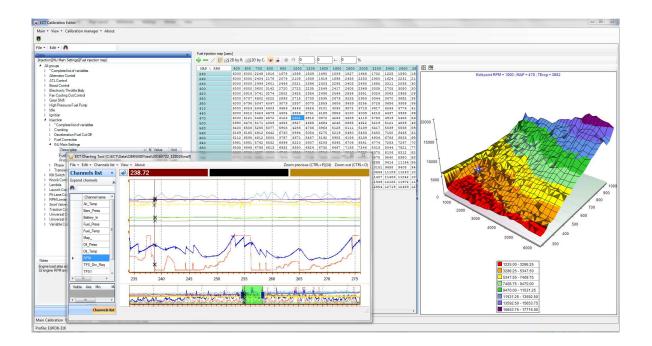


Quick guide to ECU Configuration Tool ECT

The smart tool for calibrating engine management systems and data analysis of logged data





Version 2.01 – June 2017

For use with ECT version 4.12.457

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1 Introduction

The ECT communication tool is developed to give the user full access to all features in any of our engine management systems for use in motorsport and automotive development environment.

The tool gives access to:

- Display of engine data
- Off-line modifications of main and setup calibrations
- On-line modifications of main and setup calibrations
- Sending calibrations to the ECU
- Receiving calibrations from the ECU
- Sending learn calibrations to the ECU
- Receiving learn calibrations from the ECU
- Resetting the ECU's automatic learn system
- Configuration of the ECU data logger
- Downloading data from the ECU logger
- Graphic analysis of the logged data
- Modification of the ECU databases

2 Software Requirements

- A PC running Windows 7, Windows 8 or Windows 10.
- ECT is developed with Microsoft [®]. NET Framework 4.0 which must be present on the PC. If the Framework is not installed during the installation you will be asked to authorize the installation software to download and install the Framework. Alternatively you can manually install the Framework from another source and then proceed with the installation of ECT.
- The PC must have at least 110 Mb free on the hard disk.
- The PC must have at least one available USB port and/or an Ethernet port.
- A communication interface from EFI Technology S.r.l. for communication with all current devices or an Ethernet connection for Euro-5, Euro-8 and Euro-12.
- The other software included in the package 'EFI Software Installer', ECT version 433 or higher.
- The databases provided by OBR Control Systems.
- The fundamental database to manage a device is the database in XML format. It contains the communication IDs and optionally the memory map, the list of channels to read, the structure of the calibration and other characteristics of the device.
- Display databases. These databases contain lists of channels or values of the calibration along with all necessary information to graphically render data. The database can be created from scratch in ECT or imported into the environment with wizards and can be modified using the tools provided by ECT.
- Firmware of the device. Developed by EFI and already present in the device. ECT gives you the ability to reprogram the ECU with a new version of firmware released by EFI (if the device includes the ability to be reprogrammed).
- Calibration of the device. Usually developed by the customer, on an initial basis provided by EFI or OBR. If the device allows it, can be transmitted to the device and downloaded from the device through ECT. In most devices you can also view and edit the contents of the calibration on-line.



3 Software Installation

To install the ECT tool, please download the software from our website, <u>www.obr.uk.com</u>, look for the 'Support' then 'Software' section.

Download these driver packages:

- USB driver package
- Double Server
- Pseudo Programmer
- PC tool 'ECT'.

3.1 USB Communication Drivers

The Windows driver required for the functioning of the communication interfaces EFI. The installation of this software is essential for all functions involving

communication with ECT devices.

Click on **Next** to start the installation.

Accept the license terms and click Next.

Select the USB option and then click Install.

Click Next.

Click Finish to complete the installation of the device drivers.

Click **Next** to finish the driver installation.

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3.2 EFI Communication Server.

This software interfaces with the driver and provides the communication conditions to other programs such as ECT. Installation of this software is essential for all functions involving communication with devices.

Click **I Agree** to start the installation of the communication server.

Accept the default installation path or change it now, then click **Next**.

Select **Automatic Run** if you want to start the server with Windows or leave blank for the service to start when the tool is opened.

Click Install to proceed.

Click Next to continue.

Click **Finish** to close the setup.

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C PseudoProgrammer Setup

3.3 Pseudo Programmer – Programmer for EFI ECUs

This software is used for programming devices with a kernel of the latest generation. It can operate in stand-alone mode or be invoked as a tool by ECT. The installation of this software is essential if you intend to use ECT for programming devices based on the latest kernel.

Click Next to start the installation.

Accept the license terms and click Next.

Click **Next** to start the installation.

In normal installations you do not need to add neither desktop nor a quick launch shortcut. Just tick the last box to associate certain file extensions with Pseudo Programmer.

Click Next to proceed.

Click **Next** to finish the installation.

Click Finish to close the setup.

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	Click Next to continue.
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OBR Control Systems Inc

3.4 ECT Main Tool

This software is ECU tool which is described in this documentation. This guide supports of ECT version 421.

Click OK to proceed with the installation.

Click I Agree to proceed with the installation.

Select where to add shortcuts and click Next to start the installation.

Accept the default installation path or change it now, then click Next.

When the installation is complete a tool version history is displayed. Close it and then click **Close**.

3.5 ECU Logger

This is the software used for configuring the on-board data recording module available in most of our engine management modules. The software is also used for downloading logged data.

Data saved in the MDF format can be visualised and analysed graphically in the Chart Tool.

If data is saved in the "2D" format you must purchase a license from 2D in Karlsruhe in Germany, website www.2d-datarecording.com.

Click OK to proceed with the installation.

Click Next to proceed with the installation.

Click I Agree to proceed with the installation.



OBR Control Systems Inc 32233 West 8 Mile Road Livonia, Michigan 48152 USA Telephone : +1 (248) 672-3339

ole.buhl@obrcontrolsystems.com www.obrcontrolsystems.com

< Back I Agree Cancel



Accept the default installation path or change it now, then click Install.

Click Next to finish the installation.

Click Finish to close the setup.

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4 Communication

Communication with the ECU is either via CAN using a dedicated EFI Technology USB CAN interface, part number EFP02C, the CAN logger EFT20 or via Ethernet.

Ethernet communication is available with Euro-5, Euro-8 and Euro-12 ECU's. Communication via Ethernet is generally faster than CAN communication but the CAN interface is recommended in noisy conditions and required to update the ECU firmware. When communicating via CAN, the PC must be connected using the EFP02C or EFT20 interface to CAN1.

Please note that CAN1 is terminated internally in the ECU, the EFP02C or EFT20 interfaces should be terminated via software.

The server icon is found on the PC screen, in the lower right hand corner. Right click it and select **Show**: Tick the box **Enable CAN Termination** and click **OK**.

With this tool an optional ASAP3 communication is available. ASAP3 communication allows data exchange between an engine dyno and the ECU.

It is also possible, as a cost option, to replace ECT with either INCA or ATI editor systems.



5 Directory Structure

Several folders are created in the ECT main folder:

BIN

Contain program folders and associated files, for example a data base editor.

CALIBRATIONS

Suggested folder for your firmware, engine and ECU setup maps. Installing an updated version a new folder is created, containing the related firmware.

COMMON

Contains the main program data files.

DEVICE

Individual database files for each type of ECUs and for various versions of firmware releases.

DOC

System version history files are stored in this folder.

LANG Various system files.

TEMPLATES Various system files.

TOOLS Various system files.

USER

This folder contains variations of display files for supported ECUs.

6 ECT Main Menu

First time you start ECT after an installation or updated version has been installed this screen appears:



Scroll down, tick the box **Do not show this warning again** and click **I Accept**.

The ECT Main Menu now appears as a slim tool bar across your monitor:

6	ECT Main Menu	100		-				-	of the second	states in such	No. of Concession, name		
ſ	🖅 🌖 On line	Server	🚸 DeVices	🍓 EURO8-316	🔄 Displays	🝓 Calibrations	🍯 Memory Interface	😂 Charting tool	P ECU Logger	🗇 Arrangement	Workspace	X Tools	0

- **Device editor**. This section gives access to the databases for each individual ECU version installed in the tool. In order to access data of a physical device, ECT must have a database file [devicename].XML corresponding to the physical device. From this database ECT reads the information required to visualize data, to program firmware, manage engine maps etc.
- **Profile manager**. A profile is a custom environment that allows you to save collections of displays together with a set of data stored in a database file [profilename].PDB. The profile manager provides commands to create, delete, copy, import and export profiles.
- **Displays**. You can create screens displaying any ECU parameter measured and calculated for each type of ECU. A screen can display any number of channels in any size, font and colour. You can add LED's in various colours to ease the data monitoring and potentiometers for easy, adjustments of numerous parameters. Furthermore you can add access to any section of the ECU maps, allowing you to edit for example the main fuel and spark maps directly within a display window. The display screen is also used to configure your AMC, Active Mapping Controller. The display tool provides commands to create, modify, organize and load data display screens. It also features an option to record live data from any display screen.
- **Calibration editor**. The calibration editor opens the map editor and gives access to the data in both the engine maps and the ECU setup calibrations. Both types of calibrations can be accessed working either online with the ECU or offline.
- **Memory interface**. Memory interface provides access to commands to flash the device memory, to read and write the calibration, to manage diagnostic functions (if available for the current device), to manage the creation of HDP and CRP files.
- **Charting tool**. This is a tool used for graphical display of data recorded by the built-in data logger available in most of our ECUs and by the data recording option in the Display section. It can also open MDF files from other systems.
- **ECU Logger**. If you have installed the ECU logger configuration tool you can access it from this section. Here you can create logger configuration files, set sampling rates and trigger conditions. Data is also downloaded from the ECU to your PC in this section.



7 Device Manager

🊰 Open 🛛 🛷 🛅 Copy	🗡 Delete 📒	Explorer 🛛 🌞 CReate new 🖶 Load new 🛛 🔀 📝 Properties 🕘 About	
Device	Used by Displays	Description	^
E4-B025		Euro4 11/09/2007	_
E4-D1009	•	Euro-4 Direct Injection Engines FW D1009	
E4-DRAGBIKE-V002	•	Euro-4 DragBike V001	
E4-V325	•	Euro-4 Database Version 325	
E4-V326		Euro-4 Database Version 326	
E5GDI-V023CAN	•	EURO-5 Version 023 CAN	
E5GDI-V023ETH		EURO-5 Version 023 Ethernet	
E5GDI-V024CAN	•	EURO-5 Version 024 CAN	
E8B-V417CAN		EURO-8 Version 400 CAN	
E8C-V417CAN	•	EURO-8 Version 400 CAN	
E8-V/304	b	FURD-8 Database Version 304	

The Device Manager gives access to view and modify the database for each software and hardware version of ECUs supported.

This section is recommended for expert users only!

Click on the database you want to open and then click **Open**.

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- 4

This screen displays the main information about the communication protocol with the ECU. Changing any settings here might result in total loss of communication with the ECU.



7.1 Scaling

Back to device	e list 📄 Sa	ve 	HTML	Sexpert mo	ode disabl	led						
ain Scalings	Increments	Groups	Channels	Calibration p	arameters	Memory Map	Data logge	r Mem	ory downloa	ad Interfa	ice settin	igs Device i
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You can edit existing scaling and create new scaling if you introduce a new sensor to be calibrated in the system.

A sensor is calibrated following this calculation:

ENGINEERING VALUE = [(BITS x GAIN1) + OFFSET1] / [(BITS x GAIN2) + OFFSET2]

Gain 1 is the theoretical sensor range between 0V and 5V. This value is 0 for a frequency sensor.

Gain 2 is the gain for a frequency sensor. This value is 0 for an analogue sensor

Offset1 is a scaling constant to be calculated.

Offset2 is typically 256 for a 1 byte channel and 1024 for a 2 bytes channel.

Save the new channel scaling using either the proposed name or your personal preference.

7.2 Channels

Main Scalings Increments Group	Channels Calibration parameters	Me	mory Map	Data logger	Memory download	Interface settings	Device i
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Full list			Prope	rties			
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- 11 -				Factory Nar	me: Rom		
- 12				and a second	ex: 23		
- 13 -					es: 2		
- 14 -			Names	5).			*
- 15 -			Names		12200		~
ECU_On	ECU On			Display identif	202	1	
- 17 -		-		Descripti			
- 18 -				AS	AP:		
- 19 -		-	Scaled v	alues			*
- 20 - AngleCrankStatus	AngleCrankStatus	-		Scaling II); 🛹 S 1 1	0 0 1	Ξ
- 22 -	AngleCrankStatus	-		Min, va			E
Rom	RPM			Cust. min. va	. 0		
- 24				Cust max va			
- 25 -	RPM BAW	-			.: 65535		
CntCrk	Crank Count		Visualiza				
- 27			visualiza	7677.1 (*
- 28		1	2000	Contr	18878 JACON 1997		-
Sel_Smot	Crank Select		Rep	presentation typ	-		
I_PPS1	PPS1			Display Form	nat: #####0		
I_PPS2	PPS2			U	nit: 1/min		
I_ILIOS_DIP2	I_ILIOS_DIP2	-	Datalogg	jer			*
• III	•			Enal	ole:		
Groups				Dlog max	Hz: 200		-
Current Corr	mands Available	_	On-line	bioginat	. 200		
		1	Online	2000			×
	Alternator Control			Addre			
	Alternator Setup ATL Control			Byt			
	ATL Control Boost Control			Data Res	ult:		
L		*	-			Check Data	

Section Channels gives you the option to change the appearance of selected data channels. Each channel is located in a unique position, called Index. This index number is used to identify channels in other sections of the ECT tool.

In Properties you see several sections:

- Main, do not change anything here.
- **Names**, you can name the channel, you can add a short description which will be displayed on other parts of the ECT tool. ASAP, name the channel so it is recognised when used in the data exchange protocol ASAP3.
- Scaled values, select the correct scaling for your custom sensor. Be very careful if you decide to change existing scaling.
 Use 'Cust. min. val' and 'Cust. max val.' to set minimum and maximum values displayed in channel windows and strip charts.
- **Visualization**, select whether your channel is a data channel or a potentiometer. Also select which type of data it represents, for example a normal or signed byte, decimal, hex or binary etc.
- **Data logger**, tick the box if you want this channel to be selectable within the data logger tool. Also set your preferred sampling rate, this can be changed in the logger tool. In Display Format you define how to display values. Using "0" means you want to display this digit while "#" means reserve space for this digit. Using the "#.#" gives the option to define the desired number of decimals. For example, ##0.0 means you will reserve space for 2 additional digits in front of the comma and display the value with 1 decimal, for example 2.5.

