

Porsche ICD - Dash Layout

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Date:	afordham at 13/11/2013 08:36
Rev	2 (warning LED colour change) 3 (fuel cons, fuel level channel display change on the race page, gear pot description on vitals page) 4 (track map) 5 (fuel level tweak) 6 (alarms more description) 7 (brake switch and ignition on statements)

Overview

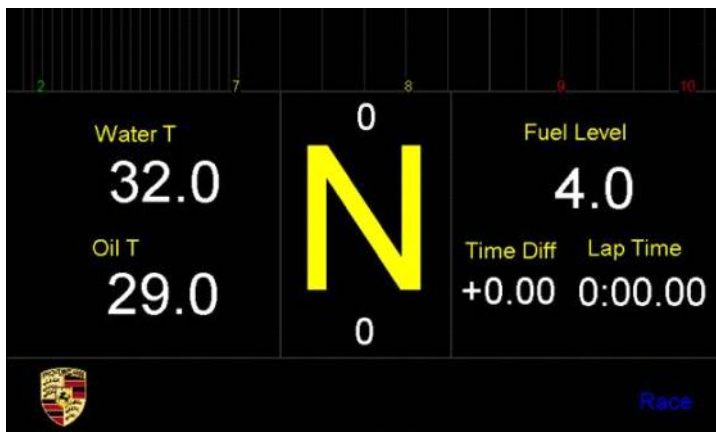
Pages 1 & 2 are 'track' pages and are the only visible pages to the driver when the car speed is above 10 Kph.

Pages 3 onwards are 'pit' pages and visible only if the speed is less than 10kph, if the speed goes to more than 10kph then the pit page is removed and replaced with the track page.

Throughout the display pages the ECU should be powered for valid readings to be displayed - this is with IGNITION on.

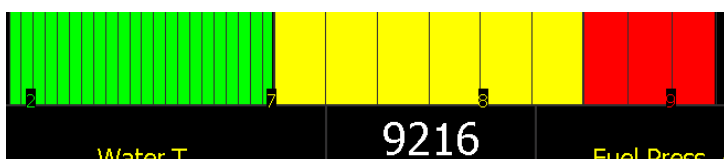
Race Page 1

On power up and when the car leaves the garage the dash will always revert to the race page. The page is divided into 3 main areas of information as shown.

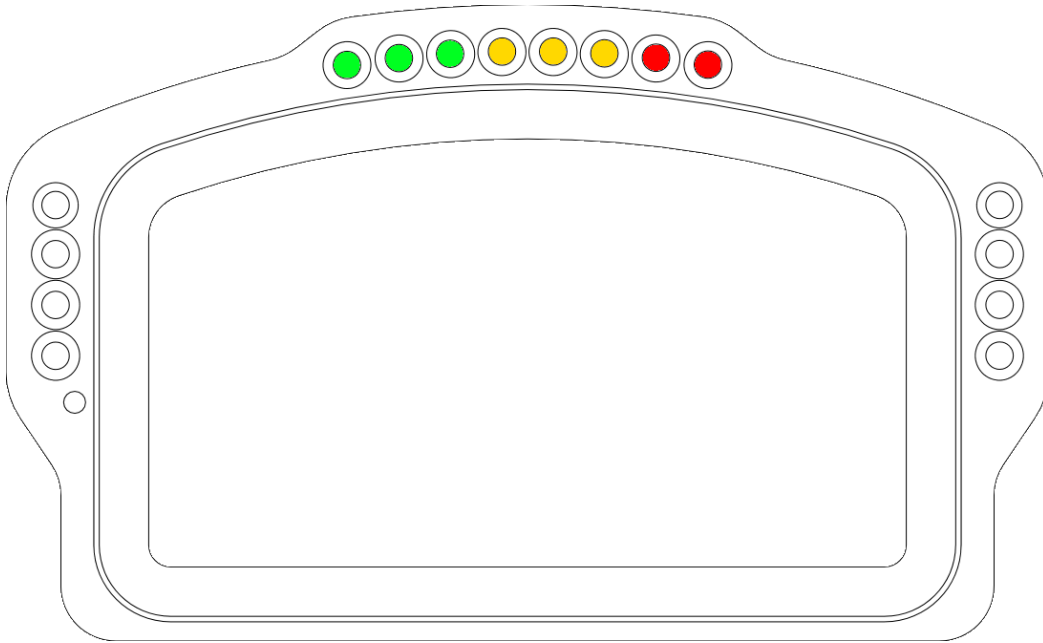


Engine Speed nmot area

Engine RPM is sent directly from the Bosch ECU and is displayed from 1500 to 10000 rpm. Green until 7000 rpm, Yellow from 7000 to 8500 rpm and red from 8500 to 10000 rpm.



This also matches the shift lights.



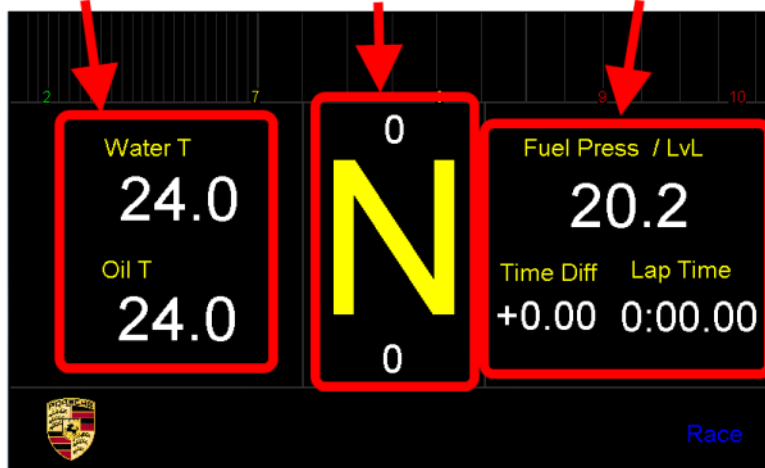
Channel information

Divided into 3 main areas;

Channel Display
click 'Page' button to
change channel pairs

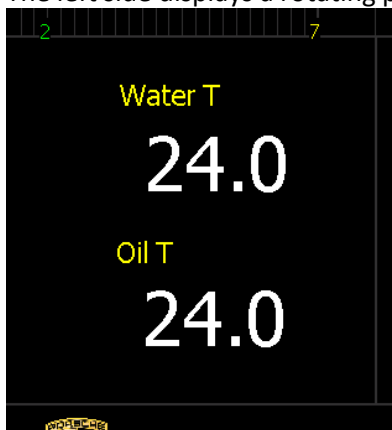
Fixed Display
RPM as a number
Gear & Car Speed

