



GM Controller Locking

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GM Controller Locking

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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.

Documentation

The GM Controller Locking guide replaces the EFILocker Custom Operating System Patch document.

The GM Controller Locking guide documents controller locking functionality. All other processes, such as reading, licensing and flashing are documented in the GM Gas User Guide and the GM Diesel User Guide.

Software Version Overview

The GM Controller Locking guide replaces the EFILocker Custom Operating System Patch document and 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 V8.3.8 or later.
2. FlashScan V3 / AutoCal V3 Firmware – V3.00.068.
3. FlashScan V2 / AutoCal V2 Firmware - V2.08.177.

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. FlashScan/AutoCal V3 and FlashScan/AutoCal V2 are compatible with the V8 software.



Controller Locking

Controller Locking

Locking refers to the security system built into most vehicle controllers. Most controllers' security systems employ a simple seed/key system to prevent unauthorized access to the controller's operating system and/or calibrations.

Many tuners like to protect their tunes by locking the controller.

Due to the very different controller architectures that have been released between 1998 and 2021, locking has been implemented differently for different controllers. In some instances only specific operating systems are supported for locking. Controller locking on 2017+ model year vehicles is not available due to GM security changes.

There are two different locking methods – Auto Lock and Manual Lock.

What GM Controllers can be Locked?

GM Gas

Controller	Locking method
E38 ¹	Auto Lock via BootLocker, or Manual locking.
E39/E39A ^{1 2}	Auto Lock via EFILocker Patch.
E40	Auto Lock via BootLocker, or Manual locking.
E67	Auto Lock via BootLocker, or Manual locking.
E78 ^{1 2}	Auto Lock via EFILocker Patch.
E80 ^{1 2}	Auto Lock via EFILocker Patch.
E92 ^{1 2}	Auto Lock via EFILocker Patch.
LS1B	Auto Lock via BootLocker, or Manual locking.

GM Diesel

Controller	Locking method
E54	Auto Lock via BootLocker, or Manual locking.
E60	Auto Lock via BootLocker, or Manual locking.
E98 ^{1 2}	Auto Lock via EFILocker Patch.

Transmission Controllers

Controller	Locking method
A50	Auto Lock via EFILocker Patch.
T43 ^{1 2}	Auto Lock via EFILocker Patch.
T87 ^{1 2}	Auto Lock via EFILocker Patch.

¹ Where the controller remains in use in 2017+ model year, or was released during or after 2017, locking is not available due to GM security changes.

² Select Operating Systems only; refer to Appendix for a list of supported EFILocker patch operating systems.

Auto Locking

Auto Locking is an EFILive exclusive feature that allows tuners to automatically lock controllers when flashed with a protected tune file and to automatically unlock controllers when flashed with a non-protected tune file where the tune file was locked using V8.2.2 build 225 software (June 2013) or later.

When an ECM is Auto-Locked all non-EFILive reflashing tools (such as GM's Tech II) will be prevented from reading and flashing the controller. However EFILive's Tuning Tool will always be able to reflash the ECM. Depending on the Auto-Lock status of the file being flashed, the ECM will either remain locked or be unlocked at the completion of the flash.

The Auto-Lock system generates and manages its own keys to ensure that any EFILive user can reflash an Auto-Locked controller. Because the keys are managed internally and are never exposed to the user, the controller cannot be unlocked manually by supplying the key.

Auto-Locking is implemented using two distinct methods, dependent on the controller type. The two methods are:

