"Digital DSP-5 switch"

Installation instructions, 2001-2010 LB7/LLY/LBZ/LMM Duramax

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First of all, thank-you for purchasing the BT DieselWorks digital DSP-5 switch for 2001-2010 GM Duramax diesel pickup trucks running the EFILive DSP-5 custom operating system. "DSP-5" is a method of integrating 5 tunes into one ECM tune, that can be selected on the fly, for ease of changing engine operating modes and parameters. Up until now, DSP-5 switching was accomplished with a very basic mechanical rotary switch that can be hard to read while driving. The BT DieselWorks digital DSP-5 switch provides a large, easy-to-read LED display that clearly shows tune number at a glance, without having to look down at the small print/markings on the traditional rotary DSP-5 switches. The digital DSP-5 switch is encased in a standard 2 1/16" gauge pod housing for an easy/clean/no-drilling/cutting install anywhere that a standard 2 1/16" gauge will fit. The tune control buttons are back-lit for easy access/viewing at night. Installation is very easy, with only 4 wires to hook up.

The BT DieselWorks digital DSP-5 switch takes the concept of DSP-5 to the next level, providing a much cleaner, easier to see alternative to the traditional mechanical switch, while giving a much fancier high-tech appearance to the interior of your truck. The digital DSP-5 switch is functionally identical to the old mechanical switches in that it offers the same instant switch-on-the-fly capability, however it also adds some unique new features that were previously not available with the old mechanical switches.

The digital DSP-5 switch offers a unique "valet" mode that allows you to hide a secret toggle switch under the dash so that, when flipped, the truck is permanently locked into the "stock" tune. This is excellent if you want to let someone borrow your truck and don't want them messing with your tuning or abusing/damaging your truck on a "hot" tune setting.

You can also use this input as a secret anti-theft/ignition kill switch! Simply program the tables in the "stock tune" portion of the EFILive tune to inject "zero" fuel, and then whenever the "valet" switch for the DSP-5 switch is flipped, the truck will not start.

Additional features include "tune reversal", "adjustable display brightness", and "tune remember". The tune reversal feature is a program setting that will effectively reverse the order in which the DSP-5 switch cycles through the tunes. This is due to the fact that some tuners configure their tunes differently from other tuners. IE, some tuners put the "stock" tune into "DSP #4" tables in the EFILive tune file, and others use "DSP #4" tables for the "race" tune. **(contact your tuner for details)** With the BT DieselWorks digital DSP-5 switch, you can easily setup your switch to work with either DSP-5 tune configurations! The Adjustable display brightness feature allows you to set the brightness of the LED display for both easy reading in direct sunlight, as well as not being distracting at nighttime. The final feature is "tune remember", which simply allows you to program the switch to either default to "stock" tune every time the truck is started, or to "remember" which tune the truck was in when it was last shut off. The choice is yours!

DISCLAIMER: Ben Tyler or BT DieselWorks, LLC will not be held responsible for any personal, property, truck, vehicle, engine/powertrain, or transmission damage/injury that may result with the use of this module. This is an aftermarket part; just like any other aftermarket performance truck parts, install/use it at your own risk. Be sure to use caution when working around yellow connectors or wiring as these can be related to the SIR (airbag) system.

I fully test every module for proper operation before I send it out. This is why some of the wires on the harness might appear to have been 'used' before. This module has been used on many trucks during testing/prototyping, with great success. If yours does not work for some reason, email/PM me and I will correct the situation. This is, of course, provided you do not have an existing mechanical/electrical problem with your truck/transmission that is outside of my control or the module's abilities. IE, if you have a bad ground, bad wiring, incorrect ECM programming, ECM pin is not seated fully in the connector, etc, this module obviously will not be able to function properly.

The digital DSP-5 switch modules are covered by a 1-year warranty. If the module 'stops working' for some reason and you have diagnosed the problem and eliminated wiring problems/blown fuses/flasher module as a problem source, send the module back to me. I will test the module and if it is indeed found to be defective/failed, I will replace or repair the module free of charge. **I will not cover shipping charges though.**

If I receive the module back and see that it has been modified, tampered with, water-damaged, wired incorrectly, opened, or physically damaged, the warranty is VOID. If the module does incur damage that would normally not be covered by warranty, let me know and I can most likely repair it for substantially less than the cost of a whole new module. If you have any questions regarding the warranty or module repair, feel free to contact me.

