CAN Formula Wheel (CFW277)

User Guide

www.cosworth.com

Contents

Introduction

The Cosworth CFW277 is a 277mm diameter formula wheel for use in open and closed cockpit racing cars. Using Cosworth's experience in building F1 steering wheels, the CFW277 is constructed from aerospace grade Aluminium with moulded rubber grips – Manufactured using techniques developed for use in F1 steering wheels. It has a rich 3.5" sunlight viewable TFT display which boasts high graphical resolution at 320x240 QVGA with 64k colours making this one of the most powerful dash displays on the market. Paired with 8 clearly visible and configurable shift lights this is the perfect solution for a formula wheel.

There are 6 permanently fitted switches which have been ergonomically positioned for driver comfort and practicality. All switch states are available on CAN and 2 switches also have a direct electrical connection for switching non CAN devices such as radio push to talk function. There is an option to have two rotary switches fitted. The wheel comes with a professional sticker pack to allow the end user to easily mark the wheel up to their own specifications whilst maintaining the sharp, F1 visual attraction.

The CFW can be connected to the car via a coily cable, and has two low-cost connectors to keep the loom prices down. One connector is for the switches and power, the other for expansion to a paddle shift system.

The wheel has been designed to accept industry standard paddles including Cosworth, Shiftec and Hewland as standard but others may be compatible. The paddles are CAN based as well as directly being passed through to the system connector for direct electrical connections. Designed to be electrically robust, the CFW277 has reverse-battery, over-voltage and load dump protection built in.

Specifications

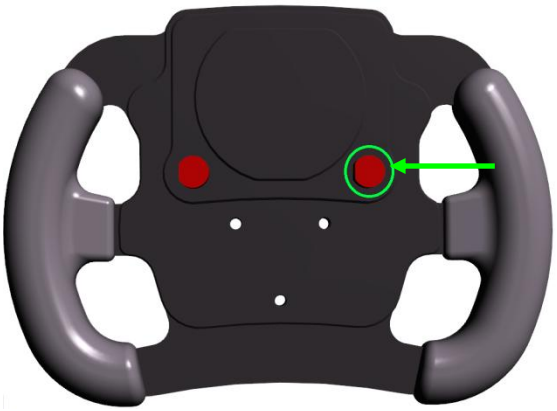
Technical Data	
Supply voltage	10-18V
Supply current	230mA
Screen	a-Si TFT LCD 3.5”
Pixels	320 x 240 QVGA
Viewable Area	70.08 x 52.56mm
Switches	6
Button Legends	User Configurable
Gearshift Paddles	2 (optional)
Coily cable Outputs	2x Switch (S1 and S4) 2x Paddles
Rotary switches	2 (only on –RS version)
Switch steps	12 Positions
CAN Ports	1 x CAN 2.0B
CAN BAUD rate	1Mb
CAN Termination	Un-terminated
Temperature Rating	Operating -20 to +70°C Storage -30 to +80°C
Mechanical Data	
Material	AI.Alloy 6082-T6
Diameter	277mm
Quick Release offset	19mm back from grip centreline
Quick Release Mounting	3 hole 50.8mm PCD QR
Quick Release Fixing	M5 countersunk high tensile bolts (not included)
Weight	1200g (ex QR & paddles)
IP Rating	IP65

Ordering Information

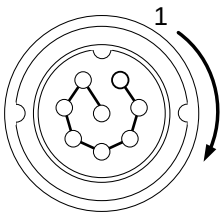
Part Number	
01D-032985	Cosworth CAN Formula Wheel (ex Rotary switches)
01D-032985-RS	Cosworth CAN Formula Wheel (inc Rotary switches)
03A-06500	CAN Formula Wheel Coiled Cable

Connector Information

System Connector



Connector	Mating connector
LTW BD-08PMMP-LC7001	LTWBD-08BFFA-LL7001

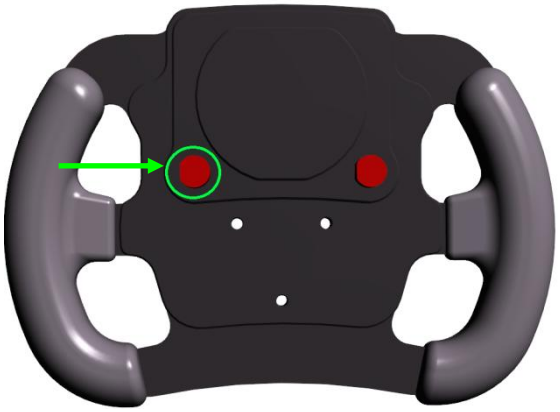


Amphenol
LTWDB-08BFFA-LL1001
Mating Face view

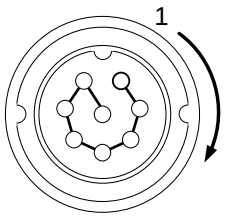
Pinout

Pin	Signal	Description
1	Gnd	Ground
2	+12V	VBatt
3	CAN Lo	CAN Lo
4	CAN Hi	CAN Hi
5	CS1	Column Switch 1 (S1)
6	CS2	Column Switch 2 (S4)
7	Up_Pad_Out	Up Paddle Output
8	Dn_Pad_Out	Down Paddle Output

