EcoCAL
User Manual for EFI

V1.7

COPY RIGHTS ECOTRONS LLC

ALL RIGHTS RESERVED

Http://www.ecotrons.com

Note: If you are not sure about any specific details, please contact us at info@ecotrons.com
<table>
<thead>
<tr>
<th>Index</th>
<th>Page</th>
<th>Revision</th>
<th>Date</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>----</td>
<td>First Edition</td>
<td></td>
<td>V1.0</td>
</tr>
<tr>
<td>2</td>
<td>----</td>
<td>Second Edition</td>
<td></td>
<td>V1.1</td>
</tr>
<tr>
<td>3</td>
<td>----</td>
<td>Third Edition</td>
<td>Mar. 10, 2016</td>
<td>V1.2</td>
</tr>
<tr>
<td>4</td>
<td>----</td>
<td>Fourth Edition</td>
<td>Nov. 18, 2016</td>
<td>V1.3</td>
</tr>
<tr>
<td>5</td>
<td>----</td>
<td>Fifth Edition</td>
<td>May 13, 2017</td>
<td>V1.4</td>
</tr>
<tr>
<td>6</td>
<td>----</td>
<td>Sixth Edition</td>
<td>Aug. 17, 2017</td>
<td>V1.5</td>
</tr>
<tr>
<td>7</td>
<td>----</td>
<td>Seventh Edition</td>
<td>Sept. 18, 2017</td>
<td>V1.6</td>
</tr>
<tr>
<td>8</td>
<td>----</td>
<td>Eighth Edition</td>
<td>Mar. 13, 2018</td>
<td>V1.7</td>
</tr>
</tbody>
</table>
Contents

Introduction ........................................................................................................................................... 1
Chapter 1 Basic operation of EcoCAL .................................................................................................. 1
  1.1 Installation of EcoCAL .................................................................................................................... 1
      1.1.1 Download the EcoCAL Software .............................................................................................. 1
      1.1.2 Install EcoCAL ........................................................................................................................ 2
  1.2 Start EcoCAL .................................................................................................................................. 7
      1.2.1 Start EcoCAL software ............................................................................................................. 7
      1.2.2 Load the Calibration files ......................................................................................................... 9
  1.3 Activate EcoCAL ........................................................................................................................... 12
      1.3.1 Get the key file ......................................................................................................................... 12
      1.3.2 Activate EcoCAL by license file .............................................................................................. 14
Chapter 2 Connect to ECU and Record data ...................................................................................... 16
  2.1 Connect ECU to laptop .................................................................................................................... 16
      2.1.1 Communication Settings ......................................................................................................... 16
      2.1.2 Connect to ECU ........................................................................................................................ 22
      2.1.3 Disconnect to ECU .................................................................................................................. 25
      2.1.4 Start Measuring ....................................................................................................................... 26
      2.1.5 Stop Measuring ....................................................................................................................... 27
  2.2 Record data and Play-back ............................................................................................................ 28
      2.2.1 Record data ............................................................................................................................. 28
      2.2.2 Play-back with data analyzer .................................................................................................. 31
Chapter 3 Operation for tuning ........................................................................................................... 38
  3.1 Add and Delete Calibration Variables ............................................................................................ 38
      3.1.1 Add Calibration variables ....................................................................................................... 38
3.1.2 Delete Calibration variables ................................................................. 42
3.2 Add and Delete Measured Variables .......................................................... 45
  3.2.1 Add Measured variables ......................................................................... 45
  3.2.2 Delete Measured variables .................................................................... 48
3.3 Change Calibrations (Tuning) ..................................................................... 50
  3.3.1 Change the value directly ...................................................................... 50
  3.3.2 Change the value with Formula ................................................................ 52
  3.3.3 Export / Import Calibration Data for tuning ............................................. 59
  3.3.4 On-the-fly Calibration ........................................................................... 62
3.4 Save as calibration data file ......................................................................... 63
3.5 Burn to ECU and Fetch from ECU ............................................................... 64
  3.5.1 Burn the CAL file to ECU ...................................................................... 64
  3.5.2 Fetch the CAL file from ECU .................................................................. 65
Chapter 4 Tuning help and support ................................................................. 67
  4.1 Pop-up the Help and support window ....................................................... 67
  4.2 Edit the Help and support window ............................................................ 68
Chapter 5 Advanced operation of EcoCAL ....................................................... 71
  5.1 EcoCAL setting in Customers’ demand ...................................................... 71
    5.1.1 Page setting .......................................................................................... 71
    5.1.2 Layer setting ........................................................................................ 78
    5.1.3 Alias setting ........................................................................................ 80
    5.1.4 Window setting .................................................................................... 85
    5.1.5 Fit window and grid ............................................................................. 88
    5.1.6 Smooth Cells ....................................................................................... 92
    5.1.7 Save configuration ............................................................................... 94
    5.1.8 Reset default configuration .................................................................. 95
    5.1.9 Load configuration .............................................................................. 96
5.1.10 Language Setting .................................................................................................. 98
5.1.11 "Show"/"Hide" Default List ................................................................................. 98
5.2 Diagnostics .................................................................................................................. 102
  5.2.1 Read the DTC of EFI .......................................................................................... 102
  5.2.2 Failed to connect to ECU ..................................................................................... 103
5.3 Advanced function of EcoCAL ................................................................................... 107
  5.3.1 Calibrations Data manager .................................................................................. 107
  5.3.2 Debug .................................................................................................................. 113
  5.3.3 Decimals Display ................................................................................................. 114
  5.3.4 Signal/Parameters properties .............................................................................. 116
  5.3.5 Virtual Oscilloscope ........................................................................................... 120
  5.3.6 Gauge monitoring ............................................................................................... 124
  5.3.7 3D/2D view of maps ............................................................................................ 128
  5.3.8 Cope/ Paste in tables .......................................................................................... 131
  5.3.9 Highlight of table cells ....................................................................................... 133
  5.3.10 EcoCAN ............................................................................................................ 135
Chapter 6 Exit or Uninstall the EcoCAL ........................................................................ 142
  6.1 Exit EcoCAL ......................................................................................................... 142
  6.2 Uninstall the EcoCAL ............................................................................................ 143
Introduction

EcoCAL is the Calibration software of EFI system from Ecotrons, you can use the EcoCAL to tune the maps of ECU, start fuel/ignition angle, warm-up fuel, idle ignition advanced angle, ignition timing MAP, fuel injection MAP, … etc.

Our ECU is programmable, so if you want to change the setting of EFI, you need to connect ECU to laptop via EcoCAL.

