Installing the EFILive
E38 / E67 ECM
Ethanol Custom Operating System

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Important – Please Read First

All Custom Operating Systems supplied by EFILive are provided "as is" without warranty of any kind. Please take all reasonable caution when using the extended features of EFILive's Custom Operating Systems.

This tutorial assumes you are running the software and firmware releases (or later) listed below.

- **EFILive Scan and Tune V7.5.6.99**

- **EFILive Black Box Logging and Reading V8.1.2.75**

- **FlashScan/AutoCal Firmware V2.06.16 (Oct 02, 2009)**

- **E38 / E67 .calz file dates V7.33 (December 03, 2009)**

Please ensure you are running the latest software & firmware. Free updates can be downloaded from http://www.efilive.com/

To obtain the version number of the tuning software, go to the Help > About menu option. You <u>must</u> have V7.5.6 build 99 or higher. Here you can also check the V2 firmware version under 'FlashScan V2 VIN licensing'.
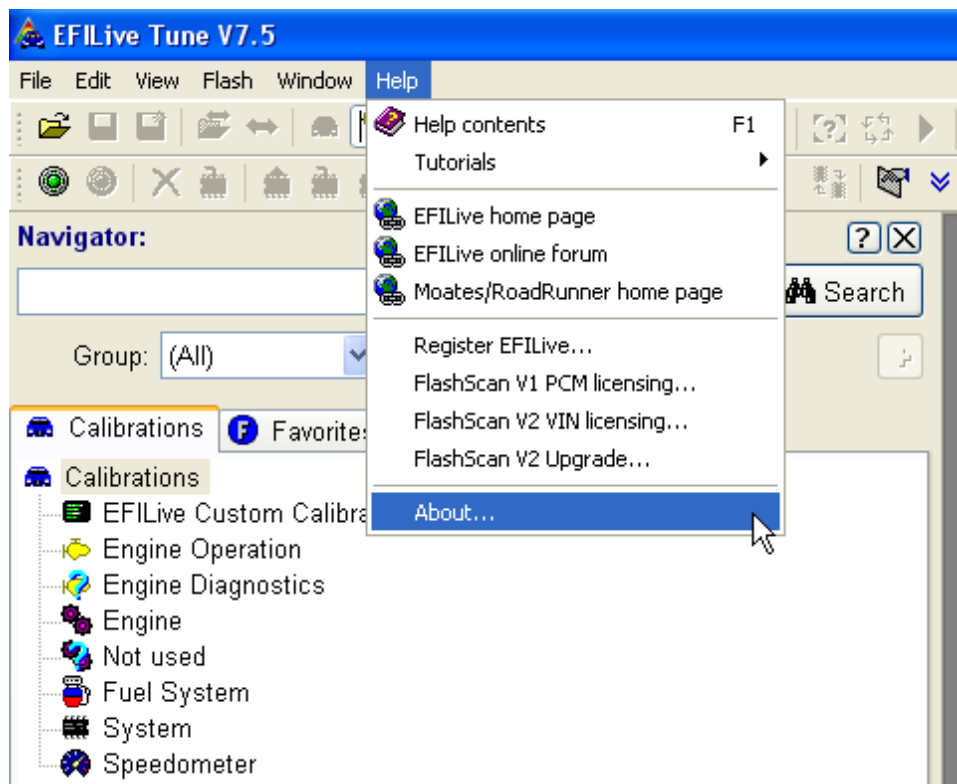
What is the EFILive E38 / E67 Ethanol Custom OS?

EFILive's E38 / E67 Custom ECM operating systems are modified versions of the factory ECM operating system that gives users the ability to use the factory ECM to perform functions beyond what was available in stock form.

The E38 / E67 ECM's already offer amazing tuning functionality for a factory computer. From ready to go 2.5bar SD tuning (with EFILive's Virtual VE Table technology) to variable camshaft control, even supercharger controls on the E67.

The EFILive ethanol custom operating system enhancement works like so:

By applying 12V to a spare input on the ECM it forces the ECM to believe the car is running 85% ethanol fuel, in doing so this allows the use of a whole range of fuel and spark tables already in the factory programs. We've also added a second Injector flow table in this mode to assist in alternate fuel situations.

These additional tables will assist tuners make the most of using alternate fuel types such as LPG / Propane, or for racing applications using Nitrous injection.

These new functions combined with the already powerful functionality of these two ECM's offers tuners amazing capabilities for a factory ECM negating the need for an expensive aftermarket ECM.

Very Important:

This custom operating system upgrade is <u>not</u> recommended for use on factory flex fuel vehicles if the owner still wants to run a mix of Ethanol fuel and normal gasoline, please do <u>not</u> apply this custom OS to any factory flex fuel vehicles without warning the owner of this situation. The Ethanol percentage estimation routines in the ECM are bypassed in this custom OS upgrade.

Northstar Engine, Please Read:

On E67 Northstar engines this upgrade may not be possible as the factory tunes have none of the underlying Ethanol fuel calibrations setup. Before updating to the custom OS check that table B3671 does not have the same number through the entire table. If it does then it is not possible to use that tune for this upgrade.

Please carefully follow the steps on the following pages to successfully upgrade your E38 / E67 ECM to the EFILive custom operating systems.

Time to upgrade the ECM

Plug your V2 in to the USB port before starting the Tuning Tool.

