



Pectel GCU to ECU CAN Link

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\$ECU\GCU\Documentation\Software\Documentation\Functional

Abstract: Overview of the Pectel GCU to ECU CAN Link

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1. Introduction

This document details the CAN interface between Pectel's Gearbox Control Unit (GCU) and an Engine Control Unit (ECU).

Standard 11 bit arbitration identifiers are used throughout, with a baud rate of 1Mbit/sec.

1.1 Revision History

Revision	Date	Author	Change and Review History
1	19/10/2010	Stephen Phillips	First Draft for Comments
2	20/05/2011	J Mckenna	Tx Frame 01h, corrected the bit definitions for the status bits
3	20/05/2011	J Mckenna	Corrected Tx Frame 01h, was still using incorrect bits for mode and pump (needed swapping)
4	21/07/2011	J Mckenna	Changed T_GCU to T_SYS in the sensor error reporting frame 0x33 Removed V_GCL, same frame as above. Frame 0x42 that transmits T_GCU, now states T_SYS to be consistent with above. Frame 0x200 should be have been Tx from GCU not Rx

1.2 Related Documents

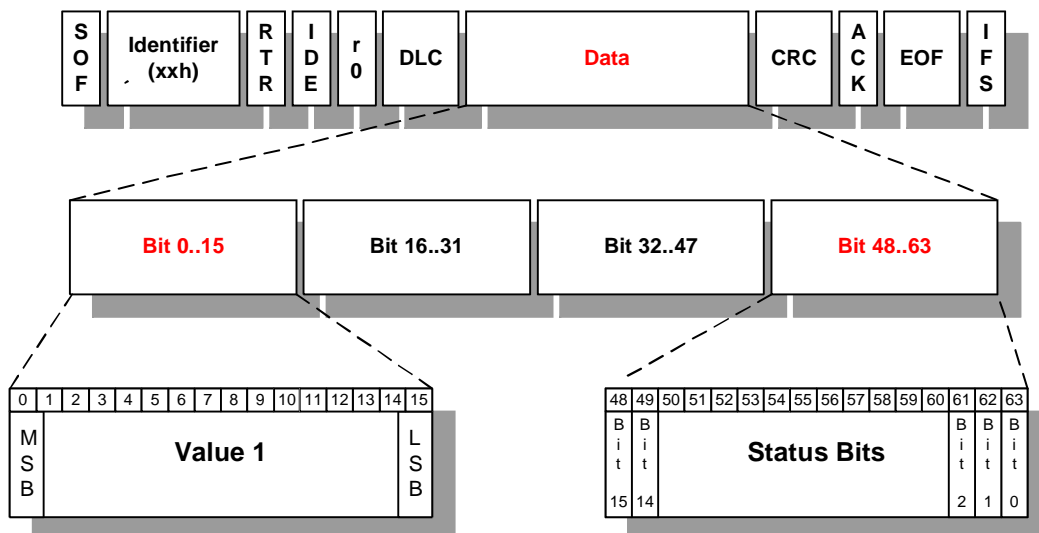
Database	Project	File Name	Description

2. Notation

Each message is defined in a table as per the example below

ID	Xxh		
Dir	GCU TX / Engine Controller RX		
Rate	1ms*		
Bits	Name	Scaling	Notes
0-15	Value 1		
16-31	Value 2		
32-47	Value 3		
48-63	Status Bits	Bit 48 Status bit 15 Bit 49 Status bit 14 ... Bit 62 Status bit 1 Bit 63 Status bit 0	

The CAN interface is defined using a bit index from the start of the data field in the message. All multi-bit values are in big-endian format.



* Some messages may have 'sub messages' multiplexed in them. In these cases the sub messages are all defined in similar tables and the Rate specified applies to the sub message and not the containing CAN message ID.

