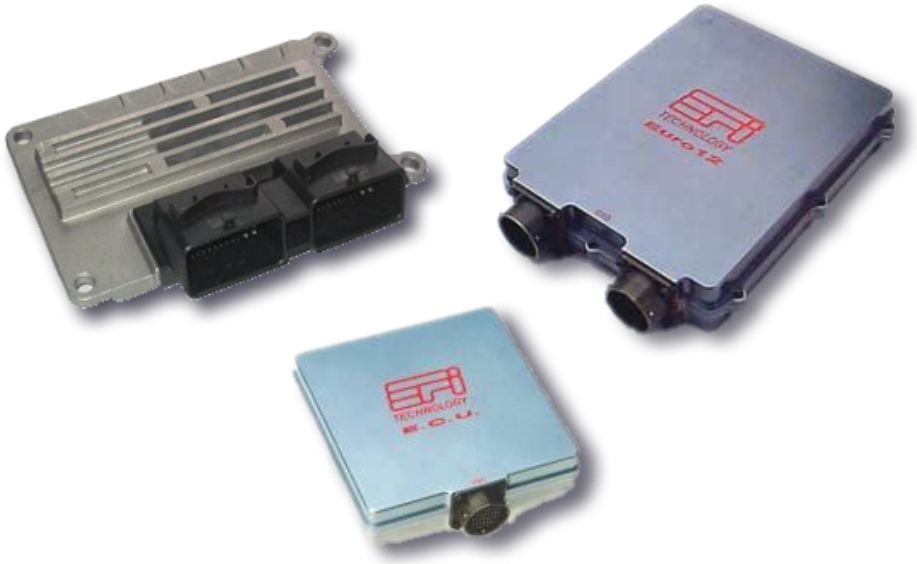
EFI Europe

Euro 4 – Euro 6 – Euro 12 ECU



Racing Data Power

INTRODUCTION

AIM has developed special applications for many of the most popular ECUs: by special applications we mean user-friendly systems which allow to easily connect your ECU to our high 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 logger and on the ECU data stream and configuration) 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 "Efi" Model "Euro_4" or "Euro_6"or "Euro_12".
Refer to Race Studio Configuration user manual for further information concerning the loggers configuration.

INDEX

Chapter 1 – Technical communication notes

EFI “Euro 4”, “Euro 6” and “Euro 12” can communicate with AIM loggers through the CAN bus. This communication can be wrong due to different reasons related to ECU hardware, firmware or software.

1.1 – Hardware check

EFI CAN line works normally with two only wires: CAN High (corresponding to AIM CAN +) and CAN low (corresponding to AIM CAN-). Generally AIM loggers do not need to ground CAN line. 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 1.8V); 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

EFI “Euro 4”, “Euro 6”, “Euro 12" ECU has a CAN line to export data to a data logger.

Warning: EFI Euro 6 ECU communication with AIM loggers depends on the ECU firmware version. No all versions are compatible with AIM loggers. Refer to the following table to know if your ECU needs a firmware upgrading.

EFI MODEL	EFI FIRMWARE VERSION	COMPATIBILITY WITH AIM LOGGERS	WHAT TO DO
EURO 4/6/12	200	Never	ECU Firmup needed.
EURO 4/6/12	300	Always	Software setup needed
EURO 4/6/12	400	Always	Software setup needed

In case Firmup is needed contact an EFI dealer.

Please ensure that the logger connected to the ECU is upgraded at the latest firmware version.

