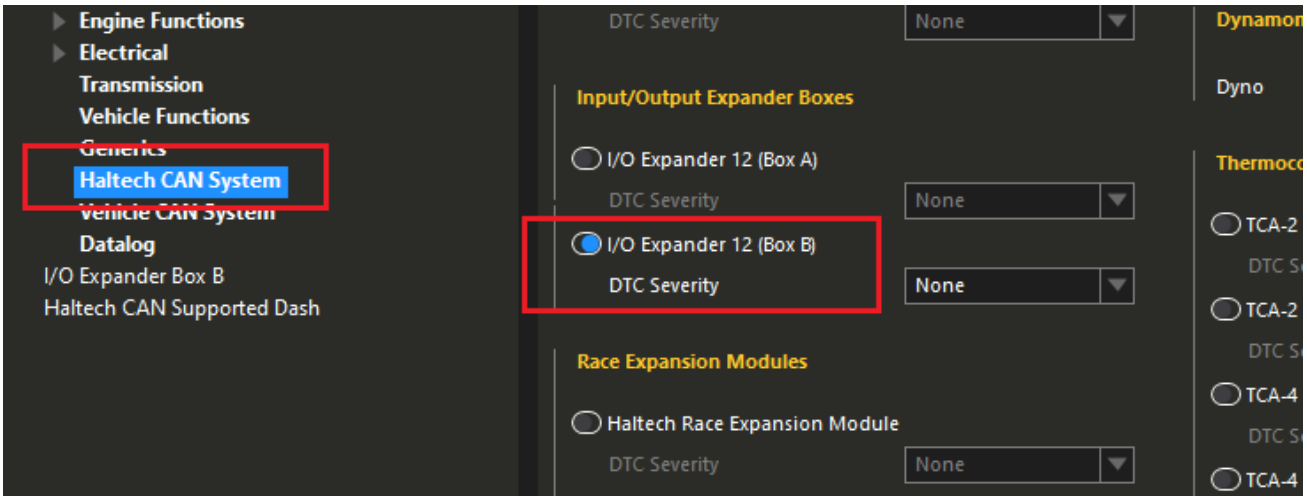
CANTCU - Haltech integration v1.0

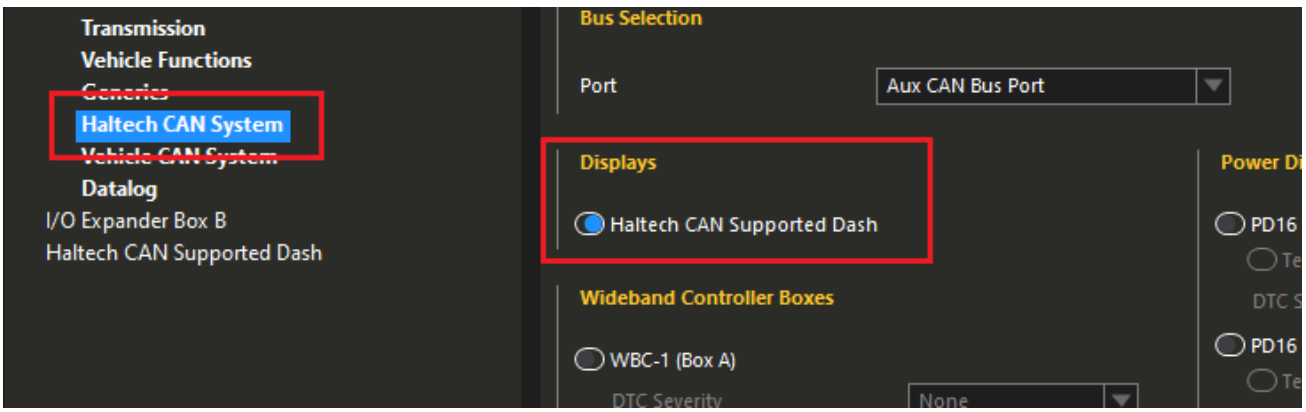
- Integrates as **I/O Expander Box B**
- Extra values integrated as **I/O Expander Box A**
- Reads data from the **Haltech CAN Stream**

Haltech Configuration:

