

**VCM**  
**SUITE**

**USER  
GUIDE**

## REVISION HISTORY

Date	Revisions
June 2022	Initial Release
September 2022	Updated for MPVI3 and added instructions for selecting language.

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# INTRODUCTION

VCM Suite is a comprehensive tuning tool that allows performance tuning and diagnostics, whether you want to increase the fuel economy of your daily driver or maximize your performance on the race track.

The suite has two components:

- **VCM Editor** allows users to adjust many of the parameters that control the operation of the engine and transmission.
- **VCM Scanner** allows users to monitor, log, and review key data that provides insight into the effectiveness of the vehicle's current tune. With such insight, a skilled tuner can return to VCM Editor and further refine the tune.

This guide covers the use of VCM Editor.

## WHAT'S NEW IN VCM EDITOR?

Recent changes to VCM Editor are listed below.

### VCM EDITOR 5.0

#### GENERAL

- MPVI3 and RTD gen 3. VCM Scanner now supports our latest generation of interface devices.
- Multi-language support. It's a work in progress, but we have begun to translate portions of the VCM Suite user interface. See *Selecting the Displayed Language* (Page 20) for more information.

#### VEHICLE SUPPORT

Added support for:

- 2007-2018 Audi TT 2.0 TFSI
- 2007-2020 Audi TTS 2.0 TFSI

## GETTING STARTED WITH VCM EDITOR

1. It is recommended you have the following before you begin using VCM Editor:

- An account on hptuners.com.
- An interface device from HP Tuners that has been registered.
- An understanding how VCM Suite licenses system vehicles and of the HP Tuners credit system.



**NOTE:** For detailed explanations of all of these topics (and more), see the [VCM Suite Getting Started Guide](#).



**NOTE:** Certain vehicles may require modifications to their VCM or special cables to allow reading and writing of tuning files. See [Manufacturer Locked Control Modules \(Page 24\)](#).

2. When you are ready to begin tuning, ALWAYS check the vehicle for diagnostic trouble codes (DTCs) before you do anything else. If there is a mechanical issue with the vehicle, it may affect performance and any performance data you want to monitor could be impacted. This makes it very difficult to tune the vehicle effectively.



**IMPORTANT:** Reading a vehicle will clear all DTCs, resulting in the loss of the troubleshooting information they contain. DO NOT proceed to the next step until you have resolved as many DTCs as possible and made note of those issues that cannot be resolved.

3. Once you have resolved as many DTCs as possible, the next step is usually to read of the vehicle's current sensor output using VCM Scanner. Obtaining this "data log" will often provide valuable information in understanding the vehicle's current behavior.

4. In VCM Editor, read the current tune of the of the vehicle. See [Reading a Vehicle \(Page 27\)](#) for instructions.

5. Before you do anything else, save this initial read to file (select **File > Save** in the menu bar). If something goes wrong with your tune, you may need to write this back to restore vehicle function.



**CAUTION:** Improperly tuning a vehicle can cause serious engine damage. Do not attempt to make any change to a vehicle's tune without thoroughly researching the potential impacts of the change.

6. Editing a tune file involves modifying the configurable parameters used by the vehicle controllers:
  - a. Locate a parameter you wish to modify. See *Locating Parameters* (Page 31).
  - b. Change the value of the parameter as needed. See *Modifying Parameters* (Page 43).

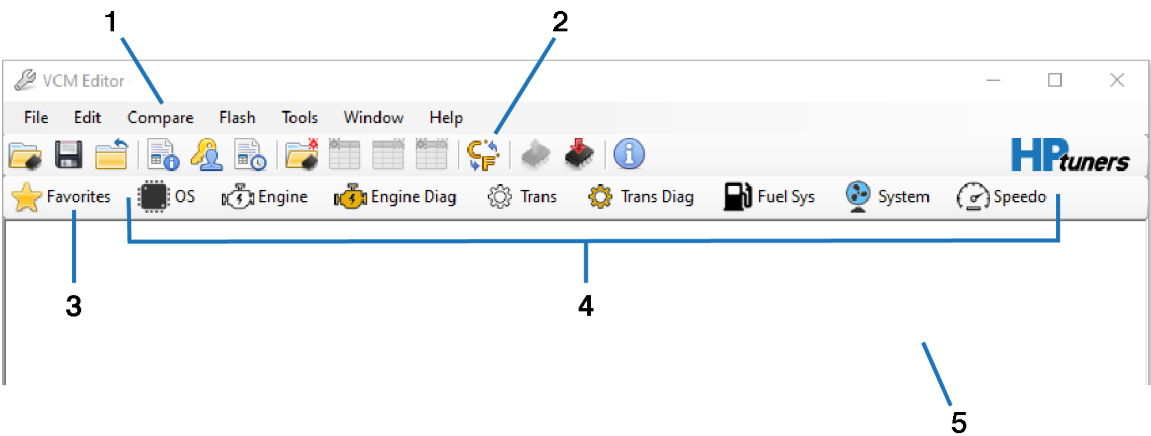


**NOTE:** The color behind the names of parameters you have edited will change. See *Parameter Colors* (Page 47), for more information.

7. Select **File > Save** in the menu bar to save your changes.
8. When you are ready to test your changes, write the modified tune file back to the vehicle. See *Writing Tunes Back to the Vehicle* (Page 129).
9. Use VCM Scanner to check the impact of your changes and verify that all performance and emissions characteristics of the vehicle remain within limits acceptable to the vehicle owner and required by law.
10. Repeat steps 6 through 9 until your desired tuning goals have been met.

# USER INTERFACE

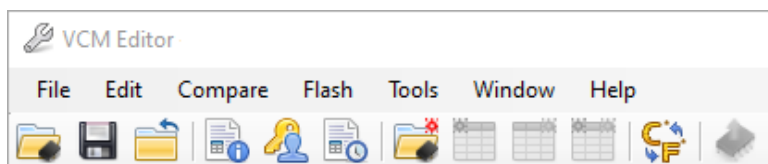
The main window of the VCM Editor interface has the following components:



Item	Description
1.	<b>Menu Bar.</b> See <i>Menu Bar</i> (Page 13) for descriptions of individual menus.
2.	<b>Toolbar.</b> See <i>Main Toolbar</i> (Page 18) for descriptions of individual items.
3.	<b>Favorites Icon.</b> Click to open the Favorites window. See <i>Using Favorites</i> (Page 40).
4.	<b>Tab Navigation Interface (Top Level).</b> Click an icon to browse the parameters in the open tune file. See <i>Tab Style Navigation</i> (Page 32) for details.
5.	<b>Workspace.</b> When you open additional windows in VCM Editor, they appear in this space.



## MENU BAR



VCM Editor's menu bar includes the following menus:

### FILE MENU

Use this menu to open, close, and save tune files you wish to edit.

### EDIT MENU

- **Calibration Details.** Opens the Tune Details window, which contains key information about the vehicle being tuned and its controllers. See *Viewing Tune Details* (Page 123).
- **Remote Tuning.** Opens the Remote Tuning window, which can be used to limit what remote customers can do with tune files you provide them. See *Remote Tuning* (Page 138).
- **View / Change History Logs.** Opens the Tune History window, which can be used to view all changes to the current tune file and to compare the current version of the file to any previously saved version. See *Viewing Tune History* (Page 119).
- **Virtual Volumetric Efficiency.** Certain GM vehicles pack VE data into a form that is difficult to modify in any meaningful way. If you are tuning such a vehicle, you can use this function to unpack the data and edit it in a format similar to a conventional VE table. See *Virtual Volumetric Efficiency* (Page 86).
- **Virtual Torque.** When tuning GM vehicles with Gen 4 and Gen 5 controllers, this option opens the Virtual Torque window, which is used to configure torque management. See *Virtual Torque* (Page 90).

- **Gear/Tire Wizard.** This item appears if the Gear/Tire Wizard can be used with the vehicle being tuned. On supported vehicles, the wizard calibrates the speedometer and scales the transmission tables to adjust for a new gear ratio or tire size. See *The Gear/Tire Wizard* (Page 95).
- **Change VIN Wizard.** This item appears if VCM Editor supports changing the VIN of the vehicle being tuned. See *Changing a Vehicle's VIN* (Page 114).
- **ETC Effective Area Calculator.** When tuning Ford vehicles, this option opens the ETC Effective Area Calculator, which can be used to update the throttle body model used by the engine controller. See *ETC Effective Area Calculator* (Page 93).
- **Torque Inverse Calculator.** When tuning Ford vehicles, this option opens the Torque Inverse Calculator, which can be used when configuring the torque model on Ford vehicles. See *Torque Inverse Calculator* (Page 94).
- **VE Neural Network Trainer.** This item appears if the vehicle being tuned employs neural network technology and the Tuner Tools portal supports training its neural network. See *Neural Network Training* (Page 97).
- **User Defined Parameters.** If you have information on parameters (switches, scalars, and/or tables) that we do not have defined currently in VCM Editor, this feature makes it possible to add them yourself and edit them in VCM Editor immediately. See *User Defined Parameters* (Page 83).
- **Template Applicator.** Opens the Template Applicator window, which applies templates created in Template Editor. See *Templates* (Page 70) for instructions on using the templates feature.
- **Navigator.** Opens the Parameter Navigator window, which lists parameters in a tree structure. See *Parameter Navigator* (Page 34).
- **View.** If you want to display only the parameters that are appropriate for less experienced tuners, select View Basic. To use the default (all parameters) display, select View Advanced.

## COMPARE MENU

The options in this menu can be used to compare the parameter values in the open tune file to the corresponding values (if any) in another tune file. See *Comparing Two Tune Files* (Page 66).

If you are comparing two files with matching operating system IDs, you can also copy segments from the compare file to the tune file being edited. See *Segment Swaps* (Page 112) for more information.

## FLASH MENU

- **Read Vehicle.** If there is a vehicle connected to your computer, select this option to read the vehicle's current tune. See *Reading a Vehicle* (Page 27).
- **Write Vehicle.** If there is a vehicle connected to your computer and you have a tune file appropriate for that vehicle open, select this option to write the tune in the open file to the vehicle's controllers. See *Writing Tunes Back to the Vehicle* (Page 129).

## TOOLS MENU

- **Unit Conversion.** Opens the Unit Conversion window, which can quickly perform many common unit conversions. See *Unit Conversion Window* (Page 116).
- **Calculator.** Opens a window containing a simple calculator.
- **Options.** Opens the Options window, which contains user preference settings for the VCM Editor application.
- **Template Editor.** Opens the Template Editor window, which is used to create and edit templates for parameters you need to modify in multiple tune files. See *Templates* (Page 70) for instructions on using the templates feature.

## WINDOW MENU

When you have multiple daughter windows open in VCM Editor's workspace, the options in this menu can be used to quickly position the open windows for easier viewing.

## HELP MENU

- **Help.** Opens VCM Editor's help system.
- **License Information.** Opens the License Information window, which lists the vehicles and controllers that are licensed on the most recently connected interface device. It also shows you how many credits you have spent for those licenses and upgrade credits available (if any). See *The License Information Window* (Page 126) for more information.
- **Resync Interface.** Selecting this item when your interface device is connected to the computer will update the device to ensure that credits and licenses purchased since the last resync are properly stored on the device and will be available when you need them.



**NOTE:** This function is also an important step in preparing a new interface for first time use. See *The VCM Suite Getting Started Guide* for more information.

- **VCM Suite Information.** Opens the VCM Suite Info window. When your interface device is connected to the computer, this window can be used to generate a log file that contains troubleshooting information. See *How to Generate a VCM Suite Infolog* (Page 146).
- **MPVI Application Keys.** Registration of older (MPVI) interface devices required entering an application key that was received by email. Selecting this menu option opens the window that allows application keys to be entered.



**NOTE:** Newer devices (MPVI2/2+/3) do not use application keys. They use verification codes for online registration. See The VCM Suite Getting Started Guide for more information.

- **MPVI2 Verification Code.** When a new MPVI2, 2+, or 3 is connected to the computer, this option will produce a verification code that is used for device registration.
- **About.** Displays a window that shows what version of the VCM Suite you are using. If there is an update to the software available, the window will have a Download button that you can use to retrieve the new version.

## MAIN TOOLBAR



VCM Editor's main toolbar contains the following items:



Open an existing tune file.



**NOTE:** If you already have a file open, this will also close the currently open file.



Save the open tune file.



Close the open tune file.



Opens the Tune Details window, which contains key information about the vehicle being tuned and its controllers. See *Viewing Tune Details* (Page 123).



Opens the Remote Tuning window, which can be used to limit what remote customers can do with tune files you provide them. See *Remote Tuning* (Page 138).



Opens the Tune History window, which can be used to view all changes to the current tune file and to compare the current version of the file to any previously saved version. See *Viewing Tune History* (Page 119).



Open a tune file that you want to compare to the tune file you are working on. See *Comparing Two Tune Files* (Page 66) for more information.



When using the compare feature to compare two tune files, show the values from the main file.



When using the compare feature to compare two tune files, show the values from the compare file.



When using the compare feature to compare two tune files, show how much each numerical value differs by.



Opens the Unit Conversion window, which can quickly perform many common unit conversions. See *Unit Conversion Window* (Page 116).



If there is a vehicle connected to your computer, select this icon to read the vehicle's current tune. See *Reading a Vehicle* (Page 27).



If there is a vehicle connected to your computer and you have a tune file appropriate for that vehicle open, select this icon to write the tune in the open file to the vehicle's controllers. See *Writing Tunes Back to the Vehicle* (Page 129).



Opens the VCM Suite Info window. When your interface device is connected to the computer, this window can be used to generate a log file that contains troubleshooting information. See *How to Generate a VCM Suite Infolog* (Page 146).

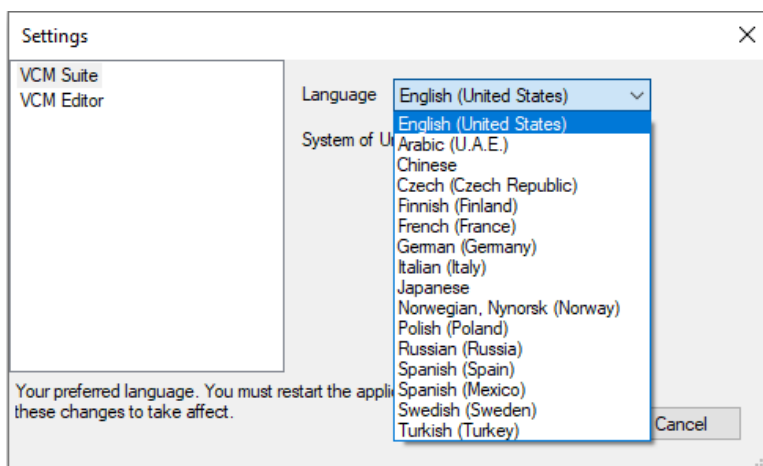
## SELECTING THE DISPLAYED LANGUAGE



**NOTE:** This feature requires VCM Suite version 4.13 (or later).

In the most recent builds of VCM Suite, we have begun to implement support for changing the displayed language of the suite's applications. Follow these steps:

1. In the menu bar of either VCM Suite application, select **Tools > Options**. The Settings window appears.



2. In the **Language** dropdown, select the desired display language.
3. Click **OK**.
4. Close the application. The selected language should be displayed the next time either VCM Suite application is opened.



**NOTE:** At the time of this writing, only a portion of the interface supports alternate languages and some of the translated text is still rough placeholder text rather than a polished translation. Please bear with us while we work on expanding this feature's implementation.



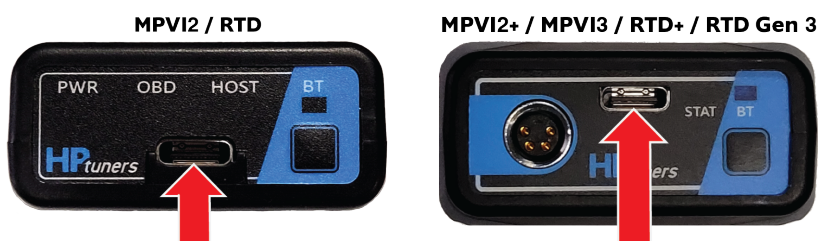
# CONNECTING TO A VEHICLE

The procedure for connecting to a vehicle varies by the type of interface device you are using.

## MPVI2/2+/3 AND ALL RTD INTERFACES

When used with the VCM Suite, a USB connection to your PC is recommended:

1. Connect the larger end of the included USB cable to an available USB port on a laptop with VCM Suite Installed.
2. Connect the other end of the USB cable to the USB type C port on the front of the interface device.



3. When you are ready to scan or reprogram the vehicle, plug the large, molded OBD-II connector on the other side of the interface device into the vehicle's diagnostic port.

When used with the TDN app for mobile devices, these devices connect to your mobile via Bluetooth®. The app provides on-screen instructions for establishing the connection and attaching the device to your vehicle. For more information, consult the documentation for the TDN app.

## MPVI

1. Connect the larger end of the included USB cable to an available USB port on a laptop with VCM Suite Installed.
2. Connect the other end of the USB cable to the USB type B port on the interface device.



3. Connect the 15-pin side of the OBD-II interface cable to the matching connector on the interface device.
4. When you are ready to scan or reprogram the vehicle, connect the 16-pin side of the OBD-II interface cable to the vehicle's diagnostic port.

## MANUFACTURER LOCKED CONTROL MODULES

Some vehicle manufacturers now put locking devices in their VCMs to prevent third parties from tuning the vehicle. Although most of these vehicles can be read by the VCM Suite without any problem, writing an updated tune to these vehicles may require special hardware.

For many of these vehicles, HP Tuners can upgrade the existing VCM to allow it to be tuned by our software or exchange it for a controller that has already been upgraded. For other vehicles, a special cable may be required.

### GM

Controller	Vehicles	HP Tuners Solutions
E41 ECM	2017+ Chevrolet Silverado and GMC Sierra 2500/3500 trucks with 6.6L Duramax diesel engines	<b>L5P purchase, exchange, or upgrade</b>
E99 ECM	2019+ Corvette ZR1	<b>ZR1 modified purchase or exchange</b>
E90 ECM	2019 - 2021 Chevrolet Silverado and GCM Sierra trucks with 5.3L L84 engines and 6.2L L87 engines	<b>L84 &amp; L87 - E90 modified ECM exchange</b>
T87A TCM	2017+ GM vehicles equipped with 8-speed and 10-speed transmissions	<b>T87A unlock service</b> <b>Unlocked T87A purchase</b>

## DODGE / CHRYSLER / RAM / JEEP

Controller	Vehicles	HP Tuners Solutions
2015+ PCMs	All 2015+ Dodge, Chrysler, RAM, and Jeep vehicles (except Dodge Viper)	<a href="#">Dodge PCM upgrade service</a> <a href="#">Dodge upgraded PCM purchase</a>
2018+ PCMs	All 2018+ Dodge, Chrysler, RAM, and Jeep vehicles.	<a href="#">Dodge 2018+ smart access cable</a> (These vehicles also require the upgraded PCM above)

## POLARIS

Controller	Vehicles	HP Tuners Solutions
MG1CA007 ECM	RZR-Pro R	<a href="#">MG1CA007 ECM upgrade service</a>
All supported ECMS	Supported Ranger, Ace, Sportsman, RZR, and Scrambler models	<a href="#">OBD-II adapter cable for Polaris vehicles</a>

## **PUTTING A VEHICLE IN THE "ON" STATE**

When connecting to a vehicle for read and write operations, HP Tuners software typically requires that the vehicle be put in an ON state without starting the vehicle's engine. The correct procedure varies from model to model. Here are some examples:

### **CONVENTIONAL KEY START IGNITIONS**

1. Insert the key in the ignition.
2. Rotate the key to the ON (or RUN) position, but do not continue to the START position.

### **DODGE / CHRYSLER / RAM / JEEP WITH RED PUSHBUTTON IGNITION**

Keep your foot off the brake and follow these steps.

1. Press the red START button once. The indicator around the button will change from OFF to ACC.
2. Wait 2 seconds.
3. Press the red START button again. The indicator should change to RUN.

### **GM VEHICLES WITH PUSHBUTTON IGNITION**

Without putting your foot on the brake pedal, push and hold the ENGINE START button for eight to ten seconds.

# READING A VEHICLE

When you read a vehicle, you are transferring calibration information from the control module(s) in your vehicle to VCM Editor. The read process will automatically detect the presence of relevant VCMs in the vehicle and read them all in sequence. The various status messages and the progress bar give information about the current state of the read.



**CAUTION:** Ensure that the vehicle battery is charged before proceeding (keeping the battery attached to a charger during the procedure is recommended). Although it should not be possible to harm any of the vehicle's control modules during the read process, vehicle controllers can be left in an odd state if a power loss occurs.

If communication is lost, the program will automatically reset the module. It will then prompt you to correct the problem and/or try again.

## READ PROCEDURE

To read the VCM, follow these steps:

1. Connect your HP Tuners interface device to a laptop with VCM Suite installed. Then, connect the device to the vehicle's OBD-II diagnostic port. See *Connecting to a Vehicle* (Page 21) for more information.
2. If VCM Scanner is open, close it before proceeding.
3. Open VCM Editor.
4. If a tune file is open, close it by selecting **File > Close** in the menu bar.
5. Turn the vehicle ignition to the ON (or RUN) position, but do not start the engine.



**NOTE:** Some vehicles require special procedures to be put in the correct state. See *Putting a Vehicle in the "ON" State* (Page 26) for more information.

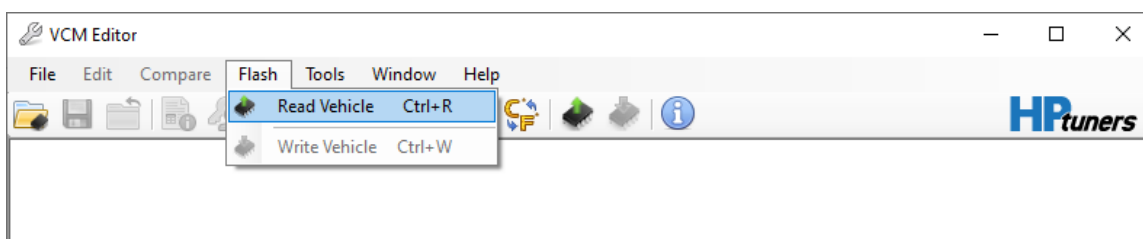
6. Make sure the doors are closed and all accessories are turned off.





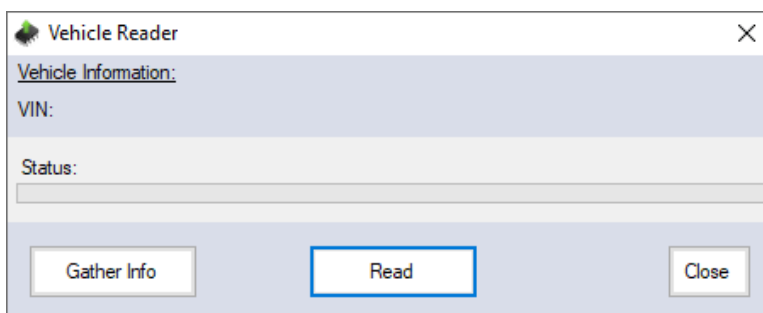
**CAUTION:** Do not use any vehicle accessories, including the door locking mechanism, while the vehicle is being read.

7. In VCM Editor, select **Flash > Read Vehicle**.



8. The Vehicle Reader window appears. Wait 10 to 15 seconds.

9. Click the **Read** button.



10. Allow VCM Editor to read the vehicle controllers until the status bar indicates the read is complete.



**NOTE:** During the read, the instrument panel may briefly display all sorts of indicators and error messages and some accessories may appear to turn on and off randomly. This is normal.