Expansion Connector



Connector	Mating connector
LTW BD-08PMMP-LC7001	LTWBD-08BFFA-LL7001

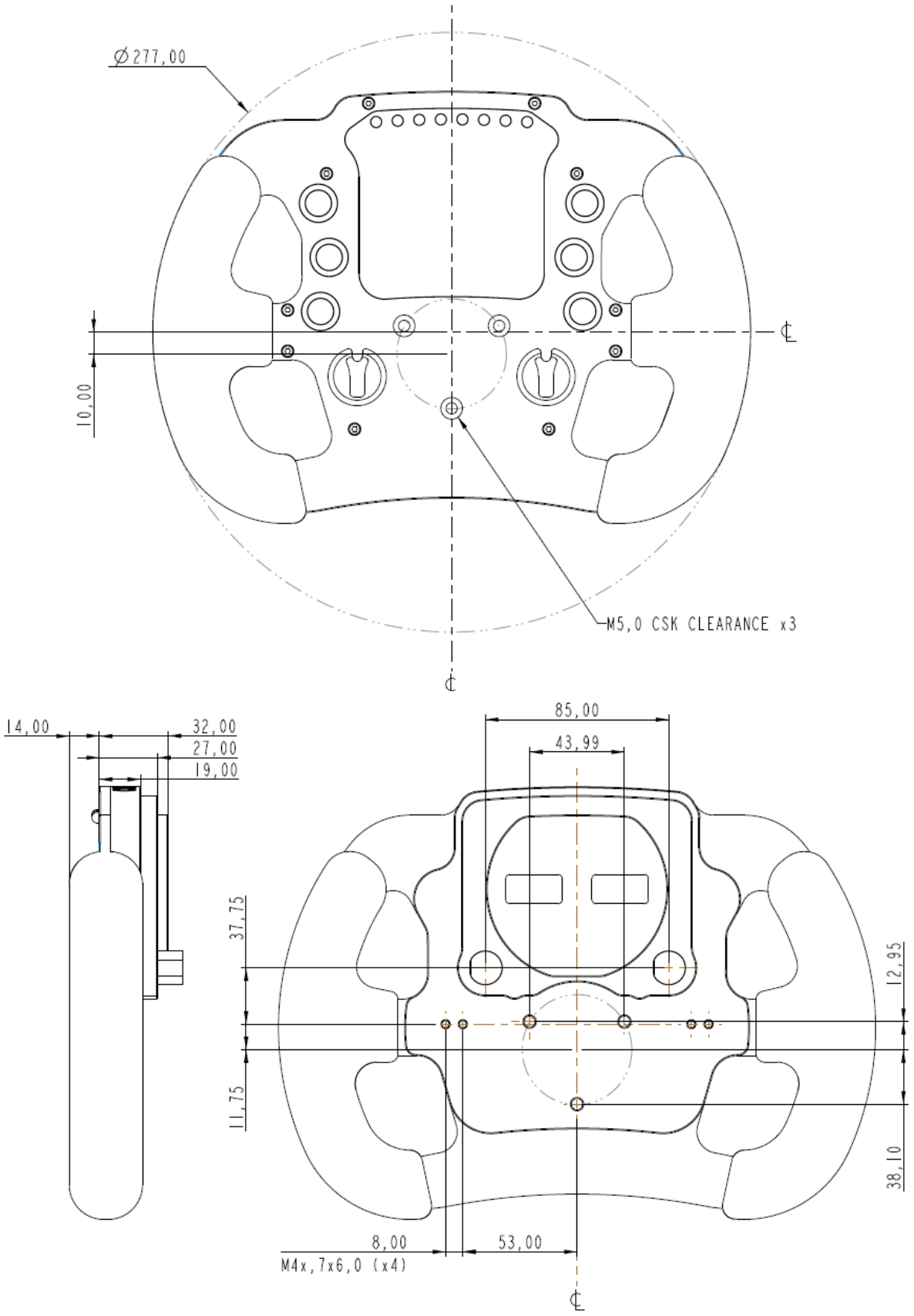


Amphenol
LTWDB-08BFFA-LL1001
Mating Face view

Pinout

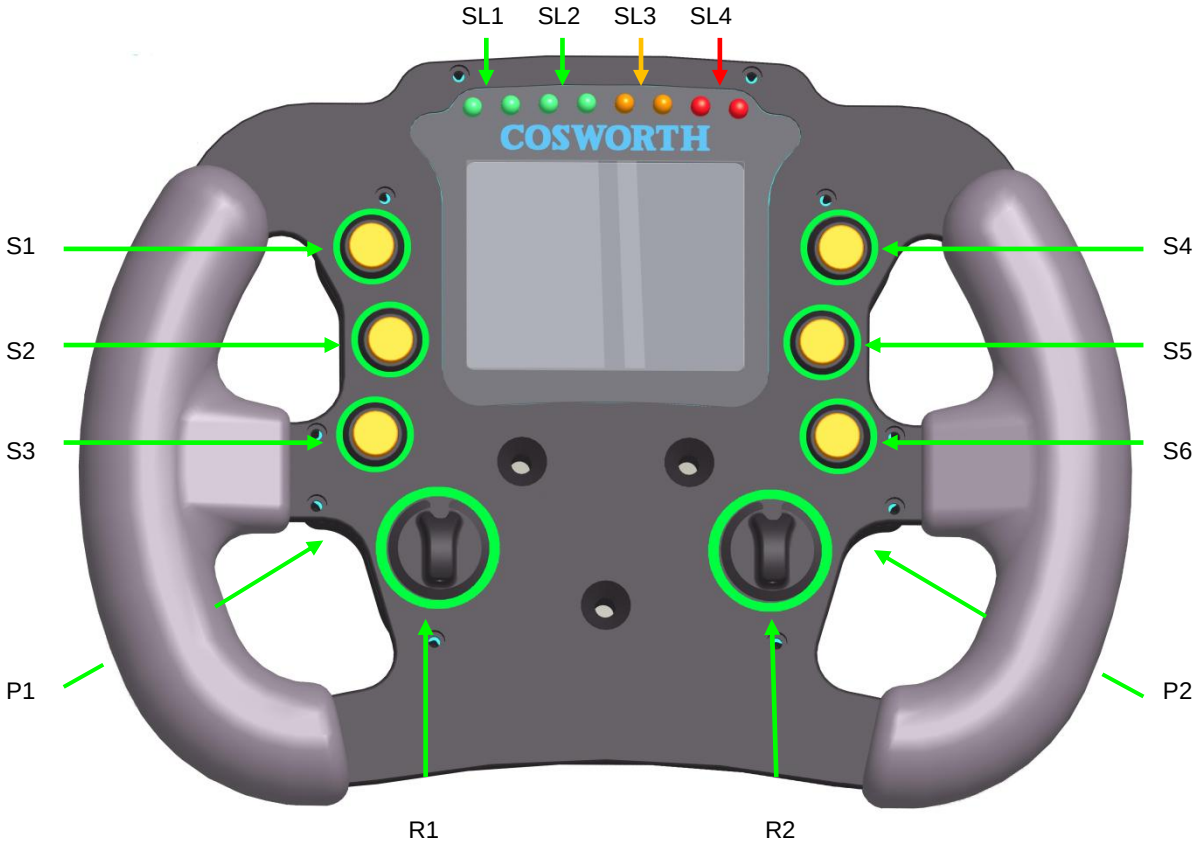
Pin	Signal	Description
1	Gnd	Ground
2	P_PWR	+8V Paddle Power
3	USB_V+	USB_V+
4	USB_D-	USB_D-
5	USB_D+	USB_D+
6	USB_Gnd	USB_Gnd
7	Up_Pad_In	Up Paddle Input
8	Dn_Pad_In	Down Paddle Input

Dimensions


Ø277,00
10,00
M5,0 CSK CLEARANCE x3
14,00
32,00
27,00
19,00
85,00
43,99
37,75
11,75
12,95
38,10
8,00
53,00
M4x,7x6,0 (x4)

LED, Button and Rotary Switch Identification

The Switches, Paddles, Rotary's and LED's are identified as shown below



Switch Inputs

There are 8 separate digital switch inputs 6 on the front and 2 additional paddle inputs available through the expansion connector which are internally pulled-up to the CFW internal +8V supply via a 10k resistor, these are transmitted via CAN at 200Hz.