Using the EFILive Tune Tool program you can either open the file to be converted to the custom OS off your computer hard drive, or read the tune from the ECM (on the vehicle or using a bench harness). To read the ECM, please follow below. Skip to the next page if you are loading an existing file off the hard disk.
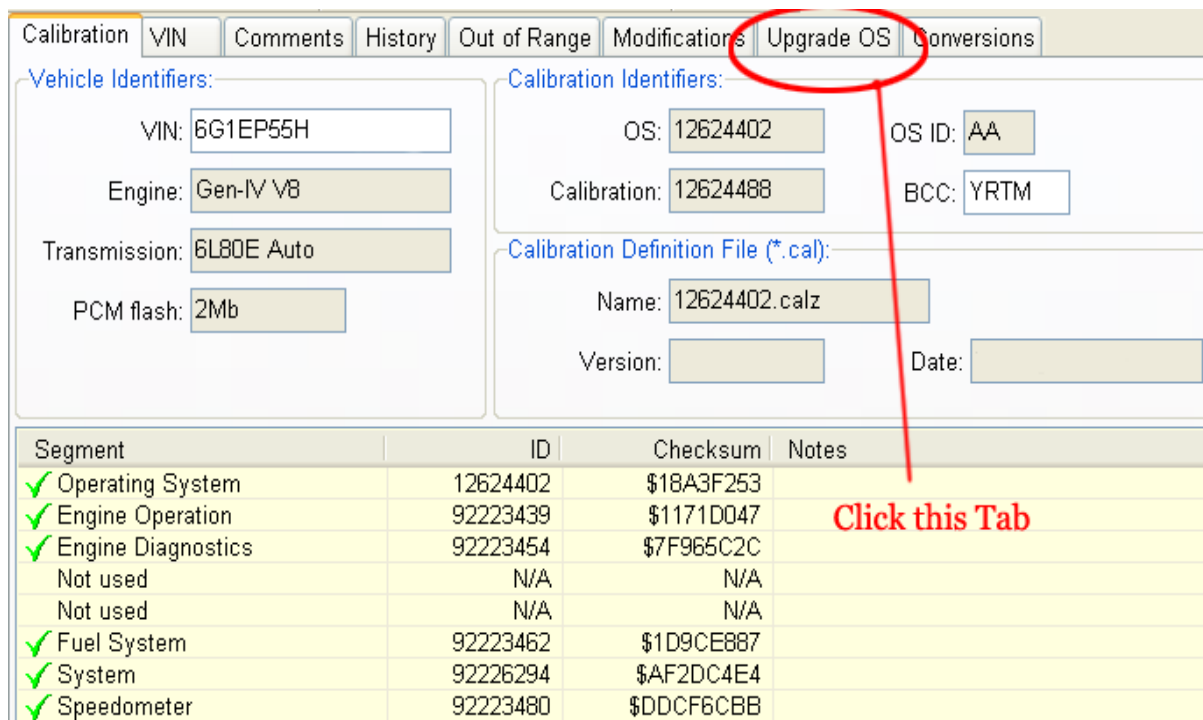
Read ECM icon:

Select either E38 or E67 ECM type to suit the vehicle:
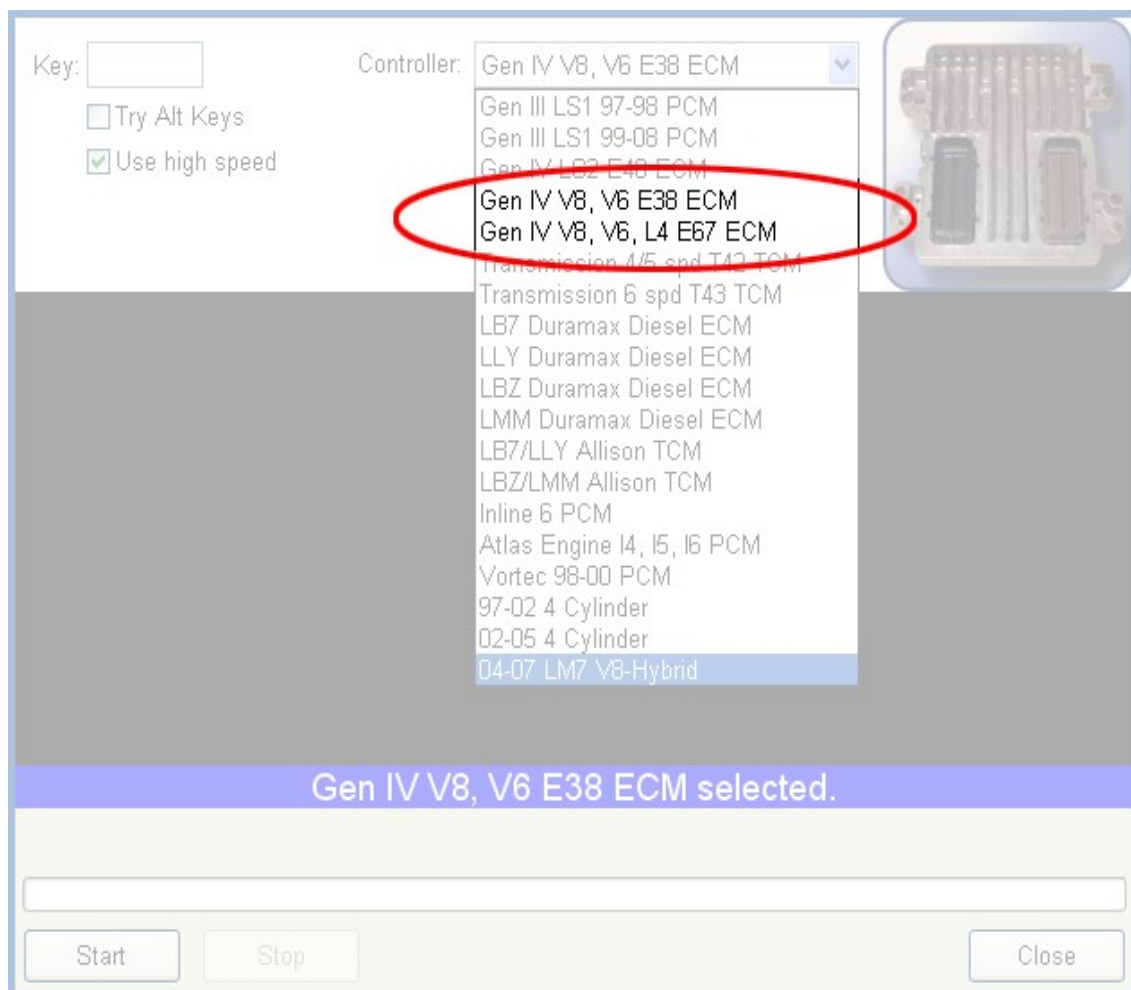
Once the file has been read from the ECM you should save this as the stock file in case you need to return the ECM back to standard.