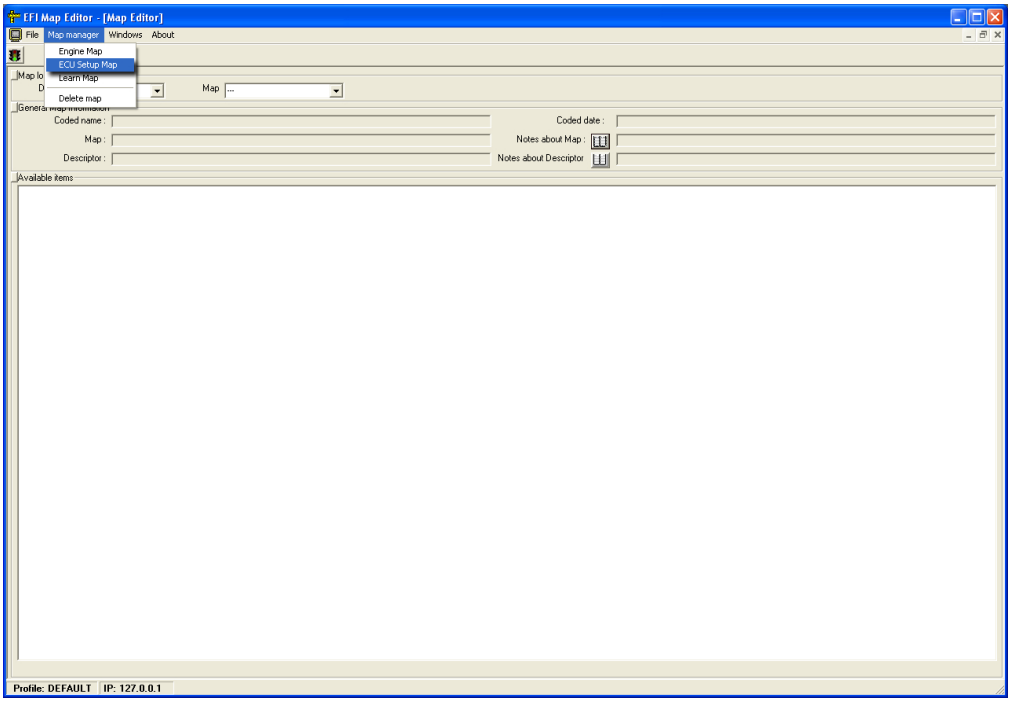
1.3 – Sotftware setup

As far as software set up is concerned here follows explanation of what to do.

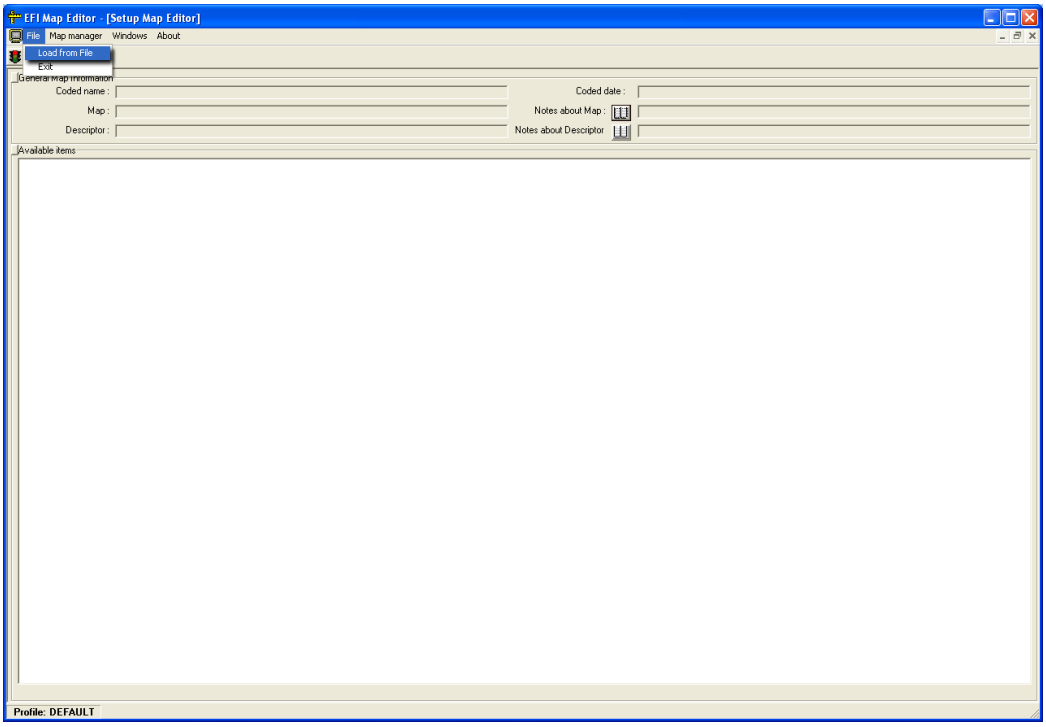
For “Euro 4”, “Euro 6”, “Euro 12” ECU with Firmware version 300 or 400 to communicate with AIM loggers it is necessary to set ECU Map through “ECT Mod”, the EFI software so that their CAN bus is managed as AIM loggers manage it.

