Z Automotive
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TranZformer Shift Kit Installation

For Firmware Version 1.3.8-031114

The TranZformer Shift Kit is an electronic shift enhancer for Dodge/Chrysler LX/LC vehicles. The TranZformer serves several functions:

- User adjustable shift firmness for each gear in Drive and AutoStick independently, a user adjustable throttle-based scaling function. Adjustments can be made using Z Automotive Programming Utility (ZPU) for Windows PCs, connected to the TranZformer via USB. Upshift pressures can also be set using steering wheel buttons on-the-fly.
- AutoUpshift – TranZformer will Upshift vehicle in AutoStick at a user-defined RPM trip point. Can be set using ZPU or via steering wheel buttons on-the-fly.
- Steering Wheel Shifting – Driver can manually shift through gears using steering wheel volume buttons.
- Line Lock Mode* – Uses ABS solenoids to lock front brakes for standing burnouts
- Burnout Mode*– Uses ABS pump to lock the front wheels for quick burn-n-go burnouts
- Launch Mode *– Uses ABS solenoids to lock the all four wheels for precise launches
- Transmission Temperature Display – Displays transmission temperature on EVIC display/gauges
- Transmission Status Display – Displays current gear and torque converter clutch status on EVIC display
- Peak RPM Display – Displays actual peak recorded actual shift RPM at every shift when in this mode
- 0 to 30 and 0 to 60 Timers – Displays 0-30 or 0-60 times on EVIC display
- ESP re-enable – ESP reset on the fly for R/T's with NoESP or "key trick" ESP disable
- Reset Adaptives – Reset TCM learned shift adaptives on-the-fly
- Kill Adaptives Mode – Keeps adaptives from learning driving habits and keeps the transmission responsive
- Clear CELs – Clear the check engine light and reset all codes without a scan tool!
- Auxiliary Output – Use this output to control an external device

This document describes how to install a TranZformer into a 2005-2010 Charger, Magnum, 300C, or 2008-2013 Challenger

*These features are experimental on 2011+ Dodge Challengers

Step 1: Removing lower Steering Panel and Knee Plate:

Remove the trim panel under the steering column. To do this, pull off the trim piece next to the dash to expose the first screw. The second screw is located underneath, next to the hood release. Once the screws are removed, the panel pulls straight rearward, with the hood release cable and trunk release wire (if equipped) still attached. The hood release cable (2005-2010) can remain attached, but the trunk release wire can be unplugged for easier access to the TCM. The TCM is the black box located to the left of the steering column with two right-angle plugs connected to it. Next, remove the 4 bolts that hold the steel knee plate on, and set it aside.

Step 2: Wiring to TCM Harness

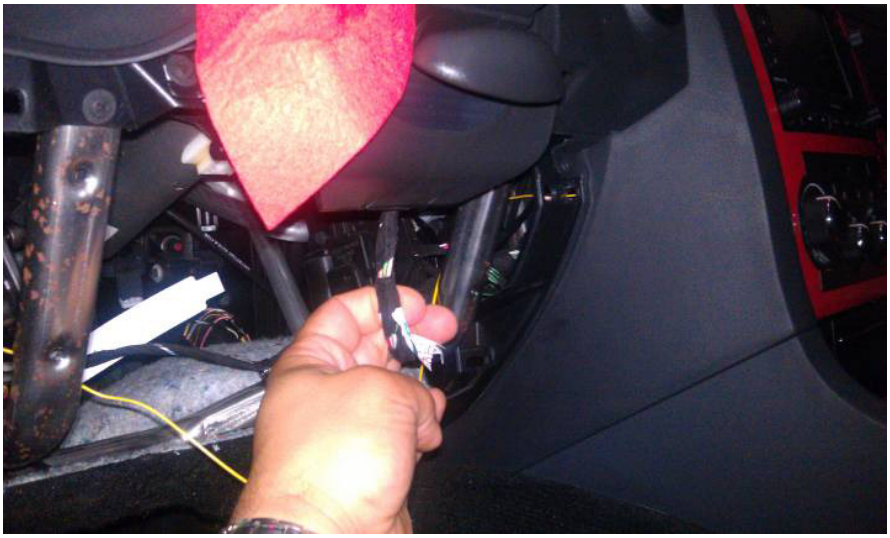
Unplug both connectors from the TCM (squeeze tab on right side of connector). The upper connector has only two wires; add a red T-tap to the Black/Orange stripe wire from this connector.