Rotary Inputs

There are 2 separate analogue inputs with a 0-5V output range these are internally pulled to ground via a 1MΩ resistor; these are transmitted via CAN at 100Hz. These analogues are optional and only fitted on the –RS version.

Switch Outputs

There are 4 digital outputs these are available on the system connector:

The first 2 are from the switches S1 and S4 these both have their output passed directly to the system connector

The second 2 are from the paddles P1 and P2 these both also have their output passed directly to the system connector

Shift Lights

There are 8 shift light LED's these are configures in 4 pairs SL1 LED 1 & 2 Green. SL2 LED 3 & 4 Green, SL3, LED 5 & 6 Orange and SL4 LED 7 & 8 Red.

CAN Communications

All CAN identifications are fixed using the following structure.

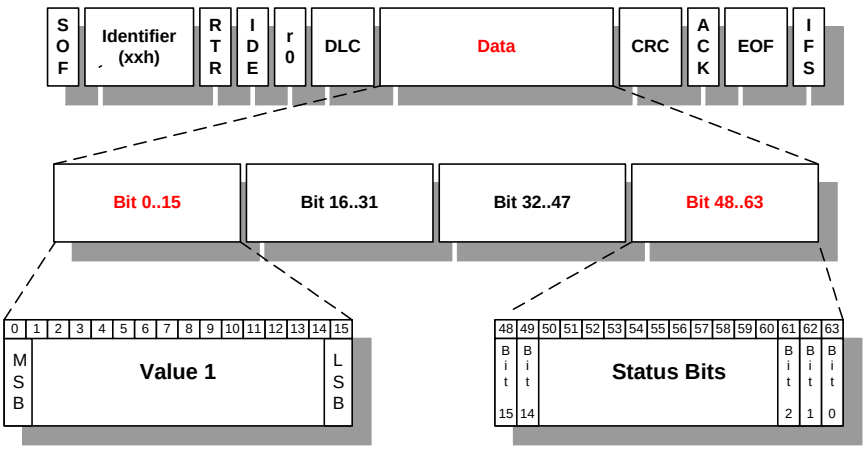
CAN Bus Properties

- A fixed BAUD rate of1MB
- 11 bit identifiers
- The data shall be in Intel format (little endian)

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

ID	Xxh		
Dir	Sigma Logger 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.

Cosworth Validation Word

To enable the CAN stream to be more robust in application, Cosworth implement a number of checks on the validity of the CAN data. The content of this word is only compatible with Pi and Pectel devices.

CAN Transmission

The following is the CAN address summary:

Description	Address
Switch Status Transmit and system parameters	0xc0
Analogue Input 1 to 2	0xc1
LED Intensity	0x72F

Message 0xc0 –Switch 1-8 Packet

CAN Switch Status and System Parameter

The following CAN message shows the state of the switch inputs and digital inputs:

Switch / Digital input status
1 = Switch closed, digital input is at 0V.
0 = Switch open, digital input is at +5V.

All switches are treated as momentary. The receiving device is responsible for interpreting the switch presses and performing any logic required for the switch to operate as a latching or multi-state switch.

Switches are de-bounced by ensuring the switch status is the same for 2 consecutive 10mS readings prior to the updated switch status being transmitted over CAN.

ID	0xc0				
Dir	CFW277 Transmit				
Rate	200Hz				
Bits	Name	Scaling	Notes		
0-15	Cosworth Validation Word	U16			
16-23					
24-31					
32-39	Dash Battery Voltage	U8	100mV/bit		
40-47					
48-63	Switch States	Status Bitfield	0	Switch 1	[S1]
			1	Switch 2	[S2]
			2	Switch 3	[S3 Page]
			3	Switch 4	[S4]
			4	Switch 5	[S5]
			5	Switch 6	[S6 Alarm]
			6	Switch 7	[P1]
			7	Switch 8	[P2]
			8	Reserved – set to zero	
			9	Reserved – set to zero	
			10	Reserved – set to zero	
			11	Reserved – set to zero	
			12	Reserved – set to zero	
			13	Reserved – set to zero	
			14	Reserved – set to zero	
			15	Reserved – set to zero	

Message 0xc1 - Analogue 1-2 Packet

This packet contains the 0-5v voltage from the 2 Analogue inputs as well as the corresponding CVW.

ID	0xc1		
Dir	CFW277 to Cosworth System		
Rate	200Hz		
Bits	Name	Scaling	Notes
0-15	Cosworth Validation Word	U16	
16-31	Rotary Switch 1	U16	1mV/bit [R1]
32-47	Rotary Switch 2	U16	1mV/bit [R2]
48-63			

Message 0xc2 – CVW ONLY 1 Packet

Reserved for Cosworth use only.

ID	0xc2		
Dir	CFW277 Transmit		
Rate	100Hz		
Bits	Name	Scaling	Notes
0-15	Cosworth Validation Word	U16	
16-31			
32-47			
48-63			

Message 0xc3 – CVW ONLY 2 Packet

Reserved for Cosworth use only.

ID	0xc3		
Dir	CFW277 Transmit		
Rate	100Hz		
Bits	Name	Scaling	Notes
0-15	Cosworth Validation Word	U16	
16-31			
32-47			
48-63			

Message 0xc4 – CVW ONLY 3 Packet

Reserved for Cosworth use only.

ID	0xc4		
Dir	CFW277 Transmit		
Rate	100Hz		
Bits	Name	Scaling	Notes
0-15	Cosworth Validation Word	U16	
16-31			
32-47			
48-63			

CAN Receive

Message 0x100 – Engine Speeds 1

ID	0x100		
Dir	CFW277 Receive		
Rate	100Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	FL_Speed	(x*0.06) [Kph]	U16
16-31	FR_Speed	(x*0.06) [Kph]	U16
32-47	RL_Speed	(x*0.06) [Kph]	U16
48-63	RR_Speed	(x*0.06) [Kph]	U16

Message 0x108 – TPS PPS

ID	0x108		
Dir	CFW277 Receive		
Rate	100Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	TPS	(x/10) [°]	U16
16-31			
32-47	PPS	(x/10) [%]	U16
48-63			

Message 0x110 – Engine Temps 1

ID	0x110		
Dir	CFW277 Receive		
Rate	5Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	ACT	(x/10)-100 [°C]	U16
16-31	ECT	(x/10)-100 [°C]	U16
32-47	EOT	(x/10)-100 [°C]	U16
48-63	FT	(x/10)-100 [°C]	U16

