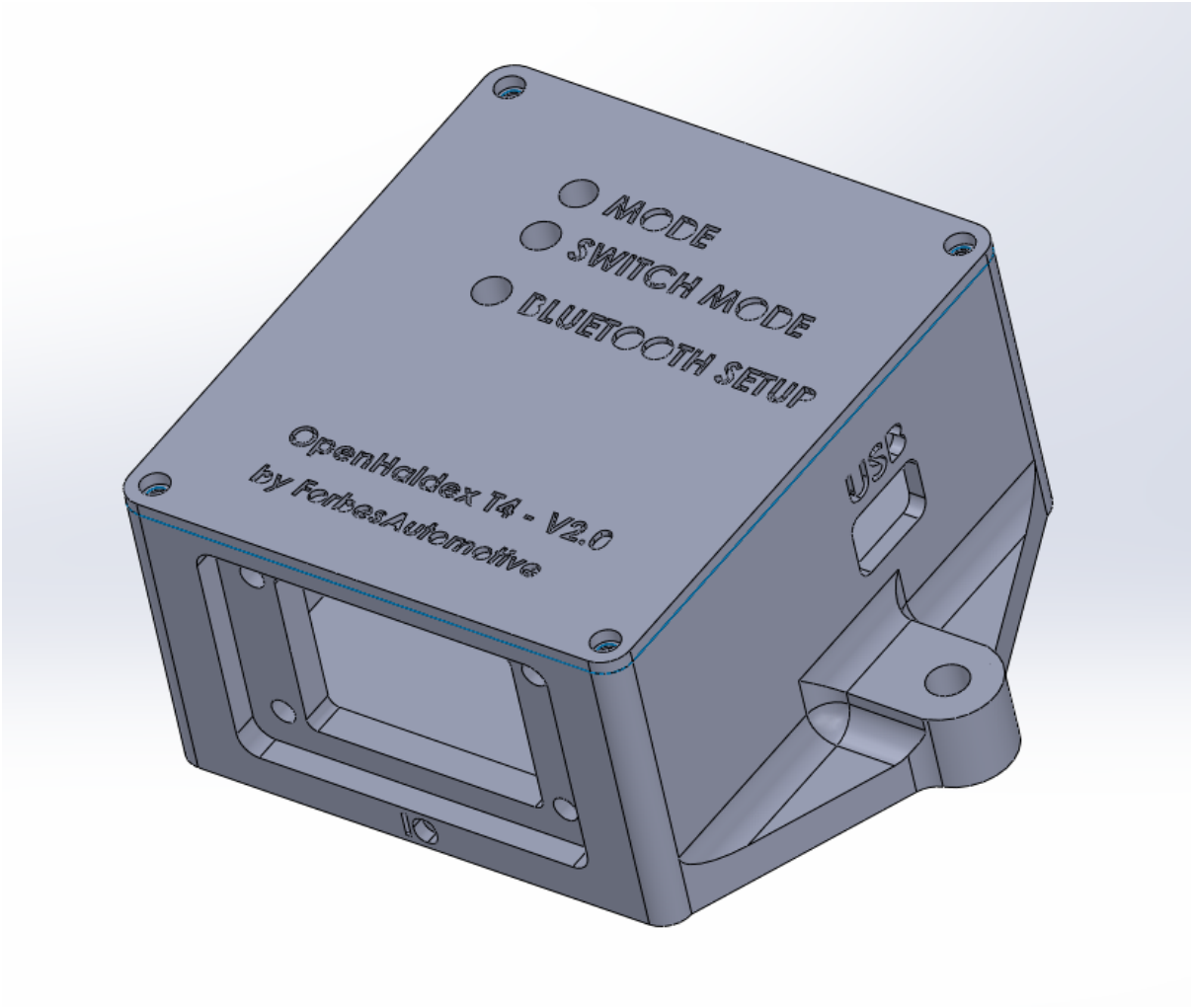
Gen1 OpenHaldex Installation Guide – V2

Forbes Automotive



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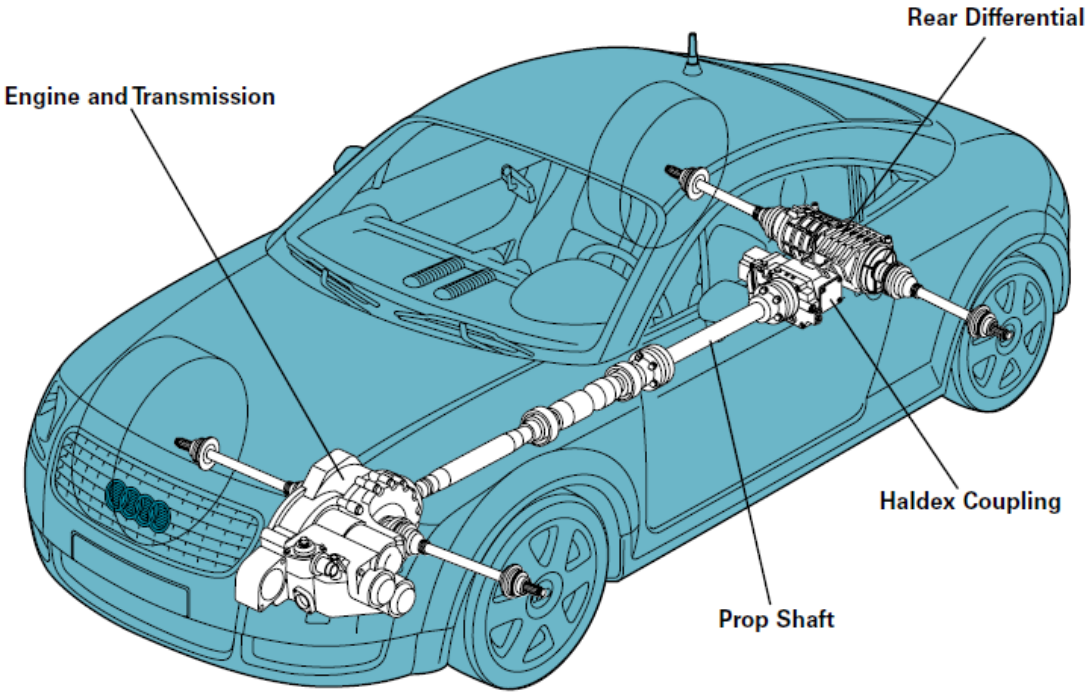
Product Overview

Thank you for purchasing the Gen1 OpenHaldex T4 Controller by Forbes Automotive!

On 4motion cars, the Haldex system waits until it detects 'slip' from the front wheels at which point it engages the clutch-pack within the Haldex unit to drive the rear wheels. On high performance cars, it may be advantageous to force specific modes to suit the driving style required at the time.



The OpenHaldex T4 controller is based on a Teensy 4.0 microcontroller and will be positioned between the ECU and the existing Gen1 Haldex module. It is Bluetooth enabled and can be controlled with push buttons on the device, an application on Android based phones as well as a remote Bluetooth screen (*optional).

Note that this product **only** works on Gen1 Haldex modules!

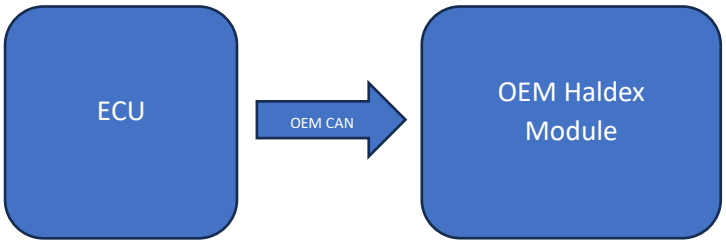
The OpenHaldex module takes the existing CAN-BUS signals coming from the ECU to the OEM Haldex module and adjusts them to suit the required mode.

There is a standalone mode which means that the OpenHaldex module can be used on conversions or cars without working CAN-BUS. This will mimic OEM CAN-BUS signals to the Haldex pump to allow it to operate as if there was an original ECU in place.

