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.

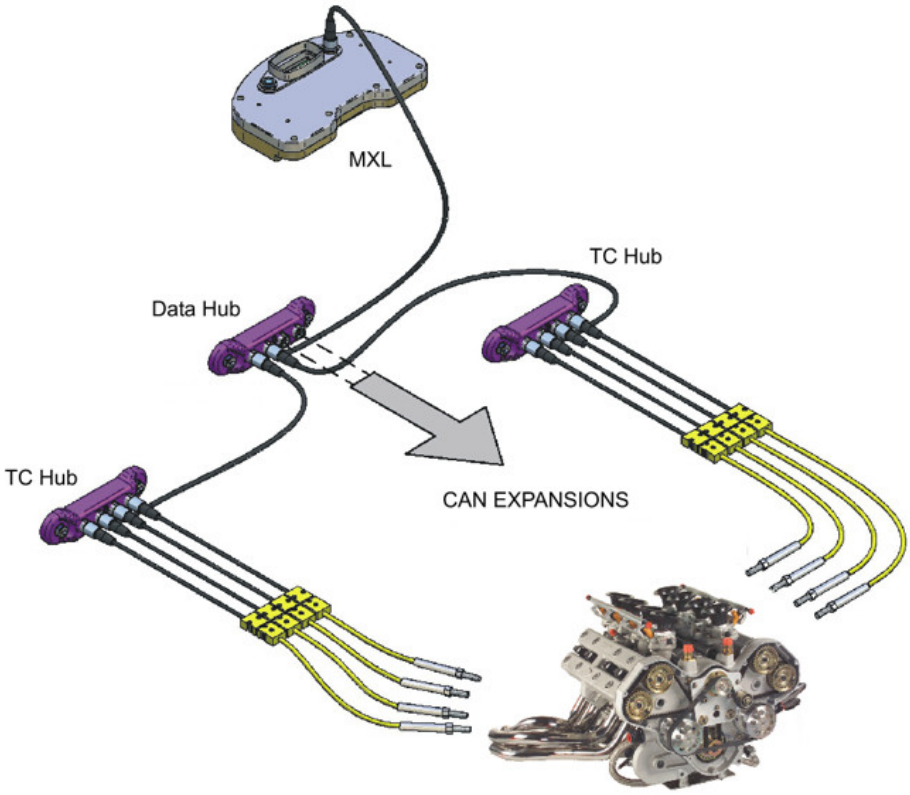
Note: **TC Hub** also correctly supports IR sensors that simulate thermocouples (“K” type only).

