MoTeC M4-M48 ECU

Racing Data Power

INTRODUCTION

AIM has developed special applications for many of the most common ECU: by special applications we mean user-friendly systems which allow to easily connect the vehicle ECU to our hi-tech data loggers: user needs only to install harness between the **logger** and the ECU.

Once connected, the logger displays (and/or records, depending on the model and on the ECU data stream) values like RPM, engine load, throttle position (TPS), air and water temperatures, battery voltage, speed, gear, lambda value (air/fuel ratio) analog channels...

All AIM loggers include – free of charge – **Race Studio 2** software, a powerful tool to configure the system and analyze recorded data on your PC.

Warning:
MoTeC M4-M48 ECU are supported by AIM loggers only from serial number 3000 onwards. Once the ECU is connected, it is necessary to set it in the logger configuration in Race Studio 2 software. Select Manufacturer "MoTeC" and Model:

"M4-M48-Data3" for ECU using DataSet3 with baud rate 9600
"M4-M48-Data5" for ECU using DataSet5 with baud rate 9600
"M4-M48-Data5-19200" for ECU using DataSet5 with baud rate 19200

Refer to Race Studio Configuration user manual for further information concerning the loggers configuration.

As far as any further information concerning ECU firmware/software settings is concerned, it is always recommended to address to your ECU dealer.

INDEX

Chapter 1 – Technical notes

MoTeC M4-M48 ECU can communicate with AIM loggers through the CAN BUS. This communication can be wrong for different reasons related to Hardware or software.

1.1 – Hardware check

MoTeC CAN line works normally with two only wires: CAN High (corresponding to AIM CAN+) and CAN low (corresponding to AIM CAN-). To check if hardware is ok:

- ensure that a 120 Ohm "line-end resistor" is installed between CAN+ and CAN-; use a multimeter; disconnect AIM logger from the ECU and make this check on both sides (ECU and logger);
- check if the amplitude of each bit is 2V (or at least 1.8); using a scope ground the probe on CAN- while measuring CAN+. Please ensure that no filtering feature is enabled on the scope: this because of high baud rate of this line.

1.2 – Software check (for MoTeC M48 only)

Before connecting MoTeC M48 ECU to AIM loggers it is necessary to check ECU setting using MoTeC "ECU Menu" software V6.20 version that can be freely downloaded from www.motec.com.au.

Connect the ECU to PC serial line.

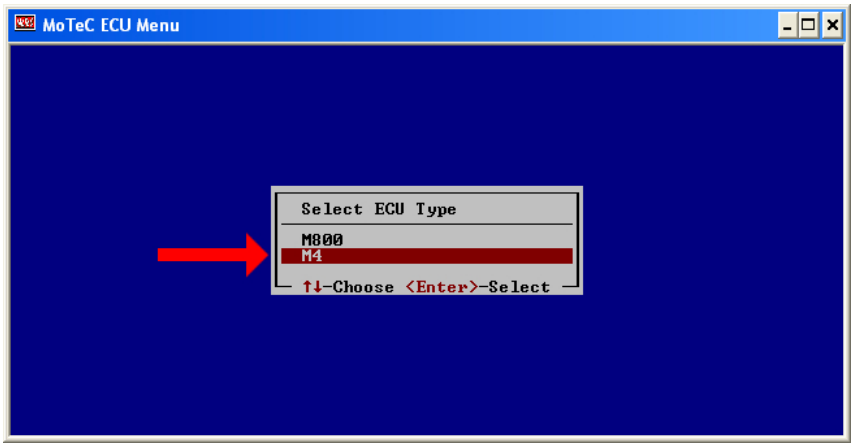
- If MoTeC software detects in the ECU an old version an upgrade is needed. It can be done using a Software upgrade unit available from most MoTeC dealers. Upgrading is automatically done by the software selecting the related voice.
- If MoTeC software detects in the ECU a corresponding software version no upgrade is needed.

1.3 – Software configuration

For MoTeC ECU to correctly communicate with AIM loggers it is necessary to have it correctly configured using MoTeC "ECU Menu" V6.20.

The configuration procedure is here below explained.

- Run MoTeC "ECU Menu" V6.20 software. This window appears.