The lower connector contains many wires that are difficult to tell apart in stripe color. Slide off the connector shield to expose the pin numbers so you can easily tell which wire goes to each pin. Add T-taps to the wires from pins 30, 36, 37, and 38 as shown in Table 1. (pin 30 is on the upper TCM connector, 36,37,38 are on the lower connector) Plug the TranZformer wires into the T-taps as per Table 1. Double check pin numbers and wire colors. Be sure that the connector is secure and centered in the T-tap. Replace the TCM plug shield, and plug the TCM back in.

Step 3: Wiring to CAN busses

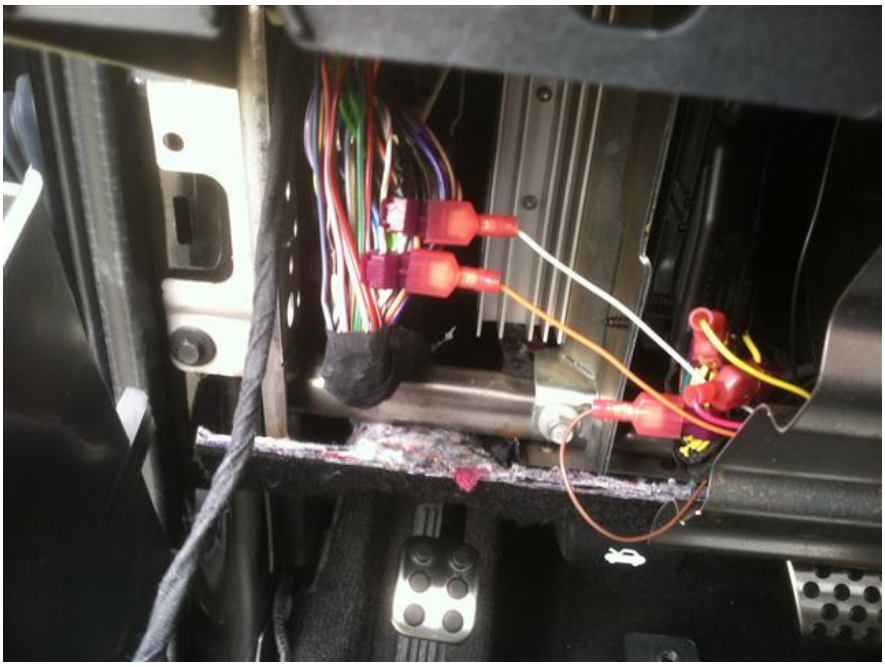
2005-2010:

The CAN Bus connections are made on the harness that goes to the steering column. Add T-Taps to the white and white/orange stripe wires, and the white/lt blue stripe and white/ lt green or black stripe. Plug in the orange, white, blue and green wires from the TranZformer as listed in Table 1.



2011+ Challengers:

The CAN-C bus wire connections on these vehicles are made at the TCM lower connector; there are two wires hiding in electrical taps that enter the bottom of the lower connector. Add t-taps and connect the blue and green wires to them. The Blue wire connects to the white/lt blue stripe, and the green wire connects to the white/black stripe. Next, locate the CAN-B bus wires; this is in a harness to the left of the TCM. See the photo below. The CAN-B wires are in a twisted pair of a white wire with no stripe, and a white wire with an orange stripe. Add t-taps to both, and connect the white wire from the tranZformer to the white wire, and the orange wire from the tranZformer to the white wire with orange stripe.



Step 4: Test for operation

Start the car and see that the TranZformer LED blinks red/green for 5 seconds, then blinks green. Place the car in Drive and the LED should blink RED. Turn off and on TranZformer by pressing the ESP button twice. You should hear an audible "beep" when turning it off, two "beeps" when turning it back on. This verifies that CAN-B bus connections are good.

Next, with car running shift into AutoStick 1, and with foot on brake pull cruise stalk towards you (or down on a 2007-2010). The ABS pump should kick on as this is Burnout Mode. If this works, then your CAN-C connections are verified good. In a 2011+ Challenger, use the steering wheel rear volume up button to see if transmission advances to gear 2. The vehicle can be stationary but running for this test.

Step 5: Finalize and Replace Panels

The TranZformer can be located adjacent to the TCM. It would be beneficial to connect the supplied USB cable to the TranZformer and leave the PC end of the cable accessible for changing parameters or updating firmware without having to pull the lower steering panel off. Replace the lower panel.