Chapter 1 Basic operation of EcoCAL

1.1 Installation of EcoCAL

1.1.1 Download the EcoCAL Software

1) Download the EcoCAL calibration software from the website:

http://www.ecotrons.com/support/

Click the “EcoCAL for EFI”, and then download the software “EcoCAL-Setup.exe”

2) Maybe, you get the software through the E-mail. So you need to rename the installation file name that is attached in the Email:

"EcoCAL-setup.exe.remove"
Please modify the attached file name extension, and remove the ".remove", then run the file: "EcoCAL-setup.exe" to install the tool software.

1.1.2 Install EcoCAL

1) Double-click the ICON "EcoCAL setup.exe" to install the EcoCAL:

2) Click “Next”
3) Click “Next” and choose the path to install EcoCAL

![Image of EcoCAL Setup window]

4) Click “Next”
5) Click “Next”
6) Click “Next” and wait for installing
7) Click “Finish”
The installation of “EcoCAL” is successful.

1.2 Start EcoCAL

1.2.1 Start EcoCAL software

(1) Double-click the ICON “EcoCAL” on the desktop to start the EcoCAL software:
(2) When you start the EcoCAL at the first time after you finish installation, the EcoCAL will load the Demo files automatically with the default page settings.

Note:

If EcoCAL does NOT automatically load the default configuration, likely you do not have the necessary A2L file and CAL file, in the installation folder of "C:\EcoCAL". Usually, the Demo files are not correct for user, you can find the correct A2L, CAL files in CD. You should copy and paste the necessary A2L file and CAL file into that folder, if the folder contains no such files, then Open the correct A2L file and CAL file in EcoCAL.
1.2.2 Load the Calibration files

1) File types and definitions

**S19 file**: this is a Motorola format microprocessor executable file;

**A2L file**: this is an ECU description file that contains variant ECU info for EcoCAL to know where to get what, etc.;

**CAL file**: this is a calibration data file that contains parameters users can tune.

*Note*: Ecotrons A2L file follows the ASAP2 standards (defined by the automotive standard association ASAM).

*Note*: most users don’t need the S19 file; unless an ECU firmware update is necessary; it is enough to have the A2L file and CAL file to run EcoCAL and tune your engines.

2) Load the correct A2L and CAL files

*Note*: If you have not got correct A2L file and CAL file in your CD or in the software package, please email us: info@ecotrons.com or support@ecotrons.com.

Often the user will need to load different A2L file and CAL file than the default ones coming with the EcoCAL.

For example, an ECU software update will give you a new A2L file and a new CAL file.

Or new calibration release will give you just a new CAL file (A2L file stays same).

**In EcoCAL, go to menu->File->Open**

Find out the place that you put the A2L and CAL files, and then choose the correct files
**Note:** EcoCAL always need to open 2 files, open A2L first, and then open CAL file next,

Click “Open”, and then load the A2L and CAL files successfully.
Note: You also can use the shortcut button of “Open” to open the files.

Note: The default Demo file is not correct for user. Please find the correct A2L, CAL files in CD.
EcoCAL will pop up one prompt box “Message” to indicate what variables do not exist when you reload A2L, CAL files.

1.3 Activate EcoCAL

1.3.1 Get the key file

In EcoCAL: Go to menu->Advanced-> License Manage->Create Key File
To generate related seed file, save it, then send the seed file to ECOTRONS
Click “Create Key File”.

Save the key file, for example, choose “Save key file” as the file name, then click “Save”.
Please send the key file to ev-support@ecotrons.com for license file.

Note: After you send the key to us, please do not regenerate it.

1.3.2 Activate EcoCAL by license file

In EcoCAL: Go to menu->Advanced-> License Manage->Register License.

For example, select “License EcoCAL.lic”, then select “Open”.
Click "OK". The activation is successful if the "Message" window is displayed as follows.
Chapter 2 Connect to ECU and Record data

2.1 Connect ECU to laptop

**Note**: When you want to connect the ECU to laptop via EcoCAL, you must make sure you have powered on the ECU—when you power on the ECU, you can hear the noise of pump working about 5 seconds.

2.1.1 Communication Settings

You should select the communication mode first based on which way you use, COM or USB or CAN or Ethernet.

In default, we provide the COM RS232 cable and USB adapter, so you can use the COM or USB for communication.

**Go to menu->Settings->Communication Settings:**
Note: By default, EcoCAL uses USB communication mode (Note: insert the Ecotrons’ USB adaptor into the laptop first for USB mode). This configuration is consistent with most of the computers.

1) COM communication mode

If the user is using the COM mode (Note: for this mode, your laptop need to have a built-in COM port). Select COM and set the COM port, the default COM port is COM1. (Note: To check the computer COM port availability, see Chapter 13.2 “Failed to connect to the ECU”)
The default baud rate is 115200, which is the fastest of the serial communication rate of the PC. It is not supposed to change.

2) **USB communication mode**

Most new computers do NOT have a built-in COM port any more. You should insert the USB adaptor (Ecotrons’ USB Adaptor) to the laptop, and then select the **USB** in the communication settings window of EcoCAL.
Note: We do not support the 3rd party USB-RS232 adapters, even though they might work sometime. The problem is that those consumer electronics rated USB adapters only works in a noise-free environments. This means, once the engine is running, it generates a lot of electronic magnetic noises. And those USB adapters, though looking pretty, will not stay working when you are driving. That's why we developed our own.

Note: Make sure the connection between laptop and USB adaptor (Serial communication cable) is FULLY plugged in.
Choose the USB first, and then click “Open Device”.

3) CAN communication mode

Our customized ECU supports the CAN communication. If the ECU of the EFI system supports the CAN communication, you can use this communication mode to connect ECU.

Select the device you are using. There are two choices of Device Type in CAN Settings: EcotronsCAN and Kvaser. If you get the CAN device from Ecotrons, please choose the “EcotronsCAN”, and we send the CAN device to user in default.

You also can choose “Kvaser” if you have the Kvaser device.

You need to choose the CAN device Type, Baud Rate, after finishing setting, then click “Open Device” to open the CAN device.
And if you don’t want to use the CAN device, you also need to click “Close Device” to close the CAN device.

4) Ethernet communication mode

Our customized ECU also support the Ethernet communication, if the ECU of EFI system supports the Ethernet communication, you can use this communication mode to connect ECU.

You need to make Ethernet connect laptop with Ethernet cable, choose the Ethernet device Type, click ”Search Module”, after IP and Port appear, then click “Open Device” to open the Ethernet device.

