Pi Omega Dash

User Guide

Advanced Technologies – Evolving Performance

www.cosworth.com

Disclaimer

Cosworth Electronics Limited makes no representation or warranties of any kind whatsoever with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Cosworth Electronics Limited shall not be liable for any errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of the software, associated hardware, or this written material.

Cosworth Electronics Limited reserves the right to revise this publication from time to time, and to make changes in the content hereof without obligation to notify any person of such revision or changes.

Please contact Pi Support at Cosworth Electronics regarding any product functionality that may be available but not explained within this guide.

A copy of the Cosworth Electronics Terms and Conditions of Sale is available on request, and includes a declaration of the warranty and limitation of liability which apply to all Cosworth Electronics products and services.

Health and Safety information

Under the terms of European and UK Health and Safety legislation, Cosworth Electronics is required to classify any hazardous materials in the products it supplies and to provide relevant safety information to users.

Any hazardous materials in Pi products are clearly marked with appropriate symbols. Product Safety Data Sheets relating to these materials are available on request.

Introduction

About this User Guide 1
- Warnings, Cautions, and Notes 1
- PDF links 1
- Text 1
- Footnotes 1

Introduction to the Omega Dash Family 2
- Versions 2
  - Omega D1 2
  - Omega D2 2
  - Omega D3 2
- Fitting the Dash 3
- Device-driven Display 3
- Stand-alone Unit 3

Omega Dash Overview 4
- Parts of the Display 4
- Dash Backlight 4
- Controls 5
- Display Pages 5
  - Pit 5
  - Race 5
  - Telltale 5
  - Display of Channel Help 5
- Sensors 6
  - Internal Sensors 6
  - External Sensors 6
  - Additional Sensors for the D3 7
- Alarms 8
- Fuel 8
- Gears 8

Drivers' Guide

In the Pit Lane 9
- Overview of Modes 9
  - Modes for Drivers and Engineers 10
- Dash Power Up 10
- Pit Lane Setup 11
- Observing a GPS Beacon Position 14
- Before Leaving the Pit Lane 14

During an Outing 15
- Before Launch 15
- Race Mode 16
  - Race Page 1 16
  - Race Page 2 16
  - Track + Fuel Display 17
  - Channel Help 17
- Alarms 18
  - How an Alarm Shows 18
  - Acknowledge an Alarm 18

Ignore an Alarm....19
Unwanted Alarms....19

After an Outing....20
Telltale Mode....20
Telltale Pages....21
Alarms....22
Channel Help....22
Download of Logged Data....22

Club Qualifying Mode (CQM)....23
Club Qualifying Modes....23
Learn Mode....23
Operating Mode....24
Channel Help....25
Resetting CQM Stored Lap Data....26

Engineers' Guide

Installation....27
Installing the Dash....27
Shift Light Module....28
Driver Switch....28
Other Options....28

Dimensions....29
Omega Dash....29
Panel Cutout....29

Setup Overview....30
Setup Menu Overview....31
Quick Ways to Change Values....32
Saving Dash Settings....32

Initial Setup....33
Display Mode setup....33
Sensor Mode setup....36
Configure GPS....38
Enable GPS Use....39
Detect a Beacon from GPS Data....39
Enable Speed from GPS Data....40
Enable GPS Display....40
Beacon Settings....41
Beacon Setup....41
Speed Detection and Display....43
RPM Detection and Display....45
Gear Display....47
Gear Detection and Display....47
Prepare for an Outing....49

Other Settings....50
Set Defaults....50
Logger Profile....50
Serial Output....52
CAN Output....53
GPS Baud Rate....54

Brightness etc 55
Setup Analogue (Omega D3 Only) 56
Format SD Card 57
Enable Advanced Mode (Omega D1 Only) 58

Basic Setup 60
Configure Channels 60
Pressure and Temperature Sensors 61
Battery Alarm 62
Throttle Position 63
Checking Outputs 64
Watching Channel Values 64
Save and Restart 65

Advanced Setup 66
Configure Channels 66
Steering Position 67
Brake Pressure Sensors 67
Thermocouple Sensors 68
Damper Position Sensors 68
Fuel Calculation 70
Checking Outputs 73
Save and Restart 73

Outing Checks 74

Troubleshooting 75
No Alarm at Extreme of RPM Bar Graph 75
Dash Shows 'NO COMMS' 75
Removing Unwanted Alarms 75
The Dash 76
Engine Speed (RPM) 76
RPM Box (HT or LT mode) 77
RPM Box HT (High Tension) Connection 77
RPM Box LT (Low Tension) Connection 77
Speed 78
Lap Times (Beacon) 79
Sensor Readings 80
Steering Position (Advanced Mode) 80
Pressures 80
Throttle Position 80
Accelerometer 81
Data Loss or Data Corruption (Omega D2) 81
Telltales 82
Remote Driver Switch 82
Restore Factory Defaults 82
To Reset Your Omega Dash to Factory Defaults 82
To Format Your Omega Dash SD Memory Card 83

Reference Pages 84
Pit Lane Setup 84
Setup Overview 85
Initial Setup - Display Mode 86
Initial Setup - Sensor Mode 87
Initial Setup - Other 88

D3 Analogue Channel Setup 89
GPS Setup 90
Initial Setup - Beacon 91
Initial Setup - Wheelspeed 92
Initial Setup - RPM 93
Initial Setup - Gears 94
Basic Setup - Overview 95
Advanced Setup - Overview 96
Advanced Setup - Fuel 97

Contact Information 98

Menus

Menu: 1.	Pit Lane Setup	11
Menu: 2.	Setup Overview	31
Menu: 3.	Display Mode	33
Menu: 4.	Sensor Mode	36
Menu: 5.	GPS Setup	38
Menu: 6.	Beacon	41
Menu: 7.	Wheelspeed	43
Menu: 8.	RPM	45
Menu: 9.	Gears	47
Menu: 10.	Other Settings	50
Menu: 11.	Setup Analogue Overview	56
Menu: 12.	Setup Basic Overview	60
Menu: 13.	Advanced Overview	66
Menu: 14.	Fuel	70

Tables

Table: 1. Omega D2 Model Options 2
Table: 2. Display Fields 4
Table: 3. Button Functions 5
Table: 4. Internal Sensors 6
Table: 5. External Sensors 6
Table: 6. Omega D3 Sensors 7
Table: 7. Default Alarm Settings 8
Table: 8. Dash Modes - Overview 9
Table: 9. Pit Lane Setup Options 12
Table: 10. CQM Learn Mode 23
Table: 11. Display Modes 34
Table: 12. Sensor Modes 37
Table: 13. Beacon Options 42
Table: 14. Wheelspeed Options 44
Table: 15. RPM Options 46
Table: 16. Gear Options 48
Table: 17. Logging Options 51
Table: 18. Serial Output Options 52
Table: 19. Can Output Options 53
Table: 20. Brightness Options 55
Table: 21. Omega D1 Advanced Mode Options 58
Table: 22. Pressure and Temperature Sensor Options 61
Table: 23. Watch Channels Pages 65
Table: 24. Thermocouple Options 68
Table: 25. Damper options 69
Table: 26. Fuel Calculation Options 71

Figures

Figure: 1. Parts of the Omega Dash display 4
Figure: 2. Pit Page 1 - Channel values display on the dash 6
Figure: 3. Pit Page 1 - Help text replaces channel display 6
Figure: 4. Omega Dash - Power Up page 10
Figure: 5. Omega Dash - display of Pit Page 1 11
Figure: 6. Beacon message upon passing the beacon position 14
Figure: 7. Pages shown before, during and after an outing 15
Figure: 8. Race Page 1 16
Figure: 9. Race Page 2 16
Figure: 10. Track + Fuel (Display Mode) - Race Page 1 17
Figure: 11. Dash Display - an Oil Temperature Alarm 18
Figure: 12. Automatic Restoration of the Alarm Threshold Value 19
Figure: 13. Telltale Pages 20
Figure: 14. Telltale Page 1 21
Figure: 15. Telltale Page 2 21
Figure: 16. Telltale Page 3 21
Figure: 17. CQM - Synchronisation before continuing 24
Figure: 18. CQM - display of segment difference and predicted lap time . 25
Figure: 19. Optimum Viewing Angles 27
Figure: 20. Omega Dash dimensions millimetres and (inches) 29
Figure: 21. Panel drilling details (viewed from behind the Omega Dash) . 29
Figure: 22. SETUP ▸ OTHER item screen 58
Figure: 23. SETUP ▸ OTHER ▸ ADVANCED MODE option screen 59
Figure: 24. SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES option screen ... 59
Figure: 25. Watch Channels - first display 64
Figure: 26. WATCH ▸ THROTL & ACCEL (Throttle & Acceleration) 64

About this User Guide

This User Guide is produced in Adobe Acrobat PDF. It is applicable to the Omega D1 dash, and the Omega D2 and D3 dash-loggers.

All three Omega Dash variants have the same main features, but the D2 and D3 variants include a built-in logger and other features while the D3 allows further custom configuration. To indicate that features are particular to one variant, the following icons are used in the left margin of applicable pages:

D1 This icon indicates that the text refers to a D1 dash.

D2 This icon indicates that the text refers to a D2 dash.

D3 This icon indicates that the text refers to a D3 dash.

Warnings, Cautions, and Notes

Warnings, Cautions, and Notes in this User Guide are indicated as below and have the meanings shown:

A Warning looks like this:

WARNING! A WARNING HIGHLIGHTS INFORMATION THAT IF NOT ADHERED TO COULD CAUSE HARM TO EQUIPMENT.

A Caution looks like this:

CAUTION: *A caution highlights procedures or information necessary to avoid damage to equipment, damage to software, or loss of data.*

A Note looks like this:

Note: A note highlights supplemental information.

PDF links

This User Guide makes use of links within the text. You can click a link to jump to other locations in the User Guide. Links are indicated like this: see page 66 . Click the link to go to the page shown.

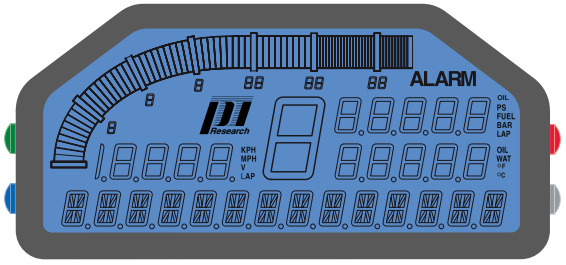
Text

Text displayed on the dash is shown in this typeface: **INITIAL SETUP ▸ RPM** Footnotes

The User Guide makes use of Footnotes. These are indicated in the text by using footnote reference numbering text e.g.[1] . The footnote text appears at the bottom of the page like this:

1 As set within **INITIAL SETUP ▸ RPM ▸ LAUNCH**, see page 46

Introduction to the Omega Dash Family



The Omega Dash is designed to replace the set of analogue instruments in a race car and enable storage and analysis of race data. The Omega Dash uses a back lit LCD panel to display channel values from on-vehicle sensors, supported Engine Control Units (ECUs) or from Pi Delta or Pi Sigma systems. For details of the full range of supported ECUs, contact Pi Research Support.

Versions

Omega D1

D1

The D1 dash provides a standard set of configuration and display features. You can connect a Pi Compact Logger (available separately) to store the data provided by the sensors fitted to your car.

Omega D2

D2

The D2 dash is similar to the D1 dash, but includes a built-in data logger (with 128MB of memory) to enable storage of outing data for later download and analysis.

There are three versions of the Omega D2 offering different logging options:

Table: 1. Omega D2 Model Options

Omega D2 Model	Analogue Inputs	Digital Inputs	Maximum Logging Rate
GPS	None	GPS plus RPM, only	Limited only
Basic	8: Oil Temp., Oil Press., Coolant Temp., Fuel Press., 2x Thermocouple, Throttle(%), Steering(%)	RPM, Beacon, GPS 2 x Wheelspeed	Low
Advanced	14: (includes brake pressures and damper positions)	RPM, Beacon, GPS 2 x Wheelspeed	High

For further details, see the product information sheet for the Omega D2 dash.

Omega D3

D3

The Omega D3 is similar to the D2 except that it allows extensive configuration of data acquisition and logging, to allow a fully customizable installation.

Fitting the Dash

When installing an Omega Dash, you can either adapt your current dash panel or make up a new panel tailored for the Omega Dash.

When you choose the location for the Omega Dash, ensure that:

- the Omega Dash is viewed head-on (perpendicular with the driver's line of vision),
- the Omega Dash display remains visible when any removable control units (such as the steering wheel) are in place,
- the Omega Dash is electrically and mechanically isolated from the vehicle chassis.

For further fitting instructions see see page 27.

Device–driven Display

When used as a device driven display, the dash functions as a dumb terminal controlled by a serial data stream coming from another compatible source.

To control the display, you will need one of the following systems:

- a Pi Delta Logger,
- a Pi Sigma Logger (Elite or Lightweight Logger Box (LLB)),
- a Pectel SQ6 ECU.

To use the Omega Dash as a device-driven display, select either **Display Mode > LOGGER DEFINED or Display Mode > SQ6 DEFINED.** (see page 33).

All further setup is then done via the ECU or logger software (so you will need to refer to the Hardware Reference and User Guide for the system that drives the display of the Omega Dash).

Stand–alone Unit

When used as a stand alone unit, the Omega Dash can display channel data received from:

- a supported ECU,
- sensors connected directly to the dash,
- a Pi Interport.

D1

If you have an Omega D1 dash and you want to record the data provided by your sensors, you can connect a Pi Research Compact Logger (available separately).

D2

D3

The Omega D2 and D3 have built-in loggers.

Contact Pi Research Support at Cosworth Electronics for details of the sensors and ECUs that can be used with an Omega Dash.

Omega Dash Overview

Parts of the Display

The Omega Dash has one RPM bar graph and five display fields which are used to display channel information.

The display fields on the dash use three types of display character:

Table: 2. Display Fields

	Display Character	Description
alphanumeric	Alphanumeric	Used to display channel values or a limited quantity of text.
7-segment	7-segment	Usually used to display the value of a channel (such as ‘75’).
annunciator	Annunciators	Used to display fixed text labels for channel values (such as ‘Fuel’, ‘MPH’ or ‘°C’).

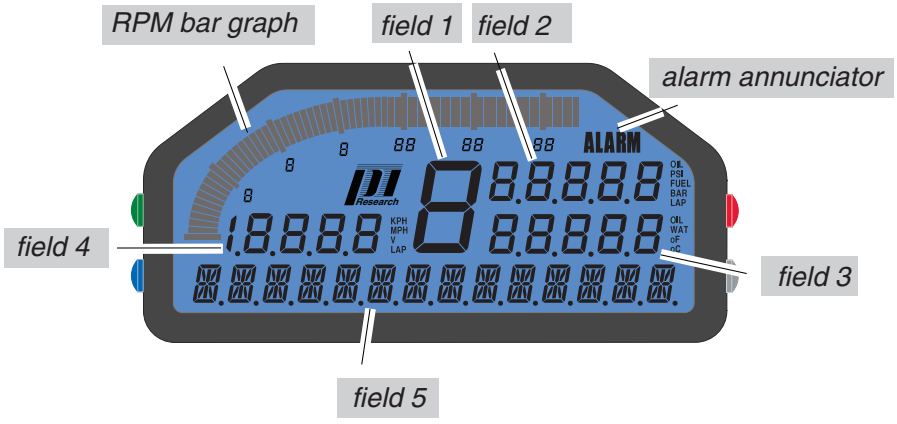


Figure: 1. Parts of the Omega Dash display

Dash Backlight

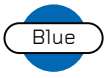
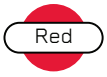
The Omega Dash display uses a brightly-coloured backlight. Two-colour LEDs within the dash enable you to select a range of backlight colours from blue, through purple, to red. To optimise the visibility of the dash in your vehicle, you can adjust the backlight colour and brightness for the dash (for more details, see page 55).

Controls

The Omega Dash has four buttons that you use to configure and operate the dash.

Generally, you use the buttons as follows:

Table: 3. Button Functions

Button	Press once	Press and hold
	Scroll up / previous item	Channel Help Mode
	Scroll down / next item	Watch Channels Mode
	Enter / Select Cancel Alarm (in race modes)	Pit Lane Setup Mode
	Back Exit (Save)	Reset Fuel

Display Pages

The information displayed on the Omega Dash is organised into 'pages'. There are three types of page:

Pit

(Displayed automatically after the dash is powered up)

Enables you to initialise the dash ready for an outing.

Race

(Displayed automatically after the detected speed exceeds the preset threshold)

Used to display RPM, gear number, speeds, sensor temperatures and pressures and fuel information. (The range of information displayed will depend on which dash is being used and how it is configured)

Telltale

(Displayed after the engine has stopped)

The channels shown on each page provide suitable displays for starting the engine and checking sensor channels, a race session and an outing summary. This page is displayed automatically after an outing once the RPM falls to zero.

The Omega Dash has a default set of channels for each page. However, when using the dash as a device-driven dash for a Pectel SQ6 ECU or a Pi Delta or a Pi Sigma system, you can change the channels that are displayed by using the appropriate setup software (see the relevant system User Guide for details).

Display of Channel Help

When the Omega Dash is displaying channel values, you can view a text version of the channel. To do this, hold the button to see Channel Help text (such '**Oil P**' and '**Cool T**')

instead of the channel values and annunciators.

The following Omega Dash displays show how values (within the first dash display) are replaced with Channel Help descriptions of the channel outputs (in the second display):

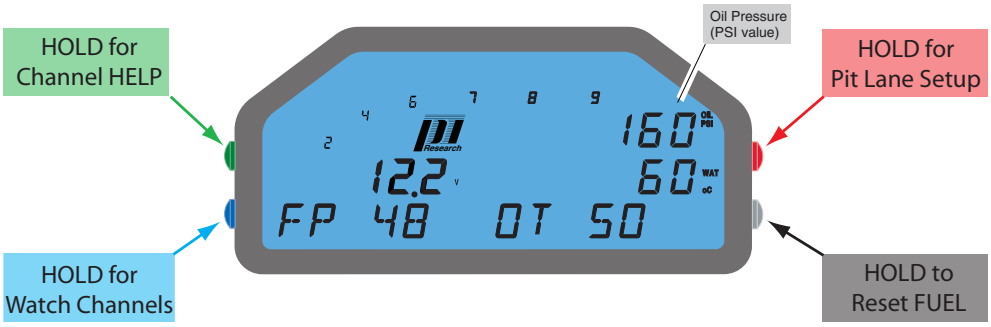


Figure: 2. Pit Page 1 - Channel values display on the dash

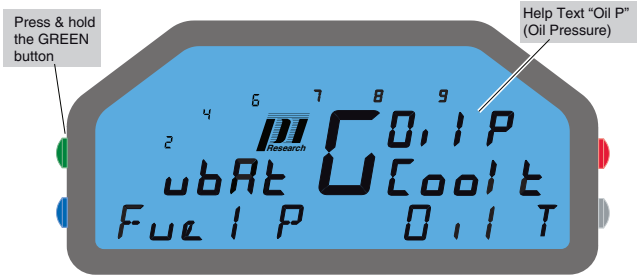


Figure: 3. Pit Page 1 - Help text replaces channel display

Sensors

Internal Sensors

The Omega Dash includes the following internal sensors:

Table: 4. Internal Sensors

Sensor	Description
2-axis Accelerometer	Provides data to enable calculation and analysis of cornering speed and the generation of outing maps.
Battery Voltage	Internal sensor to detect battery supply voltage.

External Sensors

D1

D2

The Omega Dash displays values from the following inputs when used as a standalone unit with on-vehicle sensors and/or a supported ECU:

Table: 5. External Sensors

Input / Channel	Example Sensor	Pi Part number	ECU
Beacon	Channel Zero Beacon Rx	01F-034119	—
Wheel Speed	Active Wheel Speed Sensor	21A-0144	selectable

Input / Channel	Example Sensor	Pi Part number	ECU
RPM	4 Stroke RPM Box	01F-152080	selectable
Oil Pressure	Pressure Sensor 10 bar	21A-0091	selectable
Coolant Temperature	Temperature Sensor	01G-233020	selectable
Fuel Pressure	Pressure Sensor 10 bar	21A-0091	selectable
Oil Temperature	Temperature Sensor	01G-233020	selectable
Throttle Position	Throttle Potentiometer	01G-233029	selectable
Front Damper Positions	Linear Potentiometer	01G-233034	—
Rear Damper Positions	Linear Potentiometer	01G-233034	—
Brake Pressures (Front and Rear)	Brake Pressure Sensor	01K-050620	—
Thermocouple Temperatures	EGT Thermocouple	21A-0045	—
Steering Position	Rotary Potentiometer	30K-162085	—

Additional Sensors for the D3

D3

The analogue inputs of the Omega D3 dash can be configured to accept information from a range of sources. There are 14 analogue inputs which can be programmed for the following:

Table: 6. Omega D3 Sensors

Input / Channel	Example Sensor	Pi Part number
Ext Accel Vert, Long, Lat	Single Axis Accelerometer Tri-Axis Accelerometer	01U-110028 01U-110029
Yaw Rate	Single Axis Gyro	01U-110031
Steering Angle	Rotary Sensor 360 Degree Flat	01B-606045
Throttle Angle	Rotary Sensor 360 Degree Flat	01B -606045
Gear Voltage	Raw	
Load RL, RR, FL, FR	Raw	
Clutch Press	Pressure Sensor 2400psi Sealed	01B-601453
Pitot Press	Air Pressure Sensor 2psi	01B-601219
Ride Height RL, RR, FL, FR	50-250mm Ride Height Sensor 50-350mm Ride Height Sensor	01B-050491 01B-050631
Ride Height R, F	As Above	
Torque RL, RR, FL, FR		
Tyre Temp RL, RR, FL, FR	Infrared Tyre Temp Sensor	01B-601450
Brake T Cbn RL, RR, FL, FR	Infrared Brake Temp Sensor	01B-601451
Brake T Stl RL, RR, FL, FR		
Damper RL, RR, FL, FR	Linear Pot 50mm LightWeight Linear Pot 75mm LightWeight Linear Pot 150mm LightWeight	01B-601454 01B-601455 01B-601458
Steering		
Throttle		
Brake Press R, F	Pressure Sensor 2400psi Sealed	01B-601453
Diff Oil Temp	Temp Sensor	01B-601222
Diff Oil Press	Pressure Sensor 160psi Sealed	01B-601452
GBX Oil Temp	Temp Sensor	01B-601222
GBX Oil Press	Pressure Sensor 160psi Sealed	01B-601452
Fuel Press	Pressure Sensor 160psi Sealed	01B-601452
Eng Water Temp	Temp Sensor	01B-601222
Eng Water Press	Pressure Sensor 160psi Sealed	01B-601452
Eng Oil Temp	Temp Sensor	01B-601222
Eng Oil Press	Pressure Sensor 160psi Sealed	01B-601452

Alarms

The Omega Dash will display alarms by:

- changing the backlight colour,
- displaying the ALARM annunciator on the dash,
- lighting the red alarm LED on the gear-shift / alarm LED module (if fitted).

