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.

 Engine Functions Electrical 	DTC Severity	None 🔻	Dynamon
Transmission Vehicle Functions	Input/Output Expander Boxes		Dyno
Generics Haltech CAN System	I/O Expander 12 (Box A)		Thermoco
venicie CAN System	DTC Severity	None 🔻	
Datalog	🚺 I/O Expander 12 (Box B)		0 1CA-2
I/O Expander Box B	DTC Severity	None	DTC S
Haltech CAN Supported Dash			TCA-2
	Race Expansion Modules		DTC S
			TCA-4
	Haltech Race Expansion Mod	lule	DTC S
	DTC Severity	None 🔻	○ TCA-4

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

Transmission Vehicle Functions	Bus Selection		
Canarias Haltech CAN System	Port	Aux CAN Bus Port	▼
Vehicle CAN System Datalog	Displays		Power Di
I/O Expander Box B Haltech CAN Supported Dash	Haltech CAN Supported Dash	n	PD16 Te
	Wideband Controller Boxes		DTC S
	WBC-1 (Box A) DTC Severity	None	PD16



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.

 Ignition Tuning Engine Functions Electrical Transmission Vehicle Functions Generics Engine VE (Generic Output 1) Engine VE (Generic Output 1) Wiring Haltech CAN System Vehicle CAN System Deteit 	 Generics - Generic Outp Settings Name Signal Type Mode Override Switch Enable Override Value 	ut 1 Engine VE Duty Cycle Table 100,0 %	
I/O Expander Box B Haltech CAN Supported Dash	Duty Cycle Settings Frequency	100 Hz	Frequency Settings Duty Cycle
	State Settings		Stepper Settings
 Sensors Fuel Tuning Ignition Tuning Engine Functions Electrical Transmission Vehicle Functions Generics Engine VE (Generic Output 1) Engine VE (Generic Output 1) Wiring Haltech CAN System Vehicle CAN System Datalog 	Engine V Ba 0,0 0,0	E Output: % se Fuel Tuning (%) 200,0 100,0	
 Sensors Fuel Tuning Ignition Tuning Engine Functions Electrical Transmission Vehicle Functions Generic Options Number of Generics Generic Output 1) Norm. Air Mass Flow (Generic Output 1) 	ate Safe State	Assign I Clear	08 DPO 1



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	С	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.

 Fuel Tuning Ignition Tuning 	Transmission		
Engine Functions Electrical	Transmission		Functions
 Transmission Gear Ratios Gear Detection Position 	Transmission Type	Auto with separate controller	C Gear Ratio Transmission Control
Gear Detection Wiring Paddle Shift Inputs	Number of Forward Gears		Line Pressure Control Accumulator Back-Pressure Control Torque Converter
winng ▼ Flat Shift Cut Percentage	Gear Detection Type	Gear Position Sensor	Paddle Shift Inputs Reverse Lockout
Ignition Retard Recovery Time Throttle Blip Amount Throttle Blip Duration			Trans-Brake Transfer Case Control

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.