**NOTE:** For vehicles with multiple VCMs (for example: LS2 A4 vehicles), there is a 15-second pause between reading each module.

11. Turn off the ignition and unplug the interface cable.
12. The file will automatically open in VCM Editor.
13. If this is the initial read of the stock controller, we strongly recommend that you save (and backup) the file before any modifications are made. You may wish to restore your vehicle to the stock tune at a later date.

# LOCATING PARAMETERS

There are two ways to navigate to parameters you wish to modify:

- **Tab Style Navigation** displays all parameters on a series of tabbed windows. It's often quicker to flip through a series of these tabs than it is to browse the parameter tree.
- The **Parameter Navigator** window displays all parameters in a tree structure. The search and filter features of this interface allow quick location of individual parameters.

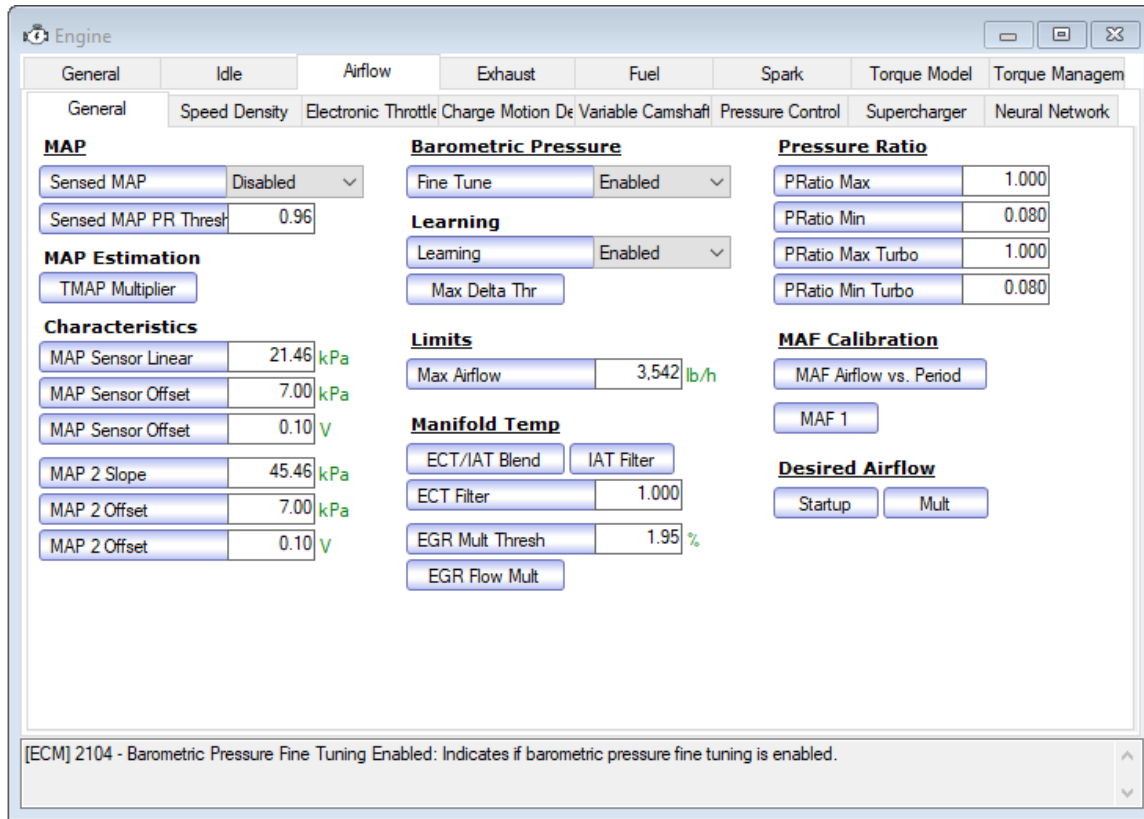
## TAB STYLE NAVIGATION

VCM Editor organizes vehicle parameters and DTC lists into a tab system. The top level of these tabs can be seen just below the main toolbar.



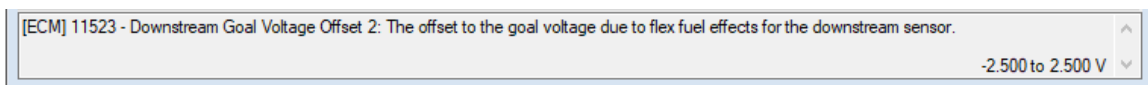
Clicking any of these icons brings up a window displaying the parameters in the corresponding group.

If there are enough parameters in the group, there will be one or two rows of tabs at the top of the window. The second row (if present) are subtabs of the first row. For example, the tab selected in the graphic below is a subtab of the **Airflow** tab in the first row.



Once you have located the tab containing the parameter(s) you wish to modify, you can do the following:

- Hover over a parameter to see a brief description for the parameter at the bottom of the window.

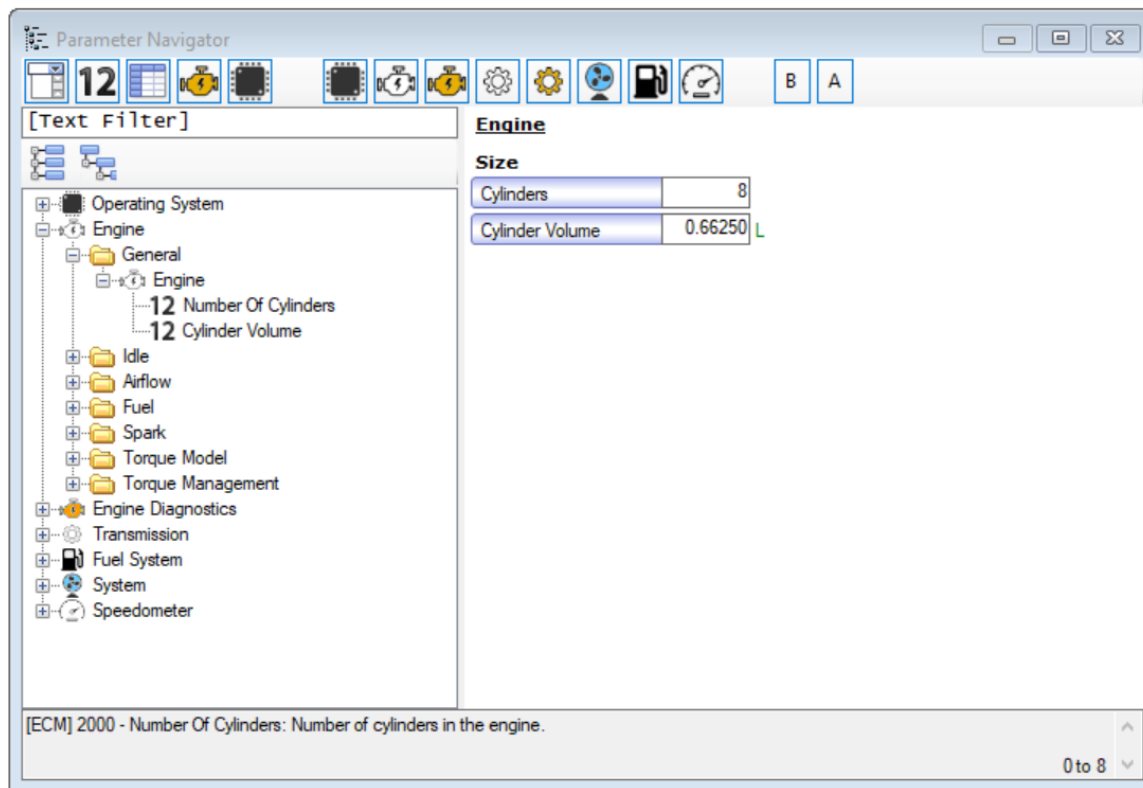


- Edit parameters as needed. See *Modifying Parameters* (Page 43).
- Right-click on the colored background of any parameter name to see a menu containing options for the parameter. See *Parameter Options* (Page 49).

## PARAMETER NAVIGATOR

The Parameter Navigator window (sometimes called "tree view") can be useful if you need to quickly search through all available parameters to find a specific parameter you need to change.

To open Parameter Navigator, select **Edit > Navigator** in the menu bar.



## SELECTING AND EDITING PARAMETERS

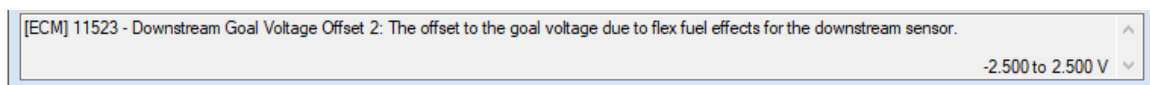
Available parameters are listed in the tree on the left. Click on a listed parameter or parameter group to display that parameter or group in the pane on the right.



**NOTE:** In the image above, we clicked on **Engine > General > Engine**. Both parameters in the group appeared on the right.

The user interface for the fields displayed on the right is no different than when the fields are displayed in tab view. You can interact with them the same way here:

- Hover over a parameter to see a brief description for the parameter at the bottom of the window.



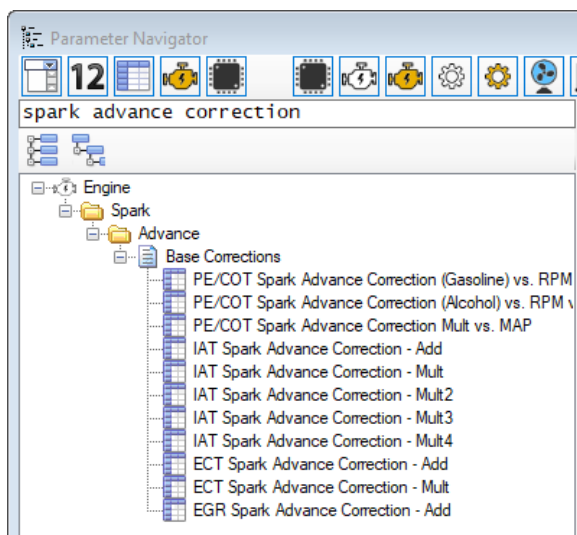
- Edit parameters as needed. See *Modifying Parameters* (Page 43).
- Right-click on the colored background of any parameter name to see a menu containing options for the parameter. See *Parameter Options* (Page 49).

## FILTERING THE TREE DISPLAY

When you need to quickly find a specific parameter or group of parameters, there are a number of ways to filter the fields listed in the tree.

### *FILTERING BY PARAMETER NAME*

To filter the tree display by parameter name, enter the text you wish to search for in the **[Text Filter]** box above the tree. The displayed tree items will be dynamically filtered as you type.





### ***FILTERING BY DATA TYPE***

The group of icons on the left end of this window's toolbar are used to filter displayed items by data type.



When a blue box appears around the icon, items of this type will be displayed. When the blue box does NOT appear, items of this type will NOT be displayed. Click the icon to turn the display off. Click again to turn it on.



Switches



Scalars



Tables



DTC Lists



Code Mods

### ***FILTERING BY PARAMETER GROUP***

The middle group of icons in the window's toolbar are used to filter displayed parameters by group.



When a blue box appears around the icon, the corresponding parameter group will be displayed. When the blue box does NOT appear, the group will NOT be displayed. Click the icon to turn the display off. Click again to turn it on.



Operating System



Engine



Engine Diagnostics



Transmission



Transmission Diagnostics



System



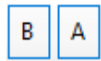
Fuel System



Speedometer

***FILTER BY BASIC / ADVANCED***

The final two icons in the window's toolbar filter by whether each parameter is considered to be "basic" (for beginners) or "advanced" (for more experienced tuners).



When a blue box appears around the icon, items of this type will be displayed. When the blue box does NOT appear, items of this type will NOT be displayed. Click the icon to turn the display off. Click again to turn it on.



Basic Parameters

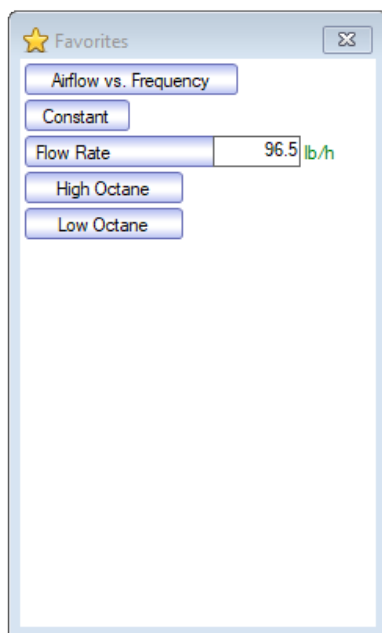


Advanced Parameters

## USING FAVORITES

Adding your most commonly-used parameters to the Favorites window allows you to quickly access all of them in the same place.

Parameters displayed here can be modified using the same methods you would use in either the Tab Navigation interface or Parameter Navigator. See *Modifying Parameters* (Page 43).



To open this window, click the Favorites icon  in the toolbar.

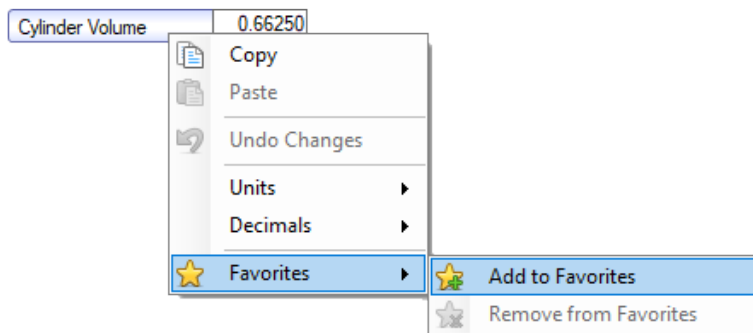


**NOTE:** This window will display only the favorites included in the file you are currently editing. If the file does not contain one or more of your favorite parameters, the missing parameters will not be displayed.

## ADDING FAVORITES


To add a favorite to the Favorites window:

1. In either the **Tab Navigation** interface or **Parameter Navigator**, locate the parameter you wish to add.
2. Right click on the colored background of the parameter's name. The Parameter Options menu appears.



3. Select **Favorites > Add to Favorites**.



**NOTE:** If you are in the Table Editor, you can also add the table by clicking the Add Favorite icon  in the editor's toolbar.

## REMOVING FAVORITES

1. Locate the parameter you want to remove in the Favorites Window or using either of the navigation interfaces.
2. Right click on the colored background of the parameter's name. The Parameter Options menu appears.
3. Select **Favorites > Remove from Favorites**.



# MODIFYING PARAMETERS

You can browse through the available parameters using either the [Tab Navigation System](#) or the [Parameter Navigator](#). Each parameter displayed will be one of the following types:

- Switches
- Scalars
- Tables
- Code Modifications

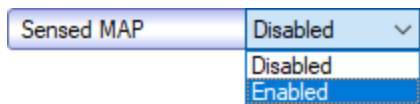
Additionally, you can configure the behavior of Diagnostic Trouble Codes (DTCs). See *Editing DTC Lists* (Page 106) for more information.

## MODIFYING SWITCHES

"Switches" are parameters that support only a handful of specific values. VCM Editor represents these as simple drop down menus.



To modify one of these, click the value to be modified and then select the new value from the drop down.





## MODIFYING SCALARS

"Scalars" are simply numerical values that can be entered in the spaces provided.

ECT Min	176 °F
---------	--------



**NOTE:** To see the range of values permitted for a particular field, hover over the field. The range will be displayed in the lower right corner of the window.

To change the display units for a field (for example, from Fahrenheit to Celsius), click the green label to the right of the field. Each click will switch to the next supported unit type. It may take several clicks to find the units you want.

ECT Min	80 °C
---------	-------



**NOTE:** When you change the displayed units, the value in the box will be displayed in the new unit and the displayed value may be rounded off. However, the underlying value does not change until you enter a new number in the box.

## MODIFYING TABLES

In the parameter display, each table is represented as a colored button bearing the name of the table.

FA Stoich	FA Stoich Even
FA Stoich Odd	

Click the button to open the table in **Table Editor**, which allows the table data to be viewed and edited.

## APPLYING CODE MODIFICATIONS

The Operating System group may contain one or more Code Modification buttons that look like this:



Clicking one of these buttons tells the VCM Suite to apply a custom HP Tuners patch to the operating system of your vehicle's ECM, TCM, or PCM.



**CAUTION:** Applying an OS mod can brick the controller being modified. When doing so, be sure to follow the instructions given on screen EXACTLY.

Follow these steps:

1. THOROUGHLY research the mod you wish to apply. Determine if:
  - There is any additional hardware that needs to be installed in the vehicle to support this mod.
  - There is any additional tuning required to support this modification. If so, what needs to be done?
2. In VCM Editor, open the tune file for the vehicle to be modified.
3. In the **OS** group, click the button for the code modification you wish to apply.
4. Immediately save the file under a different name and then close it. **DO NOT make any other modifications to the file.**
5. Open the new file again and flash the file to the vehicle using the WRITE ENTIRE option.

## PARAMETER COLORS

VCM Editor displays a colored background behind the name of each parameter. Initially, all parameters will have the same blue background.

The colors change to indicate parameters that have changed since the last save or that differ from the same parameter in a comparison file.

### SINGLE CALIBRATION FILE OPEN (NO COMPARE FILE)

When you only have one calibration file open, parameters that have changed since the last save are displayed in a different color.

#### Base



No changes have been made to either table.

#### Base



The High Octane table has changed since the last time the file was saved.

### PRIMARY CALIBRATION FILE AND COMPARE FILE OPEN

When you have a second file open for comparison, the colors also indicate parameters that differ from the corresponding parameters in the compare file.

#### Base



The values of these parameters in the primary file match the values in the compare file. No changes have been made to either parameter since this last save.

#### Base



The values of these parameters in the primary file match the values in the compare file. The High Octane table has changed since the last time it was saved to file.

#### Base



Comparable fields do not exist in the compare file. Neither field has been changed since the last save.

**Base**



Comparable fields do not exist in the compare file. The High Octane table has changed since the last save.

**Base**



The values of these parameters are different in the primary file than they are in the compare file. No changes have been made to either table since the last save.

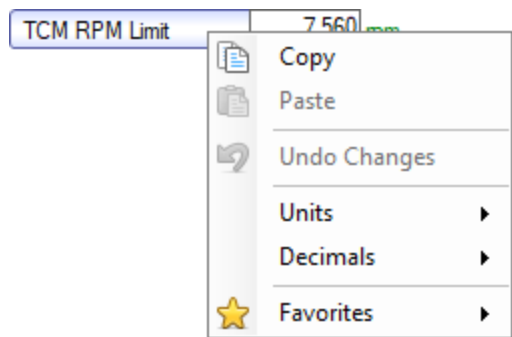
**Base**



The values of these parameters are different in the primary file than they are in the compare file. The High Octane table has been changed since the last time it was saved to file.

## PARAMETER OPTIONS

Right-clicking on the colored background of any parameter displayed in the **Tab Navigation System** or in the right pane of the **Parameter Navigator** will display a menu containing options for the parameter.



The options displayed are different for each type of parameter. They may include the following:

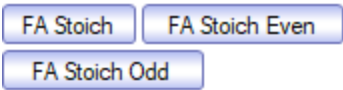
- **Copy.** Copy the value of this field to the clipboard. This allows the same value to be pasted into another field later.
- **Paste.** If you have copied the value of another field to the clipboard, select this option to paste it into the current field.
- **Undo Changes.** Select this option to revert the field back to the value in the last saved version of the tune file.
- **Units.** Select this option to change the displayed units for this field.
- **Decimals.** Select this option to add or remove decimal places from the value displayed in this field (increase or decrease the precision of the displayed value).
- **Favorites.** Select this option to add this field your favorites (or remove it from your favorites).

TABLE EDITOR

Editing tables is one of the key tasks required when modifying a tune. A good understanding of the Table Editor's display, layout, and functions will make many tuning tasks much easier.

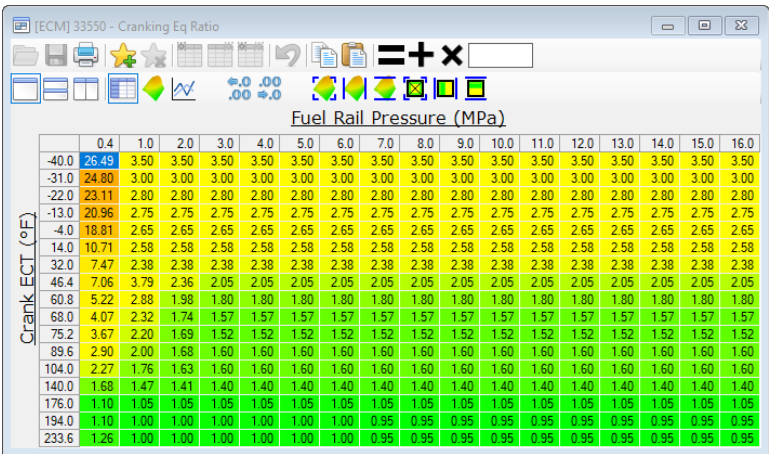
OPENING A TABLE

- 1. Find the table you wish to view in either the **Tab Navigation System** or the **Parameter Navigator**. Both of these windows represent tables as buttons with a colored background.



- 2. Click the button for the table you wish to open.

BASIC LAYOUT



When you first open the table editor, you will see data presented in a normal table view. This is the primary view for editing table data and the majority of the editor's functions are available only in this view.

You can also switch to either a 2D or a 3D graph view:



**Switch to 3D graph view.** In addition to zooming and rotating the chart, this view allows you to drag click and drag individual data points. See *Using 3D Graph View* (Page 64) for more information.



**Selects the 2D graph view.** This view allows you to click and drag individual data points. See *Using 2D Graph View* (Page 63).



**Return to the default table view.**



**NOTE:** See *The Table Editor Toolbar* (Page 54) for a full list of toolbar functions).

## EDITING CELL DATA IN TABLE

Editing cell data has two basic steps:

1. Select the cell(s) you wish to modify.
2. Enter the new cell data or specify how the cell data should be transformed.



**NOTE:** Right-clicking on a cell produces a menu that contains additional options for manipulating cell data. See *Table Editor Right-click Menu* (Page 58) for more information.

### SELECTING CELLS

To select...	Procedure
A single cell	Click on the cell.
A row or column	Click the row or column header.
All cells	Click the box in the upper-left corner of the table.
A block of cells	<ol style="list-style-type: none"><li>1. Left click on one corner of the desired block, but do not release the mouse button yet.</li><li>2. Drag the mouse pointer to the opposite corner of the desired block.</li><li>3. Release the left mouse button.</li></ol>

### ENTERING A SPECIFIC VALUE

To enter a specific value in a selected cell or group of cells, just type the new value.

- or -

Type the value in the space next to the math symbols in the toolbar and then click the equals sign.

### ADDING A VALUE TO SELECTED CELLS

To add a desired value to the selected cell(s):

1. Enter the value to be added in the space next to the math symbols in the toolbar.
2. Click the plus sign.



**NOTE:** If you wish to subtract a value rather than add one, enter the desired value as a negative number.



***MULTIPLYING SELECTED CELLS BY A DESIRED VALUE***

To multiply the selected cell(s) by a desired value:

1. Enter the value to multiply by in the space next to the math symbols in the toolbar.
2. Click the multiplication sign.