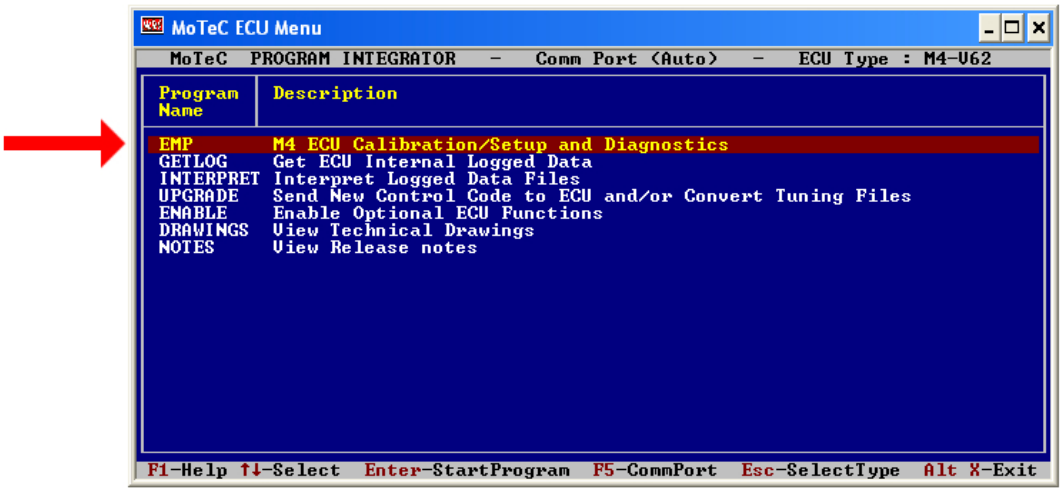


- Select "M4" and press "**Enter**"

This window appears:

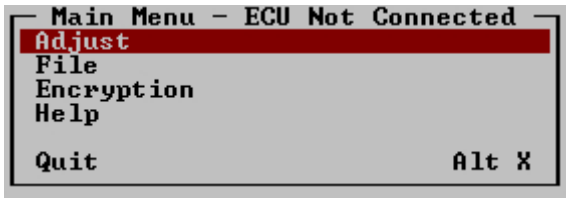
- Press "**Enter**".

This window appears:



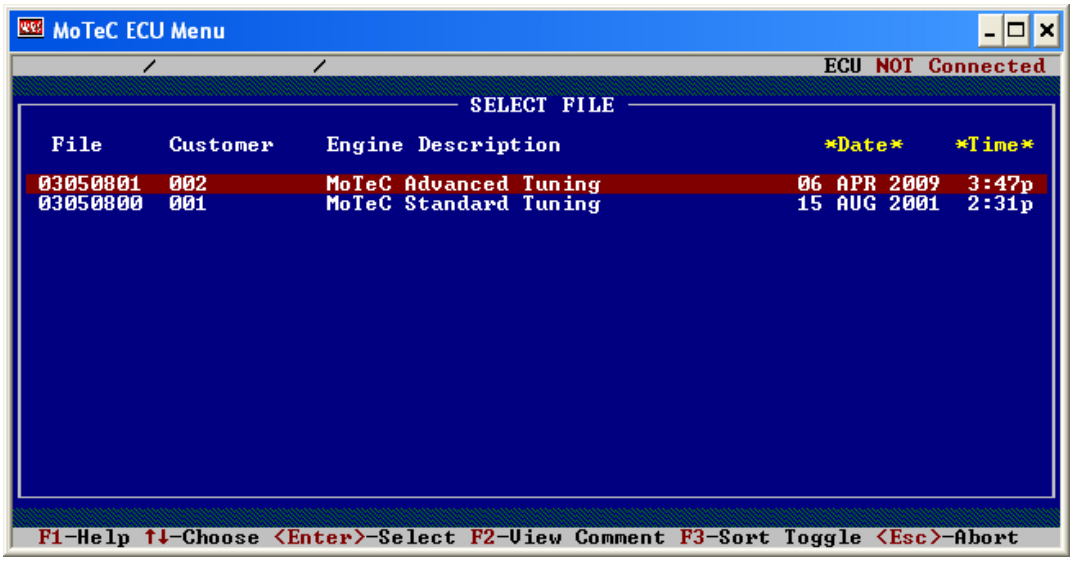
- Press "**Enter**".

