



BINARY EDITOR

GETTING STARTED

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MODIFICATIONS TO THE DOCUMENT

REV	DATE	SECTION	MODIFICATION
A	12-AUG-09	ALL	Initial Release

1 INTRODUCTION

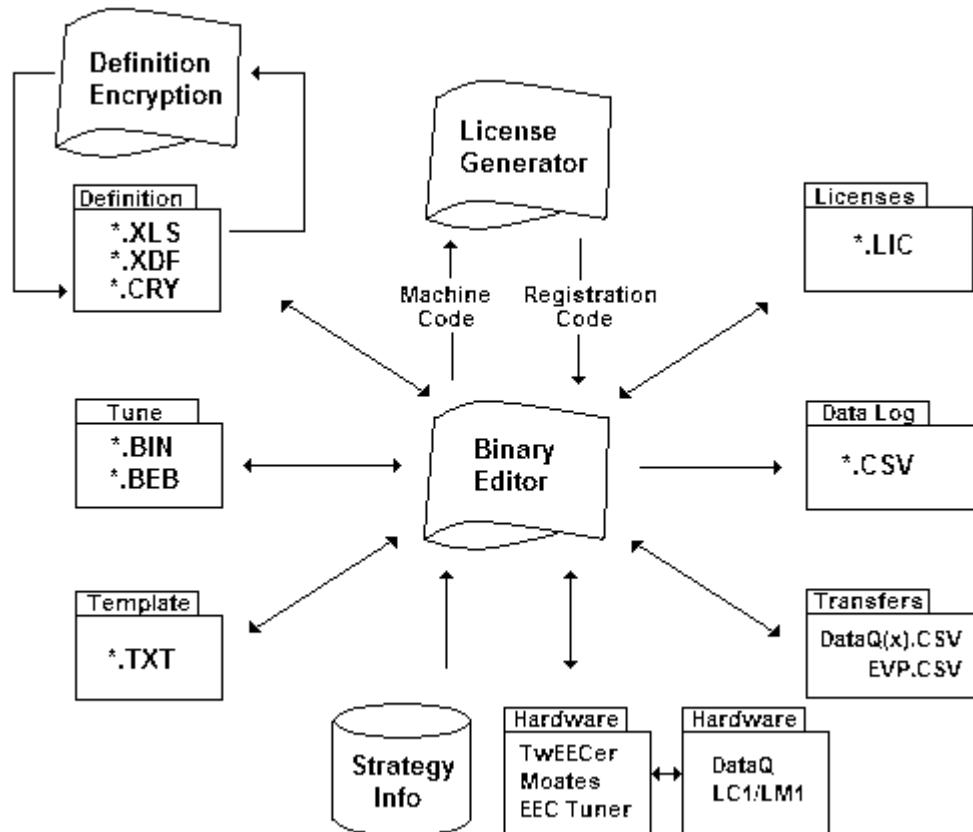
Binary Editor also known as BE is a tool that allows you to tune and or log data from the Ford Electronic Engine Control Computer (EEC). Some of the key features as listed below.

- Build and edit tune files (aka Binaries).
- Build and edit definition files (aka Strategies).
- Supports multiple hardware types ie Moates, TwEECer, EEC Tuner, Drew Technologies, ELM 327, ELM 320.
- Comparing of tunes
- Logging of key parameters in real time
- To see a full block diagram of the BE and the supported files see the diagram in section 1.2.

1.1 SCOPE

Welcome to the world of tuning. This document will help you get started using the Binary Editor also known as BE. Below are a few topics that will aid in the installation and setup of the software and hardware.

1.2 STRUCTURE



1.3 DEFINITIONS

1.3.1 EEC

The Ford Electronic Engine Control module also known as EEC or ECM or PCM

1.3.2 Strategy, Definition

The strategy and or definition are the part of the code within the EEC that defines what and how the EEC operates. The strategy defines where all of the parameters will reside within the EEC's memory (Memory Map).