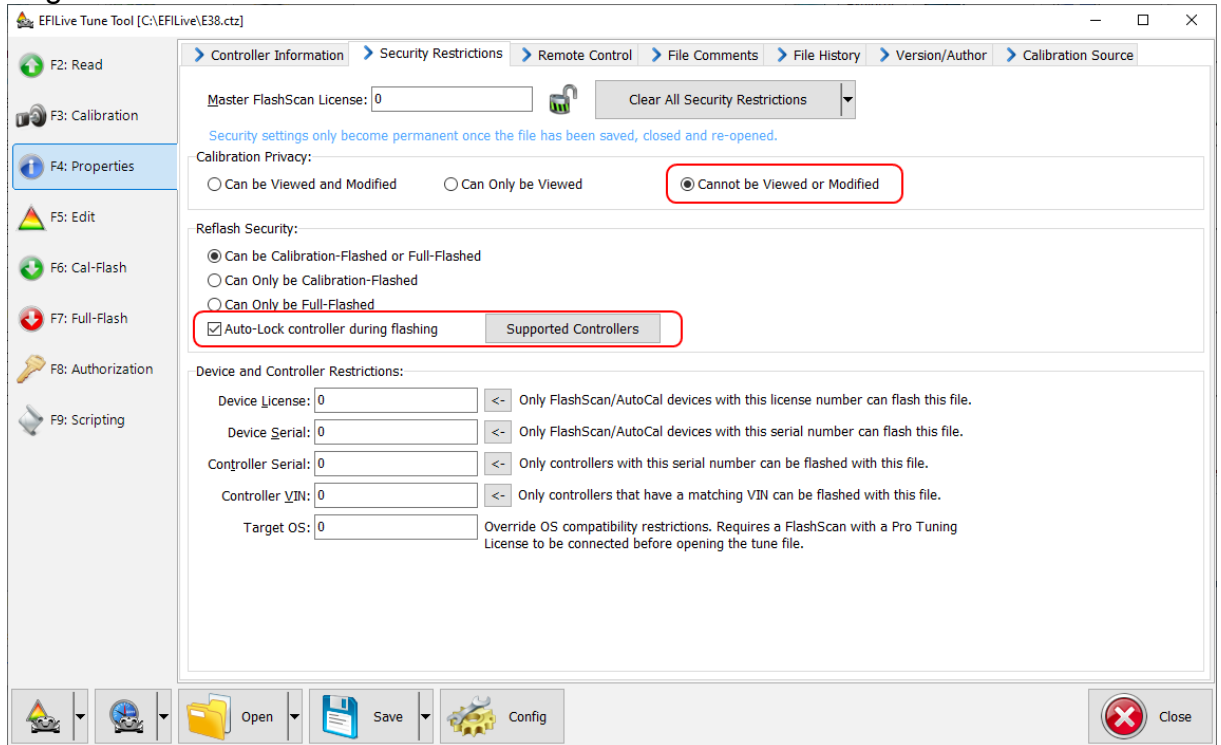
1. BootLocker.
2. EFILocker COS Patch.

Locking via BootLocker

Auto-Locking for controllers using the BootLocker can be applied by;

1. Connect FlashScan to your PC.
2. Open the V8 Scan and Tune Tool software.
3. Open the tune file.
4. Navigate to either of the below options:
 - a) V8 Scan and Tune using the **[F3: Tune] -> [F4: Properties]** via the **[Security Restrictions]** tab.
 - b) V8 Scan and Tune via the **[F5: BBX] -> [F6: Quick Setup]** feature.
5. Check the **[Cannot be Viewed or Modified]** option to prevent unauthorized access to the file by any software package.

6. Check the **[Auto-Lock Controller During Flashing]** option to cause the target controller to be locked when this file is flashed into it.



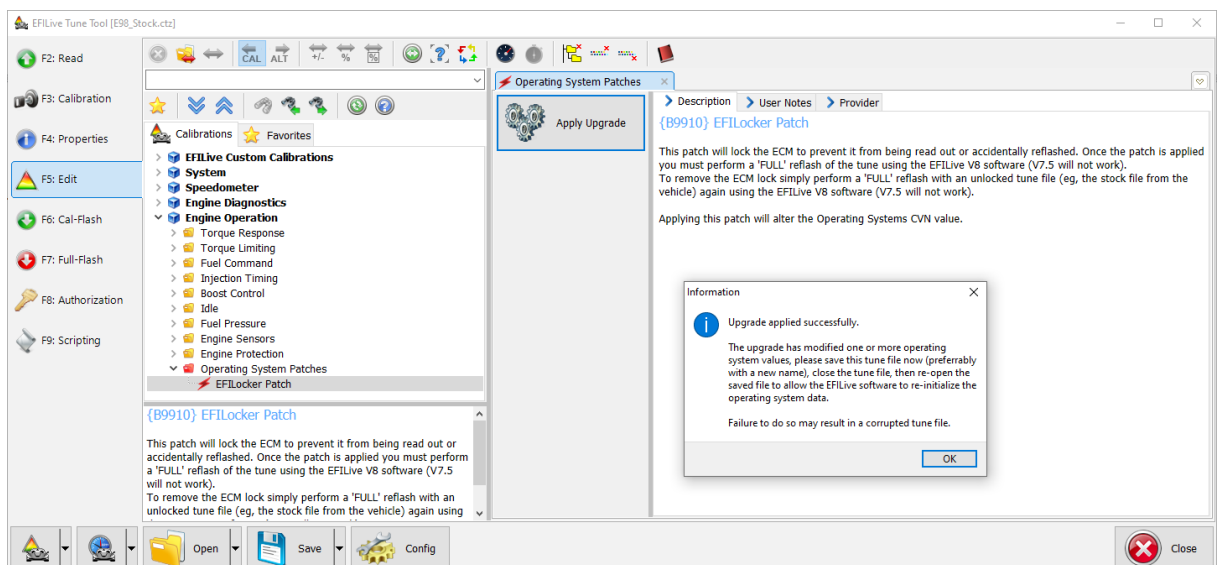
7. Select any other security restrictions required, and [Save] the tune file.
8. Flash the secured tune file into the controller.

