



## **GM Diesel User Guide**

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# GM Diesel User Guide

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# Contents



.....5

Prerequisites.....5

    Intended Audience .....5

    Computer Knowledge.....5

    Tuning Knowledge .....5



.....6

Introduction.....6

    What is EFILive? .....6

    Software Version Overview .....6

        V8 Software Support .....7

        V7 Software Support .....7

    DSP<sup>5</sup> Duramax Switchable Programming .....8

    Controller Authorization.....8



.....9

Finding the Correct Base File .....9

    V8 Scan and Tune .....9

    FlashScan/AutoCal V3 .....10

        Option 1: Display VIN/Info .....10

        Option 2: Record All Diagnostics .....10

    FlashScan V2.....10

        Option 1: Display VIN/Info .....10

        Option2: Record All Diagnostics .....11

    AutoCal V2.....11

        Option 1: Display VIN/Info .....11

Option 2: Record All Diagnostics ..... 11  
 GM Calibration Identification ..... 11  
 Match Calibration Requirements ..... 12



..... 14  
 Licensing Requirements ..... 14  
 GM Tuning Option Enabled..... 14  
 VIN Licensing ..... 14



..... 16  
 V8 Scan and Tune Scan ..... 16  
 Pass-Thru Data Logging ..... 16  
 DVT ..... 17  
 Pass-Thru Read a Controller (excludes E86A, E86B, & E47) ..... 17  
 Edit a Tune File (excludes E47, E87A/E87B)..... 18  
 Pass-Thru Licence and Flash a Controller ..... 20  
 Move Tune and Log files from FlashScan/AutoCal to your PC ..... 21  
     FlashScan/AutoCal V3 ..... 21  
     FlashScan/AutoCal V2 ..... 22



..... 23  
 Configure FlashScan/AutoCal for BBX ..... 23  
     Data Logging ..... 23  
     Configure Tuning..... 24  
     Tune File Switching ..... 24  
     Configure DTCs ..... 25  
     Quick Setup ..... 25



.....	27
FlashScan/AutoCal Menu Navigation .....	27
FlashScan/AutoCal V3 .....	27
Data Logging .....	27
Read a Controller (excludes E86A, E86B, E47) .....	27
License and Flash a Controller .....	28
Switch Tunes using FlashScan/AutoCal V3 .....	28
FlashScan V2.....	29
Data Logging .....	29
Read a Controller (excludes E86A, E86B, E47) .....	29
License and Flash a Controller .....	30
Switch Tunes using FlashScan V2 .....	30
AutoCal V2.....	31
Data Logging .....	31
Read a Controller (excludes E86A, E86B, E47) .....	31
License and Flash a Controller .....	32
Switch Tunes using AutoCal V2 .....	32
 .....	33
Support.....	33
Trouble Shooting.....	33
Error Codes.....	33
Checksums .....	33
NVRAM Status.....	34
GM Fast CAN Mode.....	34
LB7 and LLY Flashing Tips and Tricks.....	35
LB7 & LLY Controller Recovery .....	35
Full Flash.....	36
Calibration-Flash .....	36
Failed Flash Recovery Methods (excluding LB7 & LLY) .....	36
Test for Rogue Modules.....	36
Trace Files .....	37

V8 Scan and Tune *.htx files .....	37
FlashScan/AutoCal V3 *.xalm files .....	37
FlashScan V2 Trace Files .....	38
AutoCal V2 Trace Files.....	38
Knowledgebase.....	38
EFILive Authorized Dealer .....	38
How to Tune?.....	39
EFILive Service Desk.....	39



## Prerequisites

### Intended Audience

EFILive Customers using the V8 Scan and Tune Tool software.

### Computer Knowledge

It is expected that readers have a basic understanding of:

- The Windows operating system;
- Starting and using Windows applications;
- Navigating folders using Windows Explorer.

### Tuning Knowledge

It is expected that readers have a basic understanding of:

- Electronic Fuel Injection;
- On Board Diagnostics.

And enough common sense to understand the following:

- Make small incremental changes;
- Only make minimal changes at a time;
- Evaluate and analyze the results of each change using the Scan Tool and/or other data logging devices before making the next change;
- Do not make changes that you do not understand;
- If you are unsure about making a particular change, ask a knowledgeable tuner first.



## Introduction

### What is EFILive?

EFILive is tuning software and hardware - it is not a tune. Together the software and hardware give users the tools to write tunes. EFILive does not provide tune files, tuning advice or support, but do provide software support and hardware support.

### Software Version Overview

This version of the GM Quick Start Guide migrates all processes to EFILive V8 Scan and Tune software. Functionality is still available in V7.5 software, however software support and bug fixes will cease in 2021.

This document was written using the following software versions:

1. EFILive V8.3.5.
2. FlashScan V3 / AutoCal V3 Firmware – V3.00.060.
3. FlashScan V2 / AutoCal V2 Firmware - V2.08.170.

The latest software versions are available for download from EFILive's website.

VIN License management and firmware management are exclusive to the V8 Scan and Tune software.

FlashScan/AutoCal V3 and AutoCal V2 are not compatible with V7 software. V7 functions are only supported by FlashScan V2. The following is a brief overview of the activities that are performed with the different software versions:

### V8 Software Support

The following GM Controllers are supported in the following ways in the V8 Scan and Tune software:

Controller	Engine	Year	V8 Software				
			Scan	OBD	Read	Flash	Edit
E54 (LB7)	6.6L	2001-2004	✓	✓	✓	✓	✓
E60 (LLY)	6.6L	2004-2005	✓	✓	✓	✓	✓
E35A/E35B	6.6L	2006-2010	✓	✓	✓	✓	✓
E86A/E86B	6.6L	2011-2016	✓	✓	✗	✓	✓
E98	2.8L	2014-2019	✓	✓	✓	✓	✓
E20	2.0L	2011-2017	✓	✓	✓	✓	✓
E47	2.0L	2014-2015	✓	✓	✗	✓	✗
E87A/E87B			✓	✓	✓	✓	✗

### V7 Software Support

The following GM Controllers are supported in the following ways in the V7 Tune Tool and V7 Scan Tool software:

Controller	Engine	Year	V7 Software				
			Scan	OBD	Read	Flash	Edit
E54 (LB7)	6.6L	2001-2004	✓	✓	✓	✓	✓
E60 (LLY)	6.6L	2004-2005	✓	✓	✓	✓	✓
E35A/E35B	6.6L	2006-2010	✓	✓	✓	✓	✓
E86A/E86B	6.6L	2011-2016	✓	✗	✗	✗	✓
E98	2.8L	2014-2019	✓	✗	✗	✗	✓
E20	2.0L	2011-2017	✓	✗	✗	✗	✓
E47	2.0L	2014-2015	✓	✗	✗	✗	✗
E87A/E87B			✓	✗	✗	✗	✗

Editing is not supported on E47, E87A or E87B controllers in either V8 Scan and Tune or the V7 Tune Tool.

GM implemented restrictive ECM architecture which prevents E86A and E86B (LML) controllers, and E47 controllers from being read via the OBD-II Port.

Customers will need to obtain a suitable base file for these controllers. A selection of EFILive compatible base stock files is readily available on the internet or custom files may be purchased through organizations that have the necessary hardware and software to create personalized base files.

Because you cannot read the existing tune in the ECM it is important you select the correct base tune to suit your vehicle.

### **DSP<sup>5</sup> Duramax Switchable Programming**

EFILive's DSP custom operating systems for selected Duramax ECMs allows customers to be able to switch 'on the fly' between multiple tunes, all stored in the ECM's flash memory.

Refer to the specific user guide for your controller for detailed instructions on how to upgrade your operating system.

### **Controller Authorization**

The controller authorization process for E98 controllers has been retired in the April 2021 public release software (or later). V8.3.5 software and firmware now manage this process seamlessly via read/flash processes. The authorization module and purchasing of authorization codes is no longer required.



## Finding the Correct Base File

For controllers that support reading, EFILive recommends reading the vehicle's controller to obtain a suitable base file.

For controllers that do not support reading, the following instructions will help you to determine the base tune file that should be used for editing.

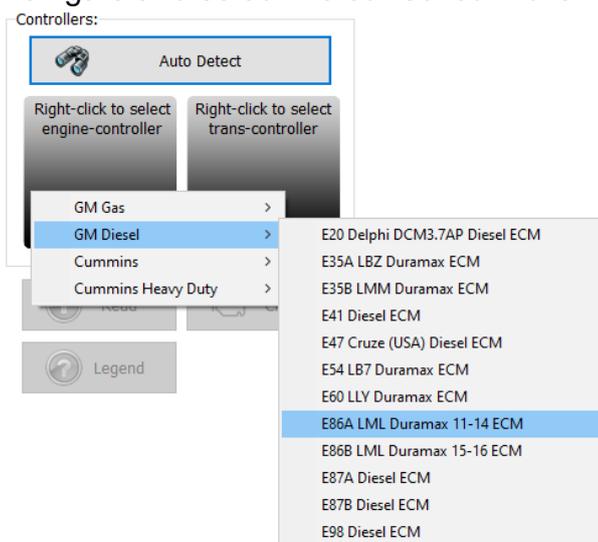
Because you cannot read the existing tune in the ECM it is important you select the correct base tune to suit your vehicle.

EFILive does not provide stock tunes or modified tunes. There are a variety of stock tunes available on the internet. Custom stock tunes can be purchased through organizations that have the necessary hardware and software to create personalized base files.

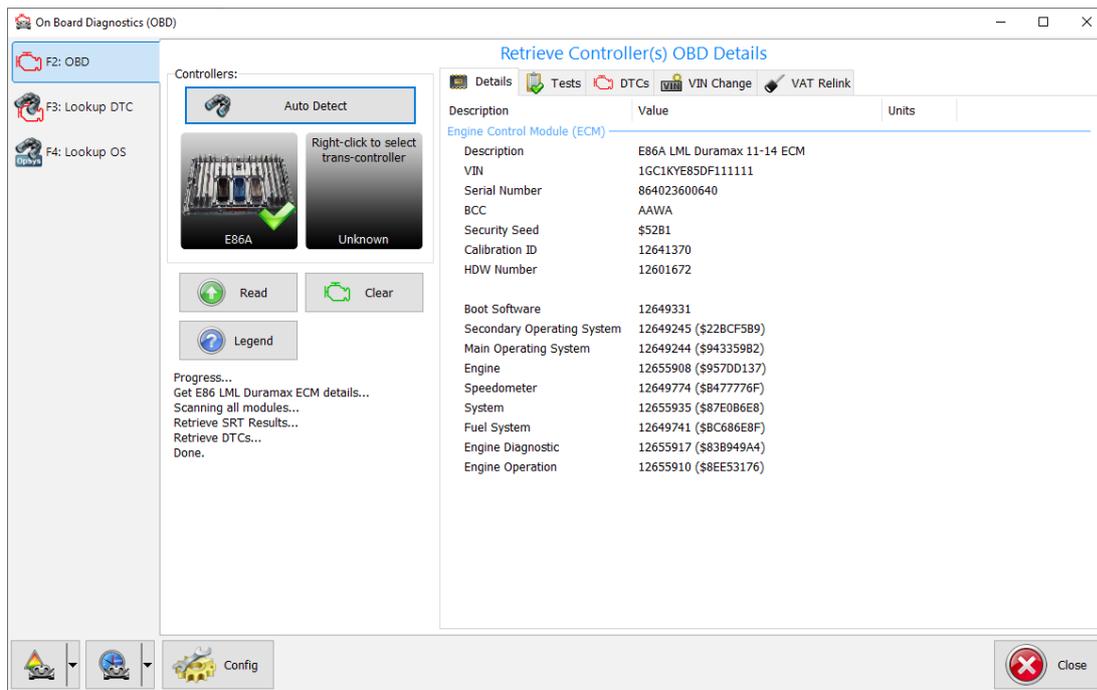
There are a number of methods to find the calibration details of the tune presently in the ECM. Customers can choose which method best suits their needs.