**NOTE:** If you wish to divide by a value rather than multiply, enter the reciprocal of the desired value as a decimal. For example, to divide by two, you would enter 0.5 (the decimal equivalent of 1/2).

***HOT KEYS***

The following hot keys are available in table view only:

+/-            Increment and decrement value(s)

CNTRL+C    Copy value(s)

CNTRL+V    Paste value(s)




CNTRL+Z    Undo last modification

## THE TABLE EDITOR TOOLBAR



The toolbar in **Table Editor** has many options for viewing and modifying tables.



### TABLE OPEN, SAVE AND PRINT

-  Import a table from a file and overwrite current table.
-  Save the table to a file.
-  Print the table.

### FAVORITES

-  Add this table to your favorites.
-  Remove this table from your favorites.

See *Using Favorites* (Page 40) for more information.

**FILE COMPARE**

View the table for the primary calibration



View the table for the compare calibration



View the differences between the primary and compare calibrations



**NOTE:** These icons change the view for the current table only. To change the view for all open tables, use the icons in VCM Editor's main toolbar or in the Compare menu. See *Comparing Two Tune Files (Page 66)* for more information.

**RELOAD**

Reload the current table




**COPY AND PASTE**

Copy table selection to clipboard






Paste table selection from clipboard




### *MODIFY*

-  Replace selected cells with the value in the box
-  Add the value in the box to the selected cells
-  Multiply the selected cells by the value in the box

### *SINGLE VIEW VS. SPLIT VIEW*

-  View only one data representation (table or 2D/3D graph)
-  Use a horizontal split with the table display on top and the graph on the bottom
-  Use a vertical split with the table display on the left and the graph on the right

### *SELECT VIEW*

-  Selects the table view. In split view mode, the table is always one of the views in the split.
-  Selects the 3D graph view. In split view mode, this changes between 2D and 3D graph view.
-  Selects the 2D graph view. In split view mode, this changes between 2D and 3D graph view.

***PRECISION***

**NOTE:** The functions of these two icons were swapped in VCM Suite version 4.12. (If you are using an older release, use the description for the other icon in this list).



Increase decimal precision (add a decimal place)



Decrease decimal precision (remove a decimal place)

***SMOOTHING AND INTERPOLATION***

Smooth the entire selection



Smooth the selection only using a horizontal pass



Smooth the selection only using a vertical pass

When using the smoothing functions, the level of smoothing will be determined by your current precision. To increase the effected area of your smoothing, increase your precision



Interpolate the entire selection (flat plane)



Interpolate between horizontal bounds (creates lines)



Interpolate between vertical bounds (creates lines)

## TABLE EDITOR RIGHT-CLICK MENU

Right clicking on a table in the table editor displays the following options:

### ***COPY***

Copy a selected cell or section of the table to the clipboard.

### ***COPY WITH AXIS***

This function copies a selected cell or section of a table and includes the axis data. When used in conjunction with the Paste Special function, Copy With Axis allows the data to be pasted into another table without selecting the destination cell. Because the data was copied with axis labels, the software will automatically place the pasted data accordingly.



**NOTE:** This is similar to the function in VCM Scanner's Graph panel and RTT Editor.

### ***PASTE***

Pastes a cell or table section into a selected cell. When pasting a copied region, the selected cell will become the top left cell in the pasted region.

***PASTE SPECIAL***

This function pastes data copied using the Copy With Axis feature into the current table.

The contents of the clipboard must be of the same dimensions as the contents of your table.

Add	Add the contents of the clipboard to the table
Subtract	Subtract the contents of the clipboard from the table
Multiply %	Multiply the contents of the table by the clipboard values as a percentage
Multiply % - Half	Multiply the contents of the table by the clipboard values as a percentage divided in half
Average	Average the values between the clipboard and the table

**Pasting Histogram Data from VCM Scanner**

When using tables in VCM Scanner's Graph panel properly, the Paste Special function can be used to import the learned graph data into the current table.

An example of this is building a knock retard graph and importing it into your main spark tables.

***UNDO LAST***

Undo your last action.

***UNDO ALL***

Undo all actions.

## UNITS

If there are multiple unit types available for the data in this table, this option allows you to choose the units of the displayed data.

## COLUMN AXIS

Includes options to copy the labels from the column axis, [edit the column axis](#), or change the units of the column axis.

## ROW AXIS

Includes options to copy the labels from the row axis, [edit the row axis](#), or change the units of the row axis.

## VIEW INVERTED

Select this option to display the table as inverted (swap the X and Y axes). When a table has been inverted, the word **INVERTED** appears above the upper-right corner of the table.

## RENUMBERING TABLE AXES

If a table axis has a name displayed AND the name is underlined, it is possible to adjust the numerical values along the table axis.

<u>Fuel Rail Pressure (MPa)</u>																	
	0.4	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
-40.0	26.49	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50



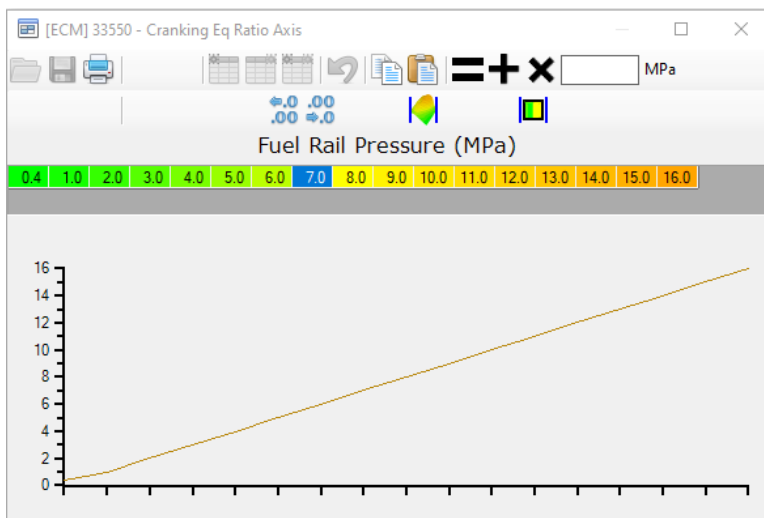
**NOTE:** Changing the axis values does not update the data in the body of the table. Once you are finished adjusting the axis values, you will need to update the cell data to be appropriate.



### CHANGING THE LABEL OF AN INDIVIDUAL ROW OR COLUMN

To change the value of the label for an individual row or column:

1. Click the name of the axis that you wish to adjust. The axis editor window appears.



2. In the row of numbers above the graph, click the value that you wish to change.
3. Enter the new value.



**NOTE:** If you are not changing one of the endpoints, the new value entered should fall between the values on either side of it.

4. To apply your changes, close the window.

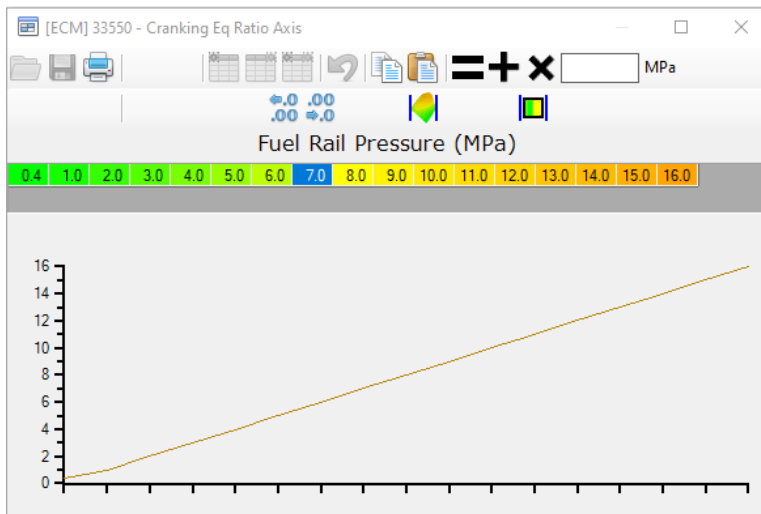
### EXPANDING OR CONTRACTING THE RANGE OF THE TABLE


If you need to expand or contract the range of values on a table axis, you can do this by adjusting the axis endpoint values.

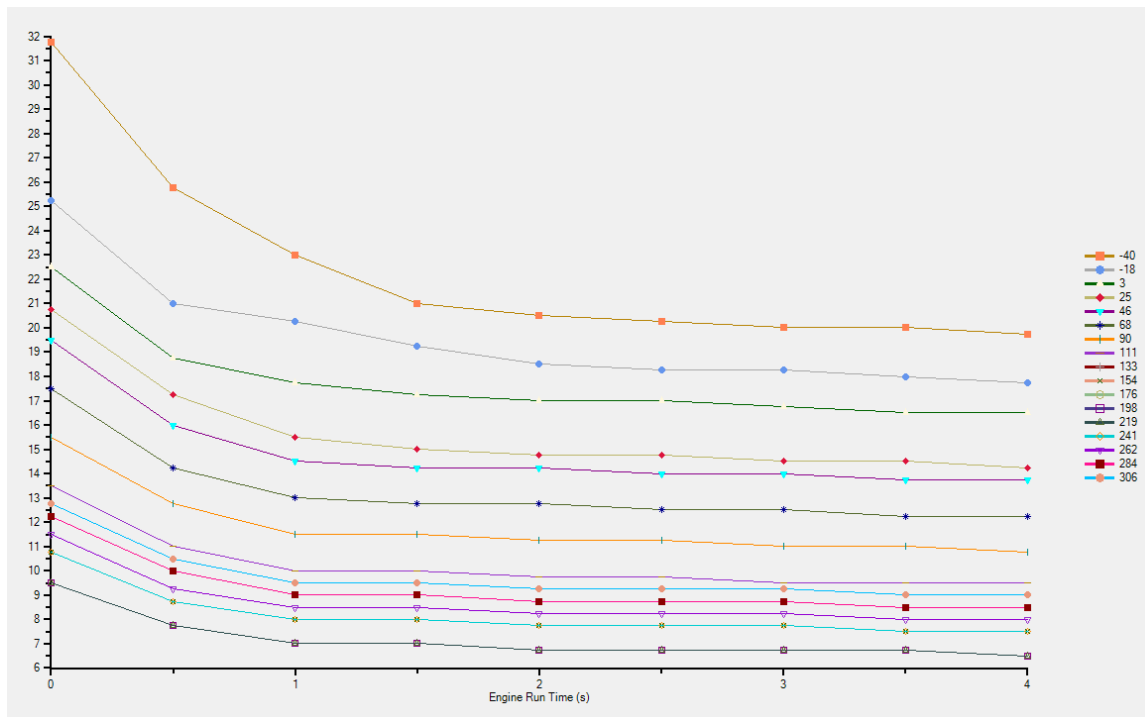


**NOTE:** On some tables, the vehicle PCM will limit how far the range of the axes can be expanded. You cannot use this function to change an endpoint beyond the maximum or minimum value supported by the PCM.

1. Click the name of the axis that you wish to adjust. The axis editor window appears.

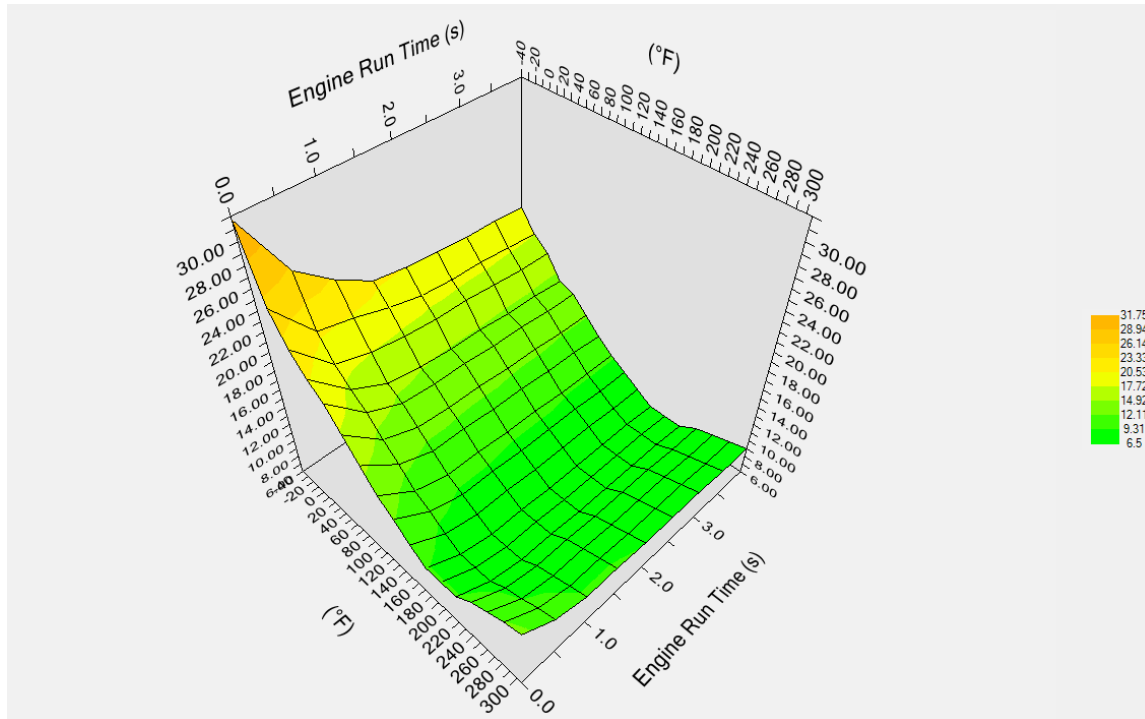


2. In the row of numbers above the graph, click either the value on the far left or the value on the far right (depending on which endpoint you wish to move).
3. Enter the new endpoint value.
4. Click the  icon in the toolbar. This will adjust the axis values in the middle to be evenly spaced between the new endpoint values.
5. To apply your changes, close the window.

**USING 2D GRAPH VIEW****MODIFYING A DATA POINT**

1. Left click on the data point to modify.
2. Drag the data point to the desired position.
3. Release the left mouse button.

## USING 3D GRAPH VIEW



You can control the rotation, shift, zoom of the 3D graph as well as modify data points with the left mouse button.

### **MODIFYING A DATA POINT**

1. Left click on the data point to modify.
2. Drag the data point to the desired position.
3. Release the left mouse button.

### **ADJUSTING THE ZOOM LEVEL**

1. Click and hold on the graph with both the left and right mouse buttons simultaneously.
2. Move the mouse up to zoom in or down to zoom out.

3. Release the mouse buttons.

### *ROTATING THE GRAPH*

1. Right click the graph.
2. Move the mouse in the direction of rotation desired.
3. Release the right mouse button.

## COMPARING TWO TUNE FILES

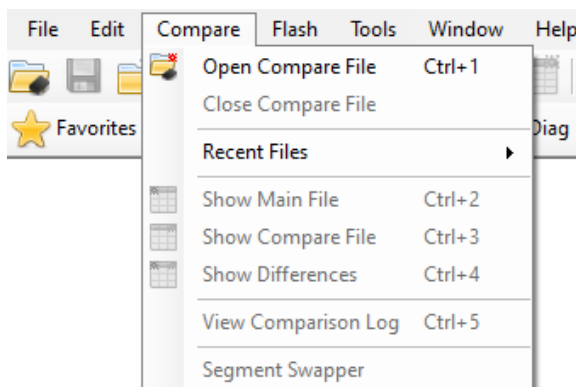
VCM Editor's compare feature can provide a very quick overview of the differences between any two tune files available.

Major points of comparison:

- You can compare any files regardless of make/model/operating system.
- When comparing files of different operating system, only parameters of similar types are compared.
- For tables to be compared they must be of the same dimensions in both files.
- DTC differences will not be compared.

## OPENING FILES FOR COMPARISON

1. Open the first of the two files you wish to compare by selecting **File > Open** in the menu bar.
2. Once the first file has been opened, the **Compare** menu becomes available. Select it in the menu bar.



3. Select **Open Compare File** and browse for the second file to compare.

## SELECTING A VIEW

Once you have opened both files, you will have three separate views available.

- Show Main File
- Show Compare File
- Show Differences

You can access these views either by selecting them in the Compare menu or by clicking the appropriate button in the toolbar of the main VCM Editor window.

## TOOLBAR ICONS



View the calibration values in the main file



View the calibration values in the compare file.



View the differences between the two files. (For each numerical parameter and table cell, this option displays the amount by which the two values differ).

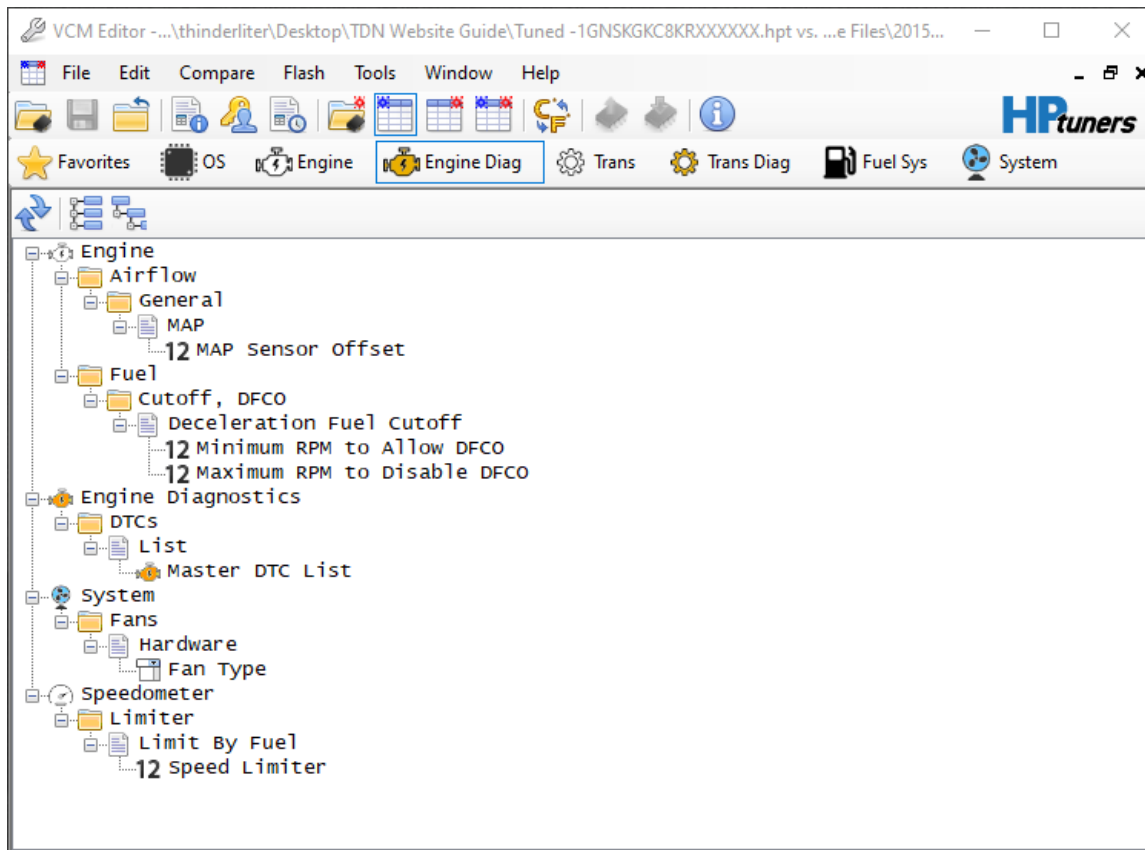


**NOTE:** These icons also appear in the toolbar at the top of each table you open. When you change the compare view of an individual table, it will affect only that table. To change the display view of all open parameters, you must use either the Compare menu or the toolbar in the main VCM Editor window.

## VIEWING THE COMPARISON LOG

The comparison log displays a quick overview of differences between the two files. To open the comparison log,

- In the menu bar, select **Compare > View Comparison Log**.



Only parameters supported by both calibrations and of similar types are displayed.



### *COPYING A SINGLE PARAMETER OR GROUP*

To easily copy a single parameter or group from the compare file to the main file:

1. Left click the parameter or group you wish to copy.
2. Right click and select **Copy Over Selected Differences**.

### *COPYING ALL DIFFERENCES*

To copy ALL differences from the compare file to the main file:

1. Right click on any parameter or group.
2. Select **Copy Over All Differences**.

When copying over differences between files of different operating system IDs, some parameters may be copied over as a close approximation rather than as an exact value. In this case, the parameter will still show up in the list.

## TEMPLATES

Templates are user created files that represent a set of parameter values.

They are useful for when you want to automate, or expedite the tuning process by applying a known set of parameter values onto a target tune.

### TYPICAL USAGE SCENARIO

- You develop a kit that requires the idle be adjusted.
- You open up your stock development tune.
- In your tune, you adjust your idle rpm.
- Creating a template file that contains these changes allows you to quickly apply them to additional customer tunes quickly and easily.

### CREATING AND APPLYING TEMPLATES

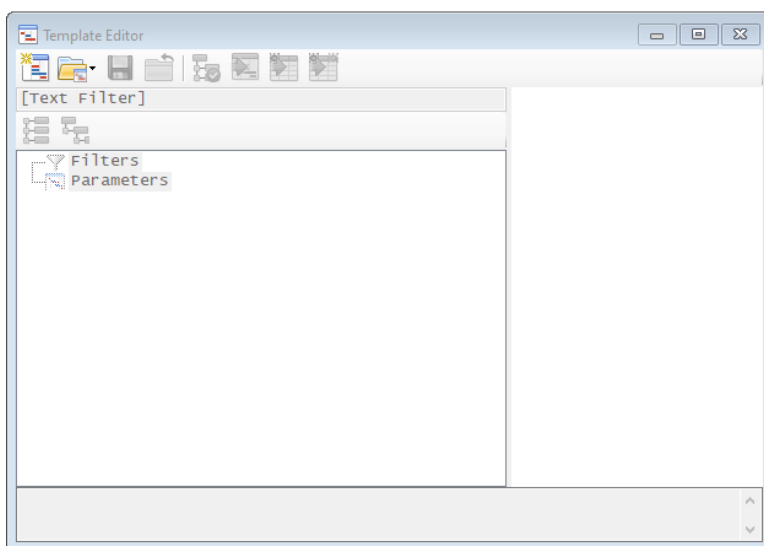
The process has two basic steps:

1. Create and edit the template in Template Editor. See *Creating a New Template* (Page 71).
2. Use Template Applicator to apply the template to a tune. *Applying a Template to a Tune* (Page 75).

## CREATING A NEW TEMPLATE

Follow these steps to create a template:

1. In VCM Editor's toolbar, select **Tools > Tune Template Editor**. The Template Editor window appears.



2. In the Template Editor toolbar, click .

A new, empty template opens in the editor.

3. Add parameters to the new template using one or more of the following toolbar icons:



Import parameters from an existing template. See *Importing Another Template* (Page 74).




Select specific parameters from the currently loaded tune. See *Adding Specific Parameters* (Page 73).



Import unsaved changes from the currently loaded tune. See *Importing Unsaved Parameters* (Page 74).