To configure these EFI ECUs:

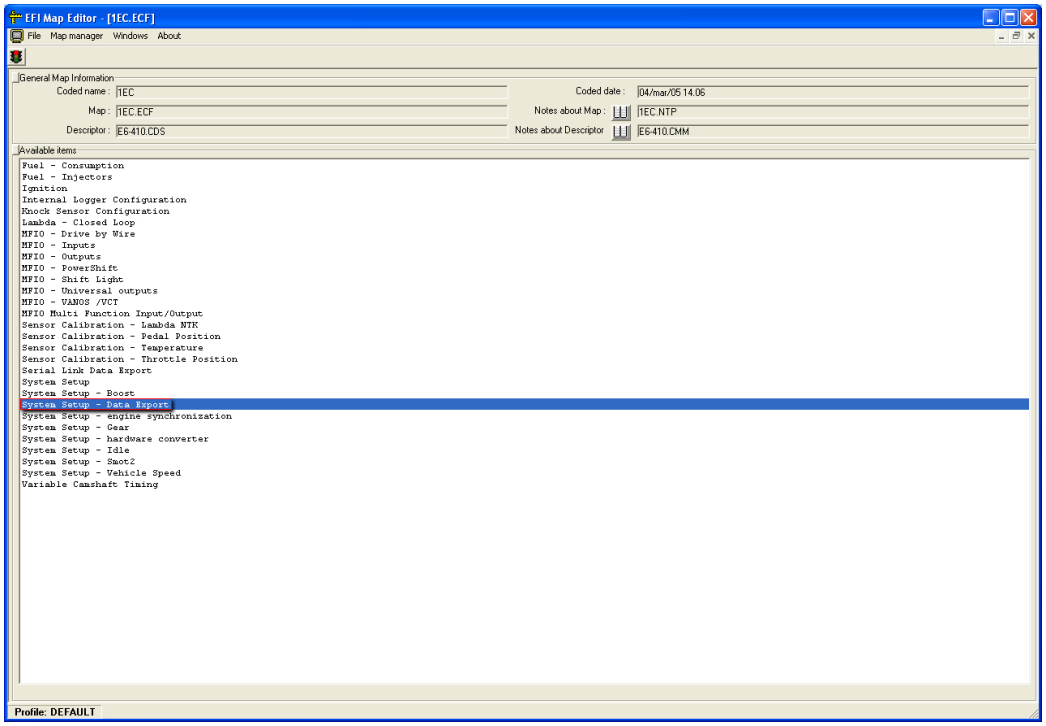
- run “ECT Mod” software
- load an “Euro 4”/“Euro 6”/”Euro12” ECU
- click “Map Editor”
- click Map Manager and select “ECU Setup Map”