And if you don’t want to use the Ethernet, you also need to click “Close Device” to close the Ethernet device.
5) Open device successfully

**Note:** when you click the “Open Device”, if the equipment is existed and working, the message will pop up, “Open device successfully!” Then you can connect to ECU.

2.1.2 Connect to ECU
After finishing communication setting, you can try to connect ECU to laptop.

**Go to menu->Run->Connect**

![Connect Menu](image)

**Note:** You also can use the shortcut button (F5) of “Connect” to Connect to ECU

![Shortcut Button](image)

When you connect to ECU successfully, the left lower corner of window will show “Connect” in Green color.

“This calibration data set matches with the ECU’s”
Note 1: If there is a warning window popped up as below, this means the software version of A2l and CAL files you loaded doesn’t match the ECU, and you need contact us to get the right files.

Note 2: If there is a message window popped up as below, it means the settings of Calibration data file (CAL file) is different from the ECU in, you need to “Burn to ECU”, burn the CAL files you use to ECU.

And if burn to ECU successfully, you will hear fuel pump running for a couple seconds. If not, please do again and check all of connection is right.

And if you do not have other operations, you should click “Cancel”.
Note 3: If you want to know the settings in ECU, you also can click “Fetch from ECU”, this will save one new CAL file.

![Image of Fetch from ECU button]

Save it as to be “Fetch from ECU.CAL” file

![Image of save dialog]

Then, the EcoCAL will load the CAL file automatically.

Note: make sure your 12V battery is healthy, before you do any "burn to ECU" or "fetch from ECU"!

During the upload or download, users are not allowed to do any operations to the EFI system.
Do not turn off the ECU power or disconnect the serial cable before the upload/download is finished.

2.1.3 Disconnect to ECU

Go to menu->Run->Disconnect
Note: You also can click the shortcut button (/logout) to disconnect to ECU

2.1.4 Start Measuring

When you connect to ECU successfully, you can measure the data of sensors' and engine running, to see the running state of engine.

Go to menu->Run->Start Measuring

Then you can see the values of measured variables.
Note: You also can use the shortcut button ( ) of “Start Measuring” to measure the value of measured variables.

Note: The “Start measuring” only works when connect to ECU successfully.

2.1.5 Stop Measuring

When you finish the test and want to do other operation, for example, read the DTC, or add measurement variable, burn to /fetch from ECU, you should stop measuring first.

Go to menu->Run->Stop Measuring
Note: You also can use the shortcut button ( ) of “Stop Measuring” to stop measuring.

2.2 Record data and Play-back

2.2.1 Record data

Sometimes, you need to record the data of engine running to analyze for EFI tuning, or you need us to help you on tuning, so you need to log data while do test and send us.

Start Recording

After successfully to connect ECU and start measuring, you can read the values of measured variables, then you can click the “Start recording” button to record the data.
Go to menu->Run->Start Recording

**Note:** You also can use the shortcut button (●) of “Start Recording” to record the data.

When you click down the button, EcoCAL will record the data automatically. And save the record file at the installation path of EcoCAL, “C:\EcoCAL\record”, and it is named with the time of recording.

For example, the record named “2017-8-22-11-39-2-747” is the record file in record.
Note: If you need us to help you on tuning, please send the recorded files to us.

Stop Recording

When you finish the test and want to see the record file, please stop recording first.

Go to menu->Run->Stop Measuring
Note: You also can use the shortcut button (■) of “Stop Measuring” to stop recording.

2.2.2 Play-back with data analyzer

After the data files are recorded, the user can select "Run → Play Back" or click the button ■ to play back the data.
The play-back software, "Data Analyzer", can start as below:

Open Data Files

In **Data Analyzer**, Go to "File → open", select the data file you want to analyze:

Again, by default, your saved files are under: "...\EcoCAL\record"; where "..." is your EcoCAL installation folder, usually it is "C:\EcoCAL\record".
Show/Hide all signals

Click "show all signals / hide all signals", toggle the signal displays.

Show/Hide Cursors

Click "show cursors / hide cursors", toggle the cursors. There are 2 cursors in the scope window. The values of all signals at the 2 cursor locations will be displayed on the right, in the variable list window:
You can move the either cursor by put your mouse on it, press the mouse button and drag it to your desired location. It will show the values of all the signals at the new cursor location.

**Line/Step curve type**

Select curve type: Step / Line, to see the different curve effect. "Line" means between 2 sample points the curve is connected by a straight line. "Step" means between 2 sample points the curve is connected by a step change.
Zoom in/out X-axis

Input the "start time" value, and "end time" value, shown as below, to zoom in/zoom out the X-axis.
Click "show all time", to get the full time range of the data file.
You can also the mouse to zoom in the X-axis direction. Just press, drag and release.

Zoom in/out Y-axis

Double click the "Max / Min" fields in the signal list, you can modify the max and min range of the signals, it will automatically zoom in/zoom out the Y-axis for the signals.
Save the Data Analyzer configuration

After you spend time to zoom in/out and/or select signals, you want to save these configurations. Just right click and choose "save configuration" and store it in a configuration file. Next time you run Data Analyzer; you can open that configuration file and load all your previous settings.

You also can click the “Load Configuration” that you have saved before.
Chapter 3 Operation for tuning

3.1 Add and Delete Calibration Variables

There are two types of Calibration variables window,

One calibration window is for “VAL_XXX” and “CV_XX” variables, and another calibration window is for “CUR_XXX_XXX” and “MAP_XXX_XXX” variables.

3.1.1 Add Calibration variables

1) Go to menu->Variables-> Add Calibrations

![Image of menu with Add Calibrations highlighted]

2) Right click on the blank area of window, click “Add Calibrations”

![Image of right click menu with Add Calibrations highlighted]
Then, the “Add Advanced Calibrations” window wills pop-up,

Input the variable on the left side, then you can see the calibration variable, for example, “MAP_LdTp_Tps_N”, then click “Add” button, add it to be right side, then Click “OK”, you can see the calibration window.
Note: Above method is to add new calibration window, if you want to add the calibration variables at the current calibration window, please use following method.
Right click on the calibration window, and then click “Add Calibrations”

Then, use the same method to add the calibration variables.
If you want to add the “VAL XXX” and “CV XX” variables, please right click on the corresponding window to add the calibration variables.

3.1.2 Delete Calibration variables

1) Right click on the current window; you can click “Delete” to delete the calibration variables. Or click “Add”, pop-up the “Add Calibrations” window, to delete the calibration variables that you have added it once.
Click the calibration variable which one do you want to delete, then click "Delete" button, then click "OK"
Choose the calibration variable that you want to delete, right click, then click “Delete”, it will delete the variable directly.
3.2 Add and Delete Measured Variables

3.2.1 Add Measured variables

1) Go to menu->Variables-> Add Measurements

2) Right click on the blank area of window, click “Add Measurements”

Then, the “Add Measurements” window wills pop-up,
Input the variable on the left side, then you can see the measured variable, for example, “UbAdc”, then click “Add to 100ms” button, add it to be right side, and then click “OK”, you can see the measured window.