This window appears:



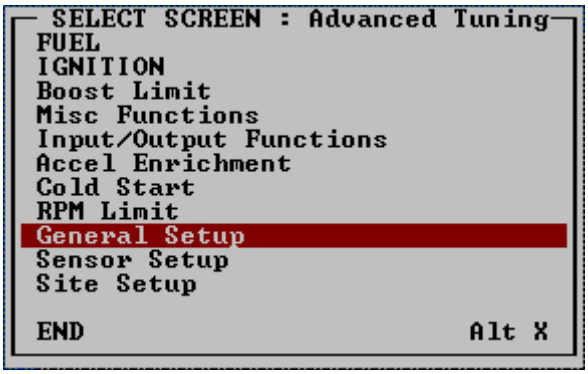
- Press "**Enter**".

This window appears:



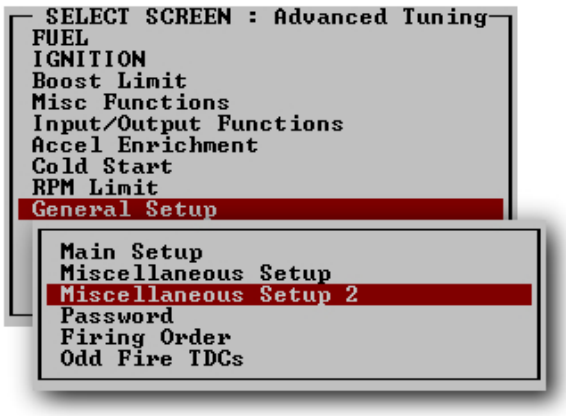
- Press "**Enter**".

This window appears:



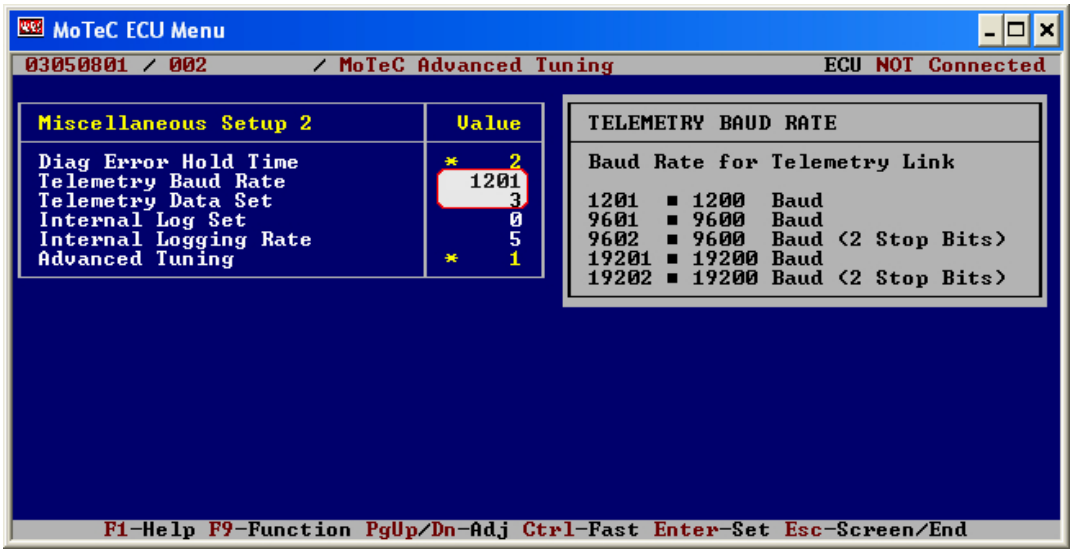
- Select "**General Setup**";
- Press "**Enter**".