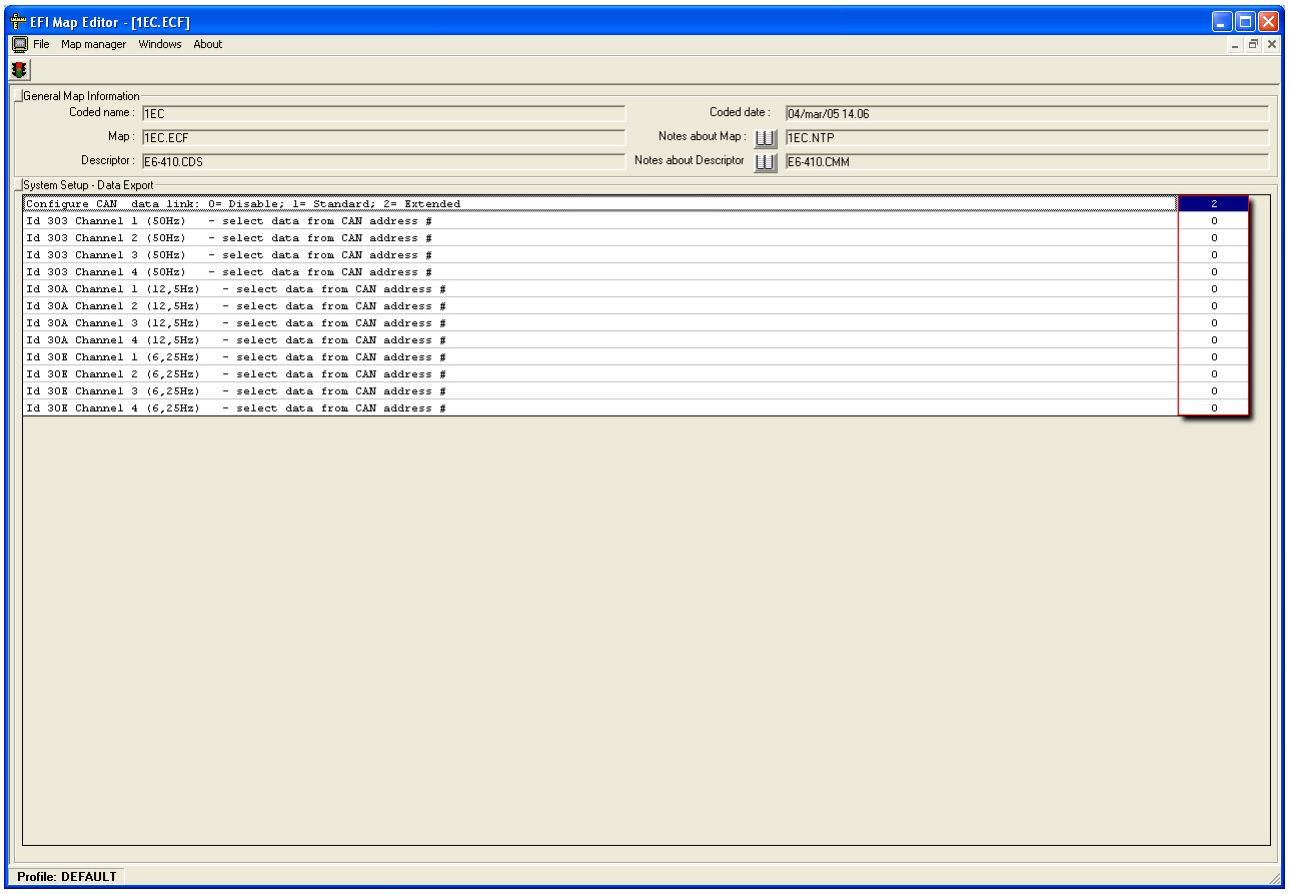
- Click File and select “Load from file” option.



- Select the “.ECF” file;
- select the “.CDS” file.
- the map is loaded
- select “System setup – data export” option



- Data export table is loaded.