Note: You also can add the variables to be “Syn”, “20ms”, this means the display frequency.

Here, we also add some other variables as example.
Note: Above method is to add new measured variables window, if you want to add the measured variables at the current Selected Variables window, please use following method.

Right click on the Selected Variables window, and then click “Add Measurements”.

Then you can see all of the variables that you have chosen, and then you can add the new measure variables as you want by using the above method.
3.2.2 Delete Measured variables

1) Right click on the Selected Variables, choose “Add Measurements”, and then delete the variables those you want.
2) Go to menu->Variables-> Show All Selected Variables

Or right click on the blank of window, then choose “Show All Selected Variables”
A window will pop-up, all of the selected measured variables showing are there, then you can find out the variable that you want to delete, and then delete it.

**Note:** if you add one variable in all of the layers, this way will delete the measured variable in all layers.

3.3 Change Calibrations (Tuning)

Calibration variables are 3 types: Values, Curves and Maps. The labels start with the prefix so you can tell immediately. VAL_ means it’s a calibration value. CUR_ means it is a curve with one input. MAP_ means it is a map with 2 inputs.

3.3.1 Change the value directly

1) Double click the value cell that you want to modify,
2) Input the value that you want
Press Enter to finish it. The modified data will show as "red" color.

Note: This method applies to break points, too.

3.3.2 Change the value with Formula

EcoCAL supports to use Formula to modify the calibration data.

Note:

: Plus;

: Minus;

: multiply by;

: be divided by;
Selected = 1

: be equal;

: Undo;

: Redo.

1) Plus and Minus

You can input the value that you want to increase or decrease, and then choose the cell or area of table you want to change.

Click the Plus or Minus button to change the value.

For example:

Input 0.1 in the box

If you want to change one cell, click cell to choose it.

<table>
<thead>
<tr>
<th>X/Y</th>
<th>300.00</th>
<th>350.00</th>
<th>400.00</th>
<th>430.00</th>
<th>460.00</th>
<th>500.00</th>
<th>550.00</th>
<th>600.00</th>
<th>650.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200.00</td>
<td>0.46</td>
<td>0.47</td>
<td>0.51</td>
<td>0.55</td>
<td>0.57</td>
<td>0.58</td>
<td>0.63</td>
<td>0.63</td>
<td>0.66</td>
</tr>
<tr>
<td>1400.00</td>
<td>0.46</td>
<td>0.47</td>
<td>0.51</td>
<td>0.55</td>
<td>0.57</td>
<td>0.58</td>
<td>0.63</td>
<td>0.63</td>
<td>0.65</td>
</tr>
<tr>
<td>1650.00</td>
<td>0.47</td>
<td>0.48</td>
<td>0.51</td>
<td>0.55</td>
<td>0.57</td>
<td>0.58</td>
<td>0.64</td>
<td>0.65</td>
<td>0.69</td>
</tr>
<tr>
<td>2000.00</td>
<td>0.48</td>
<td>0.49</td>
<td>0.51</td>
<td>0.55</td>
<td>0.58</td>
<td>0.59</td>
<td>0.65</td>
<td>0.66</td>
<td>0.69</td>
</tr>
<tr>
<td>2500.00</td>
<td>0.49</td>
<td>0.50</td>
<td>0.52</td>
<td>0.56</td>
<td>0.59</td>
<td>0.62</td>
<td>0.66</td>
<td>0.68</td>
<td>0.72</td>
</tr>
<tr>
<td>3000.00</td>
<td>0.50</td>
<td>0.51</td>
<td>0.53</td>
<td>0.56</td>
<td>0.60</td>
<td>0.63</td>
<td>0.67</td>
<td>0.70</td>
<td>0.75</td>
</tr>
<tr>
<td>3800.00</td>
<td>0.51</td>
<td>0.52</td>
<td>0.55</td>
<td>0.58</td>
<td>0.61</td>
<td>0.67</td>
<td>0.70</td>
<td>0.74</td>
<td>0.78</td>
</tr>
<tr>
<td>4400.00</td>
<td>0.52</td>
<td>0.53</td>
<td>0.57</td>
<td>0.60</td>
<td>0.67</td>
<td>0.73</td>
<td>0.74</td>
<td>0.76</td>
<td>0.82</td>
</tr>
<tr>
<td>5600.00</td>
<td>0.54</td>
<td>0.55</td>
<td>0.59</td>
<td>0.64</td>
<td>0.72</td>
<td>0.76</td>
<td>0.79</td>
<td>0.81</td>
<td>0.86</td>
</tr>
<tr>
<td>7000.00</td>
<td>0.55</td>
<td>0.56</td>
<td>0.61</td>
<td>0.66</td>
<td>0.73</td>
<td>0.78</td>
<td>0.82</td>
<td>0.85</td>
<td>0.89</td>
</tr>
<tr>
<td>8000.00</td>
<td>0.55</td>
<td>0.58</td>
<td>0.62</td>
<td>0.68</td>
<td>0.74</td>
<td>0.78</td>
<td>0.82</td>
<td>0.86</td>
<td>0.89</td>
</tr>
<tr>
<td>10000.00</td>
<td>0.56</td>
<td>0.58</td>
<td>0.63</td>
<td>0.68</td>
<td>0.74</td>
<td>0.78</td>
<td>0.82</td>
<td>0.86</td>
<td>0.89</td>
</tr>
</tbody>
</table>
If you want to increase value by 0.1 step based on the stock value, please click the "+" button.

And if you want to decrease the value, click" -" button
Note: You also can tune more than one cell together by using the buttons.
Choose the area of cells, then click the + or - button.
2) Multiply and divided by

This is the same to the Plus or Minus function, it is to multiply or divided by the factor that you input.

3) Be equal

This is used to change the value of cell to be one constant value.

Choose the cell or area of cells you want to change, and then input the value which you want in the box, then press the Enter button of keyboard to finish it.
4) Undo / Redo

The user click the button “leftrightarrow” / “rightarrow” to undo or redo the calibration as below.
3.3.3 Export / Import Calibration Data for tuning

You can also do data export to Excel sheet, and modified the data in Excel. After finishing the modification, you can import data back to EcoCAL. This is most useful for Curve and Map tables.

Right-Click the parameter window, select the **Export** option.