With the tun file now in the editor, you need to click on the Tab that says -
"Upgrade O.S". *An E38 upgrade will be the example used below.*
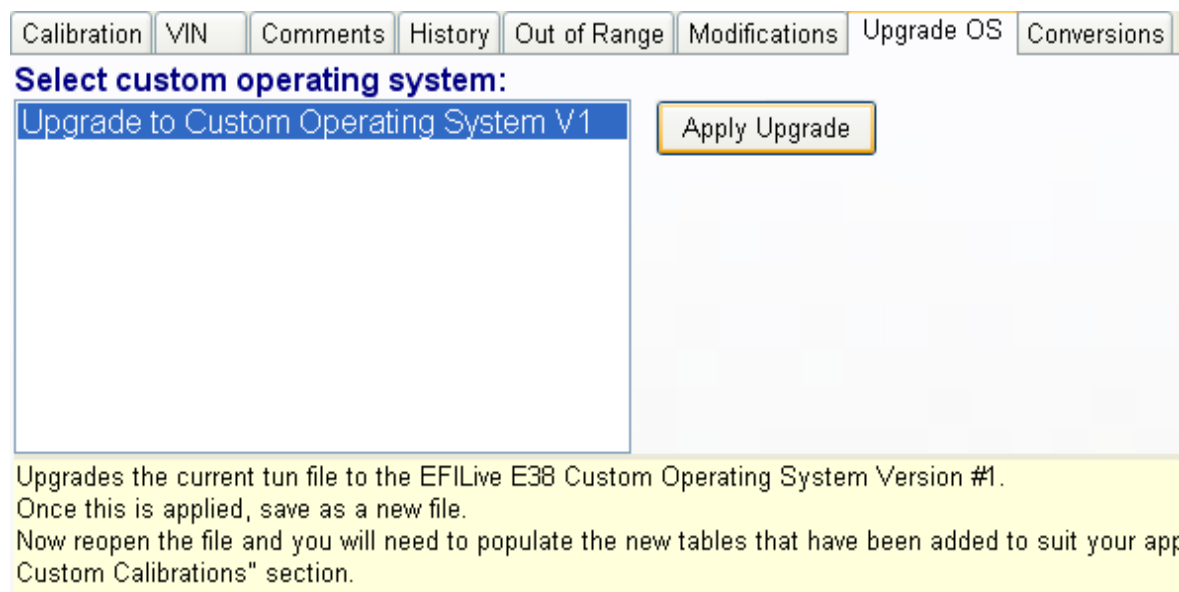
Select which operating system upgrade you wish to apply (only choose one if
multiple are shown), then click the "Apply Upgrade" button.

VERY IMPORTANT: Only click the 'Apply Upgrade' button once.

Now save the file with a new name, **File > Save As**. Maybe something like

'Joes Base Custom OS'

Or often some people might save the file base with the VIN like so

'6G1EP55H19L123456 Base Custom OS'

Once the file has been saved with its new name you now need to close the file down, **File > Close Tuning File**.

You then need to reopen the same file you just saved so EFILive will recognise the file is a converted custom operating system, please also take note of the new operating system number of the converted file once it opens.

Eg: we converted the factory OS **1**2624402, it is now **2**2624402

Please read the rest of this page very carefully.

EFILive automatically populates any new tables with some default maps during the upgrade to get you started. On modified engines these values may not be suitable, it is advised you copy your own table values in before running the engine. Currently the two tables this applies to are -

A9972 "Injector Flow Base, Alternative Fuel On", please check it against the injector flow table you are currently using and change to suit.

A9973 "P.E Mode Commanded Fuel, Alternative Fuel On", <u>used on 2006-2007 model vehicles only</u>, check the values are suitable for your application. This table is not used for 2008+ model vehicles, use table **B3670** instead.

There is also three calibrations that <u>must</u> be changed to enable switched ethanol mode.

B0178 "Flex Fuel Option", change to 'Yes'

B0184 "Flex Fuel Sensor Type", change to 'Actual Sensor'

B0186 "Flex Fuel Sensor Diagnostic", change to 'No'

Finally adjust the following tables to suit the fuel type you are using.

B3671 "Stoichiometric AFR", change to suit the fuel type you are using when in Ethanol mode, it may be set very rich from factory when at high ethanol content. If using normal fuel then set the entire table to 14.68:1 AFR. Also check **B0142 & B0144** for values that match the fuel type you are using in Ethanol mode.

C6001 "DTC Type", set P0169, P0178 & P0179 to 'X: Not Reported'

Now save the file.

This upgraded *.tun file will become your "base calibration" for the upgraded Operating System. Always keep a copy of this file incase you need to restore your ECM to its initial Custom Operating System state. Preferably, make a backup of it onto a CD or USB memory stick and store it in a safe place or Email it to a friend.

The final step is to now do an entire ECM reflash with the new operating system and calibrations. This is covered on the next page.

Hints for in-vehicle ECM flashing:

- Ensure your vehicle is keyed to ON (not Accy), without the engine running.
- Ensure the battery is in a good state of charge.

You will need to perform a 'Full Reflash' of your ECM to use the newly created custom operating system and calibrations. Once this completes successfully you will only need to do 'Calibration' flashing for normal tuning procedures.

