

The “BAGEL” Mod

Inspired by the ANDY MOD and several near death experiences brought on by VSC and/or TRAC systems. The “BAGEL” name is thanks to my 6 year old who can’t seem to remember that they are called DONUTS, not BAGELS, so if we go out in the snow to play in the truck, we are doing “bagels”, this mod enables you to play in the snow and actually perform “bagels”.

Disclaimer

These instructions describe modifications to a 2002 4Runner. It should work on all Generation 3 4Runners, but the author has not confirmed this.

These instructions involve modifying signals going to very costly ECU’s. There is a real risk of damaging them if you do something wrong. I have completed all the Mod’s, including troubleshooting them to get it to work right, without incident. You need to decide if it’s worth the risk to you, and if you feel confident doing all this soldering.

Description:

These modifications will allow you to turn VSC OFF and ON in any driving mode (2WD, 4WD, etc.) with a flip of a switch. When you have VSC enabled, the factory function is fully restored so that entering 4WD and locking the center diff will automatically disable the VSC.

The second part of these modifications will allow you to disable VSC and TRAC with the flip of a switch. Unfortunately, you need to turn the key off-on again to re-enable them if you do this one.

The third thing you could do is the ANDY MOD, which disables VSC, TRAC and ABS. It also needs a key off-on to re-enable them. I won’t cover the ANDY mod here.

Using the MOD

VSC OFF MOD: In any mode (2WD, 4WD unlocked, 4WD locked), and with the key ON, toggle switch SW1 ON, observe the “VSC OFF” light illuminate. Toggle the switch OFF, observe the “VSC OFF” light go out. If at any time the “VSC TRAC” light comes on, the computer has faulted and may indicate a wiring or relay issue (Check SW2 wiring if you have used it). You need to turn off the key and restart the vehicle to clear this fault.

VSC/TRAC OFF MOD: In any driving mode, and with the engine RUNNING toggle switch SW2 ON, observe the “VSC OFF” light illuminate. A few seconds later, the “VSC TRAC” light will light up. You may turn SW2 OFF, but both VSC and TRAC will not come back online until the key is turned off and on.

Options:

- If all you want is VSC, TRAC and ABS off, and you don't care about individual control of each system, the ANDY MOD is much easier to do.
- If you want VSC and TRAC to turn off, you want ABS, but you don't care about *only* VSC, you can either eliminate SW1 and the Diode D1, or try one of the two simpler methods below (both have the disadvantage that they don't work from *any* driving mode):
 - **#1 only works when vehicle is in 4WD:** interrupt the BLACK-BLUE wire on VSC computer (EXI3) with a toggle switch. Open the toggle and wait a couple seconds, the VSC OFF and VSC TRAC lights will come on. You can now change out of 4WD and they will stay off until you restart the truck.
 - **#2 only works when vehicle is NOT in 4WD:** interrupt the BLACK-BLUE wire on Engine ECM (4WD) with a toggle switch. Open the toggle and wait a couple seconds, the VSC off and VSC TRAC lights will come on. You can now shift into 4WD and they will stay off until you restart the truck.

Signals to Modify

- 1) EXI on VSC computer - Terminal V18-3 – wire is Red with Black Tracer

This one gets a signal from the 4WD computer when the center differential lock switch is ON. Unlocked, this line is close to 12V, locked it drops to near 0V; note that this is only the selector switch, when the diff actually locks in it also trips “CD” below.

- 2) EXI3 on VSC computer – Terminal V18-8 – wire is Black with Blue Tracer

This wire gets a signal from the 4WD computer that goes to the ADD actuator (ADD is Automatic Differential Disconnect – basically this is your front differential, the 4WD computer sends this signal to lock your front drive drain in). In 2WD this line is close to 12V, in 4WD (Hi-Lo, Locked center or unlocked center) this is close to 0V.

- 3) CD on VSC computer – Terminal V18-24 – wire is Pink with Green Tracer

This wire gets a signal from the 4WD ECU when the center diff locks in and the diff lock light lights up. 12V unlocked, 0V locked.

- 4) 4WD on Engine ECU – Terminal E12-13 – wire is Black with a Blue Tracer

This is the same signal that goes to the VSC “EXI3” input. It tells the ECU that the front drive train is connected. 12V 2WD, 0V 4WD.