The program will pop-up a "save as" dialog window.
If you click **save**, the program will save **CSV** file and open it. The default name of the **CSV** file is the calibration label name.

And the **CSV** file will be opened automatically. You can choose to open the file by anyone method from your laptop, and the below showing opens as **xls** file by Excel.

It is recommended to modify your curve and map tables in Excel, and smoothen them in Excel and then imported back to EcoCAL. And please save it after you finish tuning.
If you want to import just edited calibration tables, Right-Click the parameter window, select the **Import** option.

Import the CSV file you just modified.

The modified cells will show as "red".
Note: when you finish the data changed, please save it as one new CAL file.

Please read the flowing chapter for how to save the new CAL files.

3.3.4 On-the-fly Calibration

On-the-fly calibrations are something must to have when tuning the engine on the dyno, so that you can make you calibration changes taking effect immediately by hit a "ENTER" key. No need to "Burn to ECU" or reprogram the ECU. Only by this way, you can keep the engine running without interrupted and at the same time find the sweet spots of the certain operating conditions. And you can tune your fuel / spark maps very quickly.

But the drawback of the "on-the-fly" calibrations is to use a lot of memory of ECU. Basically any calibration data you want to do "on-the-fly" changes, you must double or even triple the size of the memory for that set of data. That would significantly increase the ECU cost.
We have a compromise to do this: only make certain critical calibration maps as "on-the-fly" capable. And most other non-critical calibrations, which are seldom changed by customers, stay the old way.

Mainly for most customers, the calibrations that need to be tuned for their engines are basic Fuel maps (VE table, TPS-load table), Spark maps, and some supplemental fuel/spark characteristic curves.

You can also use "Save CAL as" feature at "File" menu to save your new calibrations to a new CAL file. And later on load it into EcoCAL.

At this moment the below calibration maps, curves, and values are made "on-the-fly" capable:

RAM_MAP_LdTp_N_Tps; RAM_MAP_fVe_Map_N; RAM_MAP_avg_N_Ld
RAM_CUR_fAst_TmSta; RAM_CUR_fWmp_Tm; RAM_VAL_fFlApp

You can add the calibration variables in EcoCAL.

3.4 Save as calibration data file

When you finish EFI tuning or do some fine tuning, please save the tuning data before you exit the EcoCAL, otherwise, you will lost the tuning that you did.

Go to menu->File->Save CAL as
You can save it as the new calibration CAL file.

3.5 Burn to ECU and Fetch from ECU

3.5.1 Burn the CAL file to ECU

When you finish the data tuning, you want to see the performance of engine, please burn the data to ECU, then ECU will use the data that you changed to control the engine.
Connect to ECU first, and then click the “burn to ECU“ button to burn the CAL file or data changed to ECU.

When burn to ECU successfully, you will hear the noise of fuel pump working.

**Note:** make sure your 12V battery is healthy, before you do any "burn to ECU" or "fetch from ECU"!
During the upload or download, users are not allowed to do any operations to the EFI system.
Do not turn off the ECU power or disconnect the serial cable before the upload/download is finished

### 3.5.2 Fetch the CAL file from ECU
Sometimes, maybe you want to know which version of Calibration data is in ECU or you forgot the change that you did, you can fetch the data from ECU to compare.

**Connect ECU only; Go to menu->Run->Fetch from ECU**

![Screenshot of EcoCAL User Interface]

Save it as CAL file.
Chapter 4 Tuning help and support

4.1 Pop-up the Help and support window

In EcoCAL, there are many marks in the window, you can click this to get the details of calibration variables and measure variables, and you can get the method of tuning and the meaning of measure variables.

There is also help for each layer; you can click the main in EcoCAL to get the layer help.

In different layer, the help document is also different.

For example, in the “Steady-State” layer window, click the button, the help and support window will pop-up.
4.2 Edit the Help and support window

You also can edit the content by yourself for easy to read based on your own understand.

First, click the button to open the Help and support window,
### EcoCAL User Manual for EFI-V1.7

#### Measurements

<table>
<thead>
<tr>
<th>Alias</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude factor</td>
<td>FAlt</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Fuel factor closed-loop control</td>
<td>FLc</td>
<td></td>
<td></td>
<td>20ms</td>
</tr>
<tr>
<td>Pre-control fuel factor</td>
<td>FPreCtl</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Correction factor based on air temperature</td>
<td>FTempb</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Volumetric Efficiency</td>
<td>FVe</td>
<td></td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Desired Lambda</td>
<td>Lambda</td>
<td></td>
<td></td>
<td>20ms</td>
</tr>
<tr>
<td>Load</td>
<td>Ld</td>
<td>%</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Predicted Load</td>
<td>LdPrd</td>
<td>%</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Load based on TPS</td>
<td>LdTps</td>
<td>%</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Intake manifold pressure</td>
<td>Map</td>
<td>hPa</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Engine Speed</td>
<td>N</td>
<td>Rpm</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Engine-speed of byte value</td>
<td>N_b</td>
<td>Rpm</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Number of injections</td>
<td>nlnj</td>
<td></td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Raw engine speed</td>
<td>Nraw</td>
<td>Rpm</td>
<td>20ms</td>
<td></td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>Pam</td>
<td>hPa</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Intake air pressure</td>
<td>Pan</td>
<td>hPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake air temperature</td>
<td>Ta</td>
<td>DegC</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Fuel Pulse Width #1</td>
<td>tinj0</td>
<td>ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine temperature</td>
<td>Tm</td>
<td>DegC</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Throttle Position Sensor</td>
<td>Tps</td>
<td>%</td>
<td>20ms</td>
<td></td>
</tr>
<tr>
<td>Battery voltage from ADC channel</td>
<td>UbAdc</td>
<td>V</td>
<td>20ms</td>
<td></td>
</tr>
<tr>
<td>O2 sensor voltage</td>
<td>uLab</td>
<td>V</td>
<td>20ms</td>
<td></td>
</tr>
</tbody>
</table>

#### EcoCAL Help and Support-LamWO2

- **LamWO2**
- **Search**
- **Save**
- **Edit**

"Actual Lambda measured by WO2 controller"
Then choose the Edit option, from \( \text{Edit} \) to \( \text{Edit} \), then you can edit the content by yourself.

For example, add the “Lambda reading from wideband controller ALM” content.

![Image of EcoCAL Help and Support-LamWO2 window]

After finishing, please click “Save” to save the change, otherwise, the change will be lost.
Chapter 5 Advanced operation of EcoCAL

5.1 EcoCAL setting in Customers’ demand

EcoCAL supports custom design; you can set the window as your demand.