To unlock a previously Auto-Locked controller, flash a tune without without Auto-Lock security.

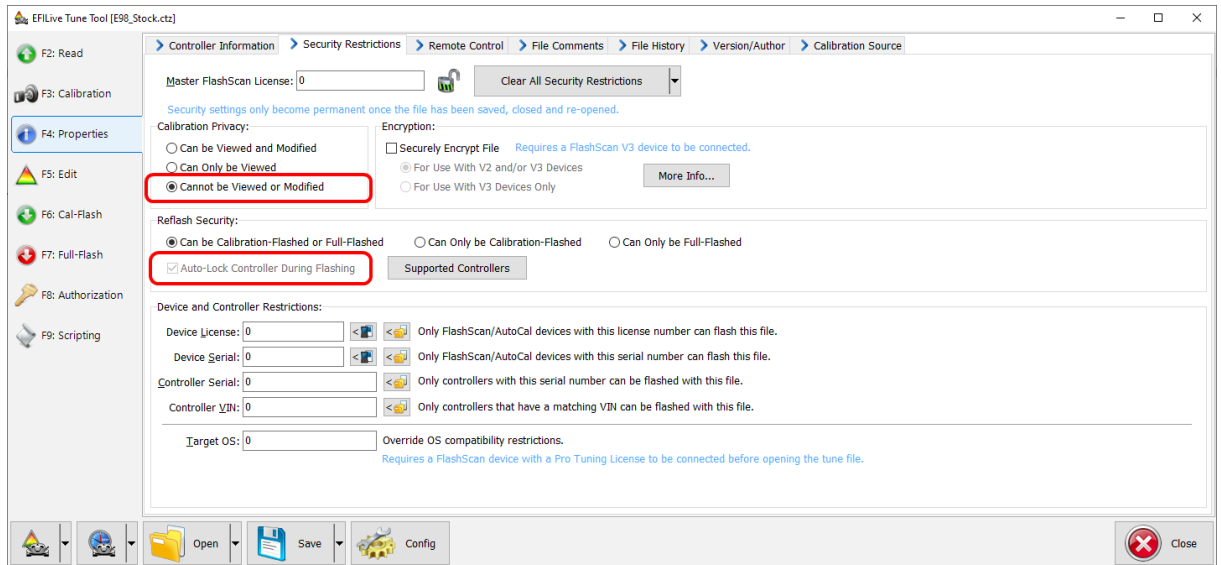
Auto Locking EFLocker COS Patch

Auto Locking for controllers using the EFLocker can be applied by;

1. Connect **FlashScan** to your PC.
2. Open the **V8 Scan and Tune** software
3. Open the tune file.
4. Navigate to the **[Operating System Patch]** folder and open the **[EFLocker Patch]**.
5. Apply the **EFLocker Patch** upgrade.



6. Navigate top the [F4: Properties] tab.



7. The **[Cannot be Viewed or Modified]** option is automatically set to prevent unauthorized access to the file by any software package.
8. The **[Auto-Lock Controller During Flashing]** option is applied to the file to lock the target when this file is flashed into it. NOTE: For the controller to be locked, this file **MUST BE FULL FLASHED** in the first instance.
9. Select any other security restrictions required, and **[Save]** the tune file.
10. Full Flash the secured tune file into the controller.

