Haltech CAN Broadcast Protocol (V2.35.0)

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 expressed 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							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Data	Manifold Pressure															
Value	1013 (0x03F5)															
Raw	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	1
Addressing	0 - 1															

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Data	MIL	Reserved			Throttle Position											
Value	1	0			750 (0x02EE)											
Raw	1	0	0	0	0	0	1	0	1	1	1	0	1	1	1	0
Addressing	2:7	2:6 - 2:4			2:3 - 3:0											

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.

CAN I.D.	Rate (Hz)	Direction	Message Position	Sign	Channel	Units	Conversion from Raw
0x360	50	TX	0 - 1	Unsigned	RPM	RPM	y = x
			2 - 3	Unsigned	Manifold Pressure	kPa (Abs)	y = x/10
			4 - 5	Unsigned	Throttle Position	%	y = x/10
			6 - 7	Unsigned	Coolant Pressure	kPa	y = x/10 - 101.3
0x361	50	TX	0 - 1	Unsigned	Fuel Pressure	kPa	y = x/10 - 101.3
			2 - 3	Unsigned	Oil Pressure	kPa	y = x/10 - 101.3
			4 - 5	Unsigned	Engine Demand	%	y = x/10
			6 - 7	Unsigned	Wastegate Pressure	kPa	y = x/10 - 101.3
0x362	50	TX	0 - 1	Unsigned	Injection Stage 1 Duty Cycle	%	y = x/10

			2 - 3	Unsigned	Injection Stage 2 Duty Cycle	%	y = x/10
			4 - 5	Signed	Ignition Angle (Leading)	°	y = x/10
0x363	20	TX	0 - 1	Signed	Wheel Slip	km/h	y = x/10
			2 - 3	Signed	Wheel Diff	km/h	y = x/10
0x368	20	TX	0 - 1	Unsigned	Wideband Sensor 1	λ	y = x/1000
			2 - 3	Unsigned	Wideband Sensor 2	λ	y = x/1000
			4 - 5	Unsigned	Wideband Sensor 3	λ	y = x/1000
			6 - 7	Unsigned	Wideband Sensor 4	λ	y = x/1000
0x369	20	TX	0 - 1	Unsigned	Trigger System Error Count	raw	y = x
			2 - 3	Unsigned	Trigger Counter	raw	y = x
			6 - 7	Unsigned	Trigger Sync Level	raw	y = x
0x36A	20	TX	0 - 1	Unsigned	Knock Level 1	dB	y = x/100
			2 - 3	Unsigned	Knock Level 2	dB	y = x/100
0x36B	20	TX	0 - 1	Unsigned	Brake Pressure	kPa	y = x - 101.3
			2 - 3	Unsigned	NOS Pressure Sensor 1	kPa	y = x*11/50 - 101.3

			4 - 5	Unsigned	Turbo Speed Sensor 1	RPM	y = x*10
			6 - 7	Signed	Lateral G	m/s2	y = x/10
0x36C	20	TX	0 - 1	Unsigned	Wheel Speed Front Left	km/h	y = x/10
			2 - 3	Unsigned	Wheel Speed Front Right	km/h	y = x/10
			4 - 5	Unsigned	Wheel Speed Rear Left	km/h	y = x/10
			6 - 7	Unsigned	Wheel Speed Rear Right	km/h	y = x/10
0x36D	20	TX	4 - 5	Signed	Exhaust Cam Angle 1	°	y = x/10
			6 - 7	Signed	Exhaust Cam Angle 2	°	y = x/10
0x36E	20	TX	0 - 1	Unsigned	Engine Limiting Active	raw	y := 0=Off,1=On
			2 - 3	Signed	Launch Control Ignition Retard	°	y = x/10
			4 - 5	Signed	Launch Control Fuel Enrich	%	y = x/10
			6 - 7	Signed	Longitudinal G	m/s2	y = x/10
0x36F	20	TX	0 - 1	Unsigned	Generic Output 1 Duty Cycle	%	y = x/10