Operation:

The TranZformer monitors the shifter position and is only active in Reverse, Drive and Manual (AutoStick) modes. See the ZPU user's guide for information on configuring the TranZformer's settings. Factory default settings are mild, so it is safe to road test the vehicle before changing parameters. AutoUpshift defaults at 6000 RPM trip point.

Shift Kit Enable/Disable: To disable the Shift Kit feature at any time, press the ESP button twice within two seconds. As a confirmation, the radio will be lowered in volume two notches, the chimes will "beep" once, and if equipped with EVIC will display "TFZ off" on the EVIC screen. To re-enable, press the ESP button twice again. When enabled, the radio will increase in volume two notches, chimes will "beep" twice and EVIC will display "TFZ on". The TranZformer will remember the last state when you turn the car on the next time. If pressing the ESP button twice causes the ESP system to end up in an undesired state (ie turned ESP off) you can press the ESP button again.

Setting Shift Parameters: This can be done via ZPU utility, allowing you to independently select shift strength, scaling, and Autoupshift RPMs. You can also set shift strength on-the-fly using steering wheel buttons. To set DRIVE shift settings, press in the cruise stalk (as if to turn cruise on/off) and use the volume +/- buttons, or push cruise stalk in and up/down to adjust firmness (on 2011+ Challenger use cruise on/off and page up/down). Your tachometer will move and display the setting, where 0 = 0% and 7k(8k in SRT) = 100%. Also if have an EVIC screen "TZ A xx%" will be displayed, where xx is the set strength. This setting will be applied to all accelerating shifts in the Drive range. To set AutoStick strength, place the vehicle in Autostick using the console shifter, and use the same procedure with the cruise stalk and volume buttons. "TZ M xx%" will display on EVIC screen.

Steering Wheel Shifting: (SWS) is active even if the Shift Kit function is disabled. The volume(+) button on the steering wheel can be used for upshifts, while the volume(–) button will downshift. They will be active only when in AutoStick mode as long as SWS is enabled. Use the console shifter to enter AutoStick mode. You will not re-enter DRIVE mode when pressing vol + and in gear 5, as you would using the console shifter. To re-enter drive mode, double click the vol + button while in 4th gear, or use the console shifter.

To disable SWS, press the page down and volume (-) buttons at the same time. To enable SWS, press page up and volume (+) at the same time. (in 2011+ Challenger use cruise + and page up to enable, cruise – and page down to disable)

AutoUpshift: The TranZformer will automatically upshift for you at a programmable RPM when in AutoStick mode. The TranZformer is factory preset to request a shift for you at 6000RPM, but this can be set to any value by using the ZPU utility, although the TCM will cause a "limp home" mode if RPMs exceed 7000. Keep in mind that this is the RPM at which a shift will be requested; there is delay in the TCM and hydraulic circuits that cause the shift to actually take place later, as the RPMs continue to rise. This can be anywhere from 200-600RPM higher (depending on HP, valve body modifications, clutch wear, etc) so it's best to set the RPM shift point lower, and use the PeakRPM function to test your car's delay and adjust accordingly. You can also set Autoupshift RPMs on the fly using steering wheel buttons. With the car in either Park, Reverse or Neutral, press in the cruise stalk and use the volume buttons, or push cruise stalk in and up/down to adjust(on 2011+ Challenger use cruise on/off and page up/down). The tachometer will move to show the new setting, and the new RPM will show in the EVIC display as "RPM:xxxx" where xxxx is the new set RPM. This RPM will be used for all upshifts. Use ZPU if you would like to set the RPMs differently for each gear. This function is usable only if you used a Diablo tuner to disable the factory TCM's Autoupshift feature, or are using a Mopar Performance TCM (MTCM). If you have an SRT or an 8k tachometer, use the ZPU utility => configure => options and check the 8K Tach box.