7.3 Calibration Parameters

escriptors Limits	Values Curves	Maps Cuboids					
20. 19.18	of 459 🕨 🔰	🕂 🕆 🖻 🚺					
Full list					Properties		
Factory Name	Offset in bytes	Display identifier:	Description:	Op ^	Main		*
Configuration.Blank	0	Configuration.Blank	EUR08_V3.16		Factory Name	Configuration.PhMAPInput	
Configuration.Ph	32	Configuration.Ph	Water temperatu	tuz	Type	Value	4
Configuration.Ph	33	Configuration.Ph	Air temperature s	225	Offset in bytes	37	
Configuration.Ph	34	Configuration.Ph	Oil temperature s			1	
Configuration.Ph	35	Configuration.Ph	Fuel temperature		Bytes	1	
Configuration.Ph	36	Configuration.Ph	Spare temperatur		Signed		
Configuration.Ph	37	Configuration.Ph	MAP-1 sensor de	1	Names		*
Configuration.Ph	38	Configuration.Ph	Oil pressure sens		Display	Configuration, PhMAPInput	
Configuration.Ph	39	Configuration.Ph	Fuel pressure ser	n	Description	MAP-1 sensor defined by ECU	linnut
Configuration.Phl	40	Configuration.Phl	Idle valve output				
Configuration.Ph	41	Configuration.Ph	Fuel pump output	8	Visualization		*
Configuration.Phl	42	Configuration.Phl	VCT control valv		Format	0.###	
Configuration.Phl	43	Configuration.Phl	VCT control valv		Unit	0; 1-19 analogue; 34-49 via C	AN
Configuration.Ph	44	Configuration.Ph	VCT control valv		Scaled values		\$
Configuration.Ph	45	Configuration.Ph	VCT control valv	445	Scaling ID	S_1_1_0_0_1	$\Xi \int f_x$
Configuration.Ph	46	Configuration.Ph	Lap trigger define	i	Min. possible	0	- 1
Configuration.Ph	47	Configuration.Ph	Lap marker input		Custom min.		
Configuration.Ph	48	Configuration.Ph	Wheel speed fro			0	
Configuration.Ph	49	Configuration.Ph	Wheel speed fro	.23	Custom max.	49	
Configuration.Ph	50	Configuration.Ph	Wheel speed rea	i	Max. possible	255	
Configuration.Ph	51	Configuration.Ph	Wheel speed rea		External visibility		\$
* [m	1	+	Open var.		
Groups					Notes		- A
Curre	nt	Commands	Available		Notes	1207 58 60	*
General Inputs				*	INOTES	Linear inputs: Linear 1, 8 = Channels 1, 8	A
	l	Alternato	or Control				PS2 = ≡
		Alternato	or Setup			Channel 10	DC1D
		ATL Con	steal	-		TPS1A = Channel 11 TI Channel 12 TPS2A = Ct	PS1B =

This section gives access to change settings in the engine and ECU setup maps. It is recommended to leave any intentions of modifications to OBR for this section.

7.4 Memory Map

It is strongly recommended to avoid making any changes in this section.

7.5 Data Logger

It is strongly recommended to avoid making any changes in this section.

7.6 Memory Download

It is strongly recommended to avoid making any changes in this section.

7.7 Interface Settings

In this section you can set you preferred colours of your data windows used in data display screens.

7.8 Device Info for Display

It is strongly recommended to avoid making any changes in this section.



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8 Profiles Manager

Use this section to switch between various ECU communication protocols. From the drop down menu you click on the preferred version and this sets the display screen protocol for the selected ECU.

Select Profile from list :		
EURO8316		Open profile
EUR08-245-TCR EUR08-251 EUR08-303	1	New profile
EUR08-304 EUR08-310 EUR08-315		Copy profile
EUROS-316		Import profile
EUR08-402		Export profile
Description of the Profile :		Rename profile
	^ L	the same process
		Delete profile
	- [Update Description
Referenced devices :		
E8-V316-210CAN		
		Reassign Devices
	°	
Related workspaces :		
FUBO-8 MAE XMI		
EURO 8_SD XML EURO 8_SD 800ST_LARGE_DISPLAY XML EURO 8_TPS XML		

This section also gives access to create a new profile, to copy profiles, to import and export profiles, rename and delete profiles.

It is also possible to assign a specific database version to data display screens. For Euro-5, Euro-8 and Euro-12 we provide database versions with either CAN or Ethernet based PC communication. You use this section to assign the preferred

database to the data display files.

As shown on the left the data display files are linked to a database communicating via CAN. If you want to change this to Ethernet communication, click on **Reassign Devices** and the select the database with ETH listed in its name, then click **OK**.

8.1 Importing New Profile

We release new versions of ECU data files as XIP files. This format is used by the ECT tool to import files.

When you have received a file from us click on Import Profile and locate the file, then click OK to open it.

A new display opens, showing which files are included in the new release.

Click on **Actions** in the top left corner of this wind and select **Extract All**. Close the window when done.

If you only want to import part of the files, click on those files and then select **Extract selected file(s)**.

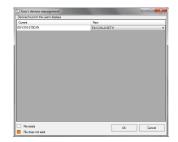
The new database will be saved in a new folder in the main Device folder, new display files will be saved in a new folder in the main User folder.

Firmware and sample maps will be found in a new folder in the main folder Calibrations. Once installed you select the new version now appearing in the version list and click **Open Profile**.

By default the XIP files we supply includes sample maps the ECU firmware corresponding to the release number. These files will be copied into the 'Calibration' folder found in the main ECT folder when installing the data files.

EURO8-316	Displays	😝 Calibrat
Profiles m	anagement	
Most recen	ntly used profil	es:
EURO8-310	6	
EURO5-02	3	
EFR18_EUF	RO12-026	
EURO8		
N_EURO12	2- <mark>01</mark> 0	
EURO8-31	5	
EFR18		
EURO4-32	6	
EURO2-064	4	
EURO5-02	2	

... full list in alphabetical order



Ac	biens						
-1	Extract selected file(s)	dified	Sze	Ratio %	Compressed size	Path	P
-9	Extract all files	1/2016 8:36:30 PM	16229	60	3303	\USER\EURO3-316.USR	
2	EURO8-316 SSPDB	6/16/2016 11:30:22 PM	22528	0	29592	\USER\EURO3-316.USR	
3	ANALOGUE.WDB	6/27/2016 7:04:10 PM	30931	85	4714	\USER\EURO3-316.USR\ANALOGUE.WIN	
4	84SE ENGINE WD8	6/27/2016 7:04:10 PM	4334	69	1248	\USER\EURO8-316.USR\BASE ENGINE WIN	1
5	800ST SD.WD8	6/27/2016 7:04:10 PM	11245	78	2505	\USER\EURO8-316.USR\BOOST SD.WW	
6	BOOST TARGET PRESS.	6/27/2016 7:04:10 PM	1647	68	528	\USER\EURO3316.USR\BOOST TARGET P	
7	BOOST WG MAP.CDB	5/27/2016 7:04:10 PM	1645	68	525	\USER\EURO8-316.USR\BOOST WG MAP C	
8	CAR SPEED WDB	6/27/2016 7:04:10 PM	7549	74	1942	\USER\EURO8316.USR\CAR SPEED.WIN	
9	CUT STATUS WDB	6/27/2016 7:04:10 PM	2987	63	1097	\USER\EURO8-316.USR\CUT STATUS WIN	
10	DIAGNOSTIC WDB	6/27/2016 7:04:10 PM	10778	78		\USER\EURO8316.USR\DIAGNOSTIC.WIN	
11	DRIVE BY WIRE WOB	6/27/2016 7:04:10 PM	16532	81	3103		
12	ENGINE DATA WOB	6/27/2016 7:04:10 PM	5699	72	1612	\USER\EURO8316.USR\ENGINE DATA.WIN	
13	ENGINE MAP-1.WDB	5/27/2016 7:04:10 PM	3512	66	1197	\USER\EURO8316.USR\ENGINE MAP-1.WIN	
14	ENGINE MAP.WOB	6/27/2016 7:04:10 PM	3370	66	1138	\USER\EURO3-316.USR\ENGINE MAP.WIN	
15	ENGINE MAPPING FUEL	6/27/2016 7:04:10 PM	1968	68	534		
16	ENGINE MAPPING SPAR	6/27/2016 7:04:10 PM	1546	69	486	\USER\EURO8-316.USR\ENGINE MAPPING	
17	ENGINE.WDB	6/27/2016 7:04:10 PM	3188	66	1074	\USER\EURO8-316.USR\ENGINE.WIN	
18	ETB PID MAPPING.COB	6/27/2016 7:04:10 PM	1680	70	506	\USER\EURO8-316.USR\ET8 PID MAPPING	
19	FIRE UP 6-8 WDB	6/27/2016 7:04:10 PM	18878	81	3531		
20	FIRE-UP MAE.WOB	6/27/2016 7:04:10 PM	22748	82	4051		
21	FIRE-UP TPS MAP.WOB	6/27/2016 7:04:10 PM	19257	81		\USER\EUROB-316.USR\FIRE-UP TPS_MAP	
22	FUEL OIL PRESSURE - T		3791	66	1279	\USER\EUROB-316.USR\FUEL_OIL_PRESSU	
23	FUEL OIL PRESSURE.W	6/27/2016 7:04:10 PM	3208	65	1115	\USER\EUROB-316.USR\FUEL OIL PRESSUL	
24	GEAR SHIFT SETTINGS	6/27/2016 7:04:10 PM	2142	72	607	\USER\EUROB316.USR\GEAR SHIFT SETTL	
25	GEAR SHIFT SRT.WDB	6/27/2016 7:04:10 PM	14331	81	2854	USER/EUROP316.USR/GEAR SHIFT SRT	
26	HIGH PRESSURE PUMP	6/27/2016 7:04:10 PM	6271	74	1601	\USER\EUROB316.USR\HIGH PRESSURE P	
27	IDLE SPEED WOR	6/27/2016 7:04:10 PM	5540	70	1671	\USER\EUROB316.USR\IDLE SPEED.WIN	
28	IGM TION COLLS WOR	6/27/2016 7:04:10 PM	4343	75	1232	\USER\EUROB-316.USR\IGN/TION COILS.WIN	٠



9 Displays

This section gives access to visualize live data from the ECU on your PC. It is possible to create display screens displaying:

- Data windows
- Potentiometers
- Strip charts
- ECU tables and maps

Here you see an example, combining all features of the display program.

Main - Data Displays - Windows - About		
	G × OMERVEN ×	* +
EDUCOME BURCOME INT MODE GER BURT CAX VLT AUALODUE MATHER INTERCENTION FOT INTERCEN	Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementatio	
D ~> 5605/b742 CANJ000 ♥ 3199 FAMEDA Properties Single IMAIt Neural Inseconds Place Charl # ● Single M ■ Ut+1000(= 12+100)(= 12+100)(= 17+0.857) = 1000 00000000000000000000000000000000	Properties Single / Mult Interval in seconds Pause Chart off O Snapshot	

9.1 Data Display

First time you have installed the ECT tool you should check the settings of the display program.

Open the display program, flick on **Main** and then select **Settings**.

- Recommended settings are:
- Enable learn tools.
- Enable ASAP3 menu (only if you need it).
- Disable potentiometers after Store.
- Set the grid size for potentiometer map window, normally displayed with 3 to 5 breakpoints shown.
- Quick access to the properties.
- New controls are synchronised with the device database by default.
- If you use an AMC connected to your PC via a USB serial port adaptor you should enable serial ports. The AMC is a mapping controller which can be configured to control any of the available software potentiometers found in the tool.

Docket displays Docket displays preview Docket displays preview Docket displays preview Docket displays and with the device displayse by deduit Docket displays and with the device displayse by deduit Docket displays preview Docket displayse Dock	Pot side grid column count 5 🗘
Cauck access to the properties Quick access to the properties Auck and of the log shows a datage box to name the file Denable Sami Ports Bhow all break points of calibration arrays The edit point administrativy follows the animation point The user multiconfirm on-fine danges by pressing File	Docked displays
New controls are synchronized with the device database by default Appendennous communication At the end of the log holes a database box to name the file Enable Serial Ports Brake Serial Ports Dra edit point automatically follows the animation point The edit point automatically follows the animation point He user must confirm on-fine danges by preseing FB	Size of the largest side of the picture 150 🗘
Asynchronous communication Asynchronous communication Cat the end of the log show a dalog box to name the file Catable Sarial Ports Show all break points of calibration arrays The edit point administrative follows the animation point The user must confirm on-line changes by pressing F8	Quick access to the properties
At the end of the log show a dalog box to name the file Enable Sarial Ports how all break points of calibration arrays The disposit contractivity follows the animation point The user must confirm on-line changes by pressing F8	New controls are synchronized with the device database by default
Enable Serial Ports Drow all break points of calibration arrays Drow all point automatically follows the animation point The user must confirm on-line charges by pressing F8	Asynchronous communication
Show all break points of calibration arrays Show all break points and calibrations the animation point The user must confirm on-line changes by pressing F8	At the end of the log show a dialog box to name the file
The add point automatically follows the animation point The user must confirm on-line changes by pressing F8	C Enable Serial Ports
The user must confirm on-line changes by pressing F8	Show all break points of calibration arrays
	The user must confirm on-line changes by pressing F8
	OK Cancel

Options Comm

Enable learn tools

al/ + +

 It is possible to open any calibration tables or maps in a display. By default any data change in a table or map will be written instantly to the ECU. If you want to manually confirm any update by pressing F8 to change the ECU data tick the box 'The user must confirm online changes by pressing F8'.

We supply the software with several different sample display layouts but you can easily create your own displays or modify any of our sample layouts to suit your requirements. With a display open you click the right hand mouse button to access:

• Enable Edit mode.

Use this to open to open the display editor where displays can be created and modified.

- Property
- Sampling interval

Set the time interval between refreshing the channel value. Select between maximum refresh rate, a set time interval between 0.05 second to 5 seconds or channel disabled.

- Sampling interval list Display refresh rates for all channels present in the open display.
- Enable Strip Chart mode Displays with up to 12 channels can be displayed graphically. See section 9.1.7.
- Sort controls Sort channels for recording mode.
- Enable Log See section 9.1.8.
- Device Information Displays information about maps and firmware loaded into the ECU.
- **Display Data** Shows base information about current display.
- Save display Save changes made to display.
- Save display as Save display to a new file name.