Installation Procedure

1. Disconnect both batteries.

2. Decide where you are going to mount the digital DSP-5 switch.

3. Depending where you mount the digital DSP-5 switch, you might have to extend some of the wires**. If you do extend the wires, be sure not to mix up wires/colors, and be sure to make the connections clean/solid. If any wires get mixed up, the DSP-5 switch could be permanently damaged and repair will not be covered under warranty.**

4. Locate a FUSED +12v hot ignition source in the under dash wiring. I highly recommend adding an additional inline fuse going to the DSP-5 switch for extra protection. A 2-amp fuse is sufficient. **NOTE: YOU MUST USE A POWER SOURCE THAT IS "HOT" DURING "RUN" <u>AND</u> "CRANK".** (ie, a power source that does NOT momentarily shut off when the key is turned to

start). Use a multimeter or test light to verify that your chosen power source is hot in both RUN and CRANK. Several easy-to-access locations for power and ground are at the BCM connectors or in the driver side fuse box.

5. Connect the PINK wire coming from the DSP-5 switch to an ignition-hot +12v power source.

6. Locate a clean, solid ground location. Having a proper/clean ground location is very important, almost all installation errors include choosing an insufficient/dirty ground location. Use a multimeter or ohmmeter to verify that the ground location you have chosen is clean.

7. Connect the BLACK/WHITE-STRIPE wire coming from the DSP-5 switch to a clean ground source.

8. If you choose to install the valet/anti-theft toggle switch, run the GRAY wire coming from the DSP-5 switch to a secret location under your dash, or wherever you want to hide the switch. If you do not want to install the valet switch, simply tape up the end of the GRAY wire and secure it out of the way.

9. **Whenever the GRAY wire is GROUNDED, the DSP-5 switch will be locked in "valet" mode. When the GRAY wire is left "floating" (IE, not connected to anything, open circuit), the DSP-5 switch will operate normally.**

10. You can use any standard basic on/off toggle switch, available at Radio Shack, auto parts stores, etc.

11. Attach the GRAY wire from the DSP-5 switch to one terminal of the toggle switch.

12. Attach the other terminal of the toggle switch to any **GROUND** source.

13. **NOTE: DO NOT CONNECT THE GRAY VALET TRIGGER WIRE TO +12v POWER, AS THIS WILL PERMANENTLY DAMAGE THE DSP-5 SWITCH AND VOID THE WARRANTY.**

14. NOTE: If you already have an existing "old-style" rotary DSP-5 switch, please skip to step #18

15. Route the purple wire (the long wire with the ECM pin pre-crimpled on the end) through the firewall and to the ECM connectors. **When routing the wire under the dash, be sure that it is secured away from the steering shaft, brake pedal, accelerator pedal, etc. Be sure that the wire is protected from chaffing where it passes through the firewall. Be sure that the wire is properly secured where it runs through the engine bay, so that it will not come into contact with any moving parts or hot surfaces.**

16. <u>**Follow the "DSP-5 switch install tutorial" in EFILive for a description of how to disassemble the ECM connectors and install the pins for your specific truck. LB7, LLY, and LBZ/LMM all have different styles of connectors and pin locations, so be sure that you install the pin in the proper location for your generation of Duramax.**</u> The pin/wire from the digital DSP-5 switch will be installed into the same "signal" wire pin location as the standard "old-style" DSP-5 switches. The "ground" pin location as described in the EFILive instructions will NOT be used; you can simply ignore it.

17. Once the pin is properly inserted (be sure that it is fully inserted, a common mistake is to insert the pin into the ECM connector, but not seat it fully, which will result in a non-functional DSP-5

switch), reassemble the ECM connector, tape up/secure any loose wiring, replace the ECM, and plug the ECM connectors back in. PLEASE SKIP TO STEP #20

18. If you already have an existing "old style" DSP-5 switch, simply remove the switch and cut the "signal" wire going to the switch. On the SoCal Diesel switches, this wire is generally purple, but be sure to double-check with whomever you bought the DSP-5 switch from to verify which wire is the "signal" wire and which wire is the "ground" wire. The "ground" wire going to the old DSP-5 switch can just be cut and taped up/secured out of the way, as it is not used with the digital DSP-5 switch.

19. Splice the "signal" wire that went to the existing "old style" DSP-5 switch onto the purple wire coming from the digital DSP-5 switch. You can cut the wire coming from the digital DSP-5 switch shorter if you wish, so there is no excess wire bundled up under the dash.

20. After securing all wiring, double-check all connections, and mount the digital DSP-5 switch in its final mounting location.

