



EFILocker Custom Operating System Patch

Cindy Myers

EFILocker Custom Operating System Patch

© 2015 [EFILive Limited](#)
All rights reserved

First published
26 March 2015

Revised
12 October 2016

Contents

Introduction2

What is Auto-Lock?.....2

What is EFILocker?2

Additional Support Resources3

Software Version Overview3

Supported Controllers.....3

How is EFILocker different to BootLocker?.....4

Software Requirements4

Licensing Requirements5

Applying the EFILocker Patch6

Controller Locking Combinations.....8

Tune File Security.....9

 [F3:Tune]10

 [F5: BBX] -> [F6: Quick Setup]11

Practical Examples12

Flash Requirements.....12

How to Remove EFILocker from an ECM.....12

Appendix A – E39 & E39A EFILocker Status13

Appendix B – E78 EFILocker Status.....14

Appendix C – T43 EFILocker Status.....15

Appendix D – T87 EFILocker Status.....15

Introduction

This document is intended to assist EFILive customers with the basic operations and steps necessary to remotely lock and unlock controllers using EFILive's Auto-Lock feature, specifically focusing on our exclusive EFILocker technology available on many late model controllers up to and including the 2016 model year.

Due to the very different controller architectures that have been released over the past 20 years, Auto-Lock has been implemented differently for different controllers.

For late model controllers, such as the E92 and E39, Auto-Lock is implemented via an EFILive developed Custom Operating System (COS) called the EFILocker patch.

Older controllers, such as the LS1, E38 and LB7 do not use the EFILocker technology, instead they implement EFILive's Auto-Lock features using our proprietary BootLocker technology. This document is only concerned with EFILocker and does not discuss BootLocker in detail.

Controller locking on 2017+ model year vehicles is not available due to GM security changes.

What is Auto-Lock?

Auto-Lock is the new way to lock and unlock controllers. The two main benefits of Auto-Locking are:

1. Tuners can configure their tuning files to remotely lock or unlock the target controller when the file is flashed into a controller.
2. Controllers that have been Auto-Locked cannot be read but they can still be reflashed.

Traditionally when an ECM is locked it cannot be reflashed by any tuning tool until it has been unlocked. Only the original tuner was able to unlock the controller to allow it to be reflashed. While that type of locking protects a tuner's IP it also creates problems for customers when their vehicle needs to be reflashed elsewhere. If the customer is no longer able to visit the tuner's shop or the original tuner is no longer in business or the tuner simply refuses to unlock the controller then sometimes the only option is to replace the controller.

Auto-Locking uses a modified locking strategy. When an ECM is Auto-Locked all non-EFILive reflashing tools (such as GM's TechII) 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.

What is EFILocker?

EFILocker is the underlying technology used to implement Auto-Locking on late model controllers. It is a custom operating system (COS) developed and supplied by EFILive called the EFILocker patch.

Additional Support Resources

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

If your question is in relation to the actual tuning of your vehicle (i.e. how to gain performance, economy etc.) then please ask these questions on the EFILive Forum (<http://forum.efilive.com/>). EFILive does not provide support or assistance for the actual tuning of any supported vehicles.

Software Version Overview

EFILive presently has two major software versions (V7 and V8) that implement different parts of the tuning and scanning process. The V8 software is undergoing significant development and will eventually supersede V7 entirely for FlashScan V2 customers. For the moment, however, both versions are required.

The following is a brief view of the activities that are performed with the different software versions:

Software Version	Purpose
V8	<ul style="list-style-type: none"> • Reads and Flashes all supported ECM's. • Maintains the bootblock and firmware versions for EFILive FlashScan V2 and AutoCal devices. • Standalone logging to FlashScan / Autocal.
V7	<ul style="list-style-type: none"> • Reads and Flashes all historical ECM's. (As additional support is developed, read and flash functions are only added to V8 software) • Modifications to the ECM calibration are made using the V7 Tune Tool application. The modified calibration is then flashed into the ECM (again using V8). • Applying the EFILocker Custom OS patch. • Pass-thru logging of real time data from the vehicle using the V7 Scan Tool application.