	Elite 1500 ECU V3.07.1 - Release		100.0 0 0.000.0			
 Ingine Configuration Options Sensors Fuel Tuning Ingine Functions Electrical Connections Electrical Gear Detection Position Fuel Solid Paddle Shift Inputs Fuel Solid Fuel Tuning Paddle Shift Inputs Fuel Tuning Paddle Shift Inputs Fuel Solid Framewission - Paddle Shift Inputs Framewission - Paddle Shift Inputs Fuel Solid Sensors Sensors Sensors Ingine Configuration Sensors Ingine Configuration Sensors Sensors Sensors Sensors Sensors Sensors Sensors Ingine Configuration Ingine Configuration Ingine Configuration Sensors Sensors Settings Paddle Shift Inputs Up-shift Request Voltage Volts Calibrate 		Transmission - Paddle Sh	lift Inputs - Wiring			
 Servors Fuel Tuning Fight Functions Identition Tuning Fights Functions Returns Sections Sections Sections Returns Retu	Engine Configuration	Options				
Fuel Tuning Paddle Shift Option Analogue Up and Down Ignition Tuning Neutral Shift Method International Internat	Sensors					
Image: Section Sections Image: Functions Image: Functions <t< th=""><th>Fuel Tuning</th><th>Paddle Shift Option</th><th>Analogue Up and Down</th><th></th><th></th><th></th></t<>	Fuel Tuning	Paddle Shift Option	Analogue Up and Down			
 Engine Functions Electrical Gear Ratios Both Paddles Input Gear Ratios Both Paddles Input Clear Clear [O/R], P18 Pull Up Disable Electrical Shift Favourites Elite 1500 ECU V3.07.1 - Release Settings Faviourites Faviourites Elite 1500 ECU V3.07.1 - Release Settings Faviourites Faviourites Ult Up Disable Ult Up Disable Clast Shift Clait Shift Clast Shift	Ignition Tuning	Neutral Shift Method	None, Paddles only select for	ward gears	T	
▶ Electrical Connections ▼ Transmission Both Paddles Input Assign IOB AVI 3 Gear Detection Position Clear Gear Detection Wring Pull Up Disable Pull Up Wring Elste Shift IOB AVI 3 ■ Paddle Shift Inputs IOP Addle Shift Inputs IOP Addle Shift Inputs ■ Elste Shift IOP Addle Shift Inputs ■ Elste Shift IOP Addle Shift Inputs ■ Elste Shift	Engine Functions					
 ▼ Transmission Gear Ratios Gear Detection Position Gear Detection Position Gear Detection Position Gear Detection Position Gear Detection Position Flad Shift Pull Up Disable Pull Up Disable Flad Shift Favourites Flat Shift Favourites Flat Shift Flat Shift Fladlies Flat Shift	▶ Electrical	Connections				
Gear Ratios Both Paddles Input A stign UD R/V 3 Gear Detection Wring						100.042
Gear Detection Position	Gear Ratios	Both Paddles Input			Assign	IOB AVI 3
Gear Detection Wiring Pull Up ■ Paddle Shift Inputs Disable ■ Flat Shift ■ Favourites ■ ■ Elite 1500 ECU V3.07.1 - Release ● ● Engine Configuration > > Sensors > > Fuel Tuning ■ ● Ingline Configuration > > Engine Functions > > Engine Functions ■ ● Electrical Up-shift Request Voltage 4,00 ▼ Transmission Up-shift Request Voltage 1,00 Volts Calibrate Down-shift Request Voltage 1,00 Volts	Gear Detection Position				Clear	(O/R), P18
Paddle Shift Inputs Disable D	Gear Detection Wiring	Pull Up				
Wring	Paddle Shift Inputs	Disable				
Favourites Transmission - Paddle Shift Inputs Elite 1500 ECU V3.07.1 - Release Transmission - Paddle Shift Inputs Ingine Configuration Settings Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0.0 km/h Ingine Functions Paddles Shift to Neutral/Reverse Maximum Speed 0.0 km/h Engine Functions Paddles Shift Hold Time 50 ms Electrical Up-shift Request Voltage 4,00 Volts Calibrate Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Wiring					
Favourites Image: Configuration Ether 1500 ECU V3.07.1 - Release Image: Configuration Engine Configuration Settings Fuel Tuning Faddles Shift to Neutral/Reverse Maximum Speed 0.0 Ingine Functions Faddles Shift to Neutral/Reverse Maximum Speed 0.0 Electrical Paddles Neutral/Reverse Shift Hold Time 50 Transmission Up-shift Request Voltage 4,00 Volts Gear Ratios Down-shift Request Voltage 1,00 Volts	- Flat Shift					
Favourites Calibrate Favourites Favourites Figine Configuration Sensors Settings Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0,0 Ignition Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0,0 Electrical Paddles Neutral/Reverse Shift Hold Time 50 ms Fagine Configuration Paddles Neutral/Reverse Shift Hold Time fue Fagine Configuration Paddles Neutral/Reverse Shift Hold Time fue Fagine Configuration Paddles Neutral/Reverse Shift Hold Time fue Fagine Configuration Down-shift Request Voltage 4,00 Volts						
File ISOD ECU V3.07.1 - Release Transmission - Paddle Shift Inputs > Engine Configuration Settings > Sensors Settings > Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0.0 > Ingine Functions Paddles Shift to Neutral/Reverse Maximum Speed 0.0 > Engine Functions Paddles Neutral/Reverse Shift Hold Time 50 > Transmission Up-shift Request Voltage 4,00 Volts Gear Ratios Down-shift Request Voltage 1,00 Volts	Favourites	<u> </u>				
Engine Configuration Settings Sensors Settings Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0.0 km/h Ingine Functions Paddles Neutral/Reverse Maximum Speed 0.0 km/h Electrical Paddles Neutral/Reverse Shift Hold Time 50 ms Transmission Up-shift Request Voltage 4,00 Volts Calibrate Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Elite 1500 ECU V3.07.1 - Release Elite 1500 ECU V3.07.1 - Release	Transmission - Paddle	Shift Inputs			
Sensors Settings > Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0,0 km/h > Ignition Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0,0 km/h > Engine Functions Paddles Neutral/Reverse Shift Hold Time 50 ms > Electrical Up-shift Request Voltage 4,00 Volts Calibrate Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Engine Configuration					
Fuel Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0,0 km/h Ising Functions Paddles Shift to Neutral/Reverse Maximum Speed 0,0 km/h Engine Functions Paddles Neutral/Reverse Shift Hold Time 50 ms Transmission Up-shift Request Voltage 4,00 Volts Calibrate Gear Detection Position Down-shift Request Voltage 1,00 Volts Calibrate	Sensors	Settings				
Ipinition Tuning Paddles Shift to Neutral/Reverse Maximum Speed 0.0 km/h Engine Functions Paddles Neutral/Reverse Maximum Speed 0.0 km/h Electrical Paddles Neutral/Reverse Shift Hold Time 50 ms Transmission Up-shift Request Voltage 4,00 Volts Calibrate Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Fuel Tuning					
Engine Functions Paddles Neutral/Reverse Shift Hold Time 50 ms Electrical Dup-shift Request Voltage 4,00 Volts Calibrate Gear Detection Position Down-shift Request Voltage 1,00 Volts Calibrate	Ignition Tuning					
Electrical Padules Nedulas Nedul	Engine Functions			50		
Transmission Up-shift Request Voltage 4,00 Volts Calibrate Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Electrical			50	IIIS	
Gear Ratios Down-shift Request Voltage 1,00 Volts Calibrate	Transmission	Up-shift Request Voltage		4,00	Volts	Calibrate
Gear Detection Position Down-shift Request Voltage 1,00 Volts Calibrate						
	Gear Ratios					
Gear Detection Wiring Voltage Tolerance 0.10 Volts	Gear Ratios Gear Detection Position	Down-shift Request Voltage		1,00	Volts	Calibrate
Paddle Shift Inputs	Gear Ratios Gear Detection Position Gear Detection Wiring	Down-shift Request Voltage Voltage Tolerance		1,00	Volts Volts	Calibrate
	Gear Ratios Gear Detection Position Gear Detection Wiring Paddle Shift Inputs	Down-shift Request Voltage Voltage Tolerance		1,00 0,10	Volts Volts	Calibrate
Wiring	Gear Ratios Gear Detection Position Gear Detection Wiring Paddle Shift Inputs Wiring	Down-shift Request Voltage Voltage Tolerance		1,00 0,10	Volts Volts	Calibrate