Message 0x118 – Engine Temps 2

ID	0x118		
Dir	CFW277 Receive		
Rate	5Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	Tex 1	(x/10)-100 [°C]	U16
16-31			
32-47			
48-63	AAT	(x/10)-100 [°C]	U16

Message 0x128 – Engine Pressures 1

ID	0x128
Dir	CFW277 Receive

Rate	50Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	EOP	(x/1000) [bar]	U16
16-31	FP	(x/1000) [bar]	U16
32-47	FRP	(X/20) [bar]	U16
48-63			

Message 0x130 – Engine Pressures 2

ID	0x130		
Dir	CFW277 Receive		
Rate	50Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	CCP	(x/1000) [bar]	U16
16-31	ECP	(x/1000) [bar]	U16
32-47			
48-63			

Message 0x138 – Steer and Shift Pressures

ID	0x138		
Dir	CFW277 Receive		
Rate	50Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	Steer	(x/10)-3276.8 [°]	U16
16-31	P_Sys	(x/200) [bar]	U16
32-47			
48-63			

Message 0x160 – Engine CalPots

ID	0x160		
Dir	CFW277 Receive		
Rate	5Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15			
16-31	CAL_POT	Identity	U16
32-47	TCS_POT	Identity	U16
48-63	B_POT	Identity	U16

Message 0x168 – Gear Box 1

ID	0x168			
Dir	CFW277 Receive			
Rate	250Hz			
Bits	**Name**	**Scaling**	**Type/Notes**	
0-15	combUpDwnShift	Enum/Bitfield	0-2	TrModeSwitch(Enum) 0 = Manual 1 = Bleed_Downshift

ID	0x168		
Dir	CFW277 Receive		
Rate	250Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
			0-2 2 = Bleed_Upshift 3 = Bleed_Clutch 4 = Bleed_Detent 5 = Bleed_Blip 6 = Clutched_Upshift 7 = Unclutched_Upshift 3 Unused 4 Detent_OP_Bit 5 Down_OP_Bit 6 Up_OP_Bit 7 Clutch_OP_Bit 8 Blip_OP_Bit 9 Pump_OP_Bit 10 Man_Sw_Bit 11 Up_Sw_Bit 12 Down_Sw_Bit 13 Detent_Sw_Bit 14 Clutch_Sw_Bit
16-21			
22-31	V_Gear	(x/204.8) [V]	
32-47			
48-63			

Message 0x170 – Engine Speeds 2

ID	0x170		
Dir	CFW277 Receive		
Rate	100Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	RPM	Identity [RPM]	U16
16-31	MAP	Identity [mBar]	U16
32-47	Engine Status	Bitfield	0-1 Sync Mode (Enum) 0 = No_Sync 1 = 360_Sync 2 = 720_Sync 2-4 Shift State 5 Rev Limit Active 6 Rev Cut Active 7 Pit Lane Cruise Active 8 Over-run Fuel Cut Active 9 Oil Pressure Cut Active 10 P2P Map Active 11 Penalty Rev Limit Active 12 Stuck Throttle Cut Active 13 Gear_Cut Active
48-63	Car_Speed	(x*0.06)[kph]	U16

Message 0x178 – VBatt

ID	0x178		
Dir	CFW277 Receive		
Rate	50Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15			
16-31			
32-47	V_Batt	(x/1000)[v]	U16
48-63			

Message 0x180 – Engine BAP and FBW

ID	0x180			
Dir	CFW277 Receive			
Rate	5Hz			
Bits	**Name**	**Scaling**	**Type/Notes**	
0-15	BAP	Identity [mBar]	U16	
16-31	FBWStatus	Bitfield	0-6	fbwErrorCause (Enum) 0 = Not_Failed 19 = Feedback_Fail 20 = Demand_Fail 40 = HBR_Fail 41 = HBR_Temp_Fail 43 = REG_EXC_Fail
			7	PPS_Range_Error
			8	TPSA_Range_Error
			9	TPSB_Range_Error
			10	PPS_Diff_Check_Fail
			11	TPSA_Diff_Check_Fail
			12	TPSB_Diff_Check_Fail
			13	PPS_Noise_Check_Fail
			14	TPSA_Noise_Check_Fail
			15	TPSB_Noise_Check_Fail
32-47	AutoCalCode	Bitfield	0	None
			1	Start
			2	Latch_PPS
			3	Opening_TPS
			4	Closing_TPS
			5	AutoCal_Success
			6	AutoCal_Fail
48-63				

Message 0x188 – Gear Box 2

ID	0x188			
Dir	CFW277 Receive			
Rate	25Hz			
Bits	**Name**	**Scaling**	**Type/Notes**	
0-15				
16-31	Gear_Pos	Enum	0 1 2 3 4 5 6 7	Reverse [R] Neutral [N] First [1] Second [2] Third [3] Fourth [4] Fifth [5] Sixth [6]
32-47				
48-63				

Message 0x190 – Engine Switch startes

ID	0x190			
Dir	CFW277 Receive			
Rate	50Hz			
Bits	**Name**	**Scaling**	**Type/Notes**	
0-15				
16-31	Comb_Sw_On	Bitfield	0 1 2 3 4 5 6 7 8 9 10 11 12	Pit_Lane Sw_On ALS_Sw_On Push_2_Pass_Sw_On Start_Line_Sw_On Kill_Sw_On Rain_Sw_On TcsSwUp TcsSwDown CalSwUp CalSwDown Gear_Sw_ON Brake_Sw_On Ac_Sw_On
32-47				
48-63				

Message 0x1a0 – GBT

ID	0x1a0		
Dir	CFW277 Receive		
Rate	5Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	GBT	(x*0.1)-100 [°C]	U16
16-31			
32-47			
48-63			

Message 0X1A8 – Dash Shift Lights & Alarms

ID	0x1A8				
Dir	CFW277 Receive				
Rate	50Hz				
Bits	**Name**	**Scaling**	**Type/Notes**		
0-15	Alarms	Status Bitfield	0	Alarm 1	[EOP L]
			1	Alarm 2	[ECT H]
			2	Alarm 3	[ECP L]
			3	Alarm 4	[FP L]
			4	Alarm 5	[ECT L]
			5	Alarm 6	[EOP H]
			6	Alarm 7	[ECP H]
			7	Alarm 8	[Batt L]
			8	Alarm 9	[EOT H]
			9	Alarm 10	
			10	Alarm 11	
			11	Alarm 12	
			12	Alarm 13	
			13	Alarm 14	
			14	Alarm 15	
			15	Alarm 16	
16-31	Shift Lights	Status Bitfield	0	LED 1	[Green]
			1	LED 2	[Green]
			2	LED 3	[Orange]
			3	LED 4	[Red]
32-47	Previous Lap time	(x/0.01)[Seconds]	U16		
48-63	Segment Time Difference	(x/0.01)[Seconds]	S16		

Message 0x1B0 – Brake Pressures

ID	0x1B0		
Dir	CFW277 Receive		
Rate	50Hz		
Bits	**Name**	**Scaling**	**Type/Notes**
0-15	Press_Brake Front_Omega	(x/200)[bar]	U16
16-31	Press_Brake Rear_Omega	(x/200)[bar]	U16
32-47	Lap Number	Identity	U16
48-63	Ref Lap Time	(x/100) [Seconds]	U16

Message 0x72F – Display & LED Intensity

The LED intensity control packet has the same CAN ID as the Membrane Switch Panel. There is only one CAN ID for this packet, and the packet will be received by all Cosworth devices who will adjust the brightness of the LEDs accordingly.

