

# TORQUE RUSH PERFORMANCE

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## **D2A** TPS Signal Converter(Analog or SENT protocol)

### Terms of Use and Sale

Our products are intended for off road use only. Torque Rush Performance Inc. assumes no responsibility for vehicle damage, personal injury, breach of law or any expenses resultant from vehicle modification or use of these products. Any modifications from the original design of a vehicle are done at the user's own risk. Purchase or installation of any of these products constitutes acceptance of these terms by the purchaser or user.

### USES

1. In D to A mode the **D2A** can be used to decode a digital SENT protocol throttle position sensor signal and convert it to the corresponding dual 0-5V analog signals. The signals can be re-scaled and/or inverted as needed.
2. In A to D mode **D2A** can be used to convert a pair of analog throttle position sensor signals to a digital signal. The signals can be re-scaled and/or inverted as needed.
3. In A to A mode the **D2A** can be used to change the ranges and/or directions of analog TPS signals.

### Installation

The **D2A** should be mounted where it will not be exposed to high temperatures.

### wiring connections:

#### V1 Units: (no red wire)

Grey(Pink on some units) -- 5V from throttle position sensor wiring

Black – ground/low ref from throttle position sensor wiring

Blue – digital signal(J2716 SENT) from throttle position sensor

White – digital TPS signal out

Green – TPS1 0-5V output signal

Purple – TPS2 0-5V output signal

Orange and Yellow wires – analog inputs for A to D and A to A modes

## V2 Units: (one red wire)

Pink -- 5V out to throttle body

Black – ground/low ref from throttle position sensor wiring of ECU/TAC Module

\* Light Green – digital(J2716 SENT) signal from throttle position sensor

\* White – digital TPS signal out

Dark Green – TPS1 0-5V output signal

Purple – TPS2 0-5V output signal

Orange and Yellow wires – analog inputs from throttle body for A to D and A to A modes

Red – 5-12V supply. **\*must be constant fused(2 amp) 12V for 1999-2007 GM full size V8 trucks and LS1/LS6 cars.** Switched(key-on) fused 12V for other vehicles where the 5V reference of the OE throttle control system is not adequate to power external devices.

Blue – 5V sense - connects to 5V reference from ECU/TAC Module for systems using a constant 12V supply. (must be Blue/Black wire for 2003-2007 GM trucks and Holden LS1 cars)

\* These 2 wires may be folded back inside the wire loom. If using the D2A for a digital TPS application, the required wire may be swapped in the connector housing with one of the other wires that is not being used.

## Mode

A to A is used if you simply want to re-scale an analog signal

D to A is used to convert the digital(SENT) signal from newer GM throttle bodies to the corresponding analog signals.

A to D converts the 2 signals from an analog output throttle body to digital (SENT) signal compatible with newer GM ECUs.

Scaling can be applied to all modes.

The D2A should be re-booted after changes to the mode. Remove, then reconnect power from the device (including USB power).

## Scaling the Outputs

The output signals can be re-scaled to simulate those of any 0-5V TPS signal throttle body. The signals can be scaled to move in the same or opposite directions. Each signal can have its own maximum, minimum and slope.

Method 1 - using the preset values if applicable to the application:

1. With the unit and vehicle powered up, key on/engine off, connect the USB cable between the **D2A** and your PC with the **D2A** app running on it.
2. Under “Emulation Type” select the vehicle in which the **D2A** has been installed.
3. If available under “New TB Type,” select the new throttle body type you are using.
4. Click “Enable” to program the values into the device.

Method 2(most accurate) – recording the actual output ranges of the throttle bodies:

5. With the unit and vehicle powered up, key on/engine off, connect the USB cable between the **D2A** and your PC with the **D2A** app running on it.
6. Disable all scaling by clicking the “Disable” button.
7. Use the logging feature to record the peak and minimum values for the digital throttle or analog throttle body by moving the blade by hand to full closed and full open. (Push it in both directions from where the springs hold it). Stop recording.
8. Under “Scale Output Ranges” set the maximum and minimum sensor output values for the throttle body you wish to emulate. Typical values for some known applications are available from the “Emulation Type” drop down list. Otherwise, these should have been obtained in a similar manner as used for the new throttle body in step 3, by moving the blade of the original throttle body by hand to full closed and full open. These values cannot be obtained by using the pedal to actuate the throttle body.
9. Click the “Enable” button to apply the new settings.
10. If applicable, check the appropriate check box to program the vehicle type.
11. Remove the USB cable and de-power, then re-power, the device to allow it to re-boot. You can simply unplug it if it is powered by constant 12V.

### **Swap Analog Inputs**

When using the preset values from the drop down list for new throttle body types, depending on your input wiring, you may need to swap the ranges that were populated for TPS1 and TPS2 if that throttle body type does not have identical ranges for both sensors. The “Swap” button will swap the TPS1 values with the TPS2 values each time you click on it. This feature is not used when manually recording the ranges from the new throttle body.

### **LED Status Indicator**

When the device is running, the LED will be flashing at a rapid rate. The LED should not be flashing when the ignition is off.

Blink fault codes;

1 single blink = loss of input signal

2 single blinks = digital throttle body reports a fault condition

3 single blinks = digital throttle body reports a fault with one of the 2 sensors

Double blinks = hardware/processor faults

\*If in an error state, for example by changing the Mode to something that does not match the inputs, correct the source of the error then de-power, then re-power the device to reboot it. This includes removing USB power.

### **Firmware Updates**

If available, firmware updates may be installed to the **D2A** by the following procedure.

1. Download and save the latest firmware file from <http://torquerush.com/downloads.html>
2. Click the “Firmware Update” tab in the **D2A** PC software.

3. Disconnect the **D2A** from vehicle power. Remove the cover screws and cover from the **D2A** enclosure and connect it to your computer using an appropriate type A to B USB cable.
4. Browse to and select the appropriate TRPD2A\_V1.trp or TRPD2A\_V2.trp firmware file.
5. Click “Update Module Firmware”.

## Logging

The TPS signals can be data-logged using our **D2A** software.

Remove the cover from the **D2A** box.

Power up the **D2A** by switching on the vehicle ignition.

Connect the USB cable between the **D2A** and you PC.

Select either “Live Data” or “Record”. Selecting record will allow you to save the log file.

You can pause playback and use the cursor to view TPS values at any point in the chart.

## PC Serial Port Settings

Communication between your PC and the **D2A** may be improved by increasing the bit rate for the port assigned to the **D2A** to a value of 115200 in the Windows Device Manager for units built after May 1, 2020. Use 38400 for older units.