When using the Omega Dash as a standalone unit, you can define alarm thresholds for the following channels by using the Initial Setup mode (See "Pressure and Temperature Sensors" on page 61):

Table: 7. Default Alarm Settings

Alarm	Default threshold	Threshold type
Oil pressure	40.0 PSI	MIN
Coolant temperature	110 °C	MAX
Oil temp	110 °C	MAX
Battery	11.0 V	MIN
Fuel pressure	40.0 PSI	MIN
Thermocouples 1 & 2	500 °C	MAX
Fuel level	10 liters	MIN

When using the Omega Dash as a system display for a Pi Delta or Pi Sigma system, you can configure alarms for any input channel by using the appropriate setup software (see your system User Guide for details).

For more about alarms and their use, see page 18.

Fuel

When using the Omega Dash as a standalone unit with a supported Pectel ECU, you can configure the dash to provide fuel usage information. This feature is especially useful in endurance racing, where the Omega Dash can predict the number of laps before the next stop for refuelling.

Gears

The Omega Dash displays gear information from:

- from a supported ECU,
- automatically calculated from the speed and RPM,
- measured using a gear potentiometer

The auto-detect feature provides an easy way to display a gear number on the dash without having to add extra sensors to your vehicle. (see page 47)

The gear channel from an appropriate ECU can be used if the dash sensor mode is set. (see page 36)

In the Pit Lane

Overview of Modes

The Omega Dash has various modes that are used to configure and operate the dash, while in the pit and before/during outings. The dash modes are as follows:

Table: 8. Dash Modes - Overview

Period	Dash mode	Description
After power-up	Power-up	The dash firstly displays the Omega Dash version number and software code number.
	Pit	It then displays Pit Page 1.
Workshop	Initial Setup	Enables you to configure the dash so that displays and sensors operate correctly during pit and race use.
Before an outing	Pit Lane Setup	Enables you to reset the lap-count and to zero sensors (such as the dash accelerometer, the damper and steering position sensors and the brake pressure sensors).
	Launch	After power-up, the dash moves into Pit mode (displaying Pit Page 1). When engine RPM is detected, the Pit Page displays the RPM Bar graph. The driver can display a pre-set launch threshold, to help maintain the optimal RPM level on the start line (where over-revving changes the dash back-light colour to red and flashes the lights on the gear-shift light module - if fitted).
During an outing	Race	The dash moves from Pit to Race mode as soon as the threshold outing speed is exceeded. Race mode provides two dash pages that display a range of sensor outputs (which can include fuel levels and the laps before the next pit stop).
After an outing	Telltale	When speed and RPM drop to zero after an outing, the dash moves from Race to Telltale mode. Telltale mode provides a summary of the values displayed during the outing (with the telltales for the fastest lap displayed first).
Club Qualifying Mode (CQM)	Learn	When the dash has no stored lap data, it can learn the lap distance (as sixteen equal sections) by passing and then re-passing a beacon.
	Operating	After learning the lap distance, the dash can begin comparing lap times.
Sensor information displayed	Watch Channels	Enables display of single sensor outputs on the dash (such as brake pressures and damper positions), so you can check for correct sensor / dash operation.
	Channel Help	Replaces numeric outputs on the dash with text labels (such as 'Oil P' in place of an oil pressure value).

Modes for Drivers and Engineers

Vehicle drivers will not usually use the Initial Setup or Pit Lane Setup modes (or most of the other setup items within the Omega Dash). The Initial Setup items are most useful to engineers (and are designed as 'one-time set & forget' items), while the Pit Lane Setup items are intended to cover changes that you might need to make just before an outing. The driver will generally see the dash in Start, Race and Telltale modes. They will also see the dash learning and operating when in Club Qualifying Mode. The driver may use some of the features within the Pit Lane Setup mode (for example to reset the lap count and to zero sensors, and enable / reset Club Qualifying Mode).

This section describes how to use the dash after it has been configured for operation and sensor inputs as described in the engineers' guide. (see page 30)

Before leaving the pits to make an outing, the Omega Dash provides a Pit Lane Setup mode, where you can:

- Reset the dash lap-count.
- Zero the dash accelerometer, damper position, steering position, and brake pressure sensors on your vehicle.
- Enable the Club Qualifying Mode.
- Set the beacon position for GPS use.

D2/D3 dash:

D2
D3

- Reset the logger memory, to delete any stored data.
- Enable manual logging, to log channel and sensor data even when engine RPM is zero.

Note: You should only zero sensors if the vehicle setup has been changed. The vehicle should be in a known stable position, ideally on a level surface. This allows for any changes in damper / steering / brake pressure setup and ensures that sensor values are measured from new reference points.

Dash Power Up

When you first connect power to the Omega Dash, the dash briefly displays a Power Up page like this:

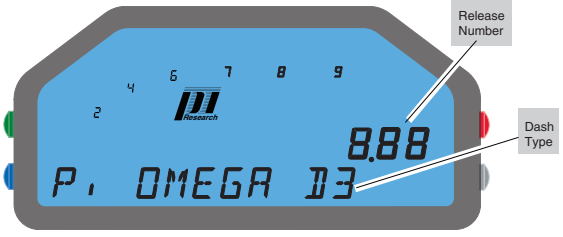


Figure: 4. Omega Dash - Power Up page

Depending on the version of your Omega Dash, the Power-up page displays '***Pi Omega D1***' or '***Pi Omega D2***' and the ***Release Number***. After a few seconds, the dash displays ***Pit Page 1***, for example:

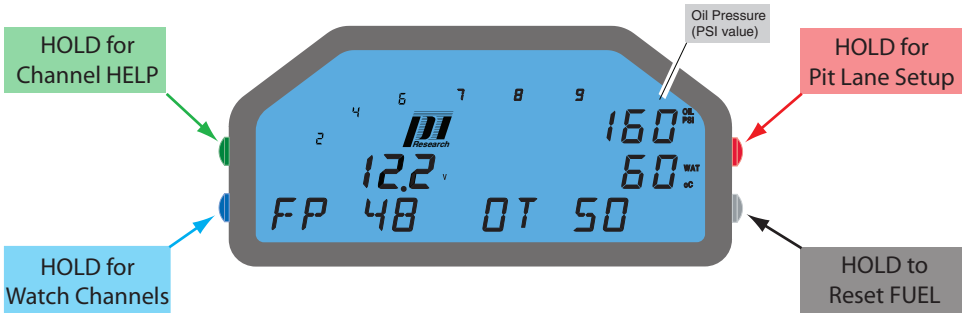


Figure: 5. Omega Dash - display of Pit Page 1

You can now configure the dash settings, or use the dash as desired.

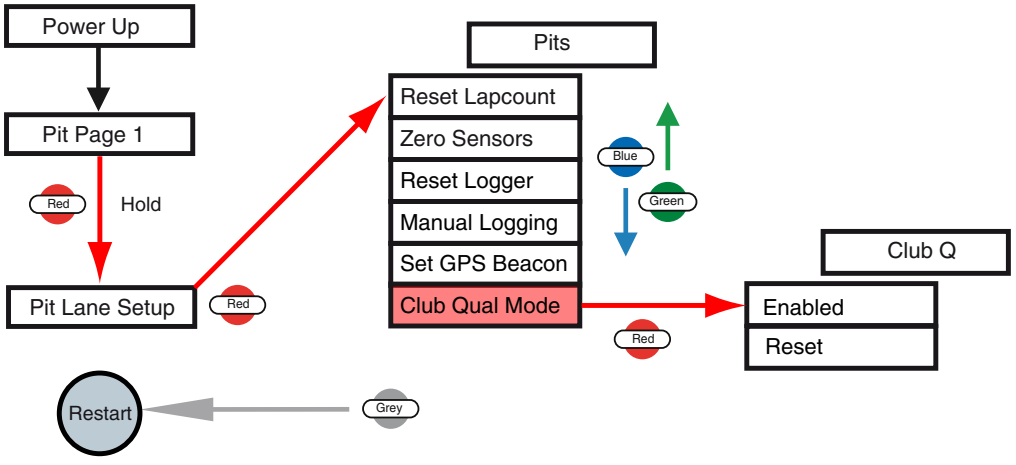
Pit Lane Setup

To use the Omega Dash in Pit Lane Setup mode:

Hold down the Red button until **PIT LANE SETUP** displays. Then click the Red button to enter the Pit Lane Setup menu.

The first item within the Pit Lane Setup (**PITS**) menu is **PITS ▸ RESET LAPCOUNT**:

Menu: 1. Pit Lane Setup



You can now configure the setup options within the PITS menu items.

Click the Blue button to scroll through the Pits menu options:

Table: 9. Pit Lane Setup Options

PITS item	Description
RESET LAPCOUNT	To return the lap counter to zero to enable another session (with no effect on stored outing or lap data), click the Red button. A **CONFIRM RESET** message displays. Click the Red button to confirm the reset. A **DONE** message briefly displays - the dash then saves the current configuration settings and restarts*.
ZERO SENSORS	Ensure the vehicle is parked on a level surface, with steering at the central position and brakes not applied. Bounce the vehicle at the front and the rear to make sure that the suspension is in a stable state. To zero the dash accelerometer and the vehicle sensors, click the Red button. A **CONFIRM ZERO** message displays. Press the Red button to begin zeroing. A **DONE** message briefly displays - the dash then saves the current configuration settings and restarts*.
RESET LOGGER**	To delete the data currently logged, click the Red button. A **CONFIRM RESET** message displays. Click the Red button to confirm the reset. A done message briefly displays - the Omega Dash then: ■ saves the current dash configuration ■ clears the logger memory ■ sets the outing number to zero ■ and restarts.
MANUAL LOGGING**	To enable manual logging, click the Red button. When you enable manual logging: ■ the dash restarts* ■ logging begins immediately ■ the annunciators within the display blink / flash, to indicate that data is being logged. To stop manual logging, either: ■ return to the **PITS ▸ MANUAL LOGGING** menu item and click the Red button. The dash stops manual logging (while it also sets the outing number to zero and restarts) and the annunciators stop flashing, or ■ turn off the power supplied to the dash.
SET GPS BEACON***	When using a GPS Beacon (see page 38), you need to mark the position of the beacon. Click the Red button to enter **PITS ▸ SET GPS BEACON**. The dash displays **BEACON IS HERE** and is now awaiting your input for the beacon position. When the vehicle is passing slowly over the desired beacon position, click the Red button to mark the GPS beacon position at this location. A **DONE** message briefly displays - the dash then saves the current configuration settings and restarts. You can now observe the GPS beacon position (see below).

D2

PITS item	Description
CLUB QUAL MODE ▸ ENABLED	Click the Red button to enter **CLUB Q ▸ ENABLED**. The Omega Dash displays the setting currently in use (**YES** or **NO**; default: **NO**). If required, click the Blue button to change the enabled setting to **YES**. If you select **NO**, then any lap data learned from driving while in Club Qualifying - Learn mode is stored for possible later reuse (if Club Qualifying Mode is re-enabled). For more about using the Omega Dash in Club Qualifying Mode, see "Club Qualifying Mode (CQM)" on page 23.
CLUB QUAL MODE ▸ RESET	(Hidden when **CLUB Q ▸ ENABLED ▸** is set to **NO**.) Click the Red button to enter **CLUB Q ▸ RESET**. A **CONFIRM RESET** message displays. Click the Red button to confirm the reset and delete any stored qualifying data. A **DONE** message briefly displays - the Omega Dash then: ■ saves the current configuration settings, ■ deletes any lap data learned from driving while in **CLUB QUALIFYING - LEARN MODE**, ■ restarts*.

* When the Omega Dash restarts, to return to the **PITS** menu, resume from step 1 above.

** (Only Omega D2 Dash): hidden if you have set logging to off, by selecting **SETUP ▸ OTHER ▸ LOGGER PROFILE ▸ LOGGING OFF;** only displayed when the Logger Profile is set to High / Med / Low (see page 50).

*** Only displayed when GPS is enabled (so **OTHER ▸ GPS BAUD RATE ▸** not set to **OFF**; and **BEACON ▸ FITTED ▸ YES** ; and **BEACON ▸ USE GPS? ▸ YES**).

When you have configured a setting within the Pits menu options, to save the setting and return to the **PITS** *menu, click the Grey button until* **PITS** *displays. You can then navigate to other* **PITS** *items.*

To exit Pit Lane Setup, store the settings and restart the dash, click the Grey button enough times to reach and then exit when **PIT LANE SETUP** *displays.*

Observing a GPS Beacon Position

After you have marked the GPS beacon position (see **PITS ▸ SET GPS BEACON** in the above table), the Omega Dash will monitor your distance from this position. When the dash next moves past the GPS beacon position (and is within the approach distance defined by the GPS Beacon Radius - see page 39), the dash will briefly display --✱ BEACON ✱-- to indicate that you have just passed the beacon position:

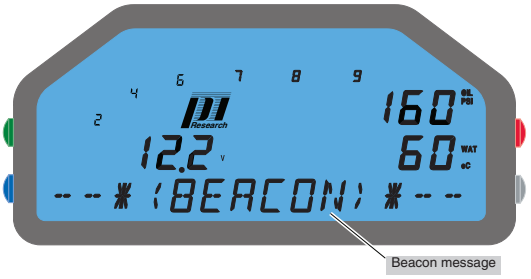


Figure: 6. Beacon message upon passing the beacon position

Note: The display is as shown on the pit page. if you are travelling faster than the outing speed threshold you will no longer be in pit lane mode and you will get a lap beacon instead of this test message.

Note: You can use Pi Toolset to save the dash settings, including the location of the beacon. When you next visit the same track you can reload the settings and the beacon position will be in the same location.

Before Leaving the Pit Lane

Ensure that you:

- Use the Watch Channels feature to check that appropriate channel values are displayed. Apply the throttle and brakes and adjust the steering position while observing the displayed values. You can press and hold Blue to display the watch channels.
- Check that the beacon signal is recognized by the dash if you are using a standard infrared beacon receiver. Use a Pi Beacon test kit or wave a beacon transmitter set to your beacon channel number in front of the beacon receiver.
- Adjust the display brightness and colour if necessary. see page 55

During an Outing

When you power-up the dash, start (and stop) the engine and begin (and stop) driving the vehicle, the Omega Dash will cycle through three different sets of standard display pages, as follows:

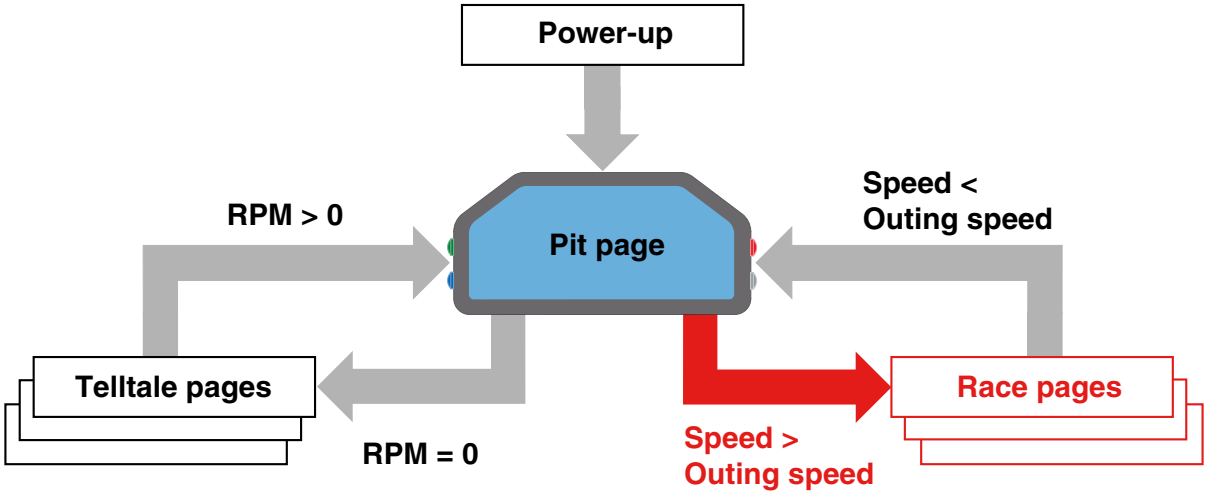


Figure: 7. Pages shown before, during and after an outing

The Pit page is the same as that displayed during the earlier setup of the Omega Dash (see page 31).

Before Launch

When you start the engine, the Omega Dash detects the engine revs and displays the RPM bar graph. However, if the speed remains below the Outing Speed[1] threshold, the dash continues to display the Pit page (Pit Page 1).

The Omega Dash helps the driver to maintain the optimal RPM level on the start line, via the preset Launch threshold[2]. Over-revving will:

- change the dash backlight colour to red,
- cause the RPM bar graph to flash,
- flash the shift lights on the Omega Dash shift/alarm module (if fitted).

1 as set within **INITIAL SETUP ▸ WHEEL SPEED ▸ OUTING SPEED**. see page 44

2 as set within **INITIAL SETUP ▸ RPM ▸ LAUNCH**. see page 46

Race Mode

The Omega Dash moves from Pit mode (displaying the Pit page) into Race mode as soon as the vehicle exceeds the Outing Speed threshold.

Race mode provides two pages which display two different sets of channel outputs. To move between the Race pages, click the Blue or Green buttons.

Race Page 1

The following are displayed:

- the current gear number and RPM (value and bar graph),
- the most recent minimum speed (when cornering) and maximum speed (during the last straight section),
- the current lap number, the current lap time and the difference between current lap and previous fastest lap.

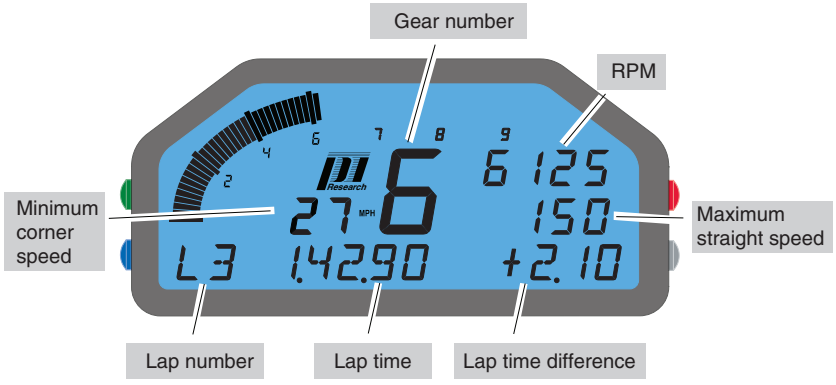


Figure: 8. Race Page 1

Race Page 2

The following are displayed:

- the current gear number, speed and RPM bar graph,
- the oil pressure and water temperature,
- the lap number and oil temperature (**OT**).

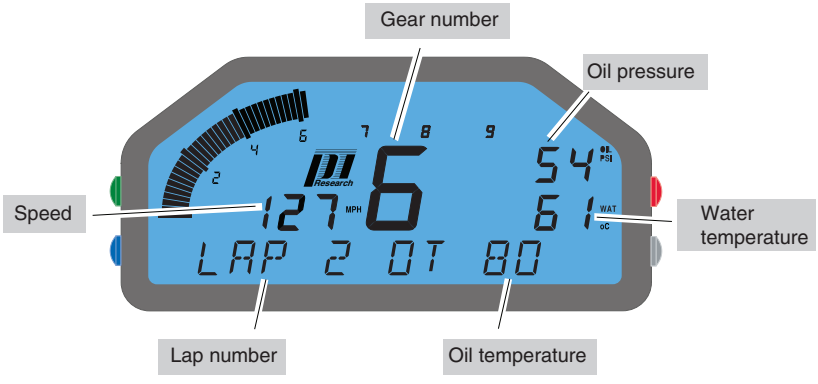


Figure: 9. Race Page 2

Track + Fuel Display

If you have setup the fuel calculation features for your Omega Dash (see page 71), you can use the dash in 'Track + Fuel' Display Mode (see page 34).

Race Page 1 will then display the fuel tank fill level ('**TF**') - and the number of laps remaining on the current fuel load ('**PIT NNL**') instead of the lap time details usually displayed:

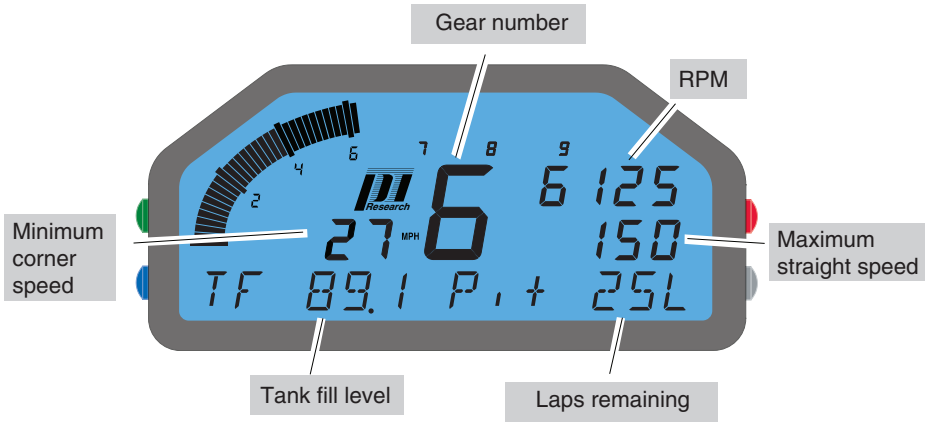


Figure: 10. Track + Fuel (Display Mode) - Race Page 1

Channel Help

To show text that describes the channel output (such as 'Oil P' instead of the channel output value usually displayed), hold down the Green button. For more details, see "Display Pages" on page 5.

Alarms

Alarms warn of abnormal conditions, for example, a temperature that is too high, or a pressure that is too low. For details of the standard alarms for channels, see page 8.

How an Alarm Shows

If you have set an alarm to display on the Omega Dash, when the alarm condition occurs, the display:

- shows the name of the alarm channel,
- shows the value of the alarm channel,
- shows the 'ALARM' annunciator,
- changes the backlight LED colour to red.

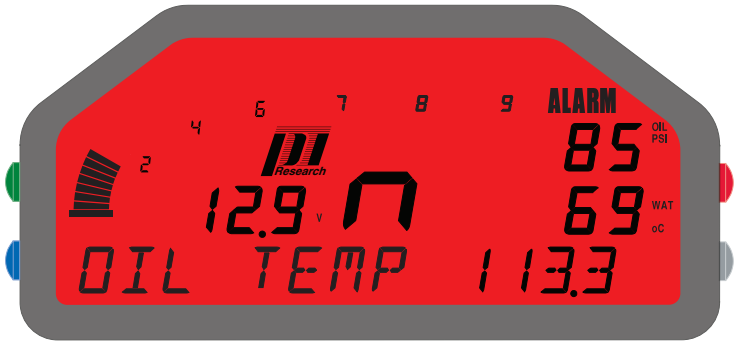


Figure: 11. Dash Display - an Oil Temperature Alarm

When an alarm occurs, you can either acknowledge it or ignore it.