Fixed Channel Display
Fuel level and pressure channel
Qualifying mode and Lap Time



Left Panel - Channel display

The left side displays a rotating pair of channels



Order	Display label	Channel Description	Toolset / Toolbox channel name
1	Water T Oil T	Water Temperature Oil Temperature	MS4 tmot MS4 toil
2	Oil P Fuel P	Oil Pressure Fuel Pressure	MS4 poil M pfuel
3	Fuel lap Fuel Cons	Fuel per Lap Fuel cons value from ECU (resettable)	MS4 fuellap old MS4 fuelcons
4	Fuel Level Oil level	Fuel Level (sensor) (not connected to the accessory oil level)	Fuel Level
5	Brake bias Brake bal	Brake bias (sensor) Brake Balance (from brake press sensors)	Brake Bias, Brake balance

Middle Panel - Fixed Display

The middle section is fixed on the 'track' pages to show the same parameters



The top numeric is Engine speed as a number from the channel MS4 nmot.

The large 'N' is an indicator of gear number. The following are possible;

Display	Description
-	Indicates a gear position between valid gear numbers, eg 1.5, 2.5 etc
R	Reverse
N	Neutral
F	An unrecognised value is being sent from the Bosch ECU
1,2,3,4,5,6	Valid Gear numbers

The lower number is vehicle speed according to the Bosch ECU.

Right Panel - Fixed Display





When the car is stationary the top value will display fuel level. When the engine is started the number will show fuel pressure for 3 seconds. When the engine is running the display shows MS4 fuelcons.

Display label	Toolset channel	Description
Fuel Level	Fuel Level	The main fuel level sensor in the fuel tank that has been calibrated to show Litres
Fuel Press	MS4 pfuel	Shown for 3 seconds after the engine has started to turn over (MS4 tmot > 0)
Fuel Cons	MS4 fuelcons	Shown while the engine is running, can be reset with long press of mark button

Fuel Reset (and Odometer Reset) method

Calculation of fuel consumption is made entirely by the ECU.

To reset the fuel consumption number press and hold the Mark button for more than 1.5 seconds.

This method also resets the odometer trip.

The ECU has to be powered for the fuel consumption to be reset. In this method it is possible to reset the display for odometer trip only.



Time Diff is the qualifying mode function to show gain or loss compared to a reference lap.

Display	Example	Description
Minus number	-0.25	Compared to the reference lap, which is learnt or provided, the car is 0.25 seconds quicker to this distance point on the track

Positive number	+0.3	The car is has taken 0.3 seconds longer to get to this distance
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Lap Time displays 2 values

Display	Toolset channel	Description
Fixed time	Lap Time	After the car has passes the beacon the lap time is shown for 30 seconds
Rolling time	Rolling	This is the stopwatch time for the current lap

Alarm Information

The lower area is reserved for display of system warnings and alarms.



Practice Page 2

Similar layout to the race page but with different channel information

Engine Speed nmot

<p>Lap Time</p> <p style="font-size: 2em;">0:34.35</p>	<p>8192</p> <p style="font-size: 4em; color: yellow;">2</p> <p>102</p>	<p>Time Diff</p> <p style="font-size: 2em;">+0.54</p>
<p>Lap # Speed</p> <p style="font-size: 2em;">13 102</p>		

Channel Information

Alarm Information

Left Panel

A black rectangular panel with yellow text. It displays 'Lap Time' followed by '0:34.35' in large white font. Below that, it displays 'Lap #' followed by '13' and 'Speed' followed by '102' in large white font.

The Lap Time field shows two possible values and is always in the format m:SS.ss

Channel	Description
Lap Time	The lap time from the lap just completed is shown for 30 seconds immediately after a beacon is seen, so the driver can see the lap time of the lap just completed.
Rolling Time	This is the time for the current lap, similar to a stopwatch and updates until a beacon is seen.

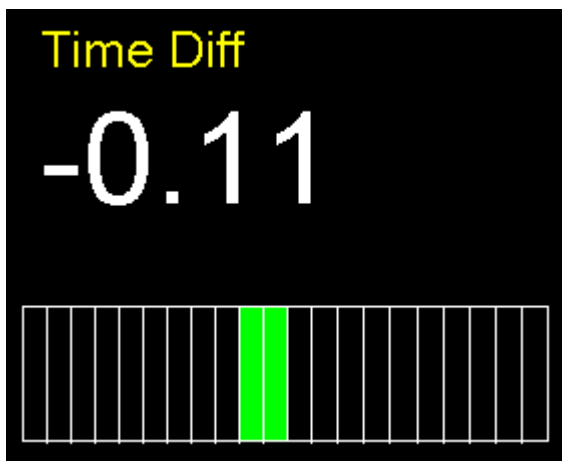
Lap Number is the number of the existing lap updated when there is an end of lap beacon. Omega will start the out lap as lap 0 and the first beacon will update to lap 1. Unless reset by the user the lap number is preserved over a power cycle and will increment indefinitely.

Speed is the same value shown below the gear number and is the speed according to the Bosch ECU.

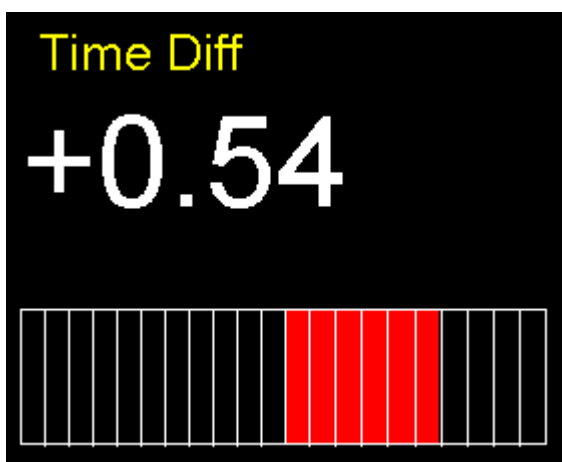
Right Panel

Time Diff is the calculation of the Qualifying mode feature and shows in time how much faster or slower the current lap is compared to the reference lap. Qualifying mode is configured via toolset.

This shows a faster lap with a minus decimal number indicating the driver is currently 0.11 seconds faster than the reference lap. The green bar also shows the same value - the max scale on the bar graph is -1 second to +1 second.



