

MoTeC CAN Dash Logger Integration with Team Plus Wheel Turtle via CAN (and optional TPMS)



The Team Plus Wheel Turtle Tyre Temperature and Pressure Sensor data can be accessed by the MoTeC Cxxx series of Dash Loggers.

Wheel Turtle sensors are Bluetooth devices, so a Team Plus CANGate is essential to capture the Bluetooth signals and add them to the CAN bus needed for this integration.

Wheel Turtle and TPMS devices are available from
<https://team-plus.com>

The MoTeC Dash devices can be configured in many different ways and for different ECU's, sensors and accessories, so each configuration will be different, but this quick guide should provide the information you need to incorporate the Wheel Turtle Data into the dash logger.

WHAT DO I NEED:

- Team Plus Wheel Turtle – set of 4. (any model)
- Team Plus CANGate for Wheel Turtle
- Optional Team Plus TPMS – set of 4 (any model)

- Team Plus TeleDash phone app – Android or iOS (for configuration of devices)
- MoTeC Cxxx Series Dash Logger
- MoTeC Dash Manager software for selected dash model. (for Dash Configuration)
- CANbus wiring from CANGate to your MoTeC Dash
- Wheel Turtle MoTeC Config files and Samples

STEP 1: Install Hardware

- Install your MoTeC dash in car and connect to ECU as per manufacturer's Instructions
- Find a location for the CANGate in the car. You may choose to mount it in a visible location as a second dash to monitor temperatures or hide it away depending on your needs.
- Connect the CANGate to the MOTEC dash CAN port. We suggest using the second CAN port and keeping it away from ECU messages. CANGate is supplied with a 4 pin DTM plug configured as per diagram on the right. Ensure that the USB-C connector on the CANGate cable is plugged into the CANGate USB-C socket. Wiring of MoTeC configurations varies, but it is common to have a 4 pin outlet of some type for CANbus connections in the car which includes the power and ground wires.
- Install your Wheel Turtles in each wheel arch as per the quick start guide. We suggest you use the supplied Mounting Brackets for Battery Powered Wheel Turtle models, so you can remove them for charging, and the mounting bracket provides important protection to the connection port and switch on the wheel turtle itself.
- Install your TPMS on each wheel.
 - For "Street Grade" TPMS, install each on the wheel indicated on the sensor.





- For “Track Day Grade” TPMS, install any sensor on any wheel, taking note of the ID code laser etched on the outside of each sensor for each wheel.

STEP 2: Configure CANGate and Wheel Turtles

- Using the TeleDash app you can make any required configuration changes to each of the wheel turtles and the CANGate. The changes you may need to make are:
 - **Wheel Turtle mounting direction:** Wheel Turtles can be mounted in a reverse direction depending on the location you place it. You may find that the temperatures are showing the wrong direction across the tyre. You can fix that by changing a setting in the Wheel Turtle called “Reverse Mount”
 - **Wheel Turtle Distance Calibration:** If you are using the wheel turtle distance sensor to act as a suspension travel meter, you may wish to set the calibration numbers of each wheel turtle to provide a zero starting point.
 - **CANGate Wheel Turtle Selection:** If you have more than one set of wheel turtles or use them close to others, you will need to set the specific ID of each of your wheel turtles into the CANGate to ensure you are seeing the correct one.
 - **CANGate CAN speed:** The CANGate can use 500K or 1M CANbus speeds. This can be set on the screen of the CANGate or in the configuration settings in the TeleDash app.
 - **CANGate protocol:** For this integration you should use the native Team Plus standard CAN protocol. The CANGate can also transmit other protocols to emulate other systems. The CANGate can use multiple protocols at the same time, but to ensure best performance on the CAN Bus we suggest only enabling the required protocol. The protocol can be set on the CANGate screen or in the configuration setting in the TeleDash app.
 - **CANGate TPMS Selection:**
 - **Street Grade** - Ensure TPMS Type is set to “STREET” and the 4 id’s should be set to “1” “2” “3” and “4” respectively.
 - **Track Day Grade** - Ensure TPMS Type is set to “TRACK” and the 4 id’s need to be set using their last 5



digits of the id code etched onto the respective sensor in the format "xx:xx". (this is case sensitive)