Acknowledge an Alarm

Click the Red button, or click the driver switch.

Note: If other channels have reached an alarm condition, the dash will show the next highest priority channel and its alarm value (and you need to acknowledge this and any further alarms, before the dash display returns to its original state).

When you acknowledge an alarm, the Omega Dash adjusts the alarm threshold:

Alarm threshold = Channel value (when alarm acknowledged) + Adjustment amount

The alarm will only display again if the channel value crosses the new alarm threshold.

When you acknowledge one or more alarms for the same channel, if the channel starts to recover (to more usual values), the Omega Dash can automatically restore the alarm threshold to its original value.

If the channel value recovers by twice the adjustment amount, then the adjustment amount is subtracted from the alarm threshold (to give a new threshold). If the channel value continues to recover, then these recovery adjustments continue, until the original alarm threshold value is reached (where the final adjustment may be less than the adjustment amount).

An example for automatic recovery of the alarm threshold is shown below:

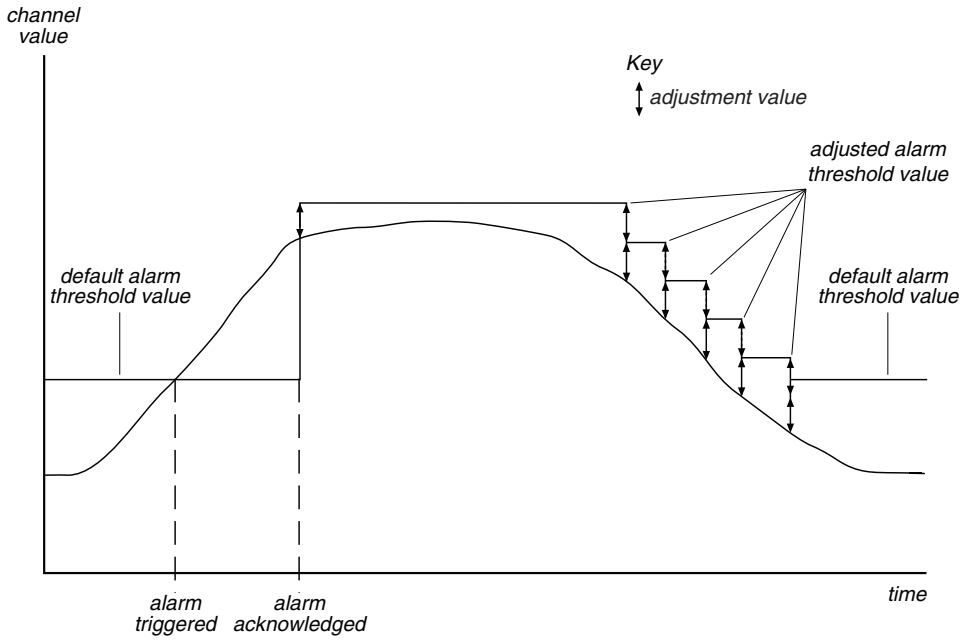


Figure: 12. Automatic Restoration of the Alarm Threshold Value

Ignore an Alarm

If you ignore an alarm, then it will cancel automatically if the channel value recovers (where the alarm threshold is not exceeded for thirty seconds). The alarm threshold value is not adjusted if this happens.

Unwanted Alarms

Some sensor configurations (such as an absence of sensor input) can trigger unwanted alarms. For more details, see page 75.

After an Outing

Telltale Mode

When speed and RPM drop to zero after an outing, the Omega Dash automatically moves into 'Telltale Mode', which provides a summary of values displayed during the outing.

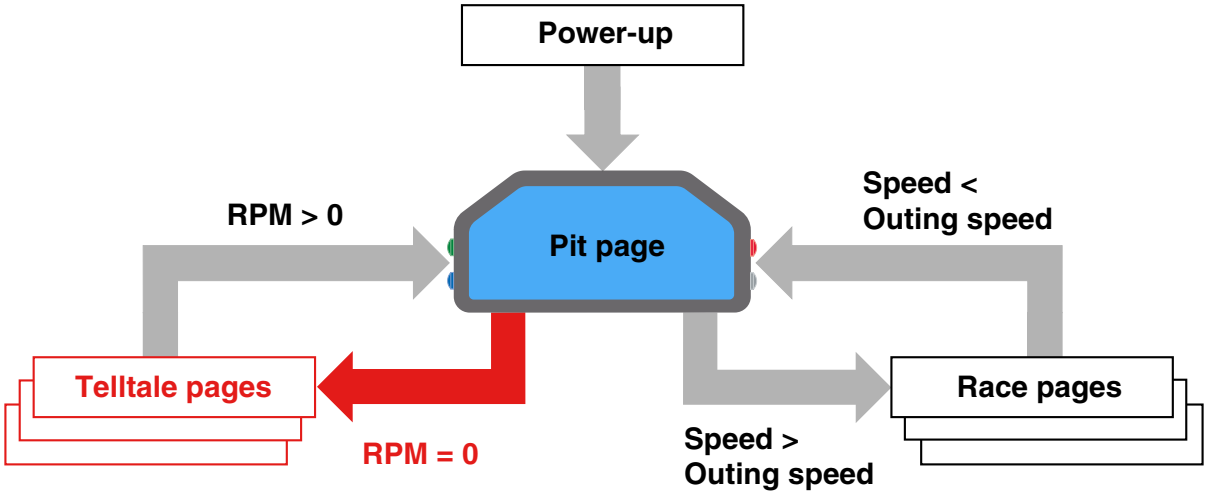


Figure: 13. Telltale Pages

Note: Telltales can be provided for a maximum of 100 laps in an outing.

Telltales for the fastest lap are shown first (when '**F**' shows as the gear number). While in Telltale Mode, the Omega Dash shows '**TT**' in the bottom left corner.

Telltale Pages

1. Press the Red button to cycle though the laps in the outing.
2. Press the Blue or Green button to scroll through the Telltale pages and the Pit page.

The following telltale pages are available:

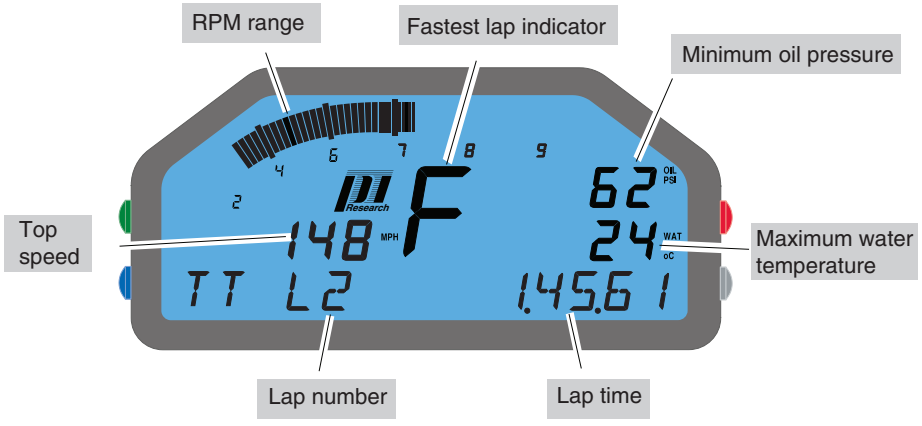


Figure: 14. Telltale Page 1

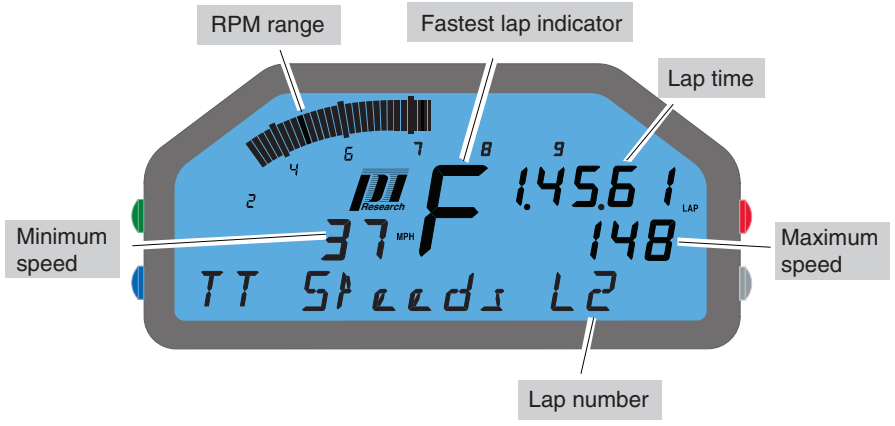


Figure: 15. Telltale Page 2

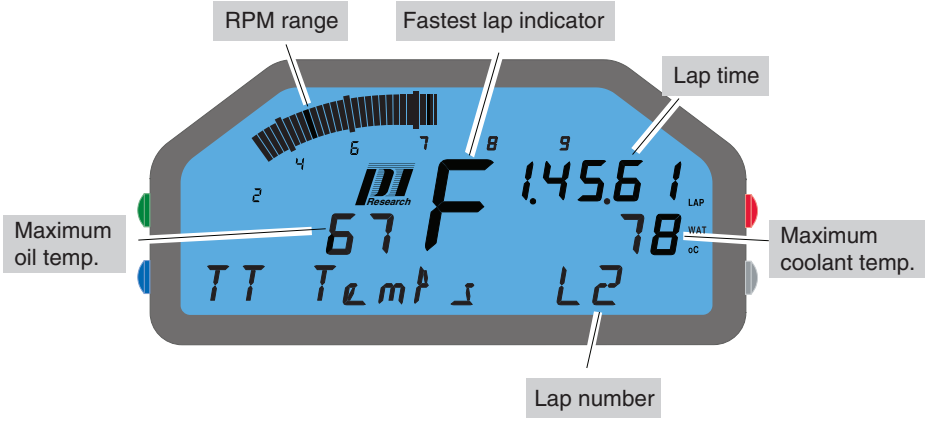


Figure: 16. Telltale Page 3

Alarms

If an alarm has been triggered during a lap, then the telltale pages for that lap display with a red backlight.

Channel Help

To show text that describes the channel output (such as 'Oil P' instead of the channel output value usually displayed), hold down the Green button. For more details, see "Display Pages" on page 5 .

Download of Logged Data

D3

D2

Pi Toolset is a software program which enables you to download logged data from the Omega Dash via the Ethernet link. Within the software you can select what data will be downloaded and where it will be stored on your PC. See the Pi Toolset Quick Start Guide for further details.

After downloading data, a copy of the downloaded data remains stored within the Omega Dash. However, this data is now marked for removal, and will be deleted when the Omega Dash starts logging again.

If you make multiple outings but do not download any data, then you may approach the storage limit of the memory within the Omega Dash. If this happens, then the Omega Dash will display an alarm warning that the memory is nearly full and continue to log data. Eventually, it will over-write the oldest data with the new data. To avoid loss of stored data, ensure that you download data before over-writing becomes necessary.

Club Qualifying Mode (CQM)

To use **C**lub **Q**ualifying **M**ode (CQM) on your Omega Dash, ensure that:

- the beacon receiver is correctly configured within **INITIAL SETUP ▸ BEACON**. see page 41,
- Club Qualifying Mode is enabled by setting '**YES**' within the Pit Lane Setup options. see page 13.

Club Qualifying Modes

Club Qualifying Mode has two modes: **Learn Mode** and **Operating Mode**. In Learn Mode, the Omega Dash is learning the correct lap distance between two beacons. In Operating Mode, the dash enables comparison of lap times and the time taken for the latest part of a lap.

Learn Mode

The Omega Dash is in Learn Mode when the dash has no stored lap data (when the dash is new, or if the stored lap data has been reset).

Learn Mode has three separate stages - **LRN 1, LRN 2 and LRN 3** - that show within the dash's lap-time display field (while alternating with the display of the running lap time).

Table: 10. CQM Learn Mode

Learn Mode display	Description
LRN 1	The dash is looking for the first beacon. When a beacon is detected, the dash moves onto the **LRN 2** stage.
LRN 2	The dash is now looking for another beacon, so it can measure the lap distance. When the next beacon is detected, the dash moves to the **LRN 3** stage.
LRN 3	The dash stores the distance for the reference lap (gained after stages **LRN1** and **LRN 2**). The stored reference lap is now split into sixteen equal-distance segments and the dash starts collecting time stamps for each of the segments.

To reach the end of the **LRN 3** stage, the dash compares the distance of the next lap to the distance of the reference lap. If the two distances are within 5% of each another, then the reference lap is stored in the Omega Dash and can be used for qualifying (using the CQM Operating Mode, below). Otherwise, the dash continues comparing distances for later laps, until one of these laps is within 5% of the distance for the reference lap.

Note: While the Omega Dash is learning the lap distance, ensure that the driver follows the racing line throughout the required laps. Otherwise the dash may learn the wrong lap distance or may not find a lap that is within 5% of the reference lap distance.
If the path of the reference lap does not closely compare to that of a race lap, then you need to reset the stored lap data - see below - and repeat the Learn Mode stages, until you have a good reference lap (that uses the correct lap distance).

Note: You can use Pi Toolset to save the dash settings, including the CQM lap data. When you next visit the same track you can reload the settings and continue where you left off.

Operating Mode

When the Omega Dash has learned the correct lap distance, you can use the dash in CQM Operating Mode to display qualifying times.

After Learn Mode is complete:

- if you continue lapping, then the Omega Dash automatically moves from Learn Mode into Operating Mode and will begin displaying qualifying times (see below).
- If you do anything other than continuing lapping (such as returning to the pits or powering-down the dash), the dash retains the reference lap data. When you re-enable the dash for Club Qualifying and resume lapping, the dash only needs to be 'synchronised' to the beacon position before it will start to show qualifying times.

If you re-enable the Omega Dash for club qualifying, the dash needs to synchronise itself by looking for the first (end of lap) beacon. Until this beacon is detected, the Omega Dash alternates between showing the running lap time and **SYNC**, as shown below**:**

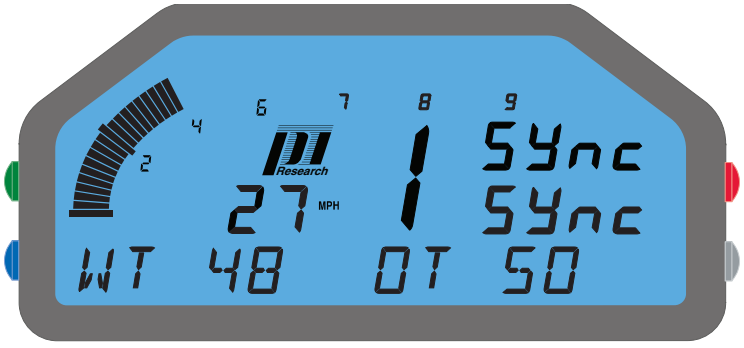


Figure: 17. CQM - Synchronisation (seeking an end-of-lap beacon) before continuing

When the Omega Dash detects the first beacon and becomes synchronised, it can start to compare lap times.

Times for the current lap are compared to the previous best lap time (which can be the first lap after the reference lap). The Omega Dash determines when the current distance from the beacon matches one of the sixteen distance segments stored in the dash. The dash compares the time taken to reach the end of the segment (from the start of the lap) to the value stored for the fastest lap[1]. The result is the 'Segment difference', displayed as **+/-m.ss.xx** for the latest segment completed. The segment difference value is displayed for three seconds, before the dash returns to displaying the running laptime:

---

1 Note that the segment difference is not the same as the time taken to cover one segment - it is the time taken to reach the end of the current segment from the start of the lap (and so is based on the sum of the times taken to cover each segment).

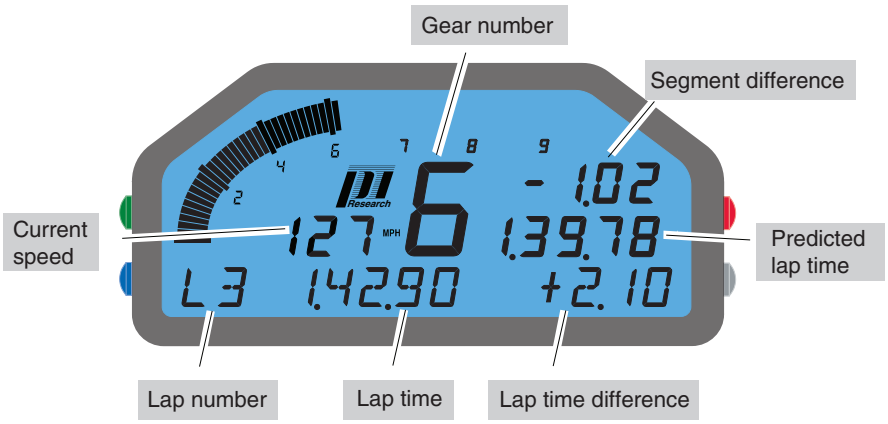


Figure: 18. CQM - display of segment difference and predicted lap time

At the end of the lap, the Omega Dash displays the latest lap time:

- if this lap time is faster than the reference fastest lap stored in the Omega Dash (and the distances for the two laps are within 5%), then the new fastest lap is stored and the lap time value is flashed upon the dash for 10 seconds.
- if this lap time is slower than the reference fastest lap (or the distances for the two laps are not within 5%), then the lap time is shown on the display but does not flash.

At the start of the next lap the above process begins again and continues while the Omega Dash remains in Race Mode (so while RPM values remain above zero and the Speed remains above the Outing Speed).

Channel Help

To show text that describes the channel output (such as 'Oil P' instead of the channel output value usually displayed), hold down the Green button. For more details, see "Display Pages" on page 5.

Resetting CQM Stored Lap Data

You will need to reset (delete) all of your stored qualifying lap data if:

- the lap distance stored (while in Learn Mode) was not suited to your needs,
- you have moved to a new / modified course and need to learn a new lap distance.

To Reset All Stored Lap Data:

1. Press and hold the

button until PIT LANE SETUP displays.

2. Click the

button to enter the PIT LANE SETUP menu.

3. Click the

button to scroll through the PITS menu items, until **CLUB QUAL MODE** displays.

4. Click the

button to enter **PITS ▸ CLUB QUAL MODE**. The dash displays '**CLUB Q ▸ ENABLED**'.

5. Click the

button to display the current setting ('**YES**' or '**NO**').

6. If required, click the

button to change the enabled setting to '**YES**'.

Note: If you set **PITS ▸ CLUB QUAL MODE ▸ ENABLED** *to '***NO***', this hides the* **PITS ▸ CLUB QUAL MODE ▸ RESET** *item (see below). Any lap data learned from driving while in Club Qualifying - Learn mode is stored for possible later reuse (if Club Qualifying Mode is re-enabled).*

7. To save this setting, press the

button to return to the **CLUB QUAL MODE ▸ ENABLED** menu item.

8. Click the

button to scroll through the PITS menu items until **RESET** displays.

9. Click the

button to enter **CLUB QUAL MODE ▸ RESET**. The dash displays '**CONFIRM RESET**'.

10. Click the

button to confirm the reset.

    A '**DONE**' message briefly displays - the dash then saves the current configuration settings and resets.

Installation

When installing an Omega Dash, you can either adapt your current dash panel or make up a new panel tailored for the Omega Dash.

When you choose the location for the Omega Dash, ensure that:

- The Omega Dash is electrically and mechanically isolated from the vehicle chassis. When fitting the Omega Dash anti vibration (AV) mounts should be used.
- The driver can see the Omega Dash display when any removable control units (such as the steering wheel) are in place.
- The driver can operate the buttons.
- If the dash is fitted with warning LEDs they are visible to the driver.
- The Omega Dash is viewed head-on (perpendicular with the driver's line of vision).

The dash has the following optimum viewing angles for best contrast:

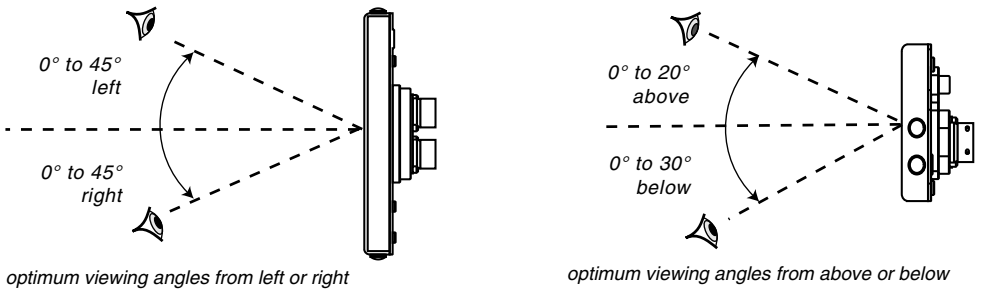


Figure: 19. Optimum Viewing Angles

Installing the Dash

CAUTION: When used as a device-driven display, the Omega Dash can be used to drive a number of Satellite display modules. To prevent damage to your Pi System from an electrical overload, ensure that the Omega Dash is connected through a separate fused connection to the vehicle battery.

When installing the Omega Dash:

- For overall size and dash panel drilling dimensions, see page 29.
- Provide enough space behind the dash panel for the cables to exit.
- Ensure the cable exit hole is large enough for the AutoSport connectors and looms to pass through.
- Avoid bending the looms so much that they strain the AutoSport connectors.
- Use the supplied anti-vibration mounts to attach the Omega Dash.

Shift Light Module

You can mount the optional Omega Dash shift light module on the top of the Omega Dash using the supplied screws, or elsewhere in the vehicle if required.

Driver Switch

The driver switch is a single pole momentary (on/off) switch connected to a loom that plugs into a loom connector at the rear of the Omega Dash. You should fit the driver switch within easy reach of the driver, to enable simple operation of the switch (to acknowledge alarms displayed by the Omega Dash).

For further information about installing an Omega Dash, please refer to the relevant Product Information Sheet for either the Omega D1 or Omega D2 Dash.

Other Options

When used as a device-driven display, the Omega Dash can be used with a number of Satellite display modules. The Omega Dash contains circuitry to drive and power up to four Satellite display modules connected together in a 'daisy chain'. The Satellite module range consists of:

- an Alarm module,
- a Gear-shift light module,
- a 5-digit 7-segment LED Numeric display module.

Dimensions

Use the following figures to help you when fitting an Omega Dash. The dimensions are shown in millimetres and (inches).