Supported Controllers

The EFILocker patch is available on the following controllers: Where the controller remains in use in 2017+ model year, locking is not available.

Controllers	
A50	E92
E39*/E39A*	E98
E78*	T43*
E80	T87*

*Select Operating Systems only; refer to Appendix A, B, C and D for a list of supported EFILocker patch operating systems.

How is EFILocker different to BootLocker?

The EFILocker implementation requires a custom operating system to be full-flashed into the controller which means controllers that use the EFILocker implementation of Auto-Lock can only be auto-locked and/or auto-unlocked during a full-flash procedure.

The BootLocker implementation does not require a custom operating system which means controllers that use the BootLocker implementation of Auto-Lock can be auto-locked and/or auto-unlocked during a calibration only-flash or a full-flash procedure.

Where the controller remains in use in the 2017+ model year, locking is not available. The following controllers use EFILive's EFILocker to implement Auto-Locking:

GM Gas Controllers	GM Diesel Controllers
E39*/ E39A*	A50
E78*	E98
E80	T87*
E92	
T43*	

Auto-Locking for controller using the EFILocker implementation may be applied to tune files by:

- Applying the EFILocker Custom OS Patch using the V7.5 Tuning tool software.

The following controllers use EFILive's BootLocker to implement Auto-Locking:

GM Gas Controllers	GM Diesel Controllers
LS1B	E54 (LB7)
E38	E60 (LLY)
E40	
E67	

Auto-Locking for controller using the BootLocker implementation may be applied to tune files in 3 ways;

- **V8 Scan and Tune** using the **[F3: Tune] -> [F4: Properties]** via the **[Security Restrictions]** tab.
- **V8 Scan and Tune** via the **[F5: BBX] -> [F6: Quick Setup]** feature.
- **V7 Tune Tool** via the **[Permissions]** tab.

Software Requirements

The EFILocker Custom OS Patch is a free software update to all EFILive customers. To access these enhancements customers must be running the following software versions:

1. EFILive V8.2.2.299 or later.
2. FlashScan V2 / AutoCal Firmware - V2.07.101 or later.
3. EFILive V7.5.7.307 or later.

The latest software versions are available for download from the [EFILive website](http://www.efilive.com).

Licensing Requirements

FlashScan V2 licensing requirements **MUST** be met in order to flash a tune into a controller. The GM Tuning Option must be enabled, and a VIN license for the target controller (or the appropriate stream license) must be available on the FlashScan or AutoCal device. If the ECM has already been licensed then the EFILive licensing requirements are already met.

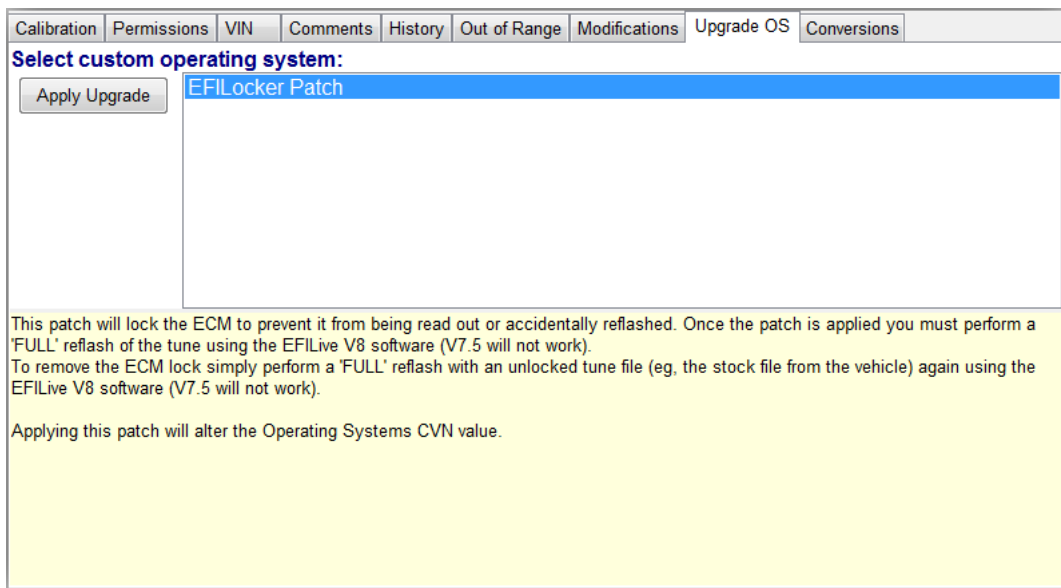
- Tuning Options can be managed by opening the **EFILive V8 Scan and Tune** software with your device connected and selecting **[F7: Licenses] -> [F2: Hardware]**.
- VIN licenses can be managed by opening the **EFILive V8 Scan and Tune** software with your device connected and selecting **[F7: Licenses] -> [F3: VIN's]**.