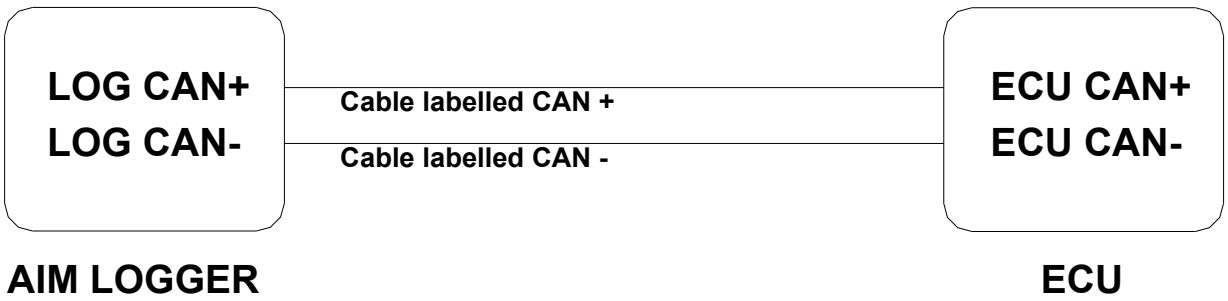


The **first row** ha to be set to **"2 =Extended."**
All other values have to be set to "**0**".

Please ensure as well that AIM logger connected to the ECU is configured with the latest version of Race Studio 2 software.

Chapter 2 – CAN communication Setup

EFI "Euro 4", "Euro 6", "Euro 12" ECU is equipped with a CAN communication setup used to communicate parameters to an external logger.
The image here below shows the standard CAN communication setup.



Chapter 3 – Connection with AIM loggers

EFI “Euro 4”, “Euro 6” and “Euro12” can be connected to AIM loggers following these instructions.

3.1 – Connection of EFI “Euro 4” ECU

EFI “Euro 4” ECU is equipped with two male connectors. The CAN bus is on the right one (CNR). To connect AIM logger to the ECU:

- connect AIM cable labelled “CAN+” to pin F3 of the right connector;
- connect AIM cable labelled “CAN-” to pin E4 of the right connector.

3.2 – Connection of EFI “Euro 6” ECU

EFI “Euro 6” is equipped with a 79 pins connector used to communicate parameters to an external data logger or to configure the ECU itself. To connect AIM logger to the ECU:

- connect AIM cable labelled “CAN+” with pin 55 of the ECU connector;
- connect AIM cable labelled “CAN-“ with pin 70 of the ECU connector.

3.3 – Connection of EFI “Euro 12” ECU

EFI “Euro 12” is equipped with a 79 pins connector used to communicate parameters to an external data logger or to configure the ECU itself. To connect AIM logger to the ECU:

- connect AIM cable labelled “CAN+” with pin 10 of the ECU connector;
- connect AIM cable labelled “CAN-“ with pin 9 of the ECU connector.

Chapter 4 – EFI communication protocol

4.1 – EFI "Euro 4" communication protocol

Channels received by AIM loggers connected to EFI "Euro 4" ECU are:

ID	CHANNEL NAME	FUNCTION
ECU_1	EFI_RPM	RPM
ECU_2	EFI_TPS1	Throttle position bank 1
ECU_4	EFI_MAP	Manifold pressure bank 1
ECU_5	EFI_LNR1	Linear 1
ECU_6	EFI_DFARF	Throttle position derivative
ECU_7	EFI_DMAP	Manifold pressure Derivative
ECU_8	EFI_AE	Fuel enrichment for positive TPS transient
ECU_9	EFI_LNR2	Linear 2
ECU_10	EFI_WHEELSPD	Driven wheel speed
ECU_11	EFI_DRAXSSPD	Driving wheel speed
ECU_12	EFI_SLIP	Slip factor
ECU_13	EFI_OSASLIP	Ignition cut vs slip factor
ECU_14	EFI_PPS	Throttle request
ECU_15	EFI_USERDEF02	User defined channel 02
ECU_16	EFI_USERDEF03	User defined channel 03
ECU_17	EFI_KINJHPRC	Terog_U/Terog_L
ECU_18	EFI_TEROGBASE	Injection table - injection time
ECU_19	EFI_TEROG	Real injection time
ECU_20	EFI_SABASE	Spark advance on ignition table
ECU_21	EFI_SA	Real spark advance
ECU_22	EFI_NGK1	Lambda value
ECU_24	EFI_KFUELLEARN	Fuel correction coefficient for auto mapping
ECU_25	EFI_CLC1	Closed loop control 1 (injection)
ECU_27	EFI_GEAR	Engaged gear
ECU_29	EFI_GEARSHIFTTIME	Gear shift time
ECU_30	EFI_OILPRESS	Oil pressure
ECU_31	EFI_FUELPRESS	Fuel pressure
ECU_32	EFI_BARO	Barometer
ECU_33	EFI_LNR3	Linear 3