1.3.3 Catch Code, Tare Tag, Binary, Tune, Calibration

Ford EEC's have two parts to the software. The first part is known as the Strategy (AKA Definition) which tells the EEC where the memory locations are (Memory Map) and how to perform calculations (The algorithms that perform engine control). An example of a strategy is GUFB.

The second part of the software is known as the calibration (AKA catch code, tune, tare tag and or binary). The calibration is the raw data that gives the strategy its inputs for calculations. The idle set point and spark tables are an example of the data within the calibration. An Example of the calibration code is A9L.

2 INSTALLING

2.1 SOFTWARE

Before installing the Binary Editor make sure that Microsoft Dot Net framework 2.0 or greater is installed. If you are using a Microsoft Windows based system that is older than Windows 2000 then make sure to also install Microsoft Windows Management Information also known as WMI. After all prerequisite are installed then download and install the Binary Editor from the following web site www.EECAnalyzer.net. Once installed, start the application while still connected to the internet. If Binary Editor informs you that there are updates, then allow Binary Editor to download the updates and install them for you. Binary Editor may also inform, you that there are new Definition files available for download. Allow Binary Editor to download the files. The definition files will be downloaded to the following Directory "C:\Program Files\Binary Editor\DEF". Definition files are the files that tell Binary Editor where and how to present the vehicle information to you.

2.2 HARDWARE

Before installing any drivers make sure Binary Editor is installed first. If you are using a Microsoft Windows based PC, plug in the hardware device. If Microsoft Windows prompts you for the location of the newly inserted device then look at the following table to determine the location of the drivers for a given piece of hardware:

2.2.1 . Links

Manufacture	Product	Driver Location	Comments	
Moates	Quarterhorse	"C:\Program Files\Binary Editor\Drivers\		
	Ostrich			
	F3			
	Burn2			
	Jaybird			
STKR	TwEECer	"C:\Program Files\Binary Editor\Drivers\TwEECer\		
	TwEECer RT			
Drew Technologies	Mongoose	http://www.drewtech.com/products/mongoose.html		
Scan Tools	ELM320	www.ScanTools.net		
	ELM327			
	ELM5			
DataQ	RS194	www.DataQ.com	Install WinDaq/Lite	
	DI148			
	DI158			

Once the drivers are installed make sure to unplug the device and plug it back in. This will reset the newly added driver to its default settings.

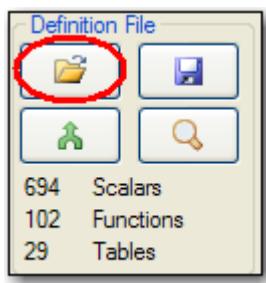
3 USING BINARY EDITOR

3.1 STARTUP

Each time Binary Editor is started, it will automatically check the internet for updates to the application and or definition files. Once Binary Editor is open and all updates are applied, you can begin configuring Binary Editor. At this point you need to know what vehicle processor catch code you have and what strategy (AKA Definition file) it belongs too. The Catch code is located on the 60 pin connector or the 108 pin connector on the Ford EEC. The catch code will be a 3 or 4 alpha numeric phrase like A9L or DDX3. You can also use <http://www.tweecer.com/ccode/> to help in determining the strategy and catch code for a given vehicle. Once the catch code and strategy are known, you can configure Binary Editor for the specific vehicle.

3.2 DEFINITION FILE

Start by opening the definition file (aka strategy file) by pressing the open button in the Definition File group. Browse to the “C:\Program Files\Binary Editor\DEF\...” and locate the strategy that your vehicle is associated with. As an example you can open the GUFB folder and then open the GUFB.xls file.



At this point Binary Editor will have the definition file loaded and you will see a list of parameters but with no values. In the lower left corner of the status bar you will see what definition file is loaded. If you double click the name GUFB.XLS then the details for that definition file will show. **Note** not all definition files have this information filled out. As definitions files are updated the details will be updated too.