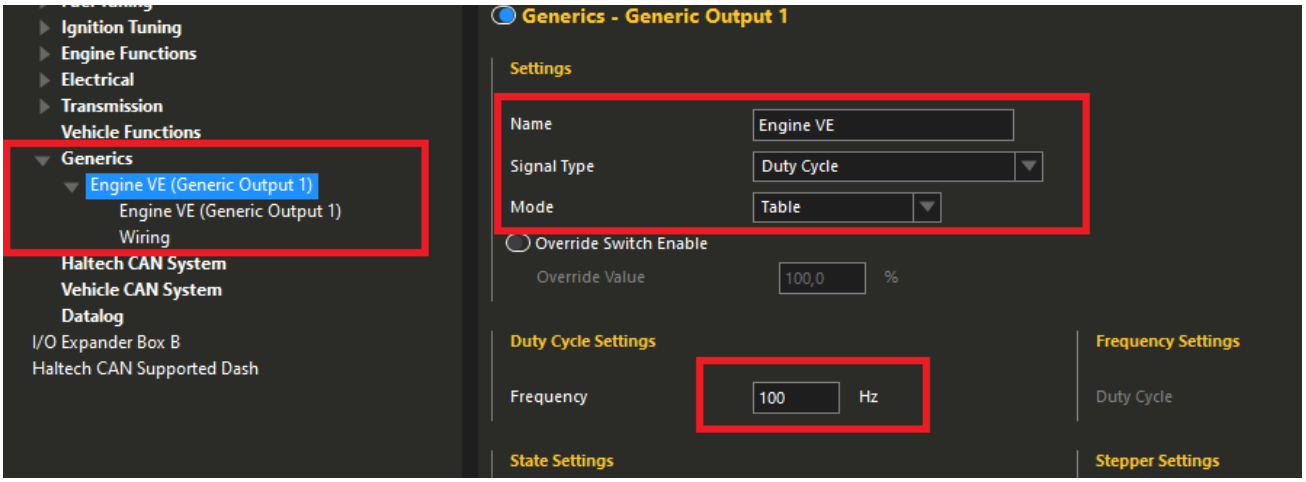
Under Haltech CAN System, **I/O Expander 12 (Box B)** needs to be activated.