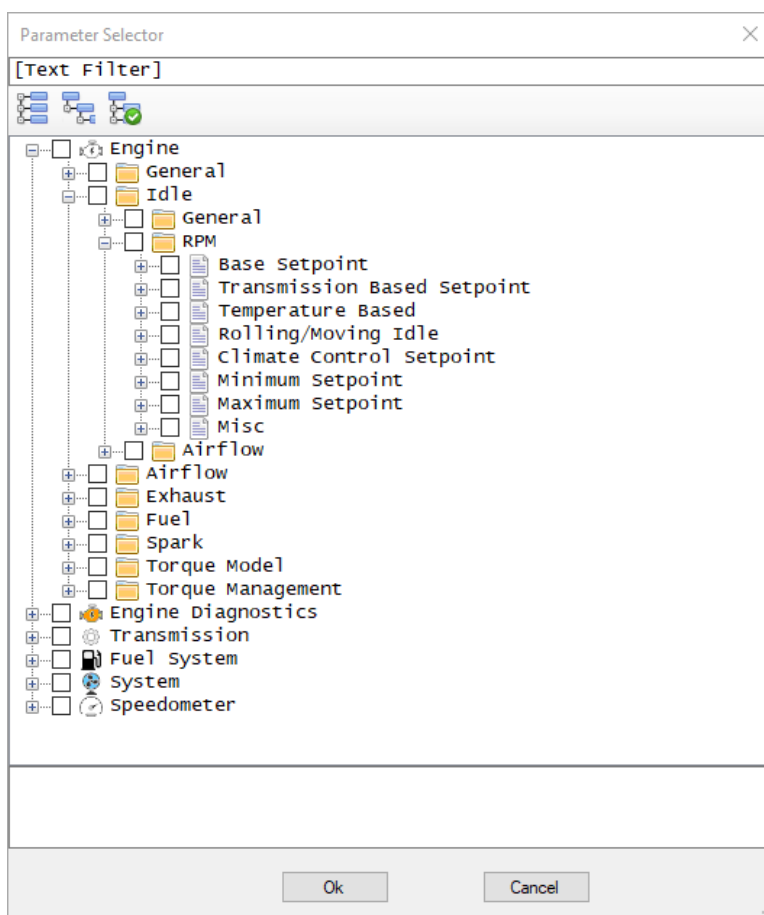
When comparing two tune files, import the compare file version of parameters that differ from the main file. See *Importing Compare File Differences* (Page 74).

4. The imported parameters should now be displayed on the right side of the window. If desired, edit the values of the imported parameters.
5. Click  to save your changes.

### ADDING SPECIFIC PARAMETERS

When editing a template in Template Editor, you can manually select parameters to add.


1. Open the tune file that contains the parameters you wish to import.
2. In the Template Editor toolbar, click . The Parameter Selector window appears.



3. Check the box for each parameter or group of parameters you wish to add.
4. Click **OK**.


### ***IMPORTING ANOTHER TEMPLATE***

When editing a template in Template Editor, you can import all the parameters in another template.

1. In the Template Editor toolbar, click .
2. Browse for and select the template file that you wish to import.
3. Click **Open**.


### ***IMPORTING UNSAVED PARAMETERS***

When editing a template in Template Editor, you can import the unsaved changes from the current tune file.

1. Open the tune file that contains the parameters you wish to import.
2. Make the desired changes.
3. In the Template Editor toolbar, click .

### ***IMPORTING COMPARE FILE DIFFERENCES***

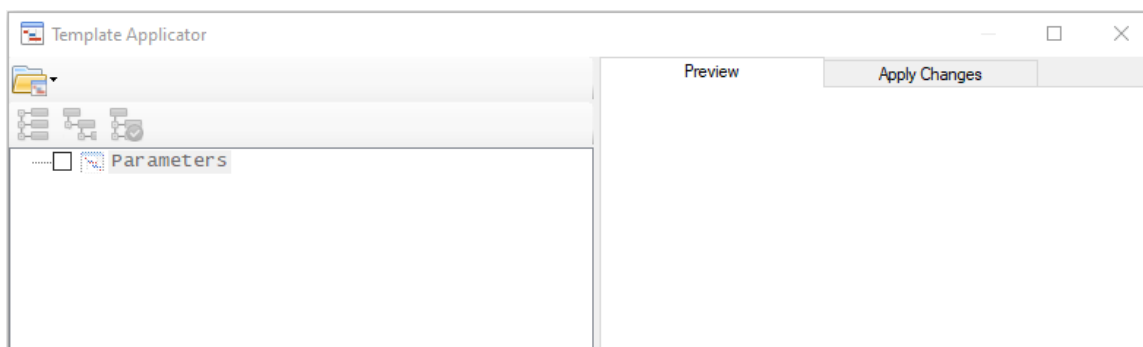
When editing a template in Template Editor, you can the parameters the differ between two tune files.


1. If they're not already open, open the two tune files to compare:
  - a. Open the first of the two files you wish to compare by selecting **File > Open** in the menu bar and then browsing for the file.
  - b. Once the first file has been opened, select **Compare > Open Compare File** in the menu bar.
  - c. Browse for and select the compare file.
2. In the Template Editor window, click .

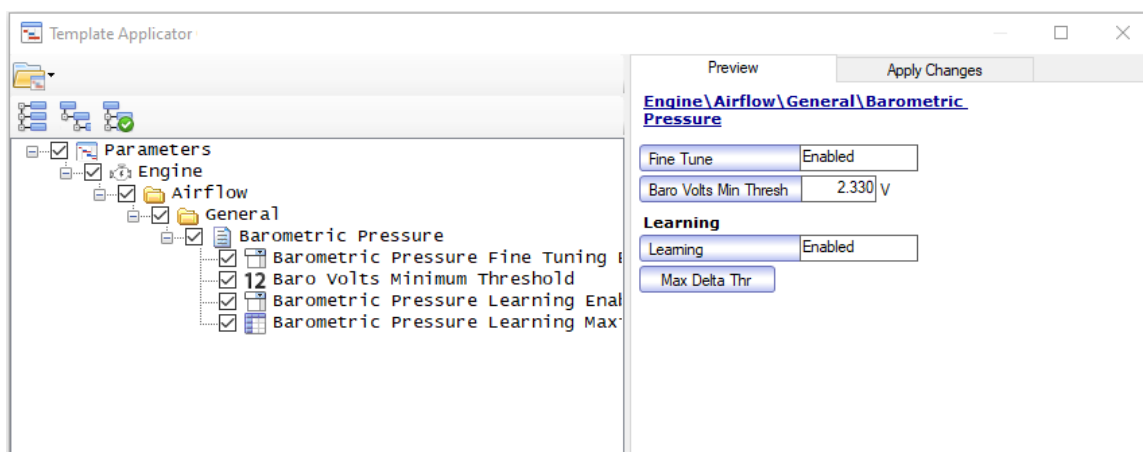
The parameters that differ will be imported from the compare file.

## APPLYING A TEMPLATE TO A TUNE

1. Open the tune file to which you want to apply the template.
2. In the menu bar, select **Edit > Template Applicator**. The Template Applicator window appears.




3. In the Template Applicator toolbar, click the  icon.
4. Browse for and select the template you wish to apply. The parameters in the selected template appear in the left pane of the window.





**NOTE:** By default, the box next to each parameter in the template will be checked. If you do not wish to apply a particular parameter to the open tune, uncheck the box.

- 5. If you want to make changes to the values of the included parameters before application, they can be edited on the Preview tab. However, template changes made in this window cannot be saved.
- 6. Select the **Apply Changes** tab.
- 7. Click the  icon. VCM Editor will apply the parameters that can be applied. Success or failure of the application will appear below.

Switches:	Skipped:	0,	Success:	0,	Failed:	0,	Not Found:	0
Scalars:	skipped:	0,	Success:	0,	Failed:	0,	Not Found:	0
Tables:	skipped:	0,	Success:	1,	Failed:	0,	Not Found:	0
DTC Lists:	skipped:	0,	Success:	0,	Failed:	0,	Not Found:	0

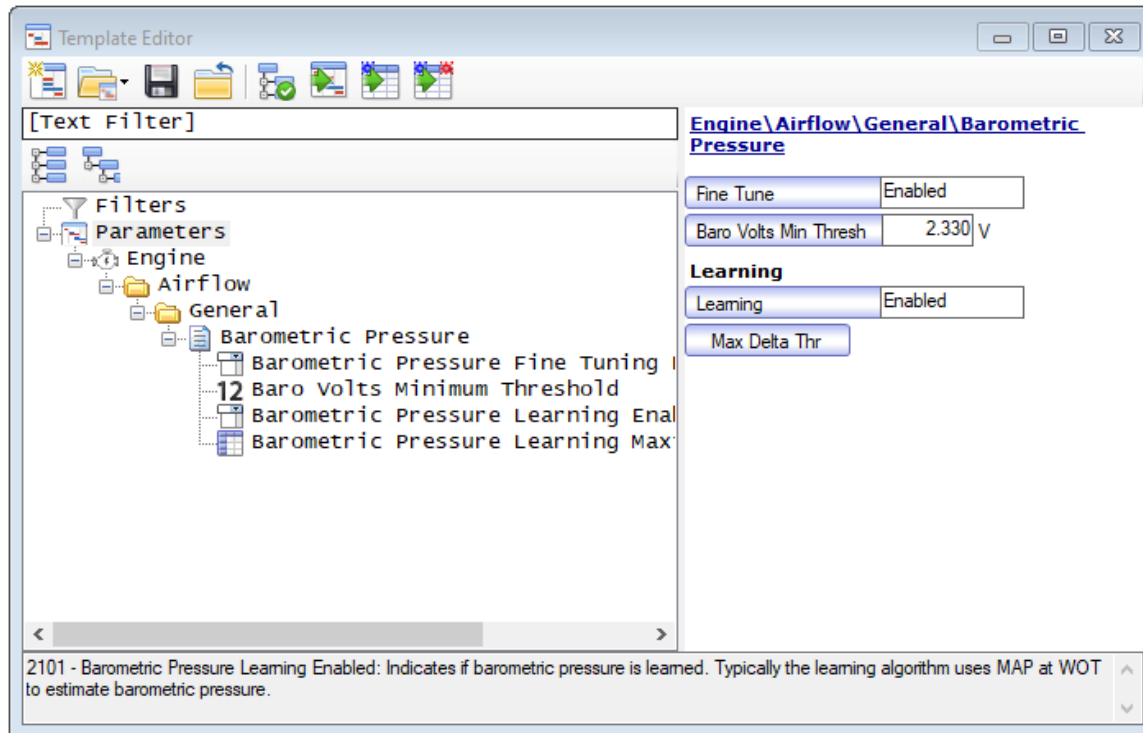
If the application was successful, you should see no entries in the Failed or Not Found columns.

You can now save the tune with the template applied.



## TEMPLATE EDITOR

The Template Editor allows you to create and edit templates containing a collection of parameter values.



To open this window, select **Tools > Tune Template Editor** in the toolbar.

### CREATING, OPENING, AND CLOSING TEMPLATES

The four icons on the left end of the toolbar are used to create, open, and close template files:



Create a new, empty template. See *Creating a New Template* (Page 71).



Open an existing template.



Save the current template.



Close the current template.

### ADDING PARAMETER VALUES

The four icons on the right end of the toolbar add parameters to a template. Each icon represents a different method:



Import parameters from an existing template. See *Importing Another Template* (Page 74).



Select specific parameters from the currently loaded tune. See *Adding Specific Parameters* (Page 73).



Import unsaved changes from the currently loaded tune. See *Importing Unsaved Parameters* (Page 74).



When comparing two tune files, import the compare file version of parameters that differ from the main file. See *Importing Compare File Differences* (Page 74).

### **EDITING PARAMETER VALUES**

You can edit the values of parameters in the Template. However, there are some limitations to this process.

#### **Editing Switches**

- The values of switches are stored as character strings. Although other windows in VCM Editor will list all possible values for the switch in a dropdown menu, in this window, you must enter the actual character string.
- For a modified switch value to be applied properly, the string you enter must be a supported value of the parameter you are modifying.

#### **Editing Scalars**

There are no restrictions on scalars.

#### **Editing Tables**

- You can edit the cell contents of the tables, but not the axis.
- For tables to be applied properly, they must have the same axis sizes and axis values as the corresponding tables in the tune to which they are being applied. Moreover, the unit type of the cell values must be the same.

### **EDITING DTC LISTS**

- For DTC values to apply to the target, they must have the same Key and the Value must also be supported on the target.
- To add new DTC value to the list, the easiest way is to change the property you desire in your tune and import unsaved changes.

### **DELETING A PARAMETER**

1. In the tree view, click on the parameter you want to delete.
2. Press the "Delete" key.

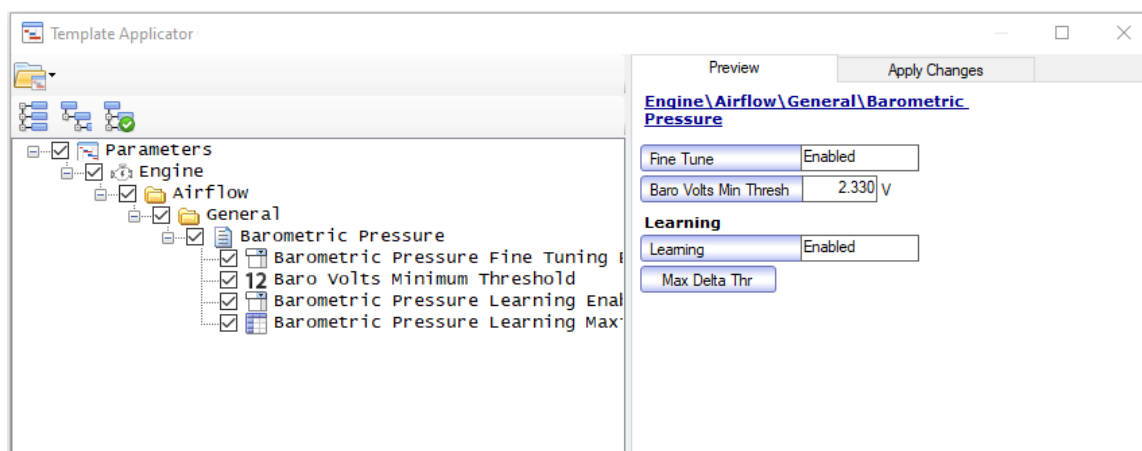
### *DELETING A DTC LIST ENTRY*

1. Click on the row containing the entry you want to delete.
2. Press the "Delete" key.

## TEMPLATE APPLICATOR


The Template Applicator allows you to apply a saved set of parameter values to your currently loaded tune.

The parameters included in the template are selected in [Template Editor](#), but you can edit the values of the parameters in this window before you apply them.



To open this window, select **Edit > Template Applicator** in the toolbar.

### OPENING A TEMPLATE FILE

To open a saved template file, click the  icon and browse for the template file that contains the parameters you want to apply.

### THE PARAMETER TREE

When a template file is open, the parameters included in the template will be listed in the tree on the left side of the window. There are two things you can do with this list:

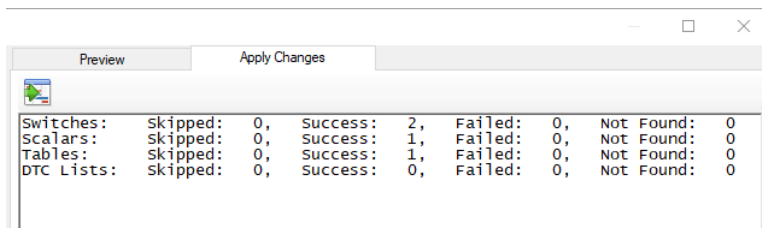
- Parameters that have a check next to them will be applied to the current tune file. If you do not wish to apply a particular parameter, uncheck the box.
- Select a parameter or group of parameters. The selected parameter(s) will be displayed in the **Preview** tab to the right.


### PREVIEW TAB

The parameters selected in the tree to the left will be displayed on this tab. You can edit the values of the parameters here before you apply them to a tune. However, this process has the same limitations as editing parameters in the Template Editor window. See *Editing Parameter Values* (Page 79) for more information.

### APPLY CHANGES TAB

Select this tab when you are ready to apply the template's parameters to the tune being configured.



Click the  icon to apply the parameters that are checked in the tree to the left. The results of the application process will be indicated in the space below:

- **Skipped:** These are template parameters that were not checked.
- **Success:** These template parameters applied OK.
- **Failed:** The template parameter failed to apply. Error messages will be included describing the parameter and error.
- **Not Found:** These are template parameters that do not exist in the currently loaded Tune.

## USER DEFINED PARAMETERS

User Defined Parameters is an optional feature that can be purchased on the HP Tuners website.

If you have information on parameters (switches, scalars, and/or tables) that we do not have defined currently in VCM Editor, this feature makes it possible to add them yourself and edit them in VCM Editor immediately.

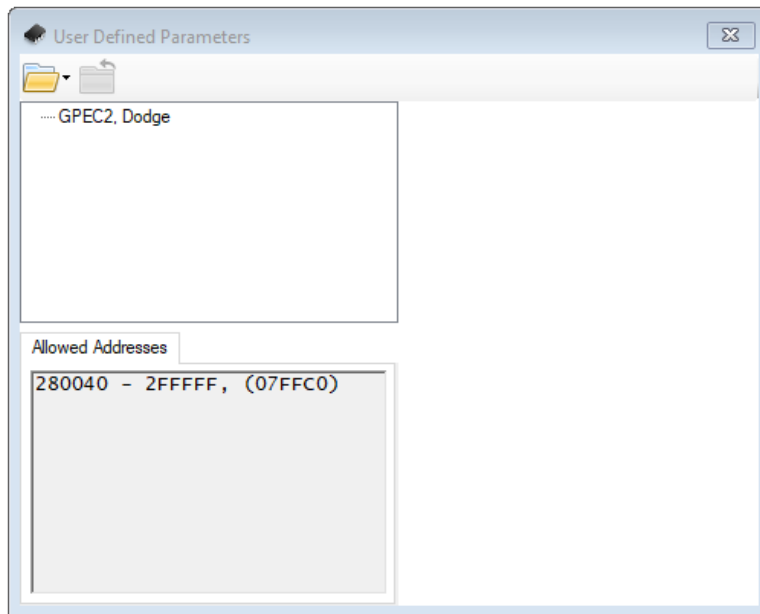



**NOTE:** Parameters added must be supported by the operating system on the controller being tuned. You are simply telling VCM Editor about parameters that it does not have any information on yet. Adding a parameter that is NOT supported by the controller's operating system will have no effect because the controller won't use it.

A summary of the procedure for adding user defined parameters can be found below. See the [User Defined Parameter Guide](#) for full instructions.

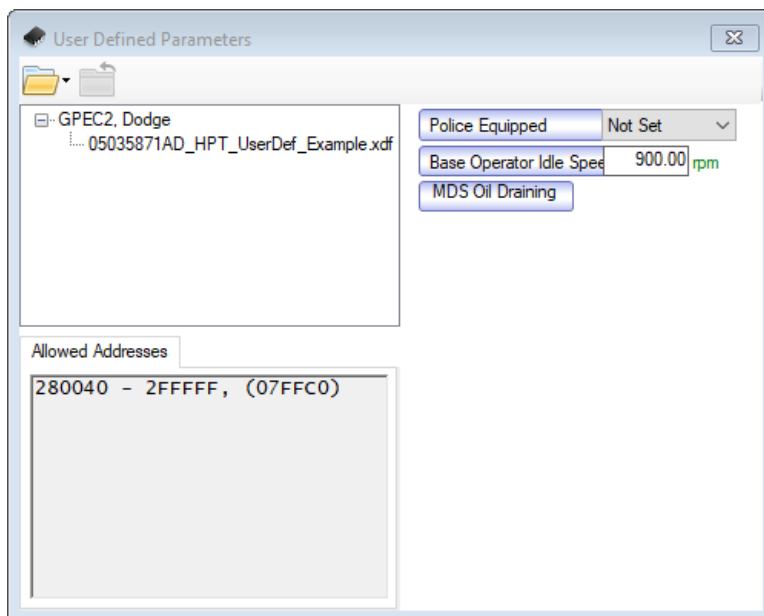
### PROCEDURE

1. Use TunerPro to define the parameters to be added. Save as an .xdf file.
2. In VCM Editor, open the .HPT file to which you want to add parameters.
3. In the menu bar, select **Edit > User Defined Parameters**.



4. Click .
5. Select the TunerPro (.XDF) file that contains the parameters you wish to import.
6. Click **Open**. Your parameters will be imported into VCM Editor.





If you would like parameters added to VCM Editor permanently, email HP Tuners support to request that they be added.



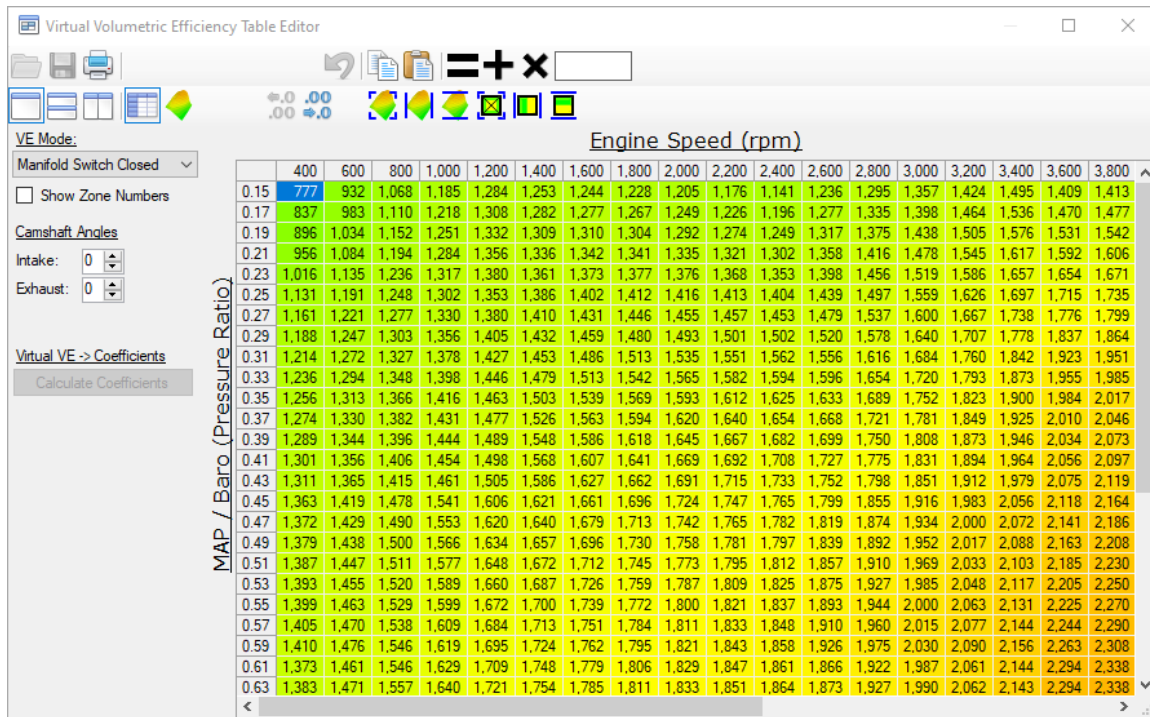
**NOTE:** Not all controllers supported by VCM Suite support User Defined Parameters, please start a support ticket for more information.

## WHAT ARE THE "ALLOWED ADDRESSES" IN THE USER DEFINED PARAMETERS WINDOW?

The allowed addresses are address ranges that you are allowed to define parameters in. If you try to define a parameter outside these ranges, they will not import and you will not be allowed to edit them.

## VIRTUAL VOLUMETRIC EFFICIENCY

Rather than a traditional VE table, certain GM vehicles use something called "VE coefficients" for volumetric efficiency. If you are tuning such a vehicle, you can use the Virtual Volumetric Efficiency Table Editor window to unpack the VE coefficient data and edit it in a format similar to a conventional VE table.