To unlock a controller previously locked with the Efilocker Patch, full flash a file without without the Efilocker Patch applied.

EFILocker Controller Locking Combinations

The Auto Lock flag automatically decides if/when to full-flash and if/when to cal flash. The flashing outcome of a tune file is dependent on the key criteria below.

1. The Auto-Lock status presently in the ECM.
2. The combination of the following security settings;
 - Auto-Lock
 - Calibration only flash restriction
 - Full flash only restriction

The table below shows the locked/unlocked status after the respective flash operation is complete.

NOTE: A50 controllers DO NOT permit calibration-only flashing when the controller has been previously Auto-Locked.

EFILocker Controller Status				
File Security Restrictions	Controller Not Yet Auto Locked		Controller Previously Auto Locked	
	Cal Flash	Full Flash	Cal Flash	Full Flash
None	Cal Flash	Full Flash	Cal Flash	Full Flash
Cal-Flash	Unlocked	Unlocked	Locked	Unlocked
Full-Flash	Unlocked	Fail: \$0539	Locked	Fail \$0539
Auto-Lock	Fail \$053C	Unlocked	Fail \$053C	Unlocked
Auto-Lock & Cal-Flash	Fail \$054D	Locked	Locked	Locked

Auto-Lock & Full Flash	Fail \$054D	Fail \$0539	Locked	Fail \$0539
None	Fail \$053C	Locked	Fail \$053C	Locked

The locked or unlocked status of the ECM is only changed if the flash is successful. If the flash fails, the previous locked/unlocked status is retained. The failed flash error codes are:

- \$054D: Calibration only flashing is not allowed.
- \$053C: Tune file does not allow calibration flashing.
- \$0539: Tune file does not allow full flashing.
- \$054E: Target controller does not support calibration-only flashing with Auto-Locking.

When a file containing the EFILocker patch is flashed into a controller that does not already have the EFILocker patch installed, the user must select a full-flash option to ensure that the EFILocker patch is installed into the controller's operating system.

If the user attempts a cal-flash when a full-flash is required the cal-flash will fail with error \$054D "Calibration only flashing is not allowed yet". Once the full-flash has completed successfully and the EFILocker patch is installed into the controller's operating system then subsequent flashes of any EFILocker files may be cal-flash or full-flash.

How to Remove Auto Lock from an ECM

Auto Lock cannot be removed from a tune file. To remove Auto Lock from an ECM, the user must full flash the ECM with a tune file that does not contain Auto Lock.

Manual Locking

Where manual locking is implemented, the controller cannot be reflashed until it is first unlocked.

Manual Locking is available for LS1B, E38, E40, E67, E54 and E60 controllers and allows tuners to manually lock a controller using a specific key. The key can be provided by the tuner or the tuner can allow the FlashScan device to choose a secret key.

