



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

Manual Version:1.01Date of publication:August 30th 2005

Please note:

This user manually is copyright of *Aim* s.r.l.; all procedures You find here explained can change also substantially so, please refer to our website <u>www.aim-sportline.com</u> to know which are the newest procedure.

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!





TABLE OF CONTENTS

TABLE OF CONTENTS	4
1 – DAVID IS FOR	6
2 – DAVID Standalone architecture	7
3 – DAVID Standalone standard kit and accessories	8
3.1 – DAVID installation and power	9
3.2 – DAVID LanC connection	11
3.3 – DAVID maintenance	12
4 – DAVID Dash (optional)	13
4.1 – MyChron 3 Dash	13
4.2 – MyChron Light TG Dash	16
5 – Race Studio 2 Software	17
Note 1: "Race Studio 2" Visualization problems	19
6 – DAVID Configuration	23
6.1 – How to set and select a Configuration	24
6.2 – How to set DAVID Channels	26
6.3 – How to set and use DAVID Displays	30
6.3.1 – How to configure MyChron 3 Dash	31
6.3.2 – Other keyboard functions of MyChron 3 Dash	32
(data recall, total running, odometer, firmware, serial nr.)	32
6.3.3 – How to configure MyChron Light TG Dash	33
6.3.4 – Other keyboard functions of MyChron Light TG Dash (data recall, data clear, obscuring time, track options, firmware, serial nr.)	37 37
6.4 – How to configure DAVID Video	37 40
Note 1: "Graphic object visualization".	48
Note 2: "Sampling Frequency"	49
Note 3: "Video objects limits"	50
7 – Sensors management	52
7.1 – How to configure a custom sensor (expert users only)	52
7.2 – How to calibrate a sensor	55
8 – How to download a test	57



DV/D

8.1 – Downloading a test 8.2 – Inserting the test in a database	58 61
9 – How to use Race Studio Analysis	63
9.1 – How to load a test 9.2 – How to plot a channel	65 67
APPENDIX "A" - DAVID technical notes	70
DAVID Pinout DAVID Dimensions	70 72
APPENDIX "B" - DAVID complementary equipments technical notes	74
DAVID supported cameras and consumption	74
DAVID supported and suggested video-recorders	74
ADRESSES	75





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

\\/|Г





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 appears¹:



Figure 4: Race Studio 2 First window

۱**۸۱/**۱۲

¹ 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

Transmi		Hecewe									
Careril configuration		Contraction of the second									
Configuration iname	De	ta logger type	Ecu		Vehicle name		Available	200 C		Total frequency	
FIFFO	De	itstandakare	PROTEC + D	REAL PROOF PRACE	FIFFO		2.40.46	fum.a)		431 (Hd)	
Lep' Obscurrigtme		These	Contraction of the second	Import	Expert	-					
Leo Obscurrig time (Jec.) Lap segments		Theory Str	elänäs endunnt jur endungunat (~	uh							
Cap Obscuring time (Jac.) Lap segments N Installation r		Se terror	e Units eed unit ju ratuer unit R TECU Manufactu	et in the second	Vehicle name	00-	Ann Store			Orated	
Leo Obscurrig time (Jec.) Lap segments		So terps	elänäs endunnt jur endungunat (~	uh	Vehicle name	00.0	Lap- Stee	(]terp	Dipley Nave TG-dash	Oracted May 31, 2005 Jane 00, 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				E
M3 Kart Plus/Gold/Ext	Contraction Contraction	614	Value rame	Available Seven	Total Requercy
	Lano Mr. Ditta	tine_time	lano.	1.00.56.00.00.0	131.541
M3 Auto-Moto Plus/Gold/X0	Seneturel period. Character System control				_
MJLog/Visor XGLog	APM service Multiply factor	/1 💌 🖲 🛛		figued_3	1
MXL	Lad Pore · muinet	0		er wheel resolution [1	
David	Car setur			Call Obecaring time (sec.)	5
TGrea	Catcarded with restruit lagrant Charriel 6	100 Pt 0		Lat appents	1 2
Dash Stl	Highest giar number	KTTT (85	T they obviate in	tead of lay time
EvoJ	The Charged for allers Threewood	845 32	18.35	The Charvel for ala	m Tredukt
1000	Charnel_2 💌 0	ALTER AND		Channel 2	· 10
17	Currel 0			Clared_4	
	Charnel,5 💌 🛛		1	Channel_B	E [0
	P E Les alers to research Male Maaure Bortraine Feel 1 - alers Spland		Y	Heaven Fait (- alwan digtan	Bortiane
	Ound Out		te statu etring	Clavel,7	• 003
	Fw0.3 - page 1			Feit 4 - page 1	1000
	[Oave]3			(Darrel, 4	
	Feld 3 - page 2			Faid 4 r page 2	and the second second
	Otamel,5 . 01.5			(have)_8	• 04.6