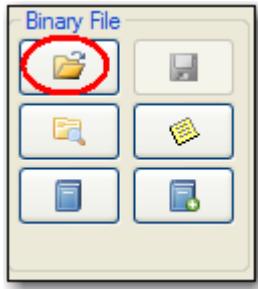


The definition files can be modified by opening the definition file in Microsoft Excel and making changes.

There are a couple of key things to remember when creating a definition file within excel. The column names must not be changed. The MAF Transfer parameter name must be “MAF Transfer” in order for the import and export of the MAF to be possible. Use the file “” for a template. It is located in the root directory of \...\BinaryEditor\DEF\Definition_Template.XLS

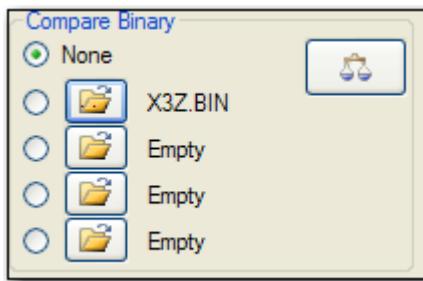
3.3 TUNE FILE

Now open a tune file (aka binary file) by pressing the open button in the Binary File group. The binary file is the actual tune the vehicle runs off of. As an example you can open the A9L.BIN file located at "C:\Program Files\Binary Editor\DEF\GUFB\".



3.4 COMPARING TUNES

Binary Editor allows four binaries to be loaded for comparison. Only one of the loaded binaries at a time can be compared against the base binary. The Base Binary is the tune that is loaded for edit. To open a base binary see section 3.3. The compare binaries are loaded by pressing one of the four buttons under the "Compare Binary" group on the bottom navigation bar. When the compare binary is loaded the name of the file will be displayed next to the associated button. When the check box next to the associated button is selected, Binary Editor will display the compare binary next to the base binary. This will populate the "Value2" column on the Scalars tab and the 3rd and 4th columns on the Functions tab and the bottom table on the Tables tab. The cells associated with the compare binary are editable but cannot be saved. This allows you to cut and copy from one binary to another. If you have multiple compare files loaded you can toggle between them using the hot keys associated with the compare binary. The hot keys are CTRL + x [x = 1-4].



3.5 SETTINGS

3.5.1 Fuel

Now move to the settings tab. Make sure to set the AFR to the type of fuel you are running. Most cases this is 14.64, but it is becoming more common to see ethanol blends like E10, which has an AFR of 14.08. Now determine how you want Binary Editor to display fuel, either AFR or LAMBDA. If you are running a Supercharger or turbo then set the Brake Specific Fuel Consumption (BSFC) to 0.66 otherwise leave it at 0.45. The BSFC is what Binary Editor uses to horsepower and torque. The AFR is used to calculate miles per gallon (MPG). Not all definition files support displaying LAMBDA but as the definition files are updated they will support LAMBDA or AFR.

Fuel Type	AFR
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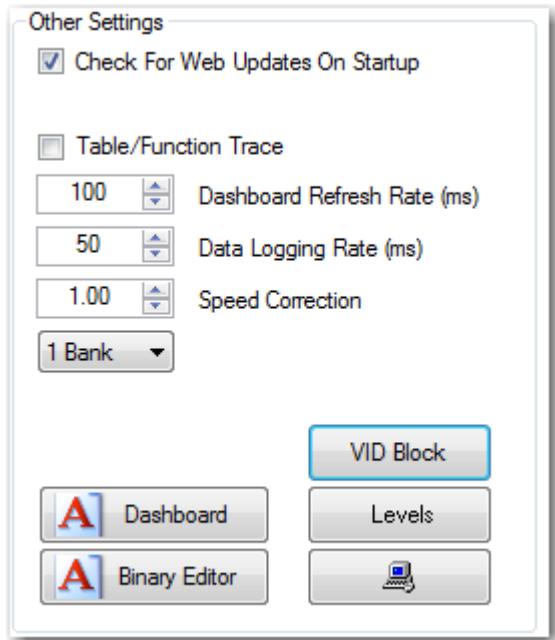
Gasoline	= 14.64
E5	= 14.35
E10	= 14.08
E15	= 13.79
E20	= 13.49
E30	= 12.92
E40	= 12.34
E50	= 11.77
E60	= 11.20
E85	= 9.76
E100	= 9.00
VP C16	= 14.77
LPG (Propane)	= 15.50
CNG	= 17.20
Methanol	= 6.40