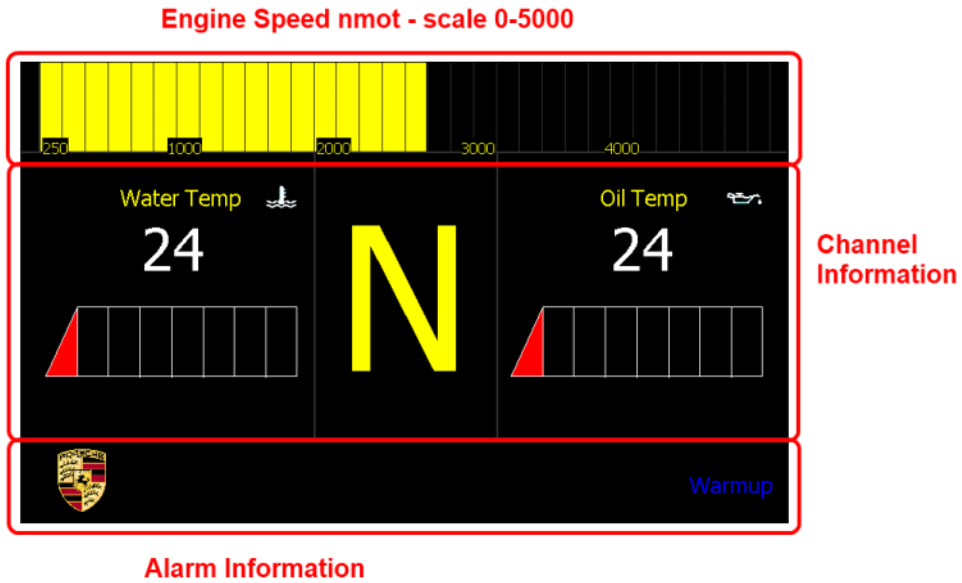
This shows a slower lap by 0.54 seconds.



Warm Up Page 3

Page 3 onwards are 'pit' pages and are accessible when the car is less than 10 Kph.

The warm up page is configured so rpm and essential engine temperatures are visible from a distance - maybe when the mechanics are not sat in the drivers seat.



Engine Speed - warm up scale

Using the Bosch channel MS4 nmot the bargraph shows rpm from 0 rpm to 5000 rpm and is all yellow.

Channel Information

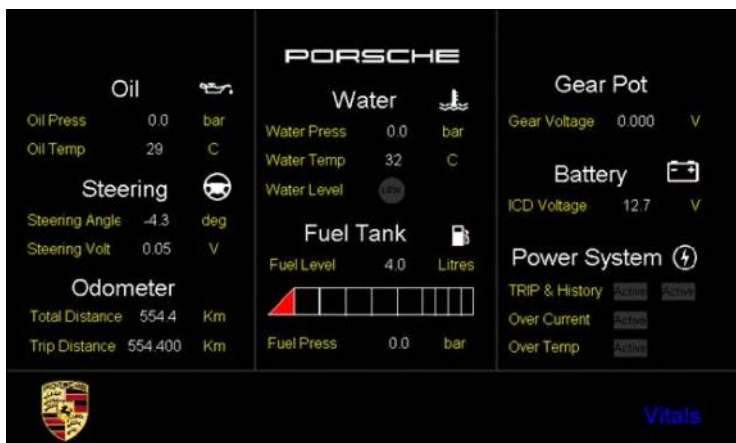
Water temp uses channel MS4 tmot, Oil temp uses the channel MS4 toil. Both scales of the bargraph are 0-120 deg C with everything over 100 Deg C as Red.

The gear number is also shown as per the 'track' pages.



Vitals Page 4

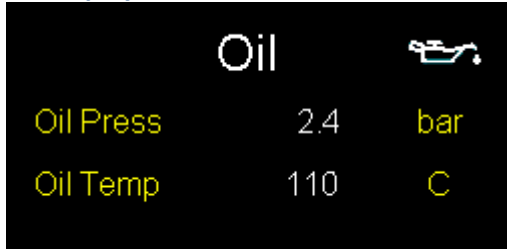
Channel information is displayed on this page.



Channel Information

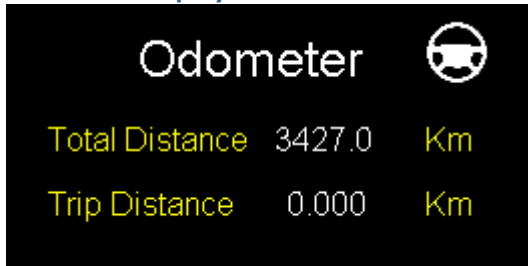
This area is fixed and is not affected with the page button.

Oil Display



Label	Channel	Resolution	Unit	Scale	Notes
Oil Press	MS4 poil	0.05	bar	12.75	
Oil Temp	MS4 toil	1	Deg C	-40 to 215	

Odometer Display



Label	Channel	Resolution	Unit	Scale	Notes
Total Distance		0.1	km	0 - 999999.9	This is a cumulative channel
Trip Distance		0.001	km	0 - 9999.999	Trip resets

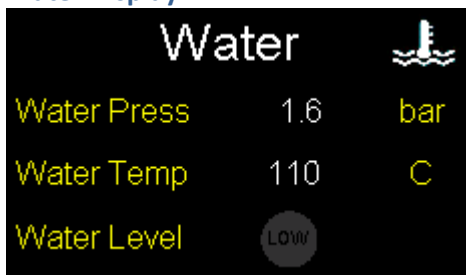
Fuel Reset (and Odometer Reset) method

Calculation of fuel consumption is made entirely by the ECU.

To reset the fuel consumption number press and hold the Mark button for more than 1.5 seconds.

This method also resets the odometer trip.

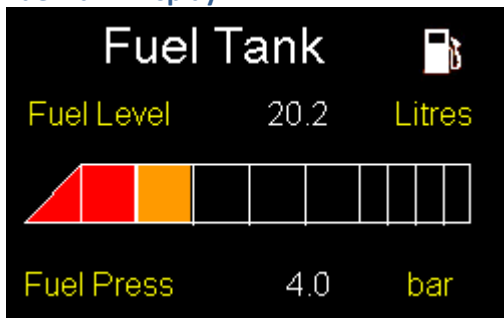
Water Display



Label	Channel	Resolution	Unit	Scale	Notes
Water Press	MS4 pwat	0.05	bar	12.75	
Water Temp	MS4 tmot	1	Deg C	-40 to 215	

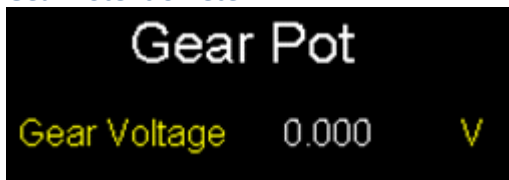
Water Level	SW09 Water Level Button	1	Digital	0 - 1	Normally logic 1 to show the level sensor is immersed. Series sensor.
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Fuel Tank Display