AutoCal end users **DO NOT** have access to create, edit or modify tunes. AutoCal end users **MUST** contact the Tuner who's FlashScan V2 their AutoCal is licensed to.

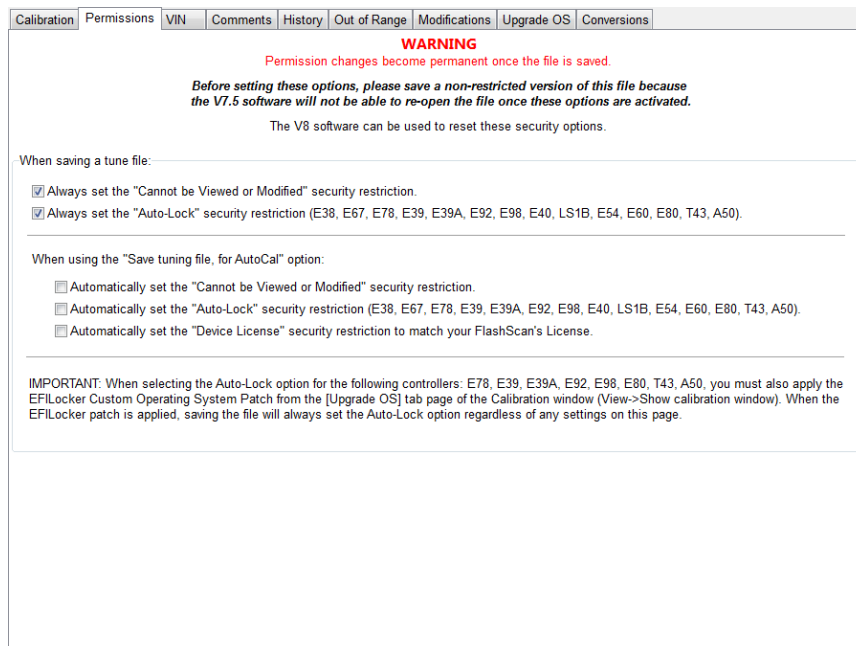
Applying the EFILocker Patch

The following steps need to be followed to apply the EFILocker patch.

1. Before starting the EFILive V7 Tune Tool software, connect your **FlashScan V2** to your PC to enable access to the EFILocker patch.
NOTE: If FlashScan V2 device is not connected prior to starting the V7 Tune Tool, the patch will not be available.
2. Start the **V7 Tune Tool** software, and open the tune file that will be flashed into the selected controller.
3. Apply the EFILocker patch by navigating to: **View -> Show calibration window -> [Upgrade OS]**, then click on the **[Apply Upgrade]** button.