Fuel

14.64	<input type="button" value="▲"/>	<input checked="" type="radio"/> AFR	<input type="radio"/> LAMBDA
6.15	<input type="button" value="▲"/>	Fuel Weight	
0.45	<input type="button" value="▲"/>	BSFC	

3.5.2 Other Settings

The next part is setting the Other Options. Determine if you want Binary Editor to check for updates when it starts. The “table/function tracing” is for real time logging. When enabled, the tables and functions will indicate the active cell that the EEC is using. If your speedometer is accurate then leave the “Speed Correction” set to 1 otherwise set it according to how far the speedometer is off. For example if the speedometer is off by 10% then set the “Speed Correction” to 1.10. Each tune is divided into banks. Each bank uses 56k of memory. Binary Editor will automatically detect the size of your tune. Use windows explorer and locate your tune. Look at the file size of your tune and it will either be a 56k (1 Bank), 112k (2 Bank) or a 256K (4 bank tune). The Vehicle Identification Block (VID) is a specific memory range in the 2 and 4 bank tunes. This VID block contains information like the VIN number, Axel Ratio and Ignition Key Security called PATS information. Each parameter in the tune belongs to a visible level. You can choose which levels you want BE to display. By default all levels are selected. At this point you can set the fonts of the dashboard and or fonts for Binary Editor in general.



3.5.3 Checksum

The checksum is Fords way of detecting if a change has been made to a tune. The Checksum is a mathematical addition of all parameters within a tune. When the EEC is powered up it goes through a self test and calculates a checksum. It then compares this checksum to a stored value in memory. If both values match then the tune is good. If the checksum does not match, then the tune is assumed to be bad and a check engine light may illuminate. The starting and ending addresses are the range in which the EEC adds all parameter values to come up with the checksum. The result is then compared to the value displayed in the ROM PID.

Checksum				
Bank 0	Bank 1	Bank 8	Bank 9	
22000	12000	2000	32000	Starting
2FFFF	1FFFF	9FFF	3FFFF	Ending
ROM	Store Checksum at PID			
<input type="checkbox"/> Store Checksum When Saved				
<input type="button" value="Apply Now"/>				

4 FEATURES

4.1 SHORTCUTS

Below is a list of the shortcuts excluding the function and table charts.

4.1.1 Tables, Functions, and Scalars

ALT + A = Add the entered value to all selected cells
ALT + D = Divide the entered value by all selected cells
ALT + M = Multiply the entered value by all selected cells
ALT + S = Subtract the entered value from all selected cells
ALT + T = Sets all selected cell to the user entered value
CTRL + A = Selects All
CTRL + C = Copy selected cells into the clipboard
CTRL + P = Forces the all of the connected USB devices to reload
CTRL + V = Paste from the clipboard
CTRL + Z = Set all selected cell to the original values

4.1.2 Compare Binaries

CTRL + 0 = Turns off all compare binaries
CTRL + 1 = Set the compare binary to position 1
CTRL + 2 = Set the compare binary to position 2
CTRL + 3 = Set the compare binary to position 3
CTRL + 4 = Set the compare binary to position 4