### V8 Scan and Tune

1. Open the EFILive V8 Scan and Tune software.
2. Connect your FlashScan/AutoCal device to your PC and vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the [F4: OBD] -> [F2: OBD] menu option and select the [Details] tab.
5. Select your controller(s) by using the [Auto Detect] button, or;
  - a. Hover over the Engine Controller box, and right click on the "Right-click to select engine-controller" box and manually select the ECM.
  - b. Navigate and select the correct controller.



6. Click the [Read] button to populate controller data.
7. Copy or record the Calibration ID to use in the "Match Calibration Requirements" step later in this document.



## FlashScan/AutoCal V3

1. Connect your FlashScan/AutoCal V3 device to your vehicle.
2. Turn the vehicle ignition to the *On* position.

### Option 1: Display VIN/Info

3. Navigate to the Diagnostics -> F1 Display Info -> F1: Display VIN Info menu option.
4. Select correct controller type from list of controllers.
5. Copy or record the Calibration ID to use in the “Match Calibration Requirements” step later in this document.

### Option 2: Record All Diagnostics

3. Navigate to the Diagnostics -> F4 Record All Diags menu option.
4. FlashScan/AutoCal will display the file name that is saved onto the device.
5. Retrieve the text file by connecting FlashScan/AutoCal as a USB thumb drive.
6. Open the text file and view the calibration information using Windows notepad.

## FlashScan V2

1. Configure FlashScan V2 for BBX features if not already setup.
2. Connect your FlashScan V2 device to your vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the F1: Scan Tool -> F1: Select PIDs menu option.
5. Select correct controller type from BBX configured controllers.
6. Return to the main menu.

### Option 1: Display VIN/Info

7. Navigate to the F3: Diagnostics -> F1 Display Info -> F1: Display VIN Info menu option.
8. Record the details displayed in the Cal: field to use in the match calibration requirements step.

### Option2: Record All Diagnostics

7. Navigate to the F3: Diagnostics -> F4 Record All Diags menu option.
8. FlashScan will display the file name that is saved onto the device.
9. Retrieve the text file using EFILive Explorer. The file is stored in the scan directory. The relevant file can then be transferred to PC
10. Open the text file and view the calibration information using Windows notepad.

## AutoCal V2

1. Configure AutoCal V2 for BBX features if not already setup.
2. Connect your AutoCal V2 device to your vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to [Scan Tool] -> [Select PIDs] menu
5. Select correct controller type from BBX configured controllers.
6. Return to the main menu.

### Option 1: Display VIN/Info

7. Users can navigate to a range of options using the [Next] button. The following options are available:

"Scan Tool"->"Display VIN"

"Scan Tool"->"Display OS"

"Scan Tool"->"Display SN"

"Scan Tool"->"Display Cal ID"

Where the display information exceeds 8 characters, a ">" character is displayed at the end of the data prompting the user to press [Next] to scroll the data horizontally. The "<" character indicates that the user can press the [Prev] key to scroll the data back again.

8. Record the details displayed in the **Cal ID:** field to use in the match calibration requirements step.

### Option 2: Record All Diagnostics

7. Navigate to the [Record Diags] menu to save the text file. AutoCal will display the file name that is saved to the device.
8. Retrieve the text file using EFILive Explorer. The file is stored in the scan directory. The relevant file can then be transferred to PC.
9. Open the text file and view the calibration information using Windows notepad

## GM Calibration Identification

Determine the specific details of the latest tune available for your vehicle from the GM Calibration ID website: <https://tis2web.service.gm.com/tis2web>

1. Enter in the VIN of the vehicle you need to check and click the "Get CAL ID" button.

SPS Info

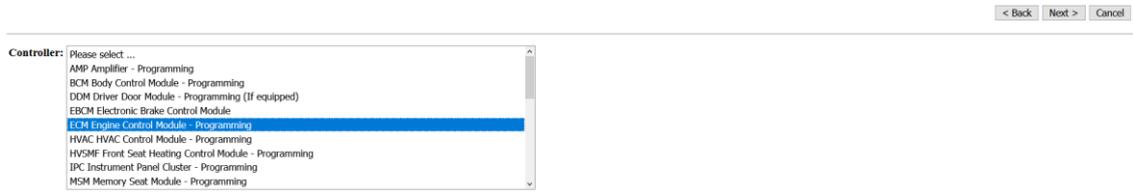
To obtain the latest electronic controller calibration information for your vehicle, enter the vehicle's 17 character Vehicle Identification Number (VIN) and select 'Get CAL ID'.

To obtain the Calibration Verification Number (CVN) for any calibration part number, enter the part number of the calibration ID and select 'Get CVN.'

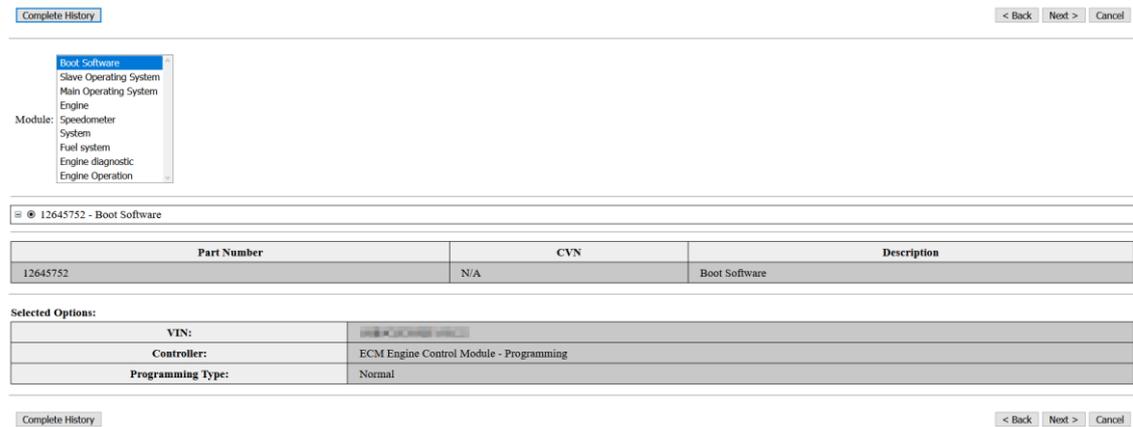
VIN:

Part Number:

2. Select the 'ECM Engine Control Module' and click 'Next'.



3. Select Normal as the programming type and click 'Next'.
4. Select 'Complete History' to see a full list of segments. There are 9 segments for E86A and 8 segments for E86B.



5. A list of all the updates GM have released by part number will be displayed.
6. Document each segment name and part number. These part numbers will be used to find your matching base tune.

NOTE: As GM revise tune files, the part number list will be updated with the most recent part number listed first.

Calibration History for: Boot Software			
Part Number	CVN	Bulletin #	Description
12645752	N/A	-	Boot Software

Calibration History for: Slave Operating System			
Part Number	CVN	Bulletin #	Description
12645751	3C700F20	-	Slave Operating System

Calibration History for: Main Operating System			
Part Number	CVN	Bulletin #	Description
12645750	969FE69D	-	Main Operating System

Calibration History for: Engine			
Part Number	CVN	Bulletin #	Description
12659092	1873E2D5	-	Engine operation

## Match Calibration Requirements

Open the tune file, confirm all segments match in the V8 Scan and Tune software by comparing the Segment Part # listed on the [F3: Calibration] tab page against the segments identified above. This file should become your base file for editing.

A backup of this file should be kept so that you can revert back to this stock file at any time.

**Calibration Summary:**

Description	Value
Controller Description	E86A LML Duramax 11-14 ECM
Name	E86A
Stream	E86
Boot Software	12645752
Secondary Operating System	12645751
Main Operating System	12645750
VIN	1GT424E85DF123456
Serial Number	864119412340
Controller Manufacturer	Bosch
Controller Hardware Specs	Infineon TC1796 Tri-Core
Controller Service Numbers	12618516, 12648344, 12654088

Segment Description	Part#	Checksum	Comments
✔ Boot Software	12645752	\$EF9C	
✔ Secondary Operating System	12645751	\$6AF5	
✔ Main Operating System	12645750	\$8305	
✔ Engine	12659092	\$DE91	
✔ Speedometer	12646629	\$5235	
✔ System	12650235	\$28FC	
✔ Fuel System	12646616	\$8DB2	
✔ Engine Diagnostic	12656505	\$DC0C	
✔ Engine Operation	12658775	\$A4E8	

For E86A, E86B and E47 you **cannot** save the tune already installed in the ECM, once you flash over it, it is gone forever, so choose your base tune wisely.



## Licensing Requirements

To Flash a GM ECM, the following licensing conditions must be met:

1. The GM Tuning Option must be enabled.
2. A VIN License must be available (if not already licensed).

The VIN License is NOT activated in this step. The VIN License is activated during the flash process.

### GM Tuning Option Enabled

To ensure that your device is licensed to tune GM vehicles:

1. Connect your FlashScan or AutoCal device to your PC.
2. Open the EFILive Scan and Tune application.
3. Select the [F7: License] option in the left-hand pane.
4. Select [F2: Hardware] to display Tuning License details.

5. To purchase Tuning Options FlashScan, click on the **Purchase Tuning License Activation Code(s)** link to order products. NOTE: The GM Tuning Option is included on AutoCal devices, if this is not active, please contact support.
6. Enter the activation code that was emailed to you and click the Activate button.

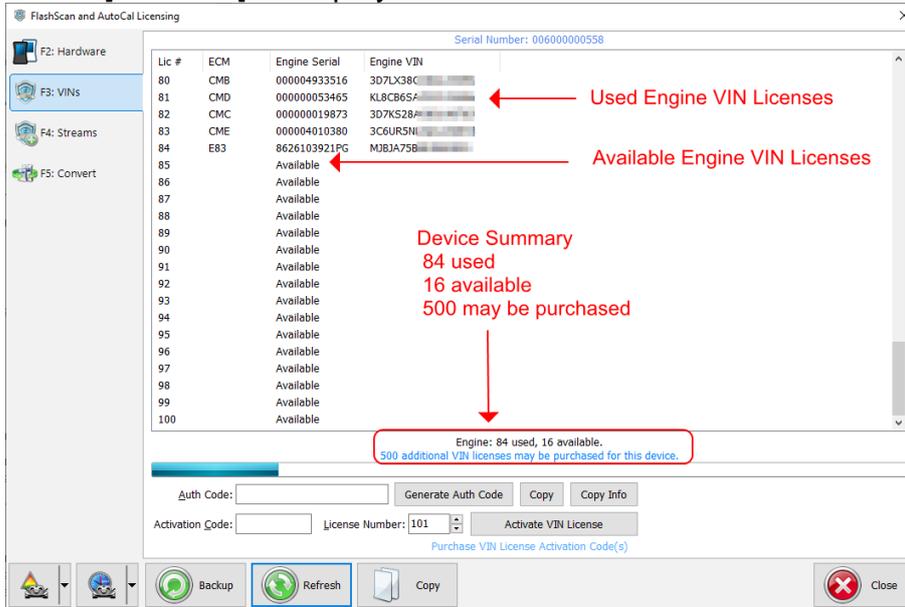
### VIN Licensing

Each additional vehicle that you tune requires an available VIN license. The license is allocated during the flashing process. Reflashing the same controller