Parts

- You will need various bits of wire – 22AWG stranded works well. A few different colors can help keep things straight for you.
- Solder, Soldering iron. Make sure you use ROSIN Core solder, not acid core or plumber’s solder. Plumber’s solder will corrode all your connections in 6 months to a year and cause a malfunction
- Tape – good quality electrical tape
- Heatshrink (optional)
- Tiewraps (optional)
- 12VDC SPDT relays (5) – about any kind will work, we aren’t switching any power loads or anything. They do really need to be double throw (DT) – you need both the normally open and normally closed contacts. PCB Mount relays from an electronics store work well.
- Toggle switch (2) to turn on relays – or one 3 position toggle (on-off-on type) – this will give you VSC OFF in one direction, Everything on in the center, and VSC and TRAC off in the other direction.
- Diode rectifier (1N4001 or any other rectifier diode)

Location of ECUs

The VSC computer is up under the dash near the driver's kick panel. It's easiest if you remove the 4 bolts holding the bottom of the dash on (where the hood release is) and lay that panel on the floor with the hood and fuel release lines still attached while you work. The connector you are interested in is the 2nd one from the top (V18). Take note that the pin diagrams are as you look at the end of the connector, not where the wires go into the connector (the back). Look at the pin numbers, empty spaces and the wire colors – if everything doesn't match the instructions, think twice or three times before cutting anything.

The ECM is behind the glove box. You need to pull the two screws off under the glove box, remove it, and then pull 3 bolts that hold the black back of the glove box in, and pull that. There are some connectors attached to the top of that black thing, you can either carefully remove them, or just leave everything hanging while you work on the ECM wiring. The connector you are interested in is the Black one, 2nd from the right.

Wiring Instructions

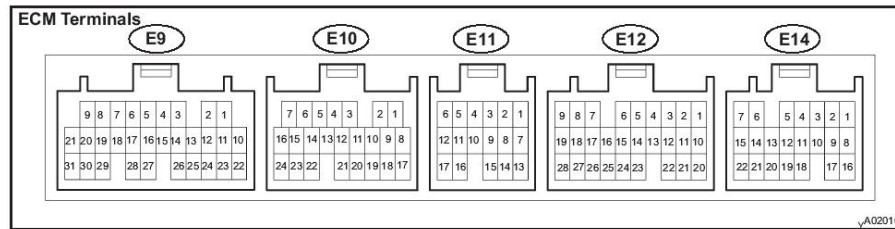
It is a good idea to locate the relays near the ECU(s) – so three near the VSC and two near the ECM.

- Use the attached schematic to complete the wiring.
- Disconnect your battery NEG terminal before and while working on this. Or at least don't turn the key on while you are doing it.
- Leave at least 1.5 inches of wire on the ECU connectors when you cut wires, this way you can strip them again if you need to.
- Keep the wires from the ECU's to the relays as short as possible (12" or less) to eliminate any interference.
- Use body grounds near each ECU to ground the relays and the signals to the ECU's. This means at least two ground connections – one near the Engine ECU and one near the VSC ECU.
- Solder all connections securely and tape them with good quality electrical tape – better yet, you can use heat shrink on all the connections.
- Use tie wraps or tape to neatly secure everything away.

ENGINE CONTROL UNIT BEHIND GLOVEBOX

TERMINALS OF ECM

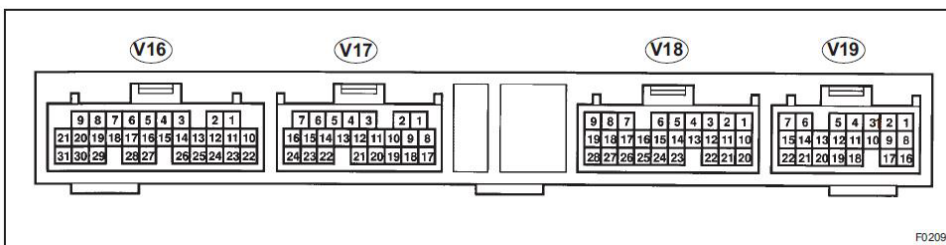
DHCE-03



SKID CONTROL (VSC) ECU UNDER DASH

TERMINALS OF ECU

LA0007-106



EXAMPLE OF RELAY WIRING (ON ENGINE ECU)