4.1.3 Global

ALT + H = Help
CTRL + D = Binary Difference
CTRL + E = Explore Binary
CTRL + F = Find
CTRL + O = Load Binary
CTRL + Q = Show Moates Quaterhorse Configuration
CTRL + R = Display Revision Information
CTRL + S = Save Binary

4.1.4 Data logging

CTRL = Toggle the data log marking value

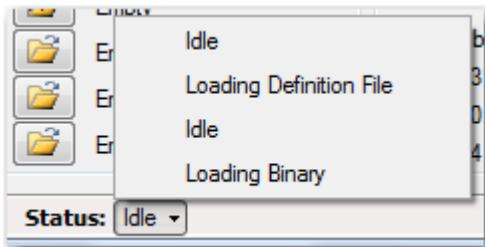
4.2 COLLAPSEABLE PANELS

There are a few different collapsible panels within Binary Editor. If you click on the area shown below in red, the panel will collapse or expand depending on its previous state. The panels can be resized by clicking and dragging the border of the panel just outside of the area between the arrows in blue.



4.3 STATUS BAR

The status bar will give you information on the status of the BE and what files are loaded. The status of the last action is also visible. If the status is red, then an error has occurred. You can view the last 16 events in the drop down list. If you would like to clear the list then double click on the word "Status:" in the status bar and the list will be cleared.



4.4 TABLE LINKS (NORMALIZERS)

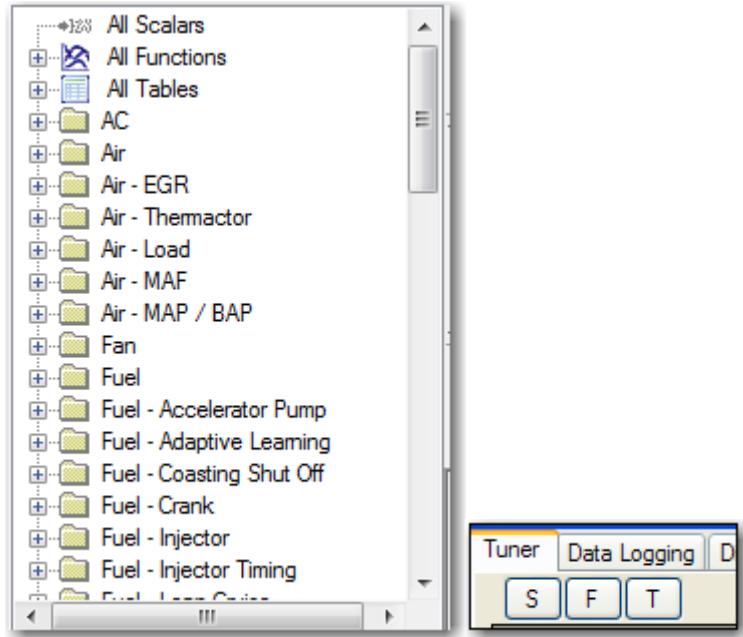
In the screen shot below, the FN070 and FN071 are hyperlinks to the functions that define the table axis headers. These are commonly referred to as normalizers. If clicked, a popup screen will list all tables that use the same normalizer and it will also list one function that defines the normalizer itself.

A screenshot of the EEC Analyzer showing a table titled 'Air - EGR Altitude'. The table has a header row with columns for RPM (500.00, 700.00, 900.00, 1100.00) and a data row for 75.00. To the left of the table, there are two blue hyperlinks: 'FN070' above the table and 'FN071' below it, next to a 'Load' button. The table data is as follows:

	500.00	700.00	900.00	1100.00
▶ 75.00	0.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	4.00
40.00	0.00	0.00	0.00	7.00
30.00	0.00	0.00	0.00	5.00
...