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

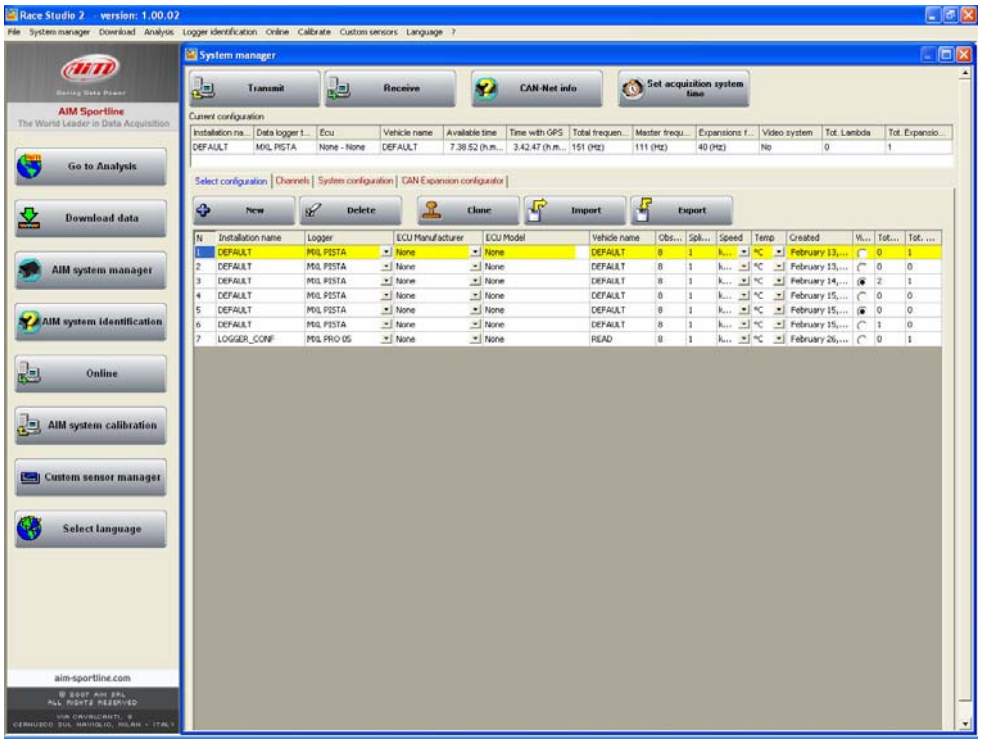


Please connect **TC Hub(s)** as normal CAN peripheral(s). Once configured with **RACE Studio 2** software, **TC Hub** will be automatically recognised at start up.

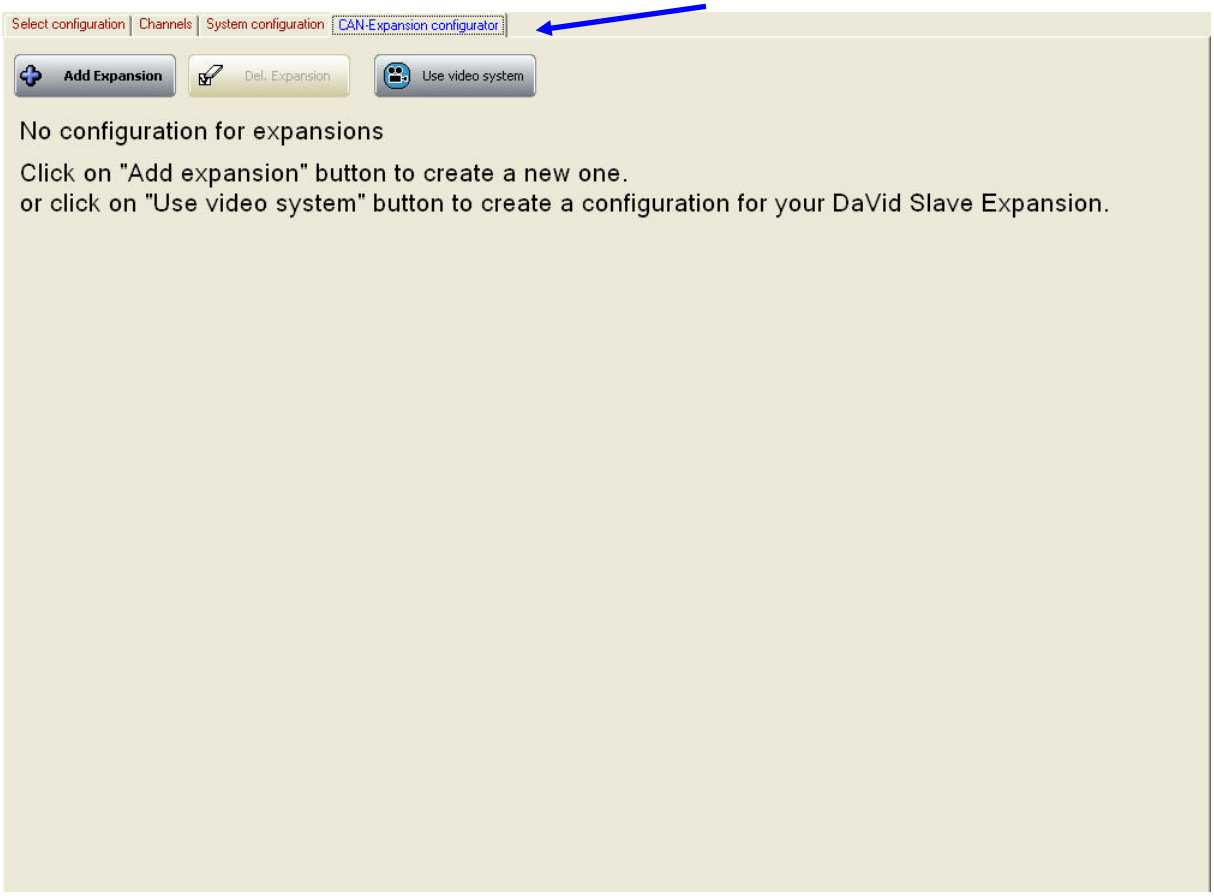
Chapter 4 - Configuration on MXL - EVO3 Pro/Pista

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.