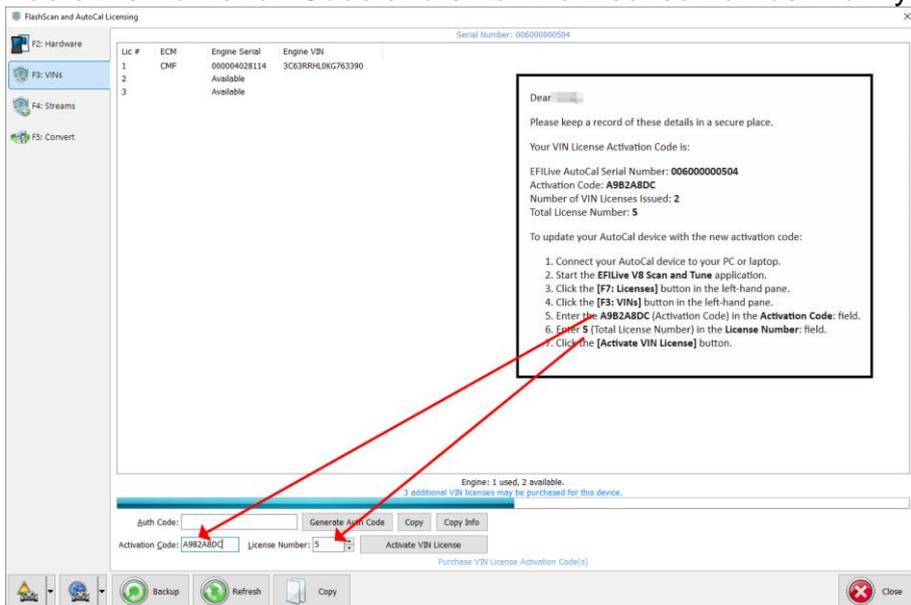
multiple times using the same FlashScan/AutoCal uses the same license each time.

To check that you have an available VIN license to allocate to your vehicle, perform these steps.

1. Connect your FlashScan or AutoCal device to your PC.
2. Open the EFILive Scan and Tune application.
3. Select the [F7: License] option in the left-hand pane.
4. Select [F3: VINs] to display VIN License details.



5. To purchase additional VIN Licenses, click on the **Purchase Activation Code(s)** link to order products. NOTE: AutoCal Users should contact their Tuner before purchasing additional VIN licenses to manage the AutoCal's maximum VIN license capacity and tune file compatibility.
6. Paste the Activation Code and enter the License number from your email.



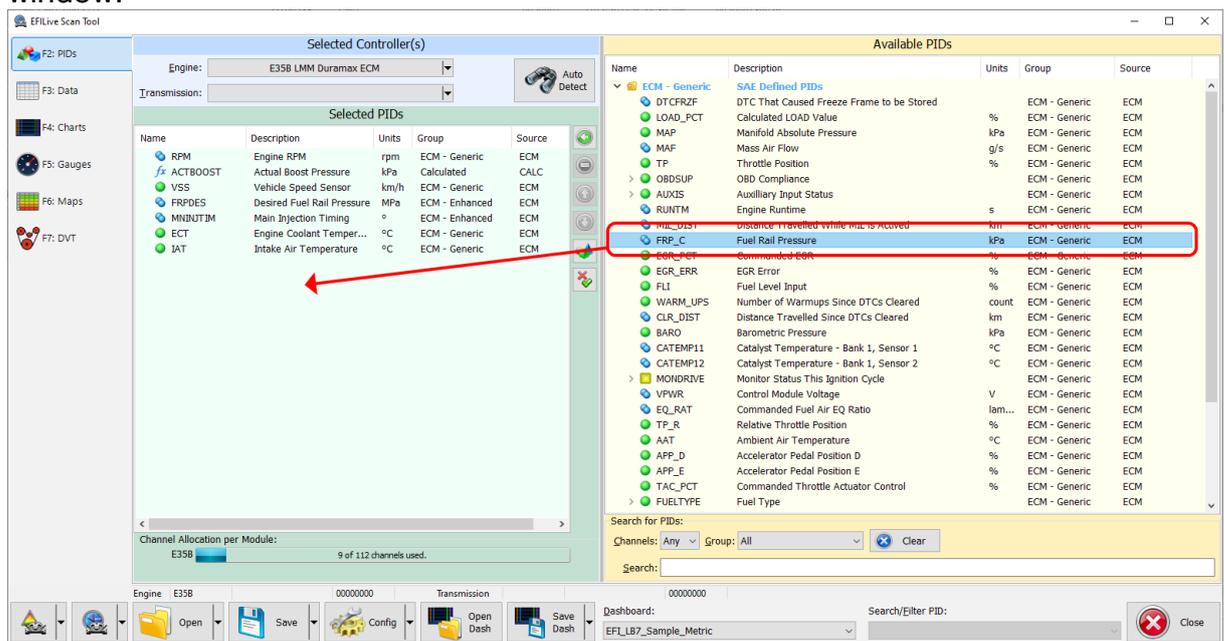


## V8 Scan and Tune Scan

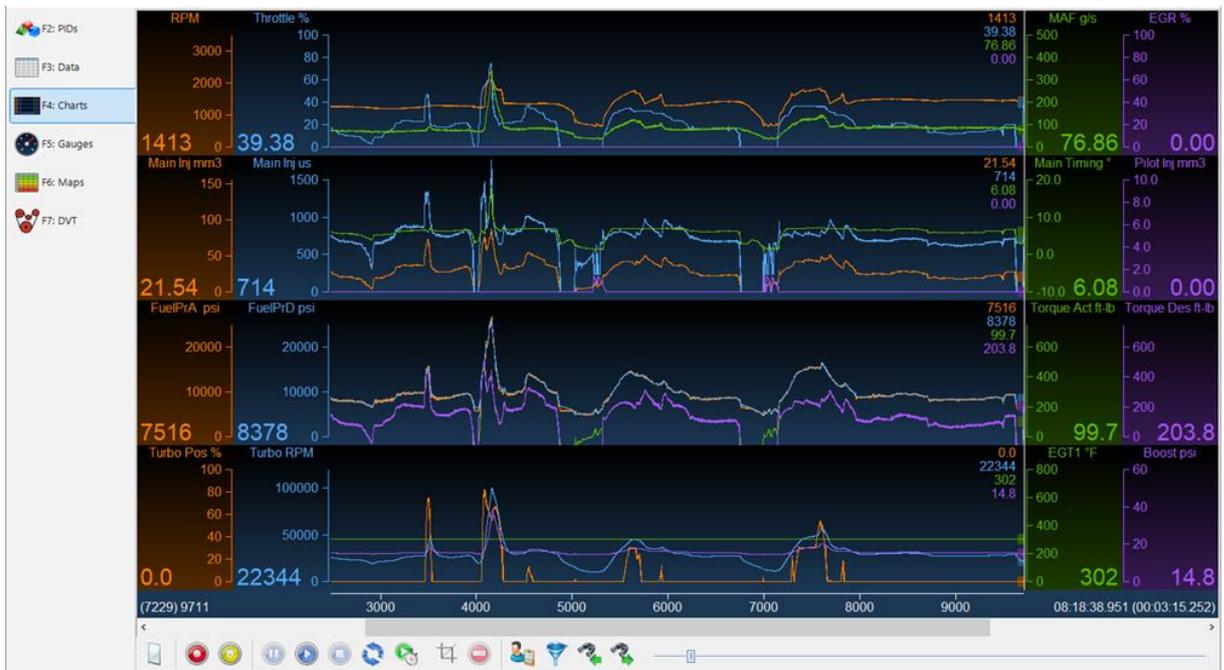
### Pass-Thru Data Logging

To log data using FlashScan or AutoCal and V8 Scan and Tune software;

1. Open the Efilive V8 Scan and Tune.
2. Connect your FlashScan/AutoCal device to your PC and vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Select an existing Dashboard configuration either by using the [Open Dash] button or using the Dashboard drop down, or configure your own customized dashboard after making controller and PID selections.
5. Navigate to the [F2: Scan] -> [F2: PIDs] menu option.
6. In the Engine field use the drop-down list to select the correct controller type or use Auto Detect option.
7. Drag the selected PID from Available PIDs window into the Selected PIDs window.



8. Navigate to the [F3: Data], [F4: Charts], [F5: Gauges] or [F6: Maps] tab and configure your dashboard to customize data display formats.
9. Users should [Save Dash] to save their custom configurations to reduce future configuration requirements.
10. Start the vehicle.
11. Select either Record or Monitor from the [F3: Data], [F4: Charts], [F5: Gauges] or [F6: Maps] screens.
12. Select Stop to stop the data logging session.
13. Save the log.
14. To replay the data log, navigate to the [F3: Data], [F4: Charts], [F5: Gauges] or [F6: Maps] tab and select the appropriate Playback buttons.



## DVT



DVT is for use by experienced EFI technicians.

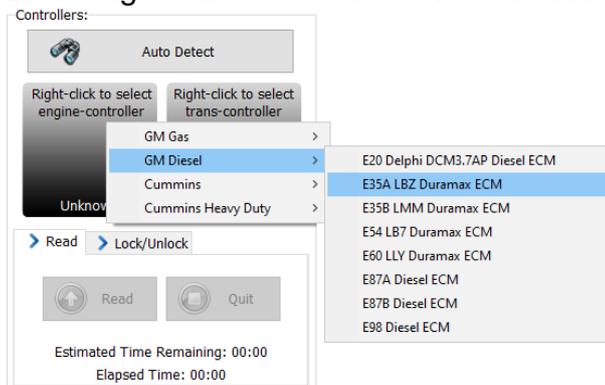
It temporarily overrides the normal operation of the controller and, if used incorrectly can damage the powertrain and/or the vehicle.

DVT controls are managed on the [F2: Scan] -> [F7 DVT] tab. Refer to the V8 reference manual for further information.

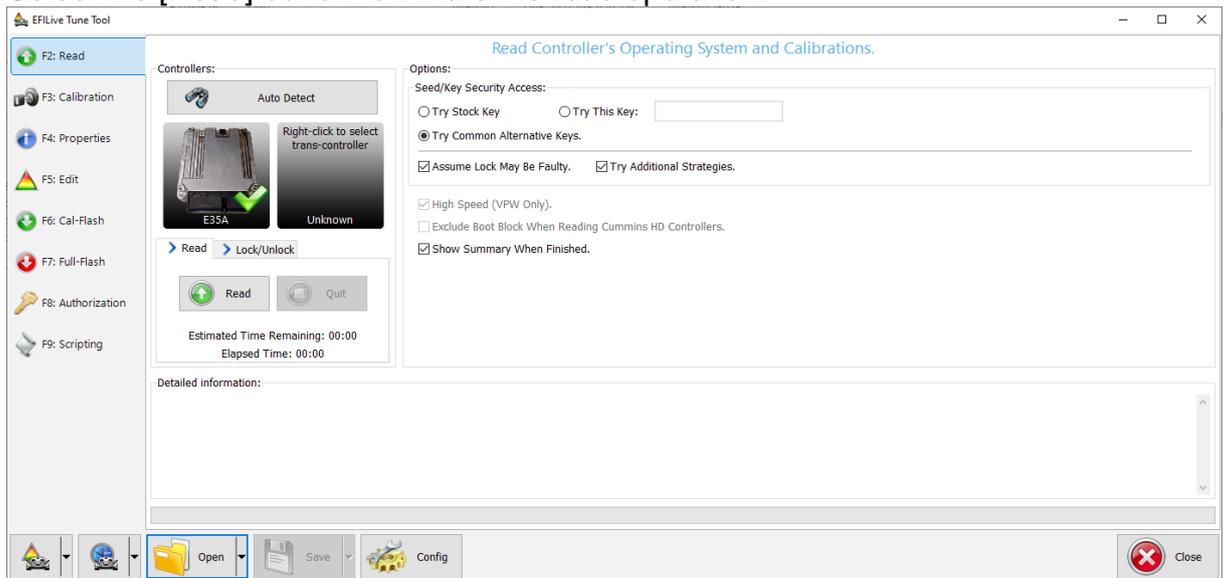
## Pass-Thru Read a Controller (excludes E86A, E86B, & E47)

Follow these steps to read the selected controller.

