



**Installing the EFILive
LBZ / LMM DSP2 & DSP5
Custom Operating Systems**

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Important – Please Read First

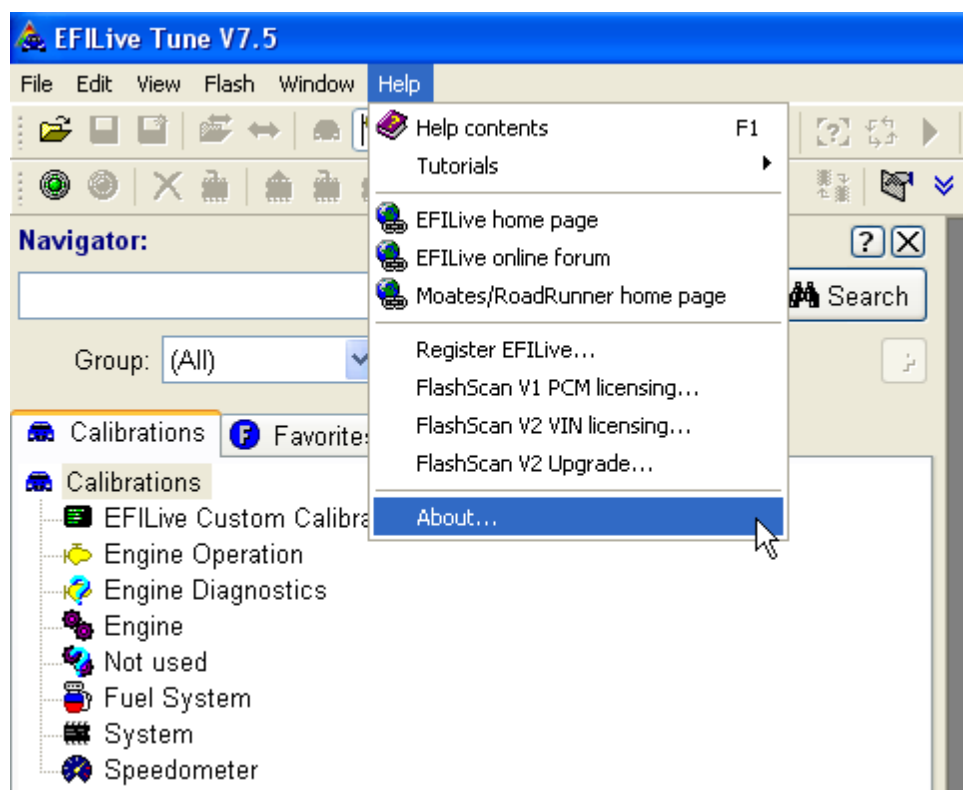
The Custom Operating Systems supplied by EFILive are provided “as is” without warranty of any kind. Please take all reasonable caution when using the extended features of EFILive’s Custom Operating Systems.

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)**
- **LBZ .calz file dates V7.23 (October 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 must have V7.5.6 build 99 or higher. Here you can also check the V2 firmware version under 'FlashScan V2 VIN licensing'.



What is EFILive DSP?

EFILive DSP (Duramax Switchable Performance) ECM (Engine Control Module) operating systems are modified versions of the factory ECM operating systems that give users the ability to use the factory ECM to perform functions beyond what was offered from the factory.

DSP2 is a customized ECM operating system developed by EFILive for the entire Duramax Diesel engine range, this document only applies to the LBZ & LMM.

DSP2 lets you switch on the fly between two user programmable tunes; DSP2 does this by allowing you to create two versions of the main operating maps that control engine performance.

DSP5 is similar to DSP2 except we expanded the number of switchable tunes from two positions to five.

The LBZ / LMM DSP programs are currently only available to be switched via a hardwired switch, not via the V2 control unit as the LB7 / LLY DSP programs can.

Please follow the steps on the following pages to successfully upgrade your Duramax ECM to DSP.