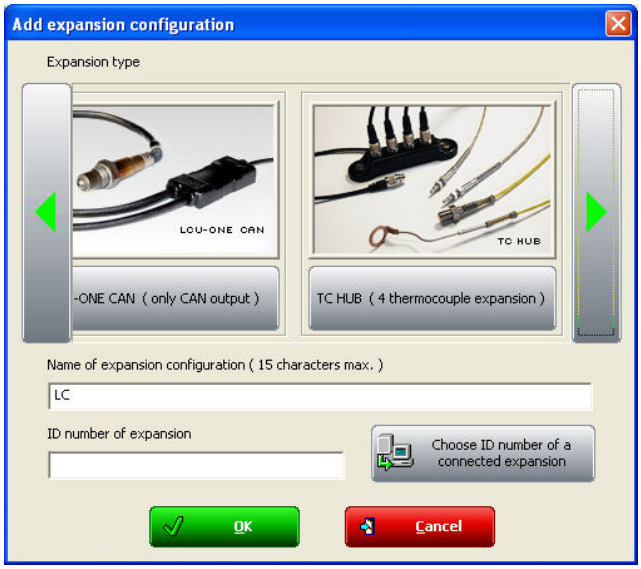
The following window appears:



Select "**CAN Expansion configurator**" layer.
In case of very first configuration the layer will show up empty, as shown below:

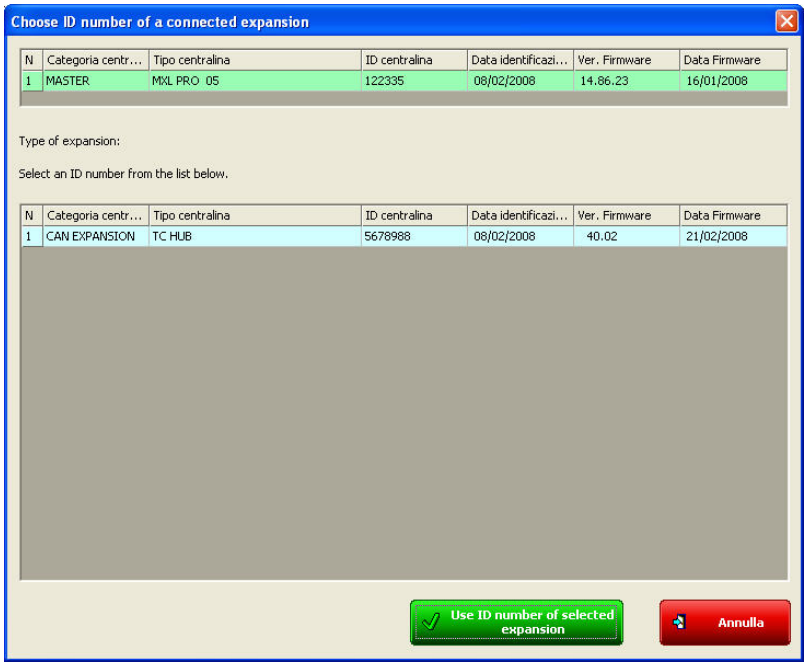


Press "Add Expansions" (or "Del. Expansion" to delete an expansion and then confirm the choice) and the following window appears:

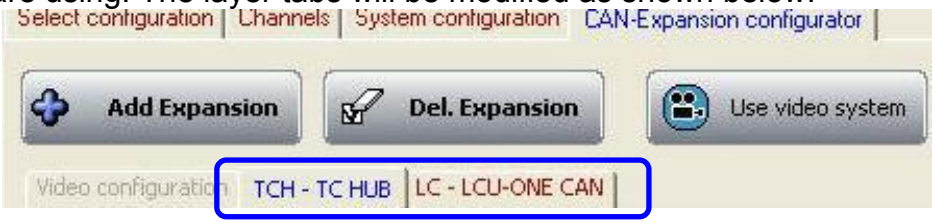


Scroll with the lateral "◄" "►" buttons until "**TC Hub** (4 thermocouples expansion)" button appears.