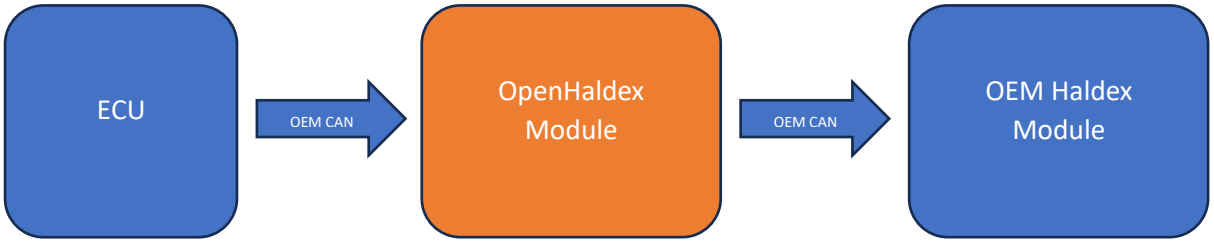
The modes available for use are:

- Stock (*if provided with OEM CAN signals)
- FWD
- 5050
- Custom (*if provided with OEM CAN signals)

Existing Setup



New Setup



Wiring Installation

To connect the OpenHaldex to the CAN network, 4 wires should be located in the existing harness. These wires will be found leading to the OEM Haldex unit, typically running down the side of the vehicle towards the rear.

In a MK4 Golf, for example, they run parallel with the passenger side (UK) floor into the boot space via. the rear passenger light cluster. Due to the age, there no other CAN-BUS cables in the rear of the car so they should be easy to locate. On the MK4 platform, access is made easier by removing the rear light cluster. Individual models may vary.

Look for a 'lightly' twisted pair of cables with an Orange (no stripe) and Orange/Black Stripe. Typical access points are:

- Under the scuttle panel in the wiring box underneath the wipers
- In the rear boot on the passenger side
- On the rear floor pan before it leaves externally to connect to the differential

Wiring the new module in is easy! Find these four wires grouped together:

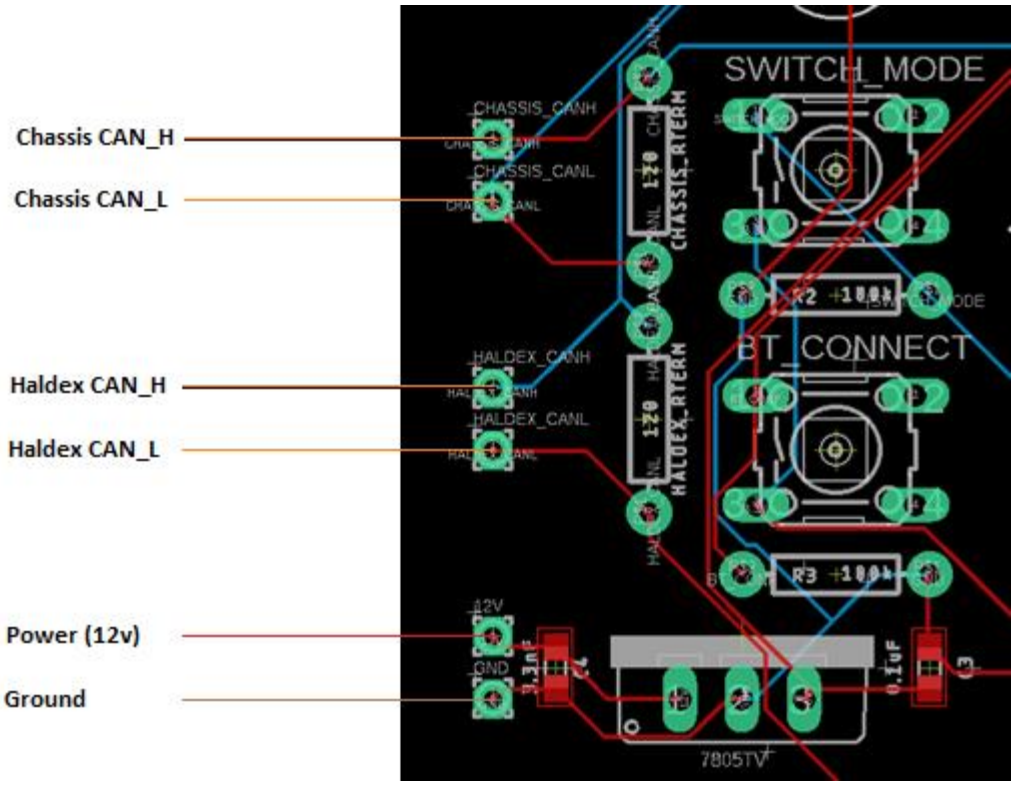
- CAN BUS (near the OEM Haldex Unit)
  - CAN High (Orange/Black stripe)
  - CAN Low (Orange)
- 12v Ignition (Red)
- Ground (Brown)

