

MoTeC M400-M600-M800 ECU



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:

once the ECU is connected to the logger, it is necessary to set it in the logger configuration in Race Studio 2 software. Select Manufacturer “MoTeC” and Model:

“M800-M600-M400” for firmware version up to 2.30S

“M800-M600-M400-1M” for firmware version 2.30S or later

“M800-M600-M400_1M-v3” from firmware version “3.x” onward.

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.

1 – Technical documentation

MoTeC M400-M600-M800 ECU can communicate with AIM loggers through the CAN BUS. This communication can be wrong for different reasons related to Hardware, firmware or software.

1.1 – Hardware check

MoTeC CAN bus communicates with two 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 – Firmware check

When selecting the ECU model in Race Studio Configuration it is necessary to check the ECU firmware version. To say:

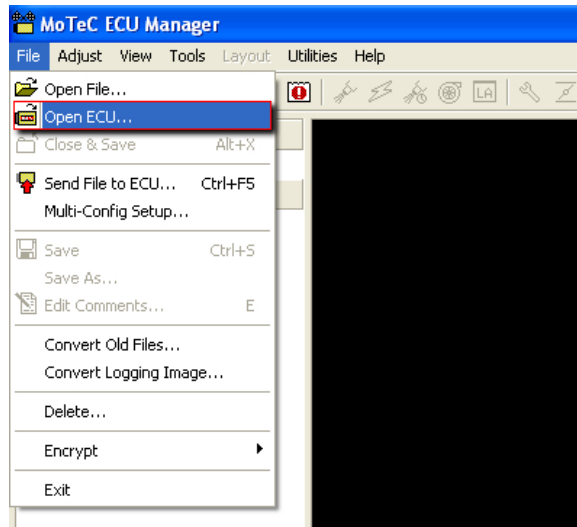
- select “M800-M600-M400” Model for firmware version lower than 2.30S;
- select “M800-M600-M400-1M” Model for firmware version 2.30S or higher
- select “M800-M600-M400-1M_v3” Model for firmware version “3.x”
- select “M800-M600-M400-500k_v3” Model for firmware version “3.x”

Please note that CAN-bus speed is 400Kbit for the first Model, 1Mbit for the 2nd and 3rd models and 500Kbit for the 4th.

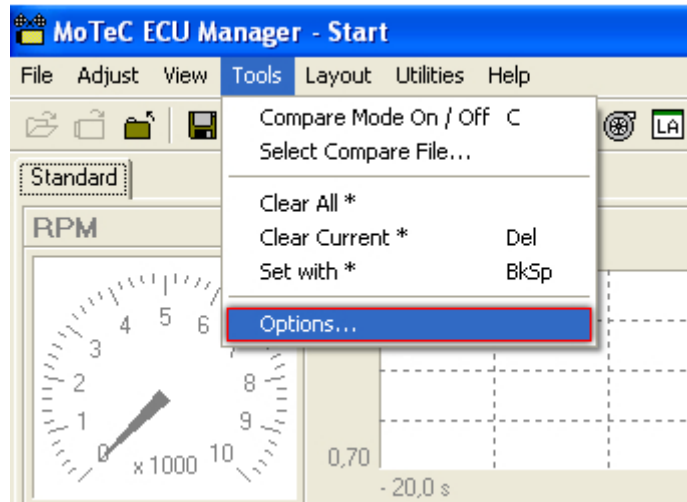
1.3 – Software check

For MoTeC ECU to correctly communicate with AIM loggers it is necessary to configure it using MoTeC “ECU Manager” software “3.x” version and keeping the ECU connected and switched on. Here follows the correct procedure.