			Bytes	Type	Name	Unit	Equation
			2 - 3	Unsigned	Boost Control Output	%	y = x/10
0x370	20	TX	0 - 1	Unsigned	Vehicle Speed	km/h	y = x/10
			4 - 5	Signed	Intake Cam Angle 1	°	y = x/10
			6 - 7	Signed	Intake Cam Angle 2	°	y = x/10
0x371	10	TX	0 - 1	Unsigned	Fuel Flow	cc/min	y = x
			2 - 3	Unsigned	Fuel Flow Return	cc/min	y = x
0x372	10	TX	0 - 1	Unsigned	Battery Voltage	Volts	y = x/10
			4 - 5	Unsigned	Target Boost Level	kPa	y = x/10
			6 - 7	Unsigned	Barometric Pressure	kPa (Abs)	y = x/10
0x373	10	TX	0 - 1	Unsigned	EGT Sensor 1	K	y = x/10
			2 - 3	Unsigned	EGT Sensor 2	K	y = x/10
			4 - 5	Unsigned	EGT Sensor 3	K	y = x/10
			6 - 7	Unsigned	EGT Sensor 4	K	y = x/10
0x374	10	TX	0 - 1	Unsigned	EGT Sensor 5	K	y = x/10
			2 - 3	Unsigned	EGT Sensor 6	K	y = x/10
			4 - 5	Unsigned	EGT Sensor 7	K	y = x/10

			6 - 7	Unsigned	EGT Sensor 8	K	y = x/10
0x375	10	TX	0 - 1	Unsigned	EGT Sensor 9	K	y = x/10
			2 - 3	Unsigned	EGT Sensor 10	K	y = x/10
			4 - 5	Unsigned	EGT Sensor 11	K	y = x/10
			6 - 7	Unsigned	EGT Sensor 12	K	y = x/10
0x376	10	TX	0 - 1	Unsigned	Ambient Air Temperature	K	y = x/10
			2 - 3	Signed	Relative Humidity	%	y = x/10
			4 - 5	Unsigned	Specific Humidity	ppm	y = x*100
			6 - 7	Unsigned	Absolute Humidity	g/m3	y = x/10
0x3E0	5	TX	0 - 1	Unsigned	Coolant Temperature	K	y = x/10
			2 - 3	Unsigned	Air Temperature	K	y = x/10
			4 - 5	Unsigned	Fuel Temperature	K	y = x/10
			6 - 7	Unsigned	Oil Temperature	K	y = x/10
0x3E1	5	TX	0 - 1	Unsigned	Gearbox Oil Temperature	K	y = x/10

			2 - 3	Unsigned	Diff Oil Temperature	K	y = x/10
			4 - 5	Unsigned	Fuel Composition	%	y = x/10
0x3 E2	5	TX	0 - 1	Unsigned	Fuel Level	L	y = x/10
0x3 E3	5	TX	0 - 1	Signed	Fuel Trim Short Term Bank 1	%	y = x/10
			2 - 3	Signed	Fuel Trim Short Term Bank 2	%	y = x/10
			4 - 5	Signed	Fuel Trim Long Term Bank 1	%	y = x/10
			6 - 7	Signed	Fuel Trim Long Term Bank 2	%	y = x/10
0x3 E4	5	TX	1:7	Unsigned	Neutral Switch	enum	y := 0=Off,1=On
			1:6	Unsigned	Reverse Switch	enum	y := 0=Off,1=On
			1:5	Unsigned	Gear Switch	enum	y := 0=Off,1=On
			1:4	Unsigned	Decel Cut Active	enum	y := 0=Off,1=On
			1:3	Unsigned	Transient Throttle Active	enum	y := 0=Off,1=On
			1:2	Unsigned	Brake Pedal Switch	enum	y := 0=Off,1=On
			1:1	Unsigned	Clutch Switch	enum	y := 0=Off,1=On

