

CAN Translator Guide

ThunderStruck Motors - v3.0 November 2020

Overview

Introduction

The TSM Canbus Translator system consists of four main parts: the controller or other source sending canbus information, the Canbus Translator with OBD2 connector, the OBD2 Bluetooth transmitter, and the display device or tablet. The ThunderStruck CAN Translator kit consists of the pre-programmed translator and a harness connecting to the OBD2 connector, depending on the requested system. A USB to serial cable is needed if configuration changes are desired.

The Translator receives canbus messages from a source and converts them to OBD2 format. Messages are then sent to a Bluetooth transmitter, which converts them for the display device. The Translator is typically used in conjunction with the Torque Pro App, but will also work with similar apps or using a direct canbus connection. The Translator sends messages Torque interprets as a vehicle system. The Translator can also send messages back to the source if needed, and is able to control a set of OEM DCDC converters. The Torque Pro app will be discussed here since it is most common.

Overall Procedure

The user purchases the Bluetooth transmitter and connects the Translator to power and the canbus source. The configuration file for the specific source is downloaded from our website and then transferred to the directory holding custom PID information. The app is configured manually by importing data from the configuration file and then building each display (gauge) needed and assigning each display to one of the custom PID entries from the downloaded file.

Configuration Options

Sevcon OS only: TSM must configure the Sevcon controller to work with the Translator
Translator: pre-configured for the controller/source by TSM, configuration file available for import
Display configuration: see our Instrumentation/CAN Translator page for CSV import files
DCDC Converter options: Chevy Volt, Delphi

Source Options	TSM Must Configure Source
Sevcon Motor Controller	Yes
Nissan Leaf Motor Controller	No
Curtis Motor Controller	No

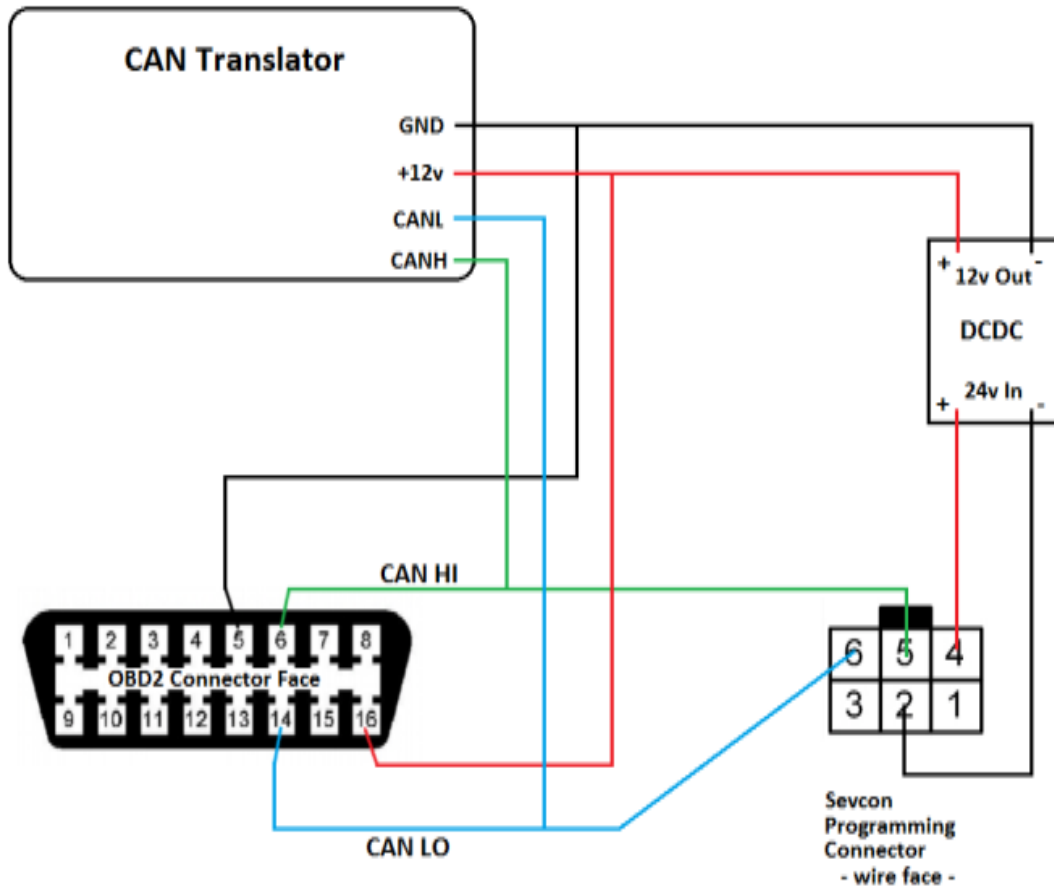
Display Options	Software	Transmitter Options
Android Phone, Tablet	Torque Pro (Google Play)	torque-bhp.com/wiki/Bluetooth_Adapters
iPhone, iPad (OS10+)	OBD Fusion (iOS app store)	www.obdsoftware.net/software/obdfusion
Other/Direct CAN	call TSM	email TSM