Line Lock Mode*: The TranZformer will use the ABS solenoids to lock the front wheels for burnout purposes. To use this feature, you must stop the car, place transmission in AutoStick 1st, then push the cruise stalk away from you. Once the ABS/ESP lights come on the dash (and "LineLock" on EVIC), press the brakes firmly once to build holding force. Car will temporarily be in "Dyno Mode". With cruise stalk held, you can use the accelerator to burn up the rear tires at any rear wheel speed, through the gears if you would like. Releasing the cruise stalk will release the brakes. If the rear wheels exceed 5mph, ABS and ESP will remain DISABLED until the car comes to a complete stop, when they will reset automatically. So if you do a burnout into a takeoff, be aware that you will not have ESP or ABS until you stop. ("NoABS!!" will display on EVIC until you stop, then "ABSReset" will display). Autoupshift is disabled in this mode, so make sure your rev limiter is not set too high, as you may bounce off the rev limiter.

Burnout Mode*: The TranZformer will use the ABS pump to lock the front wheels for burnout purposes. To use this feature, you must stop the car, place transmission in AutoStick 1st, then pull the cruise stalk towards you (2005-2006) or down(2007-2010). Once the ABS pump turns on, release the brake pedal. Releasing the cruise stalk will cancel the line lock. The pump is noisy, and there will be warning lights on the dash lit up for ABS and ESP, and the chimes will sound. It is recommended not to keep the ABS pump on for more than 30 seconds. Nail the gas pedal, and the rear wheels will instantly break traction. "Burnout" will display in EVIC screen. The Line lock will release on its own once the rear wheels exceed 5mph. Autoupshift is disabled in this mode, so make sure your rev limiter is not set too high, as you may bounce off the rev limiter.

Launch Mode*: The TranZformer will use the ABS solenoids to lock all 4 wheels for launch/track purposes. To use this feature, you must stop the car, place transmission in AutoStick 1st, then pull the High Beam stalk towards you. Firmly apply the brakes to build up holding pressure. While holding the stalk, release the brake pedal. Releasing the High Beam stalk will release the brakes. There will be warning lights on the dash lit up for ABS and ESP, and the chimes will sound. "Launch" will display in EVIC screen.

Transmission Temperature Display: Press the cruise stalk in (as if tu turn cruise on/off), and using the "north" steering wheel button, scroll to "TransTmp". Transmission temperature will be displayed and updated every 2 seconds. If not equipped with Sirius, the temperature gauge will indicate transmission temperature whenever setting shift pressures or Autoupshift RPMS using the steering wheel buttons. Center of range is 160 degrees F, regardless of how the scale is

marked. Note that in Park the reported temperature is Engine Coolant Temperature. Vehicle needs to NOT be in Park to display Transmission Temperature.

Transmission Status Display: Press the cruise stalk in (as if to turn cruise on/off), and using the "north" steering wheel button (on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "TranStat". EVIC will display G:x T:y, where x is the current gear, and y is Torque Converter Clutch status. This can be U for unlocked, P for partial, and L for locked.

Peak RPM Display: Press the cruise stalk in, and using the "north" steering wheel button(on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "PeakRPM". Every time the transmission shifts, whether in Drive or Autostick, Upshift or down, the peak RPM for that shift will be displayed on EVIC screen. Note that this actual shift RPM is where the transmission actually shifted, not when it was told to shift!

0-30 Timer: Press the cruise stalk in, and using the "north" steering wheel button(on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "0-30: ". When the vehicle is stopped, this display will change to "start 30. As soon as the vehicle starts moving, the display will change to "go to 30" and the timer starts. When the vehicle reaches 30MPH, the time will be displayed.

0-60 Timer: Press the cruise stalk in, and using the "north" steering wheel button(on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "0-60: ". When the vehicle is stopped, this display will change to "start 60. As soon as the vehicle starts moving, the display will change to "go to 60" and the timer starts. When the vehicle reaches 60MPH, the time will be displayed.

Reset Adaptives: Reset TCM adaptives at any time by pulling the cruise stalk (down in 2007-2010) (on 2011+ Challengers use cruise –) and flashing the high beams. "Adv Rst" will show on the EVIC screen.

Kill Adaptives: Keep adaptives killed, or let them work as stock: Pull the cruise stalk and hold (down in 2007-2010) (on 2011+ Challengers use cruise –), and pull the high beam stalk for at least 3 seconds then release. "Adv Kill" will display in EVIC when this mode is activated – and the tach will move to max RPMs for 6 seconds. "Adv Norm" will display when returned to normal adaptives operation, and the tach will move to 0 RPMs for 6 seconds.