• Save and lock display Save display as a locked file, can be viewed by user without the database.

• Exit

9.1.1 Create New Display

To create a new layout right click the Data Displays tab and select **New channel container**. You will be prompted for a name, then click on **OK**.

Right clicking on the display you can now add the following:

- Text
- Data channels
- LED warning lights
- Potentiometers
- Memory addresses (special applications only)

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4 Pot.

CHNOL



New channel container New link to channel container

New container group

Import existing group

Quit menu

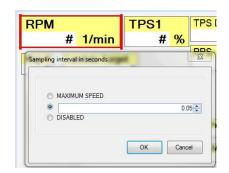
New calibration element container

Import existing channel container

New link to calibration elements containe

Import existing calibartion element container

RPM 0 1/min	TPS1 100.0 %	TPS2 100.0 %	AngleCrankStatus	~MAP	0.84 bar
Map # Lambda 1 0.000 Lambda Leam	0.877 Trim	TPS Drv Req 0.0 % PPS 0.0 %	Feel Left 0.00 Liters Feel Used 54.59 Liters	Air Temp 11.0 °C Oli Temp 95.3 °C Space Temp	Water Temp 83.3 °C Fuel Temp 160.0 °C
CLC1 0.000 %	0 % CLC2 0.000 %	Bottery In 13.2 Volt KSN SW 13.4 Volts	۲	160.0 °C Foel Press 4.0 bar Conformer	Oil Press 4.8 bar Section CragFac 2
32823 usec	Sp Adv Map 17.00 deg Sp Adv 17.00 deg				Deght 5 072529951533 Satel 4174 SHTeb 273715 7607 More 0 Miktor



Sampling interval list	
Variable	Interval (s)
	0.10
MAP	0.35
Air Temp	0.35
Oil Temp	MAXIMUM SPEED

You can load any of the many sample display windows we provide with the software. Simply click on **Data Displays** and scroll down to view all available displays, all marked with a blue icon on the left. Click on the one you want to load.

You can load multiple display screens if you want. Displays marked with a red icon are online maps with ECU data.

9.1.2 Add Text

The command allows you to add a text to a display screen.

You can edit a display if you see a grid on the grey back ground. To enable the edit mode you double click on the grey back ground or you right click and select **Enable Edit Mode**.

When the grid is visible you add text by right clicking and select **Add Text**. Write the text in the window which opens.

Click on Look to change the font and colour.

When done, the text window will appear on your screen.

You can move the window to any position on your display by click the cross at the upper left hand window, move your cursor to

Text sample for handbook

the desired position and then click again.

9.1.3 Add Channel

The command creates a window which will numerically display the value of any of the ECUs data channels.

You can edit a display window if you see a grid on the grey back ground. To enable the edit mode you double click on the grey back ground or you right click and select **Enable Edit Mode**.

When the grid is visible you add a window by right clicking and select **Add Channel**.

Check that you have selected the right database.

Now look for the channel. You can scroll through the channel list if you know the index number of the channel or you can search for it.

Use the * to search any combination where your wording exists. For example, if you are looking for oil temperature and oil pressure you could type ***OIL*** and then press Enter. The search will jump to the first channel which includes the words OIL. If this is one of the channels you want you tick the box. To continue your search click the word in the search line again and press Enter. Once you have ticked all the channels you have searched for you clock **OK**. The search window

closes and you return to the main display window, now showing your channels.

You can change the appearance of any display window. Double click on the window and the property window opens. Click on **Scaling** if you want to change the channel scaling, to toggle between decimal / signed / hex / binary presentations or change the unit.

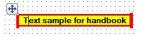
Click on **Look** if you want to change font, colour and text orientation.

You can move the window to any position on your display by click the cross at the upper left hand window, move your cursor to the desired position and then click again.



Device name	Description		EF	ID U	ne	BitRate	
E8-V316ETH	EURO-8 Version 316	Bihemet	QxA	ET	HERNET	1000	
E8-V402F_CAN	EURO-8 Version 402	CAN Ford	Qu/	C/	N	1000	
E8-V402F_ETH	EURO-8 Version 402	ETH Ford	Qx.A	ET	HERNET	1000	
E8-V403AFCCPEL	F Euro8_403aFocp EFI	Tech 27/04/16	OxA	CA	N	1000	6
EFR14	TEST EFR14_V009	17/10/2014	0x0	C/	N	1000	1
EFR18_V26	EFR18_026 EFITech	13/06/16	DxA	CA	N	1000	1
315	PFuel	Fuel Press	Engine of pressure				
Index	A Name	Name Of Press	Description Engine of pressure				L
317	Baro	Baro Press	Barometric air pre				H
	I_PBrakeF	I_PBrakeF	Front brake press				
318							
318 319	PBrakeF	Brake Press F	Front brake press				
	PBrakeF I_PBrakeR	Brake Press F I_PBrakeR	Front brake press Rear brake press				L
319							l
319 320	I_PBrakeR	L_PBrakeR	Rear brake press				

b	in settings Scaling Look Command	
Va	me	Property
•	Custom bit sequence (0,1,)	
	Default Gain 1	18
	Custom Gain 1	18
	Default Offset 1	0
	Custom Offset 1	0
	Default Gain 2	0
	Custom Gain 2	0
	Default Offset 2	1024
	Custom Offset 2	1024
	Default representation	Decimal
	Custom representation	Decimal
	Default format	##0.0
	Custom format	####0.0
	Default auxiliary text	Vots
	Custom auxiliary text	Volta
	Auxiliary text is visible	V



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9.1.3.1 Add Strip Chart

You can covert a regular display screen having up to 12 data channels into a graphic strip chart.

Create a display screen with the required data channels.

Save the display and disable the display edit mode.

Right click the display and select "Enable Strip Chart Mode".

You have 6 menu options:

• **Properties**, set channel scaling, colour and Y-axis values for each of the data channels.

	Name	Description	Database	Align to DB	Min	Max	Left axis (single track)	Right axis (single track)	Color	Data channel propertier
•	TPS1	Throttle po	E8-V412F		0.0	110.0				
	TPS Drv Req	Driver requ	E8-V412F		0.0	110.0				

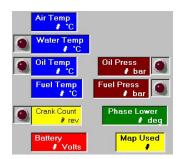
- **Single / Mult**, select to display all channels in a shared display or in separate strips for each channel.
- Interval in seconds, set the time interval for a graph to pass through the window, right to left.
- **Pause**, pause the display and use the + and keys to zoom in or out.
- Legend dock mode, select where to show channel parameters.
- Chart off, switch off graphic layout and return to channel data windows.
- Snapshot

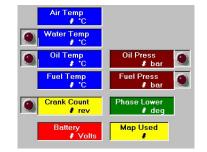
9.1.3.2 Align Windows

You can resize and realign the controls on the display screen.

Select a group of controls using the mouse, click and drag to mark windows to be resized. Now right click and select **Redim**, now click on the window in the selected group which is your target size.

In the same way you can automatically align windows left or top.





9.1.4 Add LED

The command creates a LED which can change status depending on the value of a channel.

This type of control is linked to a database device and it can be associated with any ECU channel.

The colour of the LED image is bright if the activation conditions are true and dark if the conditions are false. When the display is in online, the value is updated continuously to a variable frequency which depends on the number of variables sampled, the bit rate, the speed of response of the control unit and the time of processing data received.

Color Green ▶ Type Active when X > min and X < max. Minimum 0 Active also for Minimum 0 Active also for Minimum 0 Active also for Minimum 0 Side length in pixels (min-15 max-300) 27	
D Active also for Minimum Image: Constraint of the second s	· · · · ·
Active also for Minimum Active also for Maximum O Active also for Maximum	
Maximum 0 Active also for Maximum	
Active also for Maximum	
Side length in pixels (min=15 max=300) 27	

You can add a LED if you see a grid on the grey back ground. To enable the edit mode you double click on the grey back ground or you right click and select **Enable Edit Mode**. When the grid is visible you add a LED by right clicking and select **Add LED**. Check that you have selected the right database.



Now look for the channel. You can scroll through the channel list if you know the index number of the channel or you can search for it.

Use the * to search any combination where your wording exists. For example, if you are looking for oil temperature and oil pressure you could type ***OIL*** and then press Enter. The search will jump to the first channel which includes the words OIL. If this is one of the channels you want you tick the box. To continue your search click the word in the search line again and press Enter. Once you have ticked all the channels you have searched for you clock **OK**. The search window closes and you return to the main display window, now showing your new LEDs.

To calibrate the LED double click on it and the property window opens up. As with other channels added you can in general change the scaling and name. Click on **Led Settings** to configure the control.

Name

Main settings Scaling Led Settings

You can select several between several colours for the LED:

- Red
- Orange
- Yellow
- Green
- Blue
- Magenta

You can select the switching conditions for the LED.

Color	Green	-
Туре	Red	
Minimum	Orange Yellow	
Active also for Minimum	Green Blue Magenta	
Maximum		
Active also for Maximum		
Side length in pixels (min=15 max	=300) 27	
	122 0	
Main settings Scaling Led Settings Name Color	Property Green	•
Name		•
Name Color	Green Active when X > min and X < max Active when X > min and X < max	•
Name Color ▶ Type	Green Active when X > min and X < max Active when X > min and X < max Active when X < min or X > max String comparison	- -
Name Color ▶ Type Minimum	Green Active when X > min and X < max Active when X > min and X < max Active when X > min and X < max	•
Name Color F Type Minimum Active also for Minimum	Green Active when X > min and X < max Active when X > min and X < max Active when X > min and X < max String comparison Active when bit x = 1	•

Property

- **String comparison**. The LED is active if the string resulting from the conversion to a string of the bytes read from the control unit, is equal to the specified word in the 'string' field.
- Active if bit x = 1 The LED is on when the value of the bit at position 'Meaningful bit' of the variable read from the control unit is equal to 1.
- Active if bit x = 0 The LED is on when the value of the bit at position 'Meaningful bit' of the variable read from the control unit is equal to 0.

Use the command **Apply** to commit the changes.

Click **Exit**, press ESC or close the property page to cancel changes.

9.1.5 Add Potentiometer

This command will add a potentiometer to a display screen. It can be associated with many ECU channels and can provide a real time global trim while running the engine.

The potentiometer can be linked directly to the engine map and can store any trims into the map.

It can be operated externally by our AMC, the Active Mapping Controller, as well as in software.

Injection	TPS \ RPM	3500	4000	4500	5000 4
	80.156	9102	8579	8821	10841
	88.172	9632	9375	9514	11385
	93.842	9956	8567	8912	11494
	95.797	9995	8948	9557	11905
	97.752	10110	8892	9660	1207:

You can edit a display if you see a grid on the grey back ground.



To enable the edit mode you double click on the grey back ground or you right click and select Enable Edit Mode.

When the grid is visible you add a potentiometer by right clicking and select Add Potentiometer. Check that you have selected the right database.

Now look for the channel. You can scroll through the channel list if you know the index number of the channel or you can search for it.

Use the * to search any combination where your wording exists. For example, if you are looking for a potentiometer to control the ECU spark advance you could type ***SPARK*** and then press Enter. The search will jump to the first channel which includes the words SPARK. If this is one of the channels you want you tick the box. To continue your search click the word in the search line again and press Enter.

Once you have ticked all the channels you have searched for you clock **OK**. The search window closes and you return to the main display window, now showing your new potentiometers.

You can change the appearance of the potentiometer.

Double click on the window and the property window opens.

Click on Scaling if you want to change the channel scaling, to toggle between decimal / signed / hex / binary presentations or change the unit.

Click on **Look** if you want to change font, colour and text orientation.

Click on **Potentiometer Settings** to configure the potentiometer.

- **Potentiometer ID**, you can assign the potentiometer to any of the 6 dials on the AMC or to work as a software potentiometer.
- Default value, tick the box to send a default value when the • potentiometer is disabled.
- **Cursor layout**, select between vertical or horizontally. •
- **Limits**, these values are defined within the ECU device.
- **Default**, key in the default value to use when disabled. •
- Correction enabled, tick the box if you want the potentiometer to store changes into the ECU. • Corrections will be made to map #1 if you press the red button on the AMC or if you press F2.
- **Calibration is visible**, this will show part of the ECU map for the selected function. •
- **Descriptor**, select the preferred descriptor from the ECU device.
- **Correction type**, this will show you which type of correction of the base map is performed. This is defined within the ECU device.

To activate and deactivate the potentiometers on open display screens, press F4.

9.1.6 Add Button

Some data channels displays status flags for given functions. When adding such windows to a display screen there is an option to add a button, allowing direct access to the function, overriding the need to jump between a display and the calibration tool.

This function requires an optional programming of the EFP02 and EFT20 CAN interfaces.

Na	me	Property
۲	Command enable	
	ON value	1
	OFF value	0
	Image type	Button
	Shortcut key (19)	- ~
	Side length in pixels (min=15 max=300)	40



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Property	
✓	
1	

Name	Property		
Potentiometer ID	Potentiometer Software	-	
Send default value if disabled		Т	
Cursor layout	Vertical	•	
Lower limit: (-32)	-32		
Upper limit: (31.75)	31.75	Т	
Default	0	Т	
Correction enable			
Calibration is visible			
Descriptor			
Correction type	1 - signed sum (example: current value 20Ý, pot. value *	٠	
Apply	Eet	_	



9.1.7 Add Maps to Displays

This section described how you can load an online access to any maps in the ECU.

You can add any map from the ECU to a display window. To create a new layout right click the **Data Displays** tab and select **New calibration element container**.

You will be prompted for a name, then click on **OK**.

Select the type of ECU data you want to add, for example a calibration map.

A window called **Device and Channel** now opens.

Select the ECU database.

Select the preferred expression of the ECU engine load. You can select the engine load (the Y-axis in the map) expressed as the throttle angle (AN, alfa-N), as manifold air pressure (MAP, speed density) or as mass air flow (MAF). Next scroll through the ECU tree to find the map you are looking for.

In the example the **INJ Main Settings** has been selected and the base fuel map is shown as an option in the lower part of the window.

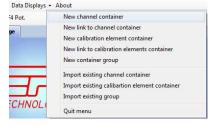
Click OK to select it.

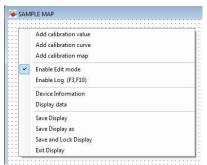
The fuel map now opens and you have full access to the injection pulse widths on a display page. You can add any map from the ECU to a display page.

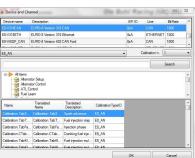
Once created a real-time table or map are marked with a red icon next to its name while a display screen are marked with a blue icon.