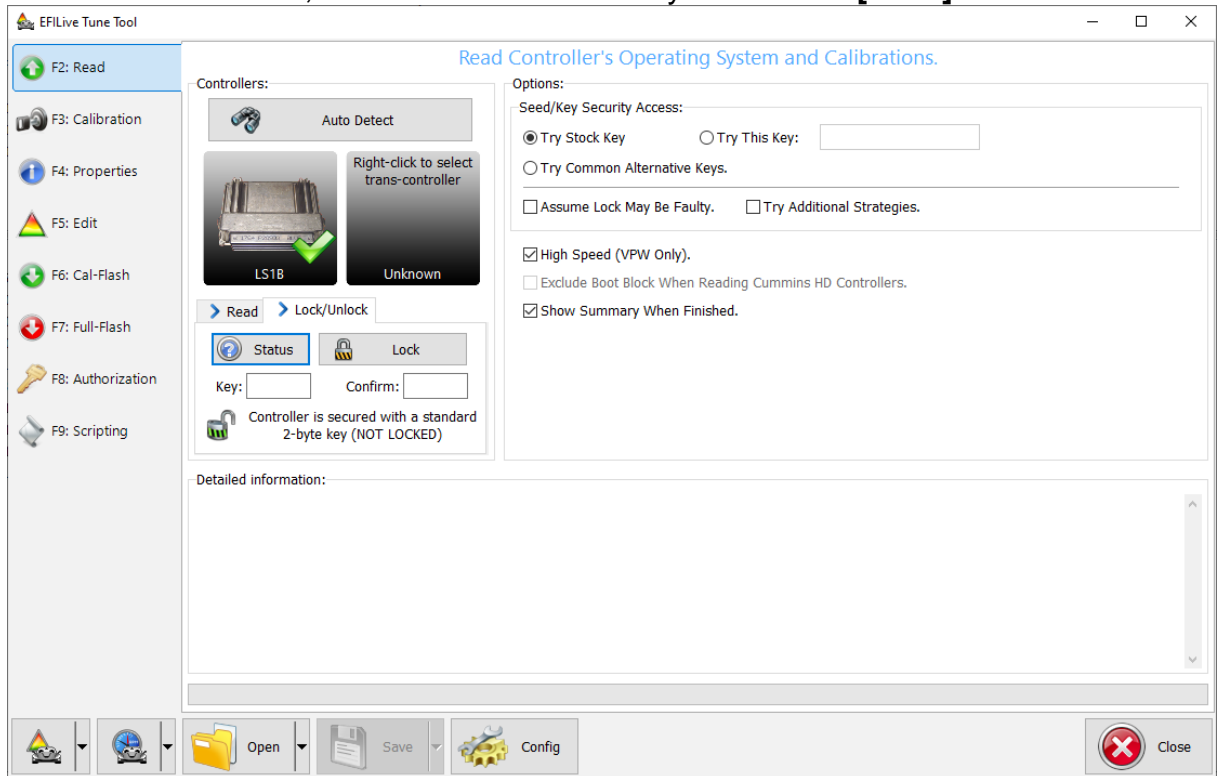
- If the key is provided by the tuner, the tuner must record that key somewhere because that key will be required to unlock the controller in future.
- If the key is generated by FlashScan, then only FlashScan devices with the same License Number can be used to unlock the controller.

Where manual locking is implemented, the controller cannot be reflashed until it is first unlocked.

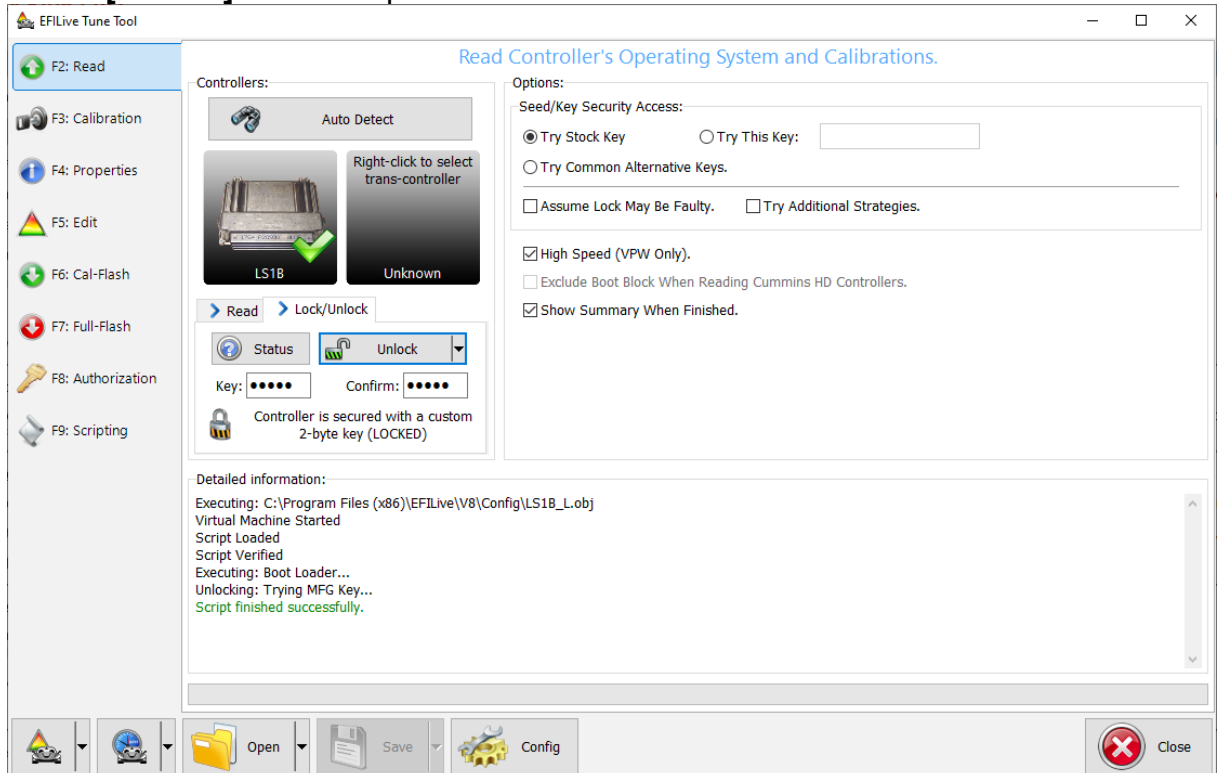
To manually lock a controller or to check the lock status of a controller;