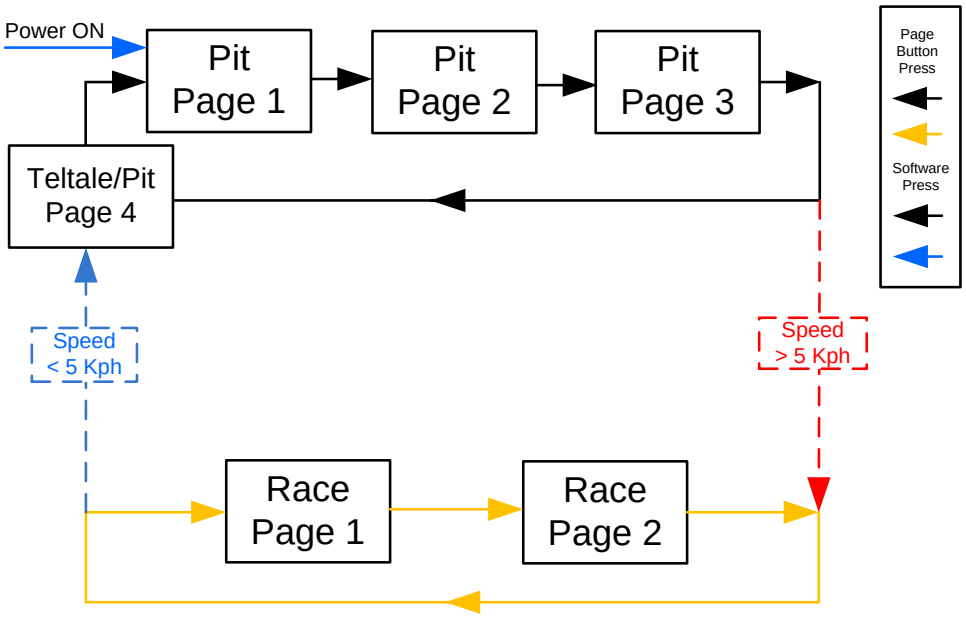
ID	0x72F			
Dir	CFW277 Receive			
Rate	1Hz			
Bits	Name	Scaling	Notes	
0-7	LED Brightness (0 to 31 to be compatible with MSP), along with indication of Day or Night brightness mode.	Status Bitfield	0 1 2 3 4 5 6 7	LED Brightness Bit 0 LED Brightness Bit 1 LED Brightness Bit 2 LED Brightness Bit 3 LED Brightness Bit 4 Must be set to zero Must be set to zero 1 = Day brightness (bright), 0 = night
8-15	Display Brightness (0-31 to be compatible with MSP), along with indication of Day or Night brightness mode.	Status Bitfield	0 1 2 3 4 5 6 7	Display Brightness Bit 0 Display Brightness Bit 1 Display Brightness Bit 2 Display Brightness Bit 3 Display Brightness Bit 4 Must be set to zero Must be set to zero 1 = Day brightness (bright), 0 = night
16–63				

Display Layouts

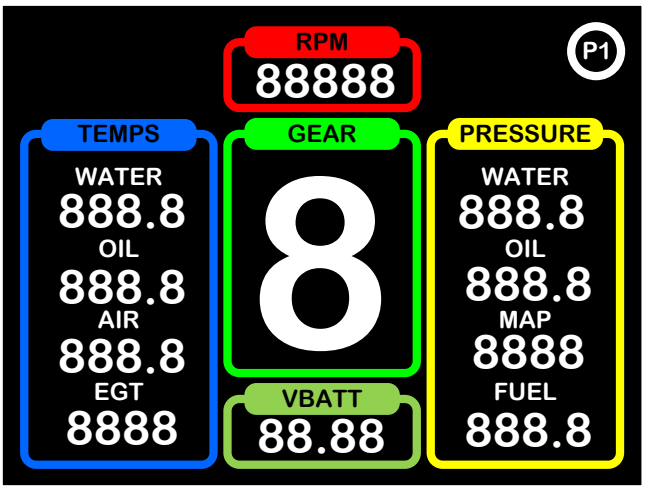
The following page layouts are fixed and will display the channels as shown. When the display turns on it will always start on page Pit page 1. The pages are changed using the page button.

Pit Pages

Pit Pages are pages that are only available when the vehicle speed is less than 5kph, the pages should function in a circular manor. 1-2, 2-3, 3-1. Once the speed is greater than 5kph they will no longer be available, unless the speed drops back below 5kph. Speed should be taken from the channel car_Speed (message 0x170 bits 48-63)



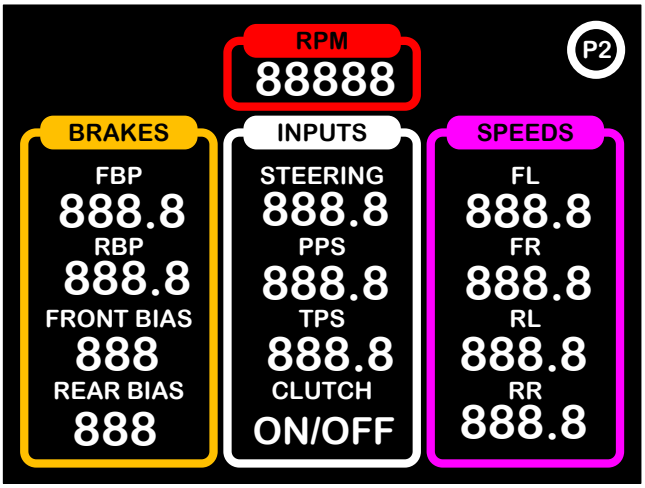
Pit Page 1



Dash Channel	CAN Name	Message
Oil Temp	EOT	0x110 Bits 32-47
Water Temp	ECT	0x110 Bits 16-31
Air Temp	AAT	0x118 Bits 48-63
EGT	EGT	0x118 Bits 0-15
Batt	VBat	0x178 Bits 32-47
RPM	RPM	0x170 Bits 0-15
Gear	Gear	0x188 Bits 16-31 **
Oil Pressure	EOP	0x128 Bits 0-15
Water Pressure	P_Wat	0x130 Bits 16-31
MAP	MAP	0x170 Bits 16-31
Fuel Pressure	FP	0x128 Bits 16-31