You may return your ECM to its GM factory condition at any time, by reflashing a stock GM Operating System and calibration over the top of any EFILive Custom Operating System using the Full reflash option.

On the LMM ECM the CVN changes to the ECM's Operating System will be logged by the ECM and be will visible by the TechII diagnostic tool.

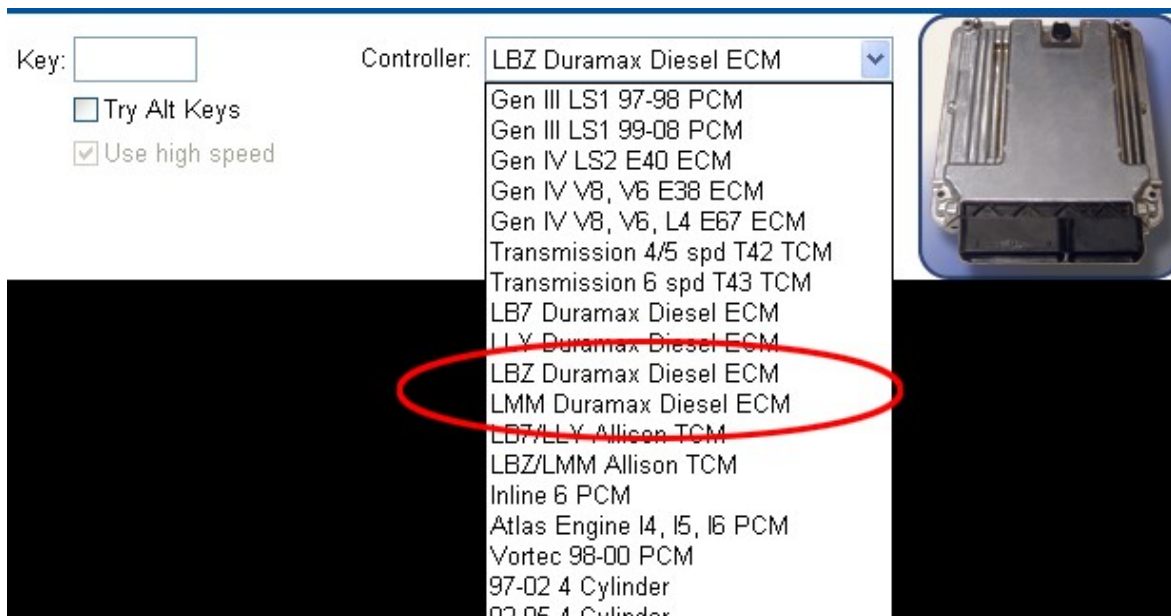
Time to upgrade the ECM to DSP

Using the EFILive Tune Tool program you can either open the file to be converted to DSP off your computer hard drive, or read the tune from the ECM (on the vehicle or using a bench harness).

Read ECM icon:

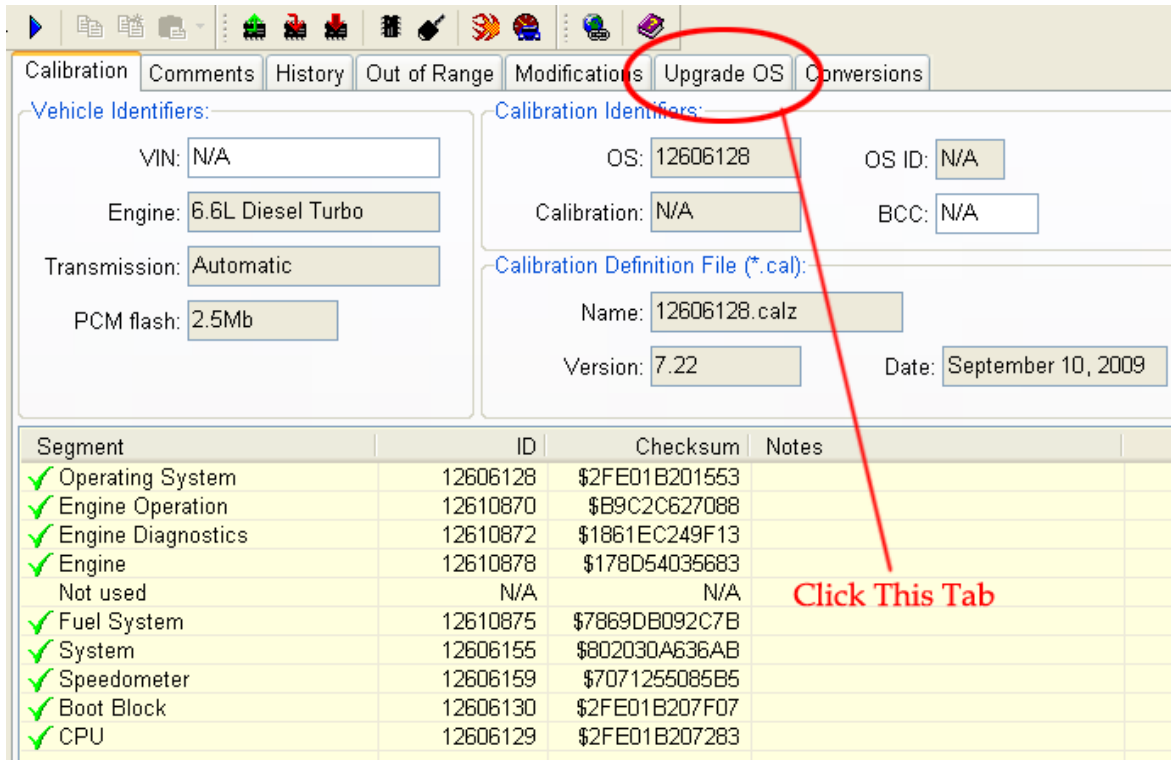


Select either LBZ or LMM ECM Type:

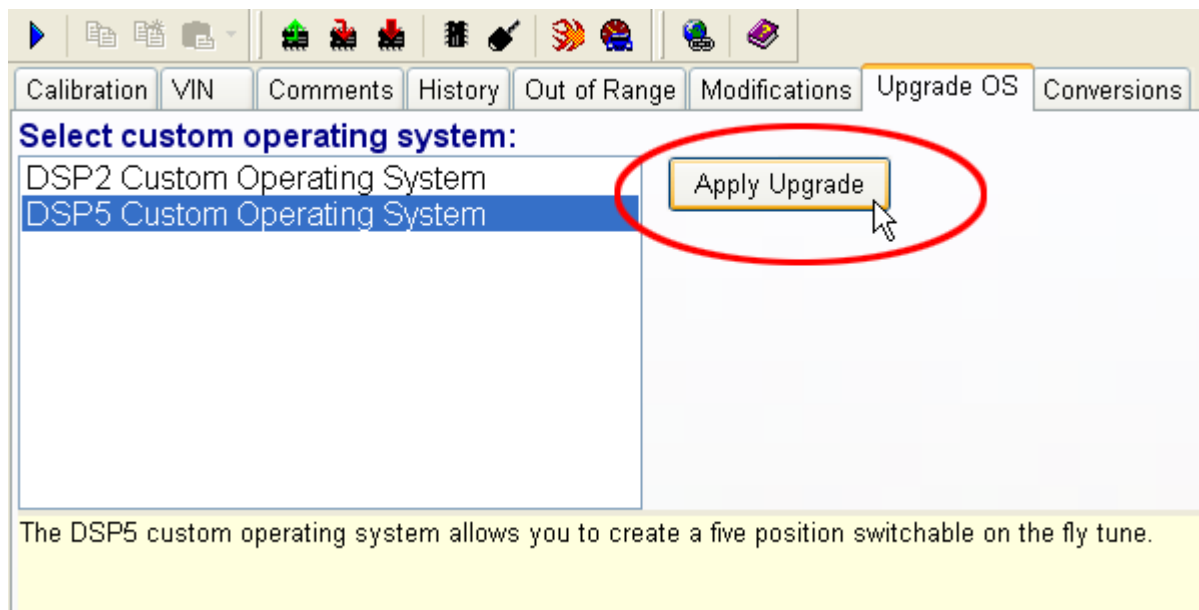


Once the file has been read from the ECM you should save this as the stock file in case you need to return the ECM back to standard.