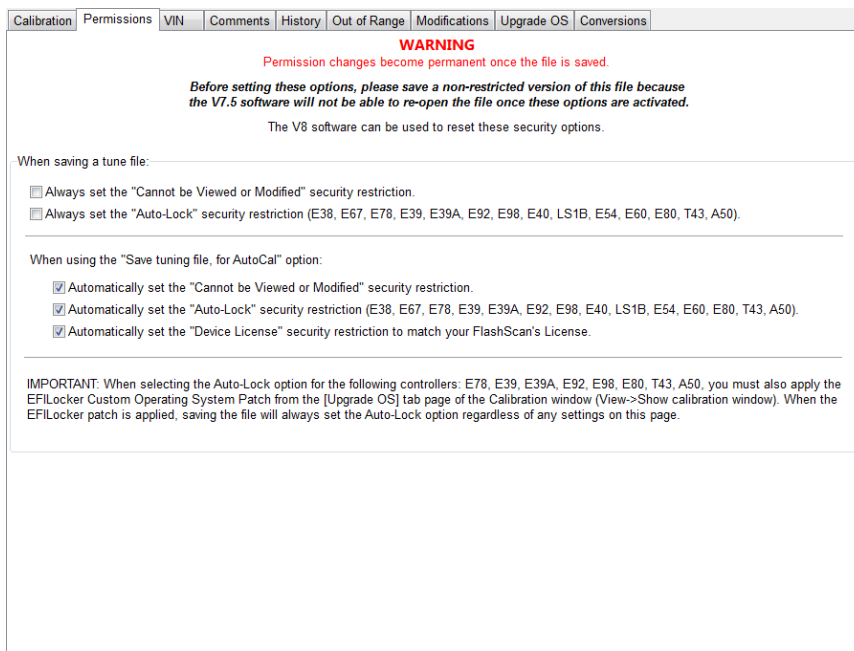


4. Select the **[Permissions]** tab page in the same window.
5. Check the: **"Always set the 'Auto-Lock' security restriction."**
EFILive also recommends checking the **"Always set the 'Cannot be Viewed or Modified' security restriction."**



6. To save a file for flashing with **FlashScan V2**, select the menu option: **File -> Save tuning file as...**
 EFILive recommends using the "Save tuning file as..." option instead of the "Save tuning file" to retain a pristine copy of your tune file because once the EFILocker patch is applied and the file saved, the EFILocker patch can never be removed from that file.
7. Uncheck the first two security restrictions.
 EFILive recommends that you don't leave the first two security restrictions set all the time, otherwise all files that you save will become security restricted and you won't be able to open them using the V7 software.

To save a file for flashing with AutoCal, set the three AutoCal security restrictions in the **[Permissions]** tab, as shown in the image below, and select the menu option: **File -> Save tuning file, for AutoCal.**



Note: Because the EFILocker patch can never be removed from a tune file, the EFILive V7 Tuning Tool software will continue to allow EFILocker files that have only the "Auto-Lock" security restriction set to be opened and edited. If the EFILocker file has any other security restrictions applied (such as "cannot be viewed or modified") then it cannot be opened or edited in the V7 Tuning Tool software. However, those other security restrictions may be removed using the V8 software.

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	Unlocked	Unlocked	Locked	Unlocked
Cal-Flash Only	Unlocked	Fail: \$0539	Locked	Fail \$0539
Full-Flash only	Fail \$053C	Unlocked	Fail \$053C	Unlocked
Auto-Lock	Fail \$054D	Locked	Locked	Locked
Auto-Lock & Cal-Flash Only	Fail \$054D	Fail \$0539	Locked	Fail \$0539
Auto-Lock & Full Flash Only	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:

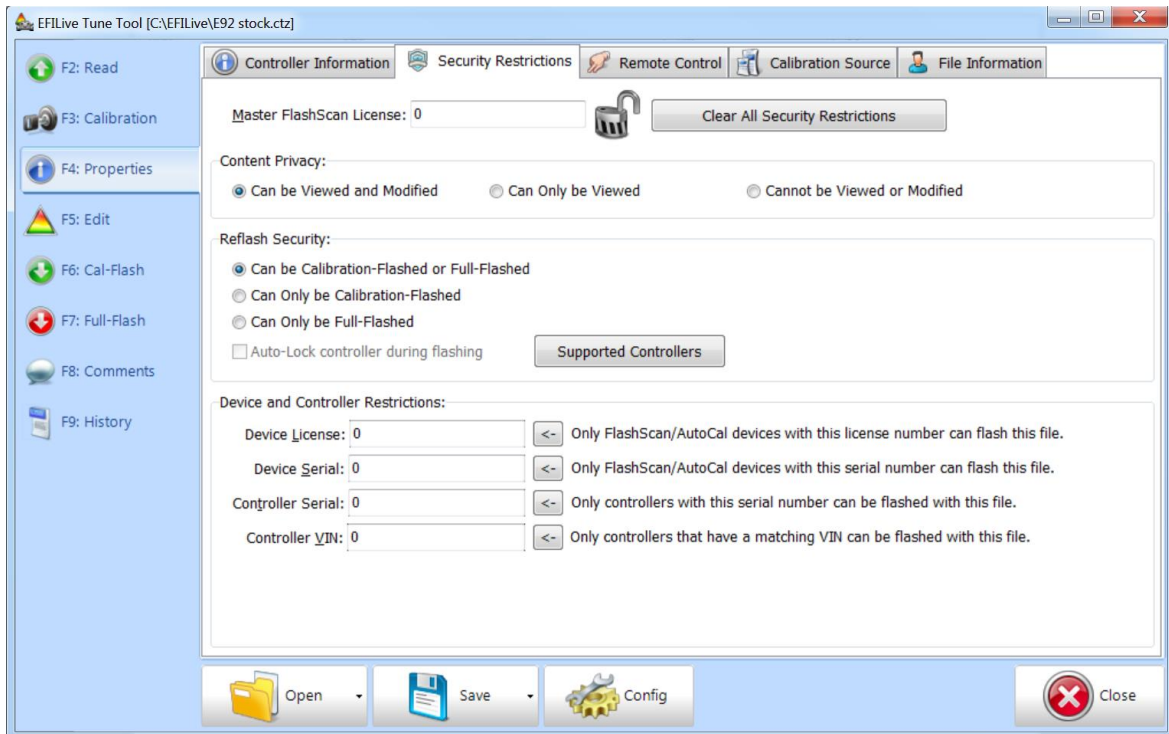
- \$054D: Calibration only flashing is not allowed.
- \$053C: Tune file does not allow calibration flashing.
- \$0539: Tune file does not allow full flashing.
- \$054E: Target controller does not support calibration-only flashing with Auto-Locking.

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.

Tune File Security

The EFILocker patch is designed to prevent the contents of the ECM from being read out and should be used with additional tune file security settings contained in EFILive V8 Scan and Tune to fully secure tune files.



EFILive recommends that tune files should also contain the “Cannot be Viewed or Modified” security restriction. NOTE: If this restriction is not set, anyone who has access to the tune file can open, view and edit your tune file in the V7 Tune tool software.

Customers should set reflash security settings most applicable to their need based on the controller locking combination matrix, or allow both full-flash and cal-flash providing instruction to the customer to full-flash in the first instance.

Device and Controller restrictions should be set based on business need. NOTE: Tune files for AutoCal end users MUST contain Remote License, and should set the Device license to prevent unauthorised FlashScan V2 devices from ‘sharing’ the tune.

Descriptions of security measures are documented in the [EFILive V8 Reference.pdf](#) guide.

Security can be adjusted via editing each tune file in V8 Scan and Tune software, or edited via the Quick Setup.

[F3:Tune]

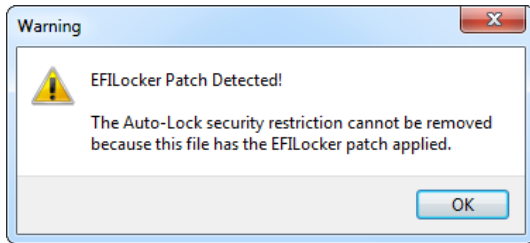
1. Connect FlashScan V2/AutoCal to your PC, and open **EFILive V8 Scan and Tune** software.
2. Select **[F3: Tune]** and open the EFILocker tune file created in V7 software. The following warning message will be displayed:



The Auto-Lock flag cannot be removed from the tune file, however other security restrictions can be added/removed.