A window appears over the previous one:



- Select "**Miscellaneous Setup 2**";
- Press "**Enter**"

This window appears:

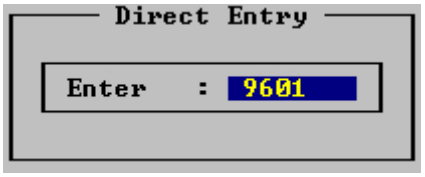


It is necessary to set:

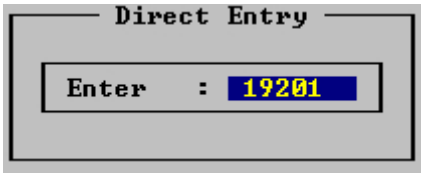
- Telemetry Baud rate
- Telemetry Data Set

To set these parameters simply select the correct row and start writing, the setting window appears. Here below are shown the windows.

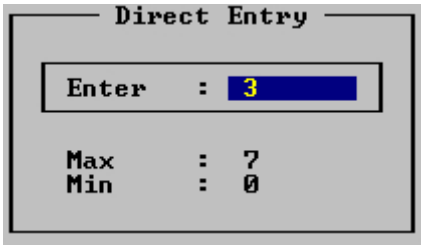
Baud Rate 9600: type “**9601**”.



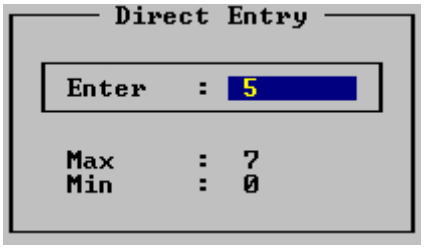
Baud Rate 19200: type “**19201**”.



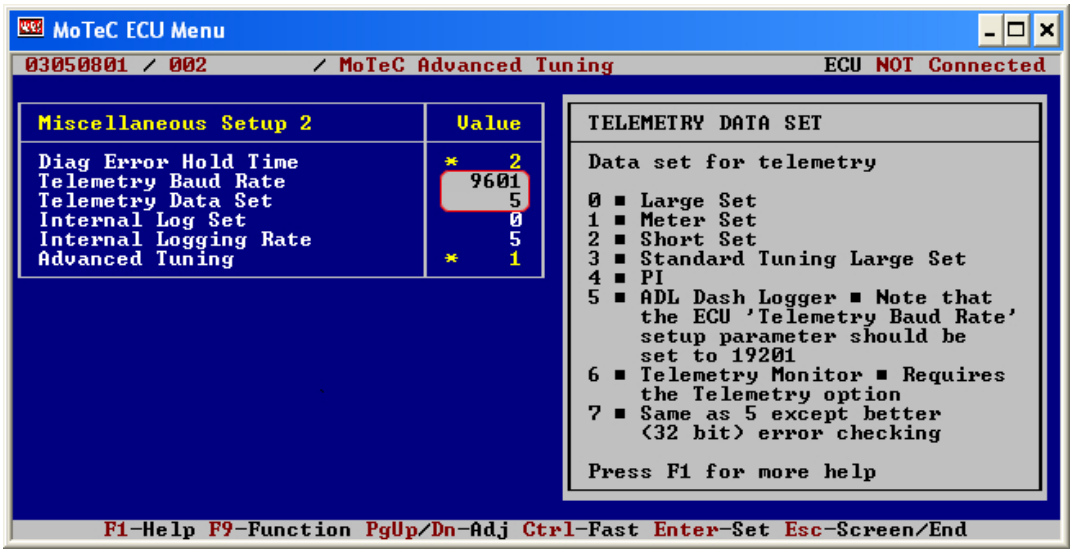
Data Set 3: type “**3**”.



Data Set 5: type “**5**”.

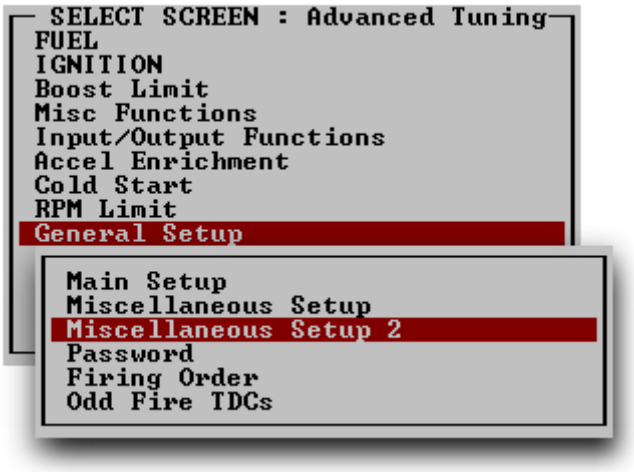


When all parameters have been set the window shows them correctly set as here below.