- **Measurement Units:** Set the units of measurement you want to see on the CANGate itself for temperatures (C or F) and pressure (psi, kpa or bar). This does not impact the units of measurement used on the MoTEC, only the CANGate screen.
- **Temperature Display Colour Limits:** Set the values for when CANGate will display colour for the temperature using the sliding bars. You set where it changes from blue to green, green to orange and orange to red. The value limits are set in the chosen measurement unit (C or F). This does not impact the alerts or colours used on the MoTEC, only the CANGate screen.
- **Pressure OK range:** set the lower and upper pressure value that represent an acceptable pressure level. Pressures outside of the set range these will show as RED on the CANGate. This does not impact the alerts or colours used on the MoTEC, only the CANGate screen.
- Once each device is configured check that the CANGate finds each one and is showing the live data. The CANGate screen shows each wheel turtle and TPMS sensor data live. TPMS may not wake up until wheel is moving and measures over 10psi.

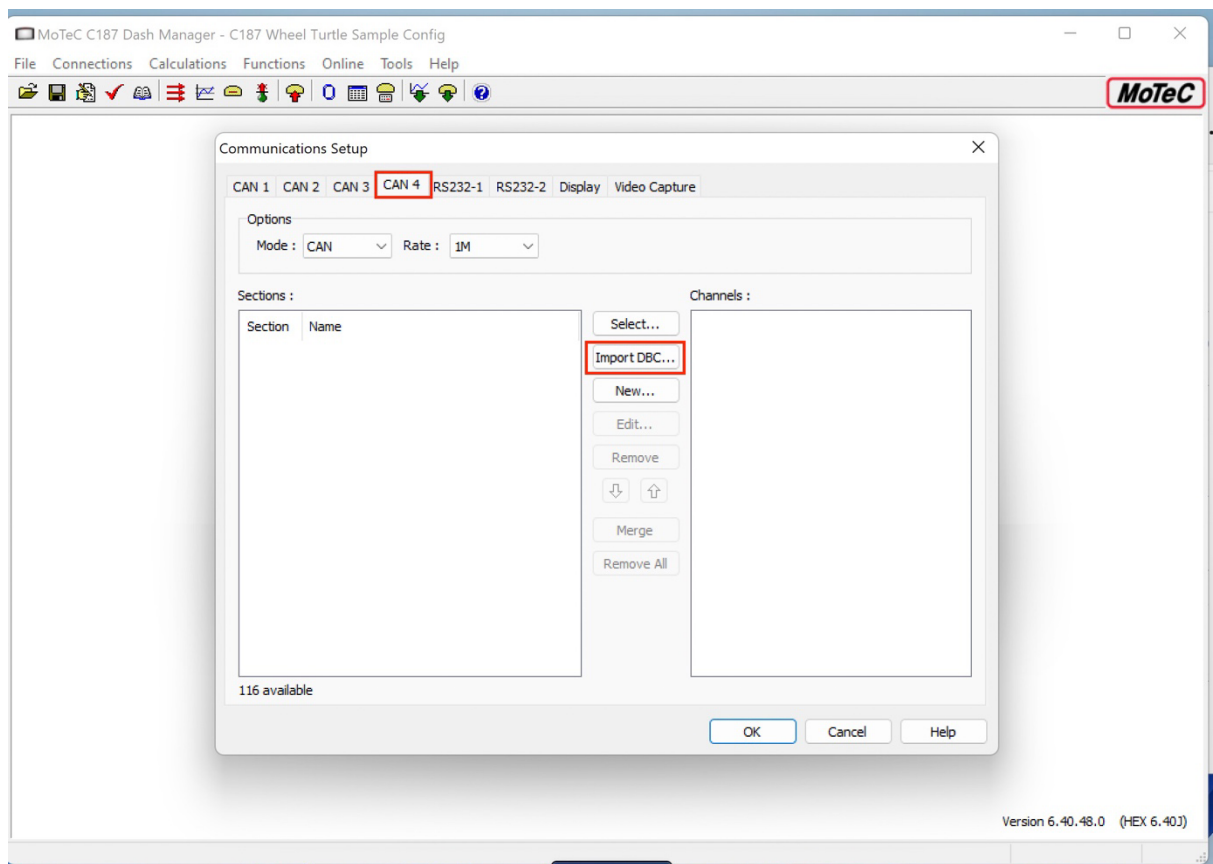
STEP 3: Import CANGate CAN protocol into Dash Manager