With the tun file now in the editor, you need to click on the Tab that says - "Upgrade O.S". An LBZ DSP5 upgrade will be the example used below.



Select which operating system upgrade you wish to apply (only choose one), then click the "Apply Upgrade" button.



VERY IMPORTANT: Only choose one DSP option and only click the Apply Upgrade button once.

Now save the file with a new name, **File > Save As**. Maybe something like 'Toms Base DSP5 Conversion'

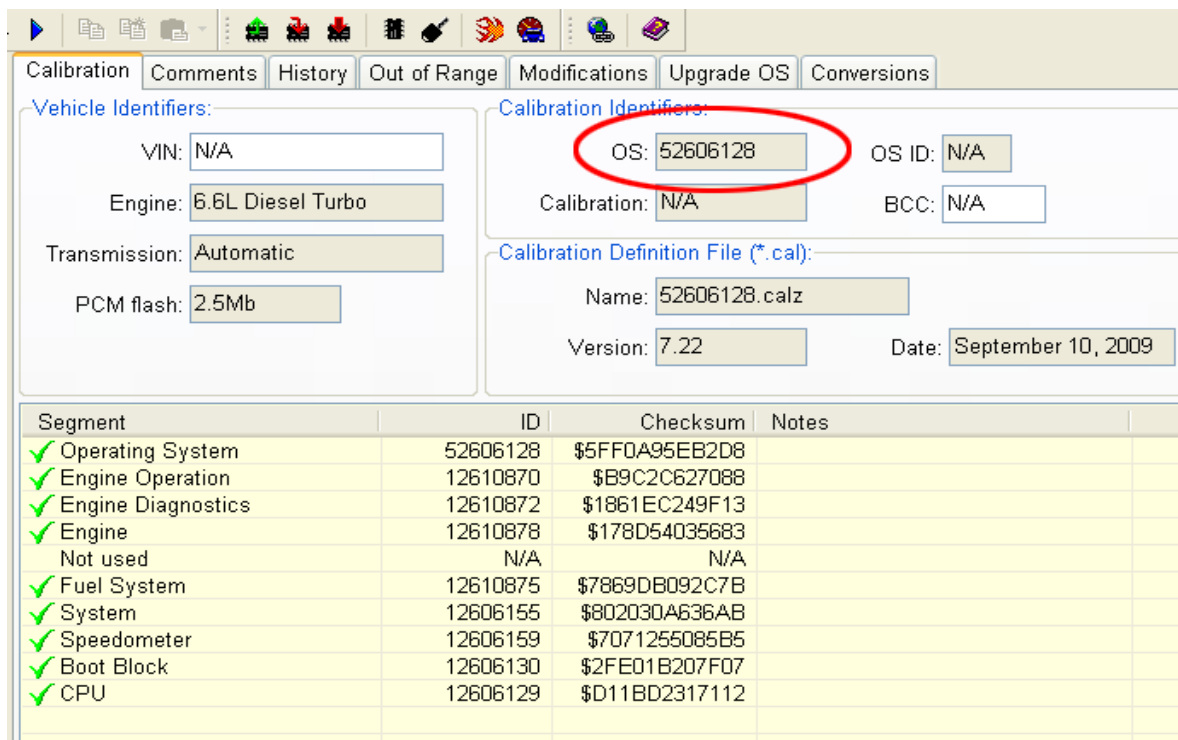
Or often some people might save the file base with the VIN like so '1GCHK23123F123456 Base DSP5 Conversion'

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

Now you need to reopen the file so EFILive will recognise the file is a DSP converted operating system, please also take note of the new operating system number of the DSP converted file (circled in red below).