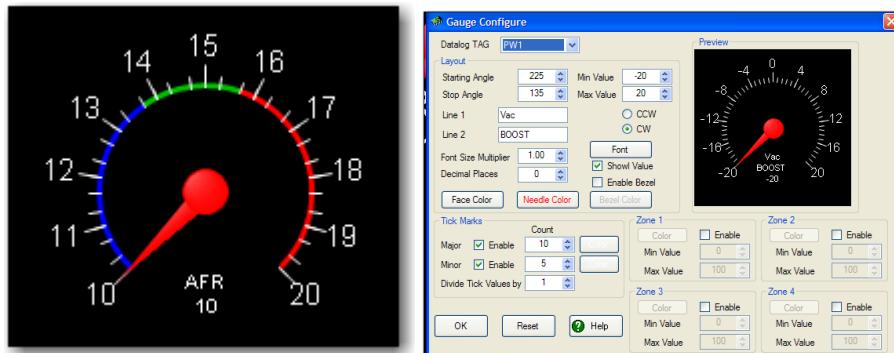
4.5 TREE VIEW

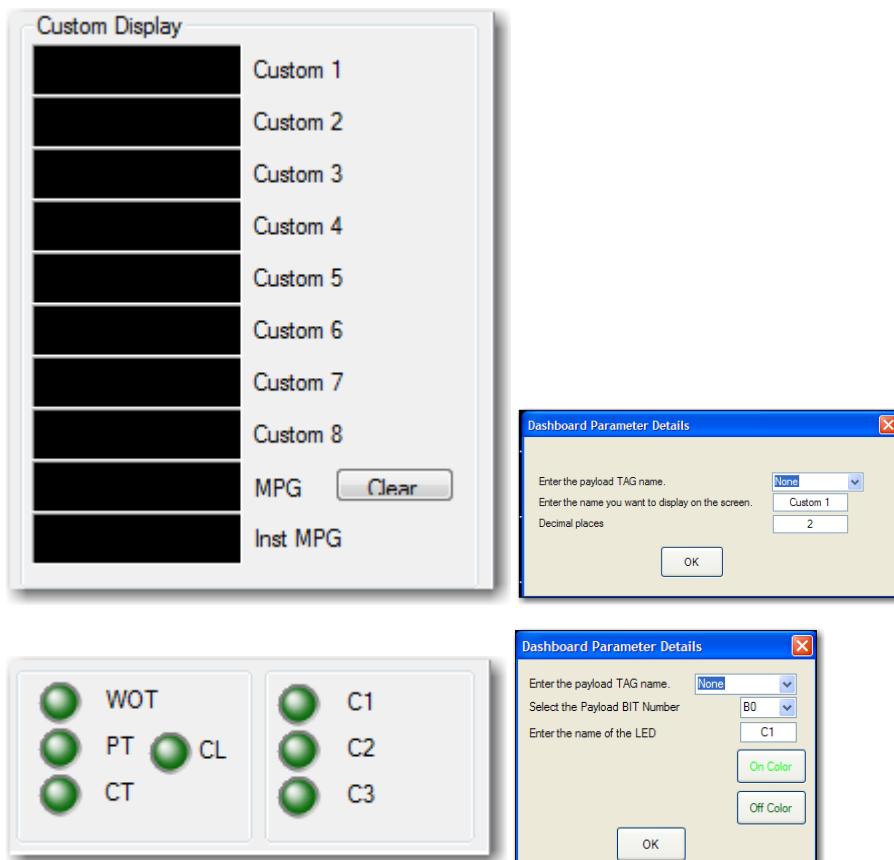
The tree view categorizes the parameters by their associated LEVELs. Some parameters may belong to two levels. If the tree view is collapsed then three buttons along the top will appear. These three buttons are shortcuts to the Scalars, Functions, and Tables.



4.6 GUAGES

The bottom three gauges on the analog dashboard can be resized and or moved. To move the gauge, left click and move the mouse. To resize the gauge, right click and move the mouse. To configure the gauge, double click. Some of the Digital and LEDs can also be configured by double clicking, but they can not be moved.