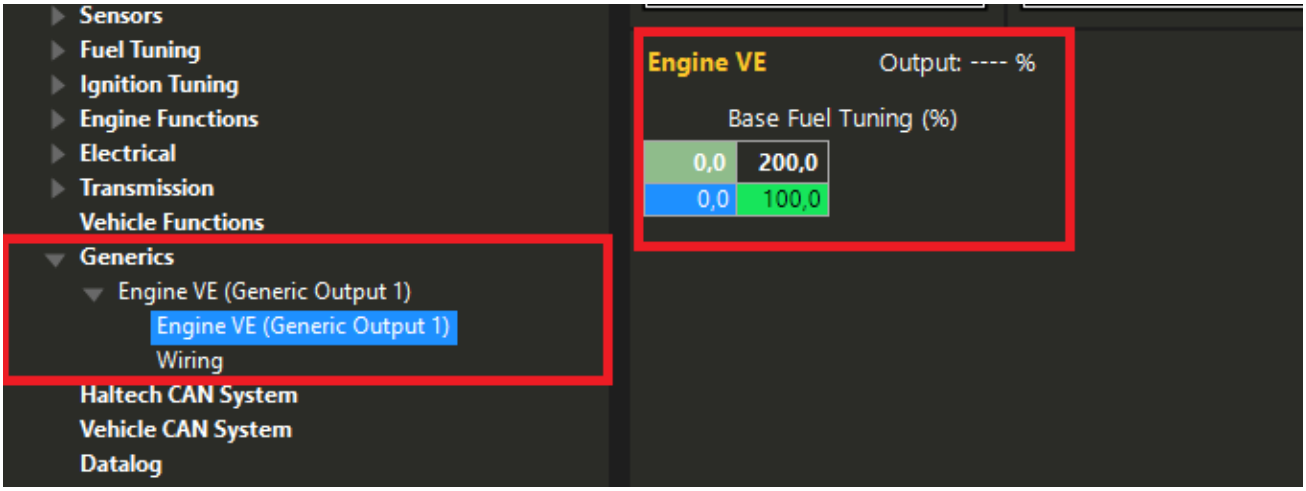


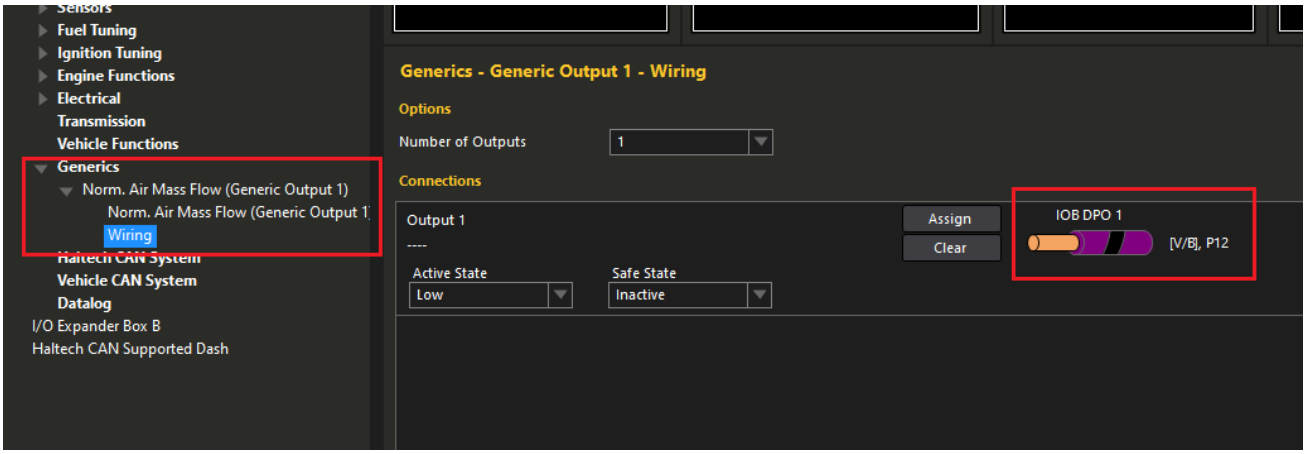
Under Haltech CAN System, **Haltech CAN Supported Dash** needs to be activated.



For CANTCU torque calculations, a **Generic Output** sending *Base Fuel Tuning* on **I/O Expander Box B** output *DPO1* needs to be defined. The variable needs to be scaled down to fit into the 0-100% duty cycle range of the DPO.







Available Realtime-values in CANTCU (sent from Haltech):

- *Engine RPM*
- *TPS Value*
- *Engine MAP*
- *Wheel Speeds*
- *Brake Switch*
- *Coolant Temperature*
- *Engine Oil Tempetature*

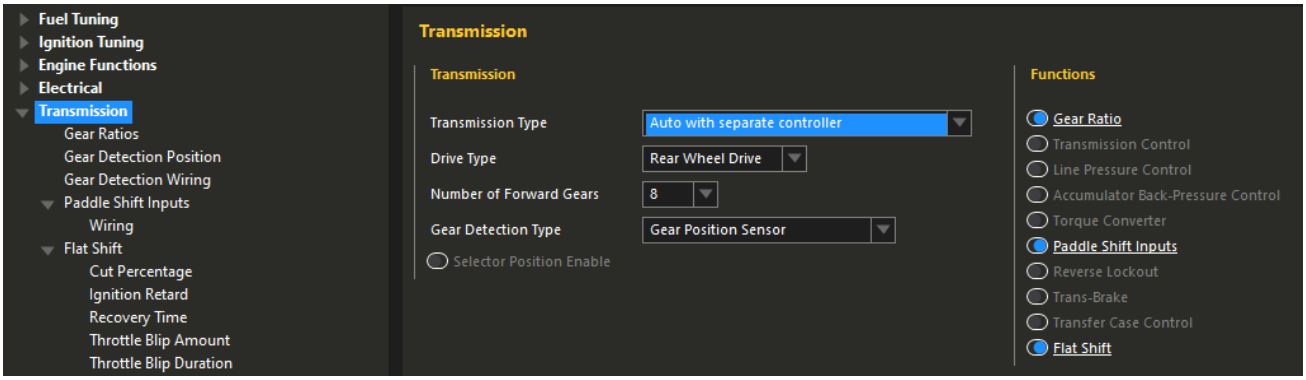
Available Realtime-values in Haltech (sent from CANTCU):

