User Manual

TC HUB Connected to

MXL - EVO3 Pro/Pista





Racing Data Power



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Chapter 1 – TC Hub Description

TC Hub is a thermocouples multiplier that can support until four thermocouples ("K" type only). In addition, more **TC Hub** can be connected to the same logger. It communicates through the CAN bus, increasing the number of available channels without engaging any analog channels of the logger.

TC Hub also allows the user to monitor many more temperatures such as the exhaust gas temperature of all cylinders, as well as water and oil temperature, all at the same time.

Note: TC Hub also correctly supports IR sensors that simulate thermocouples ("K" type only).

Moreover, **TC Hub** greatly limits the amount of overall wiring that needs to be done in your vehicle. It is also water proof (IP 65), and can be connected to **MXL Pista/Pro05** and to **Evo3 Pro/Pista**.



Chapter 2 – TC Hub Mounting

Install **TC Hub** far from heat sources or any sources of electromagnetic interference. Please do not let the wiring pass near any heat sources, as it may affect the readings gathered by the data logger. Also, please use the proper lateral mounting holes to fix **TC Hub** to your vehicle.

Chapter 3 – Connection with MXL - EVO3 Pro/Pista



Please connect **TC Hub(s)** as normal CAN peripheral(s). Once configured with **RACE Studio 2** software, **TC Hub** will be automatically recognised at start up.



Chapter 4 - Configuration on MXL - EVO3 Pro/Pista

To use **TC Hub** with **MXL/EVO3 Pro/Pista**, user needs to configure it using **Race Studio 2** software. Please refer to the software installation manual for further information concerning the software and to the MXL or EVO3 user manual for any information concerning their configuration not contained in this tutorial. To configure the peripheral run **Race Studio2** software and select the desired logger.



The following window appears:

ce Studio 2 version: 1.00.02																		
system manager Download Anayss Log	Sys	tem manager	Calbrate Custom	uensors	Language	7								_				E
	6	Transmit	12	Rece	ive	-	CAN-Net i	nfo		Set ac	quisition time	syste	8					
AIM Sportline Cu	ateri	configuration							_			_	-					
World Geader In Data Acquisition	ntel	ation na Data logge	rt. Ecu	Vehic	ie nome 🛛 A	valable time	Time with GPS	Tob	al frequen	Master free	p_ Eq	ansion	s f V	ideo	system Tot. L	anbda	To	Expensio
Go to Analysis	EFAL	t configuration Char	none - None	DEFAI	AN Escanos	7.38.52 (h.m	3.42.47 (h.m.	. 151	(H2)	111 (Hz)	40	(HII)	N	0	0		1	
Download data	•	New	ge Delet	-	2	Clone		Im	port	4	Export	1						
i i i i i i i i i i i i i i i i i i i	N	Installation name	Logger	E	U Manufactu	rer DCU	Model		Vehicle na	me Obs.	Spl	Spee	d Ten	ιp	Created	Visio	Tot	Tot
	L	DEFAULT	MOL PESTA	- No	ne	None			DEFAULT	8	1	R	<u>•</u> •	•	February 13,	C	0	1
AIM system manager	2	DEFAULT	MDQ. PISTA	- No	ne	None			DEFAULT	8	1	Rece		-	February 13,	C	0	0
The second se	3	DEFAULT	MUL PISTA	- NO	ne ce	+ None			DEFAILT	8	1	K	-140	-	February 14,		2	0
	5	DEFAULT	MUL PISTA	* No	ne	* None			DEFAILT	8	1	k	• •C		February 15	6	0	0
AIM system identification	6	DEFAULT	MDQ. PISTA	~ No	ne	· None			DEFAULT	8	1	h	-1 *C	-	February 15,	C	1	0
1	7	LOGGER_CONF	MUL PRO 05	- No	ne	* None			READ	8	1	k	-1 -0	•	February 26,	C	0	1
AIM system calibration Custom sensor manager Select language																		
aim sportline.com																		
NIN CRVALDANTI, B 200 SUL HAMIGLIO, HILAN - ITALY																		



Select "CAN Expansion configurator" layer.