	400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800
0.15	777	932	1,068	1,185	1,284	1,253	1,244	1,228	1,205	1,176	1,141	1,236	1,295	1,357	1,424	1,495	1,409	1,413
0.17	837	983	1,110	1,218	1,308	1,282	1,277	1,267	1,249	1,226	1,196	1,277	1,335	1,398	1,464	1,536	1,470	1,477
0.19	896	1,034	1,152	1,251	1,332	1,309	1,310	1,304	1,292	1,274	1,249	1,317	1,375	1,438	1,505	1,576	1,531	1,542
0.21	956	1,084	1,194	1,284	1,356	1,336	1,342	1,341	1,335	1,321	1,302	1,358	1,416	1,478	1,545	1,617	1,592	1,606
0.23	1,016	1,135	1,236	1,317	1,380	1,361	1,373	1,377	1,376	1,368	1,353	1,398	1,456	1,519	1,586	1,657	1,654	1,671
0.25	1,131	1,191	1,248	1,302	1,353	1,386	1,402	1,412	1,416	1,413	1,404	1,439	1,497	1,559	1,626	1,697	1,715	1,735
0.27	1,161	1,221	1,277	1,330	1,380	1,410	1,431	1,446	1,455	1,457	1,453	1,479	1,537	1,600	1,667	1,738	1,776	1,799
0.29	1,188	1,247	1,303	1,356	1,405	1,432	1,459	1,480	1,493	1,501	1,502	1,520	1,578	1,640	1,707	1,778	1,837	1,864
0.31	1,214	1,272	1,327	1,378	1,427	1,453	1,486	1,513	1,535	1,551	1,562	1,556	1,616	1,684	1,760	1,842	1,923	1,951
0.33	1,236	1,294	1,348	1,398	1,446	1,479	1,513	1,542	1,565	1,582	1,594	1,596	1,654	1,720	1,793	1,873	1,955	1,985
0.35	1,256	1,313	1,366	1,416	1,463	1,503	1,539	1,569	1,593	1,612	1,625	1,633	1,689	1,752	1,823	1,900	1,984	2,017
0.37	1,274	1,330	1,382	1,431	1,477	1,526	1,563	1,594	1,620	1,640	1,654	1,668	1,721	1,781	1,849	1,925	2,010	2,046
0.39	1,289	1,344	1,396	1,444	1,489	1,548	1,586	1,618	1,645	1,667	1,682	1,699	1,750	1,808	1,873	1,946	2,034	2,073
0.41	1,301	1,356	1,406	1,454	1,498	1,568	1,607	1,641	1,669	1,692	1,708	1,727	1,775	1,831	1,894	1,964	2,056	2,097
0.43	1,311	1,365	1,415	1,461	1,505	1,586	1,627	1,662	1,691	1,715	1,733	1,752	1,798	1,851	1,912	1,979	2,075	2,119
0.45	1,363	1,419	1,478	1,541	1,606	1,621	1,661	1,696	1,724	1,747	1,765	1,799	1,855	1,916	1,983	2,056	2,118	2,164
0.47	1,372	1,429	1,490	1,553	1,620	1,640	1,679	1,713	1,742	1,765	1,782	1,819	1,874	1,934	2,000	2,072	2,141	2,186
0.49	1,379	1,438	1,500	1,566	1,634	1,657	1,696	1,730	1,758	1,781	1,797	1,839	1,892	1,952	2,017	2,088	2,163	2,208
0.51	1,387	1,447	1,511	1,577	1,648	1,672	1,712	1,745	1,773	1,795	1,812	1,857	1,910	1,969	2,033	2,103	2,185	2,230
0.53	1,393	1,455	1,520	1,589	1,660	1,687	1,726	1,759	1,787	1,809	1,825	1,875	1,927	1,985	2,048	2,117	2,205	2,250
0.55	1,399	1,463	1,529	1,599	1,672	1,700	1,739	1,772	1,800	1,821	1,837	1,893	1,944	2,000	2,063	2,131	2,225	2,270
0.57	1,405	1,470	1,538	1,609	1,684	1,713	1,751	1,784	1,811	1,833	1,848	1,910	1,960	2,015	2,077	2,144	2,244	2,290
0.59	1,410	1,476	1,546	1,619	1,695	1,724	1,762	1,795	1,821	1,843	1,858	1,926	1,975	2,030	2,090	2,156	2,263	2,308
0.61	1,373	1,461	1,546	1,629	1,709	1,748	1,779	1,806	1,829	1,847	1,861	1,866	1,922	1,987	2,061	2,144	2,294	2,338
0.63	1,383	1,471	1,557	1,640	1,721	1,754	1,785	1,811	1,833	1,851	1,864	1,873	1,927	1,990	2,062	2,143	2,294	2,338

To access this window, select **Edit > Virtual Volumetric Efficiency** in the menu bar.

## EDITING VIRTUAL VE TABLES

A brief summary of the procedure for modifying a virtual VE table can be found below. See the [HP Tuners Live Training session](#) on Speed Density Tuning for details.



**NOTE:** If you have changed the fuel injectors, it is critical that you have accurate data for the new injectors entered under Engine > General > Injector Control. If the injectors are not accurately described here, your VE table configuration will not be correct.

1. If the engine also has a MAF sensor, it is necessary to temporarily force the engine to use speed-density mode in order to gather the data necessary for VE table calibration. See *Forcing Speed-Density Mode on a GM Vehicle* (Page 89).
2. Use the VE Mode and Camshaft Angle controls to select a version of the VE table to configure.
3. Configure the data in the VE table using the same methods you would use for a conventional VE table.
4. When you have a version of the table data that you want to flash to the vehicle, click **Calculate Coefficients** to update the VE Coefficients tables based on your modifications.
5. Flash the revised tune file to the vehicle.
6. In VCM Scanner, create a log containing fuel trim data at various rpms.
7. Use the observed fuel trim data to determine what changes to the virtual VE table (if any) are needed. If further changes are needed, return to step 3 and make further modifications.
8. If the vehicle has a MAF sensor, restore MAF sensor operation by reversing the changes made in step 1.

## VE MODE

Some vehicles have a (runner control) switch in the intake manifold that can be open or closed. It is possible to configure a separate VE table for each position of the switch.

On vehicles that support Displacement on Demand (DoD), an alternate version of each table can be configured for use when cylinders have been deactivated.

Use this dropdown menu to select the version of the VE table to configure.

- Manifold Switch Closed
- Manifold Switch Closed (DoD)
- Manifold Switch Open (DoD)
- Manifold Switch Open

Vehicles that do not have an intake manifold runner control switch use only the Manifold Switch Open version(s) of the table.

Vehicles that do not support DoD use only the non-DoD versions of the table.

## CAMSHAFT ANGLES

On VVT vehicles, a separate VE table can be configured for each CAM angle combination. Select a combination of intake and exhaust cam angles to configure the VE table used for that combination.

On fixed cam (non-VVT) vehicles, these can be left at 0.

## FORCING SPEED-DENSITY MODE ON A GM VEHICLE

When modifying a VE table, it is necessary to temporarily force the vehicle into speed-density mode so that the effect of your changes can be accurately observed in VCM Scanner.



**NOTE:** This procedure involves changing parameters whose original values will need to be restored later. Make note of the initial value of each parameter before you change it.

Follow these steps.

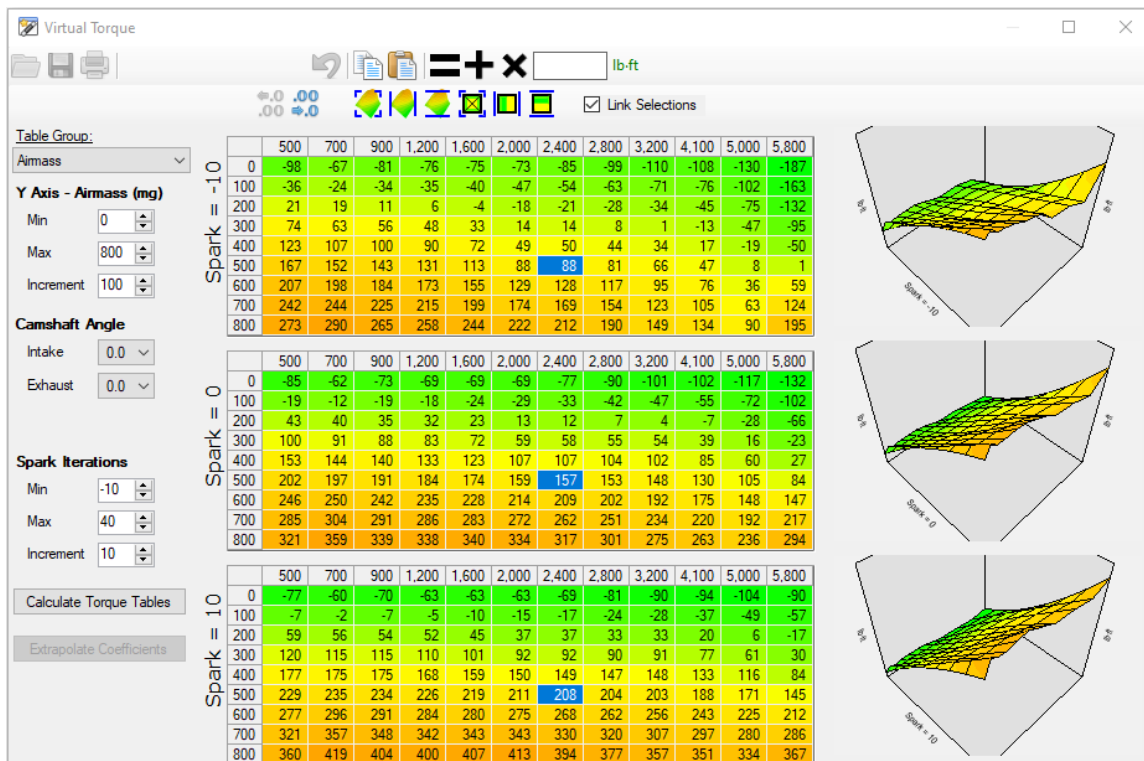
1. Navigate to **Engine > Airflow > Dynamic**.
2. Set **High RPM Disable** to an rpm value higher than the engine will reach. (8000 is usually good)
3. Navigate to **Engine Diagnostics > Airflow**.
4. Set **MAF Frequency Fail High** to 0 Hz.
5. Some GM trucks will also have two parameters named **High Count Thresh** and **Low Count Thresh** in the Mass Airflow Sensor group. If you see these parameters, set them both to 0.
6. Navigate to **Engine Diagnostics > DTCs**.
7. Change the **Error Mode** for codes P0101, P0102, and P0103 to MIL on First Error.

## VIRTUAL TORQUE

The Virtual Torque window is used to configure torque management on GM vehicles with Gen 4 and Gen 5 controllers. In these controllers, torque management is designed to protect the transmission by setting limits on how much torque the engine can deliver. However, this can be a concern to some tuners because it may limit the amount of power delivered by performance modifications.



**CAUTION:** Boosting the limits set here reduces the ability of the vehicle to protect its transmission. Proceed at your own risk. NEVER configure these tables to handle more torque than the engine will actually produce.



The window displays a series of tables, each of which correspond to an amount of spark advance or retard. When the engine is running, the ECM will use the table closest to the amount of spark advance employed at the moment.

The X-axis of these tables is rpm. The Y-axis is either cylinder airmass (in mg) or manifold air pressure (in kPa), depending on what is selected in the **Table Group** dropdown.

## CONFIGURING A TABLE GROUP



**NOTE:** Since manifold air pressure and airmass are key inputs to these tables, it is important that Virtual VE tuning be complete and as accurate as possible before you begin. Without accurate input, achieving a good output is highly unlikely.

1. Use the **Table Group** dropdown to select the group of tables to be modified.
2. Edit the tables in the group as needed.
3. Click **Extrapolate Coefficients**.
4. Click **Calculate Torque Tables**.

## EDITING THE TABLES IN TANDEM

Because the displayed tables perform the same function at different levels of spark advance, you may wish to make similar changes to all of them at the same time. VCM Editor helps you do this by providing the **Link Selections** checkbox.

When Link Selections is checked, selecting a cell or group of cells in one table will select the same cell(s) in the other tables. Changes made to the selected cells will then apply to all tables.

## TABLE GROUP

There are several different versions of the virtual torque tables. Select a table group here to specify which version of the tables is displayed to the right. There are two basic table groups:

- **Airmass.** In this group of tables, the Y axis is cylinder airmass (in mg)
- **MAP.** In this group of tables, the Y axis is manifold air pressure (kPa)

Additionally, there is an E85 version of each table group. These tables will be used if the vehicle is configured for flex fuel applications and has been filled with E85 (high ethanol content) fuel.

There is also a DoD version of each table group. In vehicles that support Displacement on Demand, these tables will be used when cylinders have been deactivated.

## Y AXIS MIN, MAX, AND INCREMENT

These fields configure the Y-axis labels for the table group selected above.

## CAMSHAFT ANGLE

On VVT vehicles, a separate version of each table group can be configured for each CAM angle combination. Select a combination of intake and exhaust cam angles to configure the table group used for that combination.

On fixed cam (non-VVT) vehicles, these can be left at 0.

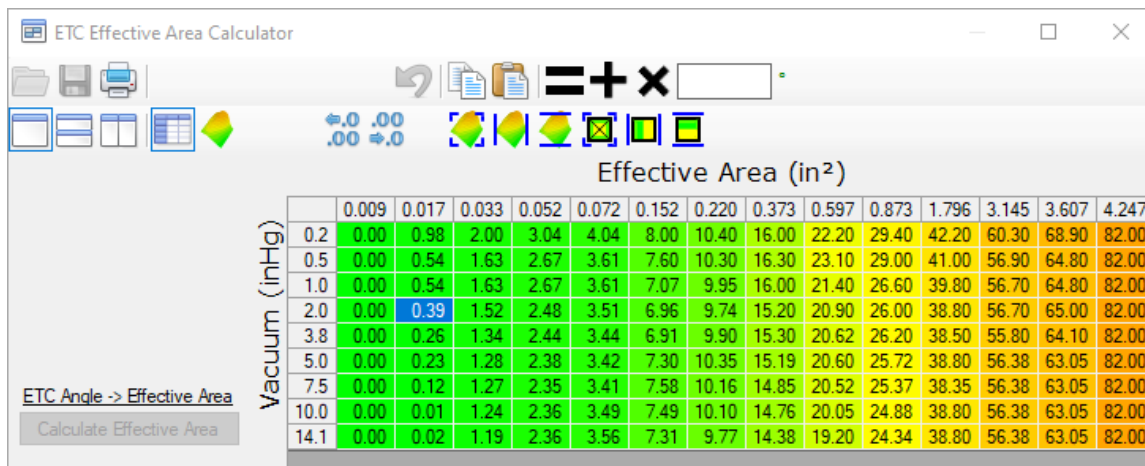
## SPARK ITERATIONS

These fields configure the amount of spark advance or retard that each of the tables is keyed to.



## ETC EFFECTIVE AREA CALCULATOR

The ETC Effective Area Calculator is a tool that can be used when configuring Ford vehicles to work with a different model throttle than was installed previously.



The X-axis of this table is the effective area of the throttle body. The Y-axis is throttle vacuum.

Entering throttle angle data in this table and clicking **Calculate Effective Area** updates the two Throttle Body Model tables at Engine > Airflow > Electronic Throttle:

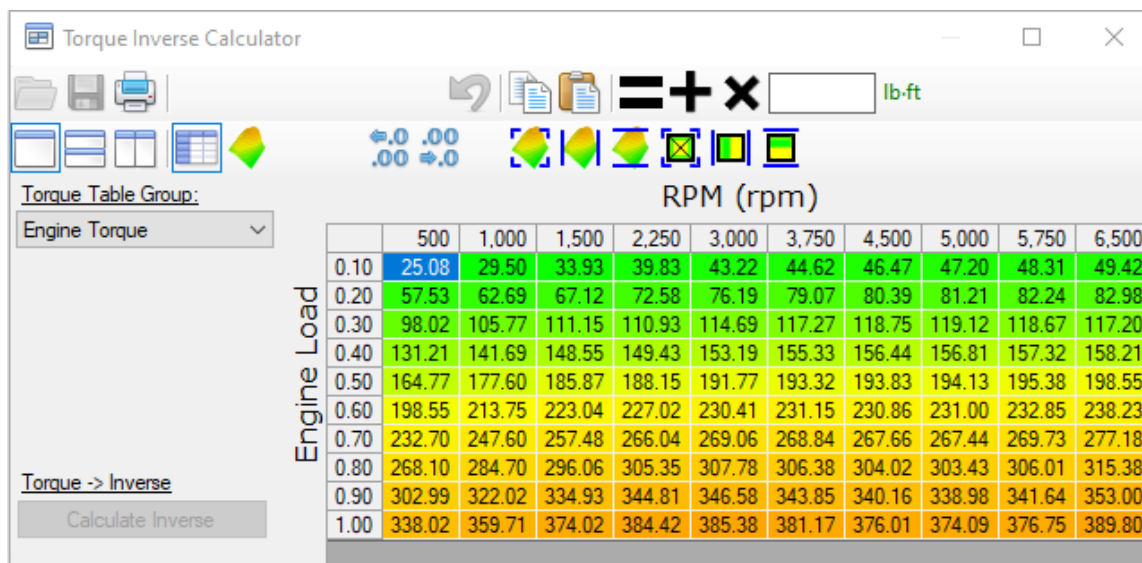
- **Effective Area.** The engine controller uses this table to calculate the airflow through the throttle body. It is (roughly) the inverse of the table here.
- **Predicted Throttle Angle.** The engine controller uses this table to determine the throttle angle required to deliver the desired airflow. The angles entered here will be copied into the body of this table.



**NOTE:** The axis labels in this window are copied from the Predicted Throttle Angle table. If you wish to change them, they must be changed in that table rather than in this window.

## TORQUE INVERSE CALCULATOR

The Torque Inverse Calculator is a tool that can be used when configuring the torque model on Ford vehicles.



	500	1,000	1,500	2,250	3,000	3,750	4,500	5,000	5,750	6,500
0.10	25.08	29.50	33.93	39.83	43.22	44.62	46.47	47.20	48.31	49.42
0.20	57.53	62.69	67.12	72.58	76.19	79.07	80.39	81.21	82.24	82.98
0.30	98.02	105.77	111.15	110.93	114.69	117.27	118.75	119.12	118.67	117.20
0.40	131.21	141.69	148.55	149.43	153.19	155.33	156.44	156.81	157.32	158.21
0.50	164.77	177.60	185.87	188.15	191.77	193.32	193.83	194.13	195.38	198.55
0.60	198.55	213.75	223.04	227.02	230.41	231.15	230.86	231.00	232.85	238.23
0.70	232.70	247.60	257.48	266.04	269.06	268.84	267.66	267.44	269.73	277.18
0.80	268.10	284.70	296.06	305.35	307.78	306.38	304.02	303.43	306.01	315.38
0.90	302.99	322.02	334.93	344.81	346.58	343.85	340.16	338.98	341.64	353.00
1.00	338.02	359.71	374.02	384.42	385.38	381.17	376.01	374.09	376.75	389.80

Entering torque data in this table and clicking **Calculate Inverse** updates the two Torque Calculation tables at Engine > Torque Model > General:

- **Engine Torque.** This table specifies the amount of torque (before friction and accessory losses) that the engine makes based on rpm and engine air load. Changes to the torque values in the Torque Inverse Calculator are copied directly into the corresponding cells in the Engine Torque table.
- **Inverse.** When the scheduled torque (the final amount of torque that the engine controller will request, including all adjustments) has been calculated, this table is used to convert the scheduled torque to the amount of engine air load that would be needed to achieve that torque. The Inverse table is (roughly) the inverse of the table in the Torque Inverse Calculator.



**NOTE:** The axis labels in this window are copied from the Engine Torque table. If you wish to change them, they must be changed in that table rather than in this window.

## THE GEAR/TIRE WIZARD

When tuning GM vehicles, the Gear/Tire Wizard can be used to calibrate the speedometer and scale the transmission tables to adjust for a new gear ratio or tire size.

1. In the menu bar, select **Edit > Gear/Tire Wizard**. The Gear/Tire Wizard window appears.

Current		New
30.94	Tire Size	
3.42	Gear Ratio	

☒ Adjust Speedometer Calibration  
☒ Scale Transmission Parameters

Multiplier: 1.0

Adjust

2. In the column on the right, enter the new **Tire Size** in inches. If the size has not changed, enter the same value.



**NOTE:** This value is the height of the tires. It must be entered in inches, even if metric units are selected.

3. In the column on the right, enter the new **Gear Ratio**. If the ratio has not changed, enter the same value.
4. Normally, the wizard will automatically determine a **Multiplier** for scaling the transmission tables that maintains similar shift RPMs. If you would prefer to manually enter a different multiplier:
  - a. In the upper-right corner of the window, select **Manual Scale**.
  - b. Enter the new value in the **Multiplier** box.
5. Click the **Adjust** button.

## NEURAL NETWORK TRAINING

Neural Network Trainer is an online tool from HP Tuners that allows tuners to configure the complex neural networks used by some modern vehicle controllers to model Volumetric Efficiency.



**NOTE:** Select 2010+ FCA and 2019+ GM vehicles are eligible for neural network training

Neural networking is an artificial intelligence concept that can be used to "train" computing systems. Such systems "learn" by recognizing patterns in sample input and output data and then apply that learning to determine a reasonable result from any input data received.

In the past, aftermarket calibration tools have been unable to configure neural networks because the calibration data produced by a neural network is often too complex to configure directly.

Neural Network Trainer takes a different approach: it allows you to specify the sample data used to train the neural network. You teach the network. It learns from you.

## CONFIGURATION OVERVIEW



**NOTE:** It takes 25 Tuner Tools Tokens to license a vehicle for one month of neural network training. Tokens can be purchased from the My Account page of the Tuner Tools website.

1. Use VCM Editor to read the vehicle's current tune.
2. Export a training file.
3. Upload the training file to the Tuner Tools website. Neural Network Trainer will process the base file and produce files containing configurable VE tables.
4. Download the VE table files produced by the Tuner Tools website and open them in the Neural Network Trainer window of VCM Editor.
5. Modify the VE tables as desired and export a new training file.
6. Upload the new training file to the Tuner Tools website. Neural Network Trainer will process the base file and produce trained files.
7. Open the trained files in VCM Editor and flash the updated tune to the vehicle.

See *Detailed Training Procedure* (Page 98) for more information.

## DETAILED TRAINING PROCEDURE

Follow these steps to train a vehicle using **Neural Network Trainer**:

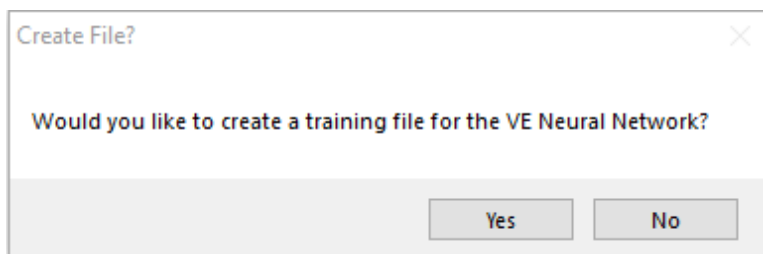
1. Using VCM Editor, read the vehicle's current tune. When the read is complete, the current tune will open in VCM Editor.
2. In the menu bar, select **Edit > VE Neural Network Trainer**.