Label	Channel	Resolution	Unit	Scale	Notes
Fuel Level	Fuel Level	0.1	Litre	0 - 110.0	Calibrated sensor so max and min could change
Bargraph	Fuel Level	1			Non linear graph response
Fuel Press	MS4 pfuel	0.05	bar	12.75	

Gear Potentiometer



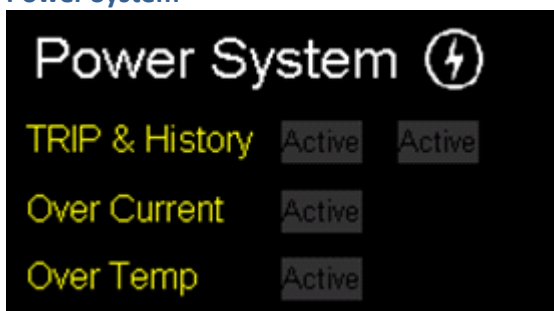
Label	Channel	Resolution	Unit	Scale	Notes
Gear Voltage	MS4 ugearp	0.001	V	65.535	

Battery Display



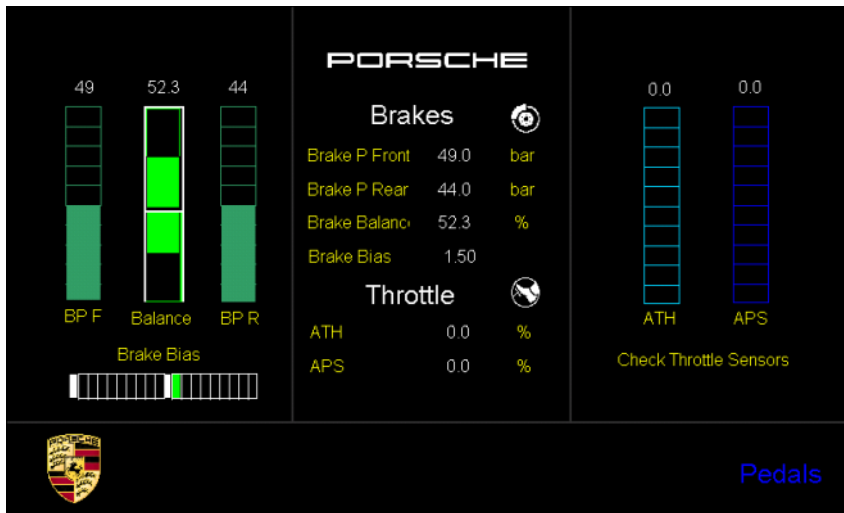
Label	Channel	Resolution	Unit	Scale	Notes
ICD Voltage	Battery Voltage	0.1	V	0 - 99.9	This is the voltage seen by the ICD

Power System



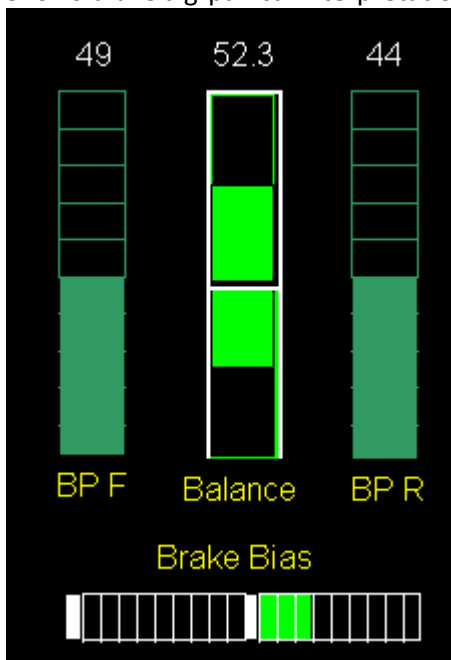
Label	Channel	Unit	Notes
Trip	IPS Error Alarm	Bit	Will show 'active' if there is a current trip condition on the IPS - any of the 32 outputs
History	IPS Error Alarm Latched	Bit	Will show 'active' if there has been a trip on the IPS since it was power up on any of the 32 outputs
Voltage Issue	IPS Voltage Alarm	Bit	Will show 'active' if there is a sustained over or under voltage condition on the IPS
Over current	IPS Output Current Alarm	Bit	Will show 'active' if the IPS power system has seen more than its rated current
Over Temp	IPS Temp Alarm	Bit	Will show 'active' if the IPS power system is too hot
Heartbeat	IPS Heartbeat	Bit	Will flash active every 1/2 second

Pedals - Page 5



Left Panel

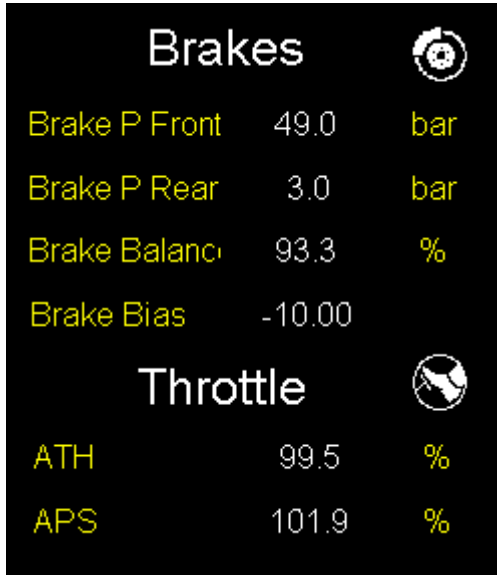
Shows brake a graphical interpretation of brake pressures ,mathematical balance and bias



Label	Channel	Resolution	Unit	Scale	Notes
BP F	Brake Press Front	1	bar	0 - 100	
Balance	Brake Balance	1	%	0 - 100	Math calculation of balance
BP R	Brake Press Rear	1	Bar	0 - 100	
Brake Bias	Brake Bias	1		-10 to +10	Mechanical bias position

Middle Panel

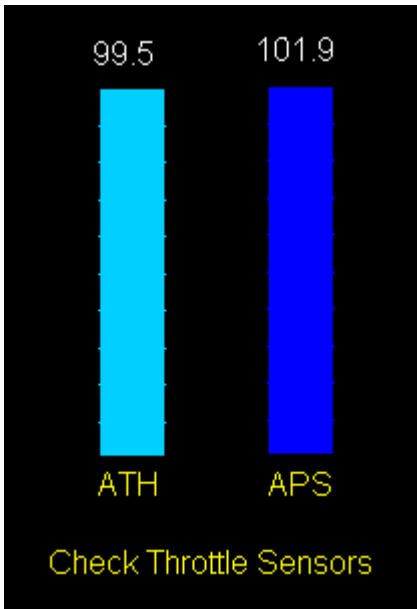
Shows numerical values for brake information and the throttle and pedal sensors.