The EFILive Tuning Tool manual covers re-flashing procedures, it is highly recommended you also refer to that document whilst performing this programming procedure as this covers the correct steps for performing the full ECM flash and how to go about ECM recovery should something go wrong.

With your custom OS file loaded press the button circled in the picture below.
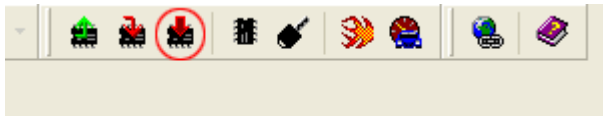
Once the full flashing procedure finishes (approx 4 - 5 mins) then turn off the IGN for at least 15 seconds to allow all the vehicle modules to fully shut down.

Next, start the vehicle and ensure everything is running and operating correctly (A/C, cruise control, etc).

Once these tests are complete you can wire up your map switching input. Without the map switching input switch wired up the ECM will still be running off the normal fuel maps.

It is highly recommended that you disconnect the vehicle battery before attempting any wiring modifications.

Wiring the map switching monitor ECM input

The ethanol switch monitor input is used to automatically select 85% ethanol fuel mode in the ECM based on the state of a pin on the ECM.

Typical usage of this would be to monitor when a nitrous solenoid is switched on or another alternative fuelling source that requires different fuelling / spark to standard fuel. As these ECM's already support E85 (Ethanol fuelling) it is not recommend this input be used to compensate for actual ethanol fuelling as it does not indicate to the ECM any other value apart from 85% ethanol.

The ECM connections are as follows –

For the E38

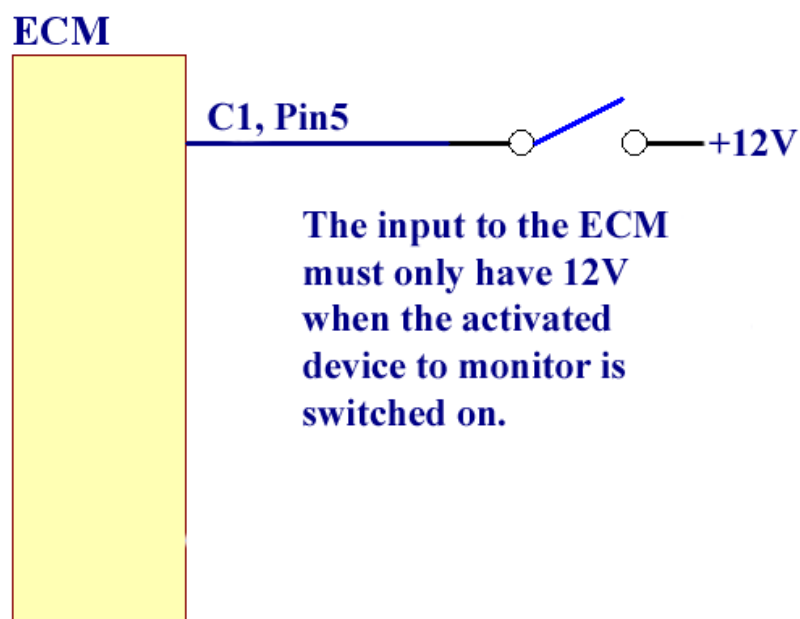Connector 1 (Black) – pin 05 (shown below).

For the E67

Connector 1 (Blue) – pin 02.

The part number of these connector pins is 33467-0005/23

To activate the input apply 12V, to deactivate the input no voltage is fed to the pin.

You can monitor the ethanol percentage the ECM is using via the scantool PID SAE.E85R, it should show 0% with the switch open and 85% with the switch closed. The engine does not need to be running to view this, handy to check wiring before starting the motor.

See the next few pages on pin installation.

ECM

C1, Pin5 ———o   o——+12V

The input to the ECM
must only have 12V
when the activated
device to monitor is
switched on.

First, disconnect the battery, never work on wiring with power active.

Locate the body or J1/X1 Connector for the ECM (E38 example shown below). It is the 73 pin connector. Note the arrow to cavity 5. Most unused cavities have either a blue plug or a black plug that is moulded as part of the connector. Cavity 5 has the moulded in plug. The cavity is blocked with this plug.
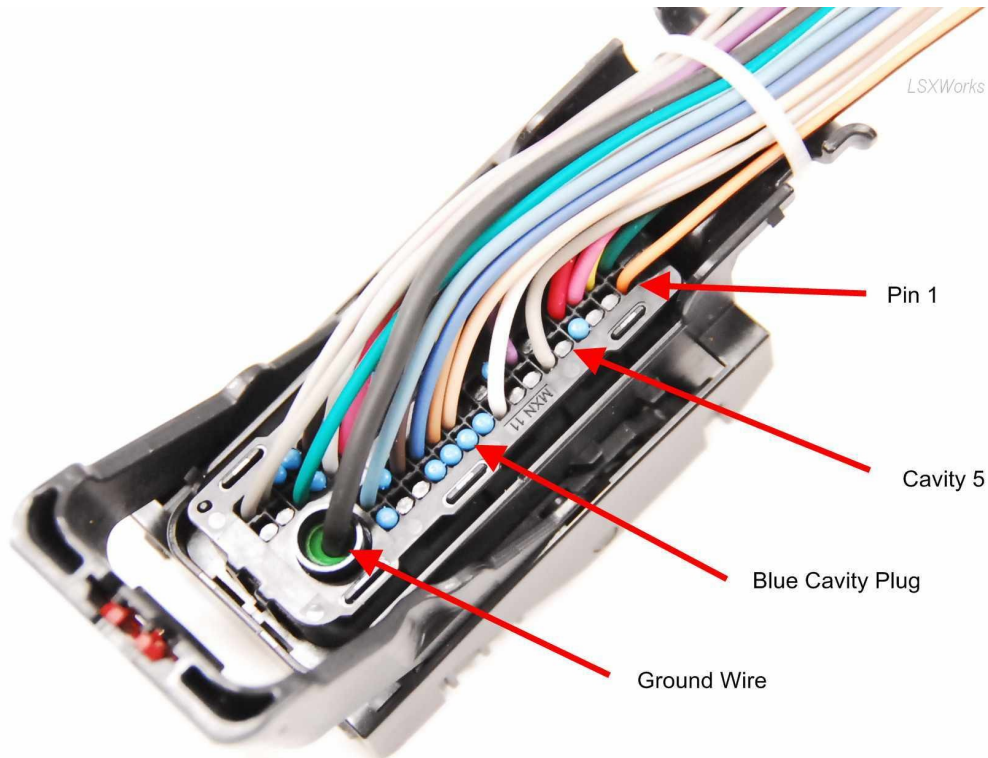