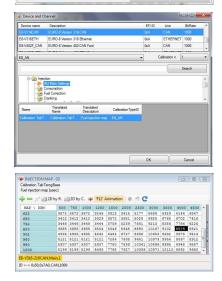
Any changes to a table or map will be written momentarily into the ECU, updating the engine settings in real time.

If you manually want to control the ECU update by pressing F8, check the settings for F8 in 'Main Settings'.











9.1.8 Multiple Display Sections

<u>M</u> ain → Data <u>D</u> isplays → <u>W</u> indows → <u>A</u> bout	
🍍 🔂 F4 Pot. 🔘 F2 Pot store 📘 def.(Off) 🐺 Engir	e: On 🧥
ETBCONF × ENGCONF × PIT MODE × GE	AR SHIFT × CAN × VCT × ANALOGUE × MAPPING × >>
INJECTION POT	😨 💽 SPARK ADVANCE POT 📃 🖾 🛛 😹 INJECTION MAP
Injection TPS \ RPM 2500 3000 3500 4	00(^ SpAdv TPS \ RPM 2500 3000 3500 400

You can create displays with multiple sections. This gives you the option to switch from one set of display windows to another without having to close and then open displays.

To add another set of display windows click on the **+** at the right edge of the main display window. This will add a tab to the main window. Type a name for the new page and click **OK**. A new blank display page will open and you can start assigning display windows.

Name of the new page.	Ok
	Cancel

To save the new display layout it must be saved as a workspace. In the 'ECT Main Menu' click on 'Workspace', then click on 'Save Workspace' and key in a name.

To open the new layout click on 'Workspace' and then click on 'Load Workspace'.

9.1.9 Strip Chart Mode

The command creates a window which will graphically display the value of any of the ECUs data channels. The maximum number of channels allowed in a window for a strip chart is limited to 12.

You can edit a display window if you see a grid on the grey back ground. To enable the edit mode you double click on the grey back ground or you right click and select **Enable Edit Mode**. When the grid is visible you add a window by right clicking and select **Add Channel**. Check that you have selected the right database.

Now look for the channel. You can scroll through the channel list if you know the index number of the channel or you can search for it.

Use the * to search any combination where your wording exists. For example, if you are looking for oil temperature and oil pressure you could type ***OIL*** and then press Enter. The search will jump to the first channel which includes the words OIL. If this is one of the channels you want you tick the box. To continue your search click the word in the search line again and press Enter.

Once you have ticked all the channels you have searched for you clock **OK**. The search window closes and you return to the main display window, now showing your channels.

Once you have created a normal display window with the required channels, right click the window and select **Enable Strip Chart Mode**.

The window is now transformed into a graphic display.

		- <mark></mark> -L	2=0.000 -	-L1=0.000		870				
T										1
8-										
							-			-
8	5 -40 -35	5 -30	-25	-20 -15	-10	·	0	5	10	



You can configure the display to suit your requirements:

In **Properties** you can set the displayed minimum and maximum thresholds, link data to default database, define whether you want Y-axis displayed on left and/or right side of the window and the colour of the graph.

	Name	Description	Database	Align to DB	Min	Max	Left axis (single track)	Right axis (single track)	Color	Data channel properties
Þ	Exhaust Ba	Exhaust Ba	E8-V412F		-32.00	31.75				
	Exhaust Ba	Exhaust Ba	E8-V412F		-32.00	31.75				1
	Exhaust Ba	Exhaust Ba	E8-V412F		-32.00	31.75				
	Exhaust Ba	Exhaust Ba	E8-V412F		-32.00	31.75				1
	Exhaust Ca	Exhaust Ca	E8-V412F		-32.00	31.75				
	Exhaust Ba	Exhaust Ba	E8-V412F		-50.0	49.6				
	Exhaust Ba	Exhaust Ba	E8-V412F		-50.0	49.6				

In **Single / Mult** you can select to display all graphs in one single window or to display each channel individually.

In Interval you set the time interval from the right to the left Y-axis, from 2 seconds to 256 seconds.

Pause allows you to stop the strip chart moving and zoom in to analyse the chart.

Legend dock mode lets you position the window channel information window in top of the strip chart, to the right, at the bottom or at left.

Snap Shot transfer the data to the Charting Tool.

9.1.10 Data Logging

The ECT tool has a built-in data logging capability. Data will be stored on your PC's hard disk. The logger will record data using any of the available display windows. Open a display window and right click anywhere on it and select **Enable Log**. The window heading now changes to this layout:

Main 👻 Data Displays 👻 Windo	ows 👻 About					
🕄 F3 Log 📔 Manual log	F10 Report in PRT	📾 Report in XLS	🔂 F4 Pot. 📘	def.(Off)	沢 Engine: On	-

Click on F3 to access the logger. Data can be stored in 3 different formats:

- **EBL**, a binary format
- ETL, a text format
- MDF, data format

Data can be recorded in fixed time intervals, keyed in as Auto Save Interval.

If you set this interval to 0, the data will be recorded at the highest possible rate allowed via the communication with the ECU and the PC.

It is possible to add a marker during data recording.

Press the space bar to add a marker. You can define the preferred colour of this marker.

Output file				
EBL (binary file)	ETL (text file) IV MDF. Ext:	DAT	File name:	C:\ECT 2016\USER\EURO8-3
	Auto save interval (0= disabled)	0	s 🗖	Play a sound after saving
Log file splitting - C	lose the file and open a new one every (0=disabled)	0	5	
Marker				
	Background color when marker is active -	Activated by a	space bar or when en	abling conditions are met
Enabling conditions				
Condition mode ena	ble			
Condition		Condition cl	heck	
				^
				-
	Seconds to record	before the co	ndition is verified	A
0	Seconds to record after th	a condition is n	o longer verified	🔄 I 🔿 Never stops
Interval between two writ				
Interval between two wit	Min. timer interval	0.015	5	
Parameters for the defin	ition of an alternative time interval subject to a conc		*	
Enable	Min. timer interval		8	
Condition		Condition cl	heck	
				*
	Seconds to record after the	and details to a		A
	Seconds to record alter the	condition is n	o longer venned	
Time column format		Channel na	sme	
) ms	HH:MM:SS.000	Custom	ttle	Factory name
Optional fields		: replaceme	ent string (f ; occurs i	n a string var)
		1		
Device ID in file				

You can define the conditions for start recording. Tick the box for enable conditions. Now type your condition as {device1,channel} (condition) (value).

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If you want to start the recording when the engine speed exceeds 2,000 RPM proceed this way:

Double click on the expression between the two brackets. A new window opens, **Device and Channel**, select the ECU device and then select the channel. Click OK to proceed. The condition now looks like: {E8-V316CAN,*23} > 2000. You can combine channels and you can use logic conditions.

You can define a condition to change to a different sampling rate if a given condition appears and the time for which this condition has to be true.

You can define the time column in ms or in HH,MM,SS.000.

Recorded data can be visualised using the Charting Tool, also found in the ECT main tool.

		Auto sa	ve interval (0= disabled	i) 0 s			ound after saving	
Log fi	🛷 Device and Cha	nnel						1
rker	Device name	Description			EFIID	Line	BtRate ^	
_	E8-V316CAN	EURO-8 Version	316 CAN		0xA	CAN	1000	-
abling co	E8-V316ETH	EURO-8 Version	316 Ethernet		0xA	ETHERNET	1000	
Condti ndition	E8-V402F_CAN	EURO-8 Version	402 CAN Ford		0xA	CAN	1000	
-V316C	E8-V402F_ETH	EURO-8 Version	402 ETH Ford		0xA	ETHERNET	1000 E	100
10100	E8-V403AFCCPELF	Euro8_403aFcc	p EFITech 27/04/16		0xA	CAN	1000	16
_	EFR14	TEST EFR14_V	009 17/10/2014		0xC	CAN	1000 +	Ψ.
arameter Enable Condition	23 24 25 26	Rpm - 24 - - 25 - CntCrk	RPM RPM RPM RAW Crank Count	Description Engine RPM Counting cycles f				
	20	- 27 -	Crank Count	counting cycles I				
	28	- 28 -		-				
	29	Sel_Smot	Crank Select	Selected crank s				
re colum ms	30	I PPS1	PPS1	Pedal position tra				
ms	L						*	
tional fie					ОК		Cancel	H

10 Calibrations

This section gives access to the engine and ECU setup maps. You can access the main settings for this tool by clicking on **Main** then **Settings** and selecting your preferred options:

- Enable learn calibration, enables the calibration tool to open learn maps. It is recommended to tick this option.
- Enable setup calibration, enables the calibration tool to open learn the ECU setup maps. Except for Euro-2 this option should always be selected.



- Show all break points, select this option if you want all available breakpoints in tables and maps to be displayed. If you want to hide unused breakpoints do not tick this option.
- The edit point automatically follows the animation point, this this option if you want the manual mapping cursor to follow the animated cursor. Do not select this option if you prefer to move the manual cursor yourself.
- The user must confirm off-line changes by pressing F8, select this option if you want to manually confirm changes made to settings when working off-line by pressing F8. Upon pressing F8 changes are stored in the map being edited but not to disc. If you want to store changes momentarily, but not to disc, do not select this option.
- The user must confirm on-line changes by pressing F8, select this option if you want to manually confirm changes to be written to the ECU when working on-line by pressing F8. Upon pressing F8 changes are stored in the map in the ECU. If you want changes to be written to the ECU momentarily do not select this option.
- Also compare different types of calibrations, select this option if you always want to compare setting in two maps, even if of different types. It is recommended not to select this option.
- Show information about the selected variable in an area below the list of variables, enable this option if you like the tool to show how parameters are linked:
- Enable the change of name and date when saving, it is recommended to check this option.
- User is prompted to confirm the change of name and date when saving, select this option if you want to confirm name and date each time you save a map to disc.

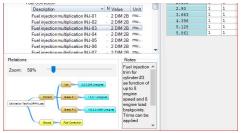
It is possible to work with the maps off-line as well as on-line. While any changes in the engine map reflect the engine calibration on the fly, the setup map needs the ECU to be reset in order to read the new settings.

10.1 Open a Map

Click on the grey area where you see **Main Calibration** to load an engine map. This is the map used to optimise the engine mapping. The engine map file has a TAB or TABX file extension.

Click on the grey area where you see **ECU Setup Calibration** to load the ECU setup map. This is the map used to configure the ECU to the engine type, the vehicle type and the sensors used on the engine and transmission.





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The ECU setup map file has an ECF or ECFX file extension.

Click on the grey are where you see the **Learn Calibration** to load the ECU learn maps. Learn maps contain the correction factors, the factors stored for adjusting the injection times to reach the lambda target values.

The learn map file has a LRN file extension.

Now click on the ECU database for the ECU in use. This sets the communication protocol.

Select the engine load – you can select the engine load (the Y-axis in the map) expressed as the throttle angle (AN, alfa-N), as manifold air pressure (MAP, speed density) or as mass air flow (MAF).

Load the map off-line – click the button with the 3 dots. Load the map on-line – click the button with the arrow. Make sure you are connected to the ECU and the ignition is switched on.

You might see a message about the length of the map: "The calibration is shorter than the descriptor....." This is because you have loaded a map from an older version of database than the one you have selected. It is not an error message, just click **OK**. When you save the file to disc the size will be adjusted automatically.

Device	к	Description	-		-		-		-		-		-
E8-V316-210CAN		EURO & Vension 316-2	210 CA	N									
E8-V316-210ETH		EURO 8 Version 316.2	210 Ef-	erret									
E8-V316ETH		EURO-8 Version 316 8	Bhene										
E8-V401CAN		EURO-8 Version 400 0											
E8-V402F_CAN		EURO-8 Version 402 0											
E8-V402F_ETH		EURO-8 Version 402 8		rd									
E8-V417CAN		EURO 8 Version 400 0	CAN										
B EFR14													
EFR18_V23		EFR18_022 EFITech											
EFR18 V25	-	EFR18 025 EFITech	13/06/	16									-
Select the descriptor													
E_AN													
1	Ĩ	0.524	1	۲	Br	ows	se e	exist	ing	ori	nev	w fi	le
<u>P</u>]			۲	Br	ows	se e	exist	ing	ori	nev	w fi	le
	C			 <th></th><th>rows n Lir</th><th></th><th>exist</th><th>ing</th><th>ori</th><th>nev</th><th>v fi</th><th>le</th>		rows n Lir		exist	ing	ori	nev	v fi	le
CT Calibration	-			•				exist	ing	ori	ne		

When you import a file from an earlier version you must check settings of any new features. Failure to do so can prevent you from starting the engine or - in the worst case - cause damages t the engine!

Once a map is loaded into the Calibration tool – on-line or off-line – you can save it to disc by clicking in **File** and then click on either **Save to file** or **Save to file as**.

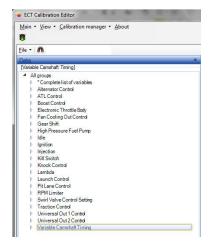
10.2 The Calibration Map Display

When you open a calibration file all available features for this version of ECU and software version are listed with its main groups shown in a tree at the left side of the display.

To open a group to gain access to the calibration parameters click on the right hand arrow to the left of the group name.

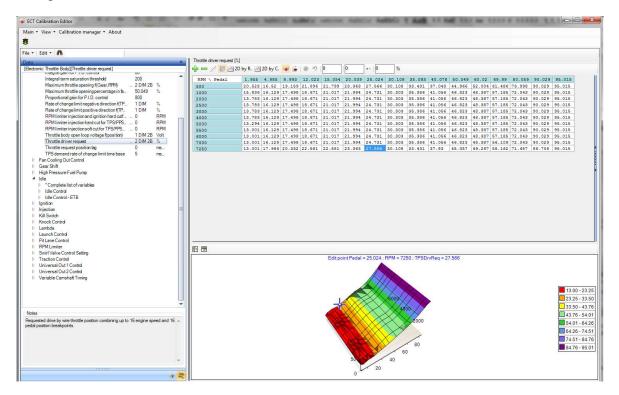
When you open a group you can sort the content alphabetically or by numeric values.

- Sort content alphabetically by clicking on the heading "Description".
- Sort content by numeric value by clicking on the heading "Value".





The screen is split between the tree on the left and selected tables and graphics are displayed on the right.



You can adjust the slit ratio between left and right. Using your mouse, grab the split line between the 2 screen halves and mode it to your preferred position.

In the same way you can adjust the split between top and bottom in the right hand display, between the numeric of the map and the graphic display.