Wiring Instructions

Sevcon Controller

Your Sevcon controller must be configured by TSM to send canbus data to the Translator. The wiring harness provided with the Translator plugs into the controller "Programming" connector and an OBD2 Bluetooth transmitter selected from the display options listed above.

Once connections are made and the controller is powered ON, the tablet/phone app will have access to the custom PID data created by the Translator. See the diagram below for wiring details.



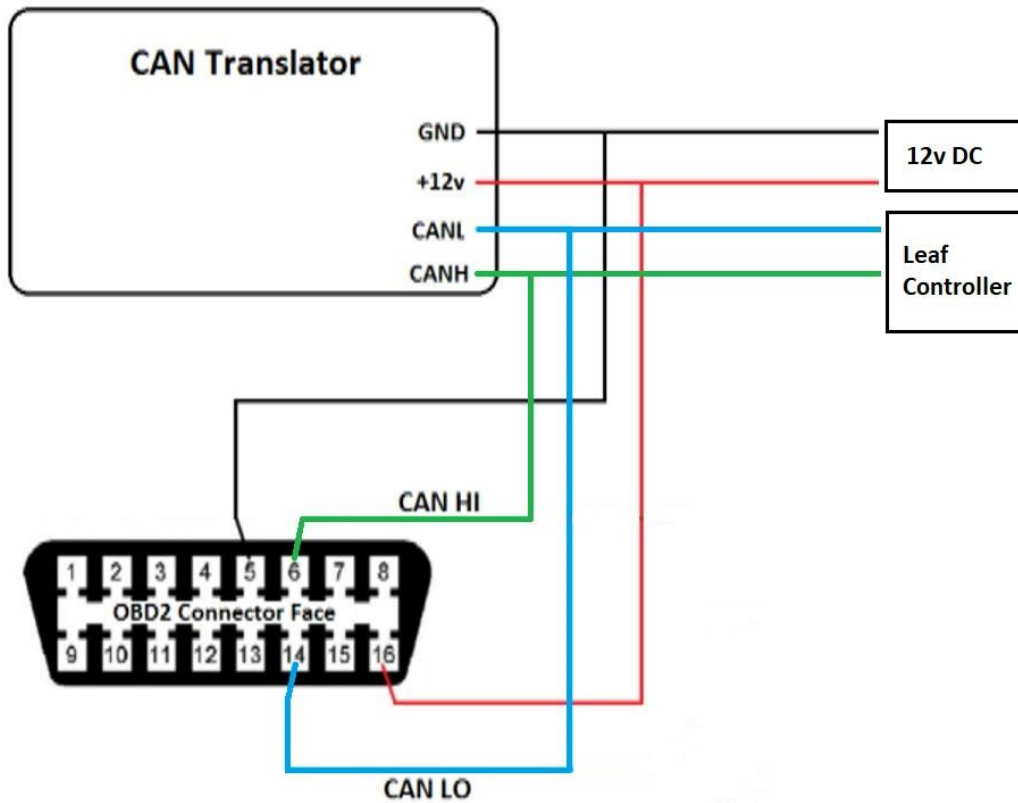
Wiring Instructions

Nissan Leaf Controller

The wiring harness provided for the Translator plugs into an OBD2 Bluetooth transmitter selected from the display options listed above.