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





Display Properties	20
Theres Darriss Scene Saver App	eases Select
Dag to minks som is math the pty	seal anangement stype manifes
1	2
Dearny 1 Plug and Play Meeting on Parcelant 3	C Proprier KORONOVICE Servers
front mathematica	Date gaths
have the base	
	Highweit [2] forth
1280 hp 1824 gaven	Happen (1) bet
CONTRACTOR OF A	
CONTRACTOR OF A	
1283 No. 1924 press	Tradentest.
1283 No. 1924 press	Trodeston Anexad

 \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.
- \Rightarrow 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

אאא א





6.1 - How to set and select a Configuration

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

	New	Delete	Clone	Import	Export						
10		Measure U	nits								
	curing time 0	Speed	unit lend								
ec.		and a speed	rorm, prove	h 💌							
		1 m m									
	6	- Enperat	ureunt 💌								
		Temperat	ure unit 🔍	•							
ap :	6	Logger	ECU Manufactu		Vehicle name	06	Lap	Speed	Temp	Display	Created
ap :	segments 6				Vehicle name ad	Ob	Lap	Speed	Temp	Display	Created May 31, 2005
	segments 6 Installation name	Logger	ECU Manufactu	ECU Model		06 8 8	6				

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	°F	•

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:

Fam		Speed_3	50	44C2	Gen service -				
Add Income	TCU signal	State of the local division of the local div		Contraction of the local division of the loc	- None		Colculated		
Sample Ballar	1100	Wheel catural arrived inset	1566 W	eel cacumberence inent 1866			leit ger natier		
	-		and the second second	ALCONTRACTOR AND A DESCRIPTION OF A DESC	and the second s	-			
MAX value :	1000 .	Puber per sched revolution	1	best per scheel revolution 1	Chanal		1.00		
Reference speed									
Chan	Speed_3	2							
Overest standifier	Endin-Didnah	Charvelname	Sangle	Service type	Houseur	Loner board	Upper bound	Parent 1	Paran 2
17 C	Coulded .	Engine	1111	Engine revolution speed	4940	£	20000	1000	Contraction of the local division of the loc
190,1	E/vabled	Speed_1	0014	Speed	Heft 1	0.0	250.0	1008.0	1.0
10,1	Evabled	Speed_2	1014	Need	No. 1	0.0	290-0	1966.0	1.8
01.1	Enabled	Channel_1	3014	Generic linear (2.5.1	W 1	0.0	6.0		
04,2	Enabled	Channel_2	12.44	Generic Insur 0-5 V	9.4	0.0	5.0		
06.1	Enabled	chavel_1	30.46	Generic linear 0-5 V	9.1	0.0	5.0		
01.4	Enabled	Charvel_4	2010	General linear 0-5 V	9.4	0.0	8.0		
04,5	Enabled	Channel S	33.46	General linear 0-5 V	W-3	0.0	5.0		
OH_8	Evalved	Channel, S	3049	Calculated Gew		0			
ACC_1	tratied	Acc_3	32.HJ	Lational accellar prestar	9.01	-3.08	1-00		
ACC_3	Endlied	Acc_2	2074	Longitudinal accelerameter	9.01	-3.00	3.00		
LOG_7MP	Enabled	Dataligger Temp	100 HM	Cold sant	*0	0	10		
BATT	Enabled	Bultory	3.44	Batery	9.1	5.0	15.0		
£04_3	Enabled	M8030_89M8	30.46	Engine speed service	- igen	6	20000		
60U_2	finalied	19800_11-8-01P08	30.90	Percentage service	N .1	0.0	500.0		
£04,3	Enabled	HERO MARTHES	10.04	Pressure service	Mrs .1	6.0	278.0		
ECU: #	Evalied .	HERO ARTINE	1079	Temperature sensor	10	30	150		
101 5	thatied .	HINO ENGINE TEMP	10214	Temperature service	40	-30	150		
102.6	Enabled	HEIOO LAHEDAL	22.74	Lambda sond	lambde .001	0.100	1.500		
CO) T	Enabled	MINO LAMERAL	100.000	Lambda sond	landsda .001	0.500	1.500		
6CU_8	Enabled	HEAD EDWART PRETE	10.94	Pressure sensor	10-1	0.0	156.0		
EGIE 9	Enabled	MEDIO ASK CHARGE	30.467	Percentage sensor		6	190		
CU 10	tivalied.	MIDOO PLELTEMP	30.90	Semperature senses	96	0	150		
101/11	fruitied	M000 PLELPRE18	10.44	Pressure entroir	ber it	0.0	8.0		
CU_17	Enabled	PEIGD COLTERS	10.044	Temperature sensor	HC .		150		-
10/ 11	Englied	MICO COPRESS	2270	Pressure entropy	bar 1	0.0	8.4		
102.14	finabled	HEIGO GEARINGS !	00.001	Voltowner	9.4	6.α.	15.0		
RC12_15	Englied	MENOD RESIDENCE F	20.99	Voltorater	4.1	0.0	15.0		
100J 16	Enabled	MILOO GEARSHOFTPORICE	10.Hz	Pressure sensor	Ma .i	0.0	155.0		
tCla 17	Ended	MIDO EXHIBIT	3546	Temperature annual	*C	6	1000		
CU_10	Enabled	MIDO EDITEMPT	35.94	Temperature sensor	10	0	1000		-
ECU IV	Instant	MICO CHANNE	2076	Ener union			1005		-
ECLA DB.	Enabled	HERD CHANNE	00.04	Raw take		e	1000		-
NTE TE	fasting.	MINO CHANNEL	2.0.000	Part of a			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 speed²
- ⇒ set channels table