Flip side of connector - terminal side where it plugs in to ECM socket.
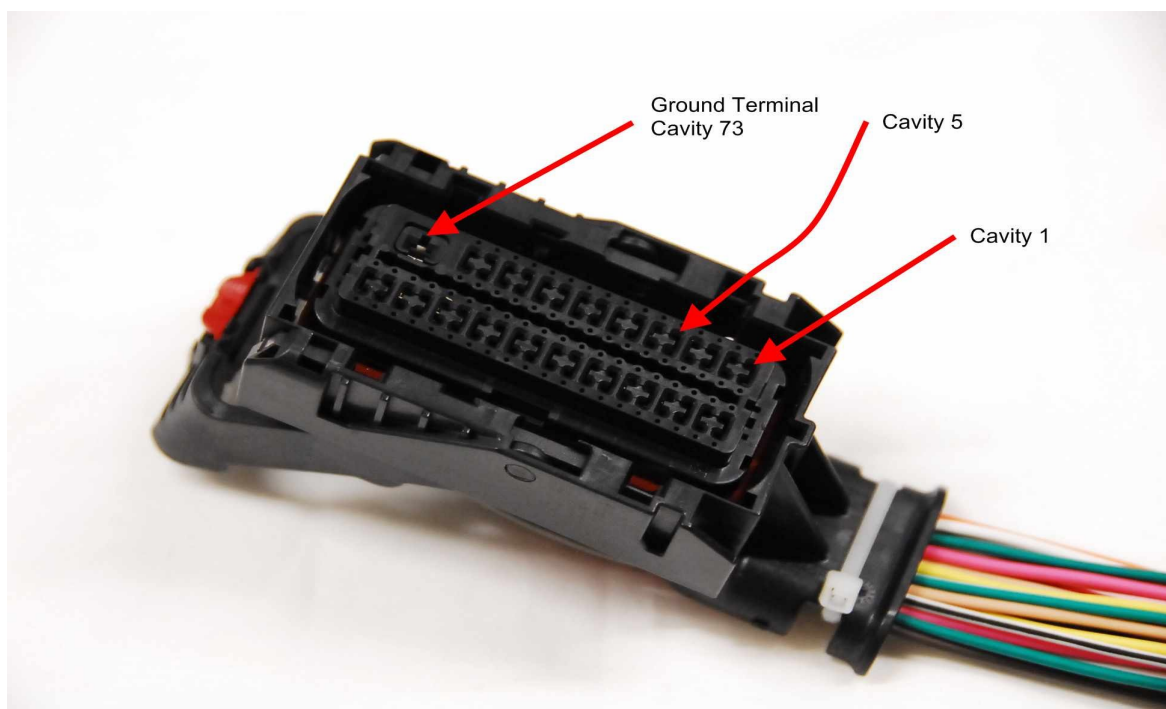
A small screwdriver is used to break the black moulded in plug loose. Push on the edge of the plug alongside the cavity wall for best leverage. It should break loose without too much pressure if you push in the right place.
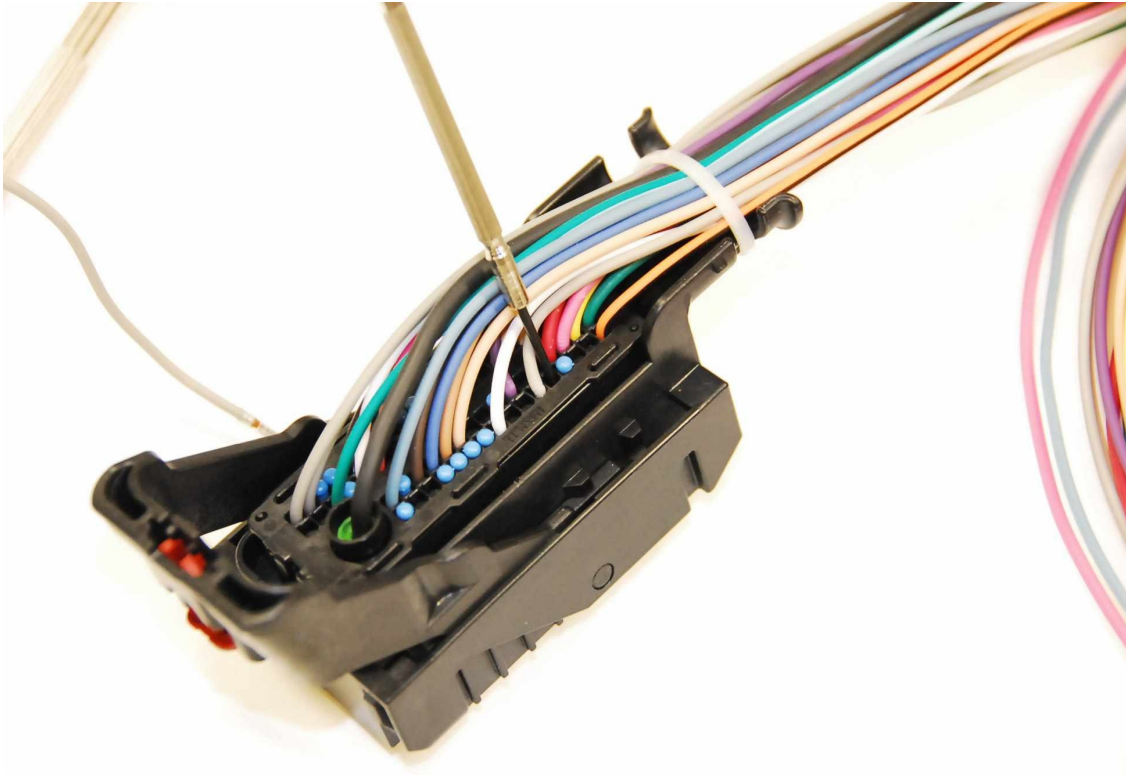