Canbus HI and LO wires are connected to the VCU to controller canbus. 12v DC power is provided by the vehicle keyswitch bus.

Once connections are made and the controller is powered ON, the tablet/phone app will have access to the custom PID data created by the Translator. See the diagram below for wiring details.



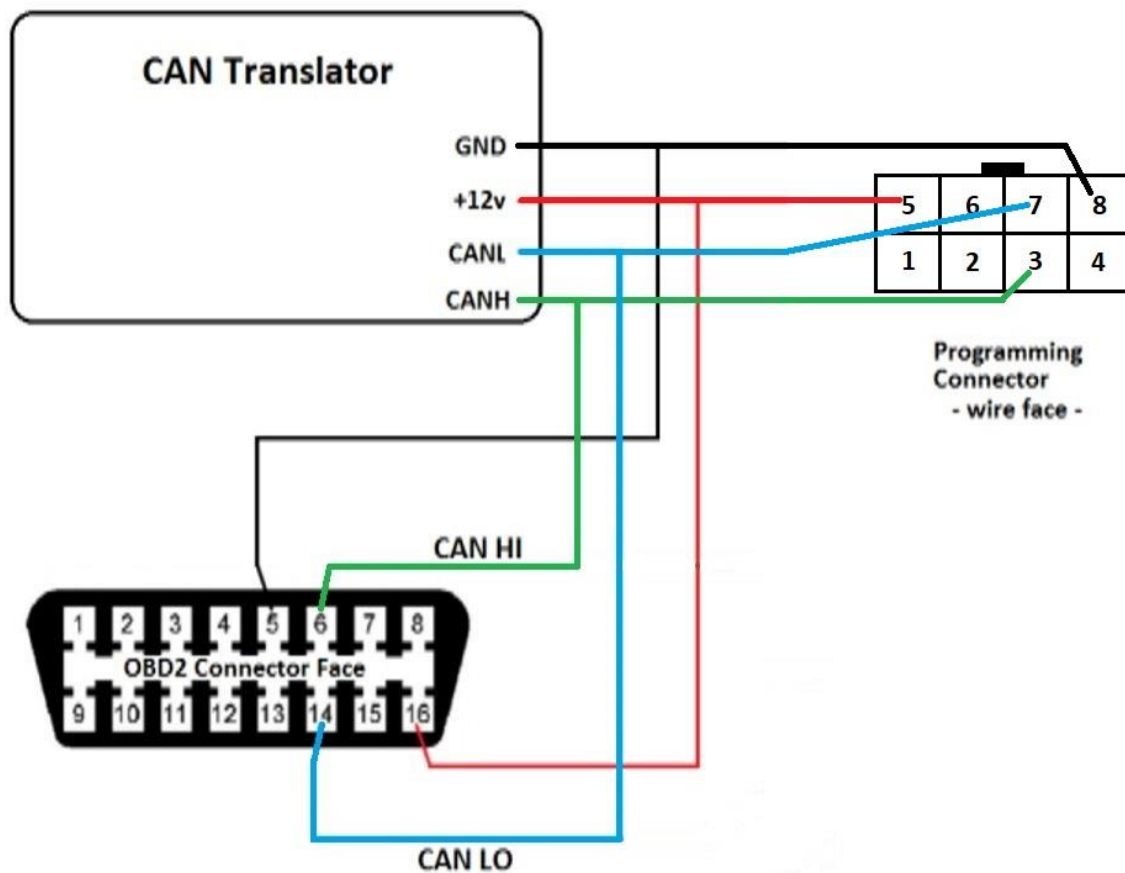
Wiring Instructions

Curtis Controller

The wiring harness provided for the Translator plugs into the Curtis controller “Programming” connector and an OBD2 Bluetooth transmitter selected from the display options listed above.

Curtis controllers sold prior to November 2020 may not include canbus wires at the 8 pin connector (below), and must be added for the Translator to function (contact ThunderStruck Motors for assistance).

Once connections are made and the controller is powered ON, the tablet/phone app will have access to the custom PID data created by the Translator. See the diagram below for wiring details.