				1:0	Unsigned	Oil Pressure Light	enum	y := 0=Off,1=On
				2:7	Unsigned	Launch Control Active	enum	y := 0=Off,1=On
				2:6	Unsigned	Launch Control Switch	enum	y := 0=Off,1=On
				2:5	Unsigned	Aux RPM Limiter Active	enum	y := 0=Off,1=On
				2:3	Unsigned	Flat Shift Switch	enum	y := 0=Off,1=On
				2:1	Unsigned	Torque Reduction Active	enum	y := 0=Off,1=On
				3:7	Unsigned	Traction Control Active	enum	y := 0=Off,1=On
				3:6	Unsigned	Traction Control Enabled	enum	y := 0=Off,1=On
				3:5	Unsigned	Air Con Request	enum	y := 0=Off,1=On
				3:4	Unsigned	Air Con Output	enum	y := 0=Off,1=On
				3:3	Unsigned	Themo-fan 4 On	enum	y := 0=Off,1=On
				3:2	Unsigned	Thermo-fan 3 On	enum	y := 0=Off,1=On
				3:1	Unsigned	Thermo-fan 2 On	enum	y := 0=Off,1=On
				3:0	Unsigned	Themo-fan 1 On	enum	y := 0=Off,1=On

ID			Byte	Type	Name	Unit	Formula
			4	Signed	Rotary Trim Pot 1	raw	y = x
			5	Signed	Rotary Trim Pot 2	raw	y = x
			6	Signed	Rotary Trim Pot 3	raw	y = x
			7:7	Unsigned	Check Engine Light	enum	y := 0=Off,1=On
			7:6	Unsigned	Battery Light Active	enum	y := 0=Off,1=On
0x3E5	50	TX	0	Unsigned	Ignition Switch	enum	y := 0=Off,1=On
			1	Unsigned	Turbo Timer - Time Remaining	s	y = x
			2	Unsigned	Turbo Timer - Engine Time Remaining	s	y = x
			4 - 5	Signed	Steering Wheel Angle	°	y = x/10
			6 - 7	Unsigned	Driveshaft RPM	RPM	y = x
0x3E6	20	TX	0 - 1	Unsigned	NOS Pressure Sensor 2	kPa	y = x*11/50 - 101.3
			2 - 3	Unsigned	NOS Pressure Sensor 3	kPa	y = x*11/50 - 101.3
			4 - 5	Unsigned	NOS Pressure Sensor 4	kPa	y = x*11/50 - 101.3

			6 - 7	Unsigned	Turbo Speed Sensor 2	RPM	y = x*10
0x3 E7	20	TX	0 - 1	Unsigned	Generic Sensor 1	%	y = x/10
			2 - 3	Unsigned	Generic Sensor 2	%	y = x/10
			4 - 5	Unsigned	Generic Sensor 3	%	y = x/10
			6 - 7	Unsigned	Generic Sensor 4	%	y = x/10
0x3 E8	20	TX	0 - 1	Unsigned	Generic Sensor 5	%	y = x/10
			2 - 3	Unsigned	Generic Sensor 6	%	y = x/10
			4 - 5	Unsigned	Generic Sensor 7	%	y = x/10
			6 - 7	Unsigned	Generic Sensor 8	%	y = x/10
0x3 E9	20	TX	0 - 1	Unsigned	Generic Sensor 9	%	y = x/10
			2 - 3	Unsigned	Generic Sensor 10	%	y = x/10
			4 - 5	Unsigned	Target Lambda	λ	y = x/1000
			6:7	Unsigned	Nitrous Stage 1 Output State	enum	y := 0=Off,1=On
			6:6	Unsigned	Nitrous Stage 2 Output State	enum	y := 0=Off,1=On
			6:5	Unsigned	Nitrous Stage 3 Output State	enum	y := 0=Off,1=On