21. Reconnect batteries.

22. **<u>IMPORTANT STEP FOR LBZ/LMM TRUCKS ONLY:</u> You must alter the DSP-5 switch voltage values in the EFILive tune file in order for the switch to work properly! First, open up your tune file in EFILive. Using the "navigator search" box, look up table A9136 and set the value to 4.00volts. Then look up table A9236 and set the value to 3.00volts. Then look up table A9236 and set the value to 2.00volts. Then look up table A9436 and set the value to 1.00volt. Then save the tune file, and perform a full-flash of the ECM.**

23. Start the truck and verify proper operation of the DSP-5 switch. When the truck is started, the DSP-5 switch will go through a little startup routine and then show which tune number you are in. "1" being "stock" tune, and "5" being "race" tune. Use the "up" and "down" buttons on the DSP-5 switch and verify that the number cycles properly 1 through 5. When the highest/lowest tune level is reached, an additional press of the "up" or "down" buttons will simply be ignored. IE, when you are in tune 5, if you press the "up" button again, nothing will happen and the switch will remain in tune 5.

24. You can also use the EFILive scan tool to verify that the DSP-5 switch is changing tunes properly. To do this, open up the EFILive scan tool, and select the PID "DSP-5 TUNE", and then log live data. As you cycle through the tunes on the DSP-5 switch, the DSP-5 tune data readout on the EFILive scan tool should change accordingly. **NOTE: If the tune does not change properly, double check the ground connection for the DSP-5 switch, and double check that the ECM pin is fully seated.**

25. To test the "valet" mode, flip your hidden toggle switch. The display should immediately switch to "L" (for "Locked"). Whenever "L" is displayed, the DSP-5 tune is locked into the "stock" tune level. Any attempt at pressing the "tune up" or "tune down" buttons will result in a "tamper protection" routine in which the DSP-5 switch display will display "LOC" ("locked") for roughly a minute, during which time all switch operation is disabled. To exit "valet" mode, flip the hidden toggle switch back, and the display should immediately return to your previously selected tune. The valet mode is "saved" when the truck is turned off. (IE, if you leave the toggle switch in "valet" mode,

and turn the truck off, "valet" mode will automatically be re-enabled next time the truck is started, until the switch is flipped back to "normal" mode.)

PROGRAMMING/OPERATION INSTRUCTIONS:

1. The following steps describe how to program the various settings of the digital DSP-5 switch.

2. There are 5 selectable brightness levels of the display. To adjust the brightness of the DSP-5 switch display, simply press both the "up" and "down" buttons simultaneously. The display will then dim one level. To dim further, press both buttons together again. Continue doing this until the desired brightness level is achieved. After the dimmest setting has been reached, the display will cycle back around to the brightest level. **NOTE: Sometimes, if the buttons are not pressed at exactly the same time, the DSP-5 switch will interpret the command as if you were only pressing one of the buttons ("up" or "down") and it will simply change tunes instead of dimming to the next level. If you find that this happens, simply toggle up to tune 5 (or toggle down to tune 1), and then when you press both buttons, press one of the buttons slightly before the other (if you toggle up to tune 5, press/hold the "up" button slightly before you press the "down" button, and if you toggle down to tune 1, press/hold the "down" button slightly before you press the "up" button)**

3. To program the "tune recall" and "tune reversal" settings, follow steps #4-6.

4. Start with the ignition OFF.

5. Press and hold both "up" and "down" buttons.

6. While still holding the "up" and "down" buttons, turn the ignition ON, but don't start the engine.

7. After a second or so, the display will show "P" (Program) to indicate programming mode has been entered.

8. Once the display shows "P", release both buttons.

9. After several seconds, the display will show a number, indicating which program setting is selected. "1" denotes "remember tune at key-off/normal tune order". "2" denotes "remember tune at key-off/reverse tune order". "3" denotes "don't remember tune at key-off/normal tune order". "4" denotes "don't remember tune at key-off/reverse tune order".

10. Whenever programming mode is entered, the DSP-5 switch will reset to programming setting "1". Once the display shows "1", to change to configuration "2", "3" or "4", simply press the "up" button. Each press of the "up" button will cycle through the different programming configurations.

11. Once the desired program setting has been reached (1, 2, 3, 4), simply turn the ignition OFF, wait 5 seconds, and the setting will be permanently saved until you re-enter programming mode again. Disconnecting the batteries, etc will not erase the programming setting. NOTE: when in

programming mode, you can only go "up" in programming settings. If you accidentally pass your desired programming setting (IE, you wanted configuration 2, but you accidentally pressed the "up" button an extra time and the DSP-5 switch went to configuration 3), simply turn the ignition OFF, wait 5 seconds, and repeat steps #4-8, and the module will reset/default back to configuration 1. The program setting can be changed/reset as many times as you want.

Any further questions or if you ever have problems, feel free to PM me, email me at BTDieselWorks@gmail.com, or call me. (email preferred)
Thanks again, Ben Tyler, BT DieselWorks, LLC.