1. Connect **FlashScan** to your PC and the vehicle.
2. Open the **V8 Scan and Tune Tool** software.
3. Navigate to the **[F3: Tune] -> [F2: Read]** menu.
4. **[Auto Detect]** the controller.
5. On the **Lock/Unlock** tab, select **[Status]** to display locking status.

6. To lock the controller, enter and confirm the key then select **[Lock]**.



7. To unlock the controller, enter and confirm the key then select **[Unlock]**. If the key was generated by FlashScan or AutoCal, then ensure that device is connected and select the **[Unlock (using FlashScan generated key)]** option on the **[Unlock]** button drop down menu.





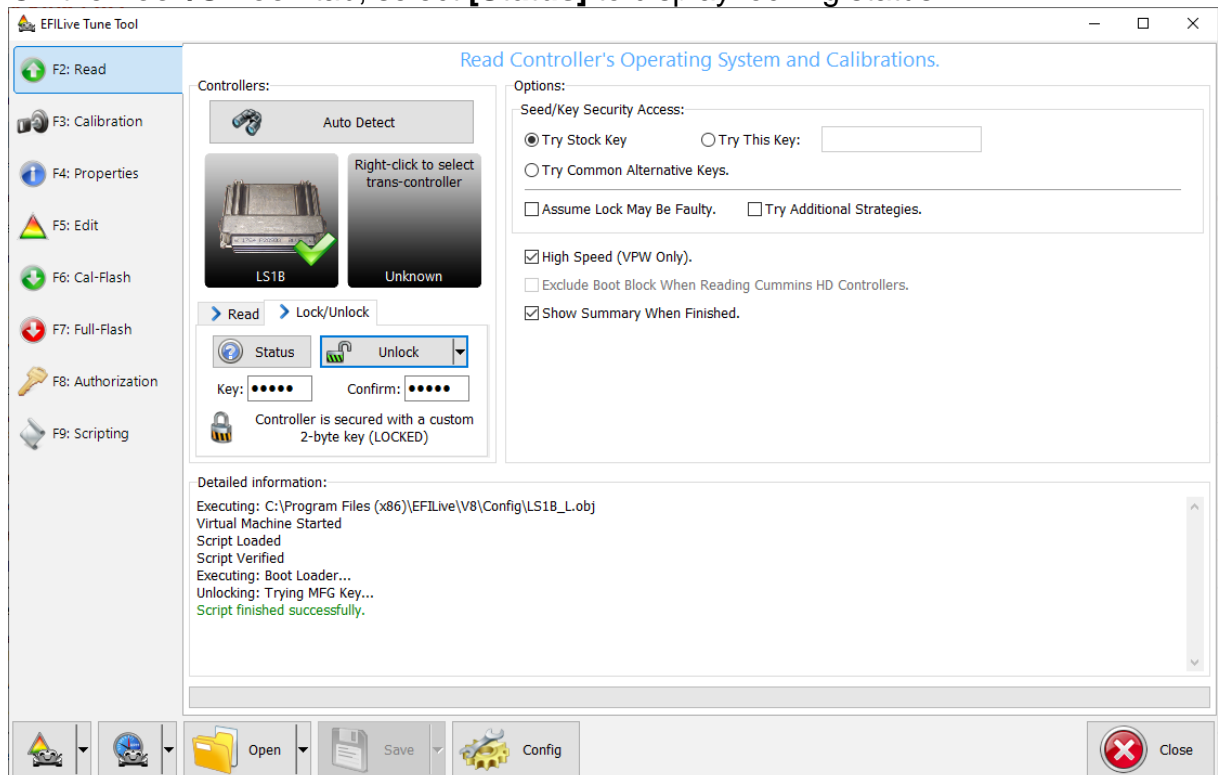
Controller Unlocking

How do I know if a Controller is Locked?