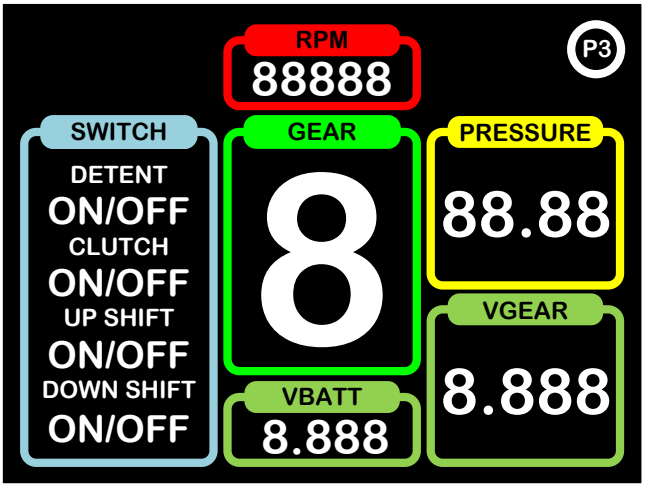
** The enumerated value of this channel will be shown.

Pit Page 2 - Chassis



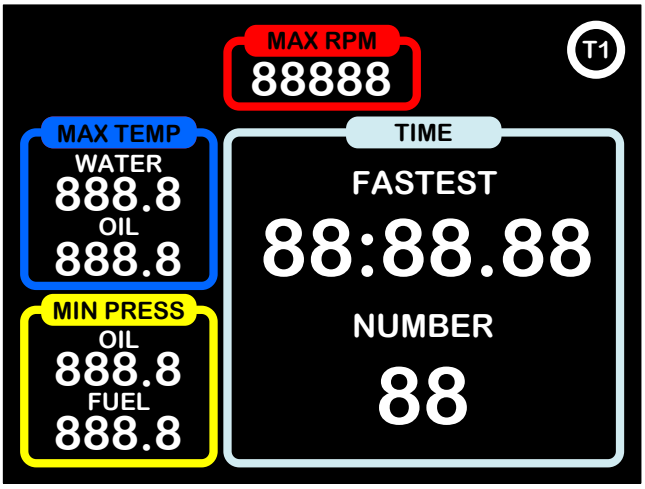
Dash Channel	CAN Name	Message
FBP	EOT	0x1B0 Bits 0-15
RBP	ECT	0X1B0 Bits 16-31
Front Bias	Dash Calc	Front Brake %
Rear Bias	Dash Calc	Rear Brake %
Rain Light	Comb_Sw_On	0x190 Bits 16-31 Bit 5 == 1**
Steering	STEER	0x138 Bits 0-15
Clutch Switch	CombUpDwnShift	0x168 Bits 0-15 Bit 11 == 1**
TPS	TPSA	0x108 Bits 0-15
PPS	PPS	0x108 Bits 31-47
FL WSP	FL_Speed	0x100 Bits 0-15
FR WSP	FR_Speed	0x100 Bits 16-31
RL WSP	RL_Speed	0x100 Bits 32-47
RR WSP	RR_Speed	0x100 Bits 48-63

Pit Page 3 – Gear Box



Dash Channel	CAN Name	Message
Detent	CombUpDwnShift	0x168 Bits 0-15 Bit 10 == 1**
Clutch	CombUpDwnShift	0x168 Bits 0-15 Bit 11 == 1**
Up	CombUpDwnShift	0x168 Bits 0-15 Bit 8 == 1**
Down	CombUpDwnShift	0x168 Bits 0-15 Bit 9 == 1**
RPM	RPM	0x170 Bits 0-15
Gear	Gear	0x188 Bits 16-31
V Gear	Gear	0x168 Bits 22-31
PSys	P_Sys	0x138 Bits 16-31
GBox Oil	GBT	0xA0 Bits 0-15

Pit Page 4 /Telltale Page



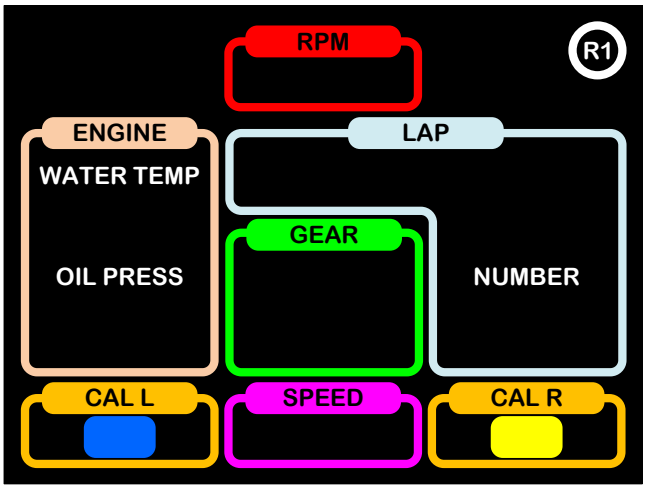
Dash Channel	Source
Max Water Temp	Internal
Max Oil Temp	Internal
Min Oil Pressure	Internal
Min Fuel Pressure	Internal
Max RPM	Internal
Fastest Lap Time	Internal
Lap Number of fastest lap time	Internal

The Telltale page will show the values as indicated from the last outing (speed >5) these information is NOT held over a power cycle.

Race Pages

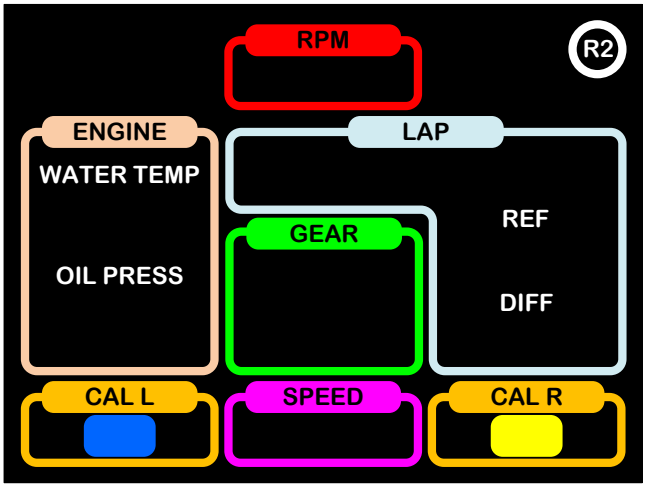
Race Pages are pages that are only available when the vehicle speed is greater than 5kph, the pages should function in a circular manor. 1-2, 2-1. Once the speed is less than 5 kph they will no longer be available, unless the speed increases back above 5kph. Speed should be taken from the channel car_Speed (message 0x170 bits 48-63). When entering Race mode the dash will always start on Race page 1.