5.1.1 Page setting

In the default page setting of EcoCAL, you can see there are many pages, for example “Desired idle speed”, “Start fuel”, “Start ignition”, etc., they are the named “layer”.

You can add or delete the layer as you want, for example, you don’t want the “Servo motor” layer, you can delete it, if you want to add the “Custom Calibration” layer, you can add the layer and re-set it as you want the calibration variables, measure variables, etc.

Go to menu->Advanced->Page setting, the page setting window will pop-up.
**Note**: you also can right click on the layer label, and then click the “Page setting”, the window will pop-up.

Page setting window:
How to delete the layer?
First, click the label to choose it, then click “Delete”, for example, delete the “Servo motor” layer.

When you click the “Delete” button, there is one message window to ask you whether you want to delete the layer, choose “Yes”, the layer will be deleted.
Then you can see there is no “Servo motor” layer in display.
How to add one new layer?

Click the “New” button to set up one new layer.

Double click the “New Layer” words, input the word as you want to re-name it, there, we re-name it be “Custom Calibration”, then press the Enter button of keyboard to finish it.
After finishing, click “OK”.

Then you can see there is the new “Customer Calibration” layer in the window.

You can use the “Up” and “Down” button to change the display order of layers.
5.1.2 Layer setting

You can edit the Layer showing via adding calibration variables and measured variables.

First, click the layer that you want to edit, for example, “Customer Calibration” layer.
Right click on the window, there some menu you can choose, to set this layer.

About add Calibration variables and Measure variables, please read the chapter 3.1 and chapter 3.2. You also can Right click on the blank area of window, click “Add Measurements->New Oscilloscope Window”, more details, you can refer to the chapter 5.3.5
5.1.3 Alias setting

Maybe you don’t know the meaning of calibration variables and measured variables, we have set the alias of variables in default, and you also can edit it for easy reading and remembering.

The words in red area are alias of variables, you can re-edit it or add new alias.

How do edit the alias?

First, choose the variable name that you want to change, and then right click.
Here, we change the alias of UbAdc, the current Alias is “Battery voltage from ADC channel”

Then click “Change Alias”, the window will pop-up,
Double click the Alias, then input the words that you want to change, for example, “Voltage of battery”, then press the Enter button of keyboard to finish it.

Then, click “OK”

So, we can see the Alias of UbAdc is changed.
Note: when you change the Alias of variables, the Alias of same variable will be changed in all layers.

Note: If you want to change the Alias of MAP and CUR variables, you need right click on the table, then to choose “Change Alias”.

### Measurements

<table>
<thead>
<tr>
<th>Alias</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine-start end</td>
<td>B_StaEnd</td>
<td>-</td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Altitude factor</td>
<td>fAlt</td>
<td>-</td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Start fuel factor</td>
<td>fFSta</td>
<td>-</td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Pre-control fuel factor</td>
<td>fPreCtl</td>
<td>-</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Lambda</td>
<td>LamWO2</td>
<td>-</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Load</td>
<td>Ld</td>
<td>-</td>
<td>%</td>
<td>Syn</td>
</tr>
<tr>
<td>Predicted Load</td>
<td>LdPrd</td>
<td>-</td>
<td>%</td>
<td>Syn</td>
</tr>
<tr>
<td>Engine Speed</td>
<td>N</td>
<td>-</td>
<td>Rpm</td>
<td>Syn</td>
</tr>
<tr>
<td>Engine-speed of byte value</td>
<td>N_b</td>
<td>-</td>
<td>Rpm</td>
<td>100ms</td>
</tr>
<tr>
<td>Number of injections</td>
<td>nInj</td>
<td>-</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Raw engine speed</td>
<td>Nraw</td>
<td>-</td>
<td>Rpm</td>
<td>20ms</td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>Pam</td>
<td>-</td>
<td>hPa</td>
<td>100ms</td>
</tr>
<tr>
<td>Intake air temperature</td>
<td>Ta</td>
<td>-</td>
<td>DegC</td>
<td>100ms</td>
</tr>
<tr>
<td>Fuel Pulse Width #1</td>
<td>dInj0</td>
<td>-</td>
<td>ms</td>
<td>Syn</td>
</tr>
<tr>
<td>Engine temperature</td>
<td>Tm</td>
<td>-</td>
<td>DegC</td>
<td>100ms</td>
</tr>
<tr>
<td>Engine temperature when start</td>
<td>TmSta</td>
<td>-</td>
<td>DegC</td>
<td>100ms</td>
</tr>
<tr>
<td>Throttle Position Sensor</td>
<td>Tps</td>
<td>-</td>
<td>%</td>
<td>20ms</td>
</tr>
<tr>
<td>Voltage of battery</td>
<td>UbAdc</td>
<td>-</td>
<td>V</td>
<td>20ms</td>
</tr>
</tbody>
</table>
Note: You can change and manage the alias of all variables at the same time

**Go to menu->Advanced->Alias Mange**, when you finish it, please click “OK”.

---

EcoCAL User Manual for EFI-V1.7
5.1.4 Window setting
You also can change the name of different window in different layers, for example, the name of following window is “Desired lambda /AFR”, now we change it to be “Desired lambda from customer”

Right click on the window, and choose “Window Properties”
A little window pop-up, change the stock words to be “Desired lambda from customer”, and then click “OK”.

![Window Property](image1)

![Window Property](image2)
Then, the name of window is changed as you want.

Note: the method to change other windows is the same.

5.1.5 Fit window and grid
Right click on the window, click “Fit Window”,

<table>
<thead>
<tr>
<th>X/Y</th>
<th>500.00</th>
<th>800.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30.00</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>-20.00</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>-10.00</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>0.00</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>10.00</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>20.00</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>30.00</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>40.00</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>50.00</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>60.00</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>70.00</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>90.00</td>
<td>135</td>
<td>135</td>
</tr>
<tr>
<td>98.75</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>110.00</td>
<td>145</td>
<td>145</td>
</tr>
<tr>
<td>125.00</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>
Then the width of grid the can be adjusted, according to the width of window,
Right click on the window, click “Fit Grid”, the width of cells will be adjusted, according to the content-length.
Then the width of grid the can be adjusted, according to the width of window,

5.1.6 Smooth Cells

This function is designed just for curve type variable, the function do not support map type now. The function is that you can set a maximum valve and a minimum, then make all other valves move into the section. The detail operation is like this:

Set a maximum and a minimum:
Select this section, then right click on the window, select “Smooth Cells”:
You can see the data which will be adjusted smoothly in this section, as below.