² 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		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 S	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 abortifier	Dubled balled	Charoot have	Sanadrig R	Served Type	Photo and	Laver bard	Tager Island	Paran, 1	Fereil 2
199	Coalited	English	1010	Engrave-revolution speed	- April 10		30000	The second	1 BOOM
PD_3	Drafied	Speed_2	10 HE	figued	144/h -2	4.0	250.0	3006-2	1.8
PD_1	Eveloc 1	Speed_4	1016	Speed	hadh it	0.0	250.0	Distance in the	18.
962	Ended	Ownet,3	10.49	Garvers Inear (15.1	14.1	8.8	1.0		
DLI -	Ended	Ountel 1	10.48	General Instal 3-1 V	14.4	8.0	8.0		
OK B	Evaluet	Owned_3	10.46	General Read 5-5 V	(W.A.	8.8	1.0		
04_4	Studied.	Channel_4	80.46	General Inser 9-5 Y	1.4	8.0	5.0		
04.8	-trubled	Clavel 3	1019	Generic Invest 0-5 V	19.4	4.0	8.0		
DÚL:	Divided .	Charvel 5	1076	Cali Jated Gen					
40C, J	Evalued	A4.1	1010	Later d'accidentation	18.78	18.08	3.04		
ACC.2.	English	Au. 7	10.48	Longitudend acceleration	8.71	-5.00	5.00		
06,718	England	Eataloguer, New	10.10	Call part	\$4 		.86		
DATT	Endled	Ballery	1.14	Battery	¥-8	3.5	15.0		
500_1	Evaluat	80534,88%	10.48	Engine spread service	499	4	19000		
100.2	Enabled .	80504_SPEED1	10+9	Bauch upwed service	high 1	8.8	100.4		
E_U08	Evaluation	00004,398000	10+8	Speed served	ingh.	8	1006		
033.4	divalitant.	\$090+_08_H4E30	10.49	Provident person	34.5	4.0	18.0		
BOUL 5	Enabled	102394, FLB1, FRESE	10 %	Pressant opposit	her 1	8.8	75.0		
101.6	Ended	BOSCH_ATM_PRESS	10 49	Pressure service	184		1230		
titu_f	Enabled	80904 AUE, 18HP	5700	Temperature cension	1	40 40	215		
0,000	Analised .	80804,08,1999	614	Tangenature service		-60	215		
e.u.e	Endled	\$1904 BISON THE	514	Tangacature service		-50	190		
00,00	Enabled.	BOSON_ADD_TERM	576	Tanparature service	5.1	-88	150		
10.00	trubled	BOSCH, THRUTT, ANS	1616	theothe postani-service	5.1	8.0	100.0		
10.1.12 ····	Erveted	WORDY_SOUT_ANG	10.78	Angle setters	deg	-90	90		
60,10	Enabled	BOSIDY_AUR_COMMUNE	40.76	Percentage server			190		
100_34	Dubled	80504_848C_TF#1	10.46	Sustaer dool	ma 20	0.00	110.00		
B131_F5	Stubbel	80904_BLBC_19402	1010	System dock	46.01	8.00	210.00		
44_1C0	Enabled	BOSTH JARBEAU	10 Hz	Lambda sonal	# .001	0.000	16.000		
101,17	Evalue1	BOSIDH LAMEDAU	BIO HE	Lambda sond	# 1001	0.000	38.000		
98,400	Ended	BOSON LAW, CONTRI	10.92	fav rete	# .001	4.000	2.000		
00u_t#	Stabled .	BOSCH, LAM, CONTROL	10.46	April Labor	# .001	0.000	1.000		
102,29	Ended	80604_FUE_LEED	1010	Numeric person	9.00.	8.00	000.00		
101.22	Ended	BODON_GEAR	5.04	Gener service					
103.25	finatient	80504 (6a11	514	Scalenator	¥.4	4.8	18.0		