Label	Channel	Resolution	Unit	Scale	Notes
Brake P Front	Brake Press Front	0.1	bar	0 - 280	250 bar sensor
Brake P Rear	Brake Press Rear	0.1	Bar	0 - 280	250 bar sensor
Brake Balance	Brake Balance	0.1	%	0 - 100	Math calculation of balance
Brake Bias	Brake Bias	1		-10 to +10	Mechanical bias position
ATH	MS4 ATH	0.1	%	0 - 127.4	Engine throttle sensor
APS	MS4 APS	0.1	%	0 - 127.4	Pedal sensor

Right Panel

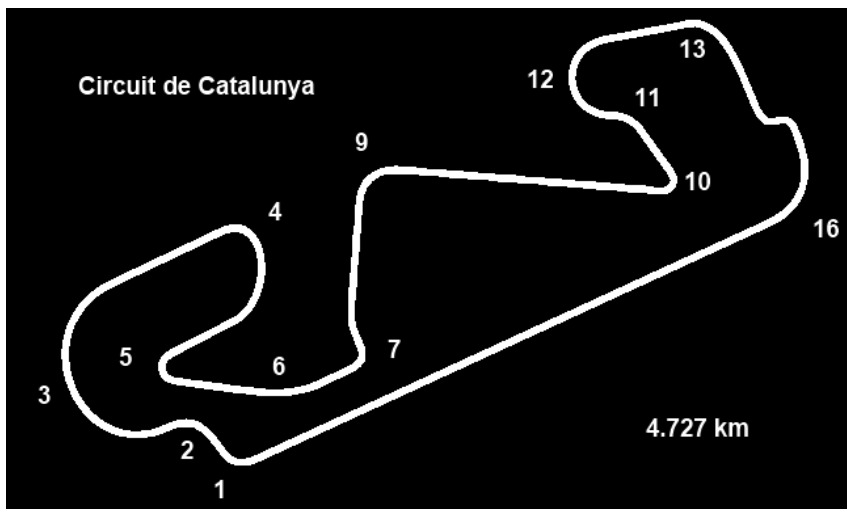
Graphical representation of the fly by wire sensors



Label	Channel	Resolution	Unit	Scale	Notes
	MS4 ATH	0.1	%	0 - 127.4	Numerical engine throttle sensor
	MS4 APS	0.1	%	0 - 127.4	Numerical pedal sensor
ATH	MS4 ATH	10	%	0 - 100	Bargraph engine throttle sensor
APS	MS4 APS	10	%	0 - 100	Bargraph pedal sensor

Track Map - Page 6

The map is a bmp file of ratio 800x480 aspect ratio and is configured by Pi Toolset. If a new bmp is loaded then this is displayed when the ICD is next power cycled. This feature is to allow maps or other instructions to be displayed to the driver.

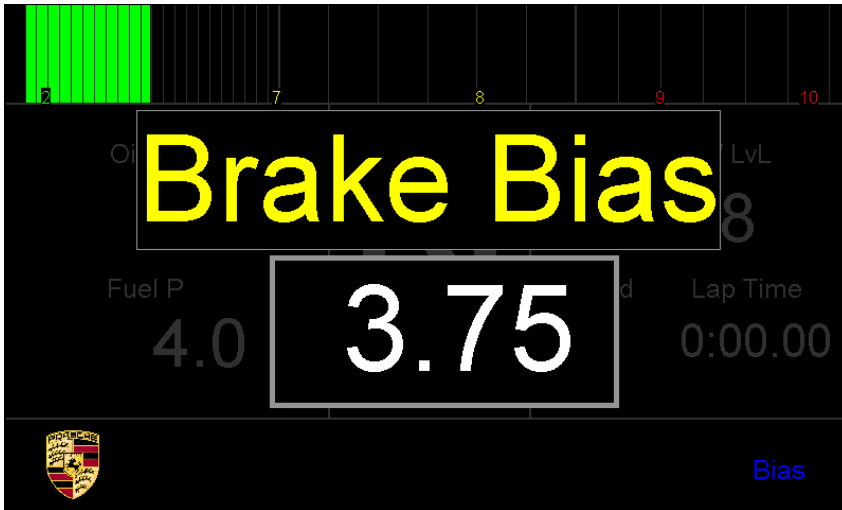


Overlays

An overlay is where additional information is displayed on the dash.

Brake Bias

When an adjustment is made to the mechanical brake bias the dash will display this value in steps on 0.25 resolution. When the adjustments have stopped the dash will wait 1 second and return to the previous display.



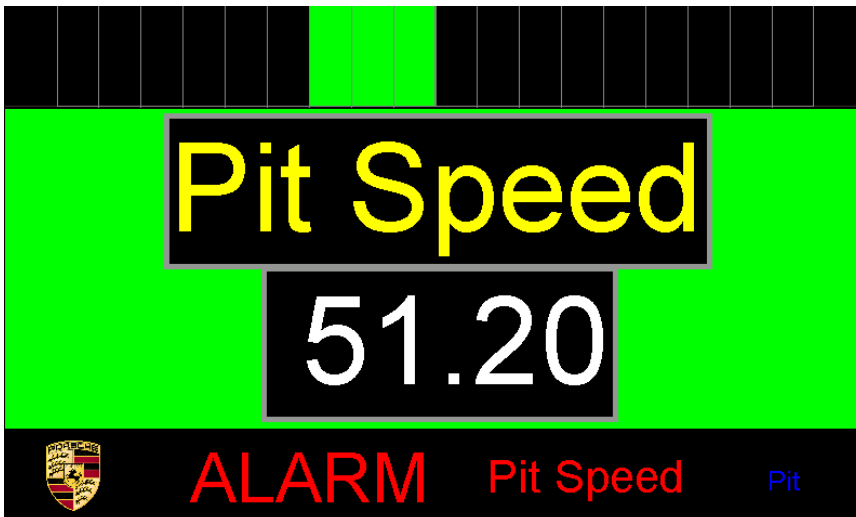
Pit Speed

Pit speed is enabled with a click of the orange pit speed switch on the right side panel on the wheel. Only when the ECU speed is above 10Kph will the pit speed page be displayed.

