

# **“Allison Tap-Shift Retrofit”**

## **Installation instructions (2003-2005 5-speed)**

**By: BT DieselWorks, LLC.**

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Thank-you for purchasing the BT DieselWorks Allison tap-shift controller module! This module was designed to add the manual shifting capability (“tap-shift”) found on the factory 2006+ 6-speed transmissions to the 2001-2005 5-speed transmissions. Full factory/automatic mode is still retained of course, but in the event that you want to shift manually or select a gear, you can go to “manual/tapshift” mode at the flip of a switch.

**Please check everything in the package to be sure nothing was damaged in shipping or otherwise not complete:**

- A) Tap-shift module**
- B) Gear indicator display (deluxe models only)**
- C) LED indicator and LED holder (basic models only)**
- D) Plastic bag containing zip-ties, heat-shrink tubing, wire taps**
- E) 6-speed shifter**
- F) Wiring harness**

All wires are color coded for easy installation. Installation should take 2 hours or so, depending on how you decide to route the wires, and if you have not previously drilled a hole in the firewall to pass wires through. The way the kit is designed allows you to easily return to stock should you decide to sell the truck or otherwise remove the tap-shift kit.

**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.**

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.** 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 tap-shift module's abilities. IE, if you have a bad NSBU switch, loose wiring connections, etc, this module obviously will not be able to function properly.

The Allison tap-shift control modules are covered by a 1-year parts/labor warranty. If the module 'stops working' for some reason and you have diagnosed the problem and eliminated transmission mechanical failure 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.**

1. Decide where to mount the main control box under the dash. It can be zip-tied in place, or secured with double sided tape behind the driver-side knee panel. **NOTE: BE SURE TO DOUBLE CHECK THAT MOUNTING OF MAIN CONTROL BOX AND ASSOCIATED WIRING DOES NOT INTERFERE WITH ACCELERATOR/BRAKE PEDAL MOVEMENT OR STEERING COLUMN MOVEMENT. ALSO USE EXTREME CAUTION AROUND ANY YELLOW/ORANGE COLORED CONNECTORS, AS THESE ARE AIRBAG SYSTEM RELATED CONNECTORS AND WIRING.**
2. Drill hole in firewall using the plow-package blank/cutout as a reference. I find a step-bit works best for this, but I am guessing most of you guys already have this hole pre-drilled for boost/EGT gauges, etc...
3. Route the long gray wire through the firewall into the engine bay. Secure the gray wire along the firewall and along the fender so that the wire ends up at the TCM harness/connectors on the radiator shroud. **NOTE: BE SURE TO SECURE GRAY WIRE OUT OF THE WAY OF ANY HOT MANIFOLDS, MOVING PARTS, OR ANYTHING ELSE THAT COULD DAMAGE THE WIRE.**
4. **Disconnect both batteries (this is very important as you will be working around the steering wheel airbag components/wiring)**
5. Remove TCM and unplug the two connectors
6. Unwrap electrical tape to expose a portion of the TCM wiring harness
7. Locate pins 5, 6, 7, 8 in the RED C2 TCM connector.
8. Using a small screwdriver, or dentists' pick, carefully remove the red TCM connector shield.
9. Pry open the gray plastic "cable dress" so you can see where the wires go into the back of the connector.
10. Using a small screwdriver, remove the BLACK/WHITE wire going to Pin #5 on the TCM connector.
11. Locate the GREEN wire on the tap-shift module. Insert the GREEN wire/pin into Pin #5 on the TCM connector.