- The first time you want to include Wheel Turtle data into a dash configuration, you need to use Import the protocol into Dash Manager.
- A .dbc file is a standardised format, containing info relevant to the CAN protocol and its integration with devices. MoTeC Dash Manager has the facility to import .dbc files into the dash configuration. Team Plus has supplied a .dbc file for the Wheel Turtle CANGate protocol.
- Import it into Dash Manager, through the following steps:

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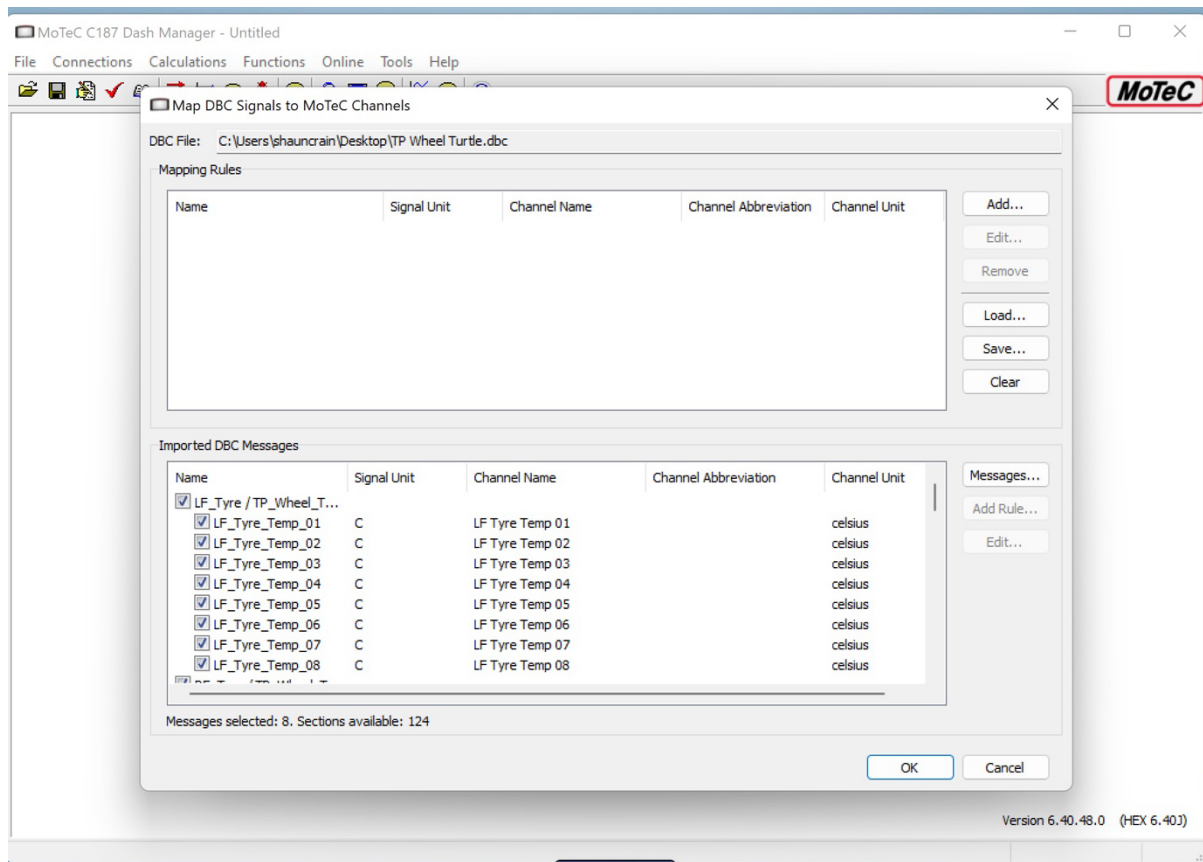
- Open Dash Manager
- Open your dash config within Dash Manager, or create a new one for your dash model, or import one of the sample files provided by Team Plus
- Open the Connections-Communications page
- If you haven't already, In, setup your ECU using the CAN channel tab it is connected to (often CAN2) as per your ECU and manufacturer's instructions.
- Select the CAN tab for the CANBus you connected the CANGate to in earlier step.
- Select "Import DBC" button
- Select the "WheelTurtleCANGate-v2.dbc" file provided in the configuration package.