**NOTE:** This menu option is displayed only for vehicles that are eligible for neural network training. At present, only select 2010+ Fiat Chrysler and 2019+ GM vehicles are eligible.

3. In the toolbar of the Neural Network Trainer window, click .

4. VCM Editor will display a prompt like the following for each supported neural network found in the tune.

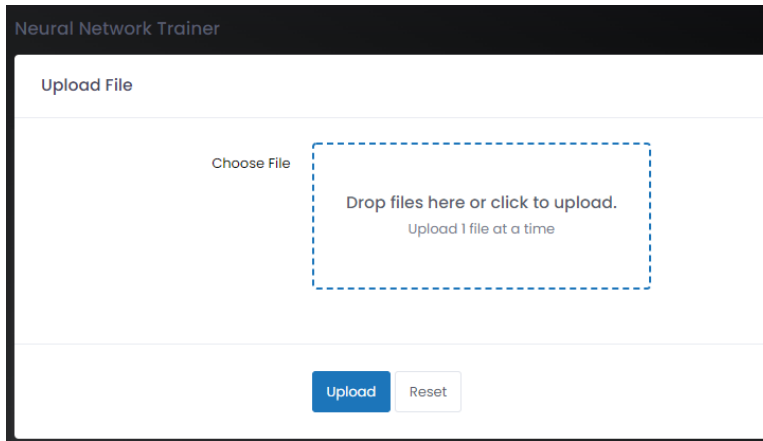



5. If you wish to train the indicated network, create a training file:
  - a. Select **Yes**.
  - b. Enter a name for the new training file.
  - c. Click **Save**.



**NOTE:** Some vehicle calibrations may support multiple neural networks. If you wish to train all supported networks, you will need to create and edit a file for each.

6. Navigate to [tunertools.hptuners.com](https://tunertools.hptuners.com).
7. Log into your account.
8. Select **Neural Network Trainer**.



9. Upload all files created in steps 3 through 5.
10. Once all files have been processed, a Download button will become available. Download all files.
11. Return to the Neural Network Trainer window in VCM Editor.
12. In the menu bar of this window, click .
13. Browse for and open the file saved in Step 10. The VE tables generated from the vehicle's initial tune should now be available for viewing and editing.



**NOTE:** There will be one table per camshaft angle combination. This could total 25 or more tables.

14. Modify the generated VE tables as desired. Follow these steps for each table:



- a. Use the dropdown menus on the left to select a cam angle combination. The corresponding VE table will appear on the right.

Intake Cam  
75

Exhaust Cam  
70

☒ Use Table for Training

	480	804
0.13	-31.811	-26.874
0.18	-33.312	-28.007
0.24	-34.451	-28.765
0.29	-35.192	-29.113
0.34	-35.497	-29.025

- b. If you want to use this table for training, check the **Use Table for Training** box.



**NOTE:** You can accelerate the process by selecting fewer tables for training. However, this reduces training accuracy.



**NOTE:** Deselecting a table can also be used to disable unused VE tables. For example, Dodge/RAM/Jeep vehicles with Hellcat engines only use a fraction of the 25 available tables.

- c. If you are using this table, edit the table values as desired.



**NOTE:** Editing a large number of tables may take several sessions. If needed, you can save your progress using the **Save Current Progress** button and then come back later.

Save Current Progress

Export for Training


0.87	
0.92	
0.97	
1.02	
1.08	
1.13	1

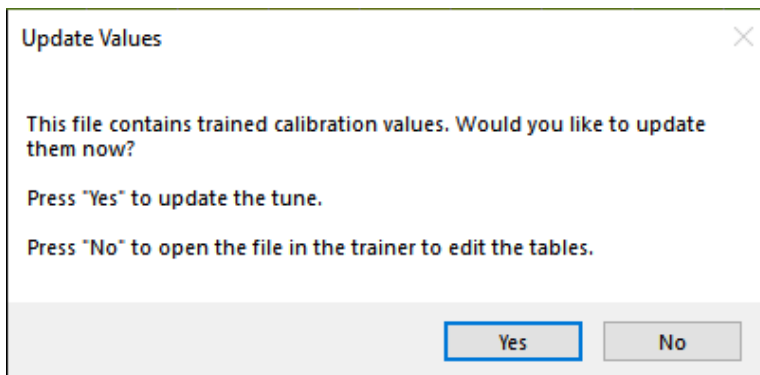
15. Once all tables that are selected for training have been modified, click **Export for Training**.
16. Return to [tunertools.hptuners.com](https://tunertools.hptuners.com) and ensure that you are logged in.
17. Select **Neural Network Trainer**.
18. Upload the file generated in Step 15. Neural Network Trainer will begin training the file.



**NOTE:** This process may take several minutes.

When training is complete, a Download button appears.

19. Click **Download** to save the trained file.
20. Return to the Neural Network Trainer window in VCM Editor.
21. In the menu bar of this window, click .
22. Browse for and open the file saved in Step 19. VCM Editor will prompt you to update the file with the new calibration values.

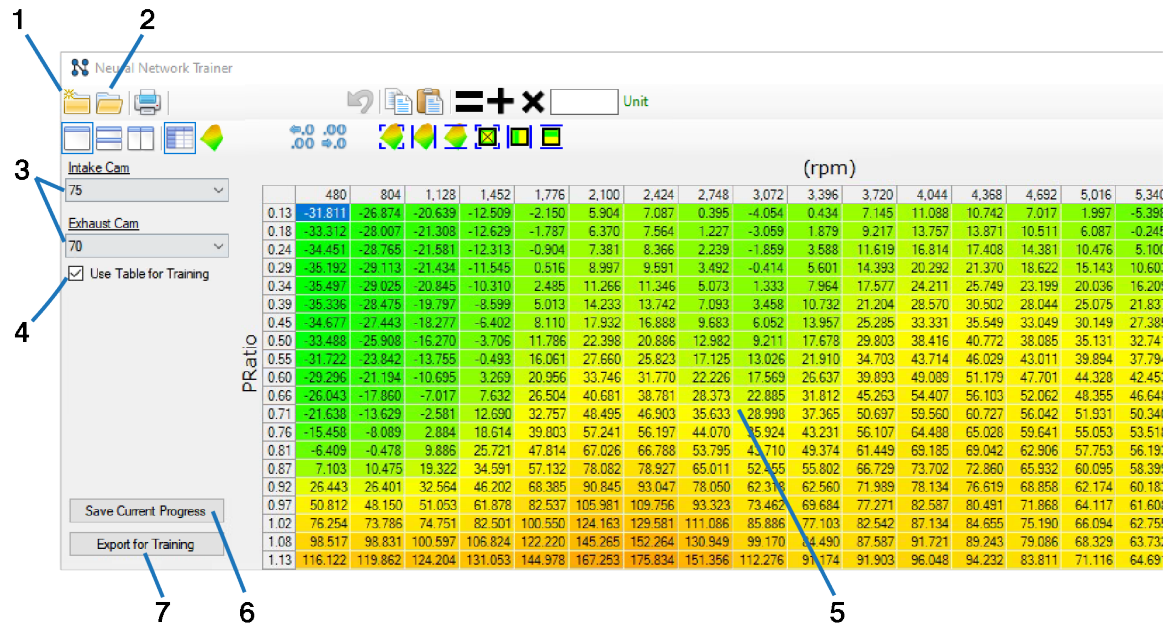


- If you want to flash the vehicle with these values, click **Yes**. This will close the Neural Network Trainer window and update the tune to include the trained values. Proceed to Step 23.
- If you would like to continue editing the trained tables, click **No** and return to Step 14.

- 23.** Flash the updated tune to the vehicle using VCM Editor.
- 24.** If additional adjustments are needed, they can be made by returning to Step 20 and editing the last saved training file.

## NEURAL NETWORK TRAINER WINDOW

If the vehicle being tuned supports **Neural Network Training**, this window can be used to prepare volumetric efficiency data to be submitted to the Neural Network Trainer at [tunertools.hptuners.com](http://tunertools.hptuners.com). Files processed by the trainer can be edited here to prepare them for further training or exported to the tune file.



Item	Description
1.	<b>Create New.</b> Click this icon to create a new training file from the current tune.
2.	<b>Open Trained File.</b> Click this icon to open a saved training file.
3.	<b>Cam Angle Selectors.</b> Use these dropdowns to select a combination of cam angles. The VE table that corresponds to the selected cam angle combination will be displayed to the right.

Item	Description
4.	<p><b>Use Table for Training.</b> If this box is checked, the table displayed to the right will be included in the VE data submitted to Neural Network Trainer.</p> <p>If this box is NOT checked, the table will not be used for training.</p>
5.	<p><b>VE Table.</b> This area displays the VE table for the combination of camshaft angles selected to the left. Table cells can be modified as needed here.</p>
6.	<p><b>Save Current Progress.</b> Saves all the VE tables configured in this window to a file. This allows you to load the file and continue editing later.</p> <p>This DOES NOT export these tables to your tune file and files saved with this method cannot be opened by Neural Network Trainer.</p>
7.	<p><b>Export for Training.</b> Saves the VE tables configured in this window in a format that can be submitted to Neural Network Trainer.</p> <p>Files in this format cannot be re-opened in this window.</p>

## EDITING DTC LISTS

Lists of Diagnostic Trouble Codes (DTCs) that can be produced by the vehicle are located in the **Engine Diag** group and the **Trans Diag** group. In most cases, VCM Editor allows you to specify whether a particular DTC is reported and whether it will cause the Malfunction Indicator Light (MIL) to be lit.



**NOTE:** Tampering with emissions control devices (including emissions-related DTCs) can be illegal. Check local laws as well as national rules and regulations to determine what is legal to modify. Emission controls should be disabled only in the case of vehicles whose intended use exempts them from emissions regulations (for example, vehicles that are for track use only).

- To view the list of engine-related DTCs, select **Engine Diag > DTCs**.
- To view the list of transmission-related DTCs, select **Trans Diag > DTCs**.

Configuration options available for DTCs vary by vehicle manufacturer.

## CONFIGURING GM DTCs

Engine Diagnostics				
General	Airflow	Pressure	Misfire	DTCs
Description	SES Enable			Error Mode
P0114 Intake Air Temperature Sensor 1 Intermittent/Erratic	<input checked="" type="checkbox"/>			MIL on Second Error
P0116 Engine Coolant Temperature Sensor 1 Circuit Range/Performance	<input checked="" type="checkbox"/>			MIL on Second Error
P0117 Engine Coolant Temperature Sensor 1 Circuit Low	<input checked="" type="checkbox"/>			MIL on Second Error
P0118 Engine Coolant Temperature Sensor 1 Circuit High	<input checked="" type="checkbox"/>			MIL on Second Error
P0119 Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic	<input checked="" type="checkbox"/>			MIL on Second Error
P0121 Throttle/Pedal Position Sensor A Circuit Range/Performance	<input checked="" type="checkbox"/>			MIL on Second Error
P0122 Throttle/Pedal Position Sensor A Circuit Low	<input checked="" type="checkbox"/>			MIL on First Error
P0123 Throttle/Pedal Position Sensor A Circuit High	<input checked="" type="checkbox"/>			MIL on First Error
P0128 Coolant Thermostat (Coolant Temp Below Thermostat Regulating Temperature)	<input checked="" type="checkbox"/>			MIL on Second Error
P012B Turbocharger/Supercharger Inlet Pressure Sensor Circuit Range/Performance	<input type="checkbox"/>			No Error Reported
P012C Turbocharger/Supercharger Inlet Pressure Sensor Circuit Low	<input type="checkbox"/>			No Error Reported
P012D Turbocharger/Supercharger Inlet Pressure Sensor Circuit High	<input type="checkbox"/>			No Error Reported

On GM vehicles, you can configure whether each DTC is reported and whether it triggers the Malfunction Indicator Lamp (MIL) and the SES lamp.

### **SES ENABLE**

Checking this box enables the display of the SES/Check Engine/Service Vehicle Soon lamp when this DTC occurs.

Unchecking this box disables the lamp.



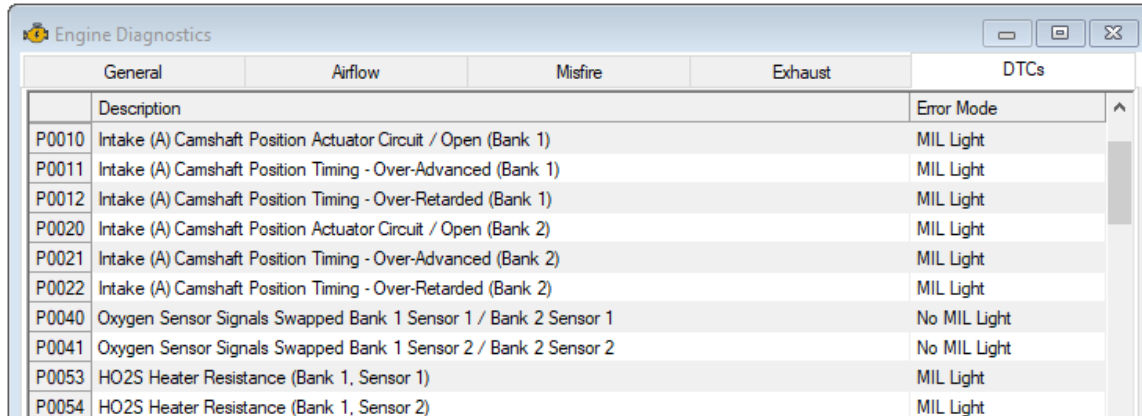
**NOTE:** In some regions, emissions testing will fail automatically if monitoring for emissions-related faults is disabled.

### **ERROR MODE**

The option selected in this dropdown specifies whether the MIL is lit for this DTC and whether the error is reported.

- **MIL on First Error.** Illuminates the MIL the first time the error is detected. This is appropriate for emissions-related faults that should be reported immediately.
- **MIL on Second Error.** Illuminates the MIL if the fault is active for 2 consecutive driving cycles. This is appropriate for emissions-related faults that should trigger the MIL if they are detected consistently, but should NOT trigger the MIL when they are detected infrequently.
- **No MIL Light.** The MIL will not be illuminated for this fault, but the SERVICE lamp will be illuminated. This is appropriate for non-emissions-related faults that should be reported to the driver.
- **No Error Reported.** Neither the MIL nor the SERVICE lamp will be illuminated for this fault. This is appropriate for non-emissions related faults that should not be reported to the driver.

## CONFIGURING FORD DTCS



	General	Airflow	Misfire	Exhaust	DTCs
	Description				Error Mode
P0010	Intake (A) Camshaft Position Actuator Circuit / Open (Bank 1)				MIL Light
P0011	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 1)				MIL Light
P0012	Intake (A) Camshaft Position Timing - Over-Retarded (Bank 1)				MIL Light
P0020	Intake (A) Camshaft Position Actuator Circuit / Open (Bank 2)				MIL Light
P0021	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 2)				MIL Light
P0022	Intake (A) Camshaft Position Timing - Over-Retarded (Bank 2)				MIL Light
P0040	Oxygen Sensor Signals Swapped Bank 1 Sensor 1 / Bank 2 Sensor 1				No MIL Light
P0041	Oxygen Sensor Signals Swapped Bank 1 Sensor 2 / Bank 2 Sensor 2				No MIL Light
P0053	HO2S Heater Resistance (Bank 1, Sensor 1)				MIL Light
P0054	HO2S Heater Resistance (Bank 1, Sensor 2)				MIL Light

On Ford vehicles, the Error Mode dropdown specifies whether each DTC should be reported and whether the MIL should illuminate when the fault occurs. It has three settings:

- **MIL Light.** The MIL will be illuminated when this fault is detected. This is appropriate for emissions-related faults.
- **No MIL Light.** The MIL will not be illuminated when this fault is detected. However, the fault will be reported. This is appropriate for non-emissions-related faults that should be reported.
- **No Error Reported.** The MIL will not be illuminated when this fault is detected and the fault will not be reported. This is appropriate for non-emissions-related faults that should not be reported.



## CONFIGURING DODGE/RAM/JEEP/CHRYSLER DTCS

Engine Diagnostics				
General	Airflow	Misfire	Exhaust	DTCs
	Description	SES Enable	MIL	
P0018	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor A	<input type="checkbox"/>	<input type="checkbox"/>	
P0019	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor B	<input type="checkbox"/>	<input type="checkbox"/>	
P0020	Intake (A) Camshaft Position Actuator Circuit / Open (Bank 2)	<input type="checkbox"/>	<input type="checkbox"/>	
P0021	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 2)	<input type="checkbox"/>	<input type="checkbox"/>	
P0023	Exhaust (B) Camshaft Position Actuator Circuit / Open (Bank 2)	<input type="checkbox"/>	<input type="checkbox"/>	
P0024	Exhaust (B) Camshaft Position Timing - Over-Advanced (Bank 2)	<input type="checkbox"/>	<input type="checkbox"/>	
P0031	HO2S Heater Control Circuit Low (Bank 1, Sensor 1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
P0032	HO2S Heater Control Circuit High (Bank 1, Sensor 1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
P0033	Turbocharger/Supercharger Bypass Valve Control Circuit / Open	<input type="checkbox"/>	<input type="checkbox"/>	
P0033	Turbocharger/Supercharger Bypass Valve Control Circuit / Open	<input type="checkbox"/>	<input type="checkbox"/>	
P0034	Turbocharger/Supercharger Bypass Valve Control Circuit Low	<input type="checkbox"/>	<input type="checkbox"/>	
P0035	Turbocharger/Supercharger Bypass Valve Control Circuit High	<input type="checkbox"/>	<input type="checkbox"/>	

On these vehicles, there are two settings for each DTC:

- **SES Enable.** Checking this box enables monitoring for this fault. Unchecking it disables the monitor.



**NOTE:** In some regions, emissions testing will fail automatically if monitoring for emissions-related faults is disabled.

- **MIL.** Check this box if the MIL should be illuminated when this fault is detected.

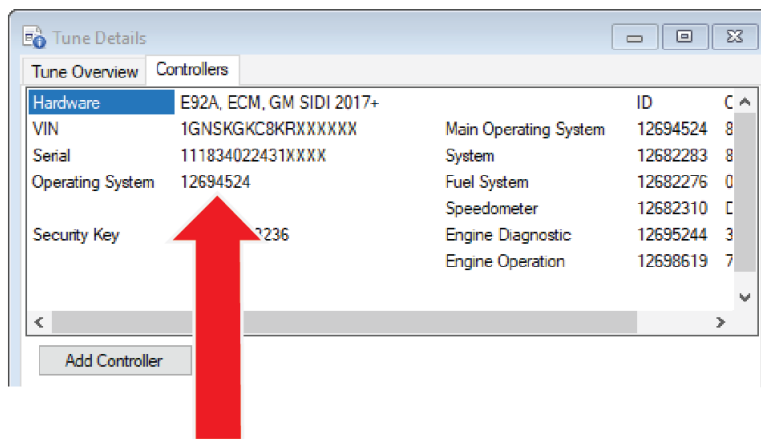


# TUNE FILE UTILITIES

## SEGMENT SWAPS

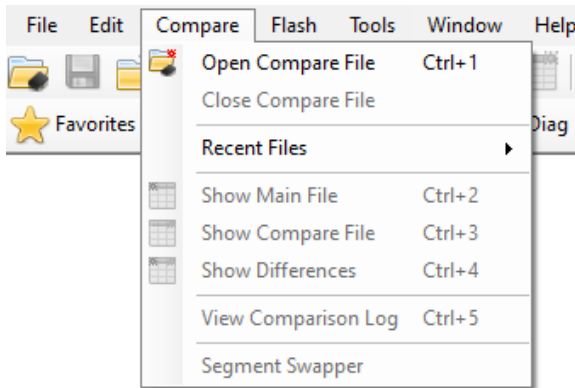
Segment Swaps can only be performed with files whose Operating System IDs match exactly.

The Operating System ID can be found in the Tune Details window. (In the menu bar, select **Edit > Calibration Details**.)

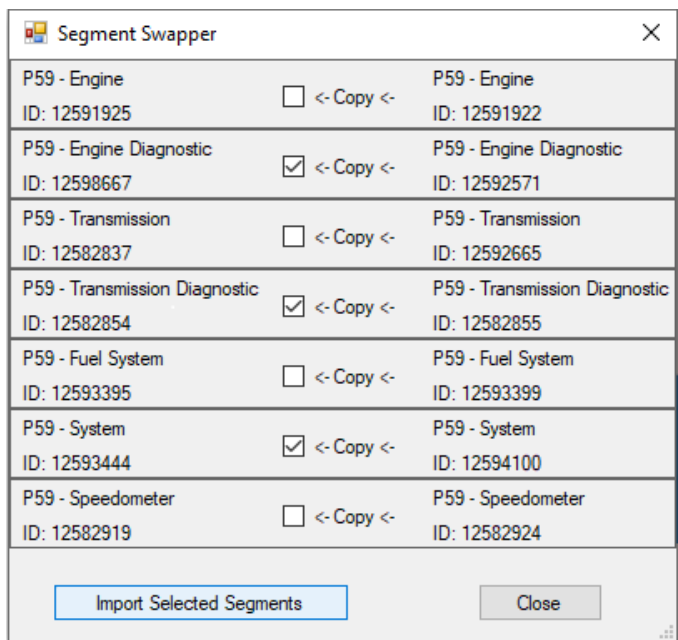


To perform the segment swap, follow the instructions below:

1. In the menu bar, select **File > Open**.
2. Select the tune file that you wish to move segments to.
3. Once the first file has been opened, the **Compare** menu becomes available.
4. In the menu bar, select **Compare > Open Compare File**.



- 5. Select the file containing the segments you want to copy.
- 6. Select the **Segment Swapper** feature in the Compare menu.



- 7. Select the segments you would like to move to the base file.
- 8. Click **Import Selected Segments**.
- 9. Click **Close** and save the file.

## CHANGING A VEHICLE'S VIN

For certain vehicles, VCM Editor supports changing the VIN. However, the new VIN must be valid for the operating system that VCM Editor finds on the VCM you are programming.

This method changes the VIN without having to write a new tune file to the vehicle. Using the Change VIN Wizard will not change the VIN of the file you currently have open.

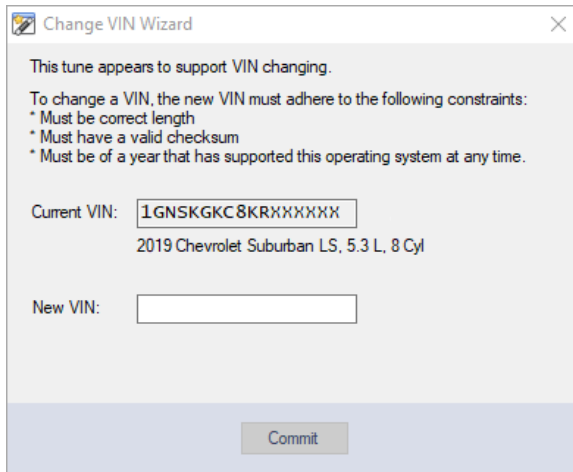


**NOTE:** For some vehicles, you will be required to purchase an additional license for the new VIN.

### PROCEDURE

To make VIN changes permanent please use the following steps:

1. Connect the laptop running VCM Editor to the vehicle whose VIN you wish to change. See *Connecting to a Vehicle* (Page 21) for instructions.
2. If you do not already have a tune file read from this vehicle, perform a read now. See *Reading a Vehicle* (Page 27).
3. With this vehicle's tune file open in VCM Editor, select **Edit > Change VIN Wizard** in the menu bar. The Change VIN Wizard appears.