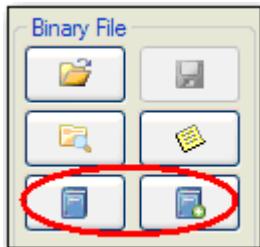




4.7 TEMPLATES

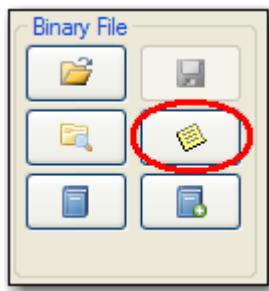
Binary Editor can load pre defined values for things like new injectors, long tube header, boosted spark and fuel tables into the base binary at the touch of a button. Opening a template file will modify the base tune with the contents in the template file. This is a fast and easy way to take a stock tune and modify it for a particular fuel injector size and or some other common modification.

Binary Editor can also create templates once you find a good combination of parameters for a given engine modification. For example you could take a stock tune and add different injectors, MAF and fuel and spark tables for a supercharger and then export it to a template. These templates may help other get base tunes up and running or if you are a professional tuner you could use these templates over and over again for different vehicles. The load and save template buttons are the lower left and right buttons in the Binary File group.



4.8 TUNE INFO

Binary Editor can try to identify the base binary catch code and which definition file (strategy) it is associated with. If the tune is a 4 bank tune, other information maybe available. To identify the tune make sure it is loaded and then press the Information button (middle right) in the Binary File group.

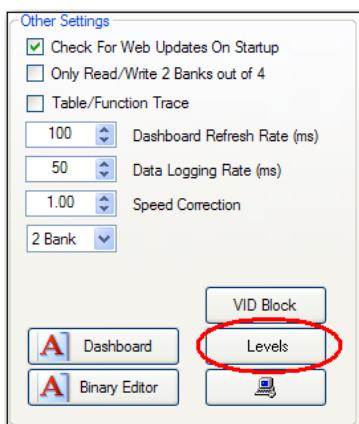


4.9 COLORS

If the current cell has a yellow background then the cells value is lower than the original. If the current cell has an Orange background then the cells value is greater than the original. The original value can be displayed if you let the mouse hover over the cell. This is also known as the tool tip. The tool tip will always display the original value. If the cell has a red background then the cell has an invalid value. This means that the data entered in the cell is not numeric. If the compare binary option is checked and the compare cell has a yellow background then the compare cell is different from the editable binary.

4.10 LEVEL

The level option is a way to narrow down the viewable parameters. See the "Definition Files" help file for more details on defining levels. You can choose which levels to display by going to the settings tab and pressing the levels button.



Now select the desired levels and press ok.

