Haltech CAN Broadcast Protocol V2.9.0

Haltech ECUs broadcast on the CAN bus a number of engine parameters/sensor readings. Third party devices can read these CAN packets and use the values for data logging, displaying on a dash, etc. This document describes the CAN packets and the data they contain.

Bus Specification

The Haltech CAN bus operates at 1MBit and uses 11-bit IDs. IDs are expressed in Hexadecimal.

The first byte in a packet is considered byte 0, and the 8th byte is byte 7. The most significant bit in a byte is considered bit 7 and the least significant bit is bit 0.

Data is encoded as big endian.

Addressing Data

Data that is the size of an individual byte (that is byte aligned) are represented with the byte number. E.g. `4` for data at byte 4

Data that crosses multiple bytes (that is byte aligned) are represented with a byte range. The range is inclusive. E.g. `0 - 1` for 2 bytes of data in byte 0 & 1, `4 - 7` for 4 byte of data in bytes 4, 5, 6 & 7.

To address data stored in individual bit within a byte, the following notation is used X:Y. The X is the byte number, and the Y is the bit number. E.g. `4:0` for bit 0 in byte 4.

To address data stored across many bits that may span bytes the above notation is used but express as a range. The range is inclusive. E.g. `6:3 - 7:0` for 12 bits of data starting at bit 3 on the byte 6 to bit 0 on byte 7.

Example

Byte	0	1	2	3	4
Bit	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 | 6 5 4	3 2 1 0 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0
Data	Manifold Pressure		Switch State | Reserved	Input Voltage	Status Enum
Value	1013 (0x03F5)		1 | 0	3000 (0x0BB8)	200 (0xC8)
Addressing	0 - 1		2:7 | 2:6-2:4	2:3-3:0	4
	0 0 0 0 0 0 1 1 1 1 1 0 1 0 1		1 | 0 0 0	1 0 1 1 1 0 1 1 1 0 0 0	1 1 0 0 1 0 0 0

Units

The *Conversion From Raw To Units* column in below table show how to convert the raw value in the message to a value known units as indicated by the *Units* column. The **x** symbol represents the raw value and **y** represents the value converted.

E.g. The *Throttle Position* channel has a raw value of 456. The conversion for it is *y = x / 10*. Therefore the converted value of y equals:

y = 456 / 10 = 45.6%

If other units are required, it is the responsibility of the device reading these values to perform these conversions. All pressures are absolute, and it is necessary to subtract 101.3 kPa from the final result if *gauge pressure* is desired.

Protocol

Not all CAN Packets will always be broadcast. The Haltech ECU may opt not to broadcast a particular packet if that feature is not enabled. Any blank areas in a message are reserved for future use. Do not assume a value for any reserved areas.

Note: The unit type of the generic sensors is user selectable. Ensure that the conversion used matches with the **Sensor Type** setting for each of the generic sensors.

CAN ID	Rate (Hz)	Position	Channel	Units	Conversion From Raw To Units
0x360	50	0 - 1	RPM	RPM	y = x
		2 - 3	Manifold Pressure	kPa	y = x/10
		4 - 5	Throttle Position	%	y = x/10
		6 - 7	Coolant Pressure	kPa	y = x/10
0x361	50	0 - 1	Fuel Pressure	kPa	y = x/10
		2 - 3	Oil Pressure	kPa	y = x/10
		4 - 5	Engine Demand	%	y = x/10
		6 - 7	Wastegate Pressure	kPa	y = x/10
0x362	50	0 - 1	Injection Stage 1 Duty	%	y = x/10

			Cycle		
		2 - 3	Injection Stage 2 Duty Cycle	%	y = x/10
		4 - 5	Ignition Angle (Leading)	°	y = x/10
0x363	20	0 - 1	Wheel Slip	km/h	y = x/10
		2 - 3	Wheel Diff	km/h	y = x/10
0x368	20	0 - 1	Wideband Sensor 1	λ	y = x/1000
		2 - 3	Wideband Sensor 2	λ	y = x/1000
		4 - 5	Wideband Sensor 3	λ	y = x/1000
		6 - 7	Wideband Sensor 4	λ	y = x/1000
0x369	20	0 - 1	Trigger System Error Count		y = x
		2 - 3	Trigger Counter		y = x
		6 - 7	Trigger Sync Level		y = x
0x36A	20	0 - 1	Knock Level	dB	y = x/100
		2 - 3	Knock Level	dB	y = x/100
0x36B	20	0 - 1	Brake Pressure	kPa	y = x/10
		2 - 3	NOS Pressure Sensor 1	kPa	y = x*11/50
		4 - 5	Turbo Speed Sensor 1	RPM	y = x*10
		6 - 7	Lateral G	m/s^2	y = x/10
0x36C	20	0 - 1	Wheel Speed Front Left	km/h	y = x/10
		2 - 3	Wheel Speed Front Right	km/h	y = x/10
		4 - 5	Wheel	km/h	y = x/10