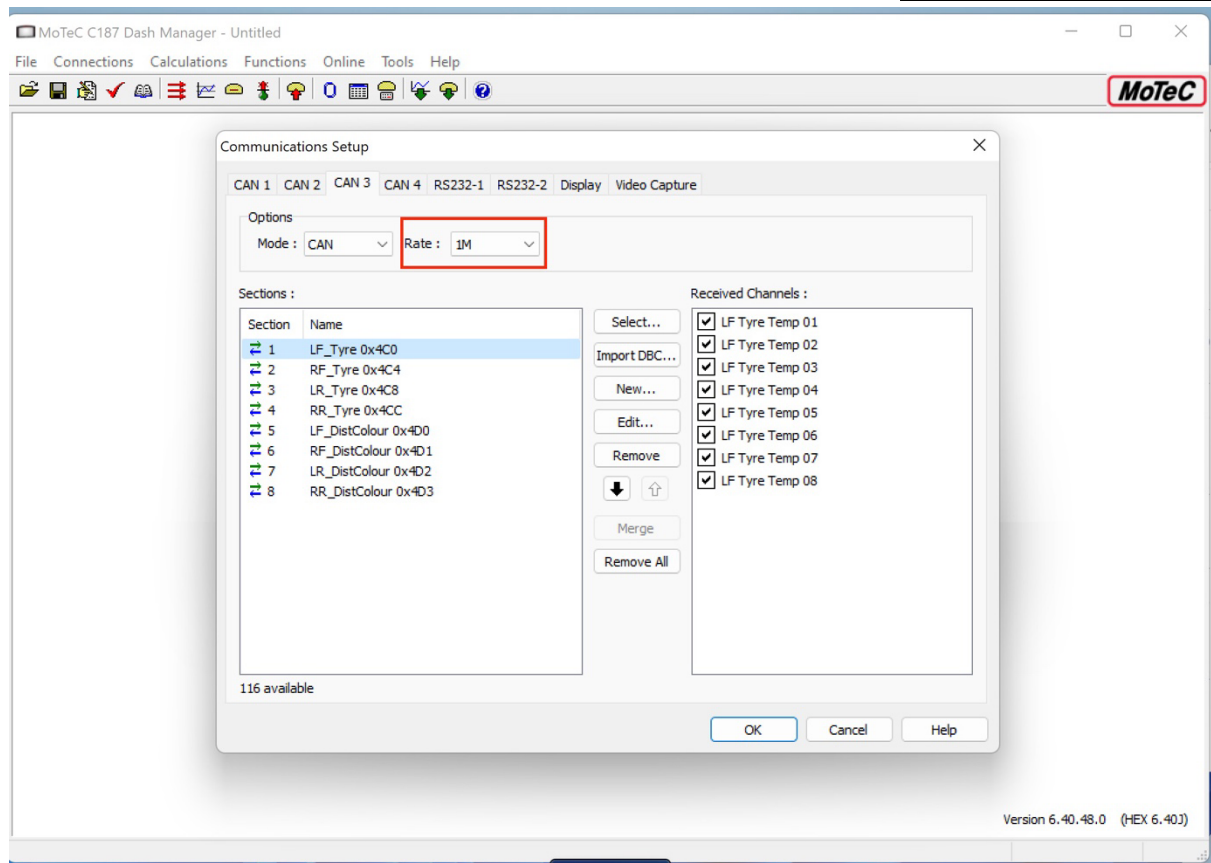
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- The import process should create all the required channels and return a screen like this:



- Press OK to finalise the import.
- Now ensure the CAN Speed is correctly set. We suggest 1M.