In case of very first configuration the layer will show up empty, as shown below:

Select configuration Channels System configuration [CAN-Expansion configurator]
Add Expansion Del. Expansion Use video system
No configuration for expansions
Click on "Add expansion" button to create a new one. or click on "Use video system" button to create a configuration for your DaVid Slave Expansion.

Press "Add Expansions" (or "Del. Expansion" to delete an expansion and then confirm the choice) and the following window appears:





Scroll with the lateral "◀" "▶" buttons until "**TC Hub** (4 thermocouples expansion)" button appears.

- Press it
- Insert Name of expansion configuration
- Insert ID number reading it from the expansion label
- Select OK or
- Click "Choose ID¹..." to load **TC Hub** using its ID
- The window below appears
- Select the ID of the **TC Hub** to configure
- Click "Use ID number of selected expansion" button

0	ose ID number o	f a connected expansion				
N	Categoria centr	Tipo centralina	ID centralina	Data identificazi	Ver. Firmware	Data Firmware
1	MASTER	MXL PRO 05	122335	08/02/2008	14.86.23	16/01/2008
/p	e of expansion: :ct an ID number fror	n the list below.				
4	Categoria centr	Tipo centralina	ID centralina	Data identificazi	Ver. Firmware	Data Firmware
	CAN EXPANSION	TC HUB	5678988	08/02/2008	40.02	21/02/2008

The operation will need to be repeated for each **TC Hub**, or any other CAN expansions that you are using. The layer tabs will be modified as shown below.



To configure **TC Hub** activate the layer corresponding to the configuration previously inserted.

¹ ID = Identifier or Serial Number, univocal identifier of each device.



The window below appears:

Add Expans eo configuration Name of expansio II	TCH - TC HUB On configuration (15 characters max.) O number of expansion	Use video s TCH 5678988	system	Choose ID number of a connected expansion]			
abled/disabled	Chappel name	Sampling fr	reque	Sensor type	Measure unit	E I	Low scale	High scale
Enabled	EGT Cylinder 1	10 Hz		Thermocouple	°C	•	0	100
Enabled	EGT_Cylinder_2	10 Hz	-	Thermocouple	°C	+	0	100
Enabled	EGT_Cylinder_3	10 Hz	-	Thermocouple	°C	-	0	100
Enabled	EGT_Cylinder_4	10 Hz	-	Thermocouple	°C	-	0	100
		50 Hz 100 Hz						

In this window you see the following:

Тор

"Name of configuration": by filling in the desired configuration name, the label of the layer is modified live.

"ID Number of expansion": it is possible to manually input this by reading the number from the device label or by choosing it as explained before.

Centre - A table shows the characteristics of the expansion channels.

"Enabled/Disabled": through this checkbox it is possible to enable/disable **TC Hub** channels. Enabling/disabling of the channels needs to be repeated for all the connected expansions.

"Channel Name": double clicking on this cell you can insert the desired name for that channel

"Sampling frequency": through a pop up menu you can set sampling frequency of the channel; values range from 1Hz to 100 Hz.

"Sensor type": this column is not configurable because **TC Hub** only supports *"K"* type thermocouples or sensors that work simulating these sensors.

"Measure unit": this column allows to set thermocouple to measure in units of °C or °F.

"Low scale/ High scale": these columns allow the user to set Low and High scale values of the sensor.



4.1 – MXL and EVO3 Pro/Pista display configuration

Once you decide which channels are to be enabled/disabled, it is possible to display, if you wish, **TC Hub** enabled channels depending on the logger and on the connected peripherals. In the case of an **MXL** it is possible to show the channels setting them in "System configuration" layer.



TC Hub channels visualisation can be selected like any other channel visualisation (see logger user manual for further information). In the example below enabled channels of **TC Hub** that the user wish to show are TC_1 and TC_2. Each of them is visible in one field of the display as shown above.