- *Gearbox Gear*
- *Gearbox Mode*
- *Gearbox Oil Temp*
- *Gearbox Delta Torque*
- *Gearbox Cut % Request*
- *Gearbox Blip % Request*
- *Cut 0/1*
- *Blip 0/1*

Rate	*Realtime variable*	*Input name*	*Unit*	*Conversion*
50 Hz	TCU Gear	AVI1 Voltage		0-4.5V
50 Hz	TCU Oil Temp	AVI2 Voltage	C	min -40 max 160, 0-5V
50 Hz	Cut/Blip Trigger	AVI3 Voltage	0/1/2	1/2.5/4V
50 Hz	TCU DL/DriveMode	AVI4 Voltage		0-1-2-3-4-5V
50 Hz	TCU Cut %	DPI1 Duty Cycle	%	0-100%
50 Hz	TCU Blip %	DPI2 Duty Cycle	%	0-100%
50 Hz	Clutch Slip %	DPI3 Duty Cycle	%	min -100 max +100
50 Hz	Converter Slip %	DPI4 Duty Cycle	%	min -100 max +100

I/O Configuration

To be able to control cuts and blips, functions like **Gear Ratio**, **Paddle Shift Inputs** and **Flat Shift** are enabled under **Transmission** in Haltech.



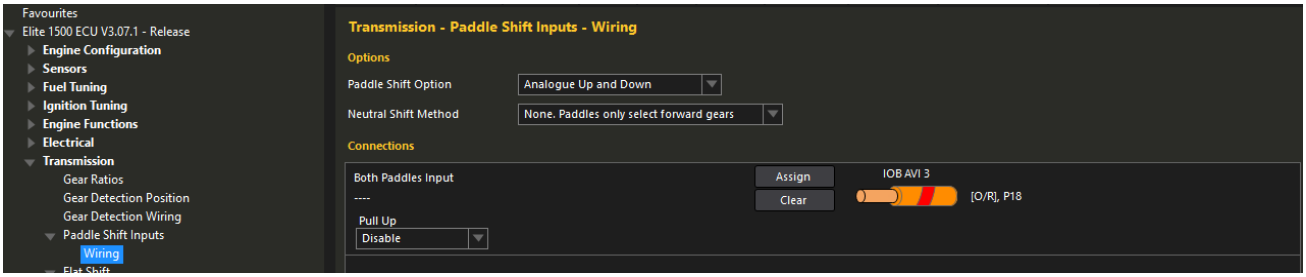
Gear Ratios need to be calibrated while driving.

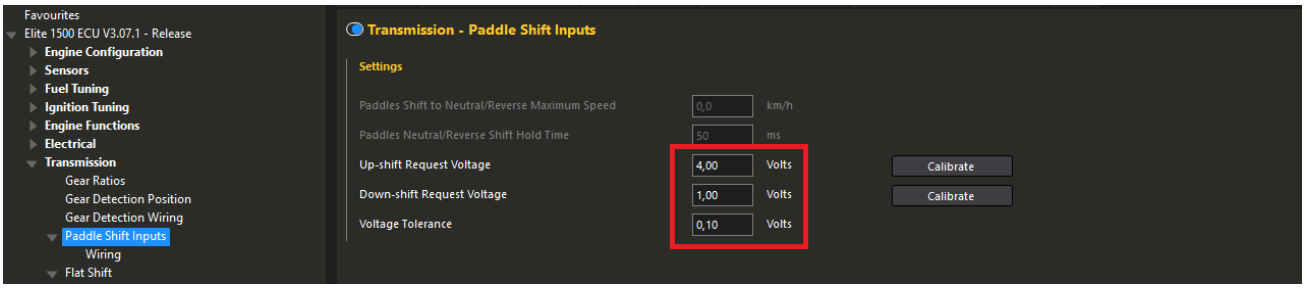
Gear Detection Position is defined as following:

Gear	1st	2nd	3rd	4th	5th	6th	7th	8th	Reverse	Neutral
Voltage	1	1.5	2	2.5	3	3.5	4	4.5	0	0.5

Gear Detection Wiring is defined to **IOB AVI1**.