Level	Description	Visible	Level	Description	Visible	Level	Description	Visible
1.00	AC	<input checked="" type="checkbox"/>	7.90	Fuel - Transient	<input checked="" type="checkbox"/>	16.40	System - Scaling	<input checked="" type="checkbox"/>
2.00	Air	<input checked="" type="checkbox"/>	8.00	Idle	<input checked="" type="checkbox"/>	16.20	System - Tests	<input checked="" type="checkbox"/>
2.10	Air - EGR	<input checked="" type="checkbox"/>	8.10	Idle - Dashpot	<input checked="" type="checkbox"/>	17.00	Temp	<input checked="" type="checkbox"/>
2.60	Air - Thermistor	<input checked="" type="checkbox"/>	8.20	Idle - ISC	<input checked="" type="checkbox"/>	17.10	Temp - Ambient	<input checked="" type="checkbox"/>
2.30	Air - Load	<input checked="" type="checkbox"/>	9.00	Knock Sensor	<input checked="" type="checkbox"/>	17.20	Temp - Exhaust	<input checked="" type="checkbox"/>
2.40	Air - MAF	<input checked="" type="checkbox"/>	10.00	Misc	<input checked="" type="checkbox"/>	17.30	Temp - Oil Temp Limit	<input checked="" type="checkbox"/>
2.50	Air - MAP / BAP	<input checked="" type="checkbox"/>	11.00	O2 / HEGO	<input checked="" type="checkbox"/>	19.00	TPS	<input checked="" type="checkbox"/>
4.00	Fan	<input checked="" type="checkbox"/>	11.10	O2 Sensor	<input checked="" type="checkbox"/>	20.00	Trans	<input checked="" type="checkbox"/>
7.00	Fuel	<input checked="" type="checkbox"/>	11.20	O2 Sensor (Rear)	<input checked="" type="checkbox"/>	20.10	Trans - Dashpot	<input checked="" type="checkbox"/>
7.10	Fuel - Accelerator Pump	<input checked="" type="checkbox"/>	12.00	RPM	<input checked="" type="checkbox"/>	20.20	Trans - Engagement	<input checked="" type="checkbox"/>
7.20	Fuel - Adaptive Learning	<input checked="" type="checkbox"/>	12.10	RPM - Rev / Speed Limiter	<input checked="" type="checkbox"/>	20.31	Trans - Gear Ratio (Auto)	<input checked="" type="checkbox"/>
7.30	Fuel - Coasting Shut Off	<input checked="" type="checkbox"/>	13.00	Security	<input checked="" type="checkbox"/>	20.32	Trans - Gear Ratio (Manual)	<input checked="" type="checkbox"/>
7.40	Fuel - Crank	<input checked="" type="checkbox"/>	14.00	Spark	<input checked="" type="checkbox"/>	20.33	Trans - Gear Timing	<input checked="" type="checkbox"/>
7.51	Fuel - Injector	<input checked="" type="checkbox"/>	14.10	Spark - Adder	<input checked="" type="checkbox"/>	20.40	Trans - Manual Shifts	<input checked="" type="checkbox"/>
7.52	Fuel - Injector Timing	<input checked="" type="checkbox"/>	14.20	Spark - Multiplier	<input checked="" type="checkbox"/>	20.50	Trans - Pressure	<input checked="" type="checkbox"/>
7.60	Fuel - Lean Cruise	<input checked="" type="checkbox"/>	14.30	Spark - Subtractor	<input checked="" type="checkbox"/>	20.61	Trans - TC Lock Schedule	<input checked="" type="checkbox"/>
7.70	Fuel - Open/Closed Loop	<input checked="" type="checkbox"/>	15.00	Speed	<input checked="" type="checkbox"/>	20.62	Trans - TC Lock Up Rate	<input checked="" type="checkbox"/>
7.80	Fuel - Pump	<input checked="" type="checkbox"/>	16.00	System	<input checked="" type="checkbox"/>	20.63	Trans - TC Misc Stuff	<input checked="" type="checkbox"/>
7.81	Fuel - Pump Returnless	<input checked="" type="checkbox"/>	16.30	System - Error Codes	<input checked="" type="checkbox"/>	20.70	Trans - Torque Limit / Reduction	<input checked="" type="checkbox"/>
7.82	Fuel - Pump Two Speed	<input checked="" type="checkbox"/>	16.10	System - Hardware Enable	<input checked="" type="checkbox"/>	25.00	Variable Cam	<input checked="" type="checkbox"/>

4.11 READ / WRITE / FORD

These buttons will allow the user to read and write from the hardware. They will also allow the user to read the factory Ford binary on some select hardware. Binary Editor will auto detect the bank size of the tune when opened or read from the EEC. The number Banks is in reference to the number of memory banks within the EEC processor. The following is a list of the banks for the given years of vehicles.

- 1986 - 1995 Use a 1 bank tune which are 56k in size
- 1996 - 1998 Use a 2 bank tune which are 112k in size
- 1999 – 200x Use a 4 Bank tune which is either 216k or 224k in size

The status bar will show all activity. If the status bar text is red for any reason, then an error has been detected. The user can click on the drop down in the status bar to find out the details of the past activities. The red actions are events that have failed. The action list will store the past 16 events.