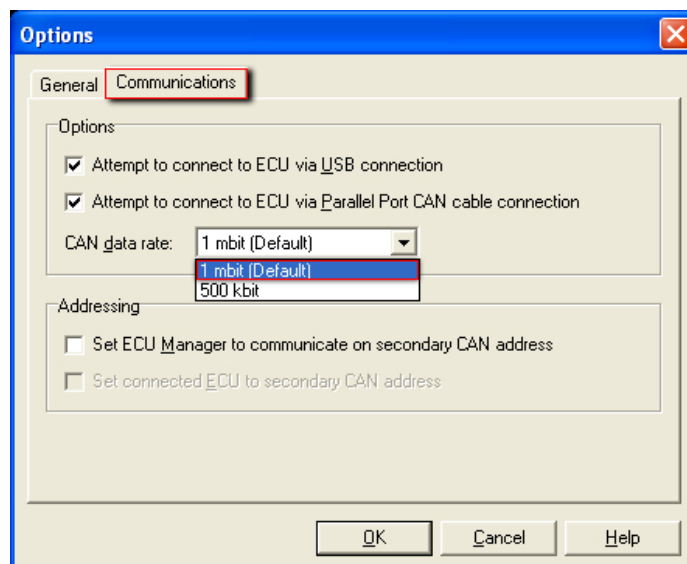
- Run “ECU Manager software” and load the ECU selecting File/Open ECU and selecting the correct one.



- Check Communications parameters following this path Tools/Options.



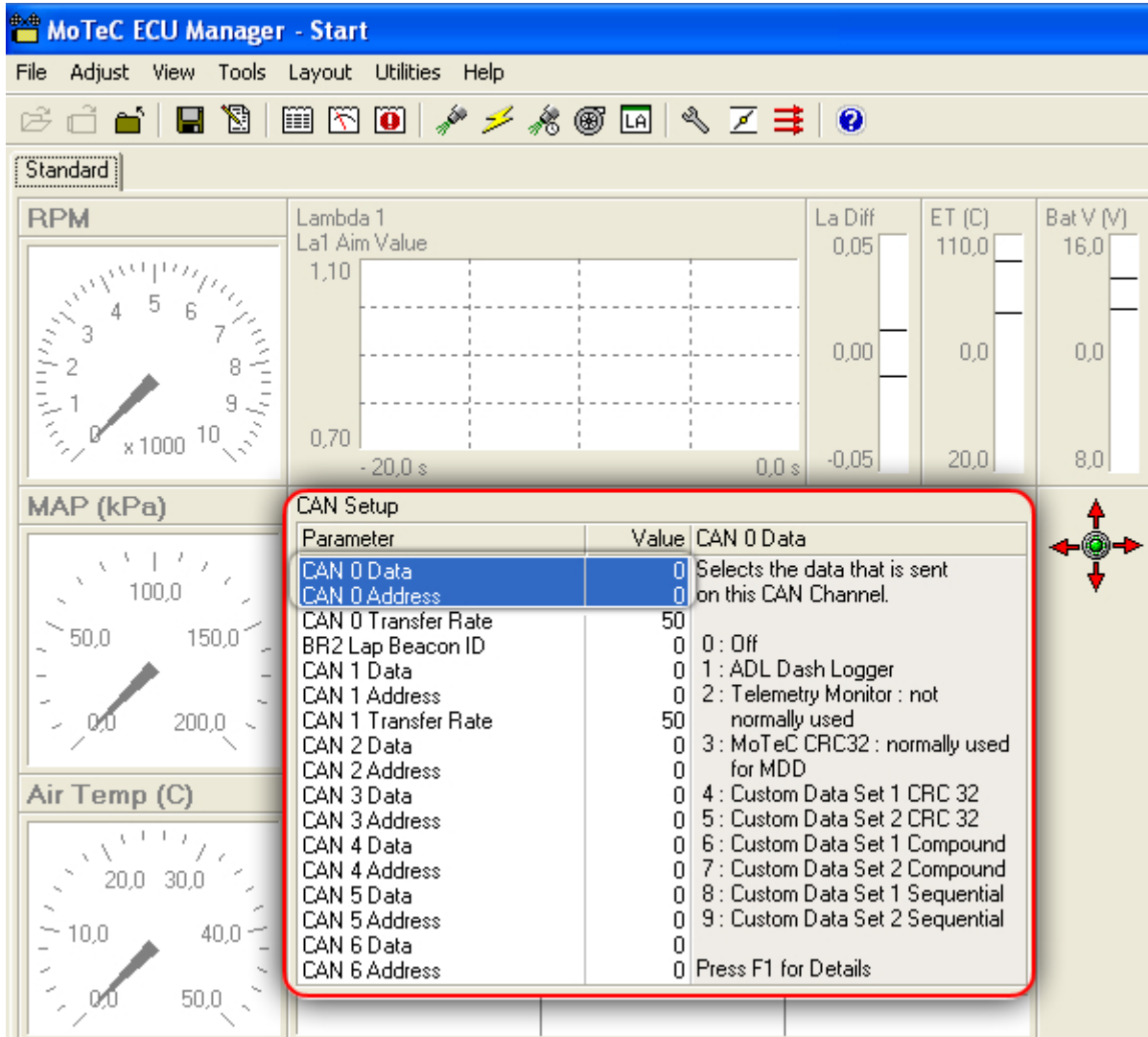
- This window appears.