DSP2 will become 2xxxxxxx (eg 12606128 to 22606128)

DSP5 will become 5xxxxxxx (eg 12606128 to 52606128)



EFILive automatically populates the new DSP tables with factory maps during the upgrade to get you started. On modified engines these may not be suitable settings, you may need to copy your own tables in to the new DSP section(s).

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 DSP operating system and calibrations. This is covered on the next page.

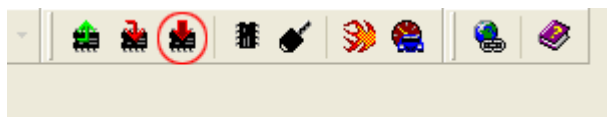
Hints for in-vehicle ECM flashing:

- 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 DSP 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 reflashing 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 DSP file loaded press the button circled in the picture below.



Once the full flashing procedure finishes (approx 8 -11 minutes depending on the ECM type), turn off the IGN for at least 30 seconds to allow all the vehicle modules to fully shut down.

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

Once these tests are complete you can wire up your DSP switch. Once that is complete you can start tuning your DSP programs. Without the DSP switch wired up the ECM will still be running off the factory maps.

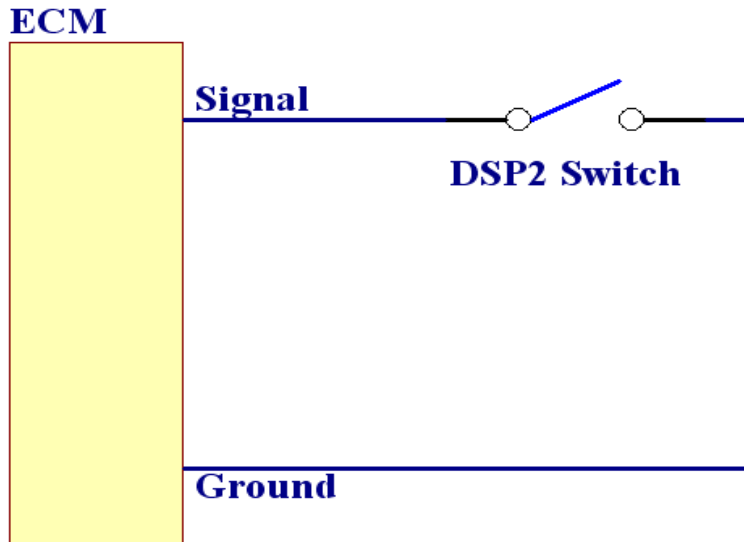
It is highly recommended that you disconnect the trucks battery before attempting any wiring modifications.

Please Note: Once the DSP OS is flashed in to your ECM you will no longer be able to read the tune back out of the ECM, so please ensure you keep a copy of your tunes safe.

Wiring the DSP2 Switch

The DSP2 switch works by switching the voltage level at an ECM pin to 0V (ground). The ECM monitors the voltage to determine which program you wish to run.

When the switch is open, the ECM will use the factory maps, when the switch is closed (grounded) the ECM will use the DSP2 tables.