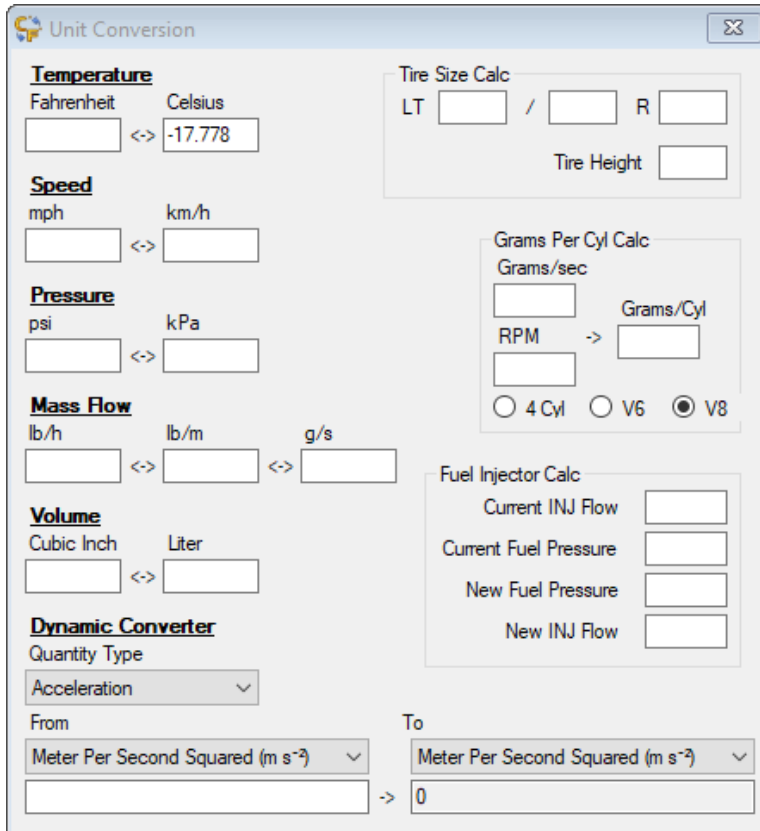


4. Enter the new VIN and click **Commit**.
5. Wait 15 seconds after VIN changes have completed.
6. Turn Ignition off for 30 seconds.
7. Turn Ignition on for 30 seconds.
8. Turn Ignition off for 30 seconds.
9. Turn Ignition on for 30 seconds.

The new VIN is now stored.

## UNIT CONVERSION WINDOW

The Unit Conversion window is a handy tool for performing common unit conversions.



**Unit Conversion**

**Temperature**  
 Fahrenheit Celsius  
 <->

**Speed**  
 mph km/h  
 <->

**Pressure**  
 psi kPa  
 <->

**Mass Flow**  
 lb/h lb/m g/s  
 <->  <->

**Volume**  
 Cubic Inch Liter  
 <->

**Dynamic Converter**  
 Quantity Type  
 Acceleration  
 From To  
 Meter Per Second Squared (m s<sup>-2</sup>) Meter Per Second Squared (m s<sup>-2</sup>)  
 ->

**Tire Size Calc**  
 LT  /  R   
 Tire Height

**Grams Per Cyl Calc**  
 Grams/sec  
 Grams/Cyl  
 RPM ->   
☐ 4 Cyl ☐ V6 ☒ V8

**Fuel Injector Calc**  
 Current INJ Flow   
 Current Fuel Pressure   
 New Fuel Pressure   
 New INJ Flow

To open this window, do either of the following:

- In the menu bar, select **Tools > Unit Conversion**
- In the toolbar, click 



## COMMON UNIT CONVERSIONS

The Temperature, Speed, Pressure, Mass Flow, and Volume on the left side of the window represent the most common unit conversions. Just type a value in any of these fields to obtain the other values in the category.

## DYNAMIC CONVERTER

The dynamic converter can be used to perform many unit conversions that aren't included in the common unit conversions displayed above it.

1. In the **Quantity Type** dropdown, select the type of unit that you would like to convert (Acceleration, Area, Length, etc.).
2. In the **From** dropdown, select the unit that you would like to convert FROM.
3. Enter the value that you would like to convert in the box below the From dropdown.
4. Use the **To** dropdown to select the unit that you would like to convert TO.

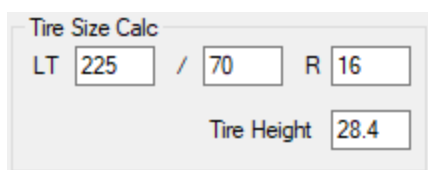
## TIRE SIZE CALCULATOR

This tool can be used to quickly find the height in inches of a metric sized tire.

### USING THE TOOL

To use the tire size calculator, just enter the three values from the metric tire size in the boxes in the top row of the tool. The tire height in inches will appear in the Tire Height box.

For example, a metric size of 225/70R16 would be entered as shown below:



The screenshot shows a window titled "Tire Size Calc". It contains a row of input boxes: "LT" followed by a box containing "225", a "/" symbol, a box containing "70", "R", and a box containing "16". Below this row, there is a label "Tire Height" followed by a box containing the value "28.4".

### *HOW METRIC SIZING WORKS*

Metric tire sizes are written in the format:

<width in mm>/<sidewall height as a percentage of width> **R**<rim diameter>

For example tire whose size is given as **225/70R16** has:

- a width of 225 mm
- sidewalls that are 157.5 mm (70% of 225 mm) high
- a 16 inch rim diameter

### **GRAMS PER CYLINDER (AIRMASS) CALCULATOR**

This tool is a quick way to calculate the mass of air in each cylinder.

1. In the **Grams/sec** box, enter the dynamic airflow.
2. Enter the **RPM**.
3. Select the number of cylinders.

The cylinder airmass will appear in the **Grams/cyl** box.

### **FUEL INJECTOR CALCULATOR**


This calculator can be used to find the correct flow rate for a new fuel injector.

1. In the first two boxes, enter the injector flow rate (in g/sec) and the fuel rail pressure of the injectors you are replacing. If you are replacing the stock injectors, use the vehicle manufacturer's spec. values for both.
2. In the **New Fuel Pressure** box, enter the fuel rail pressure for the new injectors.

## VIEWING TUNE HISTORY

The Tune History window can be used to view all changes to the current tune file and to compare the current version of the file to any previously saved version.

To open this window, do one of the following:

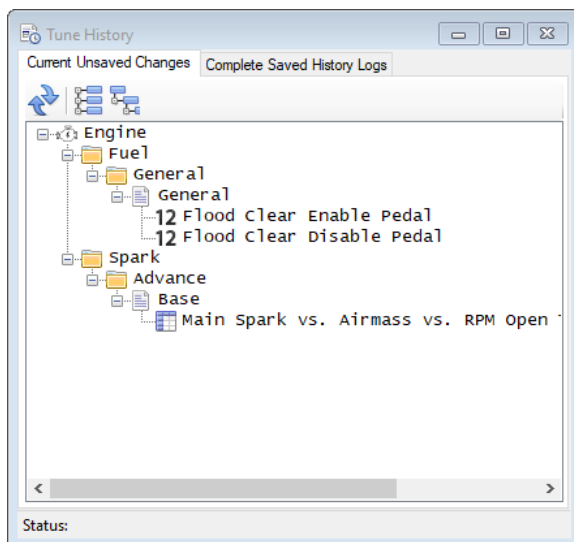
- In the menu bar, select **Edit > View Change/History Logs**.
- In the toolbar, select the  icon.

The window has two tabs:

- Current Unsavd Changes
- Complete Saved History Logs

## CURRENT UNSAVED CHANGES

The Current Unsavd Changed tab lists all changes made since the last time the file was saved.



### ***EXAMINING CHANGED PARAMETERS***

To examine the parameters changed since the last save:

1. Expand the tree to locate the parameter you wish to view.
2. Double-click a parameter to view and edit its value.

### ***TOOLBAR***

The toolbar at the top of this tab includes the following:



Refresh. Update the list to include any new items changed since you opened the window.



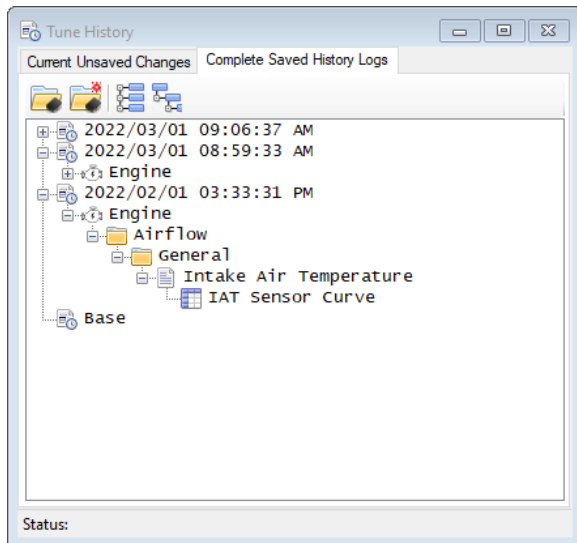
Collapse all items in the list.



Expand all items in the list.


## COMPLETE SAVED HISTORY LOGS

Each time you save a tune file, a time stamped record of the changes made since the last save is added to the Complete Saved History Logs tab.




This is useful if you want to compare the file to an earlier version of itself or roll back to an earlier version of the file.

### COMPARING THE CURRENT FILE TO A PREVIOUS VERSION

1. Select the version of the file to use for the comparison.
2. Click . The selected version opens as the compare file.

See *Comparing Two Tune Files* (Page 66) for more information on the file compare feature.

### ***ROLLING BACK TO A PREVIOUS VERSION***

1. Select the version of the file to roll back to.
2. Click . The selected version opens in a new window.
3. Save the file from the new window.

### ***EXAMINING CHANGED PARAMETERS***

To examine the parameters changed in any particular saved version:

1. Expand the tree under the desired save. You can drill down all the way to the individual changed parameters.
2. Double-click a parameter to view its value.

### ***TOOLBAR***

The toolbar at the top of this tab includes the following:



Open the selected version of the file in a new window.



Open the selected version of the file as the compare file.



Collapse all items in the list.



Expand all items in the list.

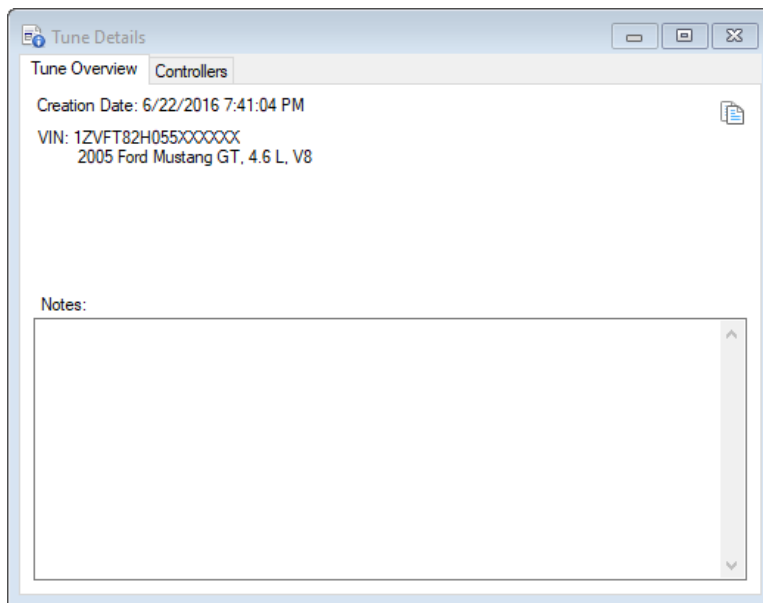
## VIEWING TUNE DETAILS

The Tune Details window contains key information about the vehicle being tuned and its controllers.

To open this window, do one of the following:

- In the menu bar, select **Edit > Calibration Details**.
- In the toolbar, select the  icon.

### TUNE OVERVIEW TAB




The tune overview tab contains general information about the tune file being edited, including:

- The date and time of the file's creation. This typically indicates when the file was read from the vehicle. However, if you built this file using the Stock File Provider on the Tuner Tools website, this will reflect the date the file was built.
- The VIN and model description of the vehicle from which this file was read.

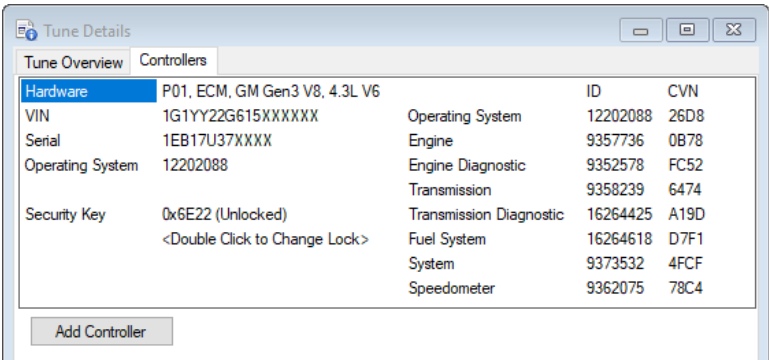
**ADDING NOTES**

You can add your own notes to the tune file by typing them in the **Notes** box.

**COPYING INFORMATION FROM THIS WINDOW**

Click the  icon to copy the text from both tabs in this window to the clipboard. This is useful if you need to paste any of this data (VIN, controller serial numbers, etc.) elsewhere.

**CONTROLLERS TAB**



For each ECM, TCM, or PCM in the tune file, this tab will display a box that shows the controller name, serial number, and operating system ID.

**SECURITY KEY**

Some GM ECMs have a security key which can be used to lock access to the controller. This type of security is called "Tuner Lock". See *Tuner Lock* (Page 134) for more information.



### ***ADDING A CONTROLLER***

If the vehicle has a supported controller that is not in the current tune file, you can add the controller to the file in this window. For example, you might need to do this if you chose not to include this controller in the initial read of the vehicle.

1. Click the **Add Controller** button.
2. Select a tune file that includes the controller to be added.

### ***REMOVING A CONTROLLER***

In some cases, a controller can be removed from the tune file. You might do this for reasons such as:

- If your file contains a TCM, but you do not wish to make any modifications to the TCM configuration, you might want to remove the TCM from the file so that you don't have to license it.
- If you replace a TCM with a completely different model, you can remove the old TCM here and then add the new one.

If a controller can be removed, the text **<Double Click to Remove>** appears in the controller information. Double-clicking this box will force you to save the tune to a new file and reopen. The new file will not contain the removed controller.

# THE LICENSE INFORMATION WINDOW

The License Information window lists your current licenses and includes a summary of how many upgrade credits you have available.

To access the License Information window, select **Help > License Information** in the menu bar.

## PAID LICENSES TAB

This tab lists each vehicle license that you have paid for and how many credits you paid for each of these licenses.



License Information					
2141234XXX					
Paid Licenses		Free Licenses		License Upgrade Paths	
License Type	Type	Credits	Description	Note	Details
Specific Controller		2	Dodge GPEC2A 2015+		T00EP0866CXXXX
Specific Controller		4	Dodge ZF8HP		T05UN09565XXXX

In the example above, the user has licensed 2 specific controllers: 1 Engine Control Module and 1 Transmission Control Module. In this case, both controllers reside in the same vehicle.

FREE LICENSES TAB

If you have purchased one more unlimited Year/Model licenses, vehicles that you have been able to flash for free because you have this type of license will be listed here.

License Information

2144740XXX

Paid Licenses

Free Licenses

License Upgrade Paths

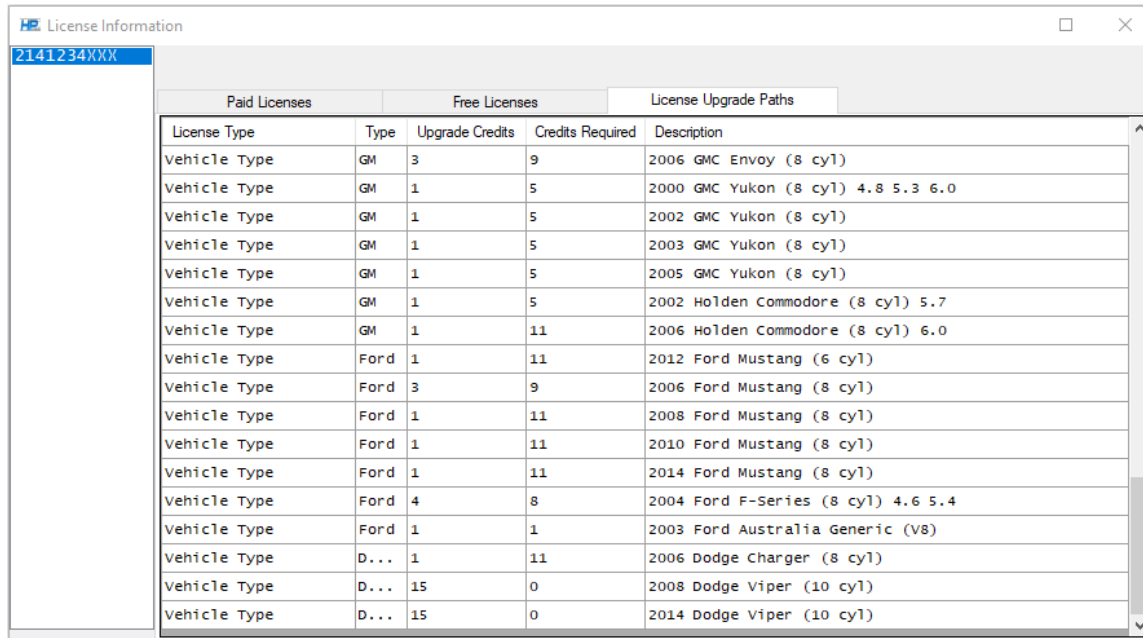
License Type	Description	Details
Specific Vehicle	2000 Chevrolet Camaro (8 cyl)	1DG0P9ZZ9264XXXX
Specific Vehicle	1999 Pontiac Firebird (8 cyl)	2DG0FNNL9155XXXX
Specific Vehicle	2002 Pontiac Firebird (8 cyl)	1EB22E0X1269XXXX
Specific Vehicle	2002 Pontiac Firebird (8 cyl)	2EB31GZN2126XXXX
Vehicle Type	2001 GMC Sierra (8 cyl) 4.8 5.3 6.0 8.1	

There are two types of licenses that are listed here:

- **Specific Vehicle.** These are individual vehicle licenses that were covered by an unlimited Year/Model license you had already purchased.
- **Vehicle Type.** These are year/model licenses that you received because the vehicles covered are essentially the same vehicle type as an unlimited license you had already purchased.

## LICENSE UPGRADE PATHS TAB

The License Upgrade paths tab displays the number of upgrade credits you have earned and how many additional credits you would need to purchase each upgrade.



License Information				
2141234XXX				
Paid Licenses		Free Licenses		License Upgrade Paths
License Type	Type	Upgrade Credits	Credits Required	Description
Vehicle Type	GM	3	9	2006 GMC Envoy (8 cyl)
Vehicle Type	GM	1	5	2000 GMC Yukon (8 cyl) 4.8 5.3 6.0
Vehicle Type	GM	1	5	2002 GMC Yukon (8 cyl)
Vehicle Type	GM	1	5	2003 GMC Yukon (8 cyl)
Vehicle Type	GM	1	5	2005 GMC Yukon (8 cyl)
Vehicle Type	GM	1	5	2002 Holden Commodore (8 cyl) 5.7
Vehicle Type	GM	1	11	2006 Holden Commodore (8 cyl) 6.0
Vehicle Type	Ford	1	11	2012 Ford Mustang (6 cyl)
Vehicle Type	Ford	3	9	2006 Ford Mustang (8 cyl)
Vehicle Type	Ford	1	11	2008 Ford Mustang (8 cyl)
Vehicle Type	Ford	1	11	2010 Ford Mustang (8 cyl)
Vehicle Type	Ford	1	11	2014 Ford Mustang (8 cyl)
Vehicle Type	Ford	4	8	2004 Ford F-Series (8 cyl) 4.6 5.4
Vehicle Type	Ford	1	1	2003 Ford Australia Generic (V8)
Vehicle Type	D...	1	11	2006 Dodge Charger (8 cyl)
Vehicle Type	D...	15	0	2008 Dodge Viper (10 cyl)
Vehicle Type	D...	15	0	2014 Dodge Viper (10 cyl)

In the example above, each row represents a vehicle model year that the user has earned upgrade credits for by purchasing single vehicle licenses:

- The **Upgrade Credits** column shows the number of upgrade credits earned toward the corresponding Year/Model license.
- The **Credits Required** column shows the number of additional credits that would be needed to upgrade to the unlimited license for the corresponding Year/Model.
- The **Description** column shows the Year/Model upgrade that these credits apply to.

# **WRITING TUNES BACK TO THE VEHICLE**

Before you begin, ensure that:

- The vehicle has a fully charged battery. Connecting the vehicle's battery to a battery charger before writing a tune is recommended.
- Your laptop has a fully charged battery.

Follow these steps to write a tune back to the vehicle:

1. Plug the interface cable into the vehicle's OBD-II port. Connect the other end to your PC's USB port. See *Connecting to a Vehicle* (Page 21) for more information.
2. If VCM Scanner is open, close it now.
3. Open VCM Editor. Ensure that a valid tune file for this vehicle is currently open.
4. Select **Write Vehicle** from the Flash menu.



**NOTE:** The first time you attempt to write to each vehicle, you will be prompted to purchase a license for that vehicle. See *Licensing Vehicles* in the VCM Suite Getting Started guide for details.

5. Turn the vehicle ignition to the ON (or RUN) position, but do not start the engine.



**NOTE:** Some vehicles require special procedures to be put in the correct state. See *Putting a Vehicle in the "ON" State* (Page 26) for more information.

6. Make sure the doors are closed and all accessories are turned off.



**CAUTION:** Do not use any vehicle accessories, including the door locking mechanism, during reading or writing procedures.

7. Wait 10 to 15 seconds.
8. Click the **Write** button.
9. Allow the PC to write the VCM until the status bar indicates the write has been completed.

10. Turn off the ignition and unplug the interface cable. Wait at least 15 seconds before restarting the vehicle.
11. The new calibration has now been written to the PCM.



**CAUTION:**

- Do not disrupt the programming session.
- Do not open vehicle doors or use vehicle accessories.
- Do not attempt to program vehicles whose battery voltage is lower than 11.5 Volts.
- Do not attempt to use the vehicle to power or charge the laptop. If it is necessary to provide additional battery power to the laptop, use an external battery that is not connected to the vehicle.

## REWRITE ENTIRE (SELECTED VEHICLES ONLY)

This is a useful feature for the tuner shop or mail order tuner and doesn't apply much to a single-vehicle tuner. What this can allow you to do is program a VCM that came from another vehicle for your specific vehicle type. You must make sure that the VCM hardware matches. This is a very powerful feature and must be used with caution. If you write a VCM with a file that doesn't belong on it, you could damage the VCM and cause it to be unrecoverable. It is not available for all vehicle types.

## VCM RECOVERY

When rewriting the VCM, critical components of the VCM software must be erased and re-written. If the VCM loses power during the writing of these critical system components, the VCM may become unrecoverable. Do not power down the VCM under any circumstances during a write failure using these advanced options.