Once the CAN High/Low have been located, they should be cut, extended and marked 'Chassis' and 'Haldex' where:

'Chassis' is the CAN_H/CAN_L **from** the car.
'Haldex' is the CAN_H/CAN_L **to** the Haldex.

12v & Ground should be terminated to the two pins marked '12v' and 'GND' respectfully.

Internally, these connect to the following pins on the PCB:



The PCB will be terminated with 2 pin headers (or a 2x and a 4x on new boards) at each location with tails leading to the one Deusche connectors internally.

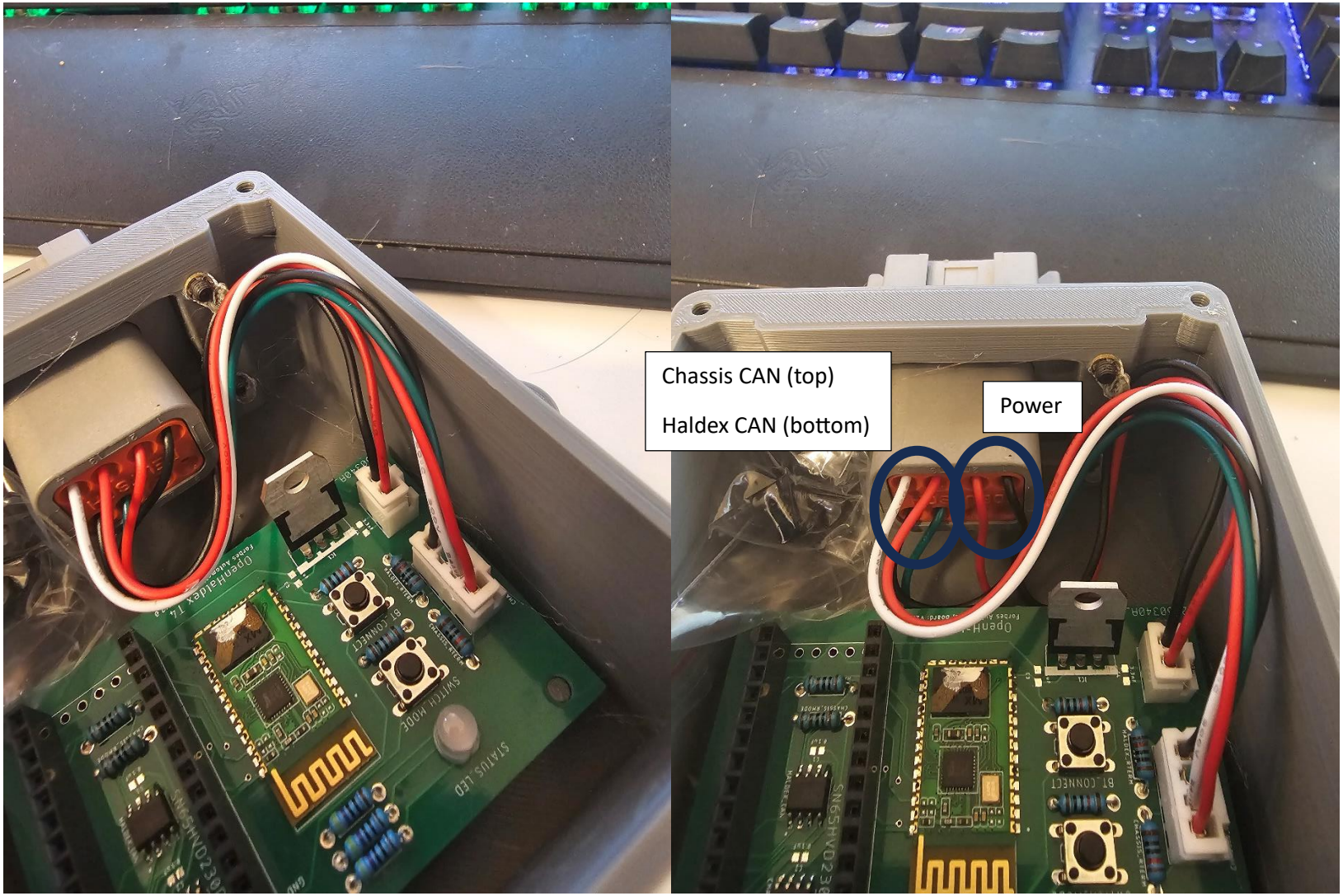
The same pinout can be used at the Deusche connectors to match the OEM Haldex wiring, where:

Chassis Connector

Pin 1: Ground
Pin 2: Power
Pin 3: Chassis CAN_H
Pin 4: Chassis CAN_L
Pin 5:
Pin 6:
Pin 7: Haldex CAN_H
Pin 8: Haldex CAN_L

The main connector counterparts should match up pin-wise to the internal pins, so that they connect.

Basic Pictures



Optional OEM Plug & Play Harness

An optional Plug & Play harness is available. This allows the utilisation of the OEM plugs which means the module can be removed at any time!

- Unplug the OEM 8 pin connector on the back of the Haldex differential
- Feed the cable back into the boot and to the location of the new module
- Install the Plug & Play harness into the module; connecting the plugs to the socket on the module
- Route the extended tail following the OEM route back to the Haldex and connect to the differential
- Turn the ignition on! The installation is complete!

Initial Setup

The modules will be uploaded with the most recent firmware version at time of sale and will be 'pre-programmed' with the correct Bluetooth data.

Once the module is powered up, the current mode should be lit as per the LED on the face plate:

- Red: Stock
- Green: FWD
- Blue: 5050
- Purple: Custom

You should be able to see it in the Bluetooth list on any mobile device (OpenHaldex T4). If for some reason it is not available, press the '**Bluetooth Setup'** button once on the module when it is powered on. This should only need to be carried out once.

The red LED should blink to show that it is calibrating the Bluetooth data. Once it stops blinking and shows a solid colour, it should be visible on mobile devices.

Pairing Bluetooth

It is advisable to use the Android application to automatically pair with the module.

Download and install the 'OpenHaldex T4' application and select 'Connect'. After a short while, the module should list as connected and display the current mode.

Choosing different modes on the phone should change the colour of the LED respective of the selected mode.

Basic Operation

Using Buttons

Once the module is powered up; it will boot into the last used mode. Note that if the module is connected to a Bluetooth device (either a phone or screen), the buttons on the module are no longer available. If they are attempted to be used, the LED will blink white to show this. Disconnect any Bluetooth devices if you wish to use the buttons.

The button 'Switch Mode' can be used to toggle through the various modes. The modes are:

- Red: Stock
- Green: FWD
- Blue: 5050
- Purple: Custom

Using Bluetooth App

The OpenHaldex T4 application may be better placed to modify the current mode 'on the fly'. Once connected, parameters (including current mode) are displayed on the mobile device.

Switching to Standalone

On setups where there are no CAN-BUS signals available, for example in conversions or non-standard ECUs, it may be beneficial to operate the unit as a 'standalone'. This will enable to unit to create false CAN data to mimic the presence of an OEM ECU & ABS unit and control the Haldex.

Only two modes are available in this style: FWD & 5050.