- ⇒ 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



רו/ייי



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) C PAL
Speed Speed Shift Light	Accelerometer Throttle	Upper Bound Measure Unit

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 layer³);
- \Rightarrow click on "Delete Object" button.

³ 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	Fooloe	10.86
SPD_1	Enabled	Speed_1	50 Hz
SPD_2	Enabled	Speed_Z	10 Hz
CH_1	Disabled	Channel_1	10 Hz
01_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	Baltery	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:

אראר



- <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 a₀ to a₄) 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 in FROM_LODG		System type EV03 - 8 channels - 321	4
evens to	adocabrate			
	Channel name Acc.,2 Acc.,1	Longitudinal acceleration Lateral acceleration Lateral acceleration		Click here to streatilizate all nears in the list
orman to Oven	calbeis Davietnese Daviet 3	Senar too Mid.com potentionofer	To calibrate	5. News to calibrate
DH <u>`</u> S	Channel_5	Mid zero poterlioneter	To calibrate	Collinate

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:

	RON 3			3
		Operation in progress		
				16
J	ear logger memory after t	aving data		
8	Rowse F. Program	WAIM\DATAWUUV0.DRK		See
eid lin	Name (necessary)	NUOVO		
z	Vehicle	Norse		Add / Modily
•	Driver:	None	· .	Add / Modity
•	Track:	None		Add / Modity
P	Championship:	None		Add / Modily
	Test type.	Generic testing		
2	Test convients:			
		28		

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	• + 🗈 💣 📰 •
EKE PORMULE KARTING NUOVO.DRK	
Nome file: NUOVO.DRK	Salva
Salga come: File DRK (.drk.)	▼ Annula

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.

		Operation completed	1	10
0	na logger namoly after s	ering date		
8	time Proper	WWHOATAWUUYO DRK		See
÷.	Nane (recettary)	NUOVO		
2	Velicle	Test vehicle		Add / ModRy
•	Drive	Test diver		Add / Madky
•	Teack.	Teil back	•	Add / Modily
T	Diargaoretig:	Text changionship:	•	Add / Modily
Ŭ.	Text type:	Generic testing		-
9	Text comments	AlM test Sie		

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:

a liter af		z ~	Salari vali		• 54	on al		Trained shares		Saled led light	
Terliname Pornale P Antional, and P	For, Das 14, 19 4 Age 06, 02 1	115	3.7	Beet log. 91 50-227 32 14-479	88.	Tertipe Geneticating Geneticating	fe. 1		CV-operation	AAM DATA POMALE . AAM DATA POMALE .	Pieros Bright
						Ingelief					,

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.

	Safabase 1 Ivanced info	-Formule	Cle			oof to Excel		enabled laps	(- Stand for strang)
L	Laptime	X on ref.	Time tos	Lap cause	a logic state of the	1.	Lost split		
11	01.17.445			(Lapmaker)		4			
11	01.16.006	64.29%	07.32.111	(Lap marker)					
1.	UI 15.487	63.85%	10 03 636	(Lap marker)					
11	01.16.238	64.40 %	15.21 591	E.ap market]					
12	01.14.682	63.17 %	25.22.015	(Lap marker)					
32	01.14.479	62.00 %	26.36.637	(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**.