The settings are saved when you exit the Calibration Manager.

10.3 Reference Map

You can load a reference file in the calibration editor once you have loaded the engine map.

Using the colours red and green it is very easy to check changes in any sections of the map. Red illustrates a decreased value where green illustrates an increased value.

By right clicking on the main group the changes can easily be cancelled, returning the values to those in the reference map.

MAP \ RPH	400	600	800	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
200	6000	4000		1873	3406	3713	4232	2579	2544	1133	1315	1626	2129	2707	3349	3626	3383	3133	2883
254	6000	4000	2875	2000	2490	3411	2924	3244	3244	1716	2027	1686	2138	2399	3195	4020	3862	3636	3386
300	6000	4000	2484	2225	1968	2199	2260	2390	2195	1305	1885	2433	2904	3002	2525	3135	3113	3077	2827
350	6000	4000	2961	2794	2000	2000	2300	2390	2586	1773	2439	2590	3263	3347	3836	4326	4638	4523	4273
400	6000	4000	3250	3094	2200	2107	2050	2390	2196	2429	2851	2965	3872	4049	4784	4855	4857	4908	4658
450	6000	4000	3538	3395	2250	2150	2196	2091	2504	2428	2944	3529	4000	4273	4724	5053	5135	4893	4643
500	6000	4000	3826	3695	2398	2248	2027	1977	3028	2955	3638	3932	4453	5412	5690	5265	5669	5524	5274
550	6000	4000	4115	3996	2448	2859	3253	2583	3260	3624	3862	4521	5039	6075	6059	6405	6163	5726	5476
600	6000	4000			2448	2675	3123	2896	4274	4513	4540	4747	5381	6842	5973	7145	7252	6394	5933
650	6000	4000		3597	2815	2947	3088	3619	4454	4226	4574	5379	5967	7719	7602	7740	7445	7142	6921
700	6000		4980		3220	3457	3420	3614	6321	5712	5850	5663	6735	8136	8684	7617	8525	8017	7417
725	6000	4000	5124	4182	3932	4361	3543	3815	5062	5941	5808	6317	7201	9274	7602	8730	9119	8471	7764
750	6000		5269		4419	4038	4358	3685	6480	6913	6785	6906	8027	8703	8727	9830	9721	8844	8096
775	6000	4000	5414		5298	4793	5097	4407	6421	6711	7144	7180	8417	9859	8992		10178	And in case of the local division of the loc	8359
800	6000	4000	\$558		5287	5895	4865	4688	6778	8227	7443	8391	8594			12094		9318	8606
850	6000	4000			5415	5583	5199	5542	7628	7471	7732	8845	9638		and the second second	10799		9701	8912
900	6000	4000	6134		5953	6035	6408	5636	7681	9376	8220	9479				12671			9837
950	6000	4000	6423		6247	6273	6856	5913	9851	8512	8747	10626		12903		12172			1018
1000	6000	4000		6687	6630	6643	7151	7464	10437	10852						12428			1060
1025	6000	4000	6856		6821	6821	7325	7173	10581	9922						12645			
1050	6000	4000	7000	7000	7000	7000	7500	6200	7000	8417	9542	11237	11904	12533	12425	12690	12737	12716	1159

Once a map is loaded in the editor click **File**, then click **Load Reference File**. Now locate the file you want to use as a reference and click **Open**.



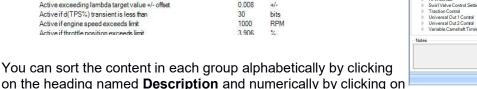
You can unload the reference file by clicking **File**, then click **Unload Reference File**.

10.4 Map Editing

This is an example of loading and changing the engine map. The map is divided into various groups, these can be expanded by clicking the arrow pointing right.

You can navigate between the sections using the up, down, left and right arrow keys and the mouse.

 Complete list of variables 		
Description	N Value	Unit
Activation time delay learn conditions valid	0	Sec
Active exceeding lambda target value +/- offset	0.008	+/-
Active if d(TPS%) transient is less than	30	bits
Active if engine speed exceeds limit	1000	RPM
Active if throttle position exceeds limit	3 906	%



Value.

Calibration parameters are divided into 3 categories:

- Constants •
- 1 dimensional tables
- 2 dimensional maps

10.4.1 Change a Constant

To change the value of a constant, simply double click the constant text and then key in a new value. Press Enter to confirm the change.

If you work on-line with the ECU then the ECU will immediately change its setting once the new data is entered - unless you are working on-line with the ECU setup map.

10.4.2 Change a 1-dimensional table

A 1-dimensional calibration table links values of a sensor or a calculated parameter with a variable output, which can be i.e. a trim offset or a multiplication factor.

Use the up and down arrows keys to move the cursor between breakpoints.

If you are working online, an animated cursor displays the current load condition. You can toggle the cursor ON and OFF by clicking the button **F12 ANIMATION**.

You can let the edit point follow the animation point. If you always want this feature active then click on Main in the calibration editor and tick the box The edit point automatically follows the animation point.

Optionally, you can select this feature directly from the engine map by clicking the icon \mathbb{P} .

Click on to open the graphic display of the data.

To change a value of any of the cells either double click on it using your mouse or move the blue cursor to the cell and then press Enter. Now key in the new value and press Enter.

• •	n	
ta		*
A	aroups	
Þ	*Complete list of variables	
Þ	Alternator Control	
Þ	ATL Control	
Þ	Boost Control	
Þ	Electronic Throttle Body	
Þ	Fan Cooling Out Control	
Þ	Gear Shift	
þ.	High Pressure Fuel Pump	
Þ	Idle	
Þ	Ignition	
Þ	Injection	
Þ	Kill Switch	
Þ	Knock Control	
Þ	Lambda	
Þ	Launch Control	
Þ	Pit Lane Control	
Þ	RPM Limiter	
Þ	Swirl Valve Control Setting	
Þ	Traction Control	
Þ	Universal Out 1 Control	
Þ	Universal Out 2 Control	
Þ	Variable Camshaft Timing	
lotes		
		^
		~
		12 5

N Value Unit

ctronic Throttle Body

Description Derivative gain for P.I.D control ETB control signal frequency



Interpolation boundarie

Baro_Press

Baro_Press 1150

Alternatively, use the + and – keys to change the values.

You can adjust the steps applied by these keys.

Look for the button on the right edge of the table; it is marked with two arrows pointing to the left and dots, here marked in red.

Click on the dots to open the configuration window. You can select to modify the cells using an algebraic sum or a percentage correction.

You can define the changes of each + key press and the coarse change by **SHIFT** +.

If you want to mark several or all cells in the table click on the first cell,

hold your left mouse button pressed and drag the cursor down, marking the cells. Then release the button.

Using the interpolation function if the tool can automatically calculate calibration values. Mark the cells in the column or row you want to linearize, click the icon and now key in the interpolation boundaries. Click OK to perform the calculation and return to the map.

0	0.023	+-	2.609	%

The 3 windows can be used for modification of the table as well	
as displaying the change to each cell from the base setting.	

The left window can be used to fill all marked cells with a new value for all cells. This can also be done by marking the cells to be changed, then press Enter, key in the new value and then press Enter again.

- The left window can be used to fill all marked cells with a new value for all cells. This can also be done by marking the cells to be changed, then press Enter, key in the new value and then press Enter again.
- The middle window is used if you want to increase or decrease cells with a specific value.
- The right window will increase or decrease selected cells with a percentage correction.
- If you want to cancel your changes press F11 or click the icon
- If you want to save your changes into the map then press F8 or click the icon
 You can change the breakpoints in tables and maps.

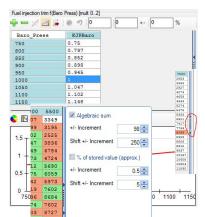
Press F9 or click the icon \bigwedge to access the break point editor. Now click on any of the break points, it will turn light brown. Using the keys on top of the window you can now:

- Delete a break point, press DEL or click the icon ¹/₁
- Insert a break point, press INS or click the icon ¹/₄
- Free edit of all break points, click the icon <a>[

Press F9 or click the icon \swarrow to close the break point editor. Please also see the section with map comparison.



Description	Ν	Value	Unit
Fuel injection multiplication Cyl-01		2 DIM 2B	mult 0
Fuel injection multiplication Cyl-02		2 DIM 2B	mult 0.
Fuel injection multiplication Cyl-03		2 DIM 2B	mult 0.
Fuel injection multiplication Cyl-04		2 DIM 2B	mult0.
Fuel injection multiplication CvI-05		2 DIM 2R	mult0



Fuel injection trim f(Baro Press) (0 - 2)

1.148

Ok

Cancel



10.4.3 Change a 2-dimensional map

A map links values of two measured channels to a calculated parameter with a variable output, which can be i.e. injection pulse width, spark advance degrees, solenoid valve duty cycles, camshaft positions, offsets or multiplication factors.

Use the up, down, left and right arrow keys to move the cursor between breakpoints.

If you are working online, an animated cursor displays the current load condition. You can toggle the cursor ON and OFF by clicking the button **F12 ANIMATION**.

You can let the edit point follow the animation point. If you always want this feature active then click on **Main** in the calibration editor and tick the box **The edit point automatically follows the animation point**.

Optionally, you can select this feature directly from the engine map by clicking the icon W.

Click on ^{2D by R.} to open 2-dimensional graphic display, showing fuel lines for each engine load site. You can toggle between showing a single line and all lines.

Click on ^{2D by C.} to open 2-dimensional graphic display, showing fuel lines for each engine speed site. You can toggle between showing a single line and all lines.

Click on 💆 to open 3-dimensional graphic display.

You can rotate the display, click and hold your left mouse button and rotate the graphics.

To change a value of any of the cells either double click on it using your mouse or move the blue cursor to the cell and then press Enter. Now key in the new value and press Enter.

Alternatively, use the **+** and **–** keys to change the values. You can adjust the steps applied by these keys.

Look for the button on the right edge of the table; it is marked with two arrows pointing to the left and dots, here marked in red.

Click on the dots to open the configuration window. You can select to modify the cells using an algebraic sum or a percentage correction. You can define the changes of each + key press and the coarse change by **SHIFT +**.

If you want to mark several or all cells in the table click on the first cell, hold your left mouse button pressed and drag the cursor down, marking the cells. Then release the button.

Using the interpolation function is the tool can automatically calculate calibration values. Mark the cells in the column or row you want to linearize, click the icon and now key in the interpolation boundaries. Click OK to perform the calculation and return to the map.

0		0.023	+-	2.609	%
---	--	-------	----	-------	---

OBR Control Systems Inc 32233 West 8 Mile Road Livonia, Michigan 48152 USA

		8
Telephone : +1	(248) 672-3339	



Fuel injection trim f(Baro Press) (0 - 2)

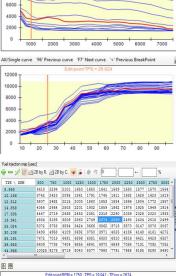
750

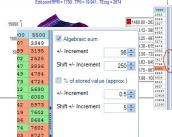
Baro Press

ole.buhl@obrcontrolsystems.com www.obrcontrolsystems.com

Ok

Cancel







The 3 windows can be used for modification of the table as well as displaying the change to each cell from the base setting.

The left window can be used to fill all marked cells with a new value for all cells. This can also be done by marking the cells to be changed, then press Enter, key in the new value and then press Enter again.

- The left window can be used to fill all marked cells with a new value for all cells. This can also be done by marking the cells to be changed, then press Enter, key in the new value and then press Enter again.
- The middle window is used if you want to increase or decrease cells with a specific value.
- The right window will increase or decrease selected cells with a percentage correction.
- If you want to cancel your changes press F11 or click the icon
- If you want to save your changes into the map then press F8 or click the icon

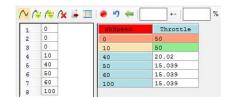
You can change the breakpoints in tables and maps.

Press F9 or click the icon *t* to access the break point editor. Now click on any of the break points, it will turn light brown. Using the keys on top of the window you can now:

- Delete a break point, press DEL or click the icon ¹
- Insert a break point, press INS or click the icon ^A
- Free edit of all break points, click the icon

Press F9 or click the icon \swarrow to close the break point editor.

Please also see the section with map comparison.





10.5 Map Comparison

You can compare the contents of two calibrations from your PC.

You can choose to display the two calibrations side by side (Splitter mode) or on two individual tabs (Tab mode).

Main 🝷	Viev	v 🔻	Calibration manager + About
R 🔗	~	Sp	olitter mode
ile •		Ta	ab mode
Data		A	lways toggle between the tree view and the array view
[Fan Co		C	ustomize

Open the calibration manager and load the first of the two calibrations to compare. Now click on **Calibration Manager** and select **Load empty frame for Main Calibration**. Load the second calibration.

Displaying the two calibrations side by side any differences between the two are marked in yellow:

Rejection [INU Main Settings][Fuel intection map]	Injection IINU Main Settings/Fuel injection map]
A All groups	A All croups
regroups Complete list of variables	
Alternator Control	Compression and an endow Additional and a second and and a second and a second and and
 ATL Control 	Additional Control Additional Control
BostControl	b BootControl
Boarconic Throttle Body	Electronic Trottle Body
Factorial United back Factorial Out Control	Electronic Control Contro Control Control Control Con
George George George	b Ger Shift
High Pressure Fuel Pump	Guest Arm High Pressure Fuel Pump
Inginasuran nunp	P rightesterververup D de
Interview of the second sec	vite logitaria
A history	 Ignacia Inscition
hydroxin f Complete listof variables	rigezuari Conclete list of variables
Competentiatory analysis Competentiatory analysis Constrained	Complete inside variables Complete inside variables
 Development Fuel Cut Off 	Cranking Deceleration Fuel Cut OF
Decension For Calcia Fuel Correction Fuel Correction	 Decembrading Decidion Fuel Correction
P Post Contectual	Profession A INJ Mark Sections
Testing T	Inscheini zeungs Description A Not, Velue Unit !
Fuel intection map	Fuel injection map
Primary fuel injector VBATT concensation 10/M 28 usec	Primary fuel injector VBATT companiation 10 IM 28 usec
Phase Dise	b Phase
Tisse	Transient Fuel
b Kill Switch	First South
 Knock Control 	Kanchal
Index condu	Cambia
Launch Control	Lance Control
 Pittane Control 	P Pit Lane Control
P RPM Limiter	P RPM Limber
 Swith Valve Control Setting 	 Switcher Linux Switcher Linux
 Traction Control 	 Swin varies control details Traction Control
Universal Qui Control	Historicality Historicality Historicality
Universal Out Control	Universal Duz Control
 Universa Cut 2 Como Variable Canadati Timing 	Oniversal Out 2 Contro Variable Canada Trimina
 variance canonin ming 	I THE MARK CHINESE CONTRACTORY

You can compare calibrations working either off-line or on-line with the ECU..