5.1.7 Save configuration

When you re-set the window by using above methods, you can save the settings as one new configuration, so you can save it, and use it when you want.

Go to menu->File->Save Configuration
Then, name the new configuration file, “customer”, and then click “Save”.

You also can save the setting based on the current loading configuration.

**Go to menu->File->Save Configuration as**

5.1.8 Reset default configuration
If you don’t want to use the page configuration setting after you change much, you can use this to reset to be default configuration of EcoCAL.

**Go to menu->File->Default configuration Reset**

Then, click “Yes

The current setting is the default configuration setting.

**5.1.9 Load configuration**

Sometimes, we will send the page configuration based on your custom EFI system for your tuning purpose. So you can load the configuration.

You also can load the configuration that you saved.
Go to menu->File->Load configuration

Choose the configuration file then click “Open”.

![Image of configuration selection]

![Image of file selection]

5.1.10 Language Setting

The user can select "Settings → Language", then select the language you want.

Note: click “English” to get the English interface;

click “Chinese” to get the Chinese interface;

5.1.11 “Show”/“Hide” Default List

The shown effect of Hide list:
You also can load the configuration that you saved.

**Go to menu->Settings->List->Show**

The shown effect of this list:
5.2 Diagnostics

5.2.1 Read the DTC of EFI

When you connect ECU to laptop successfully, you can run the diagnostics window to read the DTC, if there is something wrong, you can see the message in the diagnostics window.

**Note**: The diagnostics window only wills pop-up when the ECU is connected. If the ECU is not connected, you can’t click the button to pop-p the window.

**Go to menu->Diagnostics->ECU Diagnostics**
Click Read DTC, if all are right, the message will be “Working Properly”.

If there is something wrong in EFI, the fault message will be shown; you need to check the part of EFI.

<table>
<thead>
<tr>
<th>Component</th>
<th>DTC Code (HEX)</th>
<th>Error</th>
<th>Whether the error has been healed</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP</td>
<td>0108</td>
<td>Max error;</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>TPS</td>
<td>0208</td>
<td>Max error;</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>CKP</td>
<td>0302</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>IAT</td>
<td>0402</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>ECT</td>
<td>0502</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Battery</td>
<td>0602</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>O2 sensor1</td>
<td>0800</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>O2 sensor2</td>
<td>0900</td>
<td>Working Properly</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

If you have fixed the issue, you can click “Clear DTC” to clear DTC code.

Click “Exit” to exit the Diagnostic window.

**5.2.2 Failed to connect to ECU**

If you can’t connect to ECU, please do following steps to fix it.

1. Is the ECU power is ON? (The fuel pump will run for a few seconds when you key-on).
2. Do you have the latest and greatest EcoCAL version?
3. If you are running EcoCAL in Win Vista, have you set EcoCAL in "Win XP compatibility" mode? (Refer to the manual on how to do that).
4. Are you connecting the computer to the ECU via a built-in COM port or USB adaptor?

5. If you use a built-in COM port of the computer, please go to "setting → communication settings" and select COM port.

6. If you use an USB adaptor, is it made by ECOTRONS? If yes, you need to go to "Setting → communication settings" and select USB.

7. If you use an USB adaptor from a third party, you need to select COM port and manually set the COM port number.

How to manually set the COM port:

1) Find out the virtual COM port # from USB to RS232 converter, by going to "My Computer", right click and select "Manage".
2) Then click “Device Manager” tab.

3) You will get the below window:
4) Find the virtual COM port #, and write it down. Then start the EcoCAL:
5) Go to menu->Settings->Communication settings"; you will get the below window, select the COM port # you wrote down. And "OK".
5.3 Advanced function of EcoCAL

5.3.1 Calibrations Data manager

Go to menu->Advanced->Calibration Data Manger
How to compare and copy files?

1) Open the software "Compare V2.3" first as above method.

2) Open the data file, to click "Browse" for opening file.
First, open the Source file (the file that you want to remain the same calibrated value by yourself)
Second, open the Target file (the file that replaced the some old variables value except your own calibrated value)

Wait for about ten seconds.

**Note:** If the file loaded successfully, lower left corner will pop up message "Analyze Successfully"

3) Copy the date file.
Click the" Copy "button, it will copy the file
Precessing…

Click "OK" button and save the result (a new CAL file).
4) If you want to know whether the copy file is successfully you can compare the source file and the new saved file. Using the above mentioned method to open the "Source file" that your own file and the "Target file" that the new saved file.

To click "Compare", button and save the compare result.
You can see the result through follow method.

![Comparison Result](image)

**Note:** if the result is 0, it means cope file is successfully.

Click "View" button to open the .txt file that just saved.

![File Explorer](image)
If the number is 0, it means copy file successfully, you can use the new saved file to run your bike.

**Message:** also, you can use above method to copy or compare other files.

### 5.3.2 Debug

The Debug window reads the communication data between ECU and EcoCAL.

**Go to menu->Advanced-> Debug**

![Debug Menu](image)
5.3.3 Decimals Display

You can change the number of decimals of the values that are displayed in the variable window and calibration window.

For example:

Right click on the window of calibration variables.
The “Display setup” window pops up,

You can set the decimals, then click OK,
Then, you can see the difference.

5.3.4 Signal/Parameters properties

The detailed properties of the variables (signals and parameter calibrations), can be viewed in the variable property window.
Right click on the variable; choose “Variable Properties”, the properties window will pop up.
Measure variables' properties:

Choose the variable that you want to see, then right click, and choose “Variable Properties”

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>CUR_fCldSta_TmSta</td>
</tr>
<tr>
<td>Alias</td>
<td>Start fuel factor</td>
</tr>
<tr>
<td>Long Identifier</td>
<td>start fuel factor for cold start, depends</td>
</tr>
<tr>
<td>Type</td>
<td>CURVE</td>
</tr>
<tr>
<td>Unit</td>
<td>-</td>
</tr>
<tr>
<td>Record Type</td>
<td>UBYTE</td>
</tr>
<tr>
<td>Lower Limit</td>
<td>0</td>
</tr>
<tr>
<td>Upper Limit</td>
<td>63.75</td>
</tr>
<tr>
<td>X-Axis Points</td>
<td>BP_fCldSta_TmSta</td>
</tr>
<tr>
<td>X-Axis Reference to Input</td>
<td>TmSta</td>
</tr>
<tr>
<td>X_Point Description</td>
<td>&quot;break points, engine temperature at sta</td>
</tr>
<tr>
<td>Memory Address</td>
<td>0x4179</td>
</tr>
<tr>
<td>Conversion Method</td>
<td>COMPU_METHOD_8</td>
</tr>
<tr>
<td>Conversion Formula</td>
<td>&quot;Q = *4.000000&quot;</td>
</tr>
</tbody>
</table>
### Measurements