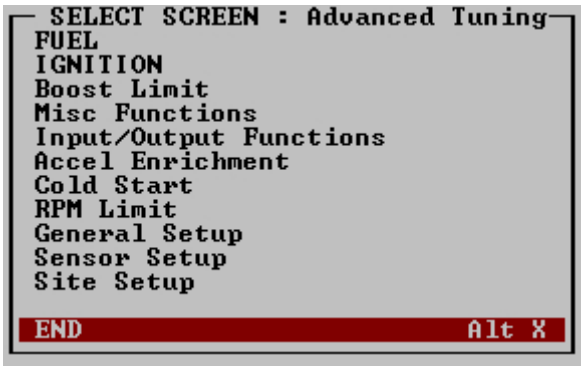


- Press "**Esc**".

This window appears

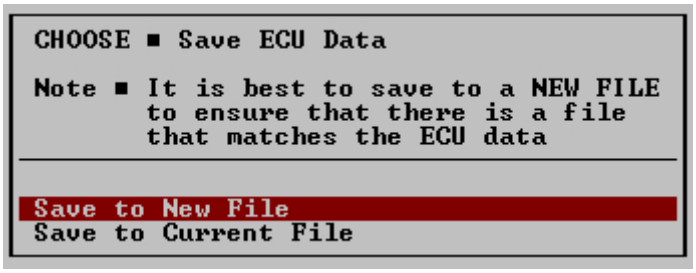


- Press "**Esc**".



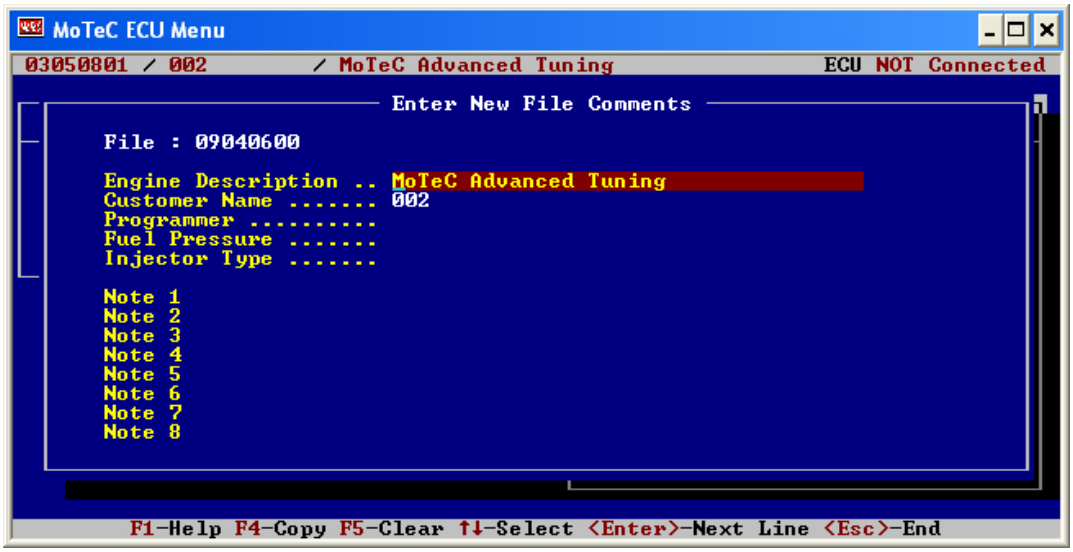
- Scroll until "**END**" and press "**Enter**" or press "**Alt+X**".

This window appears:



- Select "**Save to New File**" and press "**Enter**".