Omega Dash

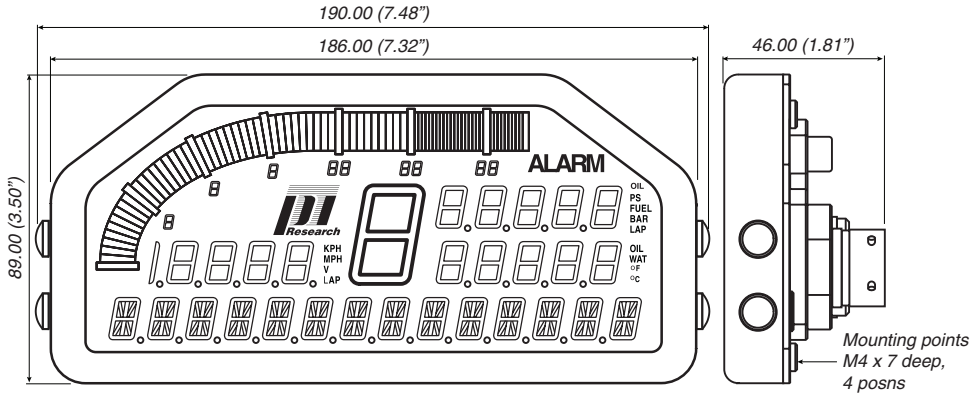


Figure: 20. Omega Dash dimensions millimetres and (inches)

Panel Cutout

Use the following figure to mark the position of the holes for mounting an Omega Dash.

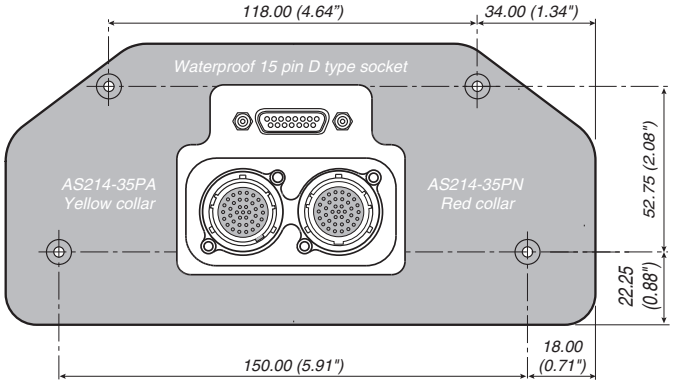


Figure: 21. Panel drilling details (viewed from behind the Omega Dash)

Setup Overview

This Manual divides the setup procedure into four phases:

- Initial Setup,
- Other Settings,
- Basic Setup,
- Advanced Setup.

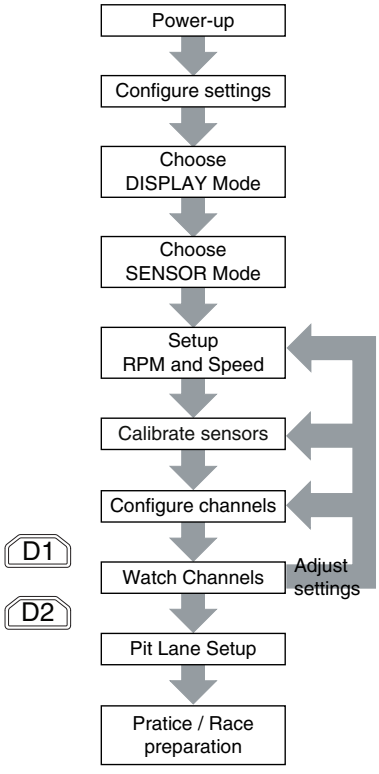
Before using your Omega Dash for the first time, you need to define the way that it will operate e.g. as a standalone dash or as a device-driven dash. You do this by configuring the various setup options provided for the dash within the '***Initial Setup***' mode.

As a minimum, before the Omega Dash is prepared for an outing, you need to:

- choose a '***Display Mode***' for the dash,
- choose a '***Sensor Mode***' for the dash,
- configure inputs to provide Speed and RPM data to the dash.

The Omega Dash enables a 'one-time set & forget' approach to the setup of sensor inputs and the display of channel information.

The general approach is as follows:



After power-up, you need to define how the dash is to be used (i.e., as a standalone dash or device-driven dash). If standalone, then you can choose a display mode, so that the dash display will suit the driving required (such as driving on a track or stage).

Your choice of Sensor Mode sets the response of the dash to sensor inputs, e.g. directly from sensors, or from a supported ECU.

Next you need to configure the speed and RPM inputs into the dash, so that the dash can detect when the vehicle starts an outing. The Omega Dash can display speeds when provided with wheel speed sensor, GPS or ECU inputs.

You can then calibrate any optional sensor inputs into the dash, such as beacon and gear detection; oil, coolant, thermocouple, battery and fuel monitoring; the position and travel of throttle and steering linkages; the ratio of brake fluid pressures and the position of suspension dampers.

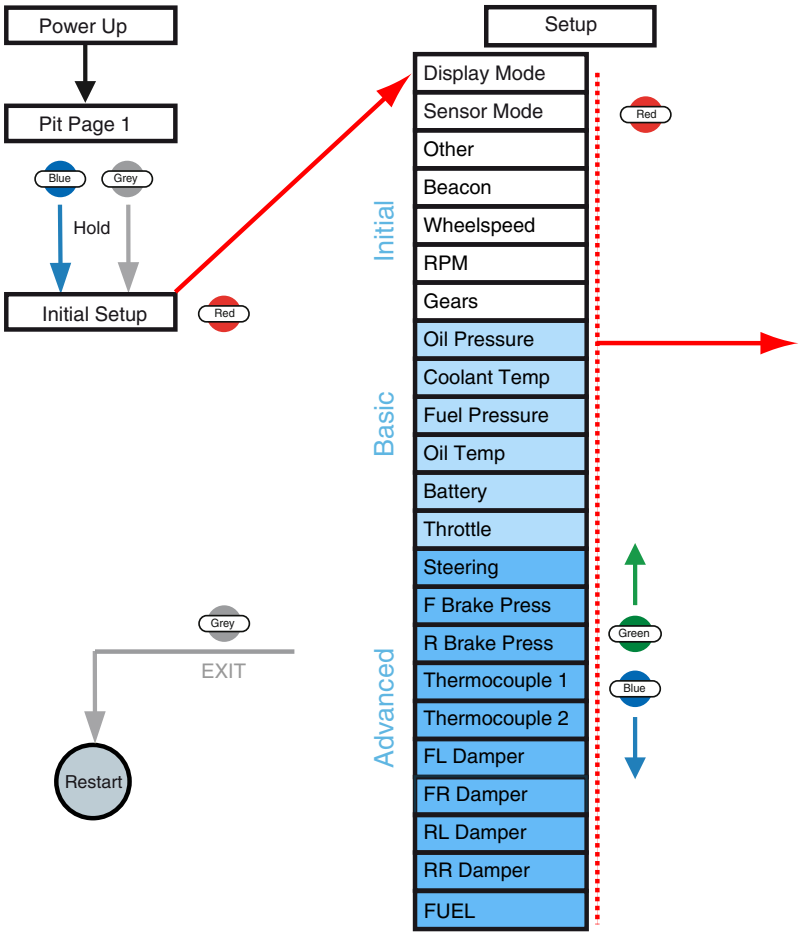
You can also configure the dash illumination levels and the output of channel data to a logger (external via Serial or CAN for the Omega D1 dash, or to an internal logger for the Omega D2/D3 dash).

To confirm sensor and channel setup, you can display outputs on the dash using the 'Watch Channels' feature. If any dash settings need adjustment, you just return to the relevant setup item. When your adjustments are complete, the 'one-time set & forget' phase is over.

After final preparations within Pit Lane Setup (such as zeroing sensors and lap count), you will be ready to start an outing.

Setup Menu Overview

Menu: 2. Setup Overview



The initial setup menu structure is illustrated above.

Note: Not all menu items are available in all versions of the Omega Dash.

Click Red to advance through the menu structure.

Click Green and Blue buttons to navigate up and down through a menu.

Click Grey to exit a menu and, if pressed sufficiently often the dash will restart.

Quick Ways to Change Values

When you want to change the numerical value of a setting for a channel or sensor, the Omega Dash enables you to use some shortcut methods to alter the value. For example, if the dash value currently set for the RPM redline is 9000, you can change this to 9400 using the buttons on the dash, as follows:

1. Navigate to the **SETUP ▸ RPM ▸ REDLINE** menu item.

2. Click the Red button to enter the **SETUP ▸ RPM ▸ REDLINE** item - the current redline setting displays, for example '9000'.

3. Click the Green and Blue buttons to change the value by plus or minus one.

Alternatively, use the Red to scroll through the digits of the number .

Then click the Green and Blue buttons to change the digit by plus or minus one

4. To save the new value and navigate elsewhere within the **SETUP ▸ RPM** menu items, click the Grey button.

Saving Dash Settings

When you have configured the settings required for the Omega Dash, you can reset the dash to save the settings.

To reset the Omega Dash:

1. Click the Grey button enough times to exit the **SETUP** menu until the original **INITIAL SETUP** page displays.

2. Click the Grey button once more to save your Initial Setup settings and reset the Omega Dash. The dash now:

- saves the current settings,
- restarts and briefly shows the Power-up page,
- returns you to a display of the Pit page (Pit Page 1).

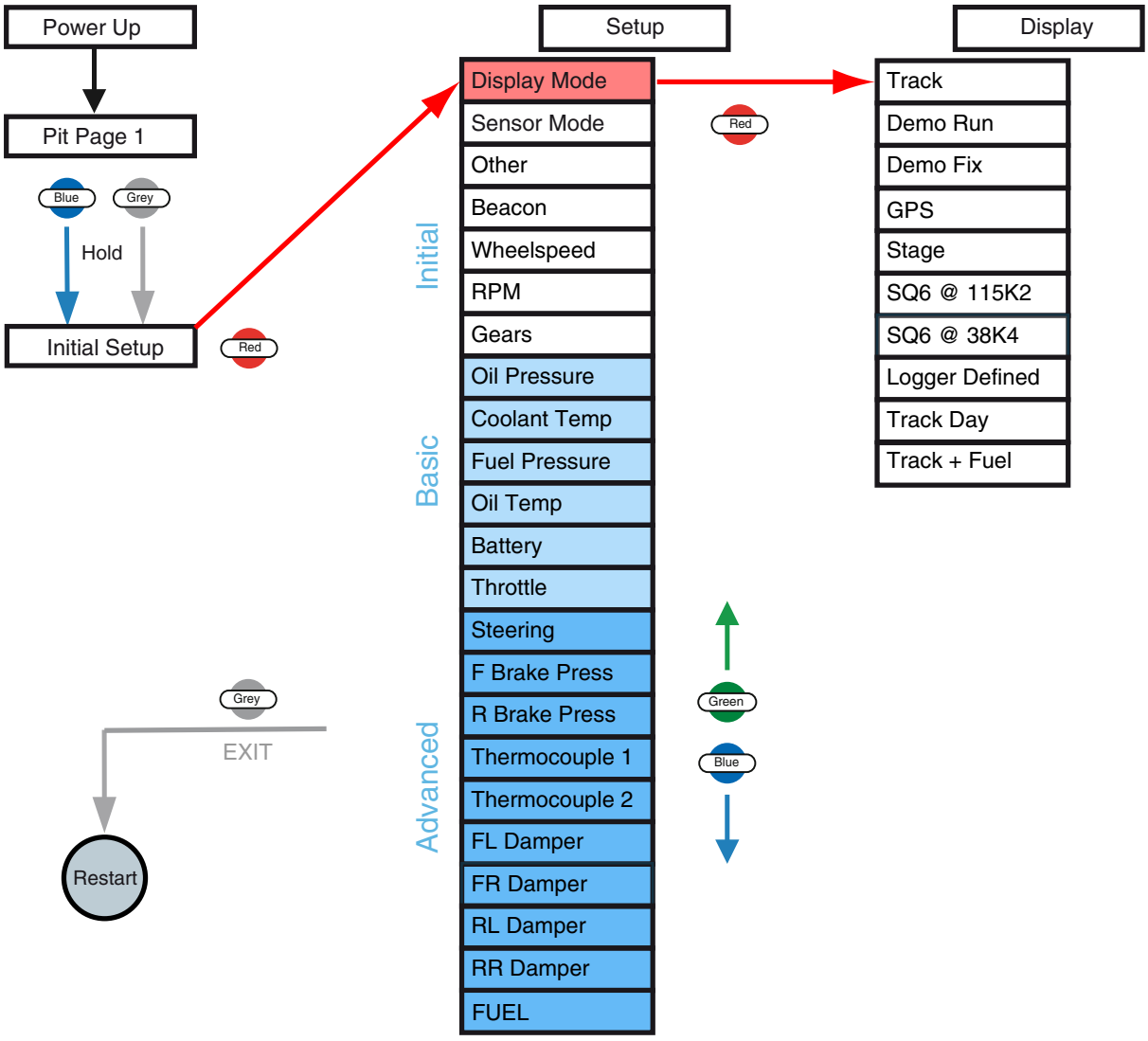
Initial Setup

Display Mode setup

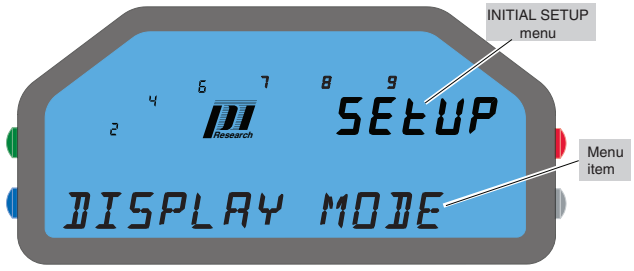
You choose a Display Mode to define how the dash is used (as a standalone or device-driven dash). The Display Mode chosen affects the display of Pit and Race pages.

When you first connect power to the Omega Dash, the dash briefly displays a Power Up page. Depending on the version of your Omega Dash, the Power-up page displays '***Pi Omega D1***', '***Pi Omega D2***' or '***Pi Omega D3***' and the ***Release Number***. After a few seconds, the dash displays ***Pit Page 1.*** You can now configure the dash settings, or use the dash as desired.

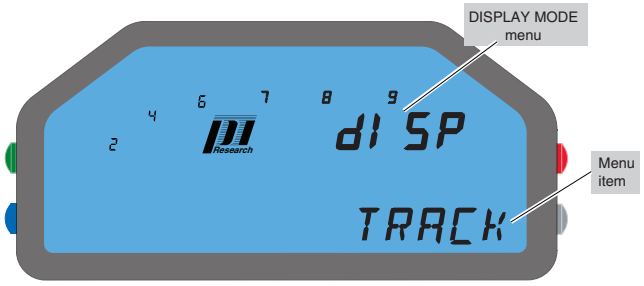
Menu: 3. Display Mode



1. Press and hold the Blue and Grey buttons until **INITIAL SETUP** displays on the dash:
2. Click the Red button to enter the Initial Setup menu.
3. The first item within the **SETUP** menu is **DISPLAY MODE**:



4. Click the Red button to enter Display setup. The first menu item is **TRACK:**



Notice that the dash display changes to show **DISP ▸ TRACK**. *The Omega Dash display only shows the last two levels within a menu structure, so*

SETUP ▸ DISPLAY MODE ▸ TRACK *displays as just* **DISP ▸ TRACK**.

5. Click the Blue or Green button to scroll through the Display Mode options:

Table: 11. Display Modes

Display Mode	Description
TRACK	The default selection that applies a standard display format for Race pages. Lap times are calculated from beacon signals. Telltales (displays of race data) are available after an outing.
DEMO RUN	A demonstration mode, useful for testing the dash display with a dynamic display of values or when showing your vehicle and the dash. The display cycles through sets of fixed values, changing every few seconds to demonstrate a variety of sensor readings (and an alarm). To view the dash operating in this mode, with **DEMO RUN** displayed, click the Grey button repeatedly until the dash resets.

Display Mode	Description
DEMO FIX	A fixed-display demonstration mode, good for testing the dash with a static display or when showing your vehicle and the dash. To view the dash operating in this mode, with **DEMO FIX** displayed, click the Grey button repeatedly until the dash resets.
GPS	Displays Latitude, Longitude and the number of satellites available.
STAGE	A modified **TRACK** mode that displays a stage timer in the bottom left area of the dash.
TRACK DAY	As for **TRACK** mode, but lap times are not displayed.
TRACK + FUEL	As for **TRACK** mode, but with fuel calculation and display features (requires a compatible ECU). This item is only displayed if: **SETUP ▸ SENSOR MODE ▸ PECTEL** (or a compatible ECU) is selected and then: **SETUP ▸ FUEL ▸ ENABLED** is set to **YES**.
Device-driven dash only	
SQ6 DEFINED	Select this mode when running the dash as a system display with a Pectel ECU. This sets the dash to 'Device-driven' display (for details, see page 3). Further setup is required when using DeskProW or CalTool systems (for details on configuring the dash display see the User Guide for your system).
LOGGER DEFINED	Select this mode when running the dash as a system display with a Pi Delta or Pi Sigma system. This sets the dash to 'Device-driven' display (for details, see page 3). Further setup is required using Pi Workshop or Delta LMS systems (for details on configuring the dash display, see the User Guide for your system).
Display Modes not listed above	
(Extra to the modes given above)	The Display Modes listed above may be expanded as the Omega Dash is developed, to provide an extended range of display options to other devices that can communicate with the Omega Dash.

6. When the required Display Mode is displayed, click the Grey button. This saves your selection, exits the Display Mode options and returns you to the **SETUP ▸ DISPLAY MODE** menu item. You can now navigate to other **SETUP** items.

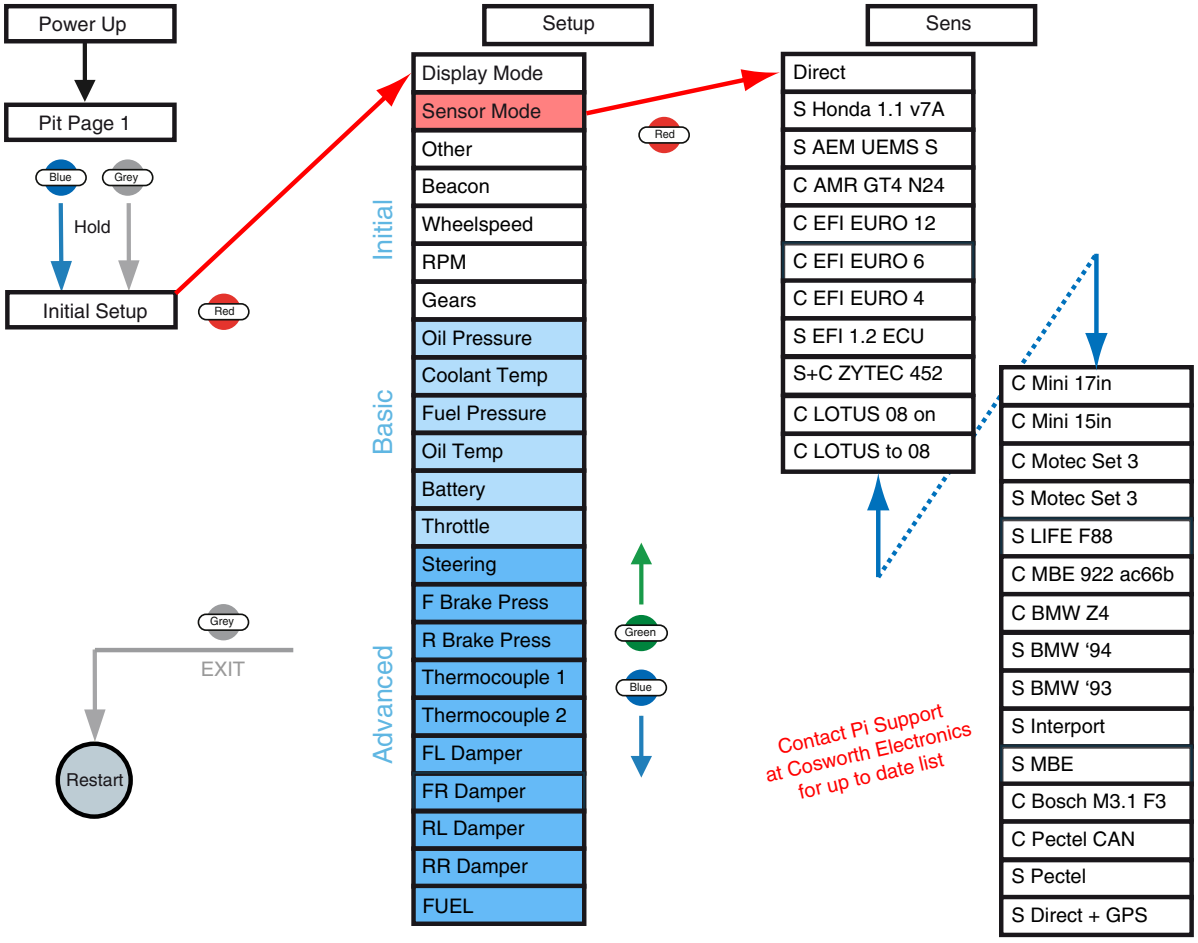
After selecting either **SQ6 DEFINED** *or* **LOGGER DEFINED** *as the Display Mode, you just need to click the Grey button to store the Initial Setup and reset the dash. You do not need to configure the other sensor and channel settings (as covered below), as the dash display will be controlled by the Logger or ECU. However, ensure you have correctly set up your logger / ECU system by following the instructions in your system User Guide.*

Sensor Mode setup

You choose a Sensor Mode to define the source of various sensor inputs to the Omega Dash from an external unit (such as a Pectel ECU). When you choose to accept input from an ECU, the Omega Dash can use the input data to display RPM, pressure, temperature, speed and throttle values etc.

Navigate to the sensor mode setup menu:

Menu: 4. Sensor Mode



Select the sensor mode from the list:

Note: Sensor Mode prefix: **C** *= CAN input;* **S** *= Serial input.*
You can choose to use on-vehicle inputs instead of specific Interport / ECU channels, by setting the **USE ANALOGUE?** *feature (within the sensor calibration menus for the Omega Dash). For more details, see* "In the Pit Lane" on page 9 .

When the required Sensor Mode is shown, click the

button.

This saves your selection, exits the Sensor Mode options and returns you to the **SETUP ▸ SENSOR MODE** menu item. You can now navigate to other **SETUP** items.

Table: 12. Sensor Modes

Sensor Mode	Description
DIRECT	The default Sensor Mode. Channel information is displayed direct from the sensors installed on your vehicle and connected to the dash. The Omega Dash will ignore data from any ECU fitted.
S PECTEL	Select when using your Omega Dash with a Pectel ECU. Channel data is displayed from the data stream produced by the ECU.
S INTERPORT	Select when using your Omega Dash with a Pi Research Interport. Channel data is displayed from a CAN stream produced by the Interport.
S DIRECT + GPS	The dash will operate as for Direct Sensor Mode, but will accept a feed of GPS data that is used to provide speeds and lap timings. (Only displayed if GPS is enabled within: **SETUP ▸ OTHER ▸ GPS BAUD RATE ▸** <value> [i.e. not set to '**OFF**']).
C BMW Z4 CAN	Select when using a BMW Z4 ECU.
S MBE	Select when using your Omega Dash with an MBE ECU (which has been setup by MBE to export a Pi Research compatible data stream). Channel data is displayed from the data stream produced by the ECU.
OTHER SUPPORTED ECUS	Contact Pi Support at Cosworth Electronics
Sensor Modes not listed above	
Extra to the modes given above	The Sensor Modes given above may be expanded as the Omega Dash is developed, to provide an extended range of sensor and display options to other devices that can communicate with the Omega Dash.