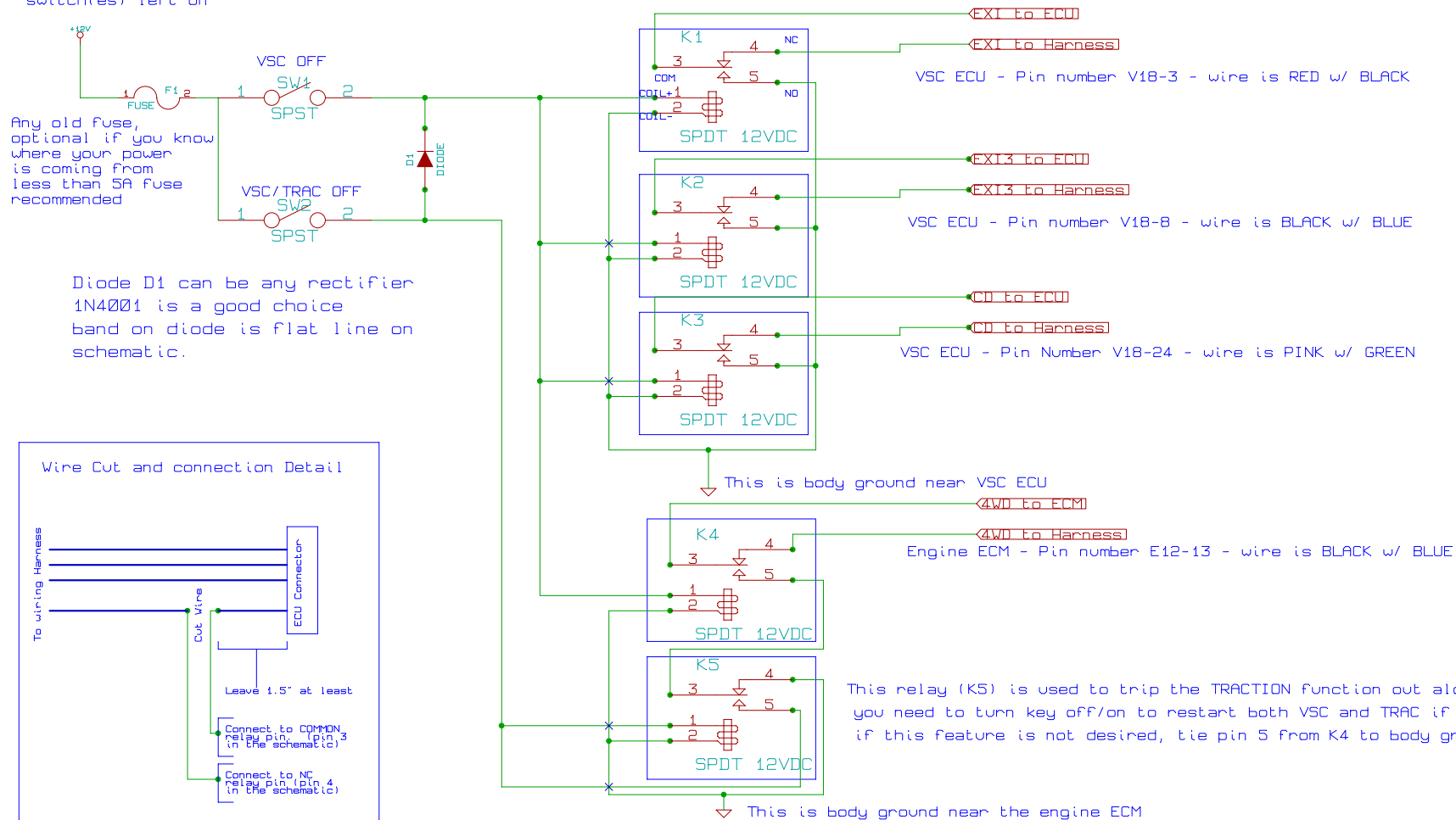
The “Bagel” Mod: VSC OFF or VSC and TRAC off

SW1 turns VSC off/on in any driving mode - auto off during 4WD function works as normal.
SW2 turns VSC and TRAC OFF in any driving mode - needs a truck restart to reenale.
If you want all three off (VSC, TRAC and ABS) the ANDY MOD is much easier to do

For VSC OFF Function ONLY:

Remove SW2, D1 and K5
Tie pin 5 of K4 to body ground

12V with KEY ON, not BATT power
or batt will drain over time if
switch(es) left on



* Note that relay pins may vary depending on type of relay used.
Ensure you connect COM, NC, and NO pins as shown! (See K1 on right)

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