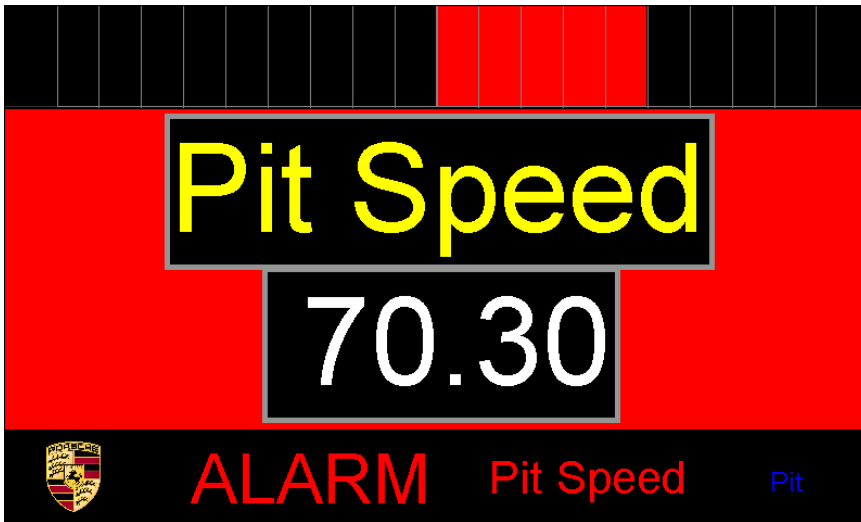
Note that in the Pit Speed mode there is an Alarm Pit Speed displayed in the alarms area and this also displays a single red alarm LED on the top left.

There are 2 main views of the pit speed page, this is the green 'under-speed' compared to the target Kph (in this example the target speed is 60 Kph).

The top bar graph is a scale of -20 to +20 Kph centred at the target speed.



This is red 'over-speed' compared to the target Kph (again in this example the speed is 60 Kph)



Alarms

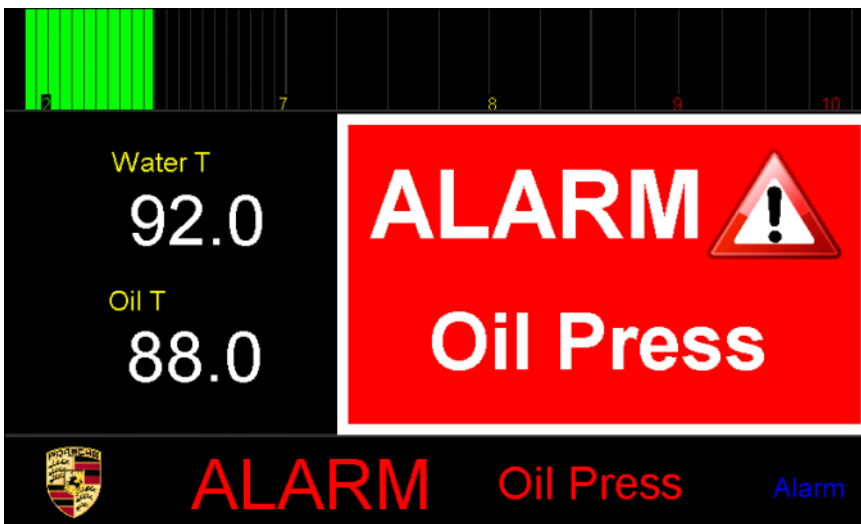
There are 3 types of Alarm in the system;

Level	Where	Text	Lights
1	Dedicated page	ALARM	4 Flashing lights
2	Lower Information area	ALARM / WARN	Continuous lights, various patterns
3	Lower Information area	ALARM / WARN	Continuous lights, various patterns

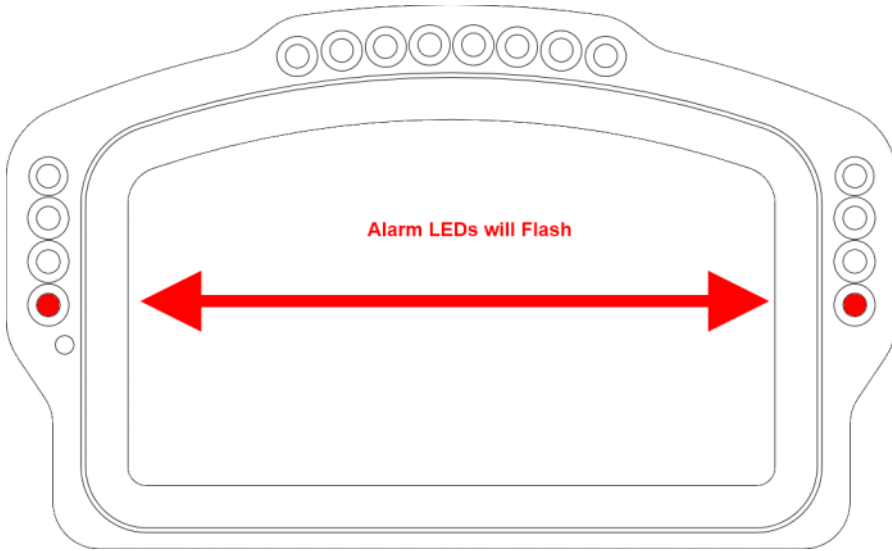
Level 1 Alarms

The main alarm page is triggered by only a few parameters - as listed in the table.

This page has priority over every other page.



Alarm lights are flashing;



Each alarm is allowed to be cancelled but the threshold is not adjusted and the re-trigger times are short - ie if cancelled they re-appear quite quickly.