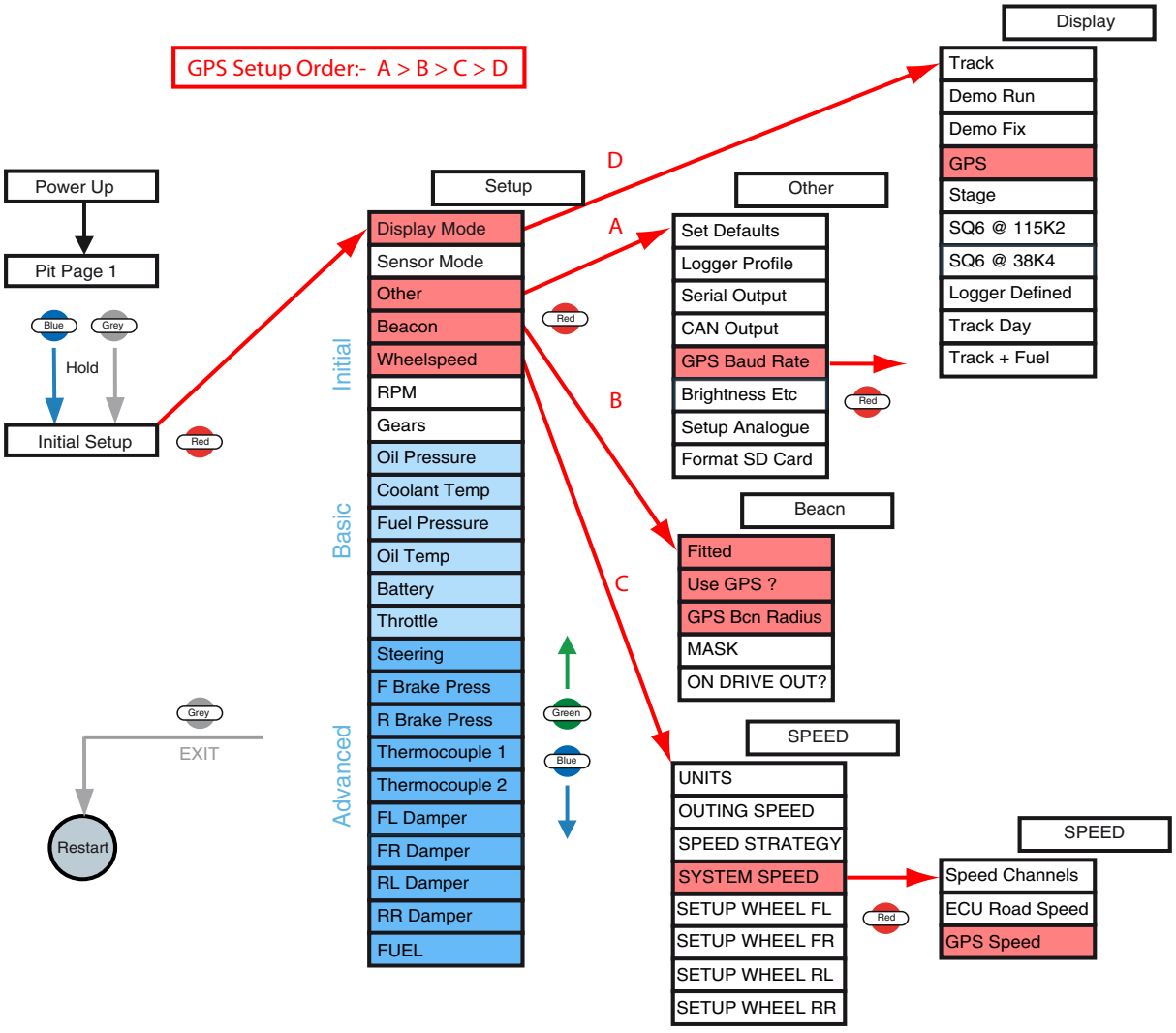
Configure GPS

You can configure your Omega Dash so that it uses GPS data to:

- set a lap beacon (see see page 41),
- calculate speeds instead of using a wheelspeed sensor or ECU data stream (see page 43).

Before your Omega Dash can use GPS data, you need to enable GPS (see below) and then configure the GPS settings within the four relevant menus (A,B,C,D below):

Menu: 5. GPS Setup



A

Enable GPS Use

Note: The various GPS options only become available in the menu structure once the GPS has been enabled.

1. Press and hold the Blue and Grey buttons until **INITIAL SETUP** displays on the dash (see page 33).
2. Click the Red button to view the **SETUP** menu (the first item is **SETUP ▸ DISPLAY MODE**).
3. Click the Blue button to scroll through the **SETUP** menu items until **OTHER** displays.
4. Click the Red button to enter **SETUP ▸ OTHER**. The first option displays (**OTHER ▸ SET DEFAULTS**).
5. Click the Blue button to scroll through the **OTHER** items until **GPS BAUD RATE** displays.
6. Click the Red button to enter **OTHER ▸ GPS BAUD RATE**. The current GPS Baud Rate displays (default: **OFF**).
7. To set a baud rate (and enable use of GPS data throughout the dash), scroll through the different rates until the rate compatible with your GPS unit is displayed. Then click the Grey button to save the setting and return to the **OTHER ▸ GPS BAUD RATE** menu option.
8. To save your settings, click the Grey button to exit to the **SETUP ▸ OTHER** menu item. You can now navigate to other **SETUP** items.

When you have set a GPS baud rate, the dash displays extra GPS-based items within menus, which you can use to configure beacon and speed detection, as follows:

B

Detect a Beacon from GPS Data

1. Navigate to: **SETUP ▸ BEACON ▸ USE GPS?** (see page 41).
2. Click the Red button to enter **BEACON ▸ USE GPS?** and display the current setting (**YES** or **NO**).
3. Click the Blue button until **YES** displays.
4. Click the Grey button to enable use of GPS data instead of a standard infrared beacon. The Omega Dash displays **BEACON ▸ USE** GPS?
5. Click the Blue button until **BEACON ▸ GPS BEACON RADIUS** displays.
6. Click the Red button to enter the **BEACON ▸ GPS BEACON RADIUS** item and display the current radius setting (in metres).

7. Set the maximum distance value from the beacon to the vehicle that will count as passing the beacon position. (Set to 25 metres as default). For an example of how to change values, see: "Quick Ways to Change Values" on page 32"

Note: Ensure that you set the beacon radius to a fairly large value, so at least wide enough to cover all possible paths past the beacon position.

8. Click the Grey button to save this setting and return to the **BEACON ▸ GPS BEACON RADIUS** menu item. You can now scroll to other Beacon menu items.

9. Click the Grey button to exit to the **SETUP ▸ BEACON** menu item. You can now navigate to other **SETUP** items.

Note: To use a beacon based upon GPS data, you need to set the beacon location at some point on a lap. To do this, you use the Omega Dash in Pit Lane Setup mode - see page 12 .

C

Enable Speed from GPS Data

1. Navigate to: **SETUP ▸ WHEEL SPEED ▸ SYSTEM SPEED ▸ GPS SPEED** (see page 43).

2. To accept the **GPS SPEED** setting, Click the Grey button. The Omega Dash displays **SPEED ▸ SYSTEM SPEED**. You can now scroll to other Speed menu items.

All speeds displayed by the Omega Dash will now be determined from GPS data.

3. Click the Grey button to exit to the **SETUP ▸ WHEEL SPEED** menu item. You can now navigate to other **SETUP** items.

D

Enable GPS Display

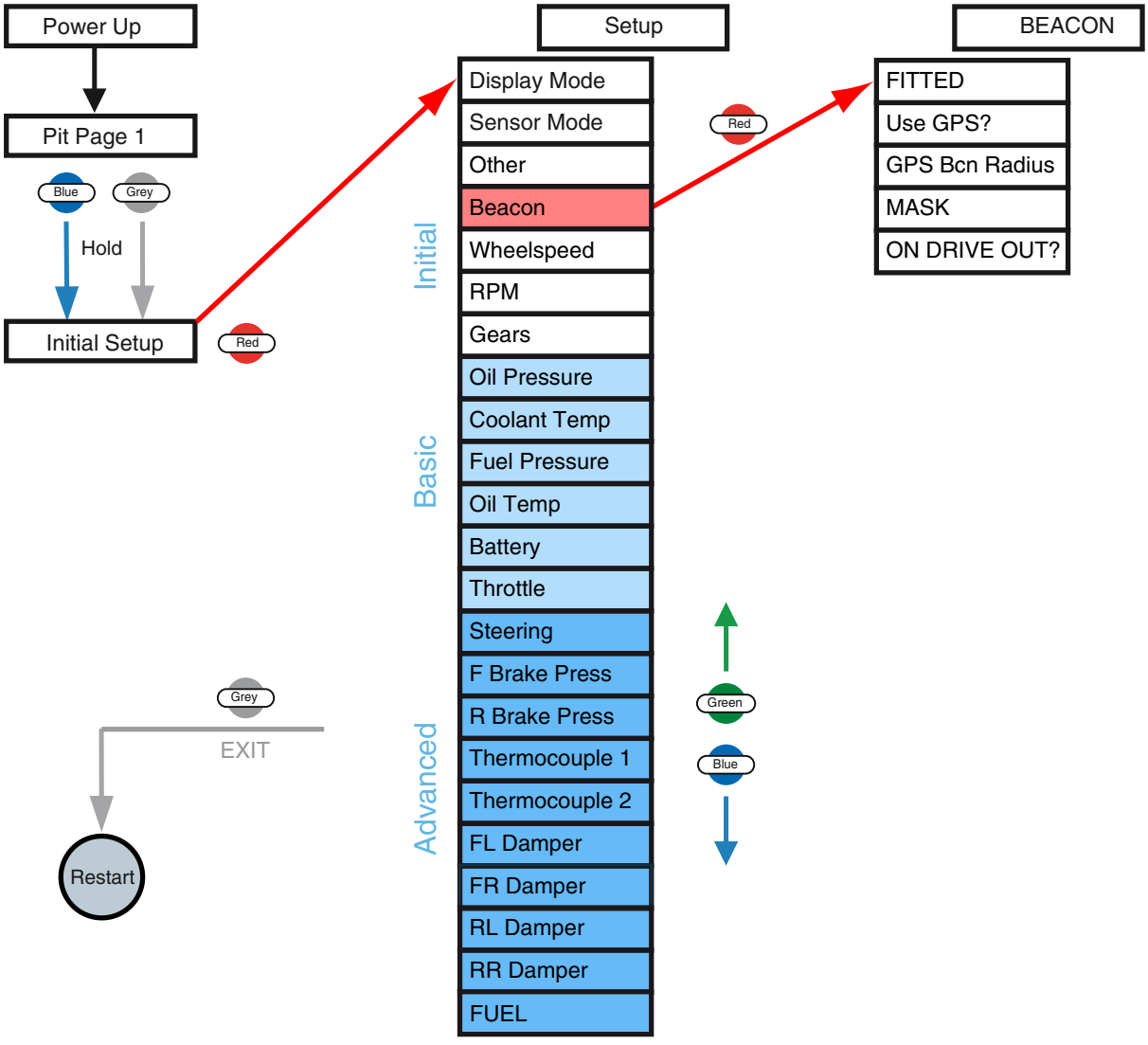
1. Navigate to: **SETUP ▸ DISPLAY ▸ GPS**.

2. To setup the display from the **GPS**, Click the Red button. The Omega Dash displays the Latitude, Longitude and number of satellites available.

Beacon Settings

Beacon Setup

Menu: 6. Beacon



1. Navigate to the **SETUP ▸ BEACON** menu item: click the Blue button to scroll through the **SETUP** menu until **BEACON** displays.

2. Click the Red button to enter **SETUP ▸ BEACON**. The first option displays (**OTHER ▸ FITTED**).

3. Click the Blue button to scroll through the beacon options:

Table: 13. Beacon Options

BEACON option	Description
FITTED	Select whether a beacon receiver is connected to your Omega Dash (**YES** or **NO**).
If you set **FITTED** *to* **NO**, *then the Omega Dash hides the all of the beacon options given below.*	
USE GPS?	Select **YES** to get the beacon position data from a Global Positioning System. (Only displayed if GPS is enabled within: **SETUP ▸ OTHER ▸ GPS BAUD ▸** <value> [i.e. not set to **OFF**]).
If you use GPS data for the lap beacon, then the Omega Dash ignores all other beacon signals into the dash (until you set **USE GPS?** *to* **NO**).	
GPS BEACON RADIUS	Select and set the maximum distance from the beacon to the vehicle that will count as passing the beacon position. (Default set to 25 metres). (Only displayed if **BEACON ▸ USE GPS?** is set to **YES**).
MASK	Set the mask window. After a beacon signal is received, the mask time is the minimum time that must pass before a second beacon signal will be recognized.
ON DRIVE OUT?	With **STAGE** set as the Display Mode, select **YES** for the dash to generate a beacon at the start of a stage. The beacon is generated when the dash detects engine RPM (and speed rising above the set Outing Speed). The dash then displays a timer for the stage, until reaching the next beacon.

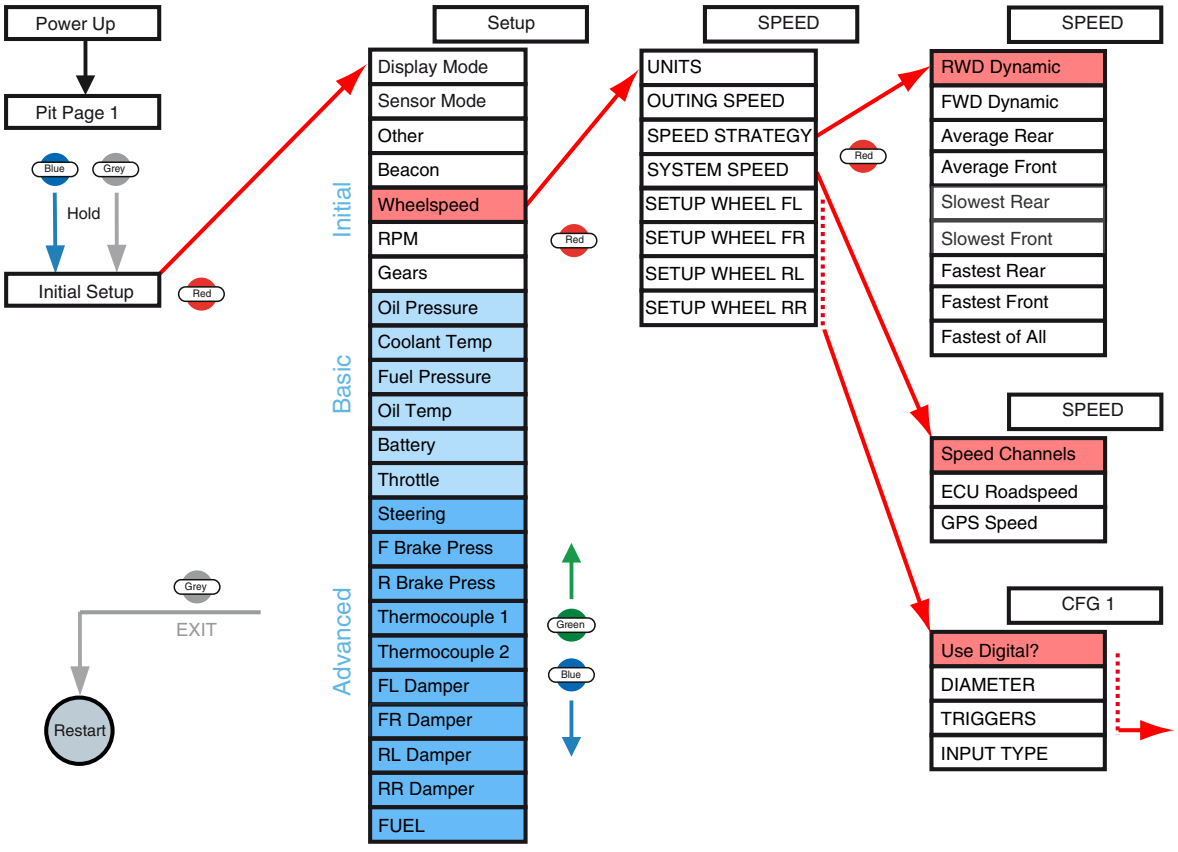
4. Click the Red button to enter a beacon option, then click the Blue button to set the required value. For an example of how to change values, see: "Quick Ways to Change Values" on page 32".

5. Click the Grey button to save the setting and return to the menu of beacon options.

6. When you have configured all of the beacon settings, click the Grey button. This saves the settings and returns you to the **SETUP ▸ BEACON** menu item. You can now navigate to other **SETUP** items.

Speed Detection and Display

Menu: 7. Wheelspeed



Before you can use the Omega Dash for an outing, you need to configure the way that speed is detected and displayed by the dash. You can provide vehicle speed via:

- wheel-speed sensors - the Omega Dash will calculate speed based on sensor input and wheel dimensions,
- from supplied ECU data,
- from movement in the vehicle's GPS location.

If you use input from wheel-speed sensors for the Omega Dash to calculate and display speeds, you can test the speed display by just spinning the wheels. The Omega Dash does not require engine RPM before it will detect and display speeds.

To set up speed detection and display:

From the **SETUP ▸ DISPLAY MODE** item (see page 33):

1. Click the Blue button to scroll through the **SETUP** menu items until **WHEEL SPEED** displays.

2. Click the Red button to enter **SETUP ▸ WHEEL SPEED**. The first option displays ('**SPEED ▸ UNITS**').

3. Click the Blue button to scroll through the Wheel Speed options:

Table: 14. Wheelspeed Options

WHEEL SPEED option	Description
UNITS	Set the units for wheel speed display (**MPH** or **KPH**).
OUTING SPEED	Set an outing speed threshold. This is the speed at which the Omega Dash automatically switches from Pit mode to Race mode (and starts to display and store data). When the vehicle speed drops below the outing speed, the Omega Dash will return to Pit mode awaiting the next outing and so on. Avoid setting the outing speed too high as the Omega Dash will not start logging when a race starts. Avoid setting the outing speed too low as the dash will switch to Pit mode too early, e.g. as soon as the vehicle goes round a slow corner.
SPEED STRATEGY	Select the operation mode for sensing speed: **RWD Dynamic, FWD Dynamic:** The brake pressure is used to help calculate the speed. Under light braking or acceleration, the faster of the un-driven wheelspeeds is used. Under heavy braking, the faster of the driven wheelspeeds is used. **Average Rear:** Calculate an average of both rear wheel speeds. **Average Front:** Calculate an average of both front wheel speeds. **Slowest Rear:** Uses the slower of the two rear wheel speed. **Slowest Front:** Uses the slower of the two front wheel speed. **Fastest Rear:** Uses the faster of the two rear wheel speed. **Fastest Front:** Uses the faster of the two front wheel speed. **Fastest All:** Uses the fastest of the four wheel speeds.
SYSTEM SPEED	Select: **GPS Speed** to calculate speed from the change in the GPS location. (Only displayed if GPS is enabled within: **SETUP ▸ OTHER ▸ GPS Baud Rate ▸** <value> [i.e. not set to '**off**']). **ECU Roadspeed** to use the speed from an ECU. (Only displayed if an ECU is enabled within: **SETUP ▸ SENSOR MODE ▸** <value> [not set to '**DIRECT**']) **Speed Channels** to accept speed data from wheelspeed channels. (Only valid if channels are available and non zero)
SETUP WHEEL FL **SETUP WHEEL FR** **SETUP WHEEL RL** **SETUP WHEEL RR**	You will need to configure both/all relevant wheels for the strategy selected above. Select which wheel to configure: **USE DIGITAL?** Use the direct digital input to the dash. **DIAMETER:** Set the wheel diameter for the vehicle. **TRIGGERS:** Set the number of triggers on the wheel. **INPUT TYPE:** Select the type of sensor you are using (**Active** or **Passive**).

4. Click the Red button to select a Wheel Speed option, then click the Blue button to set the required value. For an example of how to change values, see: "Quick Ways to Change Values" on page 32 ".

5. Click the Grey button to save the setting and return to the menu of Wheel Speed options.

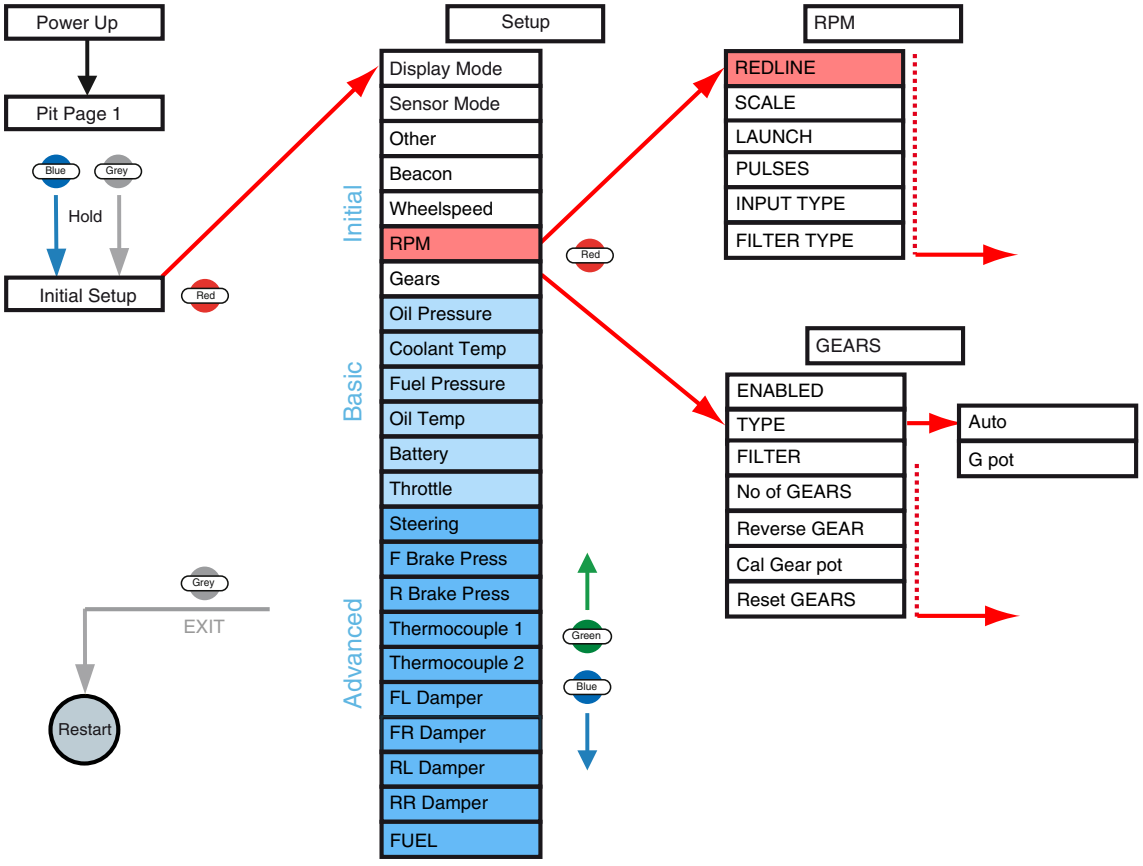
6. When you have configured all of the settings for the wheel speed channel, click the Grey button. This saves the settings and returns you to the **SETUP ▸ WHEEL SPEED** menu item. You

can now navigate to other **SETUP** items.