- Press it
- Insert Name of expansion configuration
- Insert ID number reading it from the expansion label
- Select OK or
- Click "Choose ID[1]…" 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



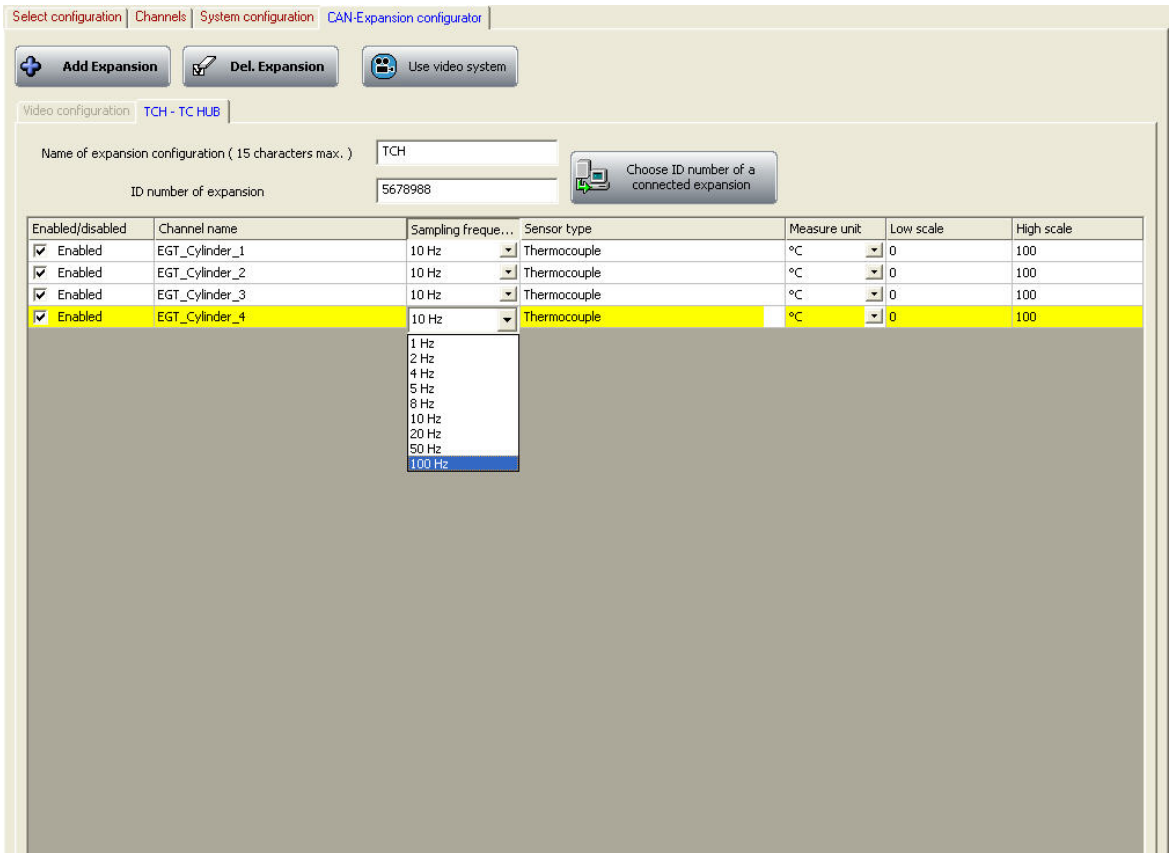
The operation will need to be repeated for each **TC Hub,** or any other CAN expansions that you are using. The layer tabs will be modified as shown below.



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:



In this window you see the following:

Top

"*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.