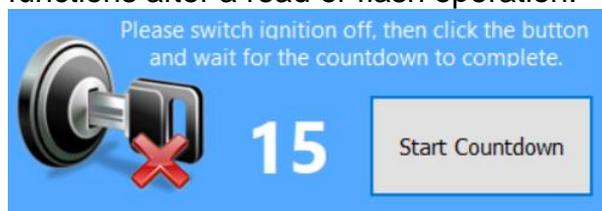
1. Connect your FlashScan/AutoCal device to your PC and vehicle.
2. Turn the vehicle ignition to the *On* position (vehicle must not be cranked/running when reading).
3. Open the EFILive V8 Scan and Tune application.
4. Select the [F3: Tune] option in the left-hand pane.
5. On the [F2: Read] menu, select your controller(s) by using the [Auto Detect] button, or;
  1. Hover over the Engine Controller box, and right click on the “Right-click to select engine-controller” box and manually select the ECM.
  2. Navigate and select the correct controller.



## 6. Select the [Read] button to initiate the read operation.



7. While the ECM is reading an Elapsed time indicator, an Estimated Time Remaining indicator, and a Progress bar will display tracking the Read progress.
8. When the read process is complete a countdown timer will be shown. When prompted perform the following actions:
  1. Turn the vehicle ignition off.
  2. Click on the Start Countdown button to begin the countdown timer.
  3. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.



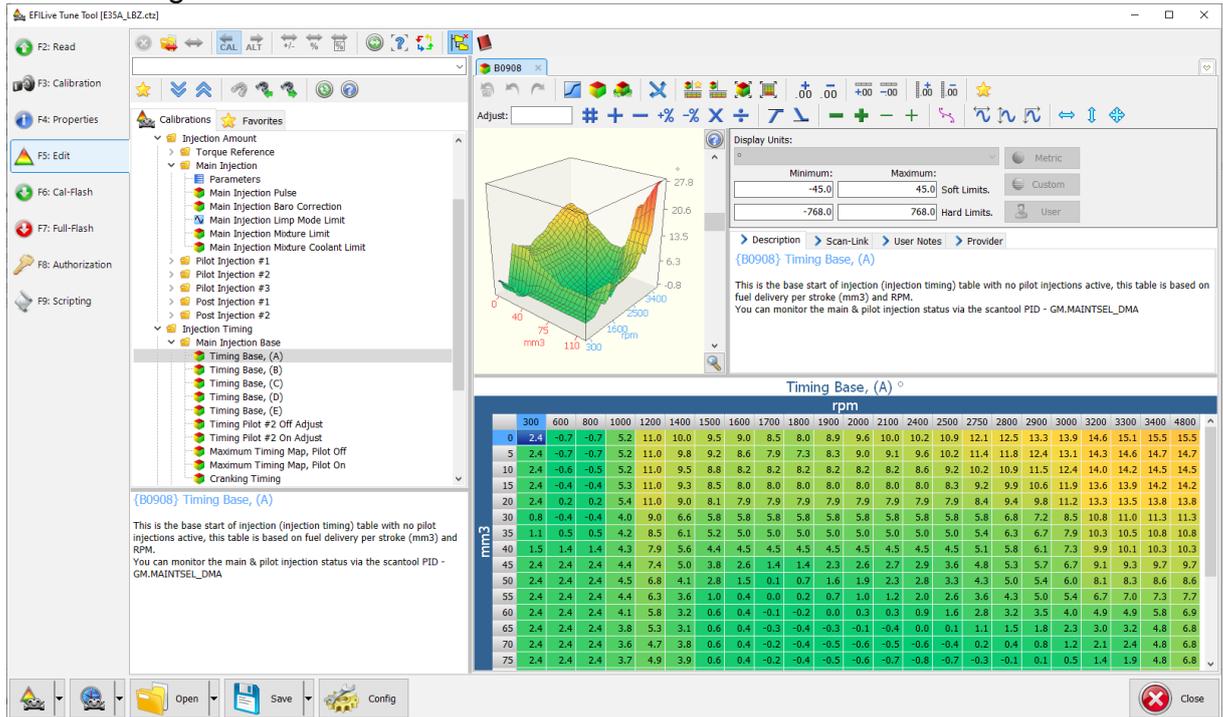
9. On the [F3: Calibration] tab, confirm Checksums are valid. Where the checksums are invalid, users should not use the file and should source a calibration file where checksums are valid.
10. If checksums are valid, save tune file. If this is your vehicle's stock calibration, you should ensure you make a backup of this file in case you ever need to return the vehicle to stock.

### Edit a Tune File (excludes E47, E87A/E87B)

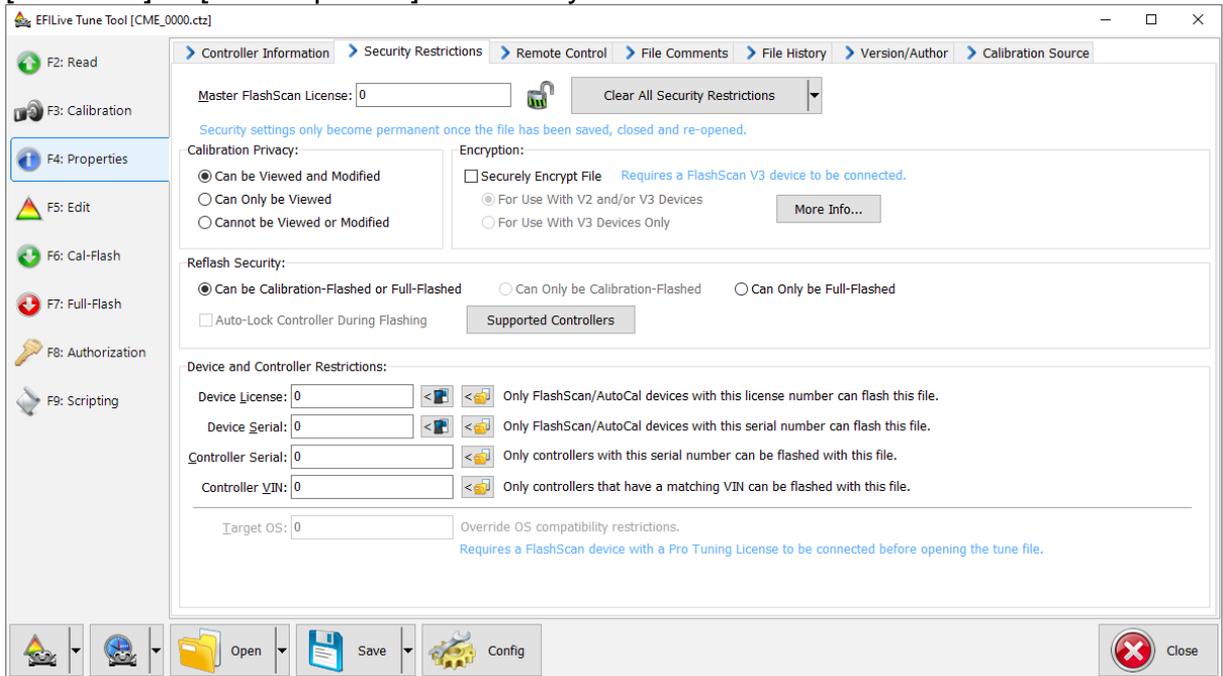
Follow these steps to modify your ECM calibration.

1. Open the EFLive V8 Scan and Tune application.
2. Navigate to the [F3: Tune] -> [F5: Edit] menu in the left-hand pane.
3. Open your selected tune file.
4. On the [F3: Calibration] tab, confirm Checksums are valid. Where the checksums are invalid, users should not use the file and should source a calibration file where checksums are valid.
5. Navigate to the table(s) you wish to modify by using the Windows Explorer style navigation window.

- Highlight a cell, multiple cells, columns, rows or the entire table and adjust the values using the calibrator editor icons.



- A range of tune file security options can be applied using the options in the [F3: Tune] -> [F4: Properties] -> Security Restrictions tab.



- Save changes to the tune file by using the Save tuning file, Save tuning file as, or Save tuning file for AutoCal options.

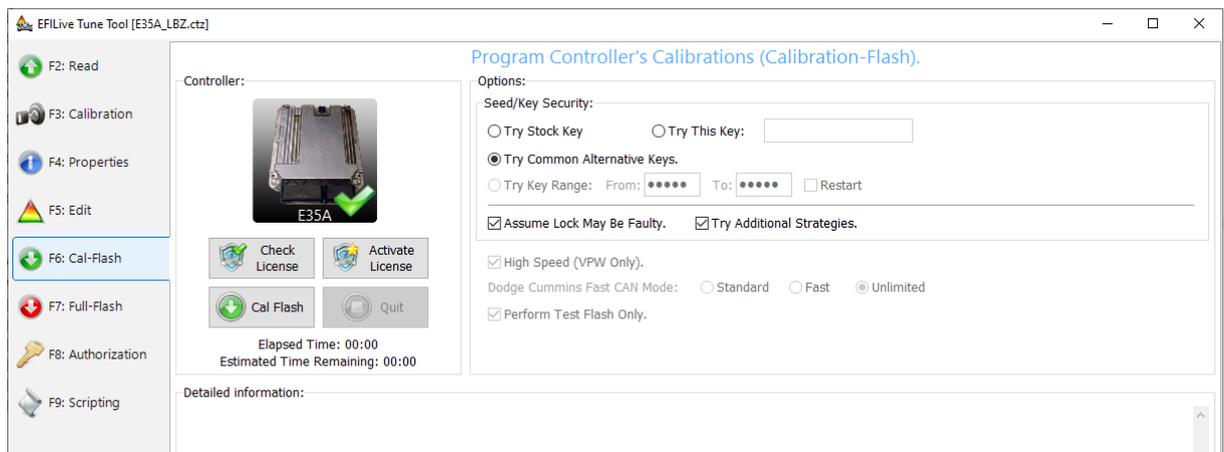
If using the Save option, ensure you have a copy of your stock tune saved elsewhere.

Save tuning file as, and Save tuning file for AutoCal options automatically appends a sequence number to the filename to make it unique giving users a history of sequentially numbered files with each saved change made. A FlashScan device must be connected to save security and/or AutoCal options.

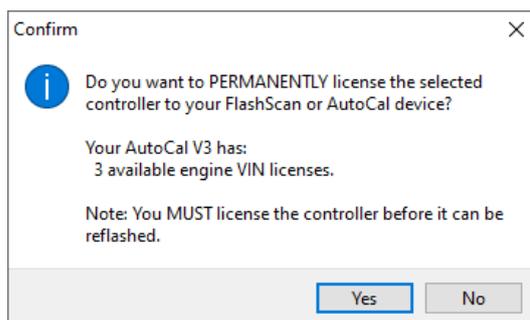
## Pass-Thru Licence and Flash a Controller

Follow these steps to license and flash the selected controller.