After configuration, you can verify your settings and check the correct values are displayed on your dash , via the 'Watch Channels' feature. For more details, see "Watching Channel Values" on page 64 .

RPM Detection and Display

Menu: 8. RPM



Before you can use the Omega Dash for an outing, you need to configure the way that engine RPM is detected and displayed on the dash.

From the **SETUP ▸ DISPLAY MODE** item (see page 33):

1. Click the Blue button to scroll through the **SETUP** menu items until **RPM** displays.
2. Click the Red button to enter **SETUP ▸ RPM**. The first option displays ('**RPM ▸ REDLINE**').
3. Click the Blue button to scroll through the RPM options:

Table: 15. RPM Options

RPM option	Description
REDLINE	Set* a Redline threshold for the RPM display on the dash. When the engine RPM exceeds this value: ■ the RPM bar graph flashes, ■ the dash backlight turns red, ■ the shift lights flash on the optional gear-shift light module, (if fitted).
SCALE	**BAR GRAPH MAX** <value> Set* the maximum RPM of the bar graph displayed (the dash automatically calculates and moves the scale markings).
LAUNCH	**LAUNCH REVS** <value> Set* the optimal launch RPM for your engine. This setting helps the driver to maintain the optimal RPM level on the start line. When the engine RPM exceeds this value (due to over-revving): ■ the RPM bar graph flashes ■ the dash backlight turns red ■ the shift lights flash on the gear-shift light module, (if fitted).
PULSES	**PULSES / 2 REV** <value> Set* the number of sensor pulses produced for every two engine revolutions.
INPUT TYPE	Select the input type for the RPM sensor (**PUP** / **PASIV** / **PDOWN**).
FILTER TYPE	Set the type of filter to be applied to your RPM signal. **NONE**. No filter will be applied **SP 1/2/3**. This filter will remove any unwanted spikes normally found on distributor ignitions. **DIS 1/2/3**. This filter will correct the RPM when used on wasted spark ignitions. Set the filter strength: 0 is least, 3 is most filtering.
*For an example of how to change values see: "Quick Ways to Change Values" on page 32 ".	

4. Click the Red button to select an option, then click the Blue button to set the required value.

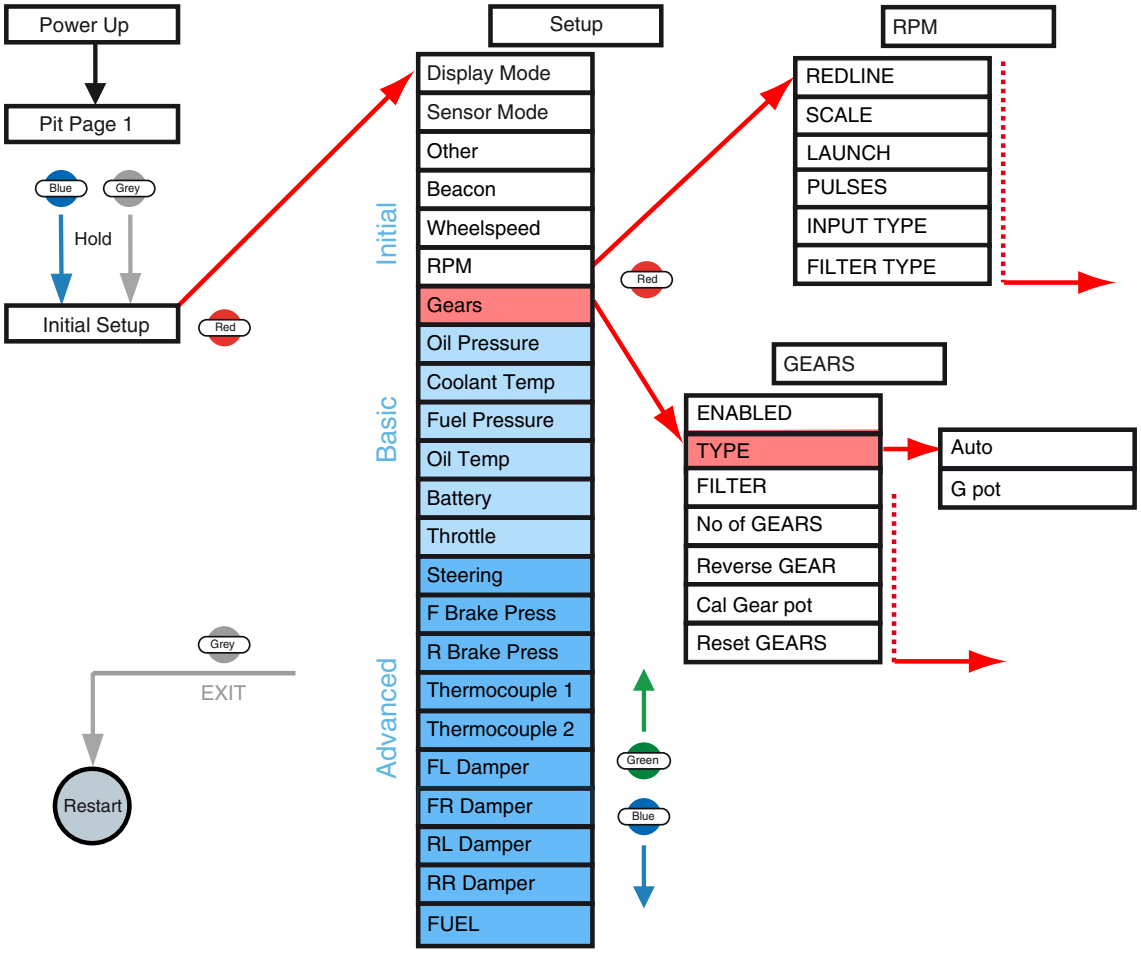
5. Click the Grey button to save the setting and return to the menu of RPM options.

6. When you have configured all of the settings for the RPM channel, click the Grey button. This saves the settings and returns you to the **SETUP ▸ RPM** menu item. You can now navigate to other **SETUP** items.

Gear Display

Gear Detection and Display

Menu: 9. Gears



Note: If you are using the Omega Dash with a supported ECU, the gear number can be obtained from the ECU data stream.

The Omega Dash can display the gear currently engaged when the vehicle is moving. It has two modes for calculating the gear number:

- Gear ratios can be learnt from the speed and RPM in **Auto** mode. If your dash has no stored gear ratio data, then it will need to learn the gear ratios. During gear learning, you need to drive using all of the gears. While the auto-detect process is learning, the gear number flashes and displays the number of gear ratios still to be detected. When all of the gear ratios have been detected, the Omega Dash will start to display the number of the engaged gear.
- If a potentiometer is connected to the gear selector shaft it be selected and calibrated using the **G POT** mode.

To configure the display of gears for the vehicle:

1. Click the Blue button to scroll through the **SETUP** menu items until **GEARS** displays.
2. Click the Red button to enter **SETUP ▸ GEARS**. The first option displays (**GEARS ▸ ENABLED**).
3. Click the Blue button to scroll through the Gears options:

Table: 16. Gear Options

GEARS option	Description
ENABLED	Select **YES** to auto-detect gear ratios. Select **NO** to disable auto-detection by the Omega Dash and display the gear ratio number provided by a supported ECU (if available).
If you set **ENABLED** *to* **NO** (the default setting), *then the Omega Dash hides the all of the Gears options given below.*	
TYPE	**AUTO:** Calculate the gear number from the speed and RPM (after learning) **G POT:** Calculate the gear number from a gear potentiometer (after calibration)
FILTER (Auto detect only)	Set* the filter value used when auto-detecting gear ratios (default = 20, range 1-100). Please accept the default value, unless the dash struggles to learn gear ratios and display the gears accurately. With a high filter value, the RPM and speed values will give more accurate gear display (once learned), but the dash will take longer to learn the gear ratios. Higher filter values tend to prevent the wrong gear from being displayed if the signals are subject to interference.
NO OF GEARS	Set* the number of gears on your vehicle.
REVERSE GEAR (G Pot only)	Enter **YES** or **NO** depending on whether your car has a reverse gear.
CAL GEAR POT (G Pot only)	Used to calibrate the gear pot. You are prompted to select each gear and click the Red button to calibrate the potentiometer.
RESET GEARS	To delete all stored gear ratio data, save any other settings and reset the dash, click the Red button twice (to select and then confirm the option to reset). The dash displays **DONE**, resets the display and returns you to a display of Pit Page 1 (within Pit mode).

*For an example of how to change values, see:
"Quick Ways to Change Values" on page 32".

4. Click the Red button to select an option, then click the Blue button to set the required value.
5. Click the Grey button to save the setting and return to the menu of Gears options.
6. When you have configured all of the Gear settings, click the Grey button to save the settings and exit to the **SETUP ▸ GEARS** menu item.

You can now navigate to other **SETUP** items.

Prepare for an Outing

This section has covered how to:

- set the Display Mode and Sensor Mode,
- configure the input and detection of RPM, Speed, Gear number and beacon position for the Omega Dash.

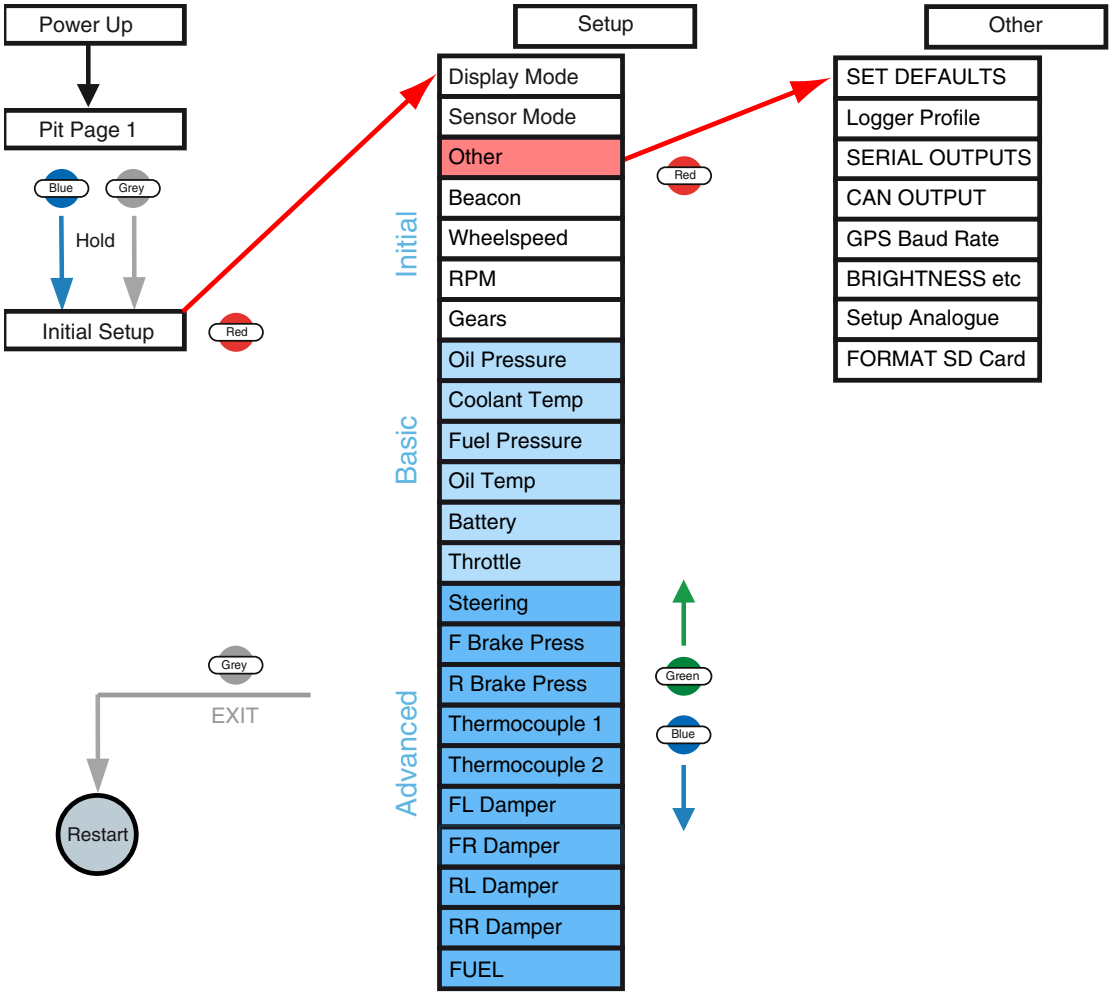
You can now use the dash for driving / racing, while accepting its default settings for sensor inputs and channel displays. However, your Omega Dash is unlikely to work well without further configuration of optional sensors and channel values.

Configuring extra sensor inputs and channel outputs for display by your Omega Dash is covered in the next section "In the Pit Lane" on page 9.

Other Settings

Navigate to **Pit Page 1 > Initial Setup > Setup > Other:**

Menu: 10. Other Settings



Set Defaults

Select and confirm.

Logger Profile

Set the logging rate. The options are: High, Medium, Low, GPS, Off. Which options are available depends on which type of Omega Dash you have. See the product information sheet for details of logging rates for individual channels.

D2

D3

With the Omega D2 and D3 Dashes, you can:

D3

- Store all sensor and channel data to the 128 MB memory within the dash.
- Control the sampling rate used for data collection (high / medium / low), to vary the time available for logging.
- Download the stored data in ***Pi Club Expert Analysis*** format via an ethernet connection. You can then analyse the data using ***Pi Club Expert Analysis*** software. For the D3 dash, data is stored in .pds format for analysis in Pi Toolbox.

The Omega Dash starts logging data when it detects engine RPM and only stops logging when both speed and RPM are zero. If you restart the engine, then logging resumes (and any previous data is retained) until speed and RPM are zero again - and so on.

Each time logging resumes, the Omega Dash treats the new logging session as a new outing (by increasing the outing number by one for the new logging session).

You can also enable manual logging when engine RPM is zero, for example to log sensor and channel data while testing (for details see page 51).

Table: 17. Logging Options

Logger Profile option	Description
Logging Off	Data is not saved to the logger memory. This setting turns logging off and hides the display of logging items within the Pit Lane Setup menu.
Log rate High	Logging capacity: 3.7 hours of saved data. Data is logged for all sensors and channels. The **High** sampling rate for logging data is usually above that for the **Med** / **Low** rates.
Log rate Med	Logging capacity: 7.8 hours of saved data. Data is logged for all sensors and channels (exception: vertical acceleration is not saved). The **Med**(medium) sampling rate for logging data is often less than the **High** rate, but is sometimes higher than for the **Low** rate.
Log rate Low	Logging capacity: 26.6 hours of saved data. Data is logged for most sensors and channels, but is not saved for the following channels: ■ damper position and velocity, ■ brake pressures and brake balance, ■ vertical acceleration. The **Low** sampling rate is sometimes less than the **Med** rate.
Log rate GPS Mode	Logging capacity: 52 hours of saved data. Limited logging for use with a GPS receiver. Data is logged from the GPS, engine RPM, Lap times and Club Qualifying Mode data.

Note: Logging time show are based on the Stand alone logging table. if you are taking information from a supported ECU then the times will be less as the logging table will be longer.

When you have the desired setting displayed, click the Grey button to save the logger setting and return to the **OTHER ▸ Logger Profile** menu item.

Click the Grey button to save the settings and exit to the **SETUP ▸ OTHER** menu item. You can now navigate to other **SETUP** items.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details see page 64

To configure logging further, you use the logging items within the Pit Lane Setup menu (for details, see page 51).

Serial Output

An Omega Dash can receive data from sensor, channel and ECU inputs. The dash can then export this data as:

- Serial output,
- CAN output.

For Serial Output the options available are:

- No,
- Video,
- Log.

To set Serial Output: Click the

button to enter **OTHER ▸ SERIAL OUTPUT**. The Omega Dash shows the Serial Output option currently in use (default: **NO**).

Click the

button to set the required value:

Table: 18. Serial Output Options

SERIAL OUTPUT option	Description
NO	Serial stream data is not produced / sent.
VIDEO	Data is sent in a format suitable for use with the Pi Video Overlay Unit. The units used for each channel are based on the Omega Dash channel settings (note that the unit set for the coolant temperature is used as the unit for all other temperatures).
LOG	Data is sent in a format suitable for logging on a Pi Compact Logger. The units used for each channel are all metric.

Click the

button to save the setting and return to the **OTHER ▸ SERIAL OUTPUT** menu item. You can now scroll to further items within the **OTHER** menu.

CAN Output

An Omega Dash can receive data from sensor, channel and ECU inputs. The dash can then export this data as:

- Serial output,
- CAN output.

For CAN output the options available are:

- No CAN Output,
- VIDS + no Term,
- VIDS + Term,
- CLOG + no Term
- CLOG + Term

CAN output from the Omega Dash enables you to transfer dash data to other modules within a CAN network.

D1

With an Omega D1 dash, you can save data from the dash by sending serial or CAN output to an external logger.

D2

With an Omega D2 dash, you do not need to use serial or CAN output, as the D2 dash has an internal logger (see page 50) that can store all of the dash data, until you are ready to download the data via Ethernet.

Click the Red button to enter **OTHER ▸ CAN OUTPUT**. The Omega Dash shows the CAN Output option currently in use (default: **No CAN out**).

Click the Blue button to set the required value:

Table: 19. Can Output Options

CAN OUTPUT option	Description
No CAN out	CAN data is not sent (the bus is un-terminated).
VIDS + no Term	The dash is configured to support a Pi VIDS2 video system. The CAN bus is un-terminated.
VIDS + Term	The dash is configured to support a Pi VIDS2 video system. The CAN bus is terminated.
CLOG + no Term	The dash is configured to support a Pi logger. The CAN bus is un-terminated.
CLOG + Term	The dash is configured to support a Pi logger. The CAN bus is terminated.

Click the Grey button to save the setting and return to the **OTHER ▸ CAN OUTPUT** menu item. You can now scroll to further items within the **OTHER** menu.

GPS Baud Rate

To set the background GPS baud rate:

1. Click the Blue button to scroll through the **SETUP** menu items until **OTHER** displays.
2. Click the Red button to enter **SETUP ▸ OTHER**. The first option displays (**OTHER ▸ SET DEFAULTS**).
3. Click the Blue button to scroll through the Other options until **GPS BAUD RATE** displays.
4. Click the Red button to enter **OTHER ▸ GPS BAUD RATE**. The first current baud rate is displayed.
5. Click the Blue button to scroll through the available values.
6. Click the Red button to select the desired value.
7. Click the Grey button to save the value and return.

See the Product Information Sheet for your GPS for the correct value. The available options for baud rate are: Off, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300.

Select Off to disable the GPS.

See also how to Configure the GPS above. (see page 38)

Brightness etc

You can alter the brightness and colour used to illuminate your Omega Dash, to improve its visibility across a variety of conditions. The dash uses a dual colour blue / red LED backlight, that you can adjust in colour from blue, through purple, to red. You can also select the brightness used to display the LEDs on the Omega Dash shift/alarm module (if fitted).

To set the background brightness, colour and shift/alarm light brightness:

1. Click the Blue button to scroll through the **SETUP** menu items until **OTHER** displays.
2. Click the Red button to enter **SETUP ▸ OTHER**. The first option displays (**OTHER ▸ SET DEFAULTS**).
3. Click the Blue button to scroll through the Other options until **BRIGHTNESS ETC** displays.
4. Click the Red button to enter **OTHER ▸ BRIGHTNESS ETC**. The first option displays (**BACK ▸ BRIGHTNESS**).
5. Click the Blue button to scroll through the Brightness etc options:

Table: 20. Brightness Options

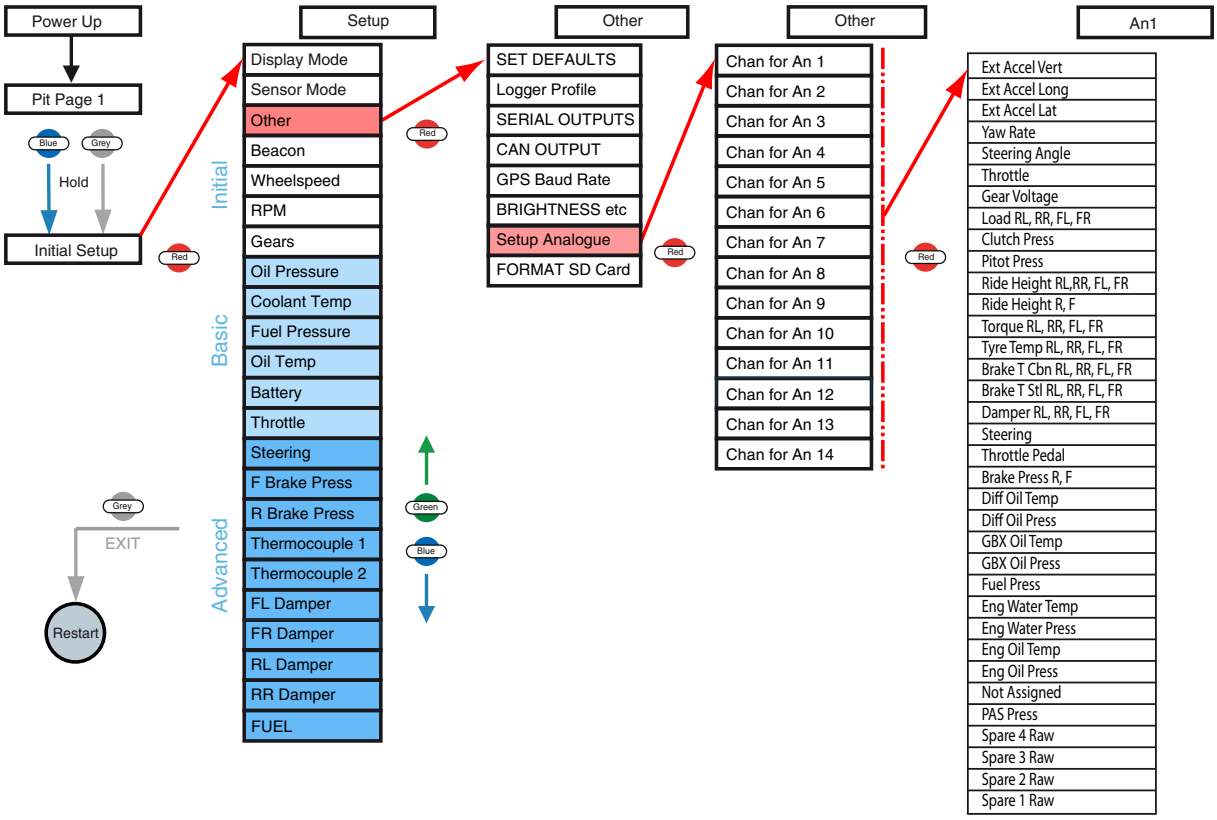
BRIGHTNESS etc option	Description
BACK ▸ BRIGHTNESS	Set* the percentage brightness level for the dash backlight used to illuminate the Omega Dash. Max = 100 (bright), min = 0 (none), default = 75.
BACK ▸ COLOUR	Set* the colour of the dash backlight used to illuminate the Omega Dash. Max = 100 (red) min = 0 (blue), default = 0 (blue).
SHIFT ▸ BRIGHTNESS	Set* the percentage brightness level for the LED lights of the gear-shift module (if fitted). Max = 100 (bright), min = 0 (none), default = 100.

