

## Introduction

The Pi Omega D2 is a high performance digital dash with on-board data logger that replaces the normal set of analogue instruments in a race car.

The Pi Omega D2 dash has an LCD to display channel values from on-vehicle sensors connected directly to the dash. In addition the dash can be configured to display channel values received via CAN or RS232 from a supported Engine Control Unit (ECU).

The Pi Omega D2 provides selectable logging tables designed for difference usage scenarios such as practice, race and endurance event. 128MB of on-board storage capacity is provided for logged data, which can be downloaded to a PC via Ethernet in Pi Club Expert Analysis format.

## Features

The Pi Omega D2 provides the following key features

### Hardware

Processor:	Freescale MPC 5553 (32bit, 132MHz)
Memory:	128MB
Display:	Backlit (dual colour) LCD
Digital Inputs:	1x RPM, 1x Lap Beacon, 4x Wheelspeed
Analogue Inputs:	14x 0 to 5V, 2x Thermocouple
Communications:	2x CAN, 2x RS232, 1x Ethernet

### Software

- Data logging at sample rates of up to 200Hz
- Support for GPS speed  
(optimal performance requires the use of a 5Hz GPS receiver as available from Pi Research)
- Automatic gear learning - displays gear number calculated from RPM and speed
- Qualifying Mode - live display of performance against best lap time
- Post run “tell-tales” - including fastest lap and alarm on lap indicators
- Configurable alarms that trigger backlight colour change
- “Plug and Perform” support for the Pi Video Overlay Unit and Pi Interport (ODBI) products

## Configuration

The Pi Omega D2 dash is configured using four built in buttons. Connections are also provided for five external buttons, four of which have the same control functions as the built in buttons while the extra Driver's switch can be used to cancel alarms and scroll through dash pages.

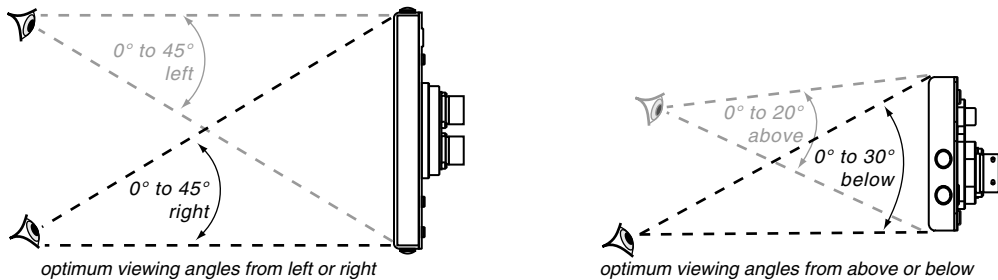
**Note: The Omega dash must be configured for your particular application and sensor source before use. The dash set-up menu can be accessed by holding the bottom two buttons for 2 seconds and navigating the menus. For further information please consult the Quick Start Guide.**

## Installation

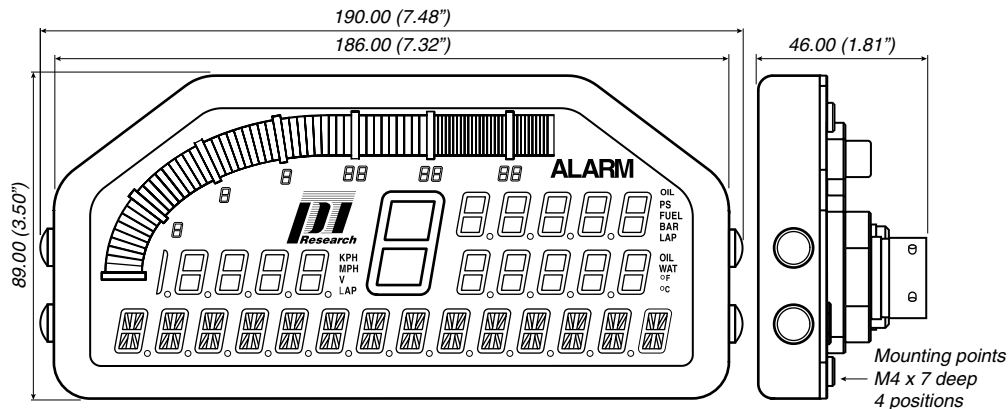
When fitting the Omega D2 anti vibration (AV) mounts should be used.

When choosing a location for the dash remember that:

- the driver needs to see the dash with the steering wheel in place;
- the driver needs to be able to operate the buttons;
- if the dash is fitted with warning LEDs they need to be visible to the driver;
- the dash has the following optimum viewing angles for best contrast.