## "WRITE VCM" FAILED AND NOW MY CAR WON'T START, WHAT DO I DO?

Don't panic. An error has occurred during the write process. Follow these guidelines:

- Make sure the vehicle has sufficient battery voltage for programming.
- Make sure your laptop has sufficient power.
- Make sure all communications cables are connected firmly.
- **DO NOT** pull your VCM's fuse or disconnect battery power in an attempt to correct the problem.
- Restart VCM Editor and open up the same file you wrote to the VCM when the error occurred. It is very important that you use the same file. Try to Write VCM again.
- If the problem persists, contact customer support. See *Contacting Customer Support* (Page 145).



# TUNE SECURITY

Some tuners prefer to lock their tunes in order to make it more difficult for customers and other tuners to view and modify them. VCM Editor supports two methods of doing this:

- **Tuner Lock:** This method takes advantage of a security key built into the operating system of some GM controllers. Changing the security key prevents anyone who does not have the new key from reading or flashing the vehicle. VCM Editor will also require this key to view or modify the tune file. See *Tuner Lock* (Page 134) for more information.
- **Master/Slave Security:** This method locks the tune file so that your Tuner ID is needed to open it, view it, or edit it. Additionally, a file locked this way can be flashed to the vehicle only by interface devices whose serial numbers you have specified. See *Remote Tuning* (Page 138).

## TUNER LOCK

Tuner Lock is an ECM locking mechanism built into the operating system of certain GM controllers. Applying this type of lock is one way to lock your tune so that it cannot be opened by other users.

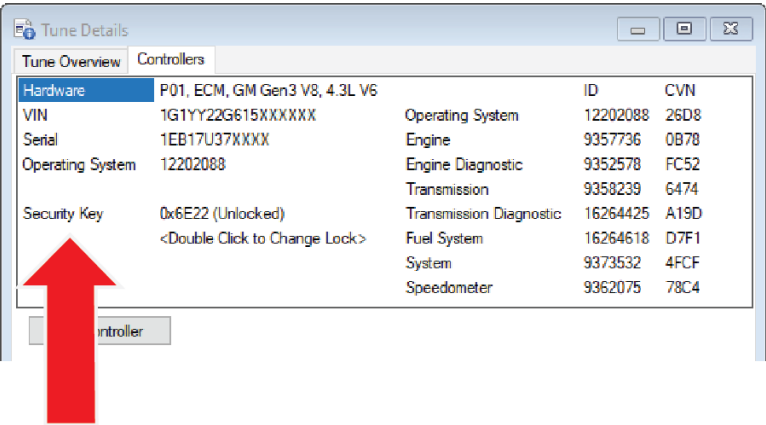


**CAUTION:** Tuner Locked ECMs cannot be read or written to by anyone who does not have the Tunerlock ID used to lock the vehicle. If you lose track of this ID, the ECM will likely need to be replaced.

**IS MY VEHICLE SUPPORTED?**

You can find out if the vehicle's controller supports Tuner Locking by doing the following:

- 1. Open the tune file that you want to lock.
- 2. In the menu bar, select, **Edit > Calibration Details**. The Tune Details window appears.
- 3. Select the **Controllers** tab.



- 4. If the ECM supports Tuner Lock, the words **Security Key** appear here, with the actual key directly to the right. Below the key, the words **<Double Click to Change Lock>** will be displayed.

## ENABLING TUNER LOCK

1. Open the tune file that you want to lock.
2. Navigate to the Controllers tab of the Tune Details window (see steps above).
3. Double-click on **<Double Click to Change Lock>**.

Select Your Tuner Identity

**Please select the Tunerlock ID you wish to use for the locking algorithm**

- Tunerlock IDs provide a unique and permanent identity even through interface replacements and upgrades.
- You can consolidate interfaces onto the same Tunerlock Identity by contacting support@hptuners.com

	<u>Interface ID</u>	<u>Tunerlock ID</u>
<input type="checkbox"/>	21412343XX	34372
<input type="checkbox"/>	20748007XX	735

OK Cancel

4. Select the Tunerlock ID you want to use to lock the controller.
5. Click **OK**. This will change the Security Key from the stock Security Key to a different Security Key and apply the selected Tunerlock ID.
6. Write the file to the vehicle.



**NOTE:** A Write Entire must be used for all controllers EXCEPT E38 PCMs. For vehicles equipped with an E38 PCM, you must select "Write VIN/Tunerlock/VATS" in the Vehicle Writer window.

## DISABLING TUNER LOCK

1. Open the tune file that you want to unlock.



**NOTE:** The VCM Editor on your PC must have been synced with the MPVI2/2+ whose ID was used to lock the controller (or with a device that shares the same Tunerlock ID). For older (MPVI) devices, you must have entered the Application Key for the device.

2. Navigate to the Controllers tab of the Tune Details window.
3. Double-click on **<Double Click to Change Lock>**. The text next to the security key should revert to "(Unlocked)."
4. Write the file to the vehicle.



**NOTE:** A Write Entire must be used for all controllers EXCEPT E38 PCMs. For vehicles equipped with an E38 PCM, you must select "Write VIN/Tunerlock/VATS" in the Vehicle Writer window.

## SUPPORTED ECMS

- |         |       |
|---------|-------|
| ▪ L4Big | ▪ P10 |
| ▪ P01   | ▪ P11 |
| ▪ P04   | ▪ P59 |
| ▪ P05   | ▪ E38 |
| ▪ P05b  |       |

## REMOTE TUNING

The Remote Tuning form allows you to configure Master/Slave Security, which restricts opening, viewing, and editing of the current file:

- Setting a **Master Tuner ID** ties the file to your interface device. Only you will be able to view and edit the file.
- Adding **Slave Interface IDs** specifies additional interface devices that are allowed to flash the file to a vehicle, but cannot but used to view or edit the file.



**NOTE:** Do not add Slave Interface IDs without first setting a Master Tuner ID. This will prevent everyone (including you) from viewing and editing the file.

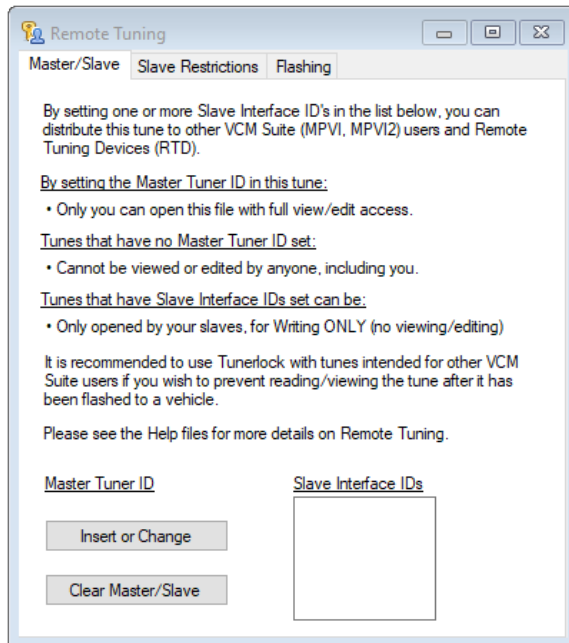
This feature locks the tune file only. It does not lock the controller.

## ENABLING AND DISABLING MASTER / SLAVE SECURITY

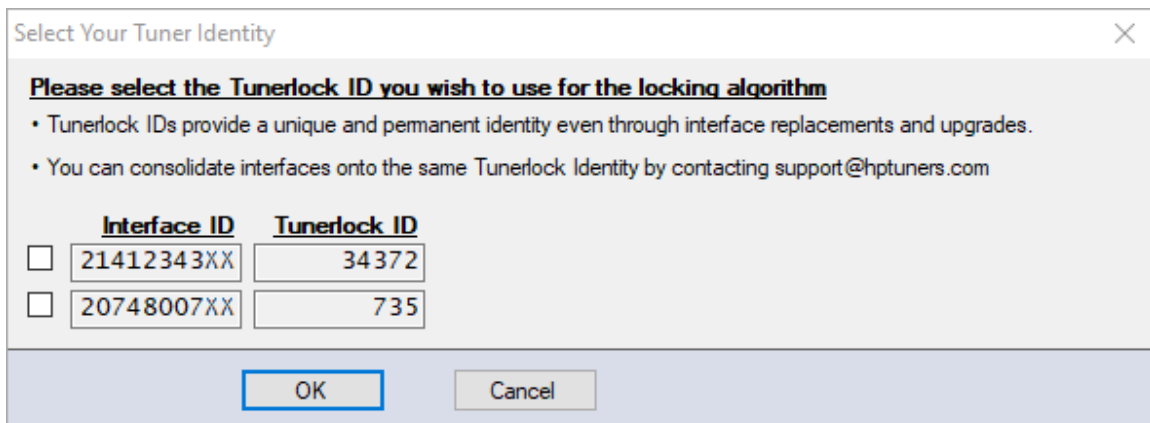
Master / slave security is enabled by specifying master and slave IDs.

### APPLYING MASTER / SLAVE IDS TO A FILE

1. In the menu bar, select **Edit > Remote Tuning**.



2. Click **Insert or Change**.



3. Select the Tunerlock ID you want to use for your Master Tuner ID.
4. Click **OK**.

5. In the **Slave Interface IDs** box, enter the serial numbers of the HP Tuners interface devices that will be allowed to flash the file to the vehicle, but not view or edit files. Enter only one ID per line.

### ***CLEARING MASTER/SLAVE RESTRICTIONS***

To clear the Master Tuner ID and all of the Slave Interface IDs:

1. Open the tune file that you want to unlock.



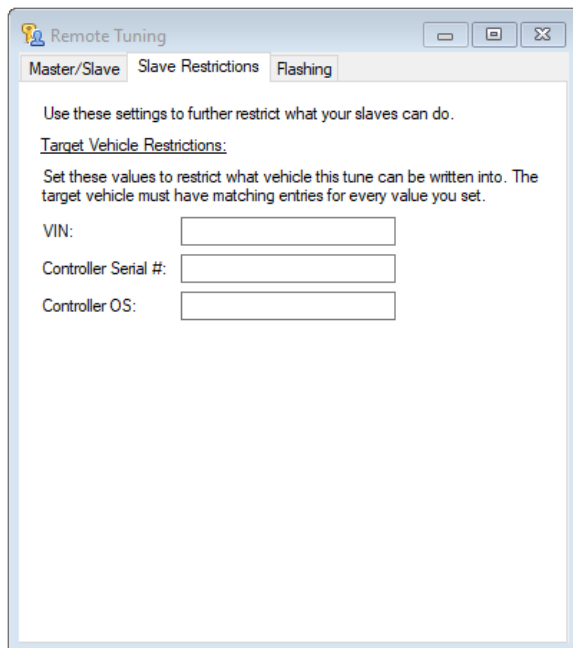
**NOTE:** The VCM Editor on your PC must have been synced with the MPVI2/2+ whose ID was used to lock the file (or with a device that shares the same Tunerlock ID). For older (MPVI) devices, you must have entered the Application Key for the device.

2. In the menu bar, select **Edit > Remote Tuning**.
3. Click the **Clear Master/Slave** button.



## ADDITIONAL SLAVE RESTRICTIONS

If you have entered master and slave interface IDs on the Master/Slave tab, the settings on the Slave Restrictions tab can be used to further restrict what slave interfaces can do.

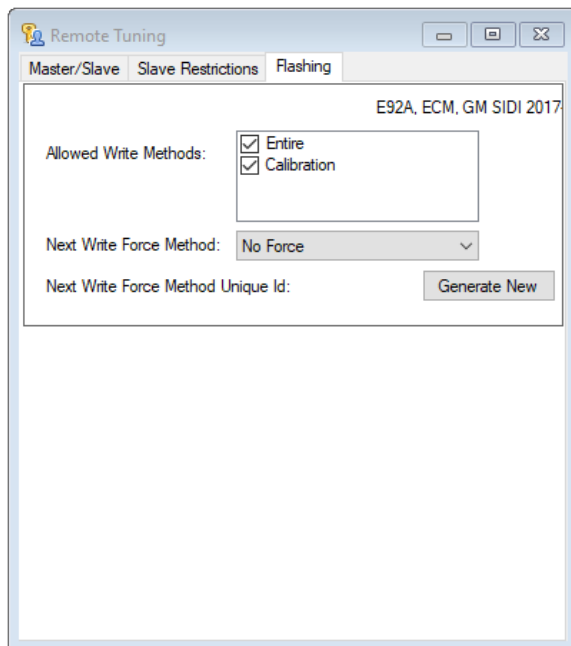


Entering any of the values on this tab restricts what vehicles slave interfaces can write this tune to. The target vehicle must have matching entries for every value entered. The fields include:

- VIN
- Controller Serial #
- Controller Operating System ID

## FLASHING RESTRICTIONS

If you have entered master and slave interface IDs on the Master/Slave tab, the settings on the Flashing tab specify what type of write slave interfaces will be allowed to perform.



## ALLOWED WRITE METHODS

These fields specify which write methods slave devices will be allowed to perform. By default, both methods are permitted (both boxes are checked). To remove permission to use a particular method, remove the corresponding check mark.

### ***NEXT WRITE FORCE METHOD***

These two fields allow you to force slave devices to use a particular write method for the next write. Follow these steps each time you want to use this feature:

1. Using the **Next Write Force Method** dropdown, select the write method to be used.
2. Click the **Generate New** button to generate a new unique ID for this event. This ID is used to identify and record the next write instance.

A new unique id is required each time you wish to force a particular write method.



# **CONTACTING CUSTOMER SUPPORT**

## OVERVIEW

HP Tuners does not currently offer incoming phone support. The best way to reach our Support Department is to [create a ticket](#). If you prefer to speak with someone on the phone, just let us know in the ticket and we'll call you back as soon as possible.

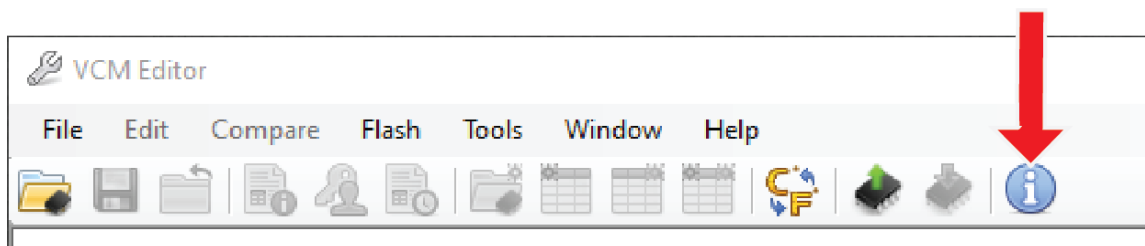
When you contact us, we may ask for an infolog, a debug.dat file, or a license file. Having these files ready may speed up the support process.

## HOW TO GENERATE A VCM SUITE INFOLOG

When contacting customer support, it's often helpful for us to have a copy of a VCM Suite Infolog. The Infolog must be generated while connected to your vehicle.

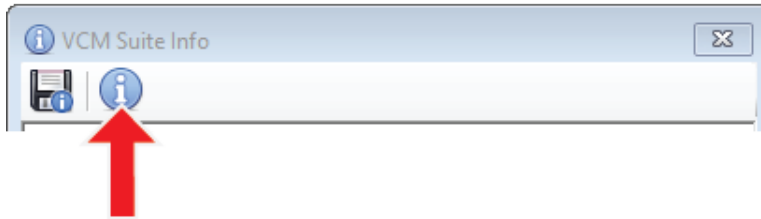
### GENERATING AN INFOLOG

1. Click the VCM Suite Info button in either VCM Editor or VCM Scanner.



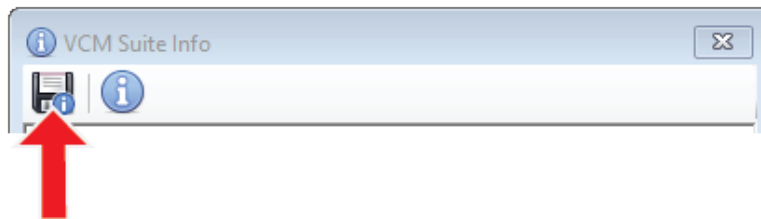
**NOTE:** make sure your cable is connected to the vehicle and the vehicle's key is in the ON position before proceeding.

2. Click the blue circle "i" icon to poll the software and the vehicle.



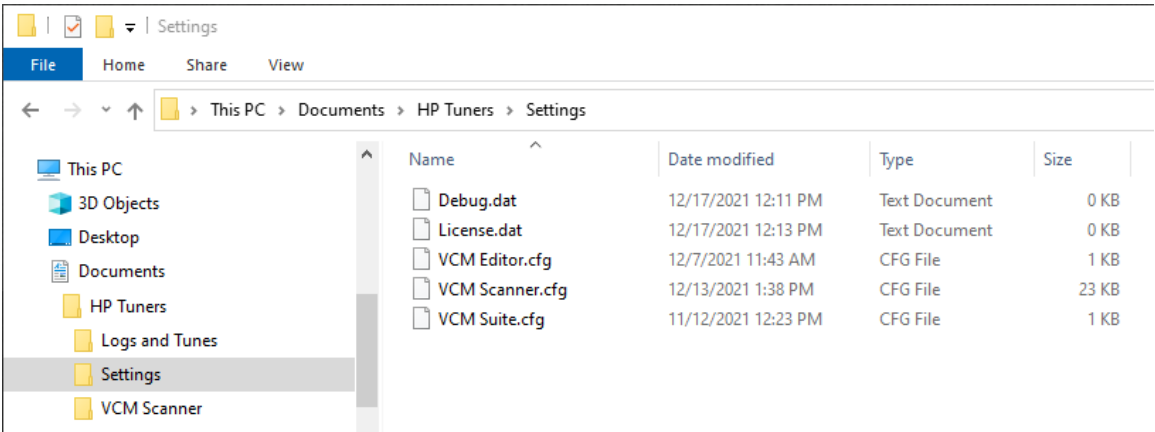
 **NOTE:** This step may take five to twenty seconds to complete.

3. When Infolog generation is finished, click on the Save icon. Once the file is saved, it is ready to email to our Support team.



# LOCATING THE DEBUG.DAT AND LICENSE.DAT FILES

For many support issues, we ask that you provide us with a debug.dat file. This file can be found in **This PC > Documents > HP Tuners > Settings**:



We may also ask for a license.dat file. This can found in the same file path.



# GLOSSARY

## AIRMASS

Also known as "Dynamic Cylinder Air", airmass is the amount of air (by weight not volume) in a cylinder at any given time. This is a very important number for tuners because the higher the mass of air is in the cylinder, the more fuel can be added. Essentially, more air = more power.

## DISPLACEMENT ON DEMAND (DOD)

Also known as "Active Fuel Management", DoD is GM's name for the ability of some engines to deactivate half of their cylinders when operating in light load conditions. Theoretically, this feature enhances fuel economy and reduces emissions slightly.

## DYNAMIC AIRFLOW

The mass airflow obtained either from reading the MAF sensor or from speed-density calculations, after corrections are applied.

## ELECTRONIC THROTTLE CONTROL (ETC)

In vehicles that employ ETC, there is no longer any mechanical linkage between the accelerator pedal and the throttle. The engine (or powertrain) controller dictates the amount of throttle applied based on a number of factors including (among other factors) current engine rpm and vehicle speed as well as the position of the accelerator pedal.

## ENGINE CONTROL MODULE (ECM)

In some vehicles, the ECM (sometimes called the Engine Control Unit / ECU) is the computer that is primarily responsible for controlling the operation of the engine. Other vehicles have a Powertrain Control Module (PCM) that controls both the engine and the transmission.

## FUEL TRIMS

Although the MAF sensor and/or speed-density tuning will give the engine controller a rough idea of the amount of fuel that needs to be injected in a variety of circumstances, it's not always perfect. Changes in engine load and other conditions may cause the air/fuel mix to be less than ideal. For this reason, the engine controller constantly monitors the amount of oxygen in the engine's exhaust and applies adjustments to the amount of fuel injected. These adjustments are called "fuel trims".

There are two types of fuel trim:

- **Short Term Fuel Trims (STFT):** These trims are an immediate response to the amount of oxygen seen in the exhaust at the moment. As such, they are being adjusted constantly.
- **Long Term Fuel Trims (LTFT):** These trims are the result of monitoring changes in the exhaust oxygen content over long periods of time and determining the average amount of adjustment required based on long term trends.

## INTAKE AIR TEMPERATURE (IAT) SENSOR

IAT sensors measure temperature of the air coming into the engine. In speed-density tunes, this data is used in conjunction with a pressure (MAP) sensor and the VE tables to determine the mass air flow.

## MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

MAP sensors measure the air pressure in the intake manifold. In speed-density tunes, this data is used in conjunction with a temperature (IAT) sensor and the VE tables to determine the mass air flow.

In naturally aspirated engines, the pressure measured will be roughly 1 bar (14.7 psi / 100 kPa), which is the normal pressure of the air we breathe at sea level. Therefore, these engines typically use a "1 bar" MAP sensor. Components such as turbochargers and superchargers that force more air into the engine increase the pressure measured and may require a MAP sensor rated for more than 1 bar.

## **MASS AIR FLOW (MAF) SENSOR**

MAF sensors measure the mass of air entering the throttle body. Some engines use this type of device to measure the mass air flow directly rather than (or in addition to) using speed density techniques to determine it by calculation.

Engines with MAF sensors typically have a MAF Calibration Table to translate the signal level (a voltage or a frequency) coming out of the MAF sensor to the amount of airflow represented by that signal.

## **POWERTRAIN CONTROL MODULE (PCM)**

In some vehicles, a single computer is responsible for controlling both the engine and the transmission. In such vehicles, this computer is called the PCM. Other vehicles have a separate Engine Control Module (ECM) and Transmission Control Module (TCM).

## **PULSE WIDTH**

The amount of time (in milliseconds or microseconds) a fuel injector remains open. Varying pulse width is typically how engines control the amount of fuel being injected into the cylinder.

## **SPARK ADVANCE**

The timing of the spark provided by the spark plugs. Spark plugs typically ignite while the piston is moving upward towards the top of the cylinder. Spark advance is how far before the piston reaches the top that the spark plugs ignite. It is usually measured as a number of degrees of crankshaft rotation. So, a spark advance of 10 would indicate that ignition occurs when crankshaft rotation is 10 degrees before the piston reaches top dead center.

## **SPEED-DENSITY**

A mode of operation that calculates the mass of air present in the cylinder rather than measuring the mass air flow. The calculation is based on air temperature and pressure gathered from the sensors as well as the values in the VE table(s).

## **TRANSMISSION CONTROL MODULE (TCM)**

In some vehicles, the TCM is the computer that is primarily responsible for controlling the operation of the transmission. Other vehicles have a Powertrain Control Module (PCM) that controls both the engine and the transmission.

## **VARIABLE VALVE TIMING (VVT)**

In a typical engine with fixed cams, the valve timing remains the same, regardless of engine speed and other conditions. This tends to create a sweet spot, where performance and emissions are best at a particular rpm.

Engines with variable valve timing can vary the timing of their intake and exhaust valves in order to achieve more optimal results across the board. This is typically achieved by rotating their cams to a position appropriate for the current rpm.

## **VEHICLE CONTROL MODULE (VCM)**

The computer that is primarily responsible for engine and transmission operation. In some vehicles, there is a single Powertrain Control Module (PCM) that controls both the engine and the transmission. In other vehicles, there are actually two modules: an Engine Control Module (ECM) and a Transmission Control Module (TCM).

## **VOLUMETRIC EFFICIENCY (VE)**

The actual amount of air flowing through the cylinders, compared to the theoretical maximum they can hold.

In naturally aspirated engines, VE is normally less than 100%. Components that force air into the cylinders (turbos, superchargers, etc.) may boost VE above 100%.