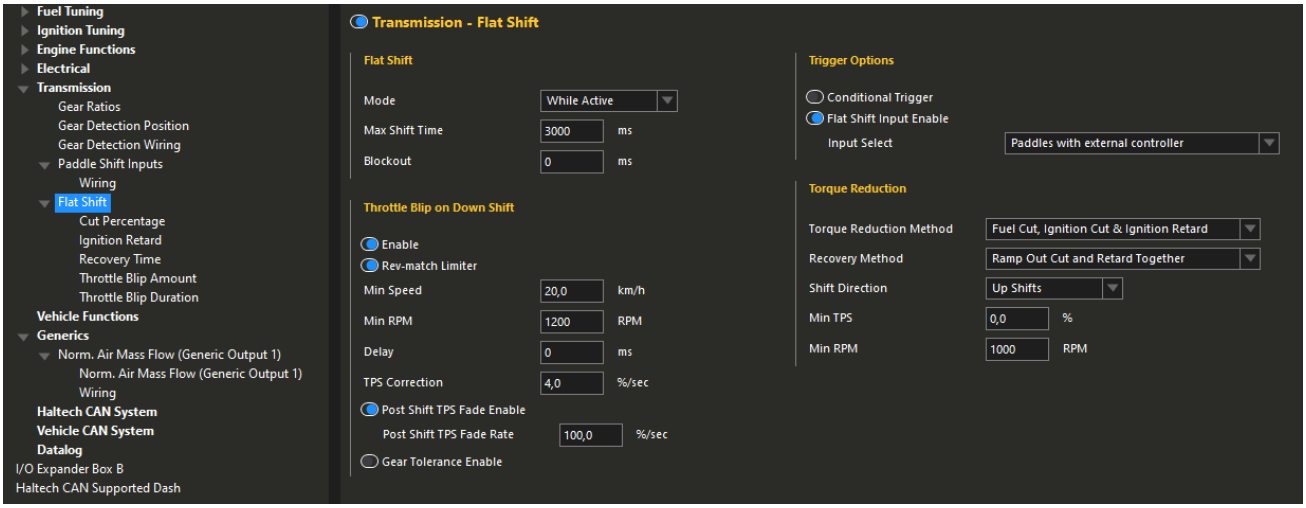
Paddle Shift Input uses both "Up" and "Down Paddles" that are assigned to **IOB AVI3**.





Cuts and Blips

The **Flat Shift** function dictates how both cuts and blips are performed. **Flat Shift** mode needs to be "while active", to let CANTCU decide the length of cuts. Triggering of the function is done by the virtual paddles that are defined on the IOB DPIs. The method of cutting (listed under **Torque Reduction**) can freely be chosen to whatever suits engine setup and driving style. **Shift Direction** on torque reduction needs to be "up shifts" only, as the paddle signal sent from CANTCU is a cut request. Blips are enabled and use the downshift paddle as a trigger. A rev-match limiter is used to keep the RPM's from overshooting until the blip is done.



For cuts, both the **Cut Percentage** and **Ignition Retard** maps will use **IOB DPI1** (Cut% from CANTCU) as an axis. This way the cut intensity can be fully controlled and adjusted during the shift. Other axes can be freely defined. An example of this is shown below using **IOB AVI4** (CANTCU Drive Mode) as an added Y-axis for different behavior of the flat shift cut function depending on transmission drive mode.

Flat Shift Cut Percentage Table Output: ---- %

IO Box B Analogue Voltage Input 4 Voltage (Volts) / IO Box B Digital Pulse Input 1 Duty (%)