Race Page 1



Dash Channel	CAN Name	Message
Oil Pressure	EOP	0x128 Bits 0-15
Water Temp	ECT	0x110 Bits 16-31
CAL L	Internal	
CAL R	Internal	
RPM	RPM	0x170 Bits 0-15
Gear	Gear	0x188 Bits 16-31
Last Lap	Previous Lap Time	0x1A8 Bits 32-47
Lap Number	Lap Number	0x1B0 Bits 32-47

Race Page 2



Dash Channel	CAN Name	Message
Oil Pressure	EOP	0x128 Bits 0-15
Water Temp	ECT	0x110 Bits 16-31
CAL L	Internal	
CAL R	Internal	
RPM	RPM	0x170 Bits 0-15
Gear	Gear	0x188 Bits 16-31
Last Lap	Previous Lap Time	0x1A8 Bits 32-47
Ref	Ref Lap Time	0x1B0 Bits 32-47
Diff	Seg Time Diff	0x1A8 Bits 48-63

Alarm Overlay Layouts

Alarm overlays are displays that only display the information shown; the other areas show whatever information is required by the current page. The user is able to change page with an overlay active and whatever information is shown outside the area of the overlay will change. The alarms are triggered by the channel Alarms (message 0x1A8bits 0-15) each of the alarms comes from a single bit. If multiple alarms are true the dash will scroll through them all at a rate of 0.5Hz. The Alarm overlays will stay present until the Cosworth system stops sending them out at which point they will be removed as they are no longer active or have been acknowledged.

All alarms and overlays will display the unit as shown in the channel decode.

EOP L Alarm

Alarms channel bit 0 == 1, the channel value that needs to be displayed will come from the channel EOP (Message 0x128 bits 0-15), 1 decimal place will be shown.

ECT H Alarm

Alarms channel bit 1 == 1, the channel value that needs to be displayed will come from the channel ECT (Message 0x110 bits 32-47) , 1 decimal place will be shown.

ECP L Alarm

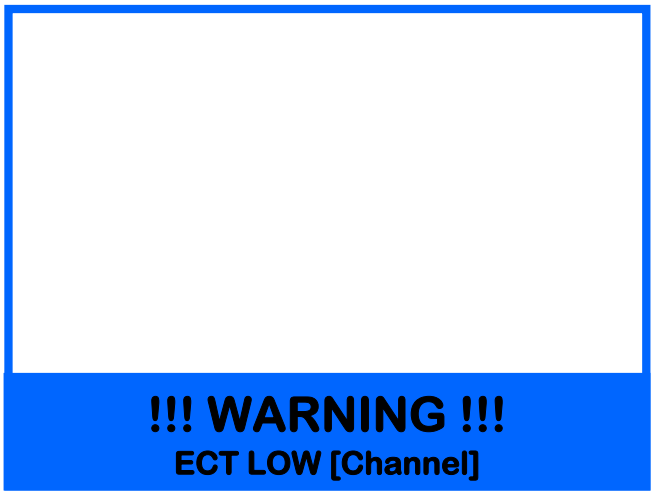
Alarms channel bit 2 == 1, the channel value that needs to be displayed will come from the channel ECP (Message 0x130 bits 16-31) , 1 decimal place will be shown.

FP L Alarm

Alarms channel bit 3 == 1, the channel value that needs to be displayed will come from the channel FP (Message 0x128 bits 16-31) , 1 decimal place will be shown.

ECT L Alarm

Alarms channel bit 4 == 1, the channel value that needs to be displayed will come from the channel ECT (Message 0x110 bits 32-47) , 1 decimal place will be shown.



EOP H Alarm

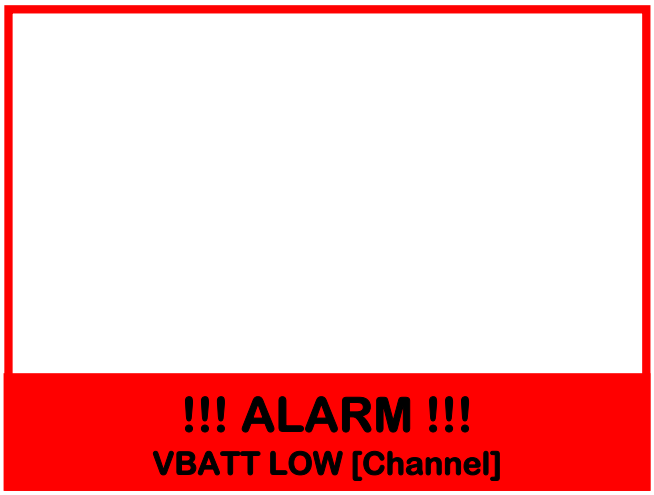
Alarms channels bit 5 == 1, the channel value that needs to be displayed will come from the channel EOP (Message 0x128 bits 0-15) , 1 decimal place will be shown.

ECP H Alarm

Alarms channel bit 6 == 1, the channel value that needs to be displayed will come from the channel ECP (Message 0x130 bits 16-31), 1 decimal place will be shown.

VBatt L Alarm

Alarms channel bit 7 == 1, , the channel value that needs to be displayed will come from the channel Vbat (Message 0x178 bits 32-47), 2 decimal place will be shown.



EOT H Alarm

Alarms channel bit 8 == 1, , the channel value that needs to be displayed will come from the channel EOT (Message 0x110 bits 32-47), 2 decimal place will be shown.

FRP L Alarm

Alarms channel bit 9 == 1, , the channel value that needs to be displayed will come from the channel FRP (Message 0x128 bits 32-47), 2 decimal place will be shown.

FRP H Alarm

Alarms channel bit 10 == 1, , the channel value that needs to be displayed will come from the channel FRP (Message 0x128 bits 32-47), 2 decimal place will be shown.

CCP H Alarm

Alarms channel bit 11 == 1, , the channel value that needs to be displayed will come from the channel CCP (Message 0x130 bits 0-15), 2 decimal place will be shown.

TEX H Alarm

Alarms channel bit 12 == 1, , the channel value that needs to be displayed will come from the channel TEX1 (Message 0x118 bits 0-15), 0 decimal place will be shown.

GBT L Alarm

Alarms channel bit 14 == 1, , the channel value that needs to be displayed will come from the channel GBT (Message 0x1A0 bits 0-15), 2 decimal place will be shown.