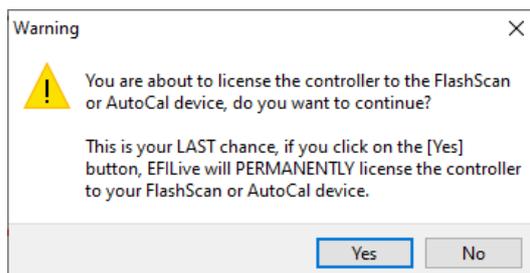
1. Open the EFILive Scan and Tune application.
2. Connect your FlashScan/AutoCal to your PC and your vehicle.
3. Turn the vehicle ignition to the *On* position, (not the Accessory position. Vehicle must not be cranked/running when flashing).
4. Select the [F3: Tune] option in the left-hand pane.
5. Click on the Open button and select the calibration file for the controller you wish to flash or license.
6. If tune file security has been applied to the tune file, review and accept the Security Warning.
7. Click on the [F6: Cal Flash] or [F7: Full Flash] option in the left-hand pane.



8. Click on the Check License button. This will indicate if the controller is already licensed or needs to be licensed.
9. Where the controller is NOT licensed, select Activate License to license the controller.
10. Select Yes to license the controller or No to close this window without licensing the controller.



11. Select Yes to license the controller or No to close this window without licensing the controller.



12. Select the Cal Flash or Full Flash button to commence the flash.
13. While the ECM is flashing an Elapsed time indicator, an Estimated Time Remaining indicator, and a Progress bar will display tracking the Flash progress.
14. When the flash process is complete a countdown timer will be shown. When prompted perform the following actions:
  - a. Turn the vehicle ignition Off.
  - b. Click on the Start button to begin the countdown timer.
  - c. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read/flash operation.

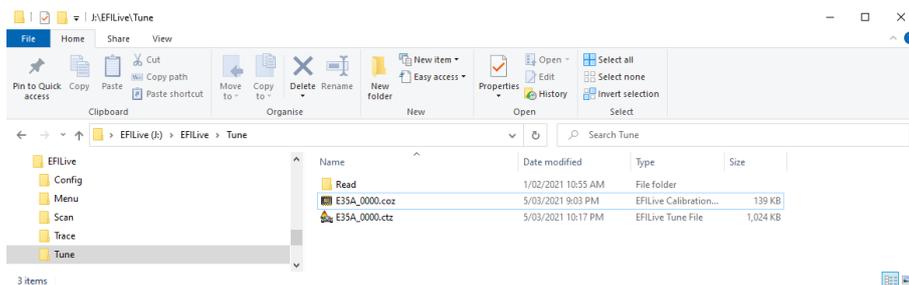
## Move Tune and Log files from FlashScan/AutoCal to your PC

### FlashScan/AutoCal V3

#### Connect FlashScan/AutoCal V3 as a USB Thumb Drive to Windows Explorer

To move tune files and log files from FlashScan V3 onto your PC;

1. Connect FlashScan V3 to your PC.
2. On FlashScan V3 navigate to Options -> File System -> USB Thumb Drive.
3. Using Windows Explorer, locate the files you wish to copy in the correct folder of your FlashScan V3 and copy or drag the files into the desired folder on your PC.

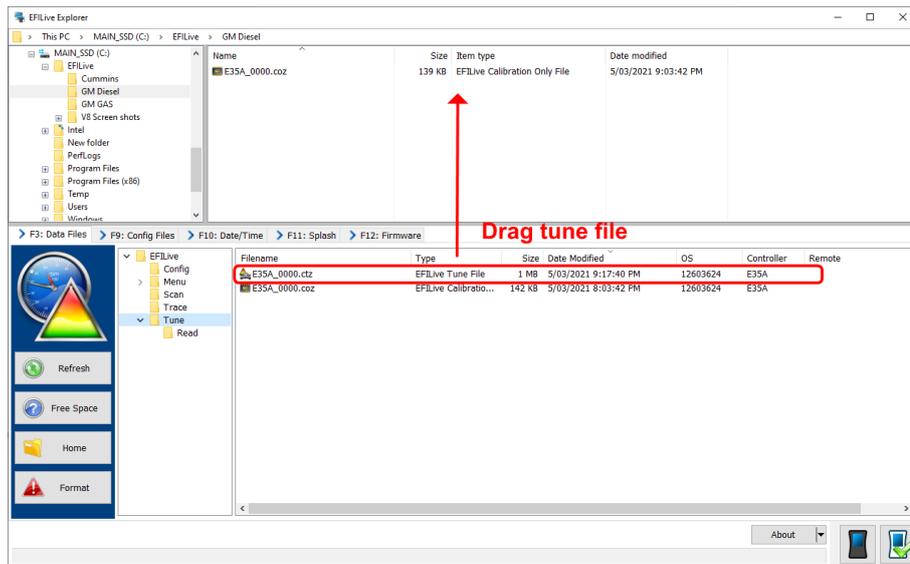


### EFILive Explorer

To move tune files and log files from FlashScan/AutoCal V3 to your PC;

1. Connect FlashScan/AutoCal V3 to your PC.
2. Open EFILive Explorer.
3. Navigate to the directory on your PC where you wish to save the file.
4. Navigate to: [F3: Data Files].

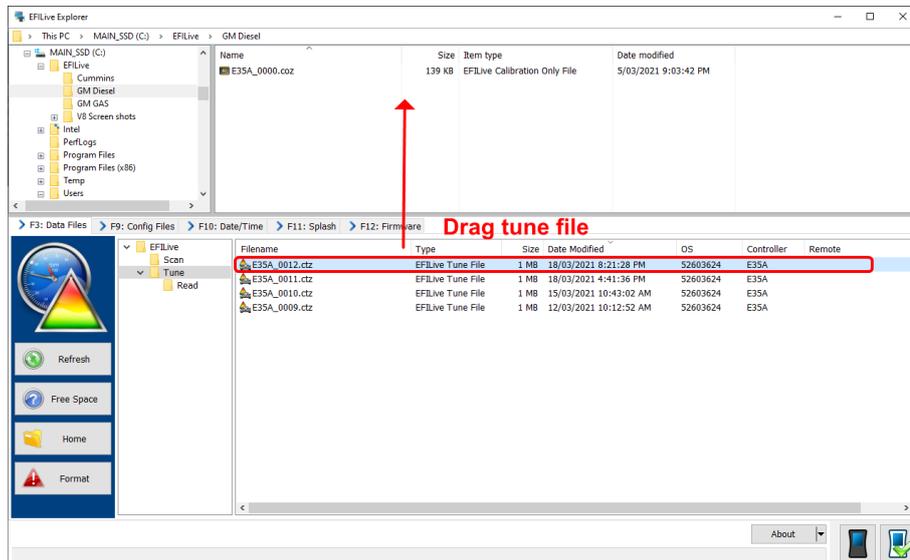
5. Select appropriate folder on your FlashScan device and drag the selected file to your PC.



## FlashScan/AutoCal V2

To move tune files and log files from FlashScan/AutoCal V2 to your PC;

1. Connect FlashScan/AutoCal V2 to your PC.
2. Open EFILive Explorer.
3. Navigate to the directory on your PC where you wish to save the file.
4. Navigate to: [F3: Data Files].
5. Select appropriate folder on your FlashScan device and drag the selected file to your PC.



Once tune and log files are copied from your FlashScan/AutoCal to your PC, they can be opened/viewed using EFILive V8 Scan and Tune.



## Configure FlashScan/AutoCal for BBX

There are a range of configuration files that must be installed on FlashScan and AutoCal devices before the device can be used in standalone mode (BBX).

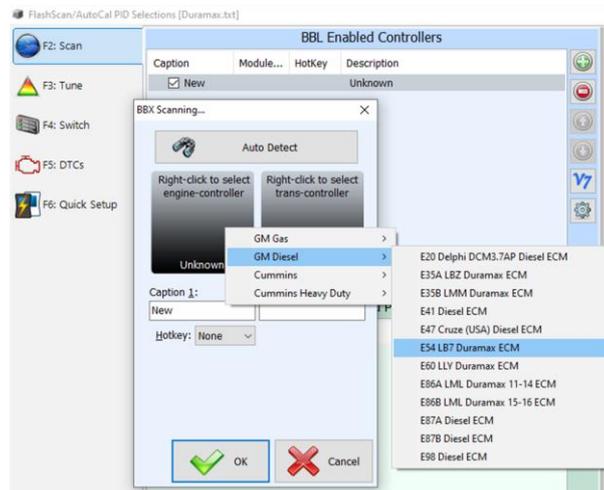
Follow these instructions to configure your FlashScan or AutoCal for BBX.

1. Connect your FlashScan or AutoCal to your PC.
2. Open the Efilive V8 Scan and Tune application.
3. Select the [F5: BBX] option in the left-hand pane.

### Data Logging

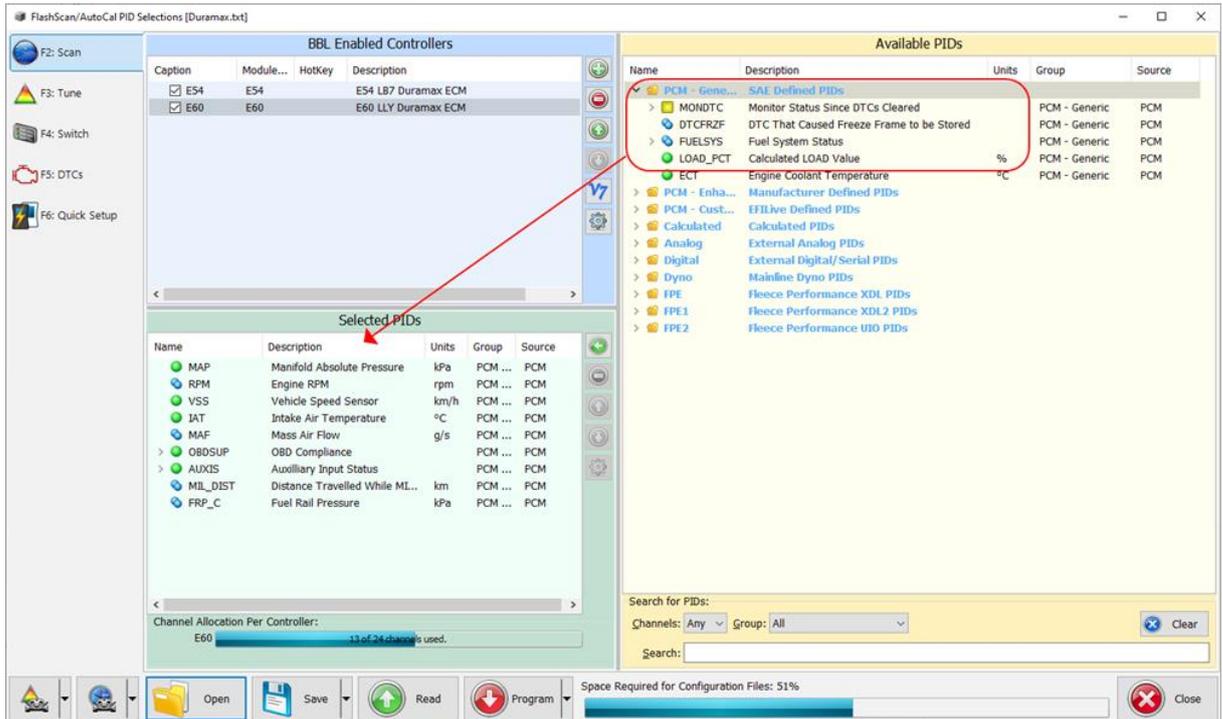
To configure data logging;

1. Select the [F2: Scan] option in the left-hand pane.
2. Remove any unnecessary controller configurations to ensure capacity restrictions are not exceeded.
3. Add your chosen controller(s) to your list;
  - a. Press the green '+' icon.
  - b. Right click on the Engine Controller box.
  - c. Navigate to Select the correct controller.
  - d. Select OK.