This window appears:

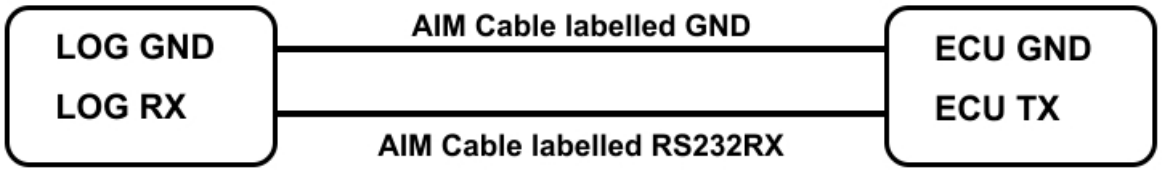


- Fill in the desired fields and press "**Esc**".

The configuration is saved and the ECU is re-started..

Chapter 2 – Serial Communication setup

MoTeC M4-M48 ECU are equipped with a serial communication protocol used to communicate parameters to an external logger and to configure the ECU itself. The standard communication setup is shown here below.



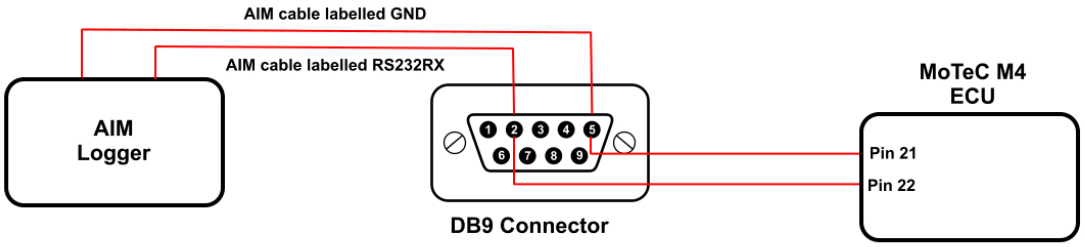
Warning: if MoTeC communication cable is connected to the PC, this last one takes priority and AIM logger will not receive data. It is thereby strongly recommended to make sure that MoTeC software is not active.

Chapter 3 – Connection with AIM loggers

Connection of MoTeC M4 and M48 ECU with AIM loggers is different for the two ECU.

2.1 – Connecting MoTeC M4 ECU to AIM loggers

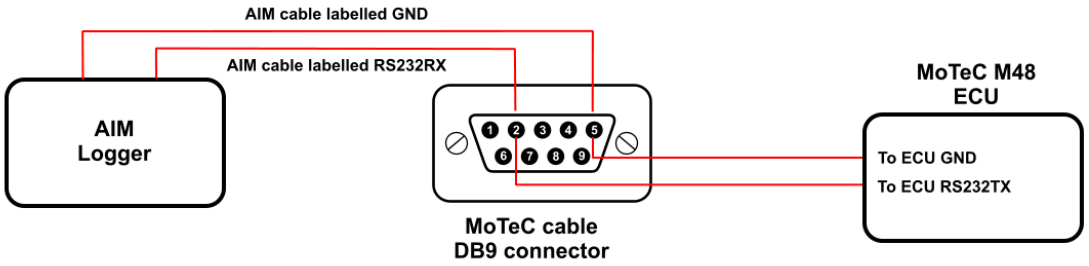
To connect AIM logger to MoTeC M4 ECU a DB9 female connector is needed and the correct connection wiring diagram is shown here below.



- connect AIM cable labelled RS232 to pin 2 of DB9 connector connected to pin 22 of MoTeC M4 ECU;
- connect AIM cable labelled GND to pin 5 of DB9 connector connected to pin 21 of MoTeC M4 ECU;

2.2 – Connecting MoTeC M48 ECU to AIM loggers

To connect MoTeC M48 to AIM loggers a MoTeC cable (part number 61015 following MoTeC documentation) is needed. The image here below shows the correct connection wiring diagram.



To connect AIM loggers to MoTeC M48 ECU use the MoTeC cable and:

- connect AIM cable labelled RS232 to pin 2 of DB9 connector, that is connected M48 RS232RX pin;
- connect AIM cable labelled GND to pin 5 of DB9 connector that is connected to M48 GND pin;

Chapter 3 – MoTeC M4-M48 communication protocol

Channels received by AIM loggers connected to MoTeC M4-M48 ECU are different according to the selected Data Set and Baud Rate.