The connections to the ECM from the switch are made to the following pins –

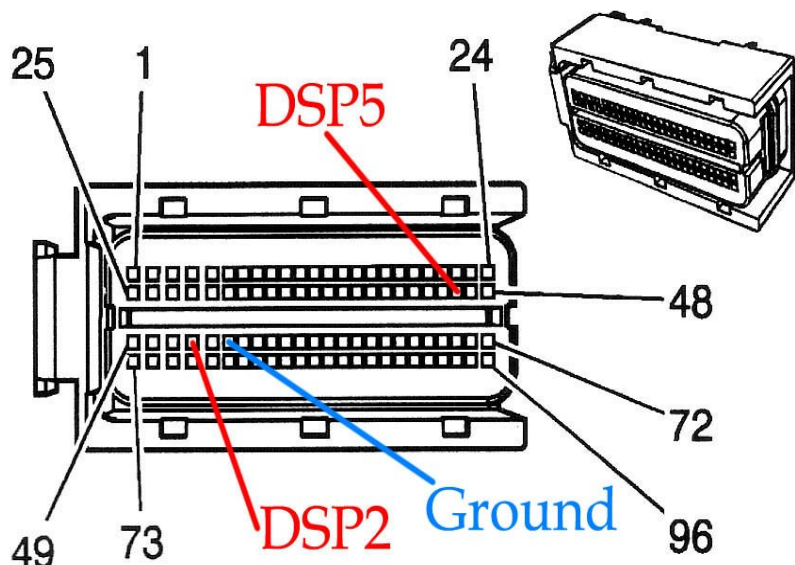
LBZ & LMM

Signal = Connector 1 (the larger plug), pin 52 , (*next to LtBlue/Black wire*).

Ground = Connector 1 (the larger plug), pin 54, (*next to Yellow/Black wire*).

Note: It may also be possible to make the ground connection in the cab rather than the ECM.

(Also see the connector view below for reference)