To see the differences between i.e. the two fuel maps, open the fuel map in both maps. The coloured cells indicate that values differ between the two maps:

Fuel injection map (use	ec]																				Fue	el injection map (us	ec]																		
🚽 💳 🎋 🏊	2D by I	e 🖂	2D by	c. 🦂		0	90		0	+-		%									÷	- % ^ 2	2D by F	L 🖂 2	D by C	. 🗰	i e	50		0	+-		%								
TPS \ RPM	400	600	80	0 10	10 12	150	1500	1750	2000	2500	3000	350	4000	4500	5000	5500	6000	6500	7000	7500	1	IPS \ RPM	400	600	800	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
19.55	6000	4000	196	4 187	3 34	06	3713	4232	2579	2544	1133	1250	1603	2228	2757	3349	3633	3383	3133	2883	1	9.55	6000	4000	1964	1873	3406	3713	4232	2579	2544	1133	1315	1626	2129	2707	3349	3626	3383	3133	2883
24.829	6000	4000	287	5 200	0 24	90	3411	2924	3244	3244	1730	1986	1587	2117	2418	3261	4020	3862	3636	3386	2	4.829	6000	4000	2875	2000	2490	3411	2924	3244	3244	1716	2027	1686	2138	2399	3195	4020	3862	3636	3386
29.326	6000	4000	248	4 222	5 19	68	2199	2260	2390	2195	1351	1788	2252	2775	2943	2588	3160	3113	3077	2827	2	9.326	6000	4000	2484	2225	1968	2199	2260	2390	2195	1305	1885	2433	2904	3002	2525	3135	3113	3077	2827
34.213	6000	4000	296	1 279	4 20	00	2000	2300	2390	2481	1795	2391	2704	3060	3307	3939	4352	4638	4523	4273	3	4.213	6000	4000	2961	2794	2000	2000	2300	2390	2586	1773	2439	2590	3263	3347	3836	4326	4638	4523	4273
39.101	6000	4000	328	0 309	4 22	00	2107	2050	2390	2298	2454	2940	2995	3617	3892	4902	4894	4857	4908	4658	3	9.101	6000	4000	3250	3094	2200	2107	2050	2390	2196	2429	2851	2965	3872	4049	4784	4855	4857	4908	4658
43.900	6000	4000	353	8 339	5 22	50	2150	2196	2070	2555	2404	3061	3494	3976	4014	4743	5136	5145	4893	4643	4	3.988	6000	4000	3538	3395	2250	2150	2196	2091	2504	2428	2944	3529	4000	4273	4724	5053	5135	4893	4643
48.876	6000	4000	382	6 369	5 23	98	2248	2015	2189	3109	3028	3457	4038	4339	5213	5622	5351	5727	5524	5274	4	8.876	6000	4000	3826	3695	2398	2248	2027	1977	3028	2955	3638	3932	4453	5412	5690	5265	5669	5524	5274
53.763	6000	4000	0 411	5 399	6 24	48	2859	3005	2473	3418	3661	3831	4397	5059	5795	5618	6367	6163	5726	5476	5	3.763	6000	4000	4115	3996	2448	2859	3253	2583	3260	3624	3862	4521	5039	6075	6059	6405	6163	5726	5476
58,651	6000	4000	440	4 270	0 24	48	2670	3227	2833	4371	4522	4531	4795	5469	6912	62.63	7292	7604	6420	5933	5	0.651	6000	4000	4404	2700	2448	2675	3123	2896	4274	4513	4540	4747	5381	6842	5973	7145	7252	6394	5933
63.539	6000	4000	465	2 359	7 28	15	2883	3045	3663	4463	4209	4658	5347	5838	7845	7437	7803	7907	7171	6921	6	3,539	6000	4000	4692	3597	2815	2947	3088	3619	4454	4226	4574	5379	5967	7719	7602	7740	7445	7142	6921
68.426	6000	4000	498	0 364	7 32	20	3409	3427	3592	6347	5758	5910	5573	7018	8338	8127	8451	8718	8148	7417	6	8.426	6000	4000	4980	3647	3220	3457	3420	3614	6321	5712	5850	5663	6735	8136	8684	7617	8525	8017	7417
70.87													6723								7	0.87																	9119		
73.314													7048								7	3.314																	9721		
75.758																				8359	7	6.758																	3 10178		
78.201													8307	8391	10080	1176	11048	10630	9356	8606	7	8.201																	4 11037		
83.089								5178					8688								8	3.089						5583											9 11027		
87.977													9310								8	7.977																	12158		
92.864																				7 10187	9	2.864																	2 11953		
97.752	6000	4000	673	2 668	7 66	30	6643	7151	7464	10437	1083	0 9519	1018	10193	2 1236:	1426	1250-	12138	1188	7 10608	9	7.752	6000	4000	6712	6687	6630	6643	7151	7464	10437	10852	9519	10209	10192	12361	14267	12428	11649	11887	7 10608
100.196	6000	4000	685	6 685	0 68	21	6821	7325	7173	10583	9922	1027	6 1172	11005	9 13224	1234	12645	11762	1169	3 10804	1	.00.196	6000	4000	6056	6850	6821	6821	7325	7173	10581	9922	10276	11725	11089	13224	12349	12645	5 11691	11693	10804

10.5.1 Copy and insert data

While comparing calibrations there are several ways you can blend values from one map to another map.

If you want to copy all cells and break points from map to the other you can do so with two clicks of the mouse.

Having the two maps next to each other click on this icon *mon* the calibration you want to export data from.

In Export Option select your preferences and click OK.

The complete map, including breakpoints, is now being copied to the other map.

This method can be used with tables and maps.

Export BreakPoint 1 (RPM)	
Export BreakPoint 2 (TPS)	
Export Values	
Target	
The array currently being editer	d in the other calibration
Clipboard	



You can also clone settings from one calibration directly into a second calibration. Go to the section in the calibration you want to copy.

4	Injection		Injection		
	Complete list of variables		Complete list of variables		
	Cranking		▷ Cranking		
	Deceleration Fuel Cut Off		Deceleration Fuel Cut Off		
	Fuel Correction		Fuel Correction		
	 INJ Main Settings 		 INJ Main Settings 		
	Description	▲ N Value Unit !	Description A N Value Unit !		
	Fuel injection map	2 DIM 2B user	Fuel injection map 2 DIM 2B usec		
	Primary fuel injector	Clone the selected items to the other calibration	Primary fuel injector VBATT compensation 1 DIM 2B usec		
	D Phase		TT D Phase		

Right click the section you want to copy to the other calibration and select **Clone the selected items to the other calibration**.

This way you can easily copy constants, tables and maps between calibrations.

Furthermore, you can copy parts of one map or the complete map and paste the data into the same map or different maps and documents, spreadsheets etc.

Mark the map cells to copy by clicking on the first breakpoint, hold the left mouse-button down and drag the cursor to the last breakpoint to copy.

Press CTRL+C to copy the data.

Now mark the other part of the map where you want to copy the data to. (Make sure you highlight the same number of cells in the map you are copying to). You can also import data from a spreadsheet.

Press **CTRL+V** to paste the data.

Click or press **F8** to save the changes or **F11** to discard changes.



11 Memory Interface

The Memory Interface is used to program an ECU with firmware and calibrations. It is also used to read calibrations from the ECU.

Furthermore, it can be used to create files for protected and encrypted ECU versions.

11.1 Send Calibrations

Click on **ECU Comms** and select **Send** to get access to commands for sending main calibrations, ECU setup calibrations and learn files to the ECU.

Make sure you have selected the right ECU database. Next locate you calibration map folder in the tree on the left. This section will allow you to send firmware, main calibration file and ECU setup calibration.

To send firmware to an ECU you will need to use CAN communication, using EFI Technology's EFP02C or EFT20 USB CAN interface. Start by switching the ECU ignition off.

Click the firmware version you want to send.

Click Send Firmware to ECU and follow the instructions on screen.

Warning:

If you switch the ECU off during the transmission of firmware, the ECU will appear to communicate when you switch it on again. But this is quickly sorted out. Simply repeat the firmware transmission, the ECU will be back communicating.

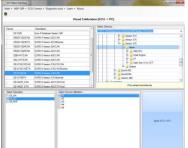
To send the main calibrations to the ECU click on the calibration to send. Now select which of the multiple locations you intend to update. Click **Send Calib to ECU**.

To send the ECU setup calibrations to the ECU click on the calibration to send. Now click **Send Calib to ECU**.

11.2 Read Calibrations

Click on **ECU Comms** and select **Read** to get access to commands for sending main calibrations, ECU setup calibrations and learn files to the ECU.

Make sure you have selected the right ECU database. Next locate you calibration map folder in the tree on the right. This section will allow you to read main calibration files and ECU setup calibrations.



To read the main calibrations from the ECU click to select the descriptor settings and select which of the multiple locations you intend to read from. Click **Read**.

You will be prompted for a calibration name but the tool will propose the current name.

Main + HDP-CRP +	ECU Comms +	Diagnostic tools - Learn - Abou
8	Send (PC->ECU)	
	Send Calibration (PC -> ECU) Read Calibration (ECU -> PC)	
Device	Send SETUP Calibration (PC -> ECU)	
E4-V326	Read SET	UP Calibration (ECU -> PC)

Next you will be asked if you want to mix the calibration with the learn calibration map.

Control Systems

- If you are mapping the engine and are using the ECU self-learn feature, you select YES to this option. Have patience while the tool creates the new fuel map, you will see when it has finished.
- If you are not mapping the engine and only want the calibration from the ECU, select NO to this option.

To read the ECU setup calibration make sure you have selected the right ECU database.

Next locate you calibration map folder in the tree on the right. Click **Read**.

	Pilling de l'	IP Calibration (ECU -> PC)
Deves ERGCA VEDICAN ERGCA VEDICAN ERGCA VEDICAN ERVERTICAN ERVERTICAN ERVERTICAN ERVERTICAN	Despeter EURO 3 Vession: EUR CM EURO 3 Vession: EUR CM EURO 3 Vession: EUR CM EURO 3 Vession: EURO CM EURO 3 Vession: EURO CM EURO 3 Vession: EURO 2000 EURO 3 Vession: EURO 2000 EURO 3 Vession: EURO EURO 2000; EURO 2000 EURO 2000; EURO 2000 EURO 2000; EURO 2000; EURO 2000; E	C - 457 219 May Call Solution C
ERVIER_ET#	ELIPO 9 Vesser, 452 ETH Feet F EFR18_E24 EP/Sech 12/06/18	View Garo Nino VCT Sing Sparse View Garo Nino VCT Sing Sparse View Garo Nino VCT Sing Sparse View Garo Nino VCT View Garo Nino
Least Descentor		

11.3 ECT Calibration File Verification Function

A new way to compare and verify maps programmed into any of the ECU's has been developed. Using this process, it is possible to let for example a scrutineer check if the ECU maps conform to provided sample maps. It is not necessary for the engine builder to hand over the real maps. The engine builder will use the ECT to generate a signature file for each of the maps programmed into the ECU, being either engine or setup maps.

11.3.1 Tool Version

The compare function is available in ECT from version 314.

Please check your ECT version is compatible, otherwise you can always download the latest tool version from our website - <u>www.obrcontrolsystems.com</u> – from the Support section.

To check which tool version you have installed, please click on the "?" in the main menu, then select "About":

	EFI Technology S.r.I. on the Web
	EFI Technology Online Wiki
	Report an issue or make a suggestion
	Collect information about this system into files you can send to EF
	Check for updates
	Disclaimer
1	ABout

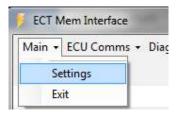
11.3.2 Configuration

Once the right tool is installed on your PC, start the ECT program. Click on the icon for "Memory Interface" in the main menu:

librations	Memory Interface	👸 Cha
------------	------------------	-------



When the new window appears click on "Main" and then on "Settings".



In Settings tick the 2 boxes:

- "Calculate MD5 of calibrations downloaded from unit and save the result to file".
- "Enable the MD5 verification command for calibrations".



11.3.3 Creating MD5 files

Creating the MD5 files used for map verification is very easy. Simply copy the finalised maps from the ECU to your PC.

Select "ECU Comms" and then "Read Calibration" to copy an engine map to your PC. Do not mix with the learn table.

Select "ECU Comms" and then "Read Setup Calibration" to copy an ECU setup map to your PC.

		Rea	ad Calibration (ECU -> PC)
Device ESCIPI/013CAN E8/225210ETH-C E8/2251210ETH E8/2251210ETH E8/2251210ETH E8/2251ETH E8/2302210CAN E8/3032210ETH E8/3032210ETH E8/3032210ETH	K Description EURO-5 Version 013 CAN Image: Comparison of the	ver Version	Select Directory : C:\ECT_MOD/Maps\Euro-5:\Version 013/0BR Image: Select Directory : C:\ECT_MOD/Maps\Euro-5:\Version 013/0BR Image: Select Directory : C:\ECT_MOD/Maps\Euro-5:\Version 013/0BR Image: Select Directory : Image: Selectory : Image: Sele
Select Descriptor E5_AN 50 E5_50 E5_MAF		Select Source Calibration :	Read (ECU->PC)

Here is shown the result of downloading two engine maps and one ECU setup map:

Name	Date modified	Туре	Sîze
E5_setup_map_1.ECF	17/12/2015 11:09	ECF File	7 KB
E5_setup_map_1.ECF.MD5	17/12/2015 11:09	MD5 File	1 KB
Euro-5_map_pos_1.TAB	17/12/2015 11:08	TAB File	68 KB
Euro-5_map_pos_1.TAB.MD5	17/12/2015 11:08	MD5 File	1 KB
Euro-5_map_pos_2.TAB	17/12/2015 11:08	TAB File	68 KB
Euro-5_map_pos_2.TAB.MD5	17/12/2015 11:08	MD5 File	1 KB

The files with extension MD5 are the files used for use with the verification process.

11.3.4 Verifying Engine Maps

To verify maps in the ECU proceed this way:

Connect your PC to the ECU and open the "Memory Interface" section in ECT.

Click "ECU Comms" and then "Read Calibration".