Me	asures Laps			
	Antoniol_emi		Lap 26	Lap 10
	RPM		6583	rpm
	Fr Left Spd	\Box	190.1	km/h
	Speed		190.6	km/h
	c1_Pos. Farfalla		102.6	%
	c2_Oil pressure		2.8	bar
	c3_Water Temp		124	°C
	c6_Lambda		0.768	Volt
	Lateral acc.		-0.038	g
	Longitudinal acc.		-0.229	g
	data logger temp.		28	°C
	Battery		14.02	V
E	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: Jun/h Channel used Speed Plotting scale Min [50] Max [500] Alarms Min [70] Max [70]	RPM Fr Left Spd Steed cl_Pos. Farfalla c2_08 pressure c3_Water Temp c6_Lambda Lateral acc. Longitudinal acc. data logger temp. Battay Gear
Value = [Value x A] + 8 A = 1 B = 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 4th 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 3	CAN+ GND +VB	4 5	CAN- n.c.
Power camera 1 & 2 pinout				3	ŦVD		
		-					
Pin	Function	Pin	Function		pinout		
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
<u> </u> 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





ADRESSES



Aim Srl Via Cavalcanti, 8 20063 Cernusco Sul Naviglio Milan - Italy Tel.: 0039.02.92.90.571 Fax: 0039.02.92.11.80.24 E-mail: info@aim-sportline.com www.aim-sportline.com

EUROPEAN DEALERS

Ann Racing

Konsertv 7 S-245 42 Staffanstorp Tel.: 0046.46.25.53.84 www.aim-racing.se Sweden

Data Box

Pje ST Jordi, 1 Baixos 08757 Corbera de Llobregat – Barcelona Tel.: 0034.936.882.513 Fax: 0034.936.882.518 www.databox.es

Dataspares Acquisition Ltd

4 Southbrook Mews Southbrook Road London - SE 12 8LG Tel.: 0044.208.463.9222 Fax.: 0044.208.463.9333 www.dataspares.co.uk

Ing. Pavel Gellner

Dlohua, 464 380 01 Dacice Czech Republik Tel.:00420.384.423.862 http://www.aim-cz.com

Meca Racing

Rue du Paradis 91370 Verrières Le Buisson France Tel.: 0033.1.644.90.369 www.meca-racing.com

Memotec GMBH

Bauwaldstrasse, 1 75031 Epping Elsenz D Germany Tel.: 0049.7260.920440 Fax: 0049.7260.920444 www.me-mo-tec.com





Roteg Racing b.v.

Voorsterweg, 79 8042 AB Zwolle The Netherlands Tel.: 0031.38.423.85.82 Fax: 0031.38.423.85.83 E-mail: <u>info@roteg.nl</u> www.roteg.nl

Vinco Race Co Ltd

Scladochnaya Str. 1/6 127018 Moscow Russia Tel./Fax: 007.095.287.3860 E-mail: <u>karting@vinco.ru</u> www.karting.vinco.ru

AMERICAN DEALERS

Aim Sports LLC

31889 –Corydon Suite 140 92530 Lake Elsinore - CA USA Tel: 001.909.674.9090 www.aimsports.com

Aim Sports LLC South East

1636, B 9th Street SE#B Roanoke, VA 24013 USA Tel.: 001.540.342.9680 www.aimsports.com





ASIAN AND AUSTRALIAN DEALERS

Bear Inc.

7-2-26 Todoroki, Setagaya-ku, Tokyo. Cap-zip 158-0082 Japan Tel.: 0081.3.3704.0083 Fax.: 0081.3.3704.0194 www.aimsports.jp

AIM Sportsystems Pty. Ltd

60 Dobbie Av Corrimal East 2518 NSW Australia Tel.: 0061.02.428.31.855 www.aim-sportsystems.com

AFRICAN DEALERS

Development and Technology Solution

26 Japie LudickStreet Pentagon Park Bloemfontein South Africa Tel.: 0027.(0)51.43.61.026 Fax.: 0027.(0)51.43.68.746 http://www.aimonline.co.za