3. Engine Controller Transmission

3.1 Message 02h

ID	02h			
Dir	Engine Controller TX / GCU RX			
Rate	2ms			
Bits	Name	Scaling		Notes
0-15	RPM	1 RPM/bit, 00h = 0 RPM		Engine Speed
16-31	TPS	0.1°/bit, 00h = 0°		Throttle angle
32-47	Speed	1bit = 1m/minute		Vehicle Speed
48-63	Error Status Bitfield	Bit 48	TPS sensor failure	
		Bit 49	TBD	
		Bit 50	TBD	
		Bit 51	TBD	
		Bit 52	TBD	
		Bit 53	TBD	
		Bit 54	TBD	
		Bit 55	TBD	
		Bit 56	TBD	
		Bit 57	TBD	
		Bit 58	TBD	
		Bit 59	TBD	
		Bit 60	TBD	
		Bit 61	TBD	
		Bit 62	TBD	
		Bit 63	TBD	

3.2 Message 100h – ETC application only

ID	100h		
Dir	Engine Controller TX / GCU RX		
Rate	10ms		
Bits	Name	Scaling	Notes
0-15	PPS	0.1°/bit, 00h=0°	Pedal Position
16-31	fbwTargetTps	(1/81.92)°/bit, 00h=0°	Target Throttle Position
32-47	Unused		
48-63	Unused		

4. Gearbox Controller Transmission

4.1 Message 01h

ID	01h		
Dir	GCU TX / Engine Controller RX		
Rate	2ms		
Bits	Name	Scaling	Notes
0-7	Shift Status Bits	Bit 0	SHIFT DIRECTION 0 = DOWNSHIFT 1 = UPSHIFT
		Bit 1	RAMPOUT1
		Bit 2	RAMPOUT2
		Bit 3	MAINCUT
		Bit 4	FULL POWER RETRY
		Bit 5	RAMPIN1
		Bit 6	RAMPIN2
		Bit 7	RAMPIN3
8-15	Shift Diagnostic code	Enumeration	Enumeration that latches last diagnostic code produced by shift state machine - trDiagCode
16-23	Status bits	Bit 16	Cut mode (optional) 0 = Fuel Cuts 1 = Ignition Cuts
		Bit 17	BLIPCUTACTIVE
		Bit 18	COMPRESSOR ON
		Bit 19	TBD
		Bit 20	TBD
		Bit 21	TBD
		Bit 22	TBD
		Bit 23	TBD
24-31	Cut severity	0.5%/bit	% Torque reduction
32-47	Reserved		
48-63	Reserved		

4.2 Message 05h

ID	05h		
Dir	GCU TX / Engine Controller RX		
Rate	2ms		
Bits	Name	Scaling	Notes
0-15	V_GEAR	(1/ 819.2)V/bit	Gear voltage.
16-31	Transmission Control State	Enumeration	trState
32-47	Upshift Rev Limit	1 RPM/bit, 00h = 0 RPM	Engine Speed Limiter during upshift
48-63	Spare		

4.3 Message 33h

ID	33h		
Dir	GCU TX / Engine Controller RX		
Rate	20ms		
Bits	Name	Scaling	Notes
0-3	Gear	1 position/bit	0=r, 1=n, 2=1 st ...
4-15	GCU Sensor Error Status bits (i.e sensor error bit field)	Bit 4	TBD
		Bit 5	TBD
		Bit 6	P_BLIPPER
		Bit 7	CAL_POT
		Bit 8	P_SYS
		Bit 9	P_UPSHIFT
		Bit 10	P_DOWNSHIFT
		Bit 11	V_GEAR
		Bit 12	P_CLUTCH
		Bit 13	MODE SWITCH
		Bit 14	T_SYS
		Bit 15	TBD
16-31	V_GEAR	(1/ 819.2)V/bit	Gear voltage
32-39	GCU Switch Status bits	Bit 32	UPSHIFT SW
		Bit 33	DOWNSHIFT SW
		Bit 34	DETENT SW
		Bit 35	CLUTCH SW
		Bit 36	TBD
		Bit 37	TBD
		Bit 38	TBD
		Bit 39	TBD
40-47	Shift Diagnostic code	Enumeration	Enumeration that latches last diagnostic code produced by shift state machine - trDiagCode
48-63	Spare		