*For an example of how to change values, see:
"Quick Ways to Change Values" on page 32".

6. Click the Red button to select an option, then click the Blue button to set the required value.
7. Click the Grey button to save the setting and return to the menu of **BRIGHTNESS etc** options (such as **BACK ▸ COLOUR**).
8. When you have configured all of the Brightness settings, click the Grey button to save the settings and exit to the **OTHER ▸ BRIGHTNESS etc** menu item. You can now scroll to further items in the **OTHER** menu.
9. Click the Grey button to save the settings and exit to the **SETUP ▸ OTHER** menu item. You can now navigate to other **SETUP** items.

Setup Analogue (Omega D3 Only)

Menu: 11. Setup Analogue Overview



There are fourteen analogue inputs on the Omega D3 dash which can be configured to accept information from a range of sources. The analogue channel for An1 to An14 is chosen from a list and preset scaling will be applied. The following analogue channels are available:

- Ext Accel Vert, Ext Accel Long, Ext Accel Lat,
- Yaw Rate,
- Steering Angle, Throttle,
- Gear Voltage,
- Load RL, RR, FL, FR,
- Clutch Press,
- Pitot Press,
- Ride Height RL,RR, FL, FR,
- Ride Height R, F,
- Torque RL, RR, FL, FR,
- Tyre Temp RL, RR, FL, FR,
- Brake T Cbn RL, RR, FL, FR,
- Brake T Stl RL, RR, FL, FR,
- Damper RL, RR, FL, FR,

- Steering,
- Throttle Pedal,
- Brake Press R, F,
- Diff Oil Temp, Diff Oil Press,
- GBX Oil Temp, GBX Oil Press,
- Fuel Press,
- Eng Water Temp, Eng Water Press,
- Eng Oil Temp, Eng Oil Press,
- Not Assigned
- PAS Press
- Spare 4 Raw
- Spare 3 Raw
- Spare 2 Raw
- Spare 1 Raw

For suitable Pi sensors to use with your Pi Omega Dash see page 7

Format SD Card

Used to format the data card and erase all data from it.

Enable Advanced Mode (Omega D1 Only)

D1

If you want to use the extra channels provided when the Omega D1 dash runs in Advanced Mode (dampers, brake pressures, fuel calculation, and so on), then you need to enable Advanced Mode from within the Initial Setup menu.

If you enable Advanced Mode, the Omega D1 dash displays the following extra items:

Table: 21. Omega D1 Advanced Mode Options

Mode	Advanced Mode: extra menu items displayed
INITIAL SETUP	■ STEERING ■ F (and R) BRAKE PRESS ■ THERMOCOUPLE 1 (and 2) ■ FL (and FR / RL / RR) DAMPER ■ FUEL*
WATCH CHANNELS	■ FRONT (and REAR) DAMPERS ■ BRAKES ■ THERMOCOUPLES ■ STEERING ■ TANK FUEL**

*Display of the FUEL item requires a supported ECU selected as the Sensor Mode (see "Sensor Mode setup" on page 36).

** Display of TANK FUEL requires fuel to be enabled within the **SETUP ▸ FUEL ▸ ENABLED** menu item (select **YES** to enable **FUEL**).

You should ignore this section (steps 1 to 6) if you are not using any of the extra display channels, or if you have an Omega D2 dash.

To enable Advanced Mode, from the **SETUP ▸ DISPLAY MODE** item:

1. Click the Blue button to scroll through the **SETUP** menu items until **OTHER** displays:

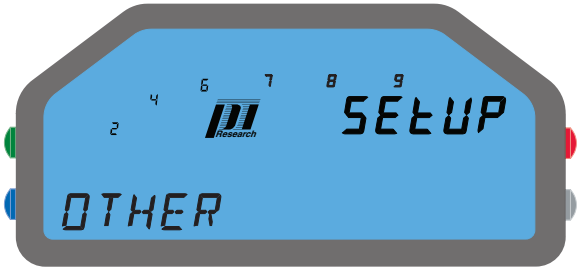


Figure: 22. SETUP ▸ OTHER item screen

2. Click the Red button to enter **SETUP ▸ OTHER**. The Omega Dash displays: **OTHER ▸ SET DEFAULTS**.

3. Click the Blue button to scroll to **OTHER ▸ ADVANCED MODE**:

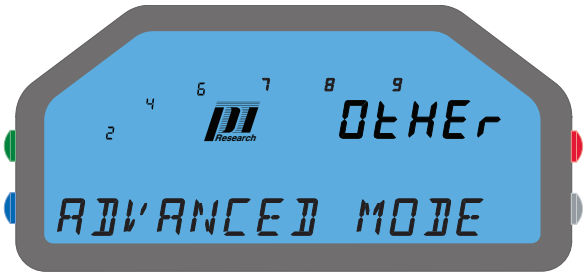


Figure: 23. SETUP ▸ OTHER ▸ ADVANCED MODE option screen

4. Click the Red button to enter **OTHER ▸ ADVANCED MODE**. The Omega Dash shows the current setting (default: **NO**, so by default the extra advanced channel items are not displayed on the Omega D1 dash).

5. Click the Blue button, so that **YES** displays as the selection to enable Advanced Mode:

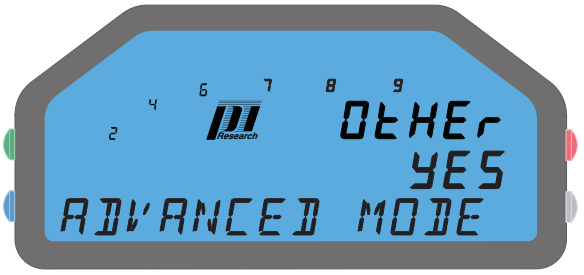


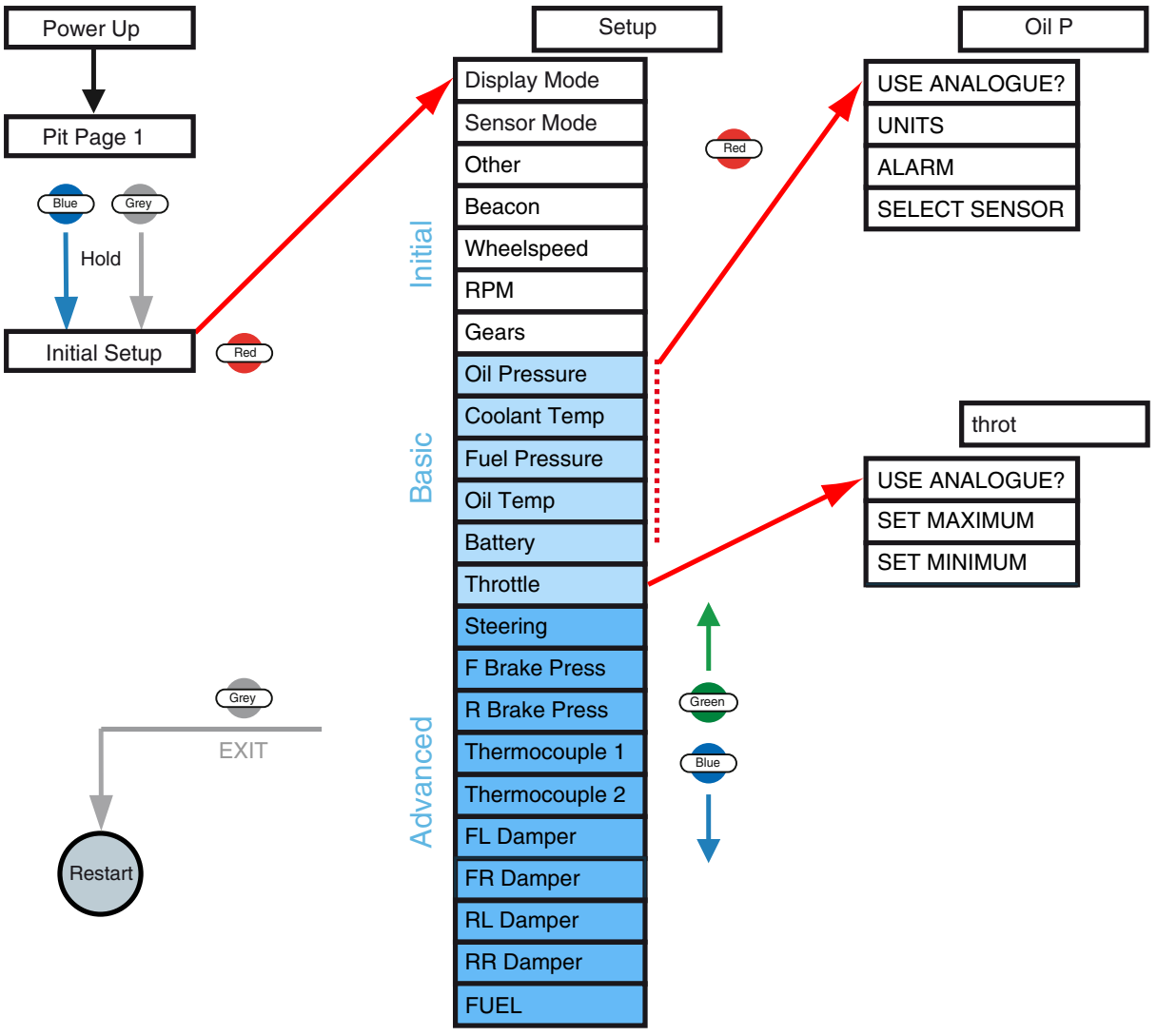
Figure: 24. SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES option screen

6. When the required setting is shown, save your selection, by clicking the Grey button enough times to exit and return to the **SETUP ▸ OTHER** menu item. You can now navigate to other **SETUP** items.

Note: When you have enabled Advanced Mode, the Omega D1 dash will immediately display the extra items listed above. You do not need to reset the dash before you can view and use the items that were hidden.

Basic Setup

Menu: 12. Setup Basic Overview



Configure Channels

The Omega Dash enables you to configure settings for each input channel, so you can setup beacon use, wheel speeds, pressure and temperature sensors, damper positions and so on.

If you are using your Omega Dash with a supported ECU (or Pi Interport), you can choose whether to use the data supplied from the ECU or the data from the on-vehicle sensors (For on vehicle sensors, set the USE ANALOGUE? option to **YES** for the input channel, within the Initial Setup menus).

To configure channel settings, you need to work within the Initial Setup menu options (press and hold the Blue and Grey buttons to display **INITIAL SETUP**, then click the Red button to display the first menu item: **SETUP ▸ DISPLAY MODE**).

Pressure and Temperature Sensors

You adjust the channel settings for oil / fuel pressure and oil / coolant temperature sensor inputs by using a similar set of menu items (within the **SETUP** menu items).

1. Click the Blue button to scroll through the **SETUP** menu items until the required channel displays, either: **OIL PRESSURE**, **FUEL PRESSURE, COOLANT TEMP**, or **OIL TEMP**.

2. Click the Red button to enter the setup for the displayed option (such as **SETUP ▸ OIL PRESSURE**, or **SETUP ▸ COOLANT TEMP**). The first option displays (such as **OIL P ▸ USE ANALOGUE?** or **Cool t ▸ UNITS**).

3. Click the Blue button to scroll through the sensor setup options:

Table: 22. Pressure and Temperature Sensor Options

Sensor option	Description
USE ANALOGUE?	(Hidden if **SETUP ▸ SENSOR MODE** is set to **DIRECT**) Select: **YES** to use the on-vehicle analog sensor, **no** to use the value provided by a supported ECU or Pi Interport, **Hide** to disable the display of this channel. (Used if no valid channel data is available)
UNITS	Select the units used to display the channel (**ºC** / **ºF** for temperatures and **PSI** / **BAR** / **HGF** for pressures).
ALARM	Set the alarm threshold value for the channel. For an example of how to change values, see: "Quick Ways to Change Values" on page 32".
SELECT SENSOR	(Only displayed for oil and fuel pressure sensors). Select the type of pressure sensor: **Club Sensor** **Custom Sensor** Or select one of the following sensors with a maximum pressure rating: **Pro 2400 PSI, Pro 160 PSI, Pro 80 PSI,** or **Pro 40 PSI.**

4. Click the Red button to select a sensor option, then click the Blue button to set the required value, followed by the Grey button to save the setting and return to the sensor option (such as **OIL ▸ ALARM** or **Cool t ▸ UNITS**).

5. When you have configured all of the settings for a channel, click the Grey button to exit to the **SETUP ▸ OIL PRESSURE** (or **FUEL PRESSURE, COOLANT TEMP**, **OIL TEMP**) menu item. You can now navigate to other **SETUP** items.

Battery Alarm

1. Click the Blue button to scroll through the **SETUP** menu items until **BATTERY** displays.

2. Click the Red button to enter **SETUP** ▸ **BATTERY**. The only option displays (**BATT** ▸ **ALARM** <value>).

3. Set the minimum alarm value for the battery voltage (for an example of how to change values, see: "Quick Ways to Change Values" on page 32"). When the battery voltage falls below this value, the Omega Dash will display the battery alarm.

4. Click the Grey button to save the battery alarm setting and exit to the **SETUP** ▸ **BATTERY** menu item. You can now navigate to other **SETUP** items.

Throttle Position

1. Press and hold down the Blue and Grey buttons until **INITIAL SETUP** displays on the dash.

2. Click the Red button to view the **SETUP** menu (the first item is **SETUP ▸ DISPLAY MODE**).

3. Click the Blue button to scroll through the **SETUP** menu items until **THROTTLE** displays.

4. Click the Red button to enter **SETUP ▸ THROTTLE**.

Note: If you have set the Sensor Mode to **DIRECT** *(within* **SETUP ▸ SENSOR MODE***) to ignore inputs from an ECU, then proceed to step 5.*

Note: If you have set the Sensor Mode to accept an ECU input, but wish to use a direct / analog sensor input for the Throttle position, then you can accept direct sensor input, as follows:

At the **SETUP ▸ THROTTLE ▸ USE ANALOGUE?** *option (hidden if the Sensor Mode is set to* **DIRECT***), press the Red button to display the current setting (***NO** *or* **YES***).*

Press the Blue or Green buttons to display **YES** *(and accept analog input).*

Press the Grey button to save the setting and return to the **SETUP ▸ THROTTLE ▸ USE ANALOGUE?** *menu item.*

Note: If you are using an ECU to provide the throttle channel, there is no need to use this calibration routine.

---

5. Press the Blue button to scroll to **THROTTLE ▸ SET MINIMUM**.

6. Ensure no throttle is applied, and click the Red button to set the minimum throttle position.

7. Click the Blue button to scroll to **THROTTLE ▸ SET MAXIMUM**. Apply full throttle, and Click the Red button to set the maximum throttle position.

8. To save your settings, click the Grey button enough times to exit to the **SETUP ▸ THROTTLE** menu item. You can now scroll to other items in the **SETUP** menu.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see "Watching Channel Values" on page 64.

Checking Outputs

When you are configuring sensor and channel settings, you can check their behaviour by displaying the sensor and channel outputs on the Omega Dash.

The Omega Dash has a Watch Channels feature, where you can check that:

- the sensors on your vehicle are working as expected,
- the dash is reporting the correct values before your vehicle leaves the pit lane.

Watching Channel Values

If you supply engine RPM to the Omega Dash, then each Watch Channels screen will show the RPM bar graph.

1. Hold down the Blue button until **WATCH CHANNELS** displays on the dash.

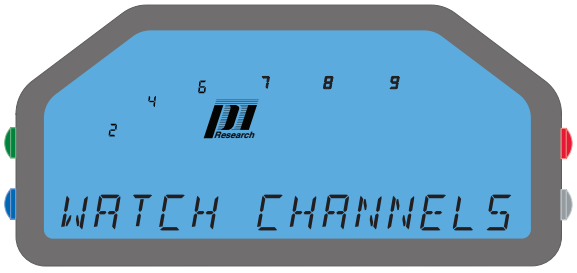


Figure: 25. Watch Channels - first display

2. Click the Red button to display the **WATCH CHANNELS** pages. The first page shown is the **WATCH ▸ THROTL & ACCEL** page.

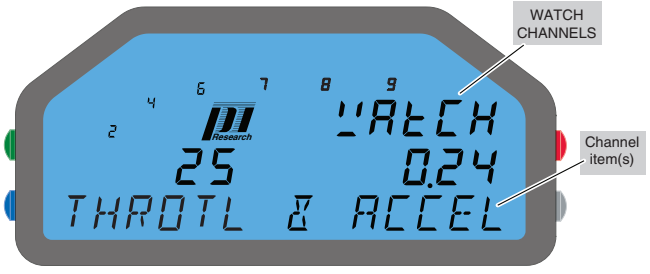


Figure: 26. WATCH ▸ THROTL & ACCEL (Throttle & Acceleration)

To scroll through the pages, click the Blue and / or Green buttons.

3. Click the Blue button to scroll through the **WATCH** pages:

Table: 23. Watch Channels Pages

Watch Channels page	Description
THROTL & ACCEL	Live display of the throttle position and acceleration channel values.
SPEED	Live display of the current speed.
Advanced Mode only	
FRONT DAMPERS	Live display of the front damper positions.
REAR DAMPERS	Live display of the rear damper positions.
BRAKES	Live display of the front and rear brake pressures, and the effective brake balance between full front (0%) and full rear (100%).
THERMOCOUPLES	Live display of the thermocouple channel temperatures.
STEERING	Live display of the steering position (Raw: the 0-100% input across the 0 to 5V sensor range; Scaled: the absolute position scaled from 100% through to -100%).
TANK FUEL	Live display of tank fuel level and laps until next pit stop (note: requires fuel display to be enabled - see page 61).
D2/D3 Dash Only	
LOG MEM LEFT	Live display of the percentage of logger memory remaining, and the time still available for logging (h.mm.ss).

D2

D3

4. To return to the previous dash display, click the Grey button twice.

Save and Restart

Your configuration of sensor and channel values for the Omega Dash is designed as a one-time set & forget phase. However, if you need to adjust any of the sensor or channel settings, you can simply return to the relevant **SETUP** menu to change the settings.

You can use Pi Toolset to download all the dash settings to PC. This enables you to restore the dash to the saved state, including GPS beacon positions, gear ratios and Club Qualifying Mode lap time. See the Pi Toolset user guide for further information.

Before proceeding to last-minute preparation for an outing, you should save your settings and reset your Omega Dash:

1. Click the Grey button enough times to exit the **SETUP** menu until the original **INITIAL SETUP** page displays.

2. Click the Grey button once more to save your Initial Setup settings and reset the Omega Dash.

The dash then:

- saves the current settings,
- restarts and briefly shows the Power-up page,
- and returns you to Pit Page 1.

Advanced Setup

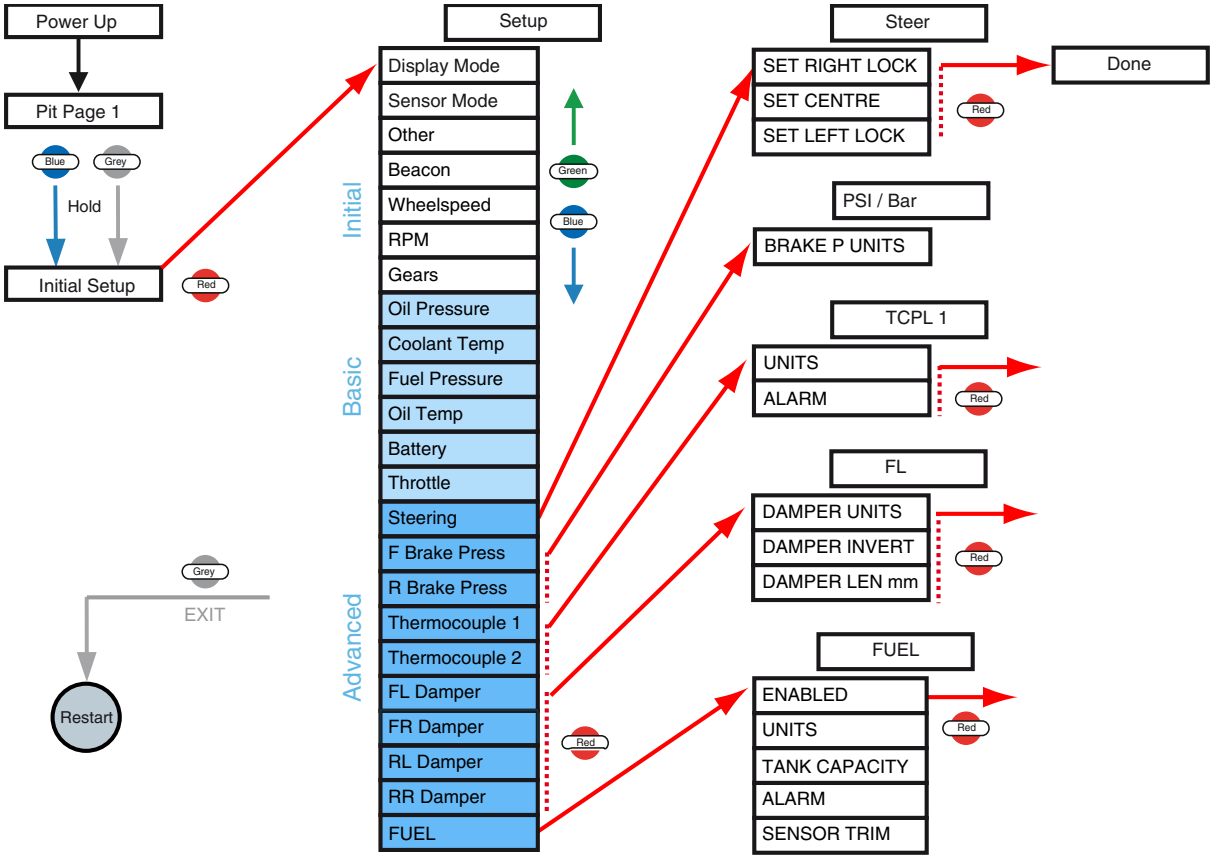
Configure Channels

The Omega Dash enables you to configure settings for each input channel, so you can setup beacon use, wheel speeds, pressure and temperature sensors, damper positions and so on.