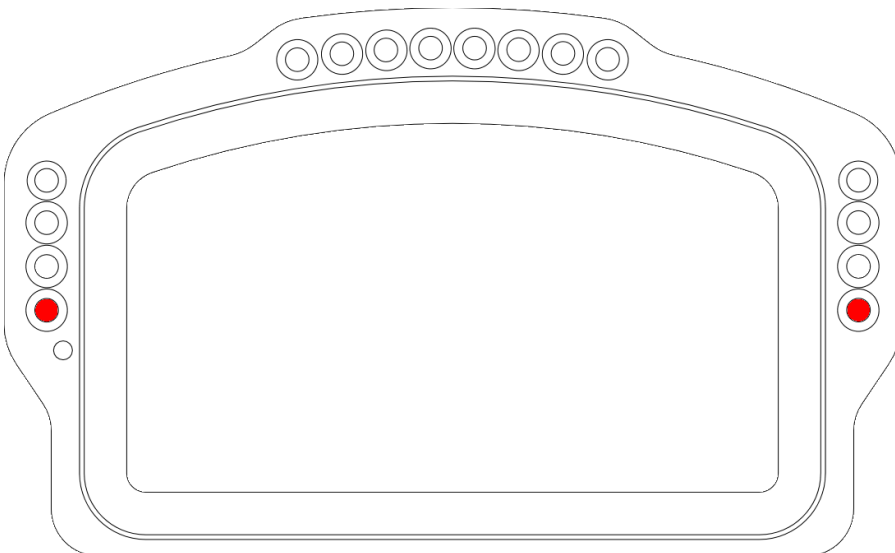
Priority	Alarm	Channel	Conditions	Description
1	Water Temp	MS4 tmot	>110 deg C for 2 seconds, If acknowledged will retrigger in 2 seconds	Can be cancelled, re-trigger in 2 seconds
2	Oil Press	MS4 B oillamp	MS4 B oillamp is active, If acknowledged will retrigger in 0.1 seconds	Usually spikes, so this alarm is displayed for at least 1 second (via math channel 'Alarm Oil Press Display')

Level 2 Alarms

Every level 2 alarm has the word ALARM or if lower priority WARN and then the description.



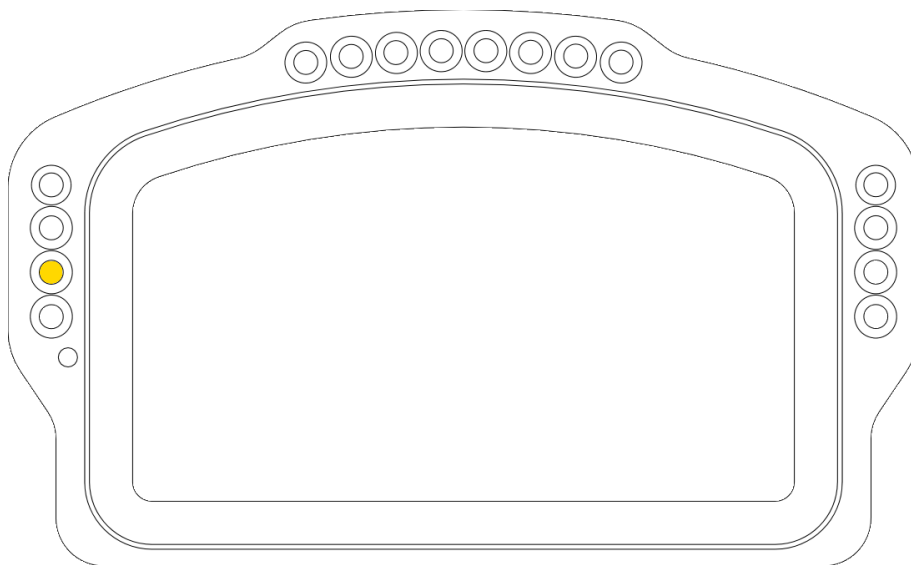
Alarm lights are solid with this pattern



Priority	Alarm	Channel	Conditions	Description
3	Fuel Press	MS4 pfuel	<2.5 bar for 5 seconds, If acknowledged will retrigger in 2 seconds	Qualified with engine running more than 2000 rpm
4	Oil Temp	MS4 toil	>120 deg C for 5 seconds, If acknowledged will retrigger in 2 seconds	
5	Water Press	MS4 pwat	<0.15 bar for 10 seconds, If acknowledged will retrigger in 10 seconds	Qualified by engine higher than 5000 rpm AND water temp is at least 68 deg C AND car is moving
6	Batt Voltage	Battery Voltage	<12 volts for 5 seconds, If acknowledged will retrigger in 5 seconds	Qualified with engine running more than 2000 rpm
7	Water Level	Engine Sensor on Digital 15	Switch is 0 for 20 seconds If acknowledged will retrigger in 20 seconds	In the presence of water this sensor is short (to ground) so the alarm is when the sensor is not ground ie released

Level 3 Alarms

Alarm light is solid with this pattern



Priority	Alarm	Channel	Conditions	Description
8	Pit Speed	SW03 Pit Speed Button	Click latched is active for 0.5 seconds, If acknowledged will retrigger in 1 seconds	Momentary switch on steering wheel toggles the state of pit speed. If power cycled or setup sent this state is cleared
9	Gbox EMSW	MS4 B emsw	Bit is active for 1 second, If acknowledged will retrigger in 1 seconds	Gearbox emergency Switch, could be used for manual shift and reverse
10	Low Fuel	Fuel Level	<7 litres for 5 seconds, If acknowledged will retrigger in 60 seconds	Qualified with car stationary (will not trigger on track)
11	Alternator	Condition	Channel is true for 2 seconds,	Channel to detect rapid drop

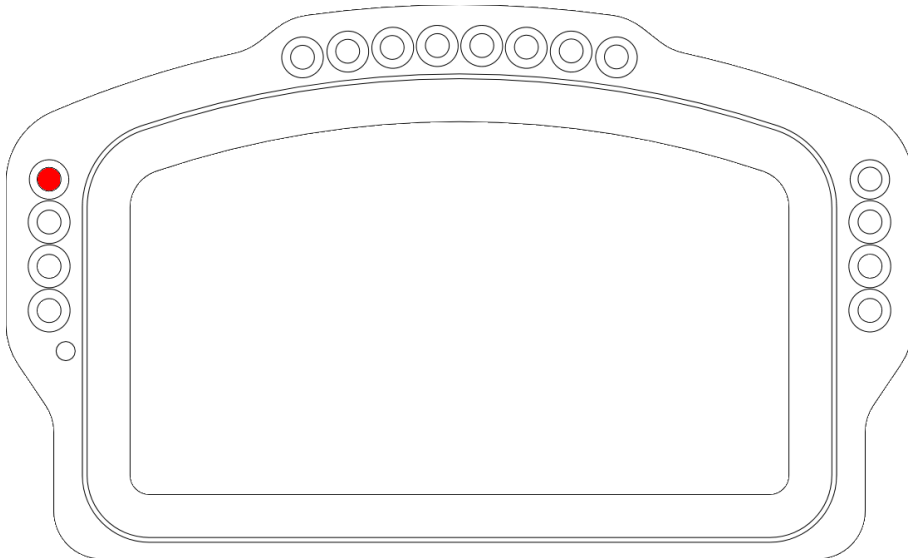
	Stopped	Alternator Stopped	If acknowledged will retrigger in 2 seconds	in battery voltage during on track
12	MS4 mildiag	MS4 B mildiag	The bit is set for longer than 2 seconds, If acknowledged will retrigger in 10 seconds	Mildiag is the malfunction indicator light from the ECU
13	Low RPM	Condition Engine Cranking	If RPM is between 50 and 1500 rpm for at least 0.5 seconds	