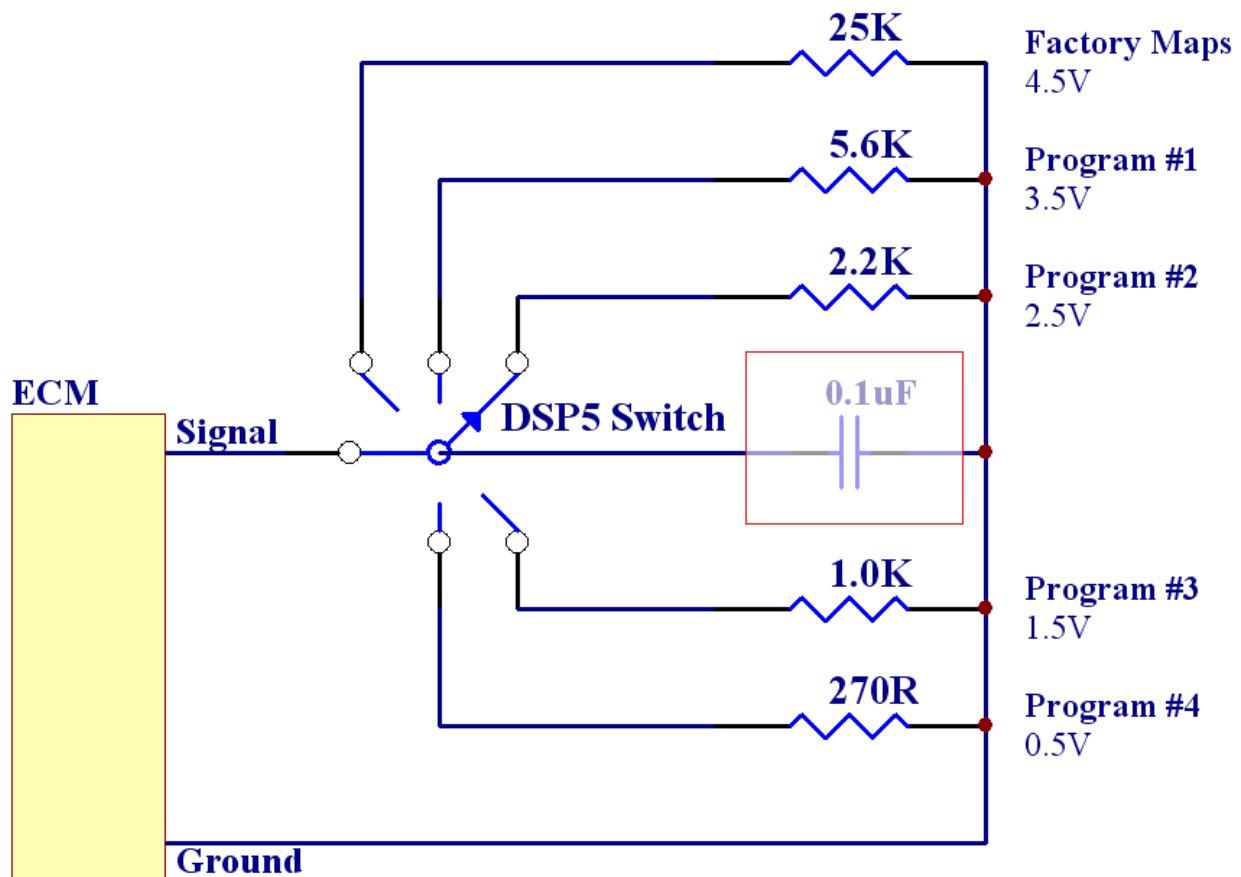


Wiring the DSP5 Switch

The DSP5 switch works by selecting different voltages for the ECM to measure, from these voltages the ECM can determine which program you wish to run.

Below is the suggested resistance to be used for any DSP5 switch you may wish to design. Also shown is the approx voltage the ECM will measure for each resistance. The switching voltages are configurable within EFILive, however, the values below give a good even separation of switch points.

The 0.1uF capacitor shown in red is optional, it is used to reduce switch bounce.



The connections to the ECM from the switch are made to the following pins –

LBZ & LMM

Signal = Connector 1 (the larger plug), pin 46, (*next to Grey wire-LBZ, Tan wire-LMM*).






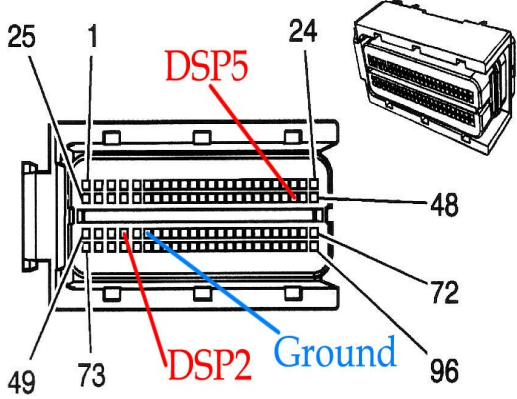
Ground = Connector 1 (the larger plug), pin 54, (*next to Yellow/Black wire*).

Note: It may also be possible to make the ground connection in the cab rather than the ECM.

(Refer to the connector view on the previous page)

The part number for the connector pins is – Tray #19, 1928498135

LBZ / LMM ECM Connector wiring installation

#1 – Locate ECM Plug	#2 – Remove the Larger Plug
	
#3 – Remove purple locking clip (don't loose it!!)	#4 – Remove top cover
	
#5 – Insert new pins/wires Reverse procedures once done.	Pin-out Reference (viewed looking at connector bottom).
	

Joe Harden has provided an in-depth install guide at the end of this document

Important DSP5 Parameters and Tables

A9136, A9236, A9336, A9436 – DSP5 switching voltages

These parameters set up the switching points for each DSP program to become enabled.

It works by the voltage from the switch for each tune needing to fall between each adjacent parameter for a valid reading. So as an example only, if you set the parameters like so –

A9136 (DSP Program #1) = 4.00V

A9236 (DSP Program #2) = 3.00V

A9336 (DSP Program #3) = 2.50V

A9436 (DSP Program #4) = 1.80V

For the non DSP Program (stock) to become enabled the switch voltage must be above 4.01V.

For DSP Program #1 to become enabled the switch voltage must be between 4.00V and 3.01V.

For DSP Program #2 to become enabled the switch voltage must be between 3.00V and 2.51V.

For DSP Program #3 to become enabled the switch voltage must be between 2.50V and 1.81V.

For DSP Program #4 to become enabled the switch voltage must be between 0.00V and 1.80V.

Check with your DSP5 switch provider for the correct settings.