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.

 Fuel Tuning Ignition Tuning 	Transmission - Flat Shi	ft					
Engine Functions	Flat Shift			Trigger Ontions			
Electrical	The Shine			ingger options			
Transmission	Mode	While Act	ive The second	Conditional Trigger			
Gear Ratios	mode			Flat Shift Input Enable			
Gear Detection Position	Max Shift Time	3000	ms		Destation		
Gear Detection Wiring	Plackout		 	Input Select	Paddle	s with external controller	
Paddle Shift Inputs	DIOCKOUL	U					
Wiring				Torque Reduction			
Fiat Shift	Throttle Blip on Down Shift						
Cut Percentage				Torque Reduction Method	Fuel Cut, I	Ignition Cut & Ignition Retard	T
Recovery Time	Enable			Becovery Method	Ramn Out	Cut and Retard Together	
Throttle Blin Amount	Rev-match Limiter			Recovery method	Kamp Out		
Throttle Blip Duration	Min Speed	20,0	km/h	Shift Direction	Up Shifts	—	
Vehicle Functions				Min TPS	0.0] •≤	
Generics	MIN RPM	1200	RPM		0,0		
Norm. Air Mass Flow (Generic Output 1)	Delay	0	ms	Min RPM	1000	RPM	
Norm, Air Mass Flow (Generic Output 1)							
Wiring	TPS Correction	4,0	%/sec				
Haltech CAN System	Post Shift TPS Fade Enable						
Vehicle CAN System	Post Shift TPS Fade Rate	100.0	%/sec				
Datalog							
I/O Expander Box B	Gear Tolerance Enable						
Haltech CAN Supported Dash							
Haltech CAN Supported Dash							

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 Perc	entage	Table		Output:	%	Flat Shift	Retard 1	Fable	C	Output: -	°	
IO Box B A Voltage In Voltage (V	analogue put 4 ′olts)		IO Box E Duty (%)	3 Digital)	Pulse Inp	out 1	IO Box B A Voltage In Voltage (V	Analogue put 4 /olts)		IO Box E Duty (%)	3 Digital)	Pulse Inj	out 1
	0,0	20,0	40,0	60,0	80,0	100,0		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	5,00	0,0	0,0	2,0	5,0	8,0	10,0
4,00	0,0	2,6	4,8	6,8	9,4	13,6	4,00	0,0	1,0	3,2	6,0	8,8	11,0
3,00	0,0	3,2	5,6	7,6	10,8	15,2	3,00	0,0	2,0	4,4	7,0	9,6	12,0
2,00	0,0	3,8	6,4	8,4	12,2	16,8	2,00	0,0	3,0	5,6	8,0	10,4	13,0
1,00	0,0	4,4	7,2	9,2	13,6	18,4	1,00	0,0	4,0	6,8	9,0	11,2	14,0
0,00	0,0	5,0	8,0	10,0	15,0	20,0	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.

Throttle Blip Amount Output: %						
IO Box B Digital Pulse Input 2 Duty (%)						
0,0	20,0	40,0	60,0	80,0	100,0	
0,0	5,0	8,0	10,0	12,0	15,0	

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.

CAN3 Configuration					×
-CAN3 Settings	CAN3 Speed	1 Mb/s	~		
	Default Output Protocol	Disabled	~		
	Send Extra Values (IOBox A)	Enabled	~		
CAN3 User Inputs		Type	Bute Order	Mark (box)	
Disabled		Type	Byte Older	MGSK [HEX]	

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.