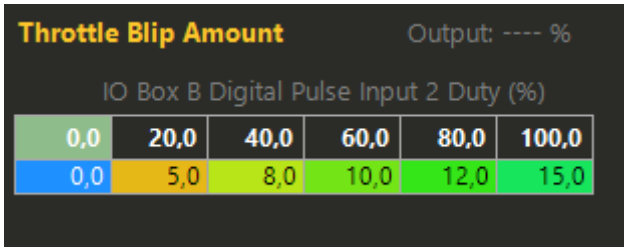
	0,0	20,0	40,0	60,0	80,0	100,0
5,00	0,0	2,0	4,0	6,0	8,0	12,0
4,00	0,0	2,6	4,8	6,8	9,4	13,6
3,00	0,0	3,2	5,6	7,6	10,8	15,2
2,00	0,0	3,8	6,4	8,4	12,2	16,8
1,00	0,0	4,4	7,2	9,2	13,6	18,4
0,00	0,0	5,0	8,0	10,0	15,0	20,0

Flat Shift Retard Table Output: ---- °

IO Box B Analogue Voltage Input 4 Voltage (Volts) / IO Box B Digital Pulse Input 1 Duty (%)

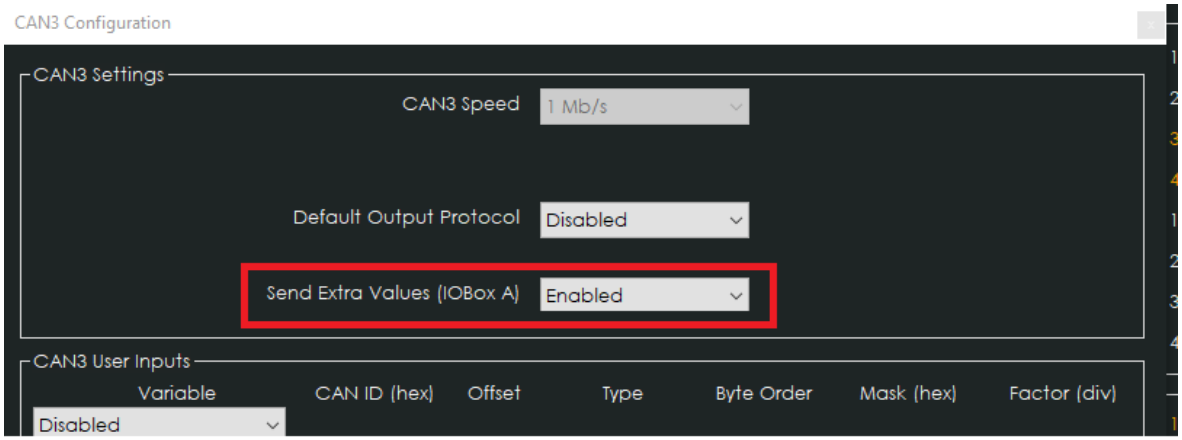
	0,0	20,0	40,0	60,0	80,0	100,0
5,00	0,0	0,0	2,0	5,0	8,0	10,0
4,00	0,0	1,0	3,2	6,0	8,8	11,0
3,00	0,0	2,0	4,4	7,0	9,6	12,0
2,00	0,0	3,0	5,6	8,0	10,4	13,0
1,00	0,0	4,0	6,8	9,0	11,2	14,0
0,00	0,0	5,0	8,0	10,0	12,0	15,0

For blips, **Throttle Blip Amount** and **Throttle Blip Duration** tables are used. The **Throttle Blip Amount** table uses **IOB DPI2** (CANTCU Blip %) as an axis to modulate the DBW throttle target during the blip. The **Throttle Blip Duration** table defines the length of the blip depending on user-definable axes.



Extra Values

It's possible to get extra values into Haltech by using **IO Expander Box A** (if free/unused). Activation is done in CANTCU CAN Configuration.



Rate	*Realtime variable*	*Input name*	*Unit*	*Conversion*
50 Hz	TCU Input RPM	AVI1 Voltage	RPM	0 - 10 000 RPM
50 Hz	TCU Output RPM	AVI2 Voltage	RPM	0 - 10 000 RPM
50 Hz	TCU RPM Target	AVI3 Voltage	RPM	0 - 10 000 RPM
50 Hz	TCU Delta TQ	AVI4 Voltage	Nm	min -1000 max +1000

NOTE!

All tuning should always be done by a professional in safe environment (track/dyno)

Before activating the blip function, it's recommended to test downshifting and verify (realtime or logging) that the user table is behaving correctly during the blip. Starting values for tuning the blip should be low and gradually increased to avoid overrevving and undesired behavior/acceleration during the shift.