If your connector has the moulded in black plugs, they need to be removed from the terminal area underneath the terminal separator. Use a small screwdriver at each end of the separator to leverage it out. Cable end:
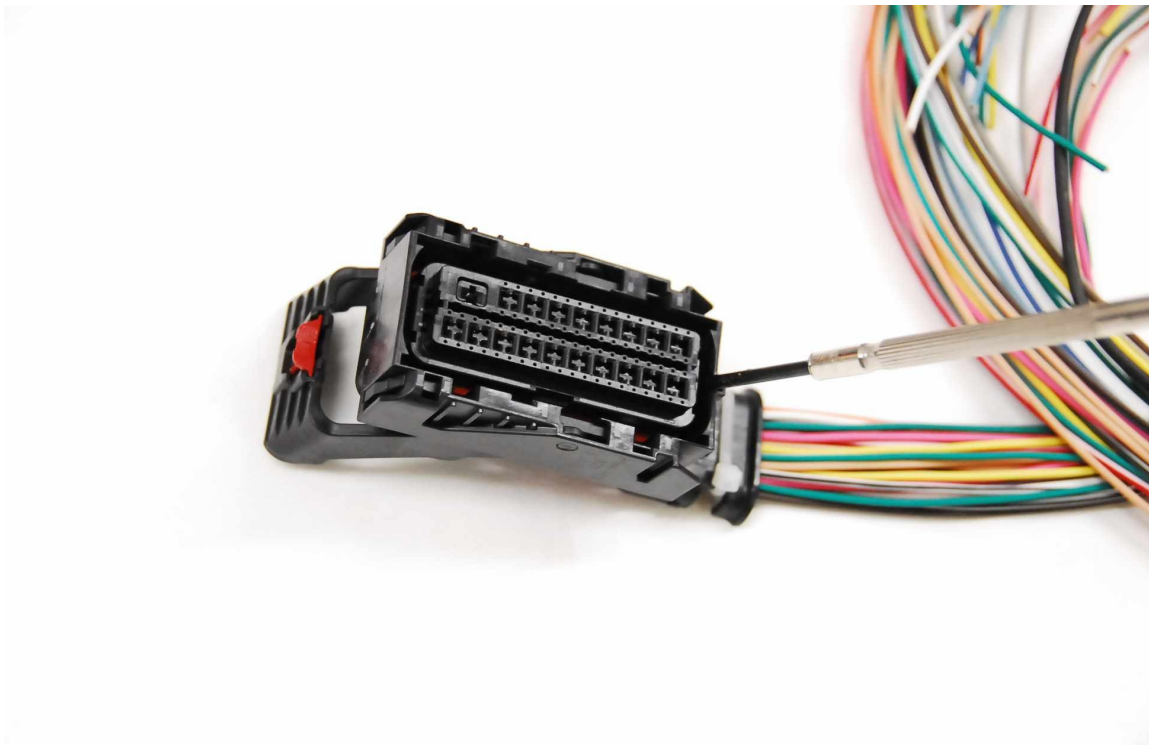
Leveraging the other end to the cable side out. The separator needs a light push upward to unclip it at each end.