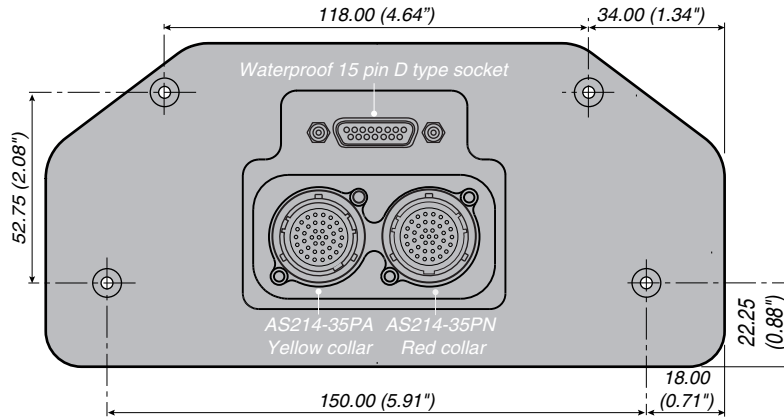
## Dimensions



Dimensions in millimetres and (inches)

## Mounting holes

Use following figure to mark the holes for mounting the Omega D2 dash. Allow space behind the Omega dash for connectors and cables.



Dimensions in millimetres and (inches)

## Specifications

Description	Value
Power requirements	Nominal +12V and +28V
Logging memory	128MB
Operational temperature range	+10°C to +70°C
Storage temperature range	-20°C to +80°C
Weight	440 grams
EMC	See Declaration of Conformity
Vibration	DV-V(a), DV-V(c)
Environmental	IP65

## Connector information

Switch / LED Alarm Module connector (Waterproof 15 pin D type socket)

Pin	Name	Note
1	LED1	120R series resistor
2	LED2	120R series resistor
3	LED3	120R series resistor
4	LED4	120R series resistor
5	Alarm	120R series resistor
6	SETUPB1	Setup button 1 (Green)
7	SETUPB2	Setup button 2 (Blue)
8	DRIVERB gnd	Driver button ground
9	LED5	120R series resistor
10	LED6	120R series resistor
11	LED7	120R series resistor
12	LED power	PWM brightness control
13	SETUPB3	Setup button 3 (Grey)
14	SETUPB4	Setup button 4 (Red)
15	DRIVERB1	Driver button signal

When the Omega D2 dash is used to display data from directly connected sensors use the information in the next two tables. See the *Omega Dash Quick Start Guide* for details on how to configure your Omega dash.

**Main connector (Autosport- Yellow collar)**

Connector	Mating connector
AS214-35PA	AS614-35SA

Pin	Name	Note
1	Battery -ve	Power -ve
2	Battery +ve	Power +ve
3	CAN1 High	ECU CAN High
4	Serial 1 Rx	RS232 (from ECU)
5	RPM gnd	RPM ground
6	RPM power	RPM power +12V
7	BCN power	Beacon power+12V
8	BCN gnd	Beacon ground
9	P1 power	Pressure 1 power +5V
10	P2 power	Pressure 2 power +5V
11	WSP1 power	Wheelspeed 1 +12V
12	WSP1 gnd	Wheelspeed 1 ground
13	THR gnd	Throttle ground
14	THR power	Throttle power +5V
15	T1 power	Temperature 1 power +12V
16	T2 power	Temperature 2 power +12V
17	STR power	Steering power +5V
18	STR gnd	Steering ground
19	CAN2 High	Comms CAN Bus 2 High
20	CAN1 Low	ECU CAN 1 Low
21	Serial 2 Tx	RS232 (to Logger)
22	RPM signal	RPM signal
23	BCN signal	Beacon signal
24	P1 signal	Pressure 1 signal
25	P2 signal	Pressure 2 signal
26	WSP1 signal	Wheel Speed 1 signal
27	THR signal	Throttle signal
28	T1 signal	Temperature 1 signal
29	T2 signal	Temperature 2 signal
30	STR signal	Steering signal
31	CAN2 Low	Comms CAN Bus 2 Low
32	100BaseT Rx-	Ethernet offload
33	100BaseT Rx+	Ethernet offload
34	Serial 0 Rx	Debug (Pi Use only)
35	100BaseT Tx+	Ethernet offload
36	100BaseT Tx-	Ethernet offload
37	Serial 0 Tx	Debug (Pi Use only)