ECU_34	EFI_LNR4	Linear 4
ECU_36	EFI_BATTVOLTDIR	Direct battery supply
ECU_37	EFI_BATTVOLTKEY	ECU voltage supply
ECU_42	EFI_LNR5L	Linear 5
ECU_43	EFI_LNR6L	Linear 6
ECU_44	EFI_SLIPCALC	Calculated slip (with engine strategies)
ECU_45	EFI_FASEUP	Upper injectors phase
ECU_46	EFI_FASEDW	Lower injectors phase
ECU_47	EFI_USERDEF08	User defined channel 8
ECU_48	EFI_WATERTEMP	Water temperature
ECU_49	EFI_OILTEMP	Oil temperature
ECU_51	EFI_AIRTEMP01	Air temperature bank 01
ECU_54	EFI_KFUELCAL	Calibration fuel multiplier
ECU_56	EFI_SELEEPROM	Selected Engine Map
ECU_57	EFI_USERDEF10	User defined channel 10
ECU_58	EFI_USERDEF11	User defined channel 11
ECU_59	EFI_USERDEF12	User defined channel 12

4.2 – EFI “Euro 6” and “Euro 12” communication protocol

Channels received by AIM loggers connected to EFI “Euro 6” and “Euro 12” ECU are exactly the same, to say:

ID	CHANNEL NAME	FUNCTION
ECU_1	EFI_RPM	RPM
ECU_2	EFI_TPS1	Throttle position bank 1
ECU_3	EFI_TPS2	Throttle position bank 2
ECU_4	EFI_MAP	Manifold pressure bank 1
ECU_5	EFI_MAP2	Manifold pressure bank 2
ECU_6	EFI_DFARF	Throttle position derivative
ECU_7	EFI_DMAP	Manifold pressure Derivative
ECU_8	EFI_AE	Fuel enrichment for positive TPS transient
ECU_9	EFI_DE	Fuel enrichment for negative TPS transient
ECU_10	EFI_WHEELSPD	Driven wheel speed
ECU_11	EFI_DRAXSSPD	Driving wheel speed
ECU_12	EFI_SLIP	Slip factor
ECU_13	EFI_OSASLIP	Ignition cut vs slip factor
ECU_18	EFI_TEROGBASE	Injection table - injection time
ECU_19	EFI_TEROG	Real injection time
ECU_20	EFI_SABASE	Spark advance on ignition table
ECU_21	EFI_SA	Real spark advance
ECU_22	EFI_NTK1	Lambda value 1
ECU_23	EFI_NTK2	Lambda value 2
ECU_24	EFI_KFUELLEARN	Fuel correction coefficient for auto mapping
ECU_25	EFI_CLC1	Closed loop control 1 (injection)
ECU_26	EFI_CLC2	Closed loop control 2 (injection)
ECU_27	EFI_GEAR	Engaged gear
ECU_29	EFI_GEARSHIFTTIME	Gear shift time
ECU_30	EFI_OILPRESS	Oil pressure
ECU_31	EFI_FUELPRESS	Fuel pressure
ECU_36	EFI_BATTVOLTDIR	Direct battery supply
ECU_37	EFI_BATTVOLTKEY	ECU voltage supply
ECU_48	EFI_WATERTEMP	Water temperature

ECU_49	EFI_OILTEMP	Oil temperature
ECU_50	EFI_FUELTEMP	Fuel temperature
ECU_51	EFI_AIRTEMP01	Air temperature bank 01
ECU_52	EFI_AIRTEMP02	Air temperature bank 02
ECU_54	EFI_KFUELCAL	Calibration fuel multiplier
ECU_56	EFI_FUELUSED	Injected fuel
ECU_57	EFI_FUELLEFT	Left fuel