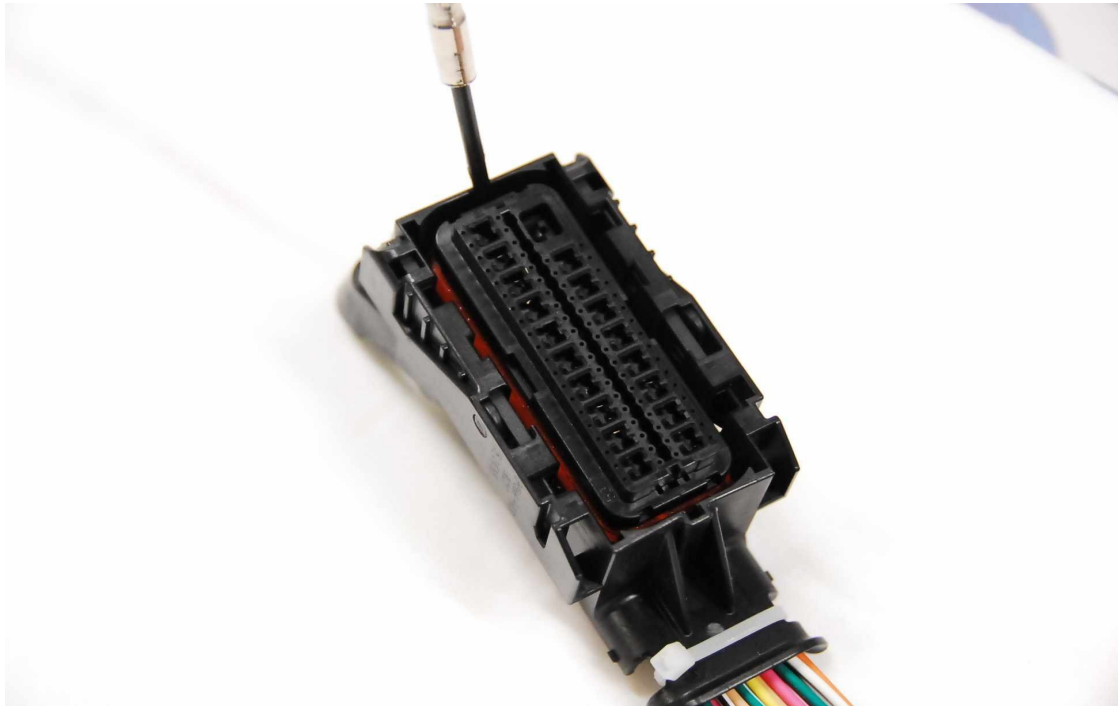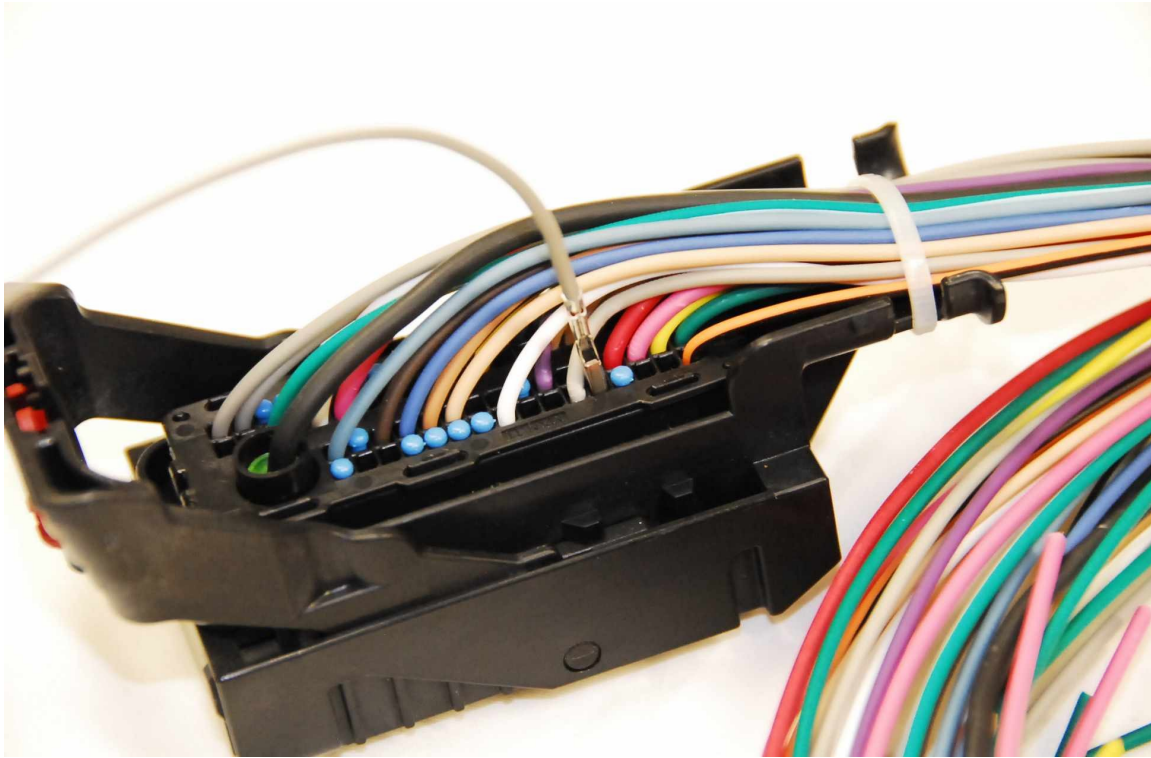
Look into cavity 5 for the moulded in plug and remove it with a small tool. Though some connectors may have no plugs, and open seals, this is unlikely.
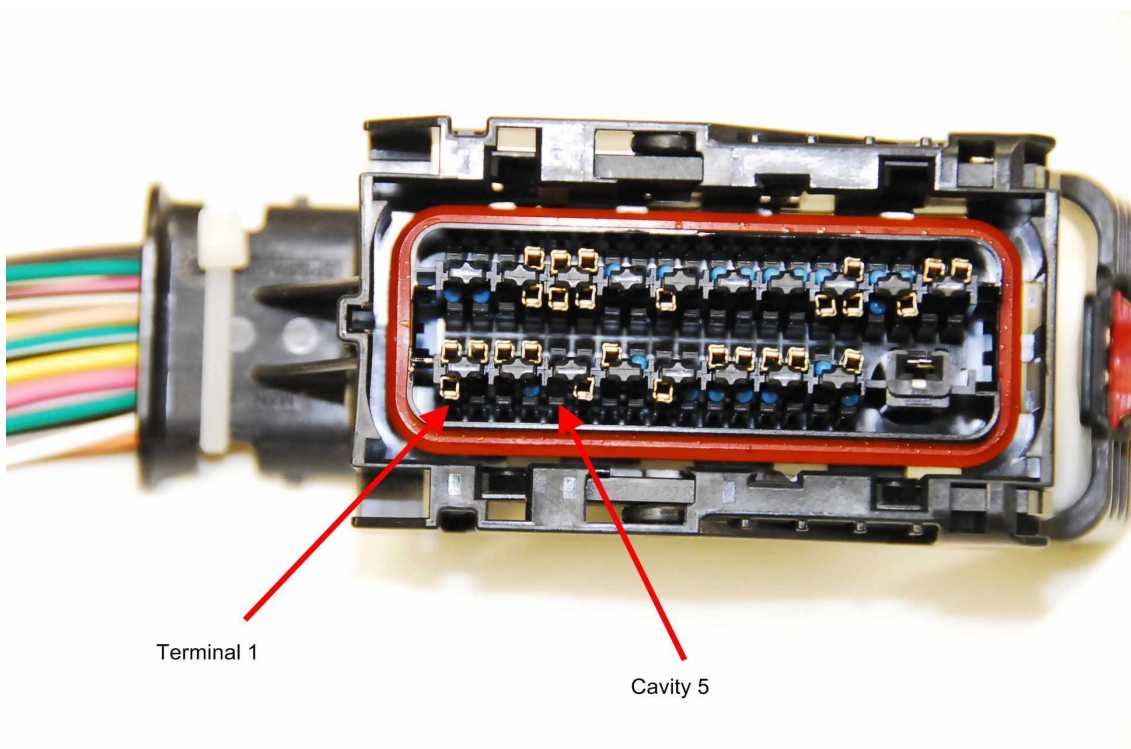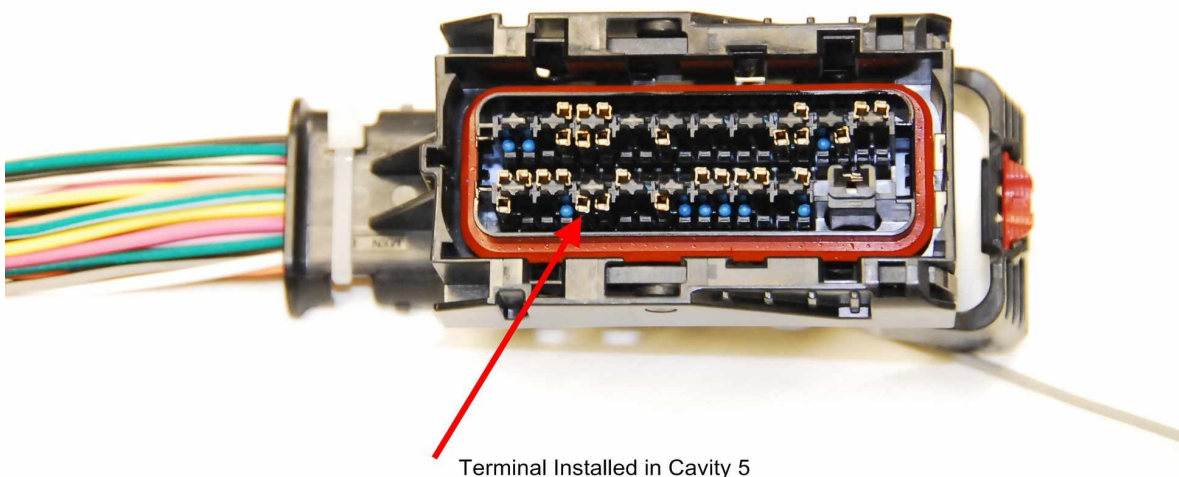
Terminal 1