EFILive Error Code \$0537 "Controller is Locked with a custom key" is displayed when attempting to read or flash the controller. NOTE: Where the controller selected is different to the controller connected, the key will fail and report that the controller is locked.

To check the controller status;

1. Connect **FlashScan/AutoCal** to your PC and vehicle.
2. Open the **V8 Scan and Tune Tool** software.
3. Navigate to the **[F3: Tune] -> [F2: Read]** menu and **[Auto Detect]** the controller.
4. On the **Lock/Unlock** tab, select **[Status]** to display locking status.



How to Unlock a Controller

Controllers previously tuned by you

Controllers intentionally locked

1. To unlock a previously Auto-Locked controller, flash a tune without Auto-Lock security. If Auto-Lock was applied via EFILocker Patch, then a tune file without Auto-Lock security must be full flashed.
2. To unlock a previously manually locked controller by you, complete the check controller status steps above, and then enter the key that you originally set and select **[Unlock]**.

3. If you have forgotten your manual locking key then, an encrypted copy of the seed and key is saved in a file called: \Program Files\EFILive\V7.5\Configuration\PCMLocks.ini. Use the V8 software option **[F8: Tools] -> [F5 Keys]** to recover those keys. This option cannot be used to recover Auto-Locking keys.

Controllers not locked/unintentionally locked

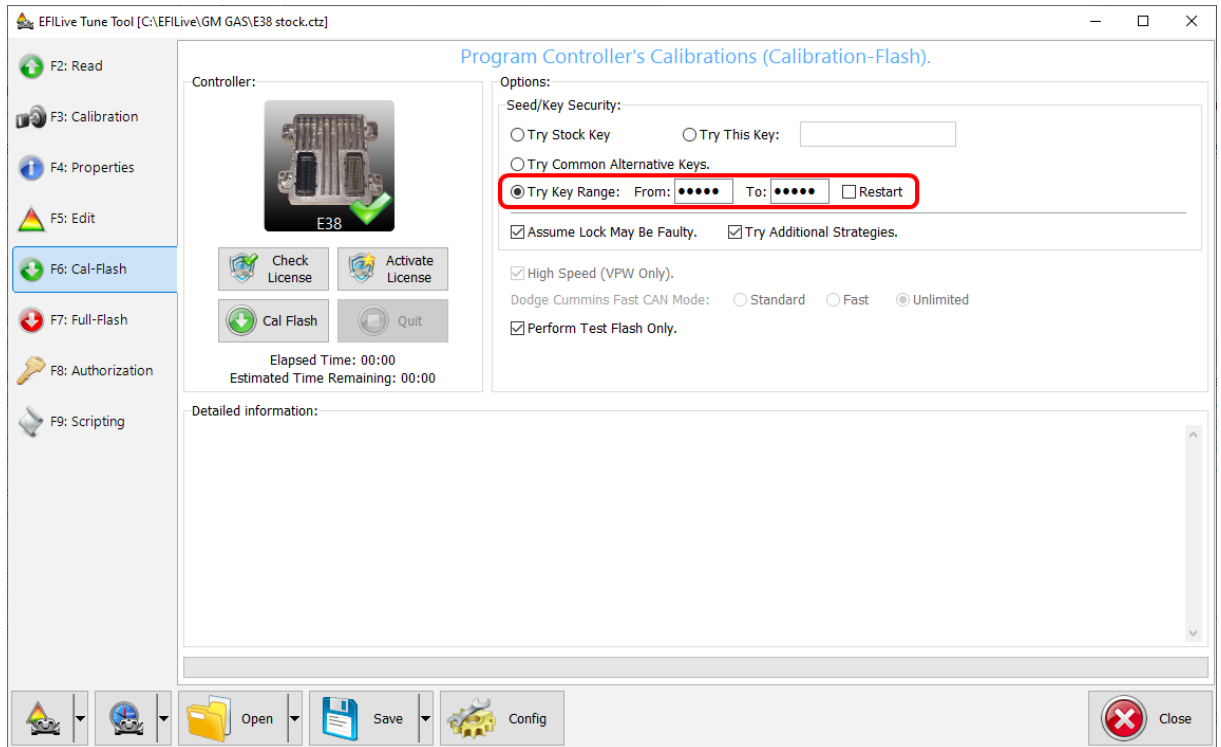
Where you have previously tuned a controller and have not applied controller locking:

1. The controller's security system may be damaged or non-functional. Select both "Try Alt Keys" and "Assume Lock May Be Faulty" check boxes and retry the flash process.
2. The controller is not the correct controller. Trying to unlock one type of controller using another type of controller's key will fail and report that the controller is locked.

Controllers not previously tuned by you.

1. To unlock a previously Auto-Locked controller, flash a tune without Auto-Lock security. If Auto-Lock was applied via EFILocker Patch, then a tune file without Auto-Lock security must be full flashed.
2. Where flashing an unlocked tune file does not grant access to the controller, the manual locking method was used. In this instance, if the key is unknown the following options are available:
 1. Use the **EFILive V8 Scan and Tune** software to try a range of keys to unlock the controller. Attempting every key will take up to 5 days.
 - a. Connect **FlashScan/AutoCal** to your PC and controller (bench harness is recommended).
 - b. Open **EFILive V8 Scan and Tune** software.
 - c. Open a tune file for your connected controller.
 - d. Navigate to the **[F3: Tune] -> [F6: Cal Flash]** menu.
 - e. Select the **Try Key Range** option and enter a key range.
 - f. Select **[Cal Flash]** to start.

- g. Keys are tried in a random order in the range specified. If a user needs to pause or end the process, select the **[Quit]** button, which also saves the previously attempted keys. To resume the process, ensure the **Restart** option is checked prior to reselecting **[Cal Flash]** so only un-attempted keys within the range are tried.



2. Contact the original tuner to locate the key.
3. Have the controller recovered by someone who can provide that service.
4. Where the controller's security system has been modified by a non-EFILive tuner to use a different unlock strategy. In that case contact EFILive support and we will attempt to help you unlock the controller using the "Try Additional Unlock Strategies" option.



Appendix

E39/E39A EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

E39 & E39A EFILocker Supported Operating Systems		
12634130	12645364	12653570
12635812	12646098	12655008
12636334	12646099	12655477
12637158	12646128	12655479
12637495	12647088	12655481
12639993	12648433	12656239
12642404	12648907	12656454
12642405	12650103	12657779
12642817	12651855	12659671
12642819	12652815	12663375
12643377	12653091	12668443
12644447	12653345	

E78 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

E78 EFILocker Supported Operating Systems		
12640467	12647731	12654413
12643574	12649251	12655492
12644082	12653708	12655493
12645607	12654014	12656286
12646746	12654130	12657062

E80 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

E80 EFILocker Supported Operating Systems		
12664513	12671093	12672628
12668077	12671118	12673258
12669202	12672375	

E92 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

E92 EFILocker Supported Operating Systems		
12657307	12663372	12670745
12657555	12663390	12671993
12658729	12663436	12672585
12659455	12664769	12673677
12660065	12665218	19330115 (GMPP)
12660506	12666661	
12662762	12670573	

E98 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

E98 EFILocker Supported Operating Systems		
55597308	55499969	55493455
55484589	55499815	55503892
55491998	55493451	55508080

A50 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

A50 EFILocker Supported Operating Systems		
15878459	24259875	24266880
24257039	24261135	94670650
24257093	24266711	

T43 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

T43 EFILocker Supported Operating Systems		
24267577	24270599	

T87 EFILocker Availability

The following table lists operating systems where the EFILocker patch is available.

T87 EFILocker Supported Operating Systems		
24271208	24274899	



Support

Trouble Shooting

Should users encounter problems with the EFILive software, FlashScan or AutoCal hardware they should refer to the GM Gas User Guide or GM Diesel User Guide for detailed information.

Should users encounter problems with Controller Locking or Controller Unlocking, users should:

1. Confirm software, firmware and boot block versions are up to date.
2. Check the locked/unlocked status of the controller.
3. For EFILocker, check that the operating system supports locking.

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.

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.