3. Select **[F4: Properties]** and **“Clear All Security Restrictions”**

NOTE: Clearing All Security Restrictions DOES NOT remove the EFILocker Patch as confirmed by this warning.

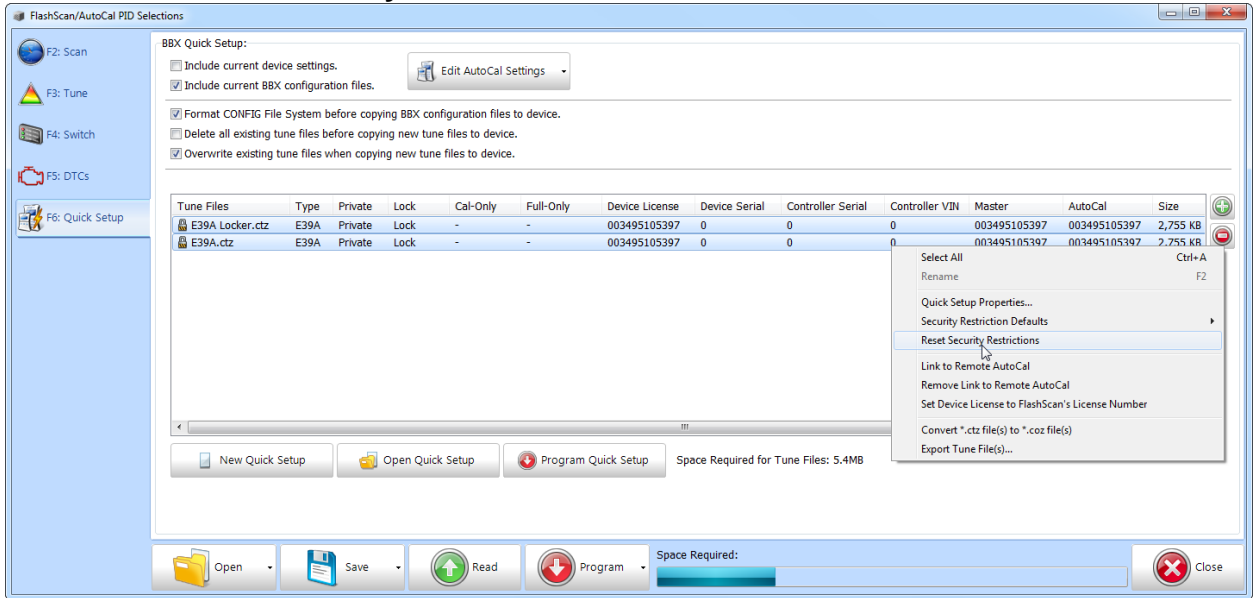


This step gives the matching FlashScan device permission to add/remove additional security settings.

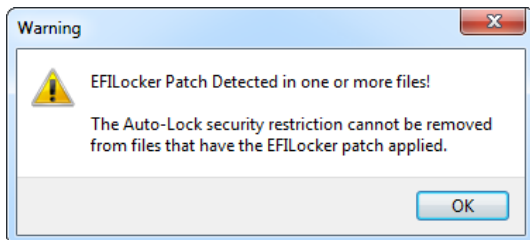
4. Modify security settings and save the tune file.

[F5: BBX] -> [F6: Quick Setup]

1. Connect FlashScan V2/AutoCal to your PC, and open **EFILive V8 Scan and Tune** software.
2. Select **[F5: BBX] ->[F6: Quick Setup]**
3. Add the EFILocker tune file(s) created in V7 software.
4. To edit security settings, highlight relevant tune files and using the right mouse click select **“Reset Security Restrictions”**.