In case on an **EVO3** logger, data visualisation is only possible if a **Formula Steering Wheel** or a **MyChron3 Dash** logger display are connected. Displayed channels will be set in that display configuration layer as shown below.

Shift Light										
Led 1	Led 2	Led 3	Led 4	Led 5						
0	0	0	0	0						
SHI	FT LIGHT ►	1234	5		Display	Page 1 - Channels a	and alarms —	Display	page 2 - Channels	and alarms —
0		••••		-	Field 2	Cilindro 1_TC_1		Field 2	Cilindro 1_TC_2	-
					HIGH	LED None 💌 0	Value	HIGH	LED None 💌 0	Value
	1 7	10100	12	EED 3	LOW	None 💌 0		LOW	None 🗾 0	
10	7		35	0	Field 1	Channel_1	•	Field 1	Channel_3	•
LED	2 00			LED 4	HIGH	LED None 💌 0	Value	HIGH	LED None 💌 0	Value
		AIT	C. S. C.		LOW	None 🗾 0		LOW	None 🗾 0	1



Once **TC Hub** configuration is over, the configuration needs to be transmitted to the logger. To do so, click on the "Transmit" button on the top of the **Race Studio 2** keyboard. The following window appears.

em o	configuration	
	Transmitting configuration	
Time	Operation requires about 20 seconds	
	07.50%	

Once the configuration has been transmitted to the logger a confirmation message appears.



If USB connection between **MXL/EVO3 Pro/Pista** and the PC is not OK or if one or more CAN expansions have not been correctly recognised by the logger, one of the following warning messages appears:

USB Error:

- unplug USB cable from the logger and from the PC USB port
- plug the cable in again
- try to retransmit the configuration to the logger.

CAN expansion has not been recognised by the logger:

- check that expansion ID number is correctly inserted;
- try to retransmit the configuration to the logger.



RaceStu	ıdioConf 🛛 🔀
1	Sorry, some of expansion configurations have no ID number or an ID number that doesn't match with those of connected expansions. Please, check the ID numbers of expansion configurations and retry to transmit. OK



Chapter 5 – Data visualisation on MXL/EVO3

5.1 – Data visualisation on MXL

TC Hub channels visualisation on **MXL** works exactly as the visualisation of any other **MXL** channel: switching from one page to another of the display is done by pressing the "quit/VIEW" button. Please refer to **MXL** user manual for further information. For example, in the image below the temperature value sampled through the **TC Hub** is **70**° and the channel's short name is **OIL T**.



When the MXL is switched on , TC Hub is automatically recognised.

5.2 – Data visualisation on EVO3

TC Hub channel visualisation on EVO3 works exactly as the visualisation of any other EVO3 channel and is thereby possible only if the logger is connected to a display. The only displays that allow you to visualize TC Hub channels are MyChron3 Dash and Formula Steering wheel. Please refer to EVO3 user manual for further information. In the image below the temperature value sampled through TC Hub is 70° and the field is labelled as ""C"



When the EVO3 is switched on, TC Hub is automatically recognised.



Chapter 6 – Data analysis through Race Studio Analysis

During data analysis **TC Hub** does not require any substantial modification of software views compared to its normal use because the **TC Hub** only adds four temperature channels that can be visualised as any other temperature channel. Those channels will simply appear at the bottom of your channels list, and can be view in the same way all of the other channels are.

Appendix – Part Numbers and technical drawings

"A" – Part Numbers

TC Hub (Complete kit with cable)

X08UTCCTC

"B" – Technical Drawings







TC HUB pinout



3 PIN FEM. BINDER CONNECTOR PINOUT



POSI	ITION 1	POS	SITION 2	PC	SITION 3	PO	SITION 4
1	TC1	1	TC2	1	TC3	1	TC4
2	GND	2	GND	2	GND	2	GND
3	NC	3	NC	3	NC	3	NC