Select which engine map to verify:

ESGUI-VUIZETH	EURU-5 Version U12 Ethemet		te-
E5GDI-V013CAN	EURO-5 Version 013 CAN		_
	1050	1940	
Select Descriptor		Select Source Calibration :	
E5_AN		Ø #1	
E5_SD		#2	
E5_MAF		#3	
		#4	
		#5	

Now click the verification button to start the process:

Check MD5 of the selected calibration

Now select the signature file linked to the selected engine map:

Name	Date modified	Type
E5_setup_map_1.ECF.MD5	17/12/2015 11:09	MD5 File
Euro-5_map_pos_1.TAB.MD5	17/12/2015 11:08	MD5 File
Euro-5_map_pos_2.TAB.MD5	17/12/2015 11:08	MD5 File
< Ⅲ Euro-5_map_pos_1.TAB.MD5	✓ File MD5 (*.MD5)	•
	Open	Cancel

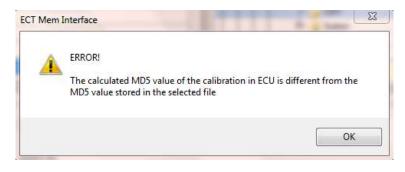
Telephone : +1 (248) 672-3339



If the signature file is generated from the map found in the checked location you will see a confirmation:



If the map and the signature files do not correspond you will see an error message:



11.3.5 Verifying ECU Setup Maps

To verify the setup map in the ECU proceed this way:

Connect your PC to the ECU and open the "Memory Interface" section in ECT. Click "ECU Comms" and then "Read Setup Calibration".

Selec	t Descriptor				
		_			_
	E8-V251-210ETH		EURO-8 Version 251-210 ETH	 	
	E8-V251-210CAN		EURO-8 Version 251-210 CAN	The System	m
	E8-V245-210ETH-C	9	EURO-8 Version 245-210 ETH Customer Version	🕀 🍌 Muger	1
	E5GDI-V013CAN		EURO-5 Version 013 CAN	E- Version 01	
	LOUDIVOILLIII			T Protaton on	

Now click the verification button to start the process:

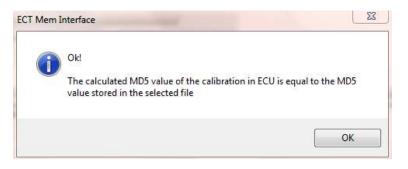
Check MD5 of the selected calibration

Now select the signature file linked to the selected ECU setup map:

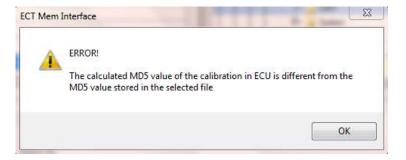


Name	Date modified	Туре
E5_setup_map_1.ECF.MD5	17/12/2015 11:09	MD5 File
Euro-5_map_pos_1.TAB.MD5	17/12/2015 11:08	MD5 File
Euro-5_map_pos_2.TAB.MD5	17/12/2015 11:08	MD5 File
5_setup_map_1.ECF.MD5	← File MD5 (*.MD5)	
	Open	Cancel

If the signature file is generated from the map found in the checked location you will see a confirmation:



If the map and the signature files do not correspond you will see an error message:





12 Charting Tool



The Charting Tool is a graphic data analysis tool, displaying recorded data in a strip chart mode. It can display data from both the ECU's with on-board data recording as well as the ECT logger tool.

It can read the dedicated file formats used in ECT as well as the standard MDF file format.

This description is for the Charting Tool included in ECT version 421.

It is a graphic data analysis tool, displaying data in a strip chart mode.

It can display data from both the ECT logger tool as well as from the ECUs with on-board data recording modules.

It can read the dedicated file formats used in ECT for logged data as well as the standard MDF format.

Data can be displayed in up to 5 separate windows plus an overview window at the bottom of the display.

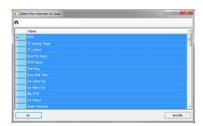
When you open the tool you will be prompted to load a logger file to analyse.

Click on the file name (which you can define within the Logger Tool, section 13) and then click open.

The tool now opens a channel window giving you the option to load all recorded data channels or to select individual channels - by default all channels are selected. Click OK to open selected files.

The channel manager opens together with a main graphic display.

- ECT :	. arm	Data + CBR + MDF + Inst + Girge	when :	• 4 Search 1			5
Organize + New!	older				31 •	08	
Computer Co		Narine	Date wea29wd 15/97/2006 02:30 22/97/2008 17:30 12/99/2008 10:45	Type MOF File MOF File MOF File	Sa	3,032 k8 2,448 k3 2,183 k8	
,	le pav	æ		MDI File Open	MDF (*.MDF	Cancel	•





12.1 Main Menu

File in the main menu gives access to:

- Open main log file and load ALL channels into memory, locate your data logger file and open it in the Chart Tool.
- Open main log file and choose which channels to load into memory, locate your data logger file and open it in the Chart Tool.
- Open another log file for comparison and load ALL channels into memory; you can compare 2 files in the Chart Tool.
- Open another log file for comparison and choose which channels to load into memory; you can compare 2 files in the Chart Tool.
- Offset value to be added to each of the compared file channels; synchronise two data sets.
- **Close file added for comparison**, close the 2nd file opened.
- **Print**, print the current layout.
- **Export**, export the current view as a picture file.
- Exit, close the Charting Tool.

Edit in the main menu gives access to:

- Channel Manager, opens the manager to create a math channel.
- Convert to constant sampling rate, only used with EBL and ETL files.

Channels List in the main menu gives access to:

- **Hide all**, hide all logged channels.
- Show all, display all logged channels.
- Expand channels, show full channel list.
- **Compact channels**, show only channels loaded in current display.
- **Expand details**, show all channel data option.
- Compact details, show minimal channel data.

View in the main menu gives access to:

- **Cursors**, select between 1 or 2 cursors visible in the strip chart. The 2nd cursor can anyway be loaded using CTRL+R. Also select the width of the cursor(s).
- **Background colour**, select between white or black background.

Tools in the main menu gives access to:

Tool tip on mouse-over; will show help topics in various sections of the tool. **Show...**; options of how to display channels data.

About in the main menu gives access to: Information about the ECT tool version and displays the software license agreement.

File •	Edit - Channel list - View - Tools - About							
	Open main log file and load ALL channels into memory							
2	Open main log file and choose which channels to load in memory							
1	Open another log file for comparison and load ALL channels into memory							
3	Open another log file for comparison and choose which channels to load into memory							
3	Offset value to be added to each x of the compared file channels	9						
3	Close file opened for comparison							
3	Print							
3	Export	2						
	Evit							



OBR Control Systems Inc

12.2 Load a File

Charting Tool opens directly, displaying a file manager. Locate the folder where you store your downloads. Select the **MDF** file format if you load a file from an ECU logger. Click Open to select the data file to analyse.

The tool opens a channel window giving you the option to load all recorded data channels or to select individual channels - by default all channels are selected.

Click **OK** to open selected files.

The channel manager and a main graphic display now opens. First time the Charting Tool opens it will display all files as default. If you change any channel data, for example scaling or colours, these settings are saved when you exit Charting Tool.

All files are displayed in a main single segment large strip chart and an overview window at the bottom of the screen.

On the left is shown the default channel list with access to recorded data. In this window you can change the colour of each channel, it shows the minimum and maximum channel values and gives access to change the minimum and maximum displayed channels.

12.3 Create, Save and Load a Personalised Display Layout

You can create personalised data layouts, making it easy to switch between for example analysis of combustion, gear shift and traction control.

Opening the tool select the channels you want to open for a specific layout.

If you loaded all channels when you opened the tool, you can generate a personalised layout by de-selecting channels.

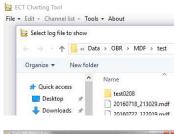
- Select channels to be included in the new group by un-ticking the box **Visible** to remove data channels you do not want to display in your personalised group.
- Select your preferred colour for the data channel.
- Tick the box **Axis** to add the channel scale on the left Y-axis in the display segment.
- Select in which segment of 5 to display the data channel.
- Select the line width; recommended setting is 1.

When the display is created, click the icon 💻 to save the layout.

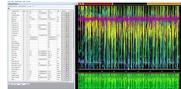
Click the icon is to load a layout. Select your layout from the list of your saved layouts. Once a new layout has been created, any changes made to it will be saved automatically when the layout is closed.

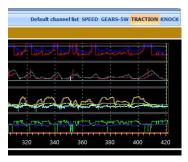
You can load several layouts in a display screen. Depending of the display orientation, you will see a tab either to the left or at the bottom of the display screen, listing the layouts loaded. Switch between layouts with a single mouse click.

The tool will automatically set minimum and maximum channel values but you can change these to suit your preferences. In the channel window click the column to the left of the data channel you want to manually set minimum and maximum display values for.

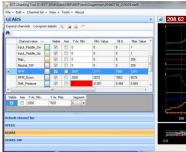








Vame Boot.CT Gen:CT Gears.CT Gears.Sw.CT Gears.Sw.CT Gears.Sw.CT PreMode.CT Start.CT Start.CT Traction.CT VCT EVH Bank A.CTT VCT INL Bank A.CTT VCT INL Bank A.CTT VCT INL Bank A.CTT

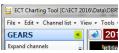


ole.buhl@obrcontrolsystems.com www.obrcontrolsystems.com

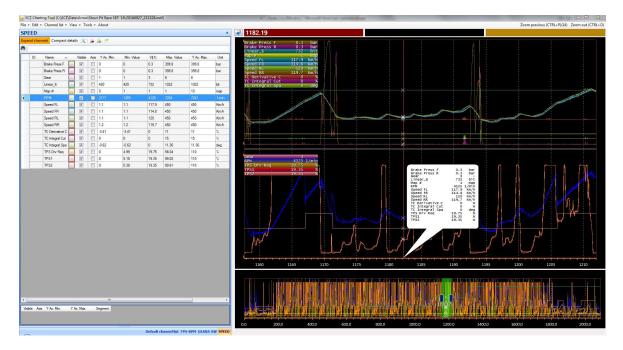


The channel selected turns blue and settings for the Y-axis can now be modified in the window below the channel data.

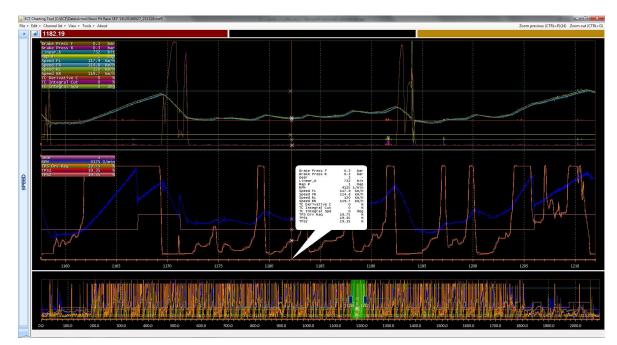
You can maximise the graphic display window by closing the channel list. Click on the double arrow, << marked in yellow, to expand the graphic window.



Change from this layout:



To this layout:

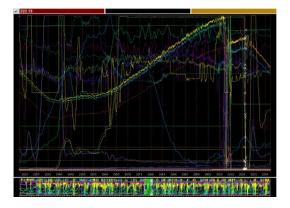


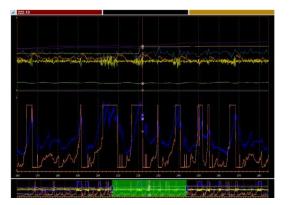
Click on the double arrow >> to return to the channel list.



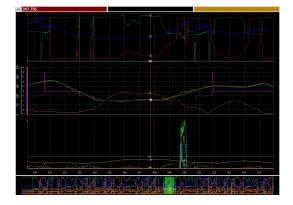
12.4 Display Segments

Data can be visualized in individual segments. You can select up to 5 individual segments. Additionally, an overview window is shown at the bottom of the window. Here are examples of 1 and 2 segments layout:



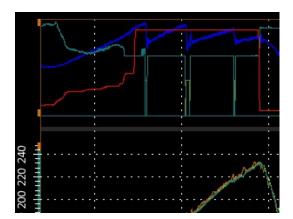


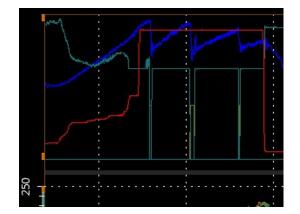
Here are layouts having 3 and 5 segments:





The height of each display segment can be adjusted to suit personal preferences. Place the cursor on the segment's bottom line, it will turn to fat grey. Click your left mouse button and mode the line up or down.





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12.5 Channel List

To the left of the strip chart graphic data window you have the channel list. This list displays either all channels loaded with the data file if you click "Expand channels" or, if you click "Compact channels" only the channels open in the data window.

- Click Channel Name to sort channels alphabetically.
- Tick or untick the box marked Visible to add or remove channels.
- Tick or untick the box marked **Axis** to add or remove the channel scaling on the Y-axis.
- **Y Ax. Min.** shows the display's minimum value of the particular channel.
- Min Value shows the data channels global minimum value.
- V(t) shows the channel data at the cursor position.
- Max Value shows the data channels global maximum value.
- Y Ax. Max. shows the display's maximum value of the particular channel.
- **Unit** shows the unit of the data channel, for example bar, degrees, RPM.
- Using Segments you can assign the data channel to 1 of 5 available display segments.
- In Line width you select the thickness of the data graph, recommended value is "1".
- Format allows you to define number of channel data decimal points.

Hoover the mouse over any channel listed in the channel list to highlight the channel in the graphic window.

You can also hoover the mouse over the data graph in the display window and the channel will be highlighted in the channel list.

- If you double click on the minimum channel value in the channel list a cursor will be placed in that position within the full run. Using the zoom function you can view the data in detail.
- If you double click on the maximum channel value in the channel list a cursor will be placed in that position within the full run. Using the zoom function you can view the data in detail.

Channel name 🔺	Visible	Axis	Y Ax. Min.	Min, Value	V(t1)	Max. Value	Y Ax. Max.	Unit	Segn	nent	Line width
Car Speed			0	37.8	146	6553.5	270	Km/h	1	-	1

Click on the icon 🔀 to define which channels shall be visible in the channel list.

