, track, championship and test type). When saving a new test file, you can insert it in the previously set database categories or create a new category.

You can load a test selecting the desired category and all tests not belonging to that category are not shown (the database works like a *filter*). To insert a test in the database after data download:

- ⇒ click on "Browse" button if you wish to select a destination folder
- ⇒ enter file name
- ⇒ click on "Add/Modify" button corresponding to *"Vehicle"* property; this window appears;



Figure 20: Race Studio 2 - Vehicle property window



- ⇒ if the database is empty or you wish to create a new name, fill the upper right box with the new Vehicle category and click "Add value to database" button. In the left column appears the new category and "OK" button becomes enabled: click on it;
- ⇒ if the desired category appears in the previously set database categories (left column), you may select it single-clicking on the name and then click on "OK" button;
- ⇒ if you do not wish to specify any category, the file are saved in the database and the attributes set to "None".
- $\Rightarrow$  please repeat this procedure for all 5 categories.

Once all the attributes have been set, like in **Figure 25**, please click on "OK" button.

Clear logger namoty after taxing data Browne / Fr/Frogravov/AMCGATA/HUDYO DVK Name (recommend) / FUDIVO Virtual / Formation / Fudivo	See
Economic / Vinogravenidah/CATAVAU01/0.04K	See
Name (necessary) (NUOVO	
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Driver     Ifed diver	Add / Mudly
🖌 Tinck, 🛛 Test back. 🚊	Add / Modily
T Dvangsonship:	Add / ModRy
Test type Generic testing	
Text comments (AIM text Sin	

Figure 25: Test property window



### 9 – How to use Race Studio Analysis

**Race Studio Analysis** is the software properly developed by *AIM* to analyse data acquired by your gauge. **Race Studio Analysis** is a very powerful instrument to analyze and improve your performances. It allows you to compare different laps, plot channels VS time, VS distance or VS frequency, has a data animation option, histograms plotting option and the very useful math channels.

If you wish to update **Race Studio Analysis** together with **Race Studio 2**, please connect to our website <u>www.aim-sportline.com</u> and go to "Download" page, where You can download the latest updates. To install the update, please click twice on the downloaded file and follow the instructions you see on your PC monitor.

To run Race Studio Analysis

⇒ click twice its icon (shown on the right), that You find on the desktop of Your Pc's monitor;



⇒ if you are working with Race Studio 2 click on "Analysis" tab, use "F5" function key or click: "Start \ Program files\ AIM \ Race Studio 2 \ Race Studio 2 Analysis".





Once Race Studio Analysis is launched, the following window appears:

Tree of	Q 2000	alari valuta	•	Land dive	_	T live	- 4	galaring	C term	election (ge	
Test name Testan Annual Mon. 2 Annual any Fe. Apr	The later 1 are 14, 99, 70, 00, 02, 15, 10, 10, 2	1. 8. 9ert 3. 7. 915 5. 3. 2214	6 25. 27 H. 83 Kar	Tertan Grani tettaj Grani tettaj	fr. 1 Fr.	Di T	0	E Vropen C Vropen		LEDPHILES VPDPHILES	Pin can
	1			and so					1		,

Figure 22: Race Studio Analysis - first window

The "Test database and lap manager" window is organized in different layers and allows You to load / unload a test and to manage both the database and the loaded tests.





You can load a test in two ways: the first one (recommended) is using

the 5 selection criteria, the second is not using the selection criteria.

#### Open test from database using selection criteria:

- ⇒ enable "Use selection criteria" box, circled in Figure 22. In the lower part of the window are all tests included in the database and in the upper part database categories and sub-categories
- ⇒ left-click on the desired selection ("Select track", "Select vehicle", etc...): the related selection window appears.





Figure 23: Test type selection window - no type selected (left) - one type selected (right)

- ⇒ to choose a database sub-category place a check beside the desired one, as in Figure 23. You can select more than one sub-category. Repeat this procedure for all categories (track, vehicle, driver, championship and test type). All tests not belonging to the selected sub-categories are filtered and not shown
- ⇒ to load a file check the desired database categories and doubleclick on the file or right-click on it and choose "Open test" option.



#### Open test from database not using selection criteria:

- $\Rightarrow$  disable "Use selection criteria" checkbox.
- ⇒ You can open a file in three ways: double-click, select it and press "Open test" button on the bottom toolbar; right-click on the file name and choose "Open test" option.

Ac	Setabase   1 Ivanced info	-Formula	Cle	eni   on test   	Espo	the Excel	Ves or	ly enabled laps	( they be trave.)
L. ]	Laptme	X on ref.	Time to:	Lap cause	TTTT	-	Last split	1	
81	01.17.445	65.51 %	36.14.666	(Lapmaker)		19			
1.	01.16.006	64.29%	07.32.111	(Lap marker)					
81.	U1.15.487	63.85%	10 03 636	(Lap market)					
81	01.16.238	64.40 %	15.21.591	E.ap market					
82	01.14.682	63.17 %	25.22.015	(Lap maker)					
82	01.14.479	62.00 %	26.36.697	(Lap marker)					

Figure 24: Race Studio Analysis - Test database and Lap Manager window

You may load up to 4 different tests at one time to make comparisons between different laps. In **Figure 24** are three layers: Test database one and two tests ones. To select a lap double-click on it or right-click on it and choose "Show lap" function. If a lap is shown the green icon on its left is yellow.