Display TranZformer Firmware Revision: Press the cruise stalk in, and using the "north" steering wheel button(on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "TZ: x.x.x.". The "x.x.x" will be the current revision number (ie "TZ:1.3.8")

Clear CELs*: With the ignition ON, but the engine NOT RUNNING, Press the cruise stalk in, and using the "north" steering wheel button(on 2011+ Challengers use cruise on/off and play(right arrow) button), scroll to "Clr CEL?". Continue to hold the cruise stalk, and press the "play" button on the steering wheel to confirm. Chimes will sound, and some indicators will flash. CEL's should now be cleared. This menu item will not display if the engine is running.

Auxiliary Output*: This can be used to turn on/off an external device via an external relay. Pin 6 of the TranZformer's connector will short to ground when activated. Activate by pulling cruise stalk (down in 2007+) and pressing "page +" on steering wheel. Deactivate by using cruise stalk and "page –", or turning vehicle off. "AUX on" or "AUX off" will display in EVIC screen.

*In LineLock, Burnout, and Launch modes, if you cancel by letting go of the stalk, you need to wait approx 5-10 seconds for the ABS system to reset before trying again, or the mode may release prematurely. Experimental on 2011+ Challengers (may not work 100%). Clear CELs and Auxiliary output not currently available on 2011+ Challengers.

Table 1: Wiring

TranZformer pin	Signal	Wire color to use	Connects to…	Vehicle wire color
1	Ground	Black	TCM pin 30	Black, with Orange or tan stripe
2	Power	Red	TCM pin 38	Yellow
3	Line Pressure Solenoid	Yellow	TCM pin 36	Yellow/Tan stripe
4	Shift Solenoid	Brown	TCM pin 37	Yellow/Brown stripe
5	Nc			
6	Auxiliary Output		External relay	
7	CAN-C (-)	Blue	TCM pin L2	White/Light Blue
8	CAN-C (+)	Green	TCM pin H1	White/Light Green or black stripe
9	CAN-B (-)	White	Gauge Cluster or Steering column harness	White
10	CAN-B (+)	Orange	Gauge Cluster or Steering column harness	White/orange stripe

Troubleshooting Guide:

Symptom	Likely Cause	Action
Unit dead – no LED flashing on power up, no LED after 5 second initialization	Power not connected or ignition not on.	Check power wires – pins 1 and 2 of TranZformer to TCM pin 30 and 38.
Not feeling shift firmness increase, or shifts "flare"	Bad connection to one or both solenoids	Check wires to solenoids – Pins 3 and 4 of tranZformer to pins 36 and 37 on TCM. Having one wire disconnected can cause shift flare or sloppy shifts.
Unit dead after initialization (after 5 second power-up)	Bad CAN connection – both busses	If CAN-B AND CAN-C are not seen, unit goes to "sleep" Check CAN wiring.
No "beep" confirmation of TranZformer on/off and does not return radio volume during steering wheel shifting. EVIC messages will not display.	One CAN-B wire disconnected	If one of the two CAN-B wires is not connected, the TranZformer will be able to listen to CAN-B but not be able to send CAN-B messages. These messages control the "beep" chimes, setting radio volume, and displaying EVIC messages.
No increase in shift firmness, No Burnout mode, Launch Mode, Steering Wheel Shifting, Autoupshift	Bad CAN-C connection – both wires	If CAN-C is not seen, most functions of the TranZformer will not work, except for turning TranZformer on and off, and setting EVIC screen menus.
No Burnout Mode, Launch Mode, Steering Wheel Shifting, Autoupshift. Shift pressure increase works.	One CAN-C wire disconnected	If both CAN-C wires are disconnected, these functions will not operate and shifts will revert to stock. If one wire is disconnected, shifts firmness function will work, but these functions will not. Check both CAN-C connections.
No EVIC message displays	Vehicle configuration or incorrect mode	In order to see any EVIC messages that the TranZformer sends out EVIC needs to be in a radio display mode. Press the music or north button to get to radio EVIC mode.

Please be sure to check your wiring for correct pinout, loose or shorted connections, overstripped wires, etc. Z Automotive cannot be held responsible for incorrect wiring, misuse or poor installation. If you are in doubt, email techsupport@zautotech.com. **Please be aware that modifying your vehicle in any way can affect your vehicle's warranty, longevity, handling, etc. Please use caution when driving with the shift kit enabled in inclement weather. The firm shifts and especially aggressive kickdowns can cause wheelspin at highway speeds and cause you to lose control. Please use with caution, and AT YOUR OWN RISK.**