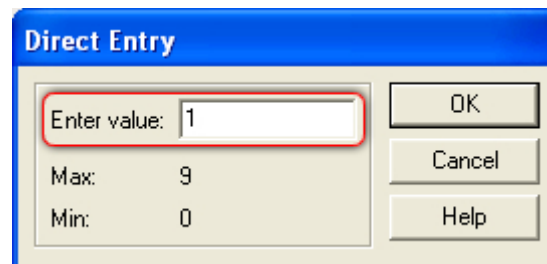
- Select “Communication” layer and check that “CAN data rate” is set on “1 mbit (Default)”.

Set CAN communication parameters following the path: Adjust / General Setup / Communications / CAN Setup.

- This window appears. It is necessary to set “CAN 0 Data” and “CAN 0 Address” parameters (highlighted in the image here below).

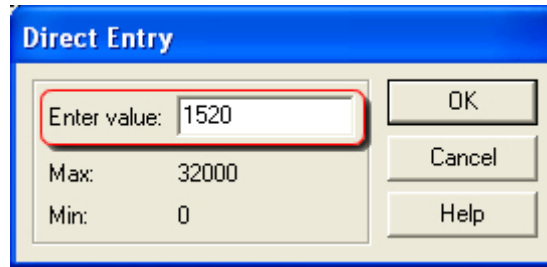


- Select “CAN 0 Data” row and press “1”. This window appears:

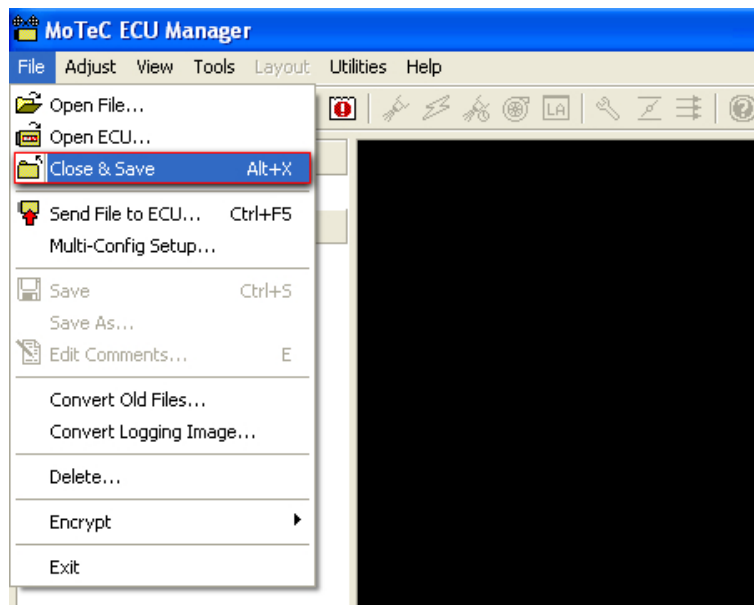


- Enter value “1”.
- Press “OK” and the software comes back to the previous window.

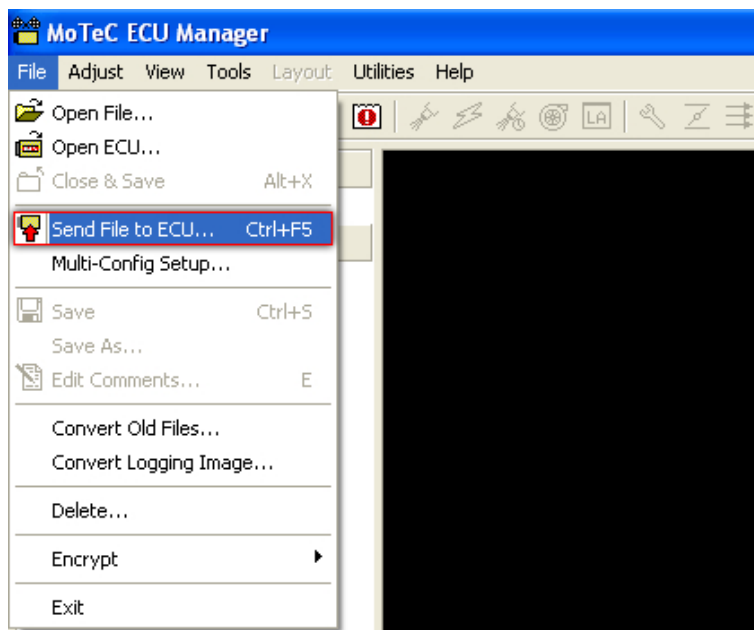
- Select “CAN 0 Address” row and press “1”. This window appears:



- Enter value “1520”.
- Press “OK” and the software comes back to the previous window.
- Close and save following this path: File/Close & Save”

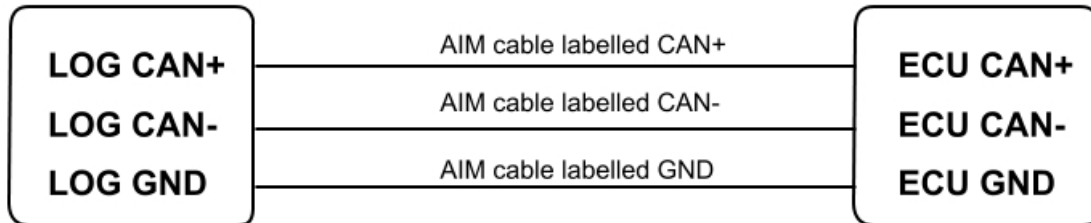


- Send the configuration to the ECU



2 – CAN Communication setup

MoTeC ECU are equipped with a CAN communication protocol whose standard 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 disconnect MoTeC communication cable after ECU configuration.

3 – Connecting MoTeC ECU with AIM logger

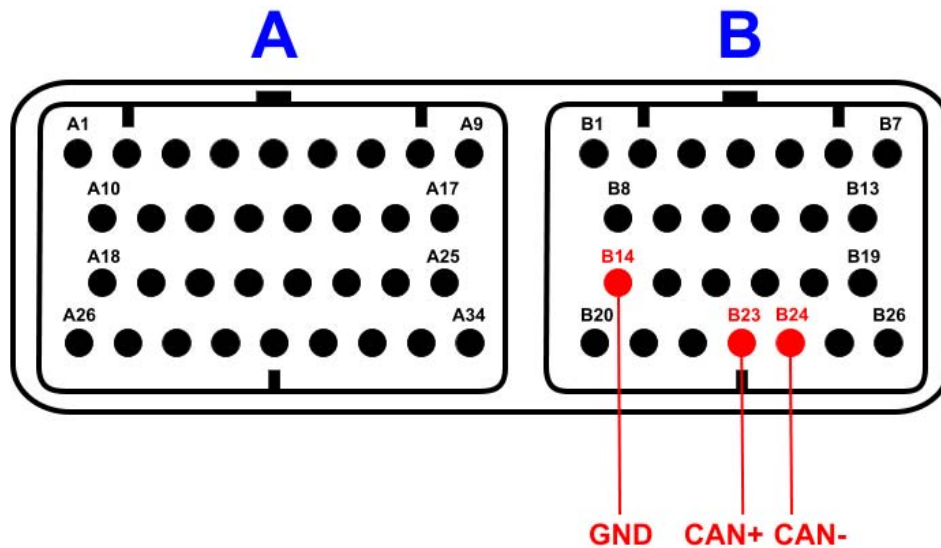
Connection of MoTeC ECU with AIM logger can be done in two ways: directly or using a Deltron CAN connector (part number 716-0-0501 – following MoTeC documentation).

3.1 – Connecting MoTeC ECU directly to AIM logger

MoTeC M400-M600-M800 ECU are equipped with two male connectors: a 34 pins male connector labelled “A” and a 26 pins male one labelled “B”, indicated in the image here below.



Here below is the draw showing MoTeC M400-M600-M800 pinout.



With reference to the draw here below, to connect Motec M400-M600-M800 ECU directly to AIM logger:

- connect AIM cable labelled CAN+ to pin 23 of 26 pins “B” male connector;
- connect AIM cable labelled CAN- to pin 24 of 26 pins “B” male connector;
- connect AIM cable labelled GND to pin 14 of 26 pins “B” male connector.