Display Configuration

Torque Pro Setup

We find that "Torque Pro" installed on an Android tablet (or phone) provides the largest set of useful display features. This app receives Bluetooth signals containing instrumentation data ready to be assigned to various gauges (called displays) you will create in the app.

We provide a data file which is downloaded onto the tablet. When imported into Torque Pro, it prepares a "custom PID" (with labels and equations) for each display option. This will help you get to the point where you are actually building your "displays" or gauges on the tablet screen.

After installing, take the following steps to upload the data file into Torque Pro. These steps are based on an Android tablet at ThunderStruck (other devices similar).

1. Connect via USB to your tablet using a Windows computer. Download a file to that computer from our website after navigating to the following location:
2. Instrumentation/Can Translator for Sevcon/Curtis/Leaf
3. Look for a link on that page entitled: [your controller name] "Torque App Config File"
4. Download the [your controller name]-PID.csv data file.
5. Transfer the file to your tablet under the following directory on the display: Internal shared storage\.torque\extendedpids\
6. If the file does not end up in that directory, use the tablet's file manager to move it. Touch and hold on the file name until a move/copy option appears.
7. Open Torque Pro on your tablet, click on the "gear" icon in the lower left and select "settings."
8. Select the option "Manage extra PIDs/Sensors."
9. In the upper right-hand corner of that list you will see some dots suggesting a menu list - touch on that, and then select the option "add predefined set."
10. You will see the file name you transferred in the list. Select that, and complete the process.
11. Now, in your "Manage extra PIDs/Sensors" list, you will see some new values.

Next, you will assign the new "PIDs/Sensors" to displays you create in Torque Pro.

1. Start up the Torque Pro app and select the "Realtime Information" option in the first screen.
2. Touch and hold in a blank space, then select "Add display." Select one of the listed display types.
3. Review the long list of PID options, and locate the ones identified by the controller type from your project.
4. From the option list, select the custom PID associated with the display/gauge you are creating.
5. Perform this one at a time for the desired display/gauges.
6. Displays can be edited by touch/holding on any display/gauge until an option list shows – select "Display Configuration" to edit or test.
7. It is also possible to add displays based on the internal 12v supply voltage and GPS information in your tablet.

Other OBD2 display apps will have similar configuration procedures. OBD Fusion is available for iOS devices, and accepts imports and has display types similar to Torque Pro, however it does not support status buttons used for showing "forward" and "reverse" motor directions.

User Interface (for advanced users)

A user interface is available for making any needed changes to the system. This requires a specific USB to serial cable and a terminal application like Putty or Coolterm. See the ThunderStruck-ev.com Serial Port Utilities doc link at the bottom of this document for installation instructions. The serial cable is an option for purchase on the CAN Translator page.

Learning the Commands

Note that commands are shown with shortcuts in upper case for reference, but the user interface is not case sensitive.

HELP – lists user interface commands

SEt – lists specific command details for making configuration settings

Setting and Deleting “Rules”

Can Open Rules (COR) are records providing receive and send data in byte form to be used by the Translator. The following is a SEt command definition and an example of adding a COR to the system.

SEt COR <n> <inSID> <outSID> <PID> <d1>

- <n> - label for each rule, 1 to 10
- <inSID> - CANID of CanOpen message
- <outSID> - CANID of OBD2 message
- <PID> - process ID, standard if pre-configured in the output device, custom if not
- <d1> - data options "b0" to "b7" listed in order, separated by spaces.

Example (note that command values are separated by spaces):

```
set cor 1 271 7e8 9 b3 b4
```

Transmit Rules (TXR) are records sent to the source equipment as needed by the system, for instance during startup or to request desired information. The following is a TXR command definition and an example of adding a TXR to the system. An example of deleting COR and TXR entries is also included.