12. Locate the RED wire/pin coming from the tap-shift module. Slip a piece of provided heatshrink tubing over the wire. Insert the RED male pin into the female pin of the transmission harness BLACK/WHITE wire that was just removed from Pin #5. After the male pin is firmly inserted into the female pin, slide the heat-shrink tubing over the connection and use a heat-gun to shrink the tubing, thus securing the pins together.
13. Using a small screwdriver, remove the YELLOW wire going to Pin #6 on the TCM connector.
14. Locate the ORANGE wire on the tap-shift module. Insert the ORANGE wire/pin into Pin #6 position on the TCM connector.
15. Locate the BLUE wire/pin coming from the tap-shift module. Slip a piece of provided heat-shrink tubing over the wire. Insert the BLUE male pin into the female pin of the transmission harness YELLOW wire that was just removed from Pin #6. After the male pin is firmly inserted into the female pin, slide the heat-shrink tubing over the connection and use a heat-gun to shrink the tubing, thus securing the pins together.
16. Using a small screwdriver, remove the WHITE wire going to Pin #8 on the TCM connector.
17. Locate the WHITE wire on the tap-shift module. Insert the white wire/pin into Pin #8 on the TCM connector.
18. Locate the BROWN wire coming from the tap-shift module. Slip a piece of provided heat-shrink tubing over the wire. Insert the BROWN male pin into the female pin of the transmission harness WHITE wire that was just removed from Pin #8. After the male pin is firmly inserted into the female pin, slide the heat-shrink tubing over the connection and use a heat-gun to shrink the tubing, thus securing the pins together.
19. Locate the GRAY wire going to Pin #7 in the TCM connector. Do NOT remove it.
20. Using the provided Scotchloc wire-tap, tap/splice the BLACK wire coming from the tap-shift controller into the GRAY wire (Pin #7) in the TCM connector. You can also solder the wire if you wish.
21. For any clarification regarding TCM connector to tap-shift module harness wiring, see diagram below.
22. Remove the dash bezel by lowering the steering wheel to the lowest position, **set the parking brake**, moving the shifter down to "1" (**keep your foot on the brake, otherwise the truck may start to roll**), and pull gently on the dash bezel.
23. Remove the driver-side knee panel by loosening the two screws on the bottom, and then pull on the top to release the clips.
24. Remove the four 10mm bolts that hold the metal shield covering the wires and the base of the steering column. Set the shield aside.
25. Disconnect the stock shifter tow/haul harness connector. It is a two-pin connector with orange wire sheath, as shown.
26. You MAY choose to remove the steering wheel in order to make shifter-removal easier. It is possible to carefully remove the rubber shift boot and steering column upper/lower trim covers with the steering wheel on. If you carefully separate the two halves of the column covers from the

rear, you can then remove the rubber shifter boot. Once the shifter boot is removed, there is a T30 Torx bolt holding the shifter in. but I recommend removing it.

27. **If you choose to remove the steering wheel, removal/replacement instructions can be found HERE:** <http://www.dieselpace.com/forum/showthread.php?t=251352>
28. Remove the stock shifter as shown and carefully pull the wire out with it.
29. Swap the shifter boot onto the new 6-speed shifter lever.
30. Route the wire from the new 6-speed shifter down through the column so it follows the path of the old 5-speed shifter wiring. Secure the wiring so it does not interfere with any shifter or steering column movement. There are little clips on the orange shifter cable specifically for this purpose.
31. Bolt the 6-speed shifter into place and tighten firmly. **NOTE:** Check positioning of the shifter before you tighten it. The 6-speed shifter is angled slightly differently than the 5-speed shifter. If you find the different angle of the 6-speed shifter uncomfortable, you can clamp the metal shifter mount/base in a vice and carefully bend the shifter so that it is at a comfortable angle to you.
32. Reinstall the steering column trim covers.
33. Reinstall the shifter boot.
34. Reinstall the steering wheel and airbag (if removed).
35. Plug the tow/haul connector coming from the tap-shift module into the existing truck tow/haul connector plug.
36. Plug the 4-pin shifter connector coming from the tap-shift module into the 4-pin plug on the new 6-speed shifter.
37. If your tap-shift kit is optioned with the gear indicator display, find a suitable mounting location for the gear indicator display. It can be secured with double-sided tape, glued, etc.
38. Route the wire from the gear indicator display to where the tap-shift module is mounted, and plug in the connector to the side of the tap-shift module.
39. If your tap-shift kit is the basic model without the gear-indicator display, choose a mounting location for the "Manual mode" LED. Once you have decided on a location on the dash, drill a ¼" hole, insert the LED holder, and tighten the nut firmly. Once the holder is secured, the LED can be pressed in from the back of the holder. Route the cable back to the tap-shift module, and plug it into the 4-pin MOLEX connector.
40. **The pink wire from the tap-shift module is the "ignition +12v" wire.** This wire must be hooked up to a FUSED RUN/CRANK ignition source. That means that the ignition wire that the tap-shift module is hooked up to should NOT be 'killed' when the key is turned to "START".
41. **The black wire from the tap-shift module is the "ground" wire.** This must be secured to a SOLID ground. Be sure that the ground location/wire is clean. A sloppy ground connection can result in erratic operation. Using a multimeter can be a help to locate a clean ground.