If you are using your Omega Dash with a supported ECU (or Pi Interport), you can choose whether to use the data supplied from the ECU or the data from the on-vehicle sensors (by setting the USE ANALOGUE? option for the input channel, within the Initial Setup menus).

To configure channel settings, you need to work within the Initial Setup menu options (press and hold the Blue and Grey buttons to display **INITIAL SETUP**, then click the Red button to display the first menu item: **SETUP ▸ DISPLAY MODE**).

Menu: 13. Advanced Overview



Steering Position

D1

*With an Omega D1 dash, these options only display if you have enabled Advanced Mode (**SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES**).*

1. Navigate to the **SETUP ▸ STEERING** menu item (click the Blue button to scroll through the **SETUP** menu until **STEERING** displays).
2. Click the Red button to enter **SETUP ▸ STEERING**. The first option displays (**STEER ▸ SET RIGHT LOCK**).
3. Apply right steering lock, and click the Red button (**DONE** displays).
4. Click the Blue button to display **STEER ▸ SET CENTRE**.
5. Centre the steering and click the Red button (**DONE** displays).
6. Click the Blue button to display **STEER ▸ SET LEFT LOCK**.
7. Apply left steering lock and press the Red button (**DONE** displays).
8. Click the Grey button to save the steering settings and exit to the **SETUP ▸ STEERING** menu item. You can now navigate to other **SETUP** items.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see "Watching Channel Values" on page 64.

Brake Pressure Sensors

D1

*Note: With an Omega D1 dash, these options only display if you have enabled Advanced Mode (**SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES**).*

When the Omega Dash displays brake pressures, the following value is shown:

Brake Pressure (%) = 100 x Front P / (Front P + Rear P)

where both Front P and Rear P are at least 20 PSI.

You adjust the channel settings for brake pressure inputs from sensors as follows:

1. Click the Blue button to scroll through the **SETUP** menu items until the required channel displays, either: **F BRAKE PRESS**, or **R BRAKE PRESS**.
2. Click the Red button to enter the setup for the displayed item (such as **SETUP ▸ F BRAKE PRESS**). The first option displays (such as **FRONT ▸ BRAKE P UNITS**).
3. Click the Blue button to select the units used to display the channel: **PSI** or **BAR**.
4. Click the Grey button to save the setting and return to the channel item (such as **SETUP**

▸ **F BRAKE PRESS**). You can now navigate to other **SETUP** items.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see page 64.

Thermocouple Sensors

D1

*Note: With an Omega D1 dash, these options only display if you have enabled Advanced Mode (**SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES**).*

You adjust the channel settings for thermocouple temperature inputs as follows:

1. Click the Blue button to scroll through the **SETUP** menu items until the required channel displays, either: **THERMOCOUPLE 1**, or **THERMOCOUPLE 2**.

2. Click the Red button to enter the setup for the thermocouple menu item (such as **SETUP ▸ THERMOCOUPLE 1**). The first option displays (such as **TCPL 1 ▸ UNITS**).

3. Click the Blue button to scroll through the setup options:

Table: 24. Thermocouple Options

Thermocouple option	Description
UNITS	Select the units used to display the channel (**°C** / **°F**).
ALARM	Set the alarm threshold value for the channel. For an example of how to change values, see: "Quick Ways to Change Values" on page 32").

4. Click the Red button to select a sensor option, then click the Blue button to set the required value, followed by the Grey button to save the setting and return to the thermocouple option (such as **TCPL1 ▸ UNITS** or **TCPL2 ▸ ALARM**).

5. When you have configured all of the settings for a channel, click the Grey button to exit to the **SETUP ▸ THERMOCOUPLE 1** (or **2**) menu item. You can now navigate to other **SETUP** items.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see page "Watching Channel Values" on page 64.

Damper Position Sensors

D1

*Note: With an Omega D1 dash, these options only display if you have enabled Advanced Mode (**SETUP ▸ OTHER ▸ ADVANCED MODE ▸ YES**).*

You can use four damper position sensors with your Omega Dash. The damper channel settings are adjusted using a similar set of menu pages.

1. Click the Blue button to scroll through the **SETUP** menu items until the required channel is displayed (either **FL DAMPER**, **FR DAMPER**, **RL DAMPER**, **RR DAMPER**)

2. Click the Red button to enter the setup for the displayed item (such as **SETUP ▸ FL DAMPER**). The first option displays (such as **FL ▸ DAMPER UNITS**).

3. Click the Blue button to scroll through the damper setup options:

Table: 25. Damper options

Damper option	Description
DAMPER UNITS	Select the units for the damper position channel (**INCH** or **MM**).
DAMPER INVERT	Select whether to invert the damper position scale (**NO** or **YES**).
DAMPER LEM MM	Set the total travel length for the damper.

4. Click the Red button to select a sensor option, then click the Blue or Green buttons to set the required value.

5. Click the Grey button to save the settings for the channel and return to the Damper setup option displayed before step **4** above (such as **SETUP ▸ FL DAMPER ▸ DAMPER LEN MM**). You can now scroll to other items in the **DAMPER SETUP** options.

6. When you have configured all of the settings for the damper, click the Grey button to exit to the **SETUP ▸ FL DAMPER** (or **FR DAMPER**, **RL DAMPER**, **RR DAMPER)** menu item. You can now navigate to other **SETUP** items.

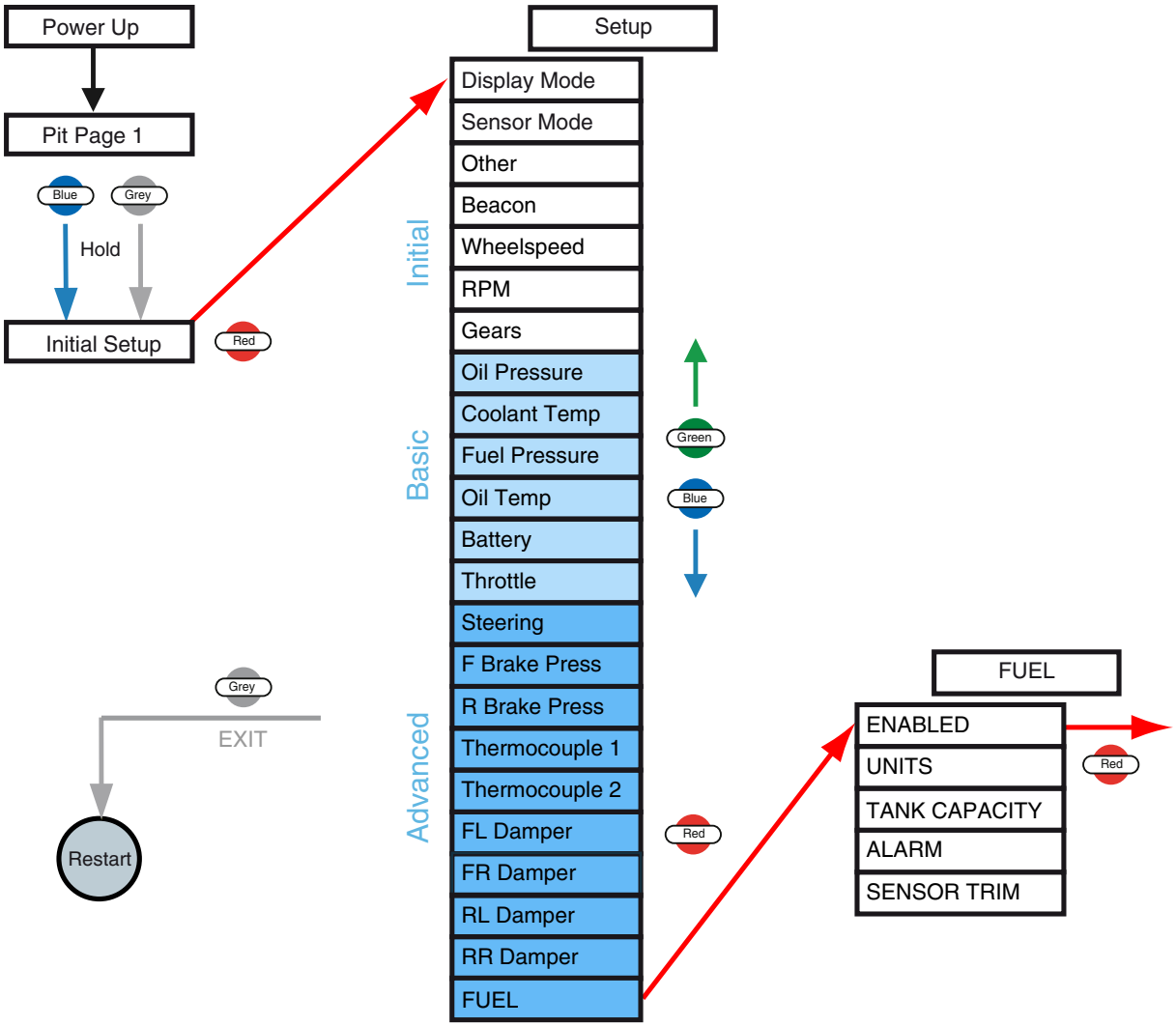
After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see page "Watching Channel Values" on page 64.

Fuel Calculation

The Omega Dash can use fuel consumption data from a Pectel or other suitable ECU, to calculate and display:

- the estimated fuel tank fill level,
- the number of laps that can be completed before the estimated fuel load is exhausted.

Menu: 14. Fuel



Note that a suitable ECU must be selected in **Setup > Sensor mode** *for the fuel option to be displayed in the menu.*

To use fuel calculation with a Pectel or other suitable ECU, ensure that:

D1

- Advanced mode is enabled - if you have a Omega D1 dash (see "RPM Detection and Display" on page 45),
- Pectel or BMW Z4 CAN is selected as the sensor mode (see "Sensor Mode setup" on page 36),
- The display of Fuel options is enabled from within the **SETUP ▸ FUEL** menu item (see below),
- Track + Fuel is selected as the display mode (see "Display Mode setup" on page 33).

To set up fuel calculation:

1. Click the Blue button to scroll through the **SETUP** menu items until **FUEL** displays.
2. Click the Red button to enter **SETUP ▸ FUEL**. The first option displays (**FUEL ▸ ENABLED**).
3. Click the Blue button to scroll through the Fuel options:

Table: 26. Fuel Calculation Options

FUEL option	Description
ENABLED	Select **YES** to turn fuel calculation on. Select **NO** to disable fuel calculation by the Omega Dash.
If you set **ENABLED** *to* **NO** (the default setting), *then the Omega Dash hides the all of the Fuel options given below.*	
UNITS	Select the units to be used for fuel calculation (**LITRE** / **USGAL** / **GAL**).
TANK CAPACITY	Set* the value of the fuel tank capacity for your vehicle.
ALARM	Set* the alarm threshold value for the fuel level.
SENSOR TRIM	Set* the fuel calculation adjustment trim. Sensor Trim is a simple multiplier. e.g. if the fuel used information from an ECU is 10 litres with a Sensor Trim setting of **1.0**, changing the Sensor Trim setting to **2.0** will cause the fuel used to read 20 litres.The default value is **1.0**. The value can be set between **0.50** (lowest consumption) and **2.00** (highest consumption) to ensure the fuel calculation is as accurate as possible. If required, you can set the trim to a higher value in order to provide a margin for error to ensure that you car doesn't run out of fuel at the end of a run.

*For an example of how to change values, see:
"Quick Ways to Change Values" on page 32".

4. Click the Red button to select an option, then click the Blue button to set the required value.
5. Click the Grey button to save the setting and return to the menu of Fuel options.
6. When you have configured all of the Fuel settings, click the Grey button. This saves

the settings and returns you to the **SETUP ▸ FUEL** menu item. You can now navigate to other items **SETUP** items.

After configuration, you can view the values that the Omega Dash will display, via the Watch Channels feature. For more details, see "Watching Channel Values" on page 64.

Remember: you need to reset the fuel level on the dash each time the fuel tank is filled. To reset the fuel level on you dash (when the dash is displaying the Pit page - Pit Page 1), press and hold the

button. The Omega Dash briefly displays a FUEL RESET message to confirm the return of fuel level to a full tank.

Checking Outputs

When you are configuring sensor and channel settings, you can check their behaviour by displaying the sensor and channel outputs on the Omega Dash.

The Omega Dash has a Watch Channels feature, where you can check that:

- the sensors on your vehicle are working as expected,
- the dash is reporting the correct values before your vehicle leaves the pit lane

For further information on watch channels - see page 64

If you supply engine RPM to the Omega Dash, then each Watch Channels screen will show the RPM bar graph.

1. Press and hold the

button until **WATCH CHANNELS** displays on the dash:

2. Click the

button to display the **WATCH CHANNELS** pages. The first page shown is the **WATCH ▸ THROTL & ACCEL** page.

3. Click the

button to scroll through the **WATCH** pages:

4. To return to the previous dash display, click the

button twice.

Save and Restart

When you have completed your initial set up of the sensors and channels for your Omega Dash, you are ready to begin your final preparations for an outing. For more information, please refer to "In the Pit Lane" on page 9.

Your configuration of sensor and channel values for the Omega Dash is designed as a one-time set & forget phase. However, if you need to adjust any of the sensor or channel settings, you can simply return to the relevant **SETUP** menu to change the settings.

Before proceeding to last-minute preparation for an outing, you should save your settings and reset your Omega Dash:

1. Click the

button enough times to exit the **SETUP** menu until the original **INITIAL SETUP** page displays.

2. Click the

button once more to save your Initial Setup settings and reset the Omega Dash.

The dash then:

- saves the current settings,
- restarts and briefly shows the Power-up page,
- returns you to Pit Page 1.

Outing Checks

- Calibrate your sensors (throttle and steering positions),
- Configure your input channel settings e.g. Beacon, GPS,
- Configure alarm levels (all temperatures, oil / fuel pressure, battery voltage and fuel level, if required),
- Check the gear settings,
- D2/D3 dash: enable logging (if required),
- Check the fuel calculation settings (if required),
- Use watch mode to check that your setup is providing the required values, by displaying sensor and channel values on the Omega Dash,
- Adjust dash brightness and colour settings (if required),
- Reset the dash lap count (if required),
- Zero your sensors,
- Set up Club Qualifying Mode (if required),
- (D2/D3 dash:) prepare for logging of sensor and channel data.

If you are using the Omega Dash as a device-driven display with a Pectel SQ6 ECU, Pi Delta or Pi Sigma system, consult your system User Guide for details of the tasks to be carried out before an outing.

Troubleshooting

Until you are completely familiar with your Omega Dash, you may encounter some difficulties. This section covers the most likely issues and how to overcome them. If the solutions suggested have no effect, please contact Pi Research or your local Pi representative.

CAUTION: Do not attempt to repair Pi Research equipment yourself. All units must be opened and reassembled in clean conditions by trained personnel. Your Warranty will be invalidated if any parts of the Omega Dash have been tampered with.

No Alarm at Extreme of RPM Bar Graph

Note: Redline and launch values can be set beyond the limit of the bar graph andthe threshold alarms will still flash the bar graph, give a red background and flash the gear-shift lights on the Omega Dash shift/alarm module if fitted.

Dash Shows 'NO COMMS'

SETUP > DISPLAY MODE = SQ6 Defined or Logger Defined.

If you have sensor inputs into your Omega Dash and no input from your logger / SQ6 module, then the dash ignores the sensor input and just displays “NO COMMS”.

Removing Unwanted Alarms

Unwanted alarms will occur for a channel when you have the alarm level set wrongly. To avoid the unwanted alarm, just alter the alarm threshold to a more suitable value. To configure alarm settings, you work within the **SETUP** item for the sensor input (see “In the Pit Lane” on page 9).

If your vehicle does not provide any sensor input for a channel, then your Omega Dash may produce an unwanted alarm. For example, you may not provide an oil pressure sensor input to the Omega Dash, but if you accept the default setting (of 40 P.S.I. for oil pressure, within: **SETUP ▸ OIL PRESSURE ▸ ALARM**), then an oil pressure alarm will display when you power the dash up. This is because the pressure is recorded as zero when no sensor input is received for oil pressure, and this triggers the alarm (as the input is below the minimum oil pressure threshold for the alarm). You can correct this by setting the threshold value for the oil pressure alarm to zero.

Similarly, if you decide to use the fuel calculation features provided by your dash, but initially have no feed from a fuel level sensor, the dash will display a low fuel level alarm (as an absence of sensor signal equates to a zero fuel level).

The Dash

Problem	**The dash doesn't start up**
Cause	No supply voltage
Action	Check the car's master switch and ignition switch.
Cause	Flat battery
Action	Make sure the car battery is charged up and connected.
Cause	The connectors on the dash are not secured.
Action	Check the AutoSport connectors on the back of the dash are properly located and locked.
Cause	Faulty wiring
Action	Check that the supply voltage wiring is not damaged or has been shorted out.
Problem	**The dash blanks out**
Cause	Supply voltage is dropping below 5.2 volts (this is the absolute lowest value at which the dash will run)
Action	Check the battery is well charged.
Problem	**The dash blanks out during use**
Cause	Excessive electrical noise
Action	Check earthing of ignition or contact Pi Research

Engine Speed (RPM)

Problem	**Poor RPM trace in logged data**
Cause	Noise from the ignition system.
Action	Try adding an RPM filter to remove unwanted signals.
Problem	**The dash is reading half the correct RPM value**
Cause	The **PULSES/2 REV** setting is wrong in the **INITIAL SETUP ▸ RPM ▸ PULSES** Menu.
Action	Check and adjust the value in the **INITIAL SETUP ▸ RPM ▸ PULSES** menu.
Problem	**The whole RPM bar-graph blanks out**
Cause	Intermittent power failure on the dash (You will see the dash going through Power-up mode each time.)
Action	Check the AutoSport connectors on the back of the dash and the connections on the car battery and Master switch.
Problem	**Part of the RPM bar-graph is blank**
Cause	Faulty LCD connection inside the display or damaged LCD: try pressing the screen gently to see if it comes on again.
Action	Return the dash to Pi Research. DO NOT ATTEMPT to fix the dash yourself.

Problem	**The Redline needs to be adjusted**
Cause	The Redline setting in the dash needs to be adjusted
Action	Check and adjust the value in I**NITIAL SETUP ▸ RPM ▸REDLINE** menu.

RPM Box (HT or LT mode)

Problem	**The RPM Bar graph is blank or intermittent**
Cause	The dash has not been set up to run with an RPM Box input
Action	Set the I**NITIAL SETUP ▸ RPM ▸INPUT TYPE** menu as required for your type of RPM box (Pull up /Passive or Pull down)
Cause	The loom connection to the RPM Box may be faulty
Action	Inspect the connector on the RPM Box and loom and repair, if necessary.
Problem	**The RPM reading is occasionally spiky and the PC Software shows small spikes**
Cause	The wiring is picking up noise from other sources on the car
Action	Check whether the RPM wiring runs close to other ignition circuits and re-route it, if necessary.

RPM Box HT (High Tension) Connection

Problem	**The RPM bargraph cuts out or flashes at high RPM**
Cause	The RPM Box is not setup correctly
Action	Check that the RPM Box is set for HT (positions 8 to F), and for the maximum sparks per minute that can be emitted by the ignition system.
Problem	**The RPM Bar graph is unstable**
Cause	The HT connection on the RPM Box may be faulty
Action	Inspect the wiring on the HT lead and repair, if necessary.
Problem	**The RPM reading is obviously too low**
Cause	The HT pick-up has been wrapped around an HT lead to an individual cylinder instead of the main HT lead and is not picking up the sparks for the other cylinders
Action	Wire the HT pick-up around the main HT lead.

Note: Some engines now have multi-coil systems, where each cylinder has its own coil. In these cases, you can use the HT lead from one coil if the PULSE value on the dash is adjusted accordingly (see the 'Installation Notes' section); alternatively, you could use the LT signal from the ignition box and drive the RPM Box in LT mode.

RPM Box LT (Low Tension) Connection

Problem	**The RPM bar-graph cuts out or flashes at high RPM**
Cause	The RPM Box is not set up correctly
Action	Check that the RPM Box is set for LT (positions 0 to 7), and for the maximum sparks per minute that can be emitted by the ignition system.

Problem **The RPM Bar-graph is unstable**

Cause The LT connection on the RPM Box may be faulty

Action Inspect the wiring on the LT connections and repair, if necessary.

Problem **The RPM Bar-graph is unstable**

Cause The polarity of the LT connection may be wrong. There are normally three connections on the coil: HT, supply and trigger. The trigger can either be switched to ground or switched to +12V.

Action Connect the RPM Box in line with the other low tension side of the coil (e.g. supply or trigger). This will reverse the polarity of the signal going through the box.

Speed

Problem **The speed reading doesn't work at all**

WARNING: DO NOT OVER-TIGHTEN THE WHEELSPEED SENSOR *– it will break. Use the locknuts provided to secure the sensor.*
DO NOT OVERTIGHTEN THE LOCKNUTS ON THE SENSOR*. The maximum torque is 4Nm.*

IMPORTANT: Although the wheelspeed sensor may appear to work at low speeds, unless the sensor is set within 0.4 and 4.0 mm, the sensor may not work at high speed.

Cause If it has never worked, the wheel speed sensor may need adjusting

Action The sensor must be set within 0.4 to 4.0 mm from the triggers on the wheel.

Problem **The sensor has been adjusted but it won't work.**

Cause Faulty sensor

Action Visually inspect the wheelspeed sensor for any damage to the head (too close to trigger) or body (over-tightened). Replace if necessary.

Cause Faulty wiring

Action See the 'Installation Notes' section for details on how to check the wiring for damage.

Problem **The wheelspeed is wrong (e.g. by a factor of 2 or 4)**

Cause The sensor is not picking up all the triggers on the wheel

Action Check that all the triggers are set within 0.4 and 0.8mm from the sensor.

Note: Because of the tolerance on the suspension of some saloon cars, it is very hard to set up multiple targets within 0.5 mm. In this case, it is best to use a single trigger.

Cause The wheelspeed Pulse setting is wrong

Action Check and adjust the value.

Note: There are various ways to tell if the wheelspeed sensor is working, depending on the dash version you have. The version number is displayed when the dash is powering up.

Lap Times (Beacon)

If you have not purchased a beacon kit for your Omega Dash, the dash cannot show lap times on the screen.

To test the beacon system, turn on the dash and beacon transmitter and wave the transmitter in front of the detector on the car. The lap times on the display should change.

Problem	**Lap times don't appear on the display**
Cause	The dash must be configured to use a beacon
Action	Check and adjust the setting.

Problem	**Lap times aren't working (dash shows 0.00)**
Cause