			Bit/Byte	Sign	Name	Units	Formula
			6:4	Unsigned	Nitrous Stage 4 Output State	enum	y := 0=Off,1=On
			6:3	Unsigned	Nitrous Stage 5 Output State	enum	y := 0=Off,1=On
			6:2	Unsigned	Nitrous Stage 6 Output State	enum	y := 0=Off,1=On
			7	Signed	Torque Management Knob	raw	y = x
0x3EA	50	TX	0 - 1	Unsigned	Gearbox Line Pressure	kPa	y = x/10 - 101.3
			2 - 3	Unsigned	Injection Stage 3 Duty Cycle	%	y = x/10
			4 - 5	Unsigned	Injection Stage 4 Duty Cycle	%	y = x/10
			6 - 7	Unsigned	Crank Case Pressure	kPa	y = x/10 - 101.3
0x3EB	50	TX	0 - 3	Unsigned	Race Timer	ms	y = x
			4 - 5	Signed	Ignition Angle Bank 1	°	y = x/10
			6 - 7	Signed	Ignition Angle Bank 2	°	y = x/10
0x3EC	50	TX	0 - 1	Signed	Torque Management Driveshaft	RPM	y = x

				Bytes	Type	Name	Unit	Equation
						RPM Target		
				2 - 3	Signed	Torque Management Driveshaft RPM Target Error	RPM	y = x
				4 - 5	Signed	Torque Management Driveshaft RPM Target Error Ignition Correction	°	y = x/10
				6 - 7	Signed	Torque Management Driveshaft RPM Timed Ignition Correction	°	y = x/10
0x3ED	50	TX		0 - 1	Signed	Torque Management Combined Ignition Correction	°	y = x/10
0x3EE	20	TX		0 - 1	Unsigned	Wideband Sensor 5	λ	y = x/1000
				2 - 3	Unsigned	Wideband Sensor 6	λ	y = x/1000
				4 - 5	Unsigned	Wideband Sensor 7	λ	y = x/1000
				6 - 7	Unsigned	Wideband Sensor 8	λ	y = x/1000
0x3EF	20	TX		0 - 1	Unsigned	Wideband Sensor 9	λ	y = x/1000

			2 - 3	Unsigned	Wideband Sensor 10	λ	y = x/1000
			4 - 5	Unsigned	Wideband Sensor 11	λ	y = x/1000
			6 - 7	Unsigned	Wideband Sensor 12	λ	y = x/1000
0x4 70	20	TX	0 - 1	Unsigned	Wideband Overall	λ	y = x/1000
			2 - 3	Unsigned	Wideband Bank 1	λ	y = x/1000
			4 - 5	Unsigned	Wideband Bank 2	λ	y = x/1000
			6	Signed	Gear Selector Position	enum	y := 0=Neutral, -1=Reverse, -2=Park, -3=Unknown, -4=Drive, -5=Sport, -6=Manual, -7 Low, -8=Overdrive
			7	Signed	Gear - Can be combined with selector pos	enum	y := -1=Reverse, 0=Neutral, 1=1st, 2=2nd, 3=3rd, 4=4th, 5=5th, 6=6th
0x4 71	50	TX	0 - 1	Signed	Injector Pressure Differential	kPa	y = x/10
			2 - 3	Unsigned	Accelerator Pedal Position	%	y = x/10
0x4 72	20	TX	0 - 1	Unsigned	Cruise Control Target Speed	km/h	y = x/10
			2 - 3	Unsigned	Cruise Control Last Target Speed	km/h	y = x/10

			4 - 5	Signed	Cruise Control Speed Error	km/h	y = x/10
			6:7 - 6:4	Unsigned	Cruise Control Controller State	enum	y := 0=Disabled, 1=Inactive, 2=Cruising, 3=Accelerating, 4=Decelerating
			6:3 - 7:0	Unsigned	Cruise Control Input State	enum	y := 0=Unused, 1=Disable, 2=Enable, 3=Enable/Disable, 4=Cancel, 8=Set, 12=Set/Cancel, 16=Resume, 20=Resume/Cancel, 32=Accel, 64=Decel, 76=Set/Coast/Cancel, 84=Resume/Coast/Cancel, 128=Increment, 168=Set/Accel/+, 176=Resume/Accel/+, 256=Decrement, 328=Set/Coast/-, 336=Resume/Coast/-, 512=Rest Position