**Race Studio Analysis** allows you to plot recorded laps and sampled channels versus time, distance and frequency.

### How to plot engine RPM and vehicle speed versus time:

⇒ click on "RPM" and "Speed" in the "Measures and laps" toolbar (to see this toolbar ⇒ "view" ⇒ "Measures toolbar" and it appears on the left of Race Studio Analysis window)

 $\Rightarrow$  then click on the "Plot vs. time" icon.

#### How to plot a channel vs. time

 $\Rightarrow$  use the shortcut "CTRL+F1" or click "View \ Plot vs. time" command.

In the following figures are shown "Measures and laps" toolbar, **Figure 25**, and speed (blue) and RPM (red) diagram during a lap, **Figure 26**.

Meas	sures and laps					x
Me	asures Laps					
	Antoniol_emi	Lap 26		Lap 10		
	RPM	6583		ŋ	om	
	Fr Left Spd	190.1		kr	n/h	
	Speed	190.6		kr	n/h	
	c1_Pos. Farfalla	102.6			%	
	c2_0il pressure	2.8		E	oar	
	c3_Water Temp	124			°C	
	c6_Lambda	0.768	Г	V	/olt	
	Lateral acc.	-0.038			g	
	Longitudinal acc.	-0.229			g	
	data logger temp.	28			°C	
	Battery	14.02			V	
	Gear	5				

Figure 25: Race Studio Analysis - Measures and Laps toolbar

1**///**/









#### How to add a sampled channel to the graph:

Left click on the channel name inside the "Measures and laps" toolbar.

#### How to change the graph colour:

Left click on the coloured-boxes column; you may set the desired colour for each recorded lap and for each sampled channel.

#### How to add the scale to the graph:

Left click in the checkbox corresponding to the desired channel name.

### How to load and use "Measure information" dialog box (Figure 27):

Click on the pushbuttons of the last right column of the "Measures and laps" toolbar: this window allows you to change channel name, plotting scale and unit of measure, amplify and shift the diagram through the "Value=(Value\*A)+B" option: where A is the amplification factor (between - 1000 and +1000), while B is shift factor (between -500000 and +500000).





Measure information	
1 - Antoniol_emi 2 - Formule	
Features       Channel name:     Speed       Sampling rate [Hz]     10       Unit of measure:     Jum/h       Chonnel used     Speed       Plotting scale     Min       Min     50       Max     500	RPM     Fr Left Spd     Steed     cl_Pos. Farfalla     c2_OI pressure     c3_Wate Temp     c6_Lambda     Lateral acc.     Longitudinal acc.     data logger temp.     Battery     Geor
Value = (Value x A) + 8         Filter steps           A =         1         8 =         0         Number         0         •	Math formula:
Parameters     1690       Wheel circumference (mm):     1690       Number of magnets (or teeth) per wheel     2       Modified value     0       Parameter not used     0       Parameter not used     0	1 st lap shown       2nd lap shown       3nd lap shown       8nd lap shown       9th lap shown       9th lap shown       0K

Figure 27: Race Studio Analysis - Measure information dialog box.

If you choose a channel from the list in the right upper corner, the parameters You can set (RPM multiply factor, wheel circumference, pulses per revolution, etc...) appears in the lower left corner.





### APPENDIX "A" - DAVID technical notes

## **DAVID Pinout**



DAVID front view - Video Side

## **Power channel pinout**

### **Expansion modules pinout**

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1 2	9-15 VDC GND	3	GND	1 2	CAN+ GND	4 5	CAN- n.c.
Dowo	r camora 1 8	2 2 nin	out	3	+VB		
			<u> </u>		ninout		
Powe	Function	Pin	Function		pinout	<u> </u>	
Powe Pin	Function	Pin 4	Function	LANC Pin	pinout Function	Pin	Function







3/4/5 pins Binder female connectors pinout: external view







DAVID front view - Logger Side

### **Channels 1-5 pinout**

Pin	Function	Pin	Function
1	An. Input	3	+V Battery
2	GND	4	V Ref.

#### **Beacon Channel pinout**

Pin	Function	Pin	Function
1	Magn/Opt. codif. Lap	3	+V Battery
2	GND	4	Opt. non codif. Lap

# **Speed Channel pinout**

Pin	Function	Pin	Function
1	Speed 1	3	+ V Battery
2	GND	4	Speed2





4/8 pins female Binder 712 connectors pinout: external view

### ECU – RPM pinout

Pin	Function	Pin	Function
1	CAN+	5	RS 232 RX
2	CAN-	6	RPM 150-400 V (coil input) and square wave (>8V)
3	+V Battery	7	GND
.4	RS 232TX	8	RPM square wave (4-8 V)



## **DAVID** Dimensions




118,7 [4,6]



**DAVID** Front View Dimensions in millimetres [inches]





# **APPENDIX "B" - DAVID complementary equipments technical notes**

# **DAVID** supported cameras and consumption

## **DAVID** supported cameras

External Power:	12 VDC +/- 10%
Max current:	130 mA for each camera
Output signal:	Analog CVBS (composite) 1 Vpp

## **DAVID** consumption

With Viosport Adventure cam 2:	~10W
Adding MyChron 3 Dash:	~10,8 W
Adding MyChron Light TG Dash:	~10,8 W

# DAVID supported and suggested video-recorders

## **DAVID** supported video-recorders

Video input: analogue/composite/CVBS TV Standard: PAL (mainly European) NTSC (Mainly American and Japanese)

## DAVID suggested video-recorders

- SONY DCR-HC30
- SONY GVD-1000





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