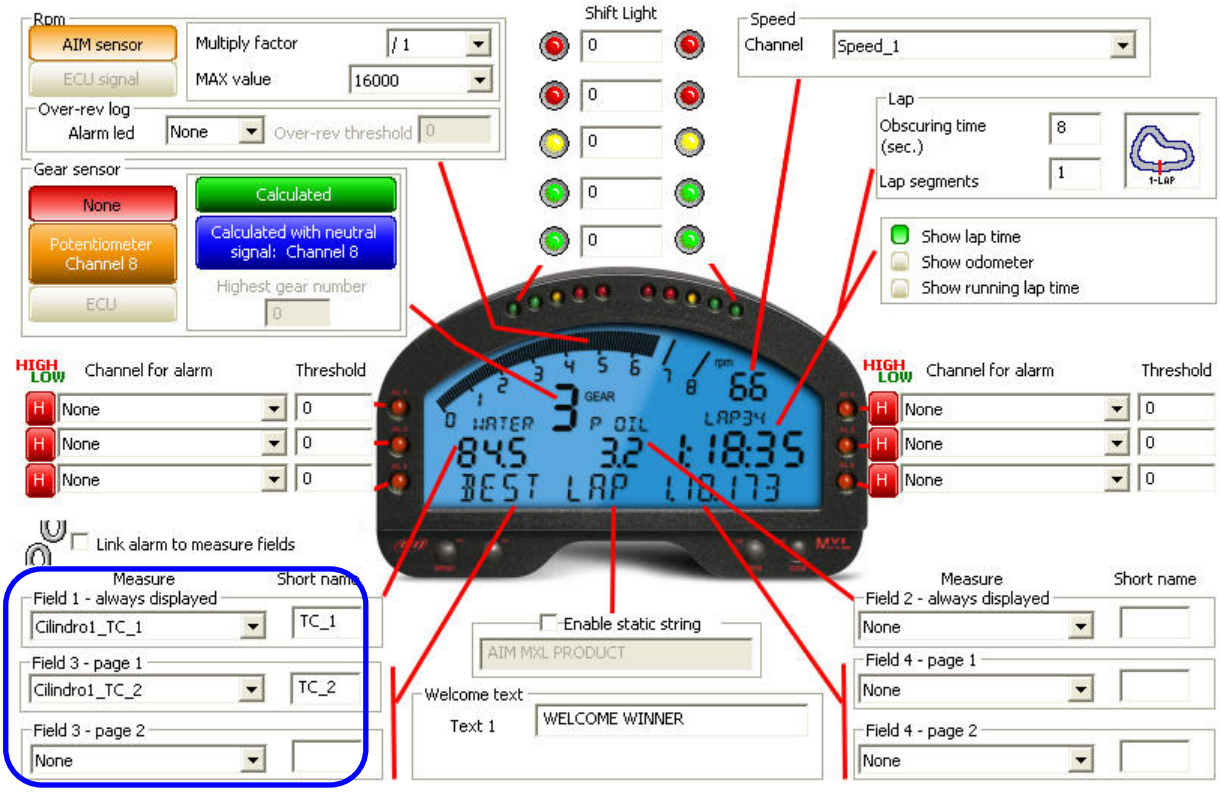
"*Sensor type*": this column is not configurable because **TC Hub** only supports "K" type thermocouples or sensors that work simulating these sensors.

"*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.

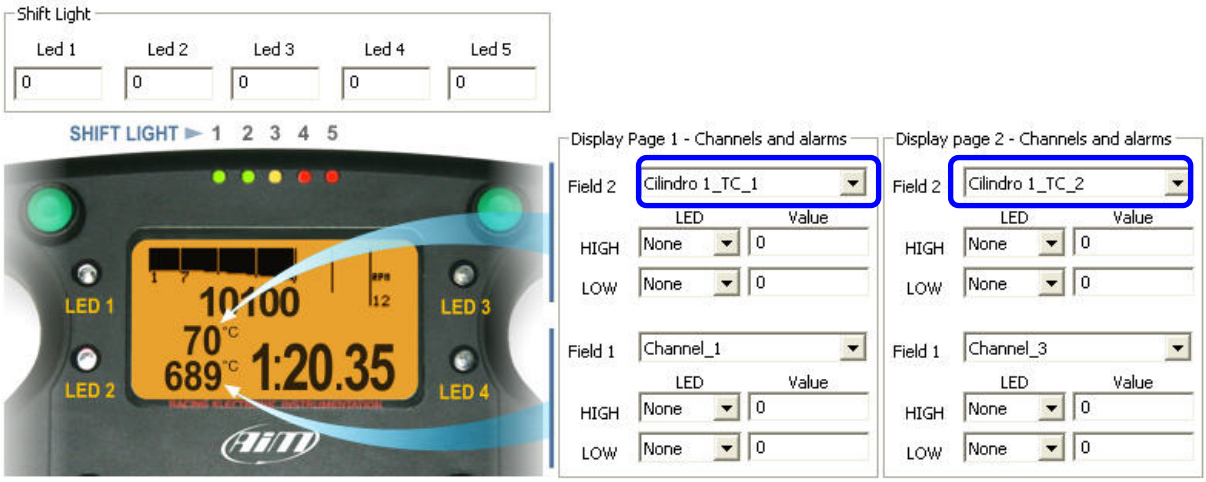
4.1 – MXL and EVO3 Pro/Pista display configuration

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.