GBT H Alarm

Alarms channel bit 15 == 1, , the channel value that needs to be displayed will come from the channel VBATT (Message 0x178 bits 32-47), 2 decimal place will be shown.

VBATT H Alarm

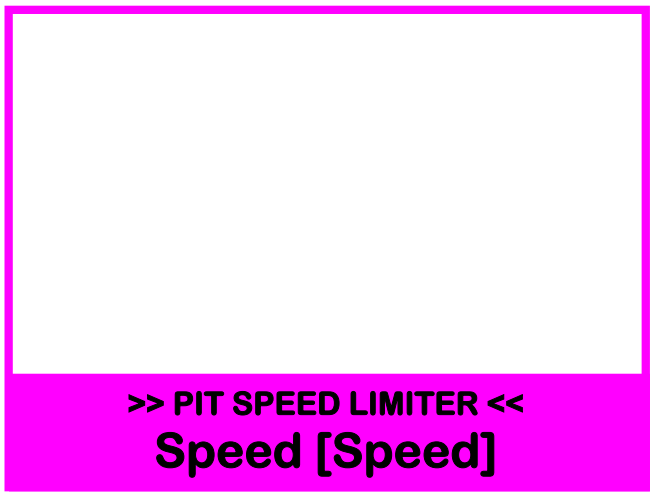
Alarms channel bit 15 == 1, , the channel value that needs to be displayed will come from the channel VBATT (Message 0x178 bits 32-47), 2 decimal place will be shown.

General Overlay Layouts

General overlays are displays that only display the information shown; the other areas show whatever information is required by the current page. General Overlays can be trigger at any time, if an alarm is active they will show on TOP. The user is be able to change page with an overlay active and whatever information is shown outside the area of the overlay will change. The overlays have a priority as shown in the order below, Priority 1 is the highest.

Pit Limit

This overlay is triggered if the channel Comb_Sw_On Bit 0 == 1 (message 0x190 bits 16-31). Priority 1, the channel value that needs to be displayed will come from the channel Car_Speed (Message 0x170 bits 48-63), 1 decimal place will be shown.



Detent Switch

This overlay is triggered if the channel CombUpDownShift Bit 10 == 1 (message 0x168 bits 0-15). Priority 2

Rain Light

This overlay is triggered if the channel Comb_Sw_On Bit 5 == 1 (message 0x190 bits 16-31), Priority 3.

FBW AutoCal Overlay

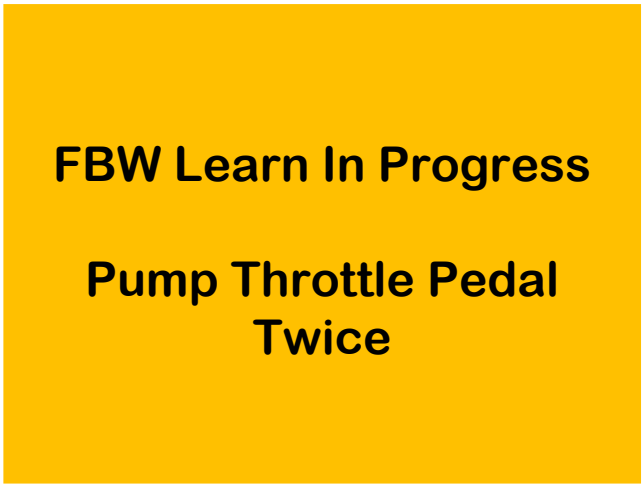
FBW AutoCal Overlays are a series of displays to aid in the calibration of the Fly By Wire. The following are displayed when the channel value is true.

FBW Autocal 1

This overlay is triggered if the channel autoCalCode == 100 (message 0x180 bits 32-47).

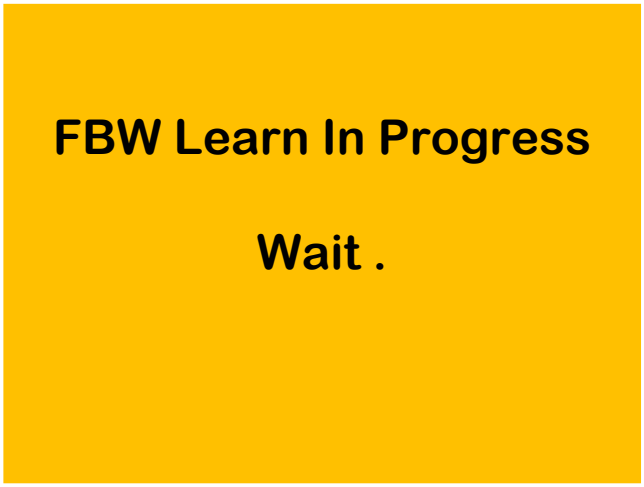
FBW Autocal 2

This overlay is triggered if the channel autoCalCode == 200 (message 0x180 bits 32-47).



FBW Autocal 3

This overlay is triggered if the channel autoCalCode == 300 (message 0x180 bits 32-47).

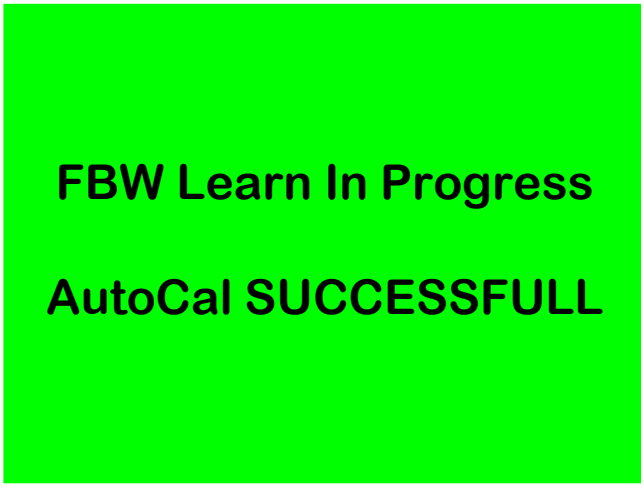


FBW Autocal 4

This overlay is triggered if the channel autoCalCode == 400 (message 0x180 bits 32-47).

FBW Autocal 5

This overlay is triggered if the channel autoCalCode == 500 (message 0x180 bits 32-47).



FBW Autocal 6

This overlay is triggered if the channel autoCalCode == 600 (message 0x180 bits 32-47). This display will self-cancel after 30 seconds of being active.

No CAN Error

If no recognised CAN packets are received within 2 seconds of power up then the dash should display NO CAN message (Shown below) and make ALL of the Shift light LED's flash on for ½ a second and off for 1.5 seconds.

If a valid CAN packet is received the display should revert back to normal functionality.