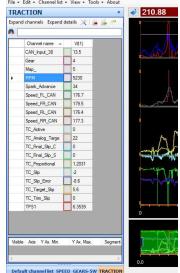
Typical full channel list for a user configured display having 2 cursors.

channels Compa	ct detail:	X	1.00.0	• *										
Channel name 🔺	Visible	Axis	Mn.	V(t1)	Mn. (C1,C2)	D (C1,C2)	Av. (C1,C2)	Max. (C1,C2)	V(t2)	Max.	Unit	Seg	ment	Line with
Car_Speed	V	10	0	78.4	78.4	0.899999999999999	78.866666666667	79.3	79.1672605760544	270	Km/h	1	-	1
Gear	V	83	1	2	2	0	2	2	2	8		0	-	1
Map_	V	10	0	1	1		1	1	1	10	map	0	-	1
RPM	2	11	2171	3837.99999964234	3815	2	3837.625	3868	3837.38084637056	7241	1/min	1	-	1
Speed_FL_CAN	1	10	0	78.4	78.4	0.899999999999999	78.866666666667	79.3	79.1672605760544	270	Km/h	0	-	1
Speed_FR_CAN	1	8	0	75.4	75.4	0.199999999999989	75.53333333333333	75.6	75.6	270	Km/h	0	-	1
Speed_RL_CAN	1	10	0	78.9	78.9	0.7999999999999997	79.3	79.7	79.5672605760545	270	Km/h	0	-	1
Speed_RR_CAN	1		0	79.2	79.2	0.399999999999999	79.3666666666667	79.6	79.5004454320408	270	Km/h	0	-	1
TPS_Drv_Req	V		0	20.0391006801035	19.3548387096774	-0.684261974584555	19.6236559139785	20.039100684262	19.3548387096774	110	34	1	-	1
TPS1	V		0	20.723362654688	19.6480938416422	-1.0752688172043	20.2101661779081	20.7233626588465	19.6152196587573	110	34	1	-	1
TPS2	3	10	0	20.7233626567673	19.5503421309873	-1.17302052785924	20,2101661779081	20.7233626588465	19.5503421309873	110	2,	1	-	1



Click on **Compact Details** to reduce the channel list to display the data channel values at cursor positions only.

ECT Charting Tool [C:\ECT_MOD_DN\Data\OBR\MDF\test\20160718_213029.mk File + Edit + Channel list + View + Tools + About





A full channel list could look like this:

Click on **Compact Channels** to show only channels active in the open graphic window.

Click on **Channels Manager** to open a window displaying all channels loaded with the current data file.

If you want to unload a data channel click on the cell to the left of the channel name and then click on the red cross.

You can also use a math function to load a calculated data file.

Select a base file for use with the math function.

Key in a name for the new data channel, select which segment to add it into and also select its colour.

Click in **Use selected channel** to proceed.

Select the math function, click on **D** to add a decimal number or click on another file name.

Click Add channel when done.

12.6 Cursor

You can place a cursor anywhere in the display window. Simply double click on the desired position to place the cursor.

You can adjust the width of the cursor by clicking on **View**, then **Cursors** and finally **Cursor line width**.

Column V(t1) in the channel list now shows the data the value of individual channels at the cursor position is shown.

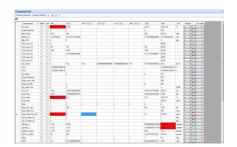
The measuring points are marked with an ${\boldsymbol x}$ where the lines are crossing.

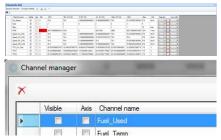
You can open a window displaying channel values for all channels displayed in the display window.

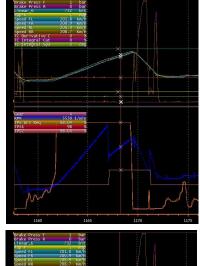
Click on Tools in the main menu, and then click on **Show the** values related to the current cursor on the chart background. Data will be shown in the upper left hand corner of the data window.

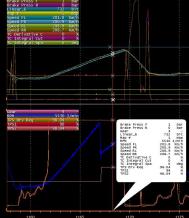
Displaying channel data can also be linked directly to the cursor position, shown in a separate window.

Click on Tools in the main menu, and then click on **Show the** values related to the current cursor in a balloon.











Using your mouse you can grab the cursor and move it to any position. Place your mouse pointer over the cursor, it will change to show arrows, now click and hold the left mouse button while dragging the cursor.

Using the left arrow key (<-) and the right hand arrow key (->) you can move the cursor in steps of 5 ms.

Using the scroll wheel on your mouse you can zoom in and zoom out centred around the cursor position. While dragging the cursor you can monitor the channel values change in window V(t1).

The overview window at the bottom of your monitor will show the full log while the sections above shows any level, zoomed in or zoomed out. The part of the logged data analysed is shown as a green area in the overview window.

- CTRL+O is a hot key to zoom out to show the complete run.
- **CTRL+P** is a hot key for zoom out in steps to finally show the complete run.
- CTRL+R bring up a 2nd cursor, placing it close to the primary cursor.

12.7 Two Cursors

It is possible to load a 2nd cursor. With this feature you can for example measure times between events and it displays mean values of the data channels between the two cursors.



Click **CTRL+R** to add a second cursor on you display.

With 2 cursors in a display you can measure time between events and you can quickly evaluate data channel values between the two cursors:

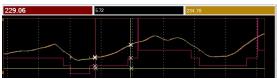
Channel name	 Visible	Axis	Y Ax. Min.	Min. Value	V(t1)	Min. (C1,C2)	D (C1,C2)	Av. (C1,C2)	Max. (C1,C2)	V(t2)	Max. Value	Y Ax. Max.	Unit	Segment	Line width
Oil_Temp			90.25	90.25	105	0	0	0	0	105.25	16327.75	16327.75	°C	0 -	1 -
Pitl ine Active	m		0	0	0	0	0	0	0	0	255	255	flag	0	1



Additional columns are now displayed in the channel list:

- D (C1,C2) shows the difference between channel values at cursor 1 and cursor 2 positions.
- Av (C1,C2) shows the average channel value between cursor 1 and cursor 2 positions.
- Max (C1,C2) shows the maximum channel value found between cursor 1 and cursor 2 positions.
- V(t2) shows the channel data at cursor 2 position.

The time measured since start recording data and to the position of cursor 1 is shown in the left window above the graphic display.



The time measured since start recording data and to the position of cursor 2 is shown in the right window above the graphic display.

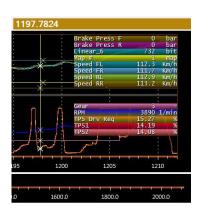
The time difference between the positions of cursor 1 and cursor 2 are shown in the middle window above the graphic display.

By clicking on either of these windows you can change which cursor is the active one.

If you have activated the display of channel data values the data for cursor 1 position will be shown on the left side of the display when you move the cursor.

The data for cursor 2 position will be shown on the right side of the display when you move the cursor.

12.8 Zoom In / Zoom Out



There are two ways you can zoom in on data for a closer analysis of events.

You can draw a rectangle by click and hold the left mouse button and move the mouse from left to right. Let go of the mouse button when the desired area is marked and the display zooms into the desired area.

Click CTRL+P to return to the previous level in steps or press CTRL+O to the initial view.

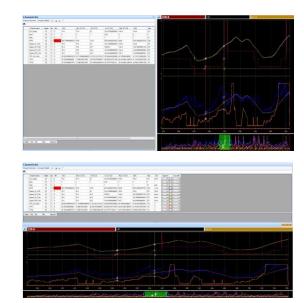
Another way is by using the cursor position and the scroll wheel on your mouse. Double click on the display to place your cursor in a desired position. Now use the scroll wheel on your mouse to zoom in, centred on the cursor.



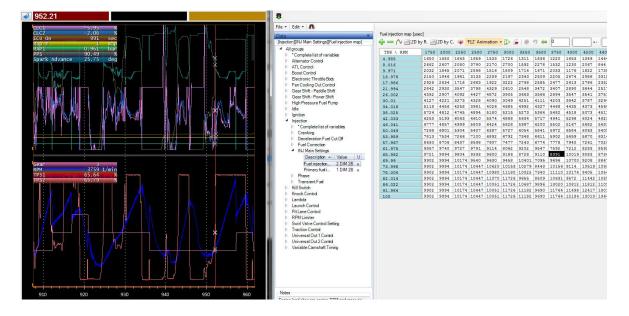
12.9 Display Orientation

You can change your display layout orientation: Click on the icon in the upper left hand corner of the graphic display to change the layout to:

Click on the icon store to return to the first orientation.



12.10 Link analysis display with engine map



You can link the logged data with the actual speed and load position within the engine calibration. The logged data has to contain a data channel with the same name as the X-axis in the engine map, for example RPM.

This way you can follow the settings with for example the base fuel map, the boost map and the spark advance base map.

To link the data simply open the logged data file, then open the tool Calibration.

Open the engine calibration which generated the data log file.

Select the base map, shown here as the fuel map, and note the black cursor indicating the location of the data cursor in the data display.



13 ECU Logger

Most of the ECUs have a built-in data recording module. If you have installed the EFI data logger tool you can access the logger tools.

13.1 Initial Setup

First time you start the logger tool, click on **File** and then **Options**.

Tick the box to clear the logger after downloading data.

Next define the path to ECU databases, it is recommended to select the main Device folder.

Select whether you prefer to download logged data in a format for use with 2D's WinaRace data analysis tool or in a standard MDF format. You can use the Charting Tool for analysing MDF data files.

Select you preferred path for data downloads. You can use different paths for 2D as for MDF files.

Click **OK** to confirm settings.

Now click on File again and click on **Select Device** to choose which ECU database you want to load.

Communication Info

Find ECU Eth

ECUCommServer : local Ethernet : Realtek PCIe GBE Family Controlle

Ctrl+Q

13.2 Communication

The logger tool can communicate with the ECUs either via CAN or optionally via Ethernet (if the ECU supports this protocol).

- Select **ECUCommServer : local** to use CAN communication.
- Select Ethernet to use Ethernet communication.

Next confirm server connection.

- Select Local when using CAN communication.
- Select the Ethernet interface if you use Ethernet and then confirm the controller in use in your PC.

13.3 Configuring

When you have loaded an ECU database you will see he channels available for the recorder module in the upper window, **Channels Available**.

Double click on channels in this list which you want to record. They will appear in the window below, **Channels Selected**.

Data channels can be recorded at sampling rates between 1 Hz and 200 Hz.

To change a selected sampling rate for a channel click on the channel in the Channels Selected window and use the right or left arrow key to select the preferred rate.





Ethernet Interface : Realtek PCIe GBE Family Controller Ctrl+1

Ethernet : Realtek PCIe GBE Family Con

Ctrl+O

Find FCU Eth

vice : E8/V316CAN.) hannels available	ML.									
hannels available —					Seial # B	CU :				
										_
Search :										
Label channel		Inde	x Typic	cal Freq. (Hz) Eve		Unt			
Active KIN Out Level		493	1.563		2		Level			
Active INJ Cut Level		497	1.563		2		Level			
AE1		199	200		2		UBIC			
Angle Crank Status		021	200							
AX1		829	1.563	6	2					
AY1		828	200		2					
BoostOC 1		595	200		2		2			1
n										
		647	- 202							یتے ۔
• Sa	mpling rate av	alable :		8 -	`	Add	-	Renove		J.
4 hannels selected Asstimum time cap	ture : 02:	alable : 11:48	1.56			Add	- -			<u>ائر</u>
Sa farmels selected Assimum time cap Label channel	iture : 02>	alable : 11:48 Freq S	[1.56	Bytes	Unit	Add	a	,		
sa harnels selected Assimum time cap Label channel Ar Temp	iture : 02: Index 301	alable : 1:48 Freq 5 1.5625	[1.56	Bytes 2	Unit.	Add	Description	1 Lair tempera		j
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Activation of the logger can be controlled by several options:

Trigger Type	Channel Int. 💌	Channel Selection	Car Speed	•	
Minimum threshold	20	Maximum threshold	400	Start delay (s) 0.5	

- **Continuous**, ECU logging data when the ECU is switched on.
- External switch, the logger is activated by an external switch.
- Internal switch, the logger is controlled by one of the logged channels.

Typical data channels used for activating the logger are car speed and engine RPM. Select the threshold for activating the logger.

If you have chosen to use the engine RPM as a trigger it is recommended to have the activation threshold above the engines idle speed.

You can set a high threshold for stopping the data recording. If you want to record data with no upper limit then it is recommended to set engine RPM or car speed well above what will be achieved.

In **Start Delay** you can key in a delay for activating or deactivating the recording when the lower threshold is reached.

Click on File and then Save Configuration to save the logger configuration file to disk.

13.4 Update Logger – Download Data



Upload logger configuration, this takes a few seconds. This process clears the logger memory.

Download logger configuration



Download logged data, click icon when you have connected to the ECU

Download logged data as soon as tool finds ECU connected

When the download has finished you will be prompted to add comments about the recording.

Click OK when done editing.

If you have chosen NOT to clear the logger memory when configuring the system, you will now be asked if you want the data cleared.

If you have chosen to delete data automatically, the ECU will clear the memory. In this process the ECU clears the memory and will start recording new data when done if the start conditions are met.

Sending logger co	onfiguration to ECU.
Please wait	
	1
Elapsed time (s) :	4.8
	Ok.
ECU Logger	8 2
ADF Format 2	D Format
1	1
Current event :	
Daytona	<u> </u>
New event	Delete event
Measure Name	
20160805	125437.mdf
Project :	
GT3 Test	
' Info Measuremen	t:
Viper	
Comments :	
Euro8_417A EF	ITech 27/07/16
6	
	1
Save	Cancel



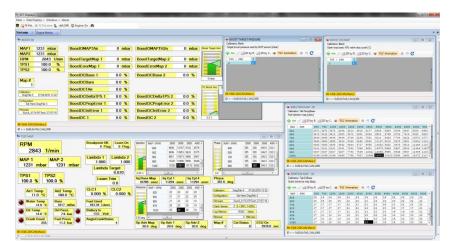
14 Workspace

Once you have created your preferred layout of the tool, combining for example displays and editor, you can save your current layout as a workspace.

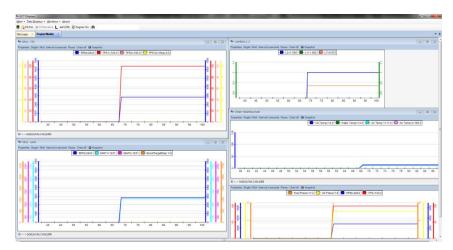
This way you can load your preferred layout with a few clicks with your mouse.

As an example, you start with this layout:

Now click on Open and your display could for example look like this:



or



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