<table>
<thead>
<tr>
<th>Alias</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine-start end</td>
<td>B_StaEnd</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Altitude factor</td>
<td>fAlt</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Start fuel factor</td>
<td>fFISta</td>
<td></td>
<td></td>
<td>100ms</td>
</tr>
<tr>
<td>Pre-control fuel factor</td>
<td>fPreCti</td>
<td></td>
<td></td>
<td>Syn</td>
</tr>
<tr>
<td>Lambda</td>
<td>LamWO2</td>
<td></td>
<td></td>
<td>Syn</td>
</tr>
<tr>
<td>Load</td>
<td>Ld</td>
<td>%</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Predicted Load</td>
<td>LdPrd</td>
<td>%</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Engine Speed</td>
<td>N</td>
<td>Rpm</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Engine-speed of byte value</td>
<td>N_b</td>
<td>Rpm</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Number of injections</td>
<td>nInj</td>
<td></td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Raw engine speed</td>
<td>Nraw</td>
<td>Rpm</td>
<td>20ms</td>
<td></td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>Pamb</td>
<td>hPa</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Intake air temperature</td>
<td>Ta</td>
<td>DegC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Pulse Width #1</td>
<td>tInj0</td>
<td>ms</td>
<td>Syn</td>
<td></td>
</tr>
<tr>
<td>Engine temperature</td>
<td>Tm</td>
<td>DegC</td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td>Engine temperature when start</td>
<td>TmSta</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Throttle Position Sensor</td>
<td>Tps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery voltage from ADC channel</td>
<td>UbADC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Add Measurements**
- **Change Alias**
- **Hide Alias Column**
- **Variable properties**
- **Window Properties**
5.3.5 Virtual Oscilloscope

1) **Right click on the blank area of window, click “Add Measurements->New Oscilloscope Window”**
You also can go to menu->Variables->Add Measurements->New Oscilloscope Window", to add the oscilloscope window.

Note: You only can add one Oscilloscope in each layer.

2) Add the measured variables that you want to show in the Oscilloscope window, here, we add the “Tps”, “N”, “uMap”, “UbAda” variables as example.
3) Click “OK”, the Scope will pop up.

4) Connect to ECU, and start measuring, you can see the signal of variables.
5) You can add or delete the variable that you choose

Right click on the scope window, and then add or delete the variables that you want.

Note: when you add the variable, you should stop measuring first.

6) You also can change the properties of scope window.
Right click on the scope window, and then click “Window Properties”. You can change the Max/Min value of variable, the lines color, etc. Click “OK” when finished.

5.3.6 Gauge monitoring

You can use this function to monitor the Gauge window of calibration data.

You can select "Variables → Add Measurements → New Gauge Window" or right click on the table, then choose “New Gauge Window”, then you can see the gauge window as below.
Add the measured variables that you want to show in the Gauge window, here, we select the “uLam”, “uLsb”, “uMap” variables as example.

You can add or delete the variable that you choose

Right click on the Gauge window, and then add or delete the variables that you want.
You also can change the value of variable.

Right click on the Gauge window, and then click “Change Max/Min Value”. You can change the Max/ Min value of variable, the Scale Num, etc. Click “OK” when finished.
5.3.7 3D/2D view of maps
You can use this function to see the graph of calibration tables.

Right click on the table, then choose “3D View” or “2D View”, then you can see the graph.

You can use this function to check the table whether is smooth. If it is not smooth, you need to smooth the value of table.
“2D View” window also supports calibration-graph function. You can use mouse to drag one of the points to revise calibration value. You can operate it like the below steps:

Press the point you need without losing, then the mouse gets into the shape of...
the upper and lower arrow. And move the point to your target, then release your mouse, as below.

![Graph](image)

### 5.3.8 Copy/Paste in tables

In EcoCAL, it supports the Copy and Paste function in CUR and MAP tables, the function is the same to Excel. You can copy the part of value then past it into the part of cells.

**For example**

Move the mouse to choose the area of cell you want to copy, then right click, and click “Copy”,

---

Copy rights ECOTRONS LLC  http://www.ecotrons.com
Click the first cell of area you want to paste, then right click and click "Paste"

You can see the values of cells are changed.
5.3.9 Highlight of table cells

When you tune the tables on the fly or you want to know which cell of tables is used, so we add the highlight function, when you add the Input-X and Input-Y variable in measured variables, the cell that used will be highlight.

Example #1:

RAM_MAP_LdTp_Tps, the Input-X is “N”, and the “Input_Y” is “Tps”, so we add the “N” and “Tps” variables in selected variables. When you start measuring, the “N” and “Tps” variables have value, and then the cell of table will be highlight.

Example #2:
CUR_fWmp_Tm, the Input is “Tm”, so we add the “Tm” variable in selected variables.

You can see the highlight cell in the table.

**Note:** If the Input variable of table is not measured, the highlight will be disabled.
5.3.10 EcoCAN

This software EcoCAN is used for CAN bus monitoring and recording CAN data.

Open EcoCAN:

Go to menu->Advanced->EcoCAN
Open .dbc file:

Click the icon ![Folder Icon] to open a .dbc file. On the opened window, select a .dbc file, then click the button “Open”. Shown as below:
When the EcoCAN has loaded a .dbc file, it will look like this:

![Image showing the EcoCAN interface]

**Set up device information:**

1) Click the icon 🔄 to open the setting window.

2) Select a CAN device and configure the correct parameters then click the button “OK”. Shown as below:
The EcoCAN window will show the device which you chose.

Open CAN device:
Click the icon to open device.

If open successfully, the status bar will show green light.

Monitor CAN bus:

When connect successfully and the CAN device has received data, the software interface will show the values of the variables.

Record CAN data:
1) Click the icon \( \bigcirc \) to start record.

2) Click the icon \( \square \) to stop record.

3) The record file is saved in the “record” folder.
Chapter 6 Exit or Uninstall the EcoCAL

6.1 Exit EcoCAL

There are two ways to exit EcoCAL

1) Use the menu to exit the EcoCAL

   **Go to menu->File->Exit**

2) Close the EcoCAL directly on the upper right corner
Note: If you have done some tuning and change, and you don’t save it, the “Exit EcoCAL” warning window will pop-up, please choose “Yes” or “No” or “Cancel” based on your demand.

6.2 Uninstall the EcoCAL

If you want to uninstall the EcoCAL, please click:
Start->All Programs->EcoCAL->Uninstall EcoCAL.