**Expansion connector**
**(Autosport - Red collar)**

Connector	Mating connector
AS214-35PN	AS614-35SN

Pin	Name	Note
1	High Power Supply	+12V 500mA from 28V input
2	No connection	
3	No connection	
4	FBP gnd	Front brake pressure ground
5	FBP power	Front brake pressure +5V/+12V
6	RBP power	Rear brake pressure+5V/+12V
7	RBP gnd	Rear brake pressure ground
8	FR/DR1 gnd	Front right damper 1 ground
9	FR/DR1 power	Front right damper 1 +5V
10	FL/DR2 power	Front left damper 2 +5V
11	FL/DR2 gnd	Front left damper 2 ground
12	RR/DR3 gnd	Rear right damper 3 ground
13	RR/DR3 power	Rear right damper 3 +5V
14	RL/DR4 power	Rear left damper 4 +5V
15	RL/DR4 gnd	Rear left damper 4 ground
16	TH1 –	Thermocouple 1 –ve
17	TH2 –	Thermocouple 2 –ve
18	No connection	
19	No connection	
20	No connection	
21	FBP signal	Front brake pressure signal
22	RBP signal	Rear brake pressure signal
23	No connection	
24	FR/DR1 signal	Front right damper 1 signal
25	FL/DR2 signal	Front left damper 2 signal
26	RR/DR3 signal	Rear right damper 3 signal
27	No connection	
28	RL/DR4 signal	Rear left damper 4 signal
29	TH1+	Thermocouple 1 +ve
30	TH2+	Thermocouple 2 +ve
31	No connection	
32	No connection	
33	No connection	
34	No connection	
35	No connection	
36	No connection	
37	No connection	

## Logging Channels & Rates

The following channels are logged on the Pi Omega D2.

Channel Name	Description	High Rate (Hz)	Medium Rate (Hz)	Low Rate (Hz)
RPM	Engine RPM	100	50	50
Speed	Vehicle Speed (obtained from Wheelspeed, ECU or GPS)	100	20	20
SP1	Wheelspeed from Sensor 1	100	20	20
SP2	Wheelspeed from Sensor 2	100	20	20
LapD	Distance into the Current Lap	10	10	10
LapT	Time of Previous Lap	1	1	1
LapTR	Time into Current Lap	10	10	10
LapN	Number of Current Lap	1	1	1
EOT	Engine Oil Temperature	5	5	5
EOP	Engine Oil Pressure	10	10	10
ECT	Engine Coolant Temperature	5	5	5
FP	Fuel Pressure	10	10	10
VBat	Battery Voltage	10	5	5
PTP	Throttle Position (%)	10	10	10
PSP	Steering Position (%)	10	10	10
FBP	Front Brake Pressure	100	20	OFF
RBP	Rear Brake Pressure	100	20	OFF
Temp1	Thermocouple 1	10	10	10
Temp2	Thermocouple 2	10	10	10
D FL	Front Left Damper Position	200	100	OFF
D FR	Front Right Damper Position	200	100	OFF
D RL	Rear Left Damper Position	200	100	OFF
D RR	Rear Right Damper Position	200	100	OFF
D FLV	Front Left Damper Velocity	200	100	OFF
D FRV	Front Right Damper Velocity	200	100	OFF
D RLV	Rear Left Damper Velocity	200	100	OFF
D RRV	Rear Right Damper Velocity	200	100	OFF
SCMin	Minimum Corner Speed	1	1	1
SCMax	Maximum Straight Line Speed	1	1	1
CQM E	Expected Lap Time in Qualifying Mode	1	1	1
CQM D	Cumulative Lap Time Difference in Qualifying Mode	1	1	1
ACCEL	Lateral Acceleration	20	20	20
GearP	Gear Number	5	5	5
BOX T	Box Temperature	1	1	1
Fuel	Tank Fuel	10	2	2
FULR	Fuel Used on Current Lap	10	2	2
FULap	Fuel Use on Previous Lap	2	2	2
FEcon	Fuel Used per Lap	2	2	2
FLapL	Predicted Laps Left in Tank	10	2	2
GearR	Gear Ratio	100	50	50
InLin	Inline Acceleration	100	20	20



Channel Name	Description	High Rate (Hz)	Medium Rate (Hz)	Low Rate (Hz)
Dist	Distance	10	10	10
BBal	Brake Balance	10	5	OFF
FUsed	Amount of Fuel Used	10	10	10
Lat	GPS Latitude Coordinate	10	10	10
Long	GPS Longitude Coordinate	10	10	10
Head	GPS Heading	10	10	10
Alt	GPS Altitude	10	10	10
GSpd	GPS Speed	10	10	10
GTime	GPS Time	10	5	5
GQual	Quality of GPS signal	10	2	2
GSats	Number of Available GPS Satellites	10	2	2

### Ordering Information

Description	Part number
Omega D2 dash	01D-032518-D2
Omega LED module add-on kit	30D-032550
LED Shift / Alarm module	01D-032539

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## Declaration of Conformity

We, the undersigned,

Pi Research  
Brookfield Motorsports Centre,  
Cottenham,  
Cambridgeshire, CB4 8PS  
United Kingdom

Certify and declare under our sole responsibility that the following equipment:

Omega Dash – part number 01D-032518

A dash for use only in motorsport applications

Conforms to the following EC directives including applicable amendments:

EMC Directive 89/336/EEC, 72/245/EEC (last amended 2004/104/EC)

The following standards have been applied:

2004/104/EC

Cottenham, 26 March 2007