NOTE: Clearing All Security Restrictions DOES NOT remove the EFILocker Patch as confirmed by this warning.



This step gives the matching FlashScan device permission to add/remove additional security settings.

5. Right click mouse and modify security by selecting the relevant security restrictions.
6. Save the Quick Setup file.

Practical Examples

Example 1 – Customer requires 3 individual tunes for an E92 controller via AutoCal and the Tuner wants to lock the controller.

1. Create modified tunes for customer and apply EFILocker patch in V7 software.
2. Add the tune files to a Quick Setup in V8 software.
3. Select “Clear All Security Restrictions” and change security settings to:
 - Cannot be Viewed or Modified.
 - Can be Calibration or Full Flashed *Note: the first flash MUST be full flash, but after the Locker Patch is installed, subsequent flashes can be cal-flashed.
 - Set Device License to FlashScan’s License Number to prevent tunes from being shared with other FlashScan V2 users.
 - Link to Remote AutoCal to give AutoCal permission to flash.
 - Set other security settings as needed (ie. Restrict flashing to a particular VIN, or controller serial to prevent the same tune being ‘shared’ between vehicles should the AutoCal user purchase additional VIN licenses.
4. Set other Quick Setup requirements e.g. Scan controllers and PID’s, Tune controllers, device settings etc.
5. Save Quick Setup, Program AutoCal and send to the customer.
6. Instruct customer to full-flash their first selected tune. All future tune changes can be cal-flashed.

Example 2 – You have a returning customer who requires a re-tune for an E92 controller in your workshop. You have previously installed Auto-Lock.

1. Create modified tune for customer, apply EFILocker patch in V7 software.
2. Flash the ECM using your FlashScan V2.

NOTE: Given your customer does not have a device they do not have a ‘hard copy’ of the tune file. The Auto-Lock restriction prevents another device from reading the ECM, so the tune file cannot be obtained or shared. All other restrictions become irrelevant.

NOTE: In this scenario, Auto-Lock is optional provided cal-flash is selected. If the file is not Auto-Locked and full-flash is accidentally selected the ECM will become unlocked.

Flash Requirements

The EFILocker patch can be flashed using standalone features in FlashScan V2, AutoCal or via pass-thru mode using EFILive V8 Scan and Tune software and FlashScan V2/AutoCal. The EFILocker patch cannot be flashed using V7 Scan and Tune software.

How to Remove EFILocker from an ECM

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

Appendix A – E39 & E39A EFILocker Status

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

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

The following table lists operating systems where the EFILocker patch is NOT available.

E39 & E39A EFILocker Unsupported Operating Systems		
12647350	12655860	12664221
12650249	12656239	12666133
12651384	12657777	12666135
12651632	12657782	12668443
12651808	12658499	12669512
12652573	12659502	12666723
12653093	12661794	12667190
12654753	12663030	

Appendix B – E78 EFILocker Status

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

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

The following table lists operating systems where the EFILocker patch is NOT available.

E78 EFILocker Unsupported Operating Systems		
12663782	12657063	12663782
12647732	12657098	12669508
12655432	12659378	12669509
12655492	12662405	12677542
12656286	12663404	

Appendix C – T43 EFILocker Status

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

T43 EFILocker Supported Operating Systems		
24267577	24270599	

The following table lists operating systems where the EFILocker patch is NOT available.

T43 EFILocker Unsupported Operating Systems		
24237276	24249833	24261871
24237685	24251030	24264142
24239353	24252573	24264923
24240291	24253414	24265260
24243170	24254909	24267571
24244551	24256025	24268005
24248859	24256125	24276633
24249042	24257301	24276638
24249179	24257135	

Appendix D – T87 EFILocker Status

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

T87 EFILocker Supported Operating Systems		
24271208	24274899	

The following table lists operating systems where the EFILocker patch is NOT available.

T87 EFILocker Unsupported Operating Systems		
24274897	24279192	24280477
24278443	24280476	24281915