4. Click on the selected controller in the "BBL Enabled Controllers" window.

5. Navigate and drag the PIDs or PID folders from the Available PIDs window into the Selected PIDs window.



## Configure Tuning

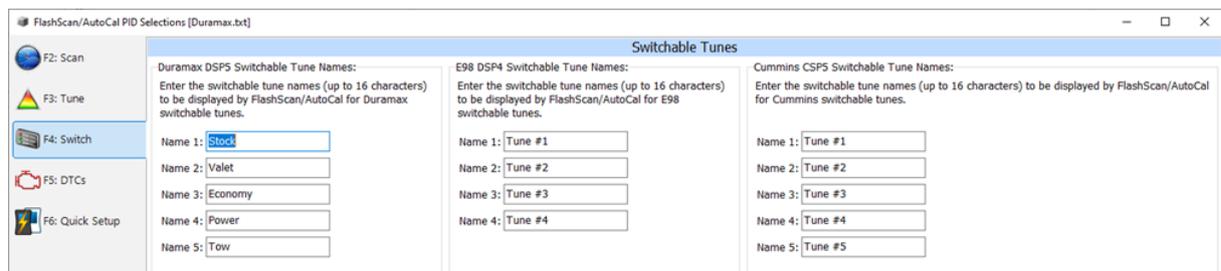
To configure flashing;

1. Select the [F3: Tune] option in the left-hand pane.
2. Remove any unnecessary controller configurations to ensure capacity restrictions are not exceeded.
3. Add your chosen controller(s) to your list;
  - a. Press the green '+' icon.
  - b. Right click on the Engine Controller box.
  - c. Navigate to Select the correct controller.
  - d. Select OK.

## Tune File Switching

To configure the switching of DSP<sup>5</sup> tune positions for LB7, LLY or E98 controllers on your FlashScan/AutoCal device;

1. Select the [F4: Switch] option in the left-hand pane.
2. Enter switchable tune names as appropriate.



## Configure DTCs

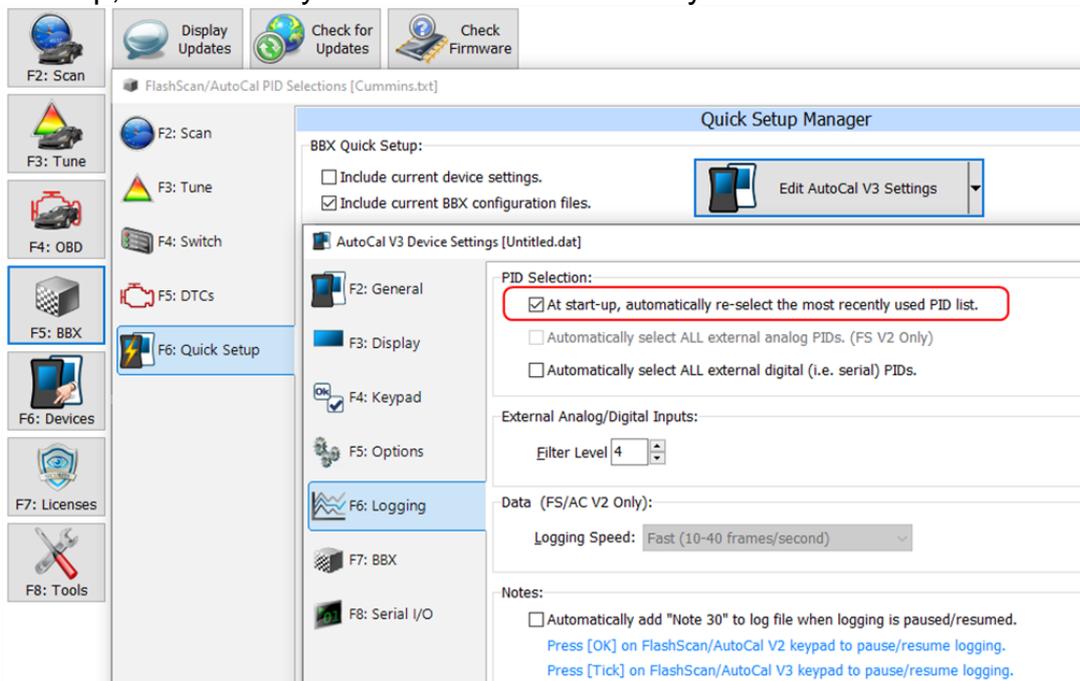
To configure the display of trouble codes and descriptions onto FlashScan;

1. Select the [F5: DTC's] option in the left-hand pane.
2. Select appropriate DTC options.

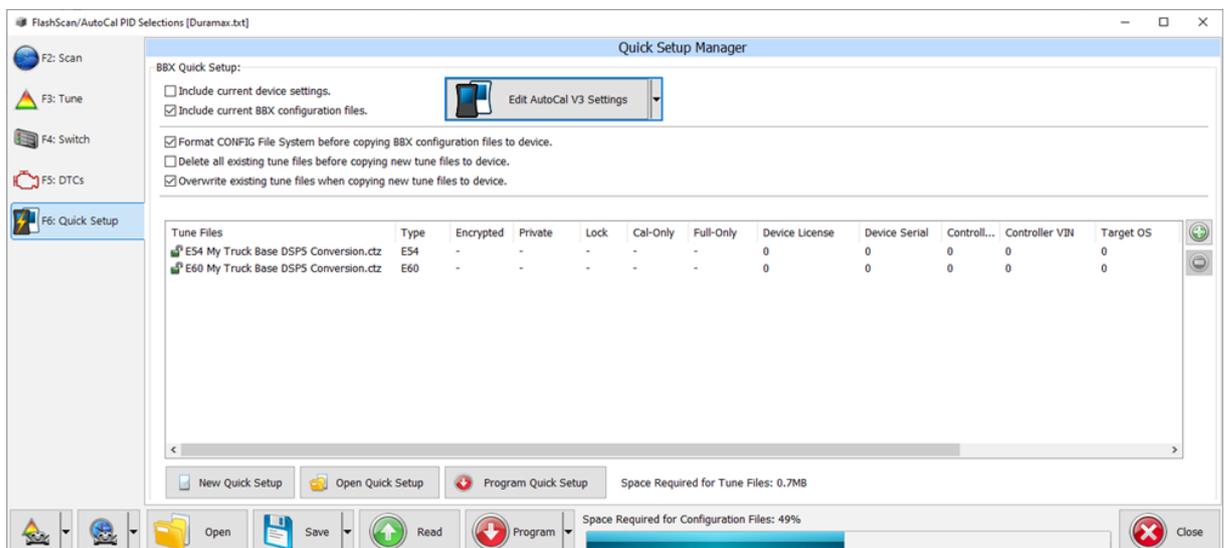
## Quick Setup

To configure BBX settings, device settings, and configure tune files for BBX;

1. Select the [F6: Quick Setup] option in the left-hand pane.
2. Select appropriate BBX configuration options.
3. Edit device settings as necessary. To automatically select the most recently used controller and PID selection when FlashScan/AutoCal powers up:
  - a. Select the correct hardware on the [F6: Quick Setup] -> [Edit AutoCal V3 Settings] button.
  - b. In the Device Settings window, navigate to [F6: Logging] and tick the "At start-up, automatically re-select the most recently used PID list."



4. Add tune files to the **Quick Setup** using the green '+' icon.



5. Write this configuration to FlashScan or AutoCal using the [Program Quick Setup] function. The [Program Quick Setup] programs all selected Scan, Tune, Switch, and DTC options, as well as selected device settings, BBX Quick Setup selections and tune files. Once the device is programmed, FlashScan or AutoCal is configured for BBX functions.

Each option can be programmed individually using the [Program] button on each tab, or collectively using the [Program Quick Setup] option.



## FlashScan/AutoCal Menu Navigation

### FlashScan/AutoCal V3

FlashScan/AutoCal V3 supports two menu structures; the EFILive standard menu and the user defined menu. Where a used defined menu is not installed, the EFILive standard menu will be displayed.

#### Data Logging

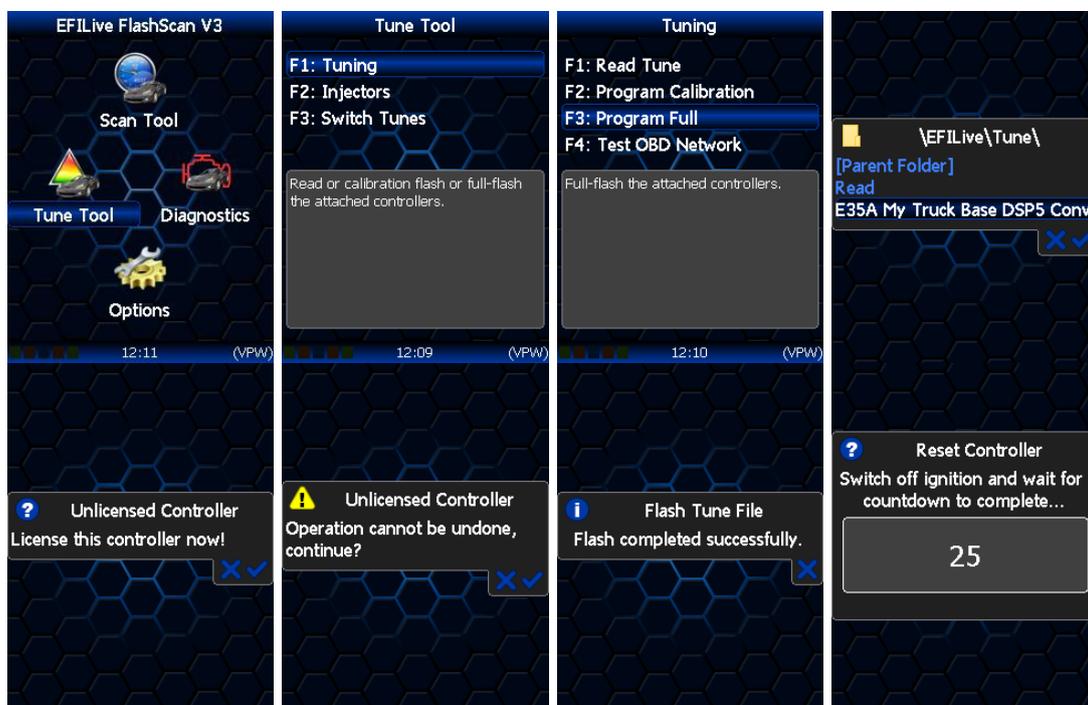
1. Configure FlashScan/AutoCal V3 for BBX features if not already setup.
2. Connect your FlashScan/AutoCal V3 device to your vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the Scan Tool -> F1 Select PIDs menu option.
5. Select correct controller type from BBX configured controllers.
6. Navigate to the F1 Scan Tool -> F2 Data Logging menu option.
7. Select F1: Record Data to commence the logging session.
8. The LCD will display recording status, elapsed time, frame count and the selected PIDs.
9. A range of options are available while the Log is recording:
  1. Select ✓ to pause/resume the log.
  2. Select the up and down arrows to navigate through selected PIDs.
  3. Select X, to stop data logging and save the logged data.
10. Start the vehicle and drive to record actual performance. Do not attempt to operate a FlashScan/AutoCal device while your vehicle is in motion.
11. Select X on FlashScan/AutoCal V3 to stop data logging and save the log file.