To set the unit into Standalone mode; it should be powered on. Press and hold both 'Bluetooth Setup' **AND** 'Switch Mode' for 3 seconds (or until the LED blinks).

The LED will blink 5x times before going into Standalone mode. The mode can be reversed at any time by following the same procedure.

Remote Screen Installation

The screens come pre-built and programmed to the module they are purchased with, so there should be no requirement to carry out any work.

The two wires are already connected internally and they should simply be connected to 12v – where the red wire is 12v and the black wire is ground.

Typically, this is onto an ignition live source, so that the display comes on with the car.

Remote Screen Setup

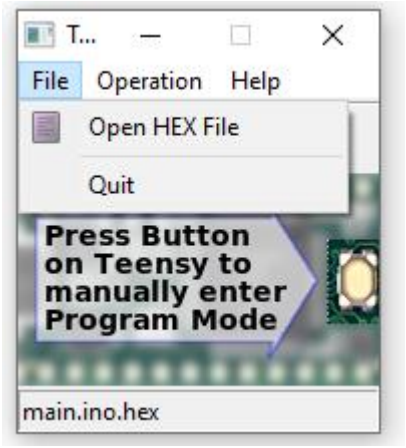
No setup should be required – the modules will automatically be paired with the OpenHaldex module it is shipped with. If some for reason it does not connect, the Options menu should be used and 'Paired' checked. If it is not paired, a click on the 'Paired' option will begin the pairing process. Allow this to complete and check again.

Remote Screen Operation

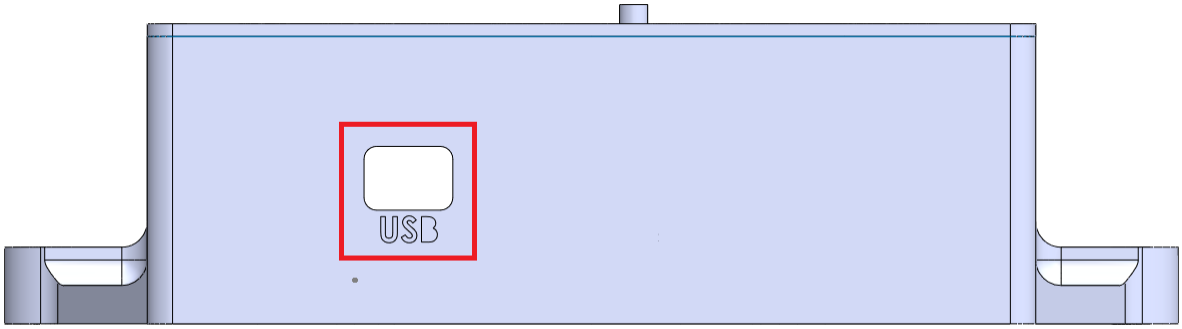
Once the boot screen has loaded, the screen will have automatically paired to the OpenHaldex module and the modes can be changed using the

Updating Software

Periodic firmware updates are available for download and can be uploaded to the OpenHaldex module with ease.

- Go to: https://github.com/adamforbes92/OpenHaldex-T4/tree/main
- Choose the most recent software version
- Download and save locally
- Open the 'Teensy' application
  - 

- Click 'File' and select 'Open Hex File'
- Browse to the new firmware version
- Plug in the OpenHaldex module to the computer using a Micro USB cable into the rear of the module



- *It may be necessary to remove the lid of the OpenHaldex module with the 4x M3 screws on the top, and press the 'programming' button on the Teensy*
- The module should update with the software version

Disclaimer

DISCLAIMER:

Forbes Automotive is not responsible for any damage or loss that may occur to your vehicle or its contents during or after the installation of the OpenHaldex T4 Module. By agreeing to use our product, you acknowledge that you have read and understand this disclaimer and agree to release Forbes Automotive from any liability for damages or losses.

LIMITATION OF LIABILITY:

In no event shall **Forbes Automotive** be liable for any direct, indirect, incidental, consequential, special, or punitive damages arising out of or in connection with the installation of the OpenHaldex T4 module, whether in contract, tort, strict liability, or any other legal theory.

This product is to be used in off-road applications only.

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