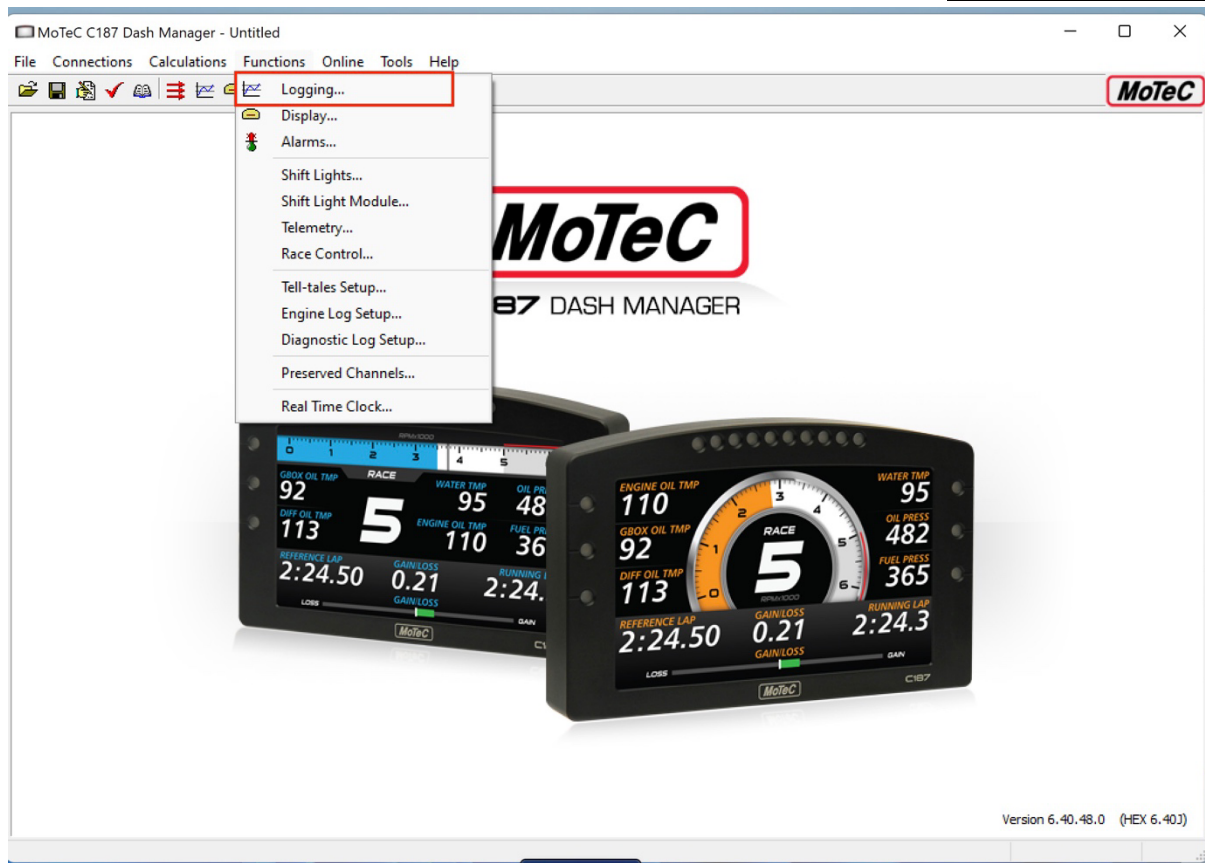


- Press OK button again to complete the setup of the CAN channels.

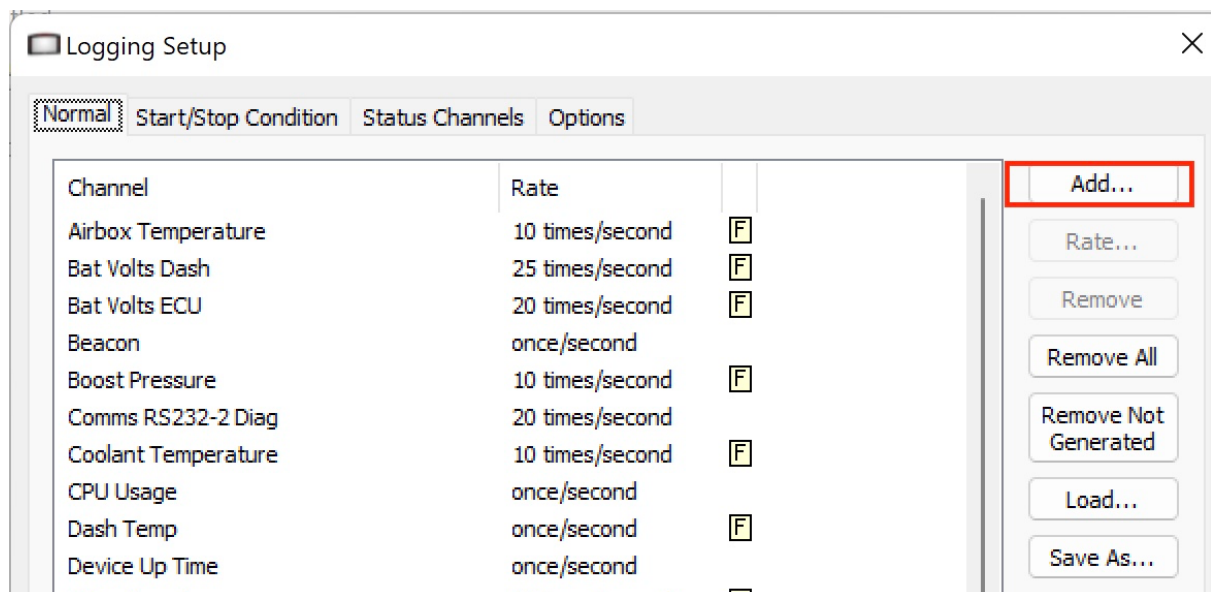
STEP 4: Add CANGate channels to your logged data.