#### Read a Controller (excludes E86A, E86B, E47)

1. Configure FlashScan/AutoCal V3 for BBX features if not already setup.
2. Connect your FlashScan/AutoCal V3 device to your vehicle.
3. Turn the vehicle ignition to the *On* position. (Vehicle must not be cranked/running when reading).
4. Navigate to the Tune Tool -> F1 Tuning -> F1 Read Tune menu option.
5. Select correct controller type from BBX configured controllers.
6. Click the ✓ button to initiate the read operation.
7. While the ECM is reading a Progress bar will display for the user to visually track the read.
8. When the read process is complete, the saved file name will display. Select **X** to close this message.
9. The **Reset Controller** notification will be shown, and the controller reset process will begin.
  1. Turn the vehicle ignition off.
  2. Click on the Start button to begin the countdown timer.
  3. **DO NOT** turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.

## License and Flash a Controller

1. Configure FlashScan/AutoCal V3 for BBX features if not already setup.
2. Copy selected tune file(s) from your PC to FlashScan/AutoCal V3 if not already copied via Quick Setup during step 1.
3. Connect your FlashScan/AutoCal V3 device to your vehicle.
4. Turn the vehicle ignition to the *On* position, (not the *Accessory* position. Vehicle must not be cranked/running when flashing).
5. Navigate to the Tune Tool menu and select F1: Tuning and select either F2 Program Calibration or F3 Program Full menu option.
6. Navigate to the folder your tune file is located in and select ✓ to commence the flash.
7. If the controller has not been licensed by this device previously, you will be presented with an “Unlicensed Controller” message. Select ✓ to proceed with licensing the controller, or X to exit without licensing the controller.
8. Select ✓ to confirm licensing the controller and commence the flash, or X to exit without licensing the controller.
9. When the flash process is complete, select X to close the flash completed message.
10. The Reset Controller notification will be shown, and the controller reset process will begin.
  1. Turn the vehicle ignition Off.
  2. Click on the Start button to begin the countdown timer.
  3. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.



## Switch Tunes using FlashScan/AutoCal V3

Tune file parameters must be correctly defined for [Serial Data] to switch via FlashScan or AutoCal. Switching via FlashScan and AutoCal is only supported for E54, E60 and E98.

1. Connect your FlashScan/AutoCal V3 device to your vehicle.

2. Turn the vehicle ignition to the *On* position.
3. Navigate to the **Tune Tool** menu and select **F3 Switch Tunes -> F1 Switch DSP5** menu option.
4. Use the arrows to navigate between tunes.
5. Press ✓ to make a tune selection.
6. You do not need to reselect the tune once the engine is shut down; the ECM 'remembers' which tune you previously selected.

## FlashScan V2

### Data Logging

1. Configure FlashScan V2 for BBX features if not already setup.
2. Connect your FlashScan V2 device to your vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the F1 Scan Tool - F1 Select PIDs menu option.
5. Select correct controller type from BBX configured controllers.
6. Navigate to the F1 Scan Tool - F2 Data Logging menu option.
7. Select F1: Record Data to commence the logging session.
8. The LCD will display the elapsed time, frame count and the selected PIDs.
9. A range of options are available while the Log is recording:
  1. Select OK to pause/resume the log.
  2. Select F1..F4 or Ctrl+F1..Ctrl+F4 to add "user notes" 1 thru 8 to the log.
  3. Select Enter to toggle between Metric and US Customary units.
  4. Select the up and down arrows to navigate through selected PIDs.
  5. Select Cancel, to stop data logging and save the logged data.
10. Start the vehicle and drive to record actual performance. Do not attempt to operate a FlashScan/AutoCal device while your vehicle is in motion.
11. Select Cancel on FlashScan V2 to stop data logging and save the log file.

NOTE: When data logging is activated you cannot return to the menu until logging is stopped.

### Read a Controller (excludes E86A, E86B, E47)

1. Configure FlashScan V2 for BBX features if not already setup.
2. Connect your FlashScan V2 device to your vehicle.
3. Turn the vehicle ignition to the *On* position. (Vehicle must not be cranked/running when reading).
4. Navigate to the F2 Tune Tool -> F1 Tuning -> F1 Read Tune menu option.
5. Select correct controller type from BBX configured controllers.
6. Click the OK button to initiate the read operation.
7. While the ECM is reading a Progress bar will display for the user to visually track the read.
8. When the read process is complete, the saved file name will display. Select OK to close this message.
9. The Reset Controller notification will be shown, and the controller reset process will begin.
  - a. Turn the vehicle ignition Off.
  - b. Click on the Start button to begin the countdown timer.
  - c. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.

## License and Flash a Controller

1. Configure FlashScan V2 for BBX features if not already setup.
2. Copy selected tune file(s) from your PC to FlashScan V2 if not already copied via Quick Setup in step 1.
3. Connect your FlashScan V2 device to your vehicle.
4. Turn the vehicle ignition to the *On* position, (not the Accessory position. Vehicle must not be cranked/running when flashing).
5. Navigate to the F2 Tune Tool -> F1 Tuning and select either F2 Program Cal or F3 Program Full menu option.
6. Using the arrow keys, navigate to the correct tune file and select OK.
7. If the controller has not been licensed by this device previously, you will be presented with the License this controller now? message. Select Yes to license the controller or No to exit without licensing the controller.
8. Select Yes to confirm licensing the controller and commence the flash, or No to exit without licensing the controller.
9. When the flash process is complete the Reset Controller notification will be shown. When prompted perform the following actions:
  - a. Turn the vehicle ignition Off.
  - b. Click on the Start button to begin the countdown timer.
  - c. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal functions after a read operation.



## Switch Tunes using FlashScan V2

Tune file parameters must be correctly defined for [Serial Data] to switch via FlashScan or AutoCal. Switching via FlashScan and AutoCal is only supported for E54, E60 and E98.

1. Connect your FlashScan V2 device to your vehicle.
2. Turn the vehicle ignition to the *On* position.
3. Navigate to the F2 Tune Tool -> F3 Switchable Tunes menu option
4. Select PIDs
5. Use the arrows to navigate between tunes.
6. Press OK to make a tune selection.
7. You do not need to reselect the tune once the engine is shut down; the ECM 'remembers' which tune you previously selected.



## AutoCal V2

### Data Logging

1. Configure AutoCal for BBX features if not already setup.
2. Connect your AutoCal device to your vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the Select PIDs menu option and select OK.
5. Select the correct controller type from BBX configured controllers and make a selection using the OK button. Where only one controller is in the BBX, executing the Select PIDs option will make that selection and return to the menu.
6. Navigate to the Record Data option and select OK to commence the logging session. AutoCal will display the following to commence the logging session;
  - a. Creating Log File.
  - b. Starting Scanner.
7. The Time indicator will increment to indicate recording has commenced.
8. Start the vehicle and drive to record actual performance.
9. Stop the vehicle and turn the ignition off prior to saving the log on AutoCal.
10. A range of options are available while the log is recording.
  - a. Select OK to pause/resume the log.
  - b. Select Next to scroll forward through the list of PIDs.
  - c. Select Prev to scroll backwards through the list of PIDs. Scrolling back to the very first entry displays "Exit", when "Exit" is displayed, click OK to stop data logging and save the log.

### Read a Controller (excludes E86A, E86B, E47)

1. Configure AutoCal V2 for BBX features if not already setup.
2. Copy selected tune file(s) from your PC to AutoCal if not already copied via Quick Setup in step 1.
3. Connect your AutoCal device to your vehicle.
4. Turn the vehicle ignition to the *On* position (not the Accessory position. Vehicle must not be cranked/running when flashing).
5. Navigate using the arrow keys to the Read menu option.
6. Select the correct controller type from the previously configured BBX controllers in the Read 1-5 options. (NOTE: Unused Read options are hidden on the AutoCal Simple Menu).
7. Click the OK button to initiate the read operation.
8. When the read process is complete the following messages will be displayed.
  - a. Saving Wait
  - b. Checking
  - c. Saved as with file name displayed on the screen.

9. The Ignition Off NOW! notification will be shown, and the controller reset process will begin.
  - a. Turn the vehicle ignition Off.
  - b. Click on the Start button to begin the countdown timer.
  - c. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.

### License and Flash a Controller

1. Configure AutoCal for BBX features if not already setup.
2. Copy selected tune file(s) from your PC to AutoCal if not already copied via Quick Setup in step 1.
3. Connect your AutoCal device to your vehicle.
4. Turn the vehicle ignition to the *On* position (not the Accessory position. Vehicle must not be cranked/running when flashing).
5. Navigate using the arrow keys to the Prog 1-5 options for calibration flash, or the Full 1-5 options for full flash. (NOTE: Unused Prog/Full options are hidden on the AutoCal Simple Menu).
6. Select the correct tune file from those listed and select OK.
7. If the controller has not been licensed by this device previously, you will be presented with the License controller message.
8. Select OK or Prev to exit without licensing the controller.
9. Select OK to license the controller and initiate the flash operation or Prev to exit without licensing the controller.
10. When the flash process is complete the Ignition Off NOW! notification will be shown. When prompted perform the following actions:
  - a. Turn the vehicle ignition off.
  - b. Click on the OK button to begin the countdown timer.
  - c. DO NOT turn the vehicle ignition on until the countdown timer expires. This time is critical to allow the ECM to perform internal, initialization functions after a read or flash operation.

### Switch Tunes using AutoCal V2

Tune file parameters must be correctly defined for [Serial Data] to switch via FlashScan or AutoCal. Switching via FlashScan and AutoCal is only supported for E54, E60 and E98.

1. Connect your AutoCal V2 device to your vehicle.
2. Turn the vehicle ignition to the *On* position.
3. Navigate to the Switch Tunes menu option
4. Select PIDs
5. Use the arrows to navigate between tunes.
6. Press OK to make a tune selection.
7. You do not need to reselect the tune once the engine is shut down; the ECM 'remembers' which tune you previously selected.



## Support

### Trouble Shooting

Should users encounter problems with the EFILive software, FlashScan or AutoCal hardware they should:

1. Confirm software, firmware and boot block versions are up to date.
2. Check that checksums are valid.
3. Check the base file matches the calibration for your vehicle.
4. Remember E86A, E86B and E47 files cannot be read from the ECM.
5. Check to see if the NVRAM in the ECM is functional.
6. DSP<sup>5</sup> tune files cannot be read from the ECM.
7. Remove/isolate all after-market devices including mobile phone adapters, after-market equipment (audio systems, security, remote start etc.) and any devices wired into the OBD port that may interfere with vehicle communications.
8. DO NOT operate any vehicle feature that may communicate on the data bus. This includes opening or closing of hood, doors, windows, as well as changing settings on radio, HVAC, connecting/removing charging devices etc.

### Error Codes

If an error occurs while using AutoCal, users can look up the error code description in the EFILive V8 Scan and Tune software.

The [F8: Tools] -> [F8: Error Codes] menu item provides an error code lookup function, and the "EFILive Error Codes.pdf" document accessed by selecting the Windows Start Icon and navigating to Program Files->EFILive->V8->Documents->EFILive Error Codes.pdf is also available. Both options provide error code descriptions, causes and actions.

Should the issue not be resolved after reviewing the Error code list, end users should contact their Tuner for support.

### Checksums

Checksums perform a vital role in ensuring the integrity of the data in the tune file. There are two main reasons that checksums display as invalid:

1. The data in the file is corrupt and MUST NOT be flashed into a controller.
2. The data in the file has been modified with a software package that did not update the checksums – such as a hex editor.

Do not correct the checksums unless you know the tune file was modified outside of the EFILive software and that the modifications are correct and accurate.

If you correct the checksums of a file with corrupt data you are merely masking corruption. If you flash a corrupt file into a controller, you risk damaging the controller and/or causing the vehicle to operate incorrectly.