Monitoring DSP status in the Scantool

You can monitor the DSP switch data using the following PID's –

GM.E35DSP2_DMA (PC) or E35DSP2_M (BBL):

This PID will show if the DSP2 tune is enabled.

GM.E35DSP5_DMA (PC) or E35DSP5_M (BBL):

This PID will show the current tune number the ECM is using for DSP5.

GM.E35DSP5V_DMA (PC) or E35DSP5V_M (BBL):

This will show the measured voltage at the ECM pin when using DSP5, useful for setting up the DSP5 switching voltages, otherwise just use the previous PID to monitor the DSP program switching.

LBZ / LMM – DSP5 pin install guide

Contributed by EFILive beta tester, Joe Harden

I'm not sure if it makes it easier for the install, but I removed the driver's side inner fender.



Use the "throttle cable" port through the firewall as a way to route the wire from the switch to the ECM. (note that EGT and boost wires are already installed through this port in the pictures)



Press the grommet into the cab



This is an under-dash view of what's taking place.



Pop the rubber center out of the grommet. (It's been a while since the egt / boost install was done, but it seems like I had to make a cut into the rubber center in order to remove it from the "throttle cable". It already had a slit in it during this install, but I don't remember if I did it earlier or not.)



Now that the center is out, the grommet can be pulled through the firewall (into the engine bay) where it is easier to feed the wire through it. I had the pin soldered to the wire, since I don't have the proper crimping tool. The crimping tabs on the pin need to be trimmed down and the solder can't be very thick, since the whole pin needs to fit down a hole about the size of the head of the pin.)



The grommet can be installed back into the firewall after the wire is fed through.



Location of ECM



At this point, the batteries need to be disconnected!

Locate the ratcheting lever on the lower connection of the ECM and pull upward (toward the sky). As the lever rotates upward, the plug will back out of the ECM. Assist the ratchet in backing out the connector. The ratchet will stop after about 90° of rotation from the starting position.



This connection is referred to as C2 of the ECM. (We're interested in C1 above it, but C2 needed to be removed in order to make C1 available.)

Now remove connector C1 (directly above C2). The same ratcheting lever is on this connector as C2, except the lever needs to be pulled down (toward the ground).

Here's C1 after being unplugged from the ECM.



There's a pink clip in the connector that holds the pins in place. This needs to be removed. I used a small allen-wrench to get down in the notch of the pink clip and applied pressure to the end of the connector to remove it.





Remove it completely from the connector.

Next, take the ratcheting mechanism / cover off the connector. First, pop up the end nearest the wire bundle.





The pin is to be inserted in location 46 (from this view with the wire bundle on the right side of the connector, it's the 3rd slot in from the beginning of the second row. If confused, follow the red wire across the picture.)



Referring to this view, the pin needs to be oriented such that the wider side of the head of the pin is closest to location 47 (grey wire).

It is a good idea to have a small piece of rigid wire (or a straightened out paper-clip) near by to help push the pin into location.

Reinstall the pink clip and make sure everything is where it needs to be. If the clip won't slide completely through the connector, especially if it stops in the area of the new pin, then check that the pin has been seated in the connector with the rigid wire.

Once the pink clip is in place, press the sliding portion of the ratcheting mechanism back into the connector and attach the ratchet lever / cover back onto the connector (the lever is to be down in the "locked" position when this is carried out.) Having the slide pushed in and the lever down properly position the gear and slide.

C1 is now ready to be connected to the ECM, so pull the lever back to the fully open position and insert the connector into the top port until you feel the slide mechanism make contact with the ECM. Now begin pushing the lever up while helping the ratchet feed the connector into the port.

C2 can now be reinstalled into the lower port. Having the lever in the full open position, follow the same steps as C1, except the lever will be pulled toward the ground while the connector is being guided into the port.

The batteries can now be reconnected and the inner fender can be reinstalled.

This install didn't include a ground wire from the switch to the ECM. I currently have the switch grounded to the metal support under the steering column, and it works fine.

END OF DOCUMENT