3.2 – Connecting MoTeC ECU using a Deltron connector

It is possible to connect MoTeC M400-M600-M800 ECU to AIM loggers using a DB9 connector and a Deltron connector whose part number, following MoTeC documentation, is 716-0-0501. To connect the devices:

- connect AIM cable labelled CAN+ to pin 5 of Deltron Connector connected to pin 23 of 26 pins “B” male connector;
- connect AIM cable labelled CAN- to pin 4 of Deltron Connector connected to pin 24 of 26 pins “B” male connector;
- connect AIM cable labelled GND to pin 1 of Deltron Connector connected to pin 5 of DB9 connector connected to pin 14 of 26 pins “B” male connector.

Warning: in case this second connection does not work, please address to MoTeC or to one of its dealers for further information.

4 – M400-M600-M800 ECU communication protocol

Channels received by AIM loggers depend on the ECU firmware version.

4.1 – M800-M600-M400 communication protocol

Channels received by AIM loggers connected to MoTeC M400-M600-M800 ECU with firmware version lower than 2.30S (select ECU Model M800-M600-M400) are:

ID	CHANNEL NAME	FUNCTION
ECU_1	M800_RPM	RPM
ECU_2	M800_THROTPOS	Throttle Position sensor
ECU_3	M800_MANIFPRES	Manifold pressure
ECU_4	M800_AIRTEMP	Intake air temperature
ECU_5	M800_ENGINE_TEMP	Engine temperature
ECU_6	M800_LAMBDA1	Lambda value 1
ECU_7	M800_LAMBDA2	Lambda value 2
ECU_8	M800_EXHAUST_PRESS	Exhaust gas pressure
ECU_9	M800_AIR_CHARGE	Air/fuel ratio
ECU_10	M800_FUELTEMP	Fuel temperature
ECU_11	M800_FUELPRESS	Fuel pressure
ECU_12	M800_OILTEMP	Oil temperature
ECU_13	M800_OILPRESS	Oil pressure
ECU_14	M800_GEARVOLT	Gearshift voltage
ECU_15	M800_KNOCKVOLT	Knock sensor voltage
ECU_16	M800_GEARSHIFTFORCE	Gearshift force
ECU_17	M800_EXHTEMP1	Exhaust temperature 1
ECU_18	M800_EXHTEMP2	Exhaust temperature 2
ECU_19	M800_CHANN1	Custom channel 1
ECU_20	M800_CHANN2	Custom channel 2
ECU_21	M800_CHANN3	Custom channel 3
ECU_22	M800_CHANN4	Custom channel 4
ECU_23	M800_BATTVOLT	Battery supply
ECU_24	M800_ECUTEMP	ECU temperature
ECU_25	M800_SPEED1	Vehicle speed 1
ECU_26	M800_SPEED2	Vehicle speed 2
ECU_27	M800_SPEED3	Vehicle speed 3
ECU_28	M800_SPEED4	Vehicle speed 4
ECU_29	M800_GROUNDSPEED	Ground speed
ECU_30	M800_DRIVESPEED	Dashboard speed
ECU_31	M800_SLIP	Driven/dragged speed difference
ECU_32	M800_AIMSLIP	Target slip value
ECU_33	M800_LAUNCHRPM	RPM at launch
ECU_34	M800_GEAR	Engaged gear

4.2 – M800-M600-M400-1M communication protocol

Channels received by AIM loggers connected to MoTeC M400-M600-M800 ECU with firmware version 2.30S or higher (select ECU Model M800-M600-M400-1M) are:

ID	CHANNEL NAME	FUNCTION
ECU_1	M800_RPM	RPM
ECU_2	M800_THROTPOS	Throttle position sensor
ECU_3	M800_MANIFPRES	Manifold air pressure
ECU_4	M800_AIRTEMP	Intake ar temperature
ECU_5	M800_ENGINE_TEMP	Engien temperature
ECU_6	M800_LAMBDA1	Lambda value 1
ECU_7	M800_LAMBDA2	Lambda value 2
ECU_8	M800_EXHAUST_PRESS	Exhaust gas pressure
ECU_9	M800_AIR_CHARGE	Air/fule ratio
ECU_10	M800_FUELTEMP	Fuel temperature
ECU_11	M800_FUELPRESS	Fauel pressure
ECU_12	M800_OILTEMP	Oil temperature
ECU_13	M800_OILPRESS	Oil pressure
ECU_14	M800_GEARVOLT	Gearshift voltage
ECU_15	M800_KNOCKVOLT	Knock sensor voltage
ECU_16	M800_GEARSHIFTFORCE	Gearshift force
ECU_17	M800_EXHTEMP1	Exhaust gas temperature 1
ECU_18	M800_EXHTEMP2	Exhaust gas temperature 2
ECU_19	M800_CHANN1	Custom channel 1
ECU_20	M800_CHANN2	Custom channel 2
ECU_21	M800_CHANN3	Custom channel 3
ECU_22	M800_CHANN4	Custom channel 4
ECU_23	M800_BATTVOLT	Battery supply
ECU_24	M800_ECUTEMP	ECU temperature
ECU_25	M800_SPEED1	Vehicle speed 1
ECU_26	M800_SPEED2	Vehicle speed 2
ECU_27	M800_SPEED3	Vehicle speed 3
ECU_28	M800_SPEED4	Vehicle speed 4
ECU_29	M800_GROUNDSPEED	Gruond speed
ECU_30	M800_DRIVESPEED	Dashboard speed
ECU_31	M800_SLIP	driven/dragged speed difference
ECU_32	M800_AIMSLIP	Target slip value
ECU_33	M800_LAUNCHRPM	RPM at launch
ECU_34	M800_GEAR	Engaged gear
ECU_35	M800_OILP_PSI	Oil pressure in PSI
ECU_36	M800_FUELP_PSI	Fuel pressure in PSI

4.3 – M800-M600-M400-1M/500K_v3 communication protocol

Channels received by AIM loggers connected to MoTeC M400-M600-M800 ECU with firmware version “3.x” (select ECU Model M800-M600-M400-1M_v3) are:

ID	CHANNEL NAME	FUNCTION
ECU_1	M800_RPM	RPM
ECU_2	M800_THROTPOS	Throttle position sensor
ECU_3	M800_MANIFPRES	Manifold pressure
ECU_4	M800_AIRTEMP	Intake air temperature
ECU_5	M800_ENGINE_TEMP	Engine temperature
ECU_6	M800_LAMBDA1	Lambda value 1
ECU_7	M800_LAMBDA2	Lambda value 2
ECU_8	M800_EXHAUST_PRESS	Exhaust gas pressure
ECU_9	M800_AIR_CHARGE	Air/fule ratio
ECU_10	M800_FUELTEMP	Fuel temperature
ECU_11	M800_FUELPRESS	Fuel pressure
ECU_12	M800_OILTEMP	Oil temperature
ECU_13	M800_OILPRESS	Oil pressure
ECU_14	M800_GEARVOLT	Gear voltage
ECU_15	M800_KNOCKVOLT	Knock sensor voltage
ECU_16	M800_GEARSHIFTFORCE	Gearshift force
ECU_17	M800_EXHTEMP1	Exhaust gas temperature 1
ECU_18	M800_EXHTEMP2	Exhaust gas temperature 2
ECU_19	M800_CHANN1	Custom channel 1
ECU_20	M800_CHANN2	Custom channel 2
ECU_21	M800_CHANN3	Custom channel 3
ECU_22	M800_CHANN4	Custom channel 4
ECU_23	M800_BATTVOLT	Battery supply
ECU_24	M800_ECUTEMP	ECU temperature
ECU_25	M800_SPEED1	Vehicle speed 1
ECU_26	M800_SPEED2	Vehicle speed 2
ECU_27	M800_SPEED3	Vehicle speed 3
ECU_28	M800_SPEED4	Vehicle speed 4
ECU_29	M800_GROUNDSPEED	Ground speed
ECU_30	M800_DRIVESPEED	Dashboard speed
ECU_31	M800_SLIP	Driven/dragged speed difference
ECU_32	M800_AIMSLIP	Target slip value
ECU_33	M800_LAUNCHRPM	RPM at launch
ECU_34	M800_GEAR	Engaged gear
ECU_35	M800_OILP_PSI	Oil Pressure in PSI
ECU_36	M800_FUELP_PSI	FUEL Pressure in PSI