- You need to select which of the CANGate Channels you wish to add to the log files for later analysis after each session.
- Your MoTeC tech may have already added many channels to the log list.
- In Dash Manager, Select Functions-Logging from menu.

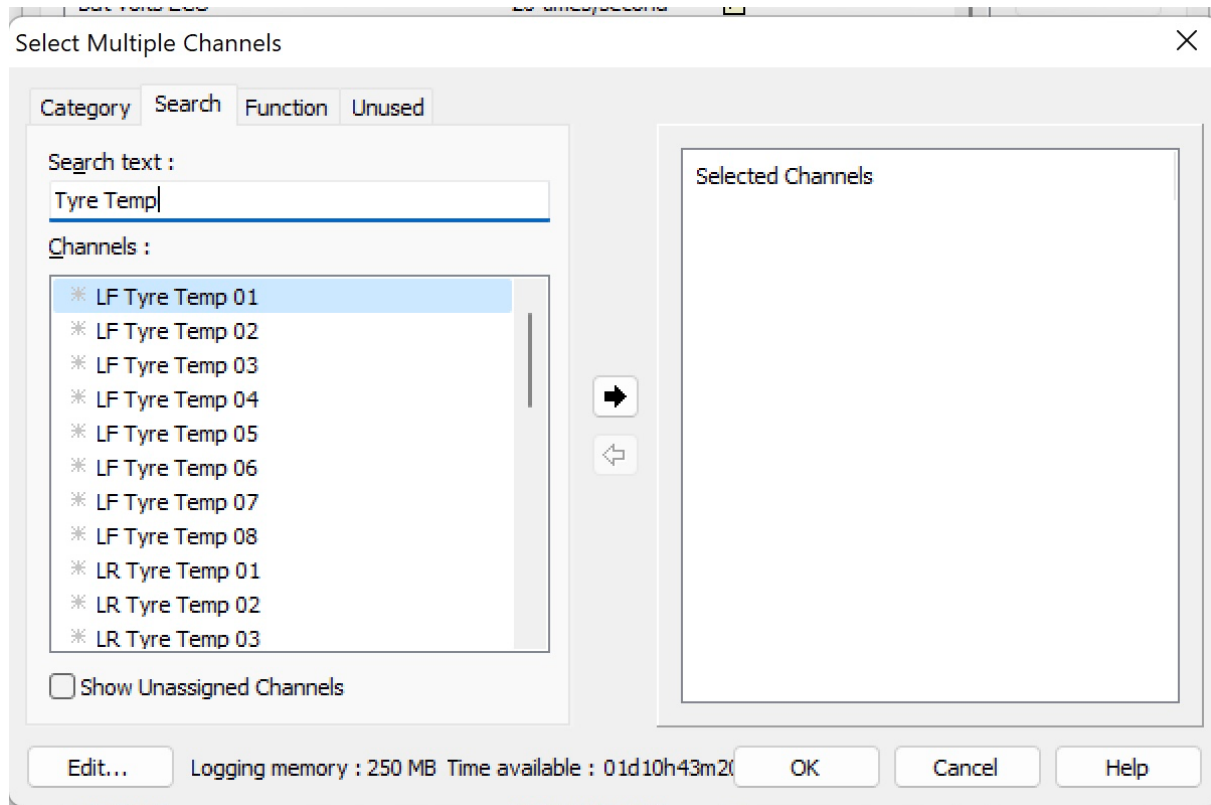
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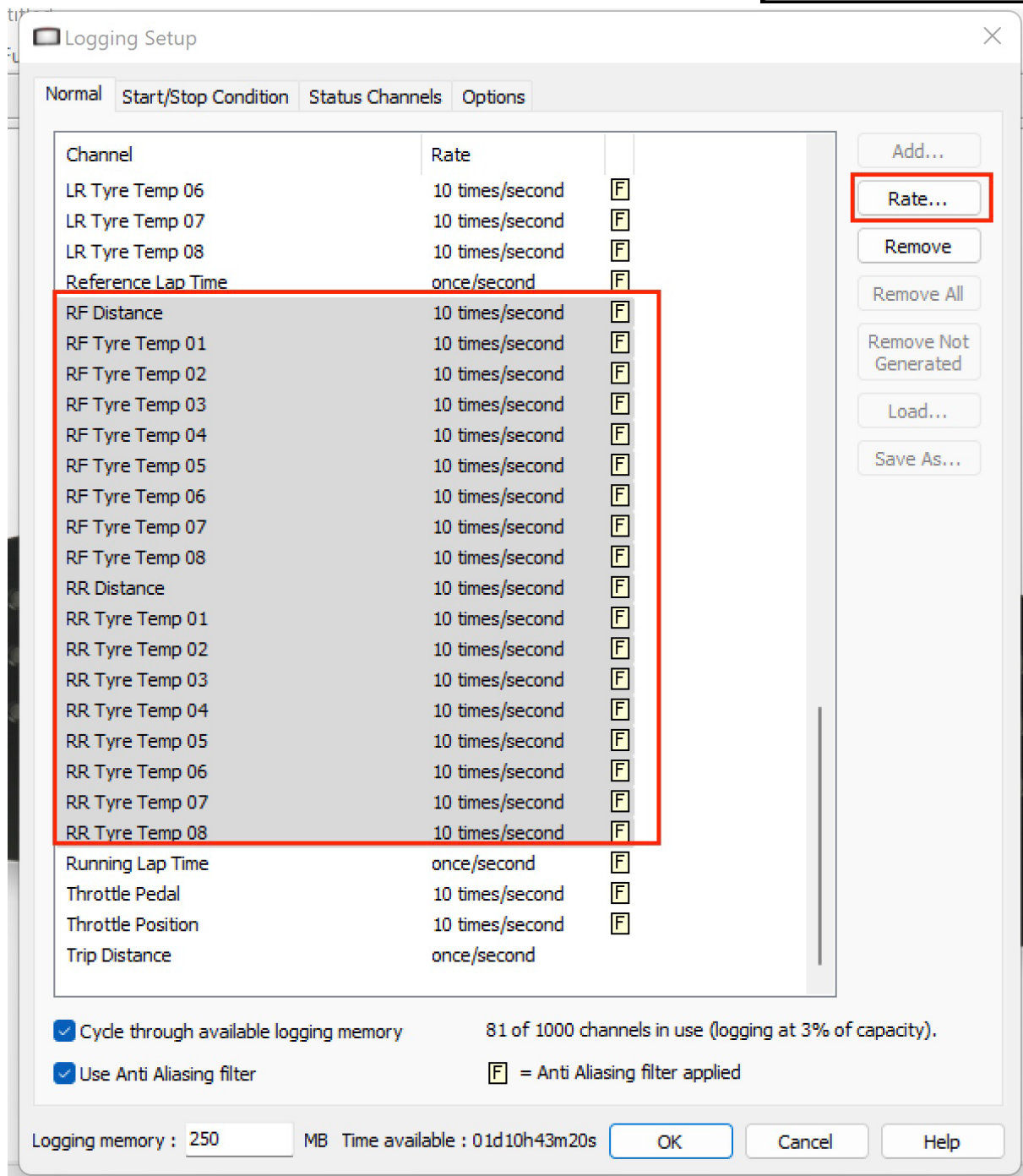
- Press the “Add” button.