4.4 Message 34h

ID	34h		
Dir	GCU TX / Engine Controller RX		
Rate	20ms		
Bits	Name	Scaling	Notes
0-7	trDebugMsgHistory01	Identity	Shift diagnostics only
8-15	trDebugMsgHistory02		
16-23	trDebugMsgHistory03		
24-31	trDebugMsgHistory04		
32-39	trDebugMsgHistory05		
40-47	trDebugMsgHistory06		
48-55	trDebugMsgHistory07		
56-63	trDebugMsgHistory08		

4.5 Message 35h

ID	35h		
Dir	GCU TX / Engine Controller RX		
Rate	20ms		
Bits	Name	Scaling	Notes
0-7	trDebugMsgHistory09	Identity	Shift diagnostics only
8-15	trDebugMsgHistory10		
16-23	trDebugMsgHistory11		
24-31	trDebugMsgHistory12		
32-39	trDebugMsgHistory13		
40-47	trDebugMsgHistory14		
48-55	trDebugMsgHistory15		
56-63	trDebugMsgHistory16		

4.6 Message 36h

ID	36h		
Dir	GCU TX / Engine Controller RX		
Rate	20ms		
Bits	Name	Scaling	Notes
0-7	trDebugMsgHistory17	Identity	Shift diagnostics only
8-15	trDebugMsgHistory18		
16-23	trDebugMsgHistory19		
24-31	trDebugMsgHistory20		
32-39	trDebugMsgHistory21		
40-47	trDebugMsgHistory22		
48-55	trDebugMsgHistory23		
56-63	trDebugMsgHistory24		

4.7 Message 37h

ID	37h		
Dir	GCU TX / Engine Controller RX		
Rate	20ms		
Bits	Name	Scaling	Notes
0-7	trDebugMsgHistory25	Identity	Shift diagnostics only
8-15	trDebugMsgHistory26		
16-23	trDebugMsgHistory27		
24-31	trDebugMsgHistory28		
32-39	trDebugMsgHistory29		
40-47	trDebugMsgHistory30		
48-55	trDebugMsgHistory31		
56-63	trDebugMsgHistory32		

4.8 Message 42h

ID	42h		
Dir	GCU TX / Engine Controller RX		
Rate	100ms		
Bits	Name	Scaling	Notes
0-15	Gear ratio	(1/8192)ratio/bit	Gear ratio for current selected gear
16-19	Mode switch enumeration	1position/bit	0 = MANUAL 1 = BLEED_DOWNSHIFT 2 = BLEED_UPSHIFT 3 = BLEED_CLUTCH 4 = BLEED_DETENT 5 = BLEED_Blip 6 = CLUTCHED_UPSHIFT 7 = UNCLUTCHED_UPSHIFT
20-23	Spare Status bits	Bit 20	TBD
		Bit 21	TBD
		Bit 22	TBD
		Bit 23	TBD
24-31	T_SYS	1 deg/bit 00h=-55deg	Shift system temperature
32-47	P_SYS	0.005 bar/bit	Air system pressure
48-63	Spare		

4.9 Message 57h

ID	57h		
Dir	GCU TX / Engine Controller RX		
Rate	100ms		
Bits	Name	Scaling	Notes
0-15	Cal Pot	Identity, 0-3	
16-31	Cal Pot Error	0=no error, 1=error	
32-47	ECUT	0.1°C/bit, 00h = -100°C	
48-63	VBAT	1mv /Bit 0-16 volts	

4.10 Message 200h – ETC applications only

ID	200h		
Dir	GCU TX / Engine Controller RX		
Rate	5ms		
Bits	Name	Scaling	Notes
0-15	Throttle Blip Position	0.1°/bit	Requests greater than 45° will be clipped
16-23	Throttle Blip Enable		0 - Disable 1 - Enable
24-31	Unused		
32-47	Unused		
48-63	Unused		

4.11 Reserved Frame Identifiers

All frames in the range 0 – 2ffh are reserved for future use and should not be used for other purposes.