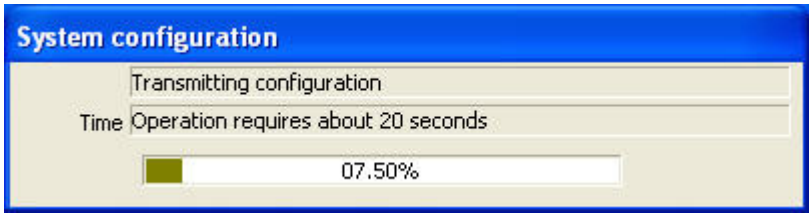


TC Hub channels visualisation can be selected like any other channel visualisation (see logger user manual for further information). In the example below enabled channels of **TC Hub** that the user wish to show are TC_1 and TC_2. Each of them is visible in one field of the display as shown above.

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.



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.



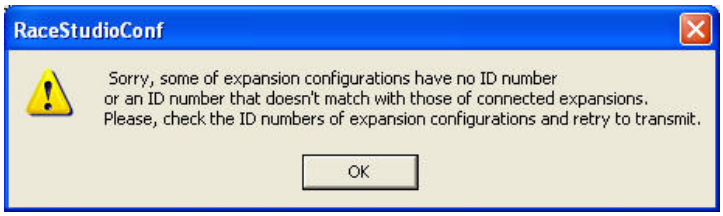
Once the configuration has been transmitted to the logger a confirmation message appears.

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.



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

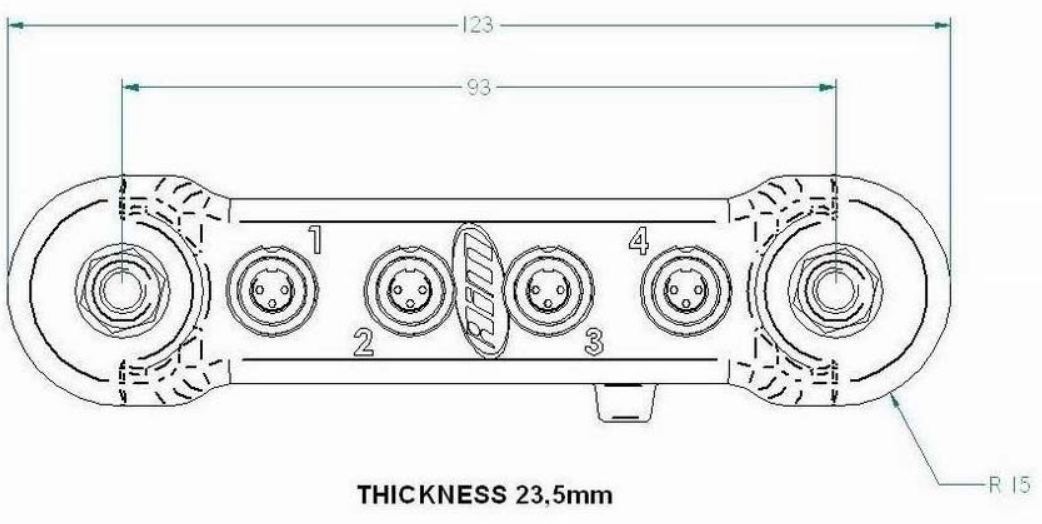
During data analysis **TC Hub** does not require any substantial modification of software views compared to its normal use because the **TC Hub** only adds four temperature channels that can be visualised as any other temperature channel. Those channels will simply appear at the bottom of your channels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

Appendix – Part Numbers and technical drawings

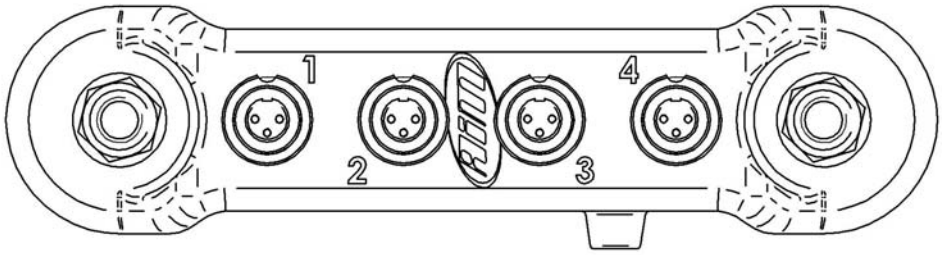
"A" – Part Numbers

TC Hub (Complete kit with cable) X08UTCCTC

"B" – Technical Drawings



TC HUB pinout



3 PIN FEM. BINDER
CONNECTOR PINOUT

POSITION 1		POSITION 2		POSITION 3		POSITION 4	
1 2 3	TC1 GND NC	1 2 3	TC2 GND NC	1 2 3	TC3 GND NC	1 2 3	TC4 GND NC