## NVRAM Status

If the NVRAM area of the ECM is corrupted the vehicle may still run, however it may not be possible to read or flash the controller. Typically, if the VIN, Serial number, Hardware number and/or calibration ID do not contain valid data, the controller will need to be repaired to restore full functionality.

An error code received during reading and/or flashing may indicate a NVRAM issue.

To identify if the NVRAM is functional or corrupt:

1. Open the EFILive V8 Scan and Tune software.
2. Connect your FlashScan/AutoCal device to your PC and vehicle.
3. Turn the vehicle ignition to the *On* position.
4. Navigate to the [F4: OBD] -> [F2: OBD] menu option and select the [Details] tab.
5. Select your controller(s) by using the [Auto Detect] button, or;
  - a. Hover over the Engine Controller box, and right click on the “Right-click to select engine-controller” box and manually select the ECM.
  - b. Navigate and select the correct controller.
6. Click the [Read] button to populate controller data.
7. Where the VIN, Serial number, Hardware number and/or calibration ID either contain all zeros or non-numeric characters, the controller will need to be repaired to restore full functionality.

The screenshot shows the 'Retrieve Controller(s) OBD Details' window. The 'Details' tab is active, displaying a table of controller information. The 'VIN' and 'Serial Number' fields are circled in red, indicating they contain invalid data (all zeros).

Description	Value	Units
<b>Powertrain Control Module (PCM)</b>		
Description	ES4 L87 Duramax ECM	
VIN	0; 000y0x=0 00,00.	
Serial Number	/000A000A000	
Hardware Number	1100349472	
Calibration ID	1012924418	
BCC		
Security Seed	\$DAA4	
Operating System	15189044 (\$0000)	
Engine Operation	15189053 (\$0000)	
Engine Diagnostics	15100899 (\$0000)	
Fuel System	15076354 (\$0000)	
System	15076387 (\$0000)	
Speedometer	15076393 (\$0000)	

Controller repair requires the flash memory chip to be replaced in the ECM. A number of companies can perform this service including SoCal Diesel and Wait4Me Performance.

## GM Fast CAN Mode

Two flash speeds exist for GM controllers;

1. **GM Fast CAN** delivers the fastest possible flash time and is approx. 50% faster than standard flash routines.
2. **Standard** can be used if you experience flash failures when using Fast CAN, try unchecking that option and retry the flash.

GM Fast CAN Mode by default is set to “Yes” and can be modified for both Pass-Thru and BBF the following ways:

1. [F6:Devices] -> [F5: Options] tab and programming the device.
2. Via FlashScan and AutoCal hardware by editing the device options.

If the following failed flash error codes are received, users should adjust the GM Fast CAN Mode to "No" and try the flash again.

- \$0312 Sub Function Not Supported or Invalid Format (\$12).
- \$0322 Conditions Not Correct or Request Sequence Error (\$22).
- \$0370 Upload Or Download Not Accepted (\$70).
- \$0371 Transfer Suspended (\$71).
- \$0372 Transfer Aborted (\$72).
- \$0374 Illegal Address In Block Transfer (\$74).
- \$0375 Illegal Number of Bytes In Block Transfer (\$75).
- \$0376 Illegal Block Transfer Type (\$76).
- \$0377 Block Transfer Data Checksum Error (\$77).
- \$0379 Incorrect Byte Count During Block Transfer (\$79).
- \$0385 General Programming Failure (\$85).

EFILive recommends restoring GM Fast CAN Mode back to "Yes" if setting it to "No" did not fix the problem. Otherwise all future flash attempts will continue to operate at the slower speed.

## LB7 and LLY Flashing Tips and Tricks

LB7 and LLY controllers use a communications platform that is not very robust and was replaced in 2006. In many cases, these controllers fail with factory tools and will be unrecoverable.

Tips for successful reading/flashing of LB7 and LLY controllers include:

1. Use a bench harness for reading/flashing (Recommended).
2. Remove/isolate all after-market devices including mobile phone adapters, after-market equipment (audio systems, security, remote start etc) and any devices wired into the OBD port.
3. DO NOT operate any vehicle feature that may communicate on the data bus. This includes opening or closing of hood, doors, windows, as well as changing settings on radio, HVAC, connecting/removing charging devices etc.
4. Check Available Licenses. The first time FlashScan/AutoCal flashes a controller, licensing requirements are validated and must be met to facilitate a successful flash. Refer to the License Status knowledgebase article for further information.
5. Check the EFILive Error Code list. The code displayed on FlashScan/AutoCal and in the EFILive software is an important diagnostic tool. Look up the error code number and obtain a detailed description of the cause and suggested solutions to your issue.

If you still have problems flashing;

1. Isolate fuses. Common communication problems are reported with the ABS, BCM, Radio, Info and Lift Pump fuses.
2. If flashing in high speed; revert to low-speed flashing.
3. Use pass-thru reading/flashing rather than standalone reading/flashing.

## LB7 & LLY Controller Recovery

To attempt to recover a failed flash for LB7 or LLY;

## Full Flash

1. DO NOT REMOVE POWER FROM THE CONTROLLER. As long as the controller remains powered up, Efilive's proprietary boot loader running in the controller will continue to wait for a successful full flash procedure. Retry the full flash procedure until it is successful.
2. POWER REMOVED FROM CONTROLLER. If power has been removed from the controller, it may be recoverable if the flash was at least 15%-20% complete and the communications portion of the operating system was reprogrammed to allow the controller to continue to operate in dead poll mode. Retry the full flash procedure.

If flashing it fails with a "no communications" error then the controller has probably been rendered inoperable and unrecoverable. The only way to recover the controller is to disassemble it and physically remove, reprogram and replace the flash chip on the main circuit board.

## Calibration-Flash

A calibration-flash failure is not critical and will generally not result in an unrecoverable controller. To recover from a failed calibration-flash, turn the ignition off, wait 30 seconds, turn the ignition back on, wait a further 10 seconds, the retry the calibration-flash.

If the calibration-flash continues to fail:

1. Remove battery power from the controller, by either removing the controller's fuse or by disconnecting the battery from the vehicle.
2. Wait 30 seconds.
3. Reconnect power.
4. Retry the calibration-flash.

## Failed Flash Recovery Methods (excluding LB7 & LLY)

In the event that an ECM fails during the flashing process, recovery methods exist to restore the ECM.

In most instances, simply retrying the flash process will return the ECM to working order.

In the instance where tuners apply security restrictions to a tune file, including locking to the controller serial number, and the flash fails, you must try to recover the ECM with a file that has no security restrictions in place (e.g. stock tune) before attempting to reflash a file with security restrictions.

If retrying the flash process does not return the ECM to working order, the [Problem Flashing a Controller](#) and [Controller Recovery](#) knowledgebase articles provide additional support resources.

## Test for Rogue Modules

For Customers with FlashScan/AutoCal V3 a range of test modes to check the network for rogue modules that may cause read or flash operations to abort are available.

Navigate to the Tune Tool -> F1: Tuning -> F4: Test OBD Network menu.

Select the Test CAN J1979 option for CAN based controllers.

Select the Test VPW 1x Speed option for VPW based controllers to test the network at normal speed, i.e. data logging speed.

Select the Test VPW 4x Speed option for VPW based controllers to test the network at the speed used to read or flash a controller.

## Trace Files

### V8 Scan and Tune \*.htx files

When V8 Scan and Tune software reads or flashes a controller the details of the read/flash process may be saved in trace files for diagnostic purposes.

In addition, users can manually save trace files where options do not perform the desired outcome.

To manually generate a trace file, generate the error in V8 software, then open the EFILive Control Panel and navigate to [F8: Trace] and select [Save Trace]. Users can set the trace file and save location during this process.

Automatically generated trace files are created on your PC or laptop in the folder: \Documents\EFILive\V8\Trace and are named using the following naming convention:

YYYYMMDD\_HHNNSS\_T\_CCC.htx, where:

- YYYYMMDD: is the year, month and day that the trace was recorded.
- HHNNSS: is the hour, minute and second that the trace was recorded.
- T: is the mode and is one of **R**=Read **F**=Full-Flash **W**=Cal-Flash.
- CCC: Is the controller type
- htx: is the file extension.

### FlashScan/AutoCal V3 \*.xalm files

Trace files are automatically saved where an error message is presented using the device in BBX mode. Users can manually save trace files where options do not perform the desired outcome, including for pass-thru functions.

To manually generate a trace file on FlashScan/AutoCal V3 navigate to Scan Tool -> F3: Scan Options -> F1: Save Trace.

FlashScan/AutoCal V3 maintains an internal buffer of the most recent messages sent to and received from the vehicle. That buffer is stored in RAM memory and is wiped clean each time the device is powered off or rebooted. Therefore you **MUST** save the trace file before powering off or rebooting the device.

Trace files are located in the EFILive -> Trace folder on FlashScan/AutoCal V3.

Trace files are named using the following naming convention:

yyyymmdd\_hhnnss\_<desc>.xalm, where:

- yyyymmdd: is the year, month and day that the trace was recorded.
- hhnnss: is the hour, minute and second that the trace was recorded.
- <desc>: is the description where;
  - "User" means user generated trace files
  - "xxx.\_x\_\$xxx" identifies the 3 character controller ID, the communication process upload/download, and the 4 digit error code.
- xalm: is the file extension.

### FlashScan V2 Trace Files

Trace files are automatically saved where an error message is presented using the device in BBX mode. Users can manually save trace files where options do not perform the desired outcome.

To manually generate a trace file on FlashScan V2 navigate to F1 Scan Tool -> F3 Scan Options -> F1 Save Trace File.

FlashScan V2 maintains an internal buffer of the most recent messages sent to and received from the vehicle. That buffer is stored in RAM memory and is wiped clean each time the device is powered off or rebooted. Therefore you **MUST** save the trace file before powering off or rebooting the device.

Trace files are located in the Scan folder on FlashScan V2. It will be named USR\_XXXX.efx, where XXXX is the unique file counter number.

### AutoCal V2 Trace Files

Provided enough space exists in the [Data] file system of AutoCal V2 trace files are automatically saved where an error message is presented using the device in BBX mode. Users can manually save trace files where options do not perform the desired outcome.

To manually generate a trace file on AutoCal V2 navigate to:

1. AutoCal (standard menu): Save Trace File
2. AutoCal (advanced menu): Scan Tool -> Save Trace File

AutoCal V2 maintains an internal buffer of the most recent messages sent to and received from the vehicle. That buffer is stored in RAM memory and is wiped clean each time the device is powered off or rebooted. Therefore you **MUST** save the trace file before powering off or rebooting the device.

The trace file will be saved in the Scan folder on the device. It will be named USR\_XXXX.efx, where XXXX is the unique file counter number.

### Knowledgebase

The [EFILive Knowledgebase](#) provides a detailed resource on how to configure and use your EFILive software and hardware.

### EFILive Authorized Dealer

If after reviewing this guide further assistance is required please contact the EFILive Authorised Dealer from whom you purchased your product. They are your first point of contact for EFILive support related inquiries.

## How to Tune?

EFILive is tuning software and hardware - it is not a tune. Together the software and hardware give users the tools to write tunes. EFILive does not provide tune files, tuning advice or support, but do provide software support and hardware support.

If your question is in relation to the actual tuning of your vehicle (e.g. how to gain performance, economy etc.) then please ask these questions on the EFILive Forum (<http://forum.efilive.com/>).

## EFILive Service Desk

Should you require additional assistance after using this support guide, please start a ticket on the [EFILive Service Desk](#). Please include the following information:

1. Dealer Name.
2. Device type.
3. Serial Number and Auth Code.
4. Your computer operating system.
5. Software and firmware versions.
6. Trace files.
7. Detailed information about your issue.