Wheel Lock Lights

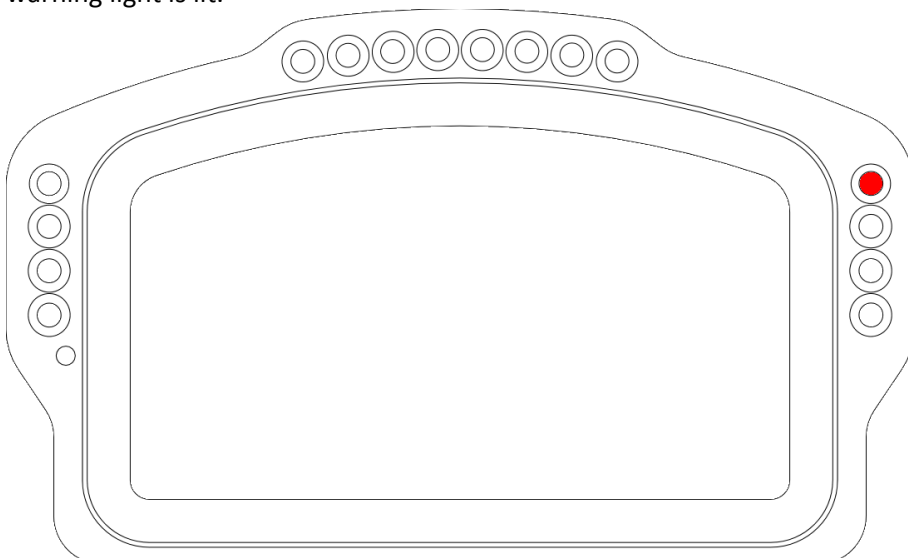
Channels that monitor front wheel locking are able to drive the following alarm lights when certain wheel lock conditions are met.

If the brake switch is active and 'Speed FL' is less than 'Speed RL' by 20 kph then the top left warning light is lit.

If there are pressure sensors fitted and the CUP level upgrade is used then the brake switch is replaced by 'Brake Press Front' is more than 10bar.



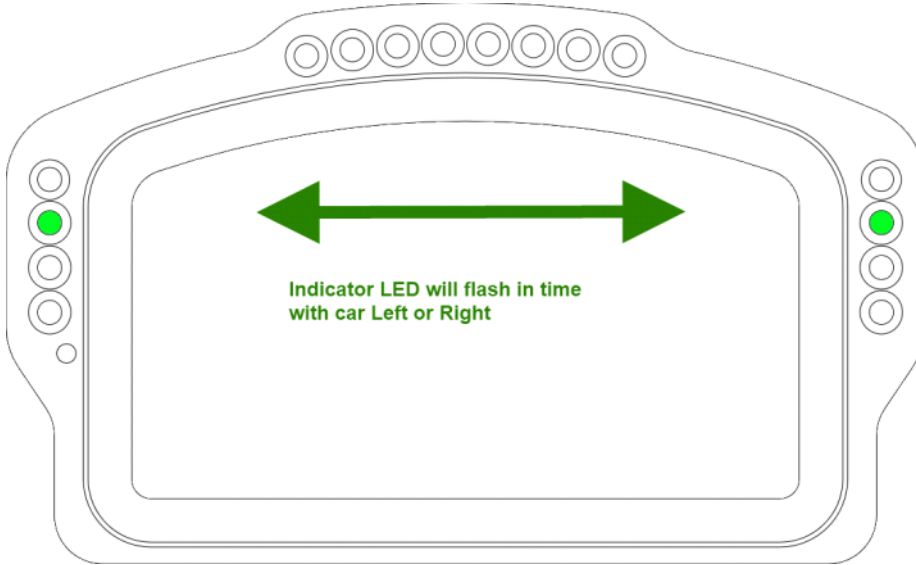
If 'Brake Press Front' is more than 10bar and 'Speed FR' is less than 'Speed RR' by 20 kph then the top right warning light is lit.



Indicator Lights

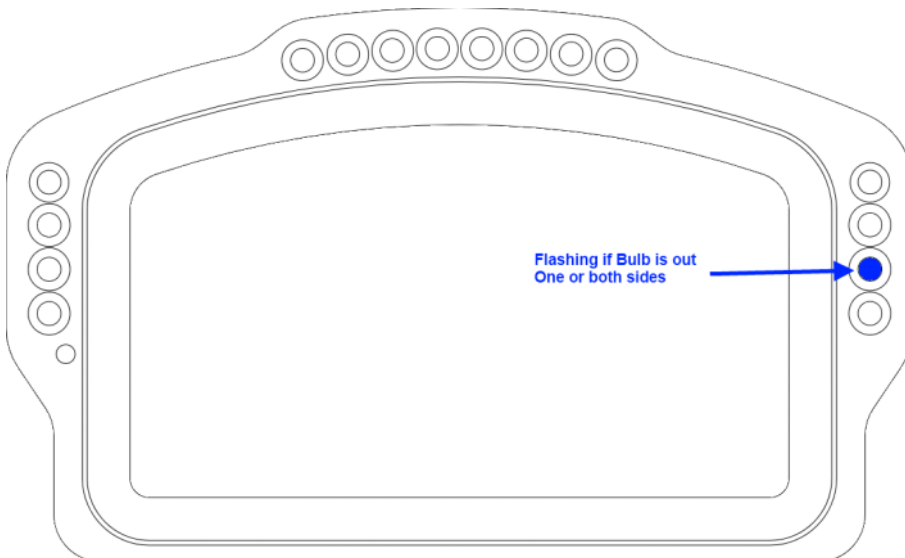
Channels that monitor current on the indicator outputs and lights the Green LED accordingly.

If 'IPS05 Flasher L Amps' or 'IPS18 Flasher R Amps' is more than 0.25 Amps then the green LED will be lit on that side.



Main Beam Indicator

If either 'IPS25 Hi Beam L Amps' or 'IPS27 Hi Beam R Amps' is more than 1 Amps then the blue LED will be lit. If one of the channels shows more than 1 Amp then the LED will flash steadily.



Other Dash messages

On startup there is a Cosworth splash logo - this should appear for 6 seconds only.

Once the dash application has started the Version information is displayed while it loads the graphics and parameters to display.