Cavity 5

Terminal on the way in to the right cavity. Make sure it is oriented the right way around. There is an open section in the terminal which needs to engage a locking tang once pushed in.

Terminal all the way home on the connector side. Note a "click" when it is in the right place as the tang clicks in to the terminal.

Terminal Installed in Cavity 5

Connector with terminal separator re-installed. Only goes one way, with different sized tongues on each end, and the ground terminal.
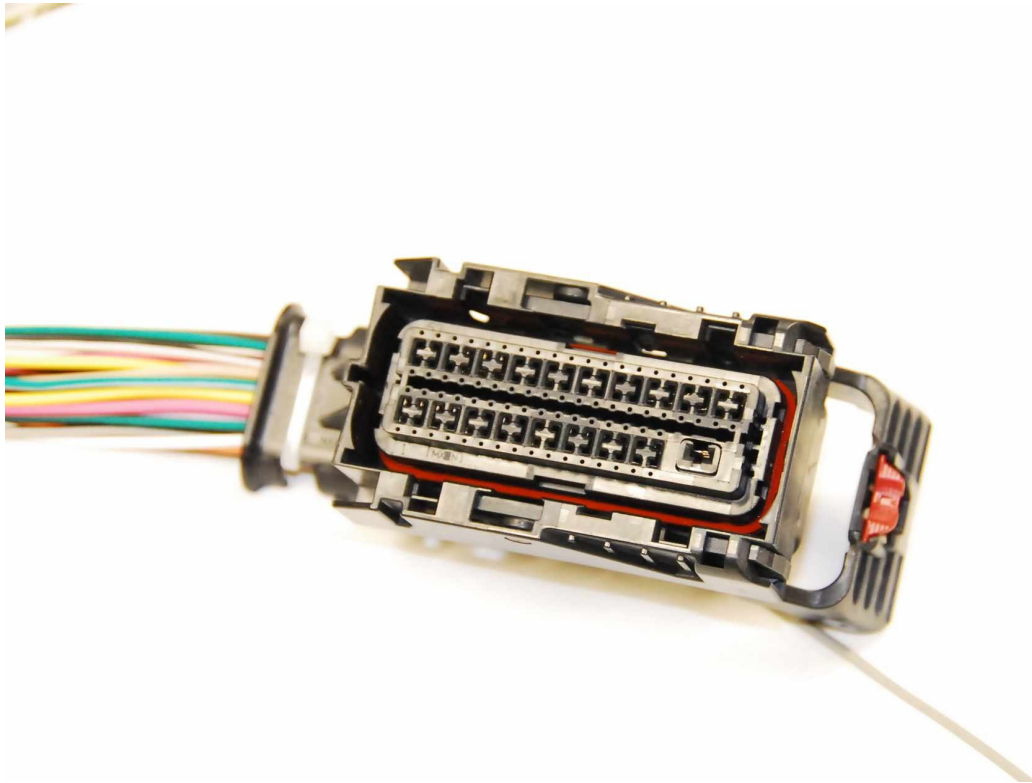
The E67 uses same connectors, but they only plug into an E67, however the process is the same.

Thanks to Ian from lsxworks for providing these photo's and text.

END OF DOCUMENT