			Speed Rear Left		
		6 - 7	Wheel Speed Rear Right	km/h	y = x/10
0x36D	20	4 - 5	Exhaust Cam Angle 1	°	y = x/10
		6 - 7	Exhaust Cam Angle 2	°	y = x/10
0x36E	20	0 - 1	Engine Limiting Active		y := 0=Off,1=On
		2 - 3	Launch Control Ignition Retard	°	y = x/10
		4 - 5	Launch Control Fuel Enrich	%	y = x/10
		6 - 7	Longitudinal G	m/s^2	y = x/10
0x36F	20	0 - 1	Generic Output 1 Duty Cycle	%	y = x/10
		2 - 3	Boost Control Output	%	y = x/10
0x370	20	0 - 1	Vehicle Speed	km/h	y = x/10
		2 - 3	Gear		y := 0=Neutral,1=First,2=Second,3=Third,4=Fourth,5=Fifth,6=Sixth
		4 - 5	Intake Cam Angle 1	°	y = x/10
		6 - 7	Intake Cam Angle 2	°	y = x/10
0x371	10	0 - 1	Fuel Flow	cc/min	y = x
		2 - 3	Fuel Flow Return	cc/min	y = x
0x372	10	0 - 1	Battery Voltage	Volts	y = x/10
		4 - 5	Target Boost	kPa	y = x/10

			Level		
		6 - 7	Barometric Pressure	kPa	y = x/10
0x373	10	0 - 1	EGT Sensor 1	°K	y = x/10
		2 - 3	EGT Sensor 2	°K	y = x/10
		4 - 5	EGT Sensor 3	°K	y = x/10
		6 - 7	EGT Sensor 4	°K	y = x/10
0x374	10	0 - 1	EGT Sensor 5	°K	y = x/10
		2 - 3	EGT Sensor 6	°K	y = x/10
		4 - 5	EGT Sensor 7	°K	y = x/10
		6 - 7	EGT Sensor 8	°K	y = x/10
0x375	10	0 - 1	EGT Sensor 9	°K	y = x/10
		2 - 3	EGT Sensor 10	°K	y = x/10
		4 - 5	EGT Sensor 11	°K	y = x/10
		6 - 7	EGT Sensor 12	°K	y = x/10
0x3E0	5	0 - 1	Coolant Temperature	°K	y = x/10
		2 - 3	Air Temperature	°K	y = x/10
		4 - 5	Fuel Temperature	°K	y = x/10
		6 - 7	Oil Temperature	°K	y = x/10
0x3E1	5	0 - 1	Gearbox Oil Temperature	°K	y = x/10
		2 - 3	Diff Oil Temperature	°K	y = x/10
		4 - 5	Fuel Composition	%	y = x/10
0x3E2	5	0 - 1	Fuel Level	L	y = x/10
0x3E3	5	0 - 1	Fuel Trim Short Term Bank 1	%	y = x/10
		2 - 3	Fuel Trim Short Term Bank 2	%	y = x/10
		4 - 5	Fuel Trim	%	y = x/10

			Long Term Bank 1		
		6 - 7	Fuel Trim Long Term Bank 2	%	y = x/10
0x3E4	5	1:5	Gear Switch		y := 0=Off,1=On
		1:4	Decel Cut Active		y := 0=Off,1=On
		1:3	Transient Throttle Active		y := 0=Off,1=On
		1:2	Brake Pedal Switch		y := 0=Off,1=On
		1:1	Clutch Switch		y := 0=Off,1=On
		2:7	Anti-lag Active		y := 0=Off,1=On
		2:5	Aux RPM Limiter Active		y := 0=Off,1=On
		2:3	Flat Shift Switch		y := 0=Off,1=On
		2:1	Torque Reduction Active		y := 0=Off,1=On
		7:7	Check Engine Light		y := 0=Off,1=On
		7:6	Battery Light Active		y := 0=Off,1=On
0x3E5	50	0	Ignition Switch		y := 0=Off,1=On
		1	Turbo Timer - Time Remaining	s	y = x
		2	Turbo Timer - Engine Time Remaining	s	y = x
		4 - 5	Steering Wheel Angle	°	y = x/10
		6 - 7	Driveshaft	RPM	y = x

			RPM		
0x3E6	20	0 - 1	NOS Pressure Sensor 2	kPa	y = x*11/50
		2 - 3	NOS Pressure Sensor 3	kPa	y = x*11/50
		4 - 5	NOS Pressure Sensor 4	kPa	y = x*11/50
		6 - 7	Turbo Speed Sensor 2	RPM	y = x*10
0x3E7	20	0 - 1	Generic Sensor 1	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		2 - 3	Generic Sensor 2	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		4 - 5	Generic Sensor 3	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		6 - 7	Generic Sensor 4	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
0x3E8	20	0 - 1	Generic Sensor 5	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		2 - 3	Generic Sensor 6	Switch	y := 0=Off,1=On
				Volts	y = x/1000

				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		4 - 5	Generic Sensor 7	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		6 - 7	Generic Sensor 8	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
0x3E9	20	0 - 1	Generic Sensor 9	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		2 - 3	Generic Sensor 10	Switch	y := 0=Off,1=On
				Volts	y = x/1000
				kPa	y = x/10
				°K	y = x/10
				%	y = x/10
		4 - 5	Target Lambda	λ	y = x/1000
0x3EA	50	0 - 1	Gearbox Oil Pressure	kPa	y = x/10
		2 - 3	Injection Stage 3 Duty Cycle	%	y = x/10
		4 - 5	Injection Stage 4 Duty Cycle	%	y = x/10