SEt TXR <n> <ms> <eid/sid> [<d1>[<d2>[<d3>[<d4>[<d5> [<d6>[<d7>[<d8>]]]]]]]]]

- <n> - rule number
- <ms> - repeat timer in milliseconds
- <eid/sid> - CAN EID or SID in hex
- <d1..dn> - 0 to 8 data bytes, in hex

Example:

```
set txr 1 250 1dd4512 23 01 00 00 00
```

```
set cor [txr] 1 none – (“none” is used to delete the referenced COR or TXR entry)
```

Setting Baud Rate

The Translator operates at various baud rates (kilobits per second) as required by the data source. Available settings are 125, 250 and 500 kb. The following command sets the baud rate to 500 kb.

```
set canbr 500
```

SHow and TRace Commands

SHow [<>|Version|Config] – displays system version or configuration. “Show” alone displays status. The following is a show configuration example for the Sevcon controller.

```
CANapp> sh c
canbr   : 500kbps
tx rules : none defined
co rules : iSID  oSID  PID  data
          1 : 0454 07e8 dd05 b1 b2
          2 : 0271 07e8 dd02 b2
          3 : 0411 07e8 dd04 b6
          4 : 0271 07e8 dd01 b0 b1
          5 : 0271 07e8 dd03 b3 b4
          6 : 0454 07e8 dd06 b0:02
          7 : 0454 07e8 dd07 b0:01
```

TRace [CANbus|OFF] – reports continuous canbus data - enter “tr off” to stop. This report is useful for verifying connection and troubleshooting.

Configuration Export/Import

The Translator can export a text record of the configuration settings required for import into a second Translator. This simplifies programming multiple devices and facilitates remote customer support.

From within the user interface, enter the command “dumpdb” and a list of hexadecimal values will display, appearing as an extended version of the following:

```
:020000040200f8
:100000000000ffffffff04ff00ff8700ffff6f
: ...
(many additional lines of data)
: ...
:1002a00007dde8070005046207dd0000000000002c
:00000001ff
```

Copy the entire string by selecting and copying all the rows, starting at the first colon (:) before the first short row and ending at the final character of the last short row. The clipboard can then be saved in a text document (not a word processor file) for use at a later time, or can be used immediately in another Translator user interface.

To import, power up the Translator device, click into the user interface and hit Enter to show the CANapp> prompt. With the configuration data already in the computer clipboard, hover over the interface window and right click (Ctrl click for Mac) to paste the contents into the window.

Use the enter key to show the CANapp> prompt, then type “show config” to verify the import.

Configuring DCDC converters

The Translator has been programmed to send control messages over canbus to the Chevy Volt and Coda Delphi DCDC converters. The following commands are used to enable and set the regulated output voltage for these devices.

DDTYPE - DCDC converter type

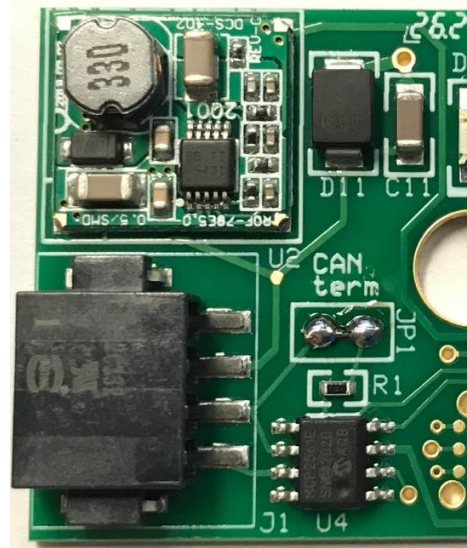
set ddtype [none|volt|delphi]

DDVOLTAGE- DCDC converter voltage

set ddvoltage <v> - enter volts and tenths (e.g., 13.4)

Canbus Termination Resistor

Many canbus networks using the Translator function well without adding terminating resistors. In these cases, no action is needed. However, it is possible to add a termination to resolve communication issues by joining two jumper pads on the Translator circuit board. See the jumper at “CAN term” on the board to the right. A thin strand of copper wire has been soldered in place.



System Upgrades

ThunderStruck Motors may periodically provide firmware upgrades for our Dilithium Designs devices. The Translator can be upgraded if needed by the user following the steps outlined in the Serial Port Utilities document at the following web address.

http://www.thunderstruck-ev.com/images/companies/1/DD_SerialPortUtilities_v1.2.pdf