42. **Carefully route all wiring and re-tape/secure/heat-shrink-tube wires so they do not interfere with proper accelerator pedal operation, brake pedal operation, or steering column/shaft operation.**
43. **Triple check all connections and be sure no wires are exposed and that the tap-shift module is mounted securely...**I will NOT be responsible for damaged TCM's, wiring, or transmissions due to mis-wiring or loose connections!!!
44. Re-wrap TCM wiring harness in electrical tape and/or wire loom and secure tap-shift module box wiring harness.
45. Plug the TCM back in and replace the TCM mount, again checking for pinched wires.
46. Reconnect batteries.
47. Turn the ignition on and start the truck. Move the shifter to R, N, D, 3, 2, 1 while watching the PRND321 display in the instrument cluster to verify proper operation.

### **OPERATION INSTRUCTIONS:**

1. Press and hold the “-“ button on the shifter for several seconds until the gear indicator display shows “5” (gear-display models) or the blue LED lights up (basic models). You might hear a faint “click” from the module when you enter/exit manual mode, this is normal. This means that the truck is now in “manual” mode, 5<sup>th</sup> gear (drive). **Note:** the truck will not start out from a stop in the gear indicated. The display indicates the uppermost gear that the truck is allowed to shift to. So, for example, if you select “4” and start off from a stop, the transmission will shift normally, 1, 2, 3, 4, and then stop at 4<sup>th</sup> gear and not shift into 5<sup>th</sup> gear.
2. Once the tap-shifter is in manual mode, you can press the “+” and “-“ buttons to change the gear. The gear indicator display should go up/down, 5,4,3,2,1, etc accordingly (gear-display model only). The PRND321 display on the dash (and the overdrive lockout light) should also change accordingly.
3. **Note that, as a safety measure, if you are in manual/tap-shift mode, and the shifter is then physically moved to neutral, reverse, or park, the manual/tap-shift mode will be automatically overridden.** So, for example, if you are driving around with the tap-shift in “2”, and then want to back up, you can shift directly to reverse, the tap-shifter module will then automatically “suspend” tap-shift mode, and then when you move the shifter back to “D”, the tapshifter module will resume manual-mode operation and go right back to “2”.
4. To exit tap-shift mode, simply “tap-up” back up to “5”, and then press and hold the “+” button for a couple seconds until the gear indicator display returns to “0” (gear-display models) or the blue LED turns off (basic models).
5. There is no harm in leaving it in “manual” mode/5<sup>th</sup> gear all the time, however sometimes, personally, I like to rest my hand on the shifter, and sometimes you can accidentally hit the “-“ button, resulting in a sudden downshift. This is why I designed the module to not be in “manual” mode all the time, and why you have to deliberately press/hold the “-“ button for several seconds to enter “manual/tap-shift mode”, to prevent accidental “tap-shifting” when you just want to drive the truck around in “automatic”.