3.1 – M4-M48 Data3 (data set 3, baud rate 9600) communication protocol

ID	CHANNEL NAME	FUNCTION
ECU_1	M4_M48_RPM	RPM
ECU_2	M4_M48_FUELUSED	Injected fuel
ECU_3	M4_M48_AUXV	Auxiliary voltage
ECU_4	M4_M48_AUXT	Auxiliary temperature
ECU_5	M4_M48_MAP	Manifold air pressure
ECU_6	M4_M48_TP	Throttle position
ECU_7	M4_M48_LA	Lambda value
ECU_8	M4_M48_ET	Engine temperature
ECU_9	M4_M48_AT	Intake air temperature
ECU_10	M4_M48_VB	Battery supply
ECU_11	M4_M48_ECUTEMP	ECU Temperature
ECU_12	M4_M48_FAPW	Fuel actual pulse width
ECU_13	M4_M48_FEPW	Fuel effective pulse width
ECU_14	M4_M48_FTIME	Fuel injection time
ECU_15	M4_M48_DUTY	Duty cycle
ECU_16	M4_M48_ACCEL	Acceleration value
ECU_17	M4_M48_IADV	Ignition advance
ECU_18	M4_M48_EPOINT	
ECU_19	M4_M48_PWM0_DUTY	Pulse width modulation duty
ECU_20	M4_M48_GEAR	Engaged gear

3.2 – M4-M48 Data5 (data set 5, baud rate 9600) communication protocol

ID	CHANNEL NAME	FUNCTION
ECU_1	M4_M48_RPM	RPM
ECU_2	M4_M48_THROTPOS	Throttle position
ECU_3	M4_M48_MANIFPRES	Manifold air pressure
ECU_4	M4_M48_AIRTEMP	Intake air temperature
ECU_5	M4_M48_ENGINE_TEMP	Engine temperature
ECU_6	M4_M48_LAMBDA1	Lambda value 1
ECU_7	M4_M48_AUXTEMP	Auxiliary temperature
ECU_8	M4_M48_AUXVOLT	Auxiliary voltage
ECU_9	M4_M48_BATTVOLT	Battery supply
ECU_10	M4_M48_ECUTEMP	ECU Temperature
ECU_11	M4_M48_BAROPRESS	Barometric pressure
ECU_12	M4_M48_SPEED1	Vehicle speed 1
ECU_13	M4_M48_SPEED2	Vehicle speed 2
ECU_14	M4_M48_GROUNDSPEED	Ground speed
ECU_15	M4_M48_DRIVESPEED	Dashboard speed
ECU_16	M4_M48_SLIP	Driven/dragged speed difference
ECU_17	M4_M48_GEAR	Engaged gear
ECU_18	M4_M48_LAMBDASHORTTRIM	Lambda short trim
ECU_19	M4_M48_LAMBDALONGTRIM	Lambda long trim

3.3 – M4-M48 Data5_19200 (data set 5, baud rate 19200) communication protocol

ID	CHANNEL NAME	FUNCTION
ECU_1	M4_M48_RPM	RPM
ECU_2	M4_M48_THROTPOS	Throttle position
ECU_3	M4_M48_MANIFPRES	Manifold air pressure
ECU_4	M4_M48_AIRTEMP	Intake air temperature
ECU_5	M4_M48_ENGINE_TEMP	Engine temperature
ECU_6	M4_M48_LAMBDA1	Lambda value 1
ECU_7	M4_M48_AUXTEMP	Auxiliary temperature
ECU_8	M4_M48_AUXVOLT	Auxiliary voltage
ECU_9	M4_M48_BATTVOLT	Battery supply
ECU_10	M4_M48_ECUTEMP	ECU Temperature
ECU_11	M4_M48_BAROPRESS	Barometric pressure
ECU_12	M4_M48_SPEED1	Vehicle speed 1
ECU_13	M4_M48_SPEED2	Vehicle speed 2
ECU_14	M4_M48_GROUNDSPEED	Ground speed
ECU_15	M4_M48_DRIVESPEED	Dashboard speed
ECU_16	M4_M48_SLIP	Driven/dragged speed difference
ECU_17	M4_M48_GEAR	Engaged gear
ECU_18	M4_M48_LAMBDASHORTTRIM	Lambda short trim
ECU_19	M4_M48_LAMBDALONGTRIM	Lambda long trim