- Search or scroll and find all the channels that contain “Tyre Temp” and all channels that contain “Distance” and all the channels that contain “tpms” and use the Right Arrow button to add them to selected side. Then press OK.



- It is also important to set how often the data updates are added to the log file (rate). In the logged data list, find all the wheel turtle channels again and press the “Rate” button and set them accordingly. We suggest a rate of 10 times per second for tyre temperatures and pressures.



- You now have all the channels available to add to dash pages, and all these channels will be added to your log data.

STEP 5: Configure dash to use and display tyre data



- The best way to setup a configuration for Wheel Turtle data in your dash is to look at the sample configurations provided. There are several samples using different Dash models and ECU's and, in each case, the key configuration items to look at and replicate where needed are:
 - **Calculations-Advanced Maths Menu:** Several math channels are used to create an average temperature for each tyre. These average temp channels can be placed in any field on the dash AND are used to trigger some COLD and HOT conditions (see below). If you don't have this option in your dash, you can use the user conditions to achieve similar results.
 - **Calculations-Constants Menu:** To make it easier to change thresholds later for cold or hot tyre indicators, the examples setup 2 constant channels that we can use. You can alter the trigger point for cold and hot temperatures to suit your tyres.
 - **Calculations-User Conditions Menu:** The examples have User Condition channels set to capture cold or hot status of each tyre. For example the 'LFcold' variable is TRUE if any of the 8 tyre temp segments in the Left Front are below the tyre cold constant we set earlier. These variables are used to trigger LED's or screen icons (see below).
 - **Functions - Shift Light Module Menu:** Depending on the dash model you are using there may be a number of LED indicators available to configure. The sample configurations have setup the following:
 - Top left LED shows BLUE if LFcold is true (tyres less than xxC). And same for the other 3 tyres using other LED's.
 - Same LED shows YELLOW if LFhot is true (tyres more than xxC). And same for other 3 tyres using other LED's
 - LED flashes WHITE if tyre pressure drops on that wheel. (pressure less than xxpsi (another constant), and GPS speed greater than 20kph). Set for each corner LED
 - Any remaining side LED's are set to for normal Dash Warning lights.



- **Functions - Display:** The LED set above will provide basic temperature and pressure colour indicators, however you should also have the average temperature and each wheel pressure values available on one or more dash pages for driver to refer to if needed. The sample config has these averages available on both the WARMUP and RACE pages.
- The best value for DRIVER live use of Wheel Turtle data is:
 - Are my tyres warmed up - Suggest using the LED blue indicators if they are not, so easy to glance and know when ok.
 - Is there a tyre pressure out of preferred range – Suggest using LED WHITE indicators when pressure of wheel is outside of set high and low range constant values.
 - Are my tyres getting too hot – Suggest using LED YELLOW indicators when they go above trigger points for driver to consider easing back on tyre use.
 - Learning best temperature ranges – have average temperature available for each tyre in a secondary page.
- All the tyre temperature segments for each tyre will be logged in the dash data for analysis later in MoTeC i2 Analysis software as separate channels. This is good to analyse:
 - Camber and caster temperature changes across face of tyre
 - Overall temperature impacts of specific corners
 - Driver Technique impact on Tyre - overheating will impact tyre degradation.
 - Building a pressure to temperature map for use when setting starting pressures.

MoTeC Options:

MoTeC Cxxx series Dash units have optional functions that can be enabled at a cost by your MoTeC dealer. Of specific interest for Tyre Temperature use are these 2:

- **Display Creator:** With Display Creator it is possible to create fully customised dash layouts including full tyre temperature blocks and alert icons. The configuration pack includes a sample display creator file that you can view using a free copy of display creator from MoTeC. You must however pay for the update to the Dash itself before the new layout can be used in the device.



- **i2 Pro Analysis Tool:** The Pro version of i2 has much better capability for customised layouts for Analysis or live telemetry from your MoTeC dash. Heat Trace widgets added to the i2 Pro version are ideal for Analysing and monitoring Wheel Turtle tyre temperatures.

These 2 options do improve the capabilities of the MoTeC dash, but are not required to get value from the Wheel Turtles. But they do make it look prettier.

MORE HELP NEEDED?

If you require support please see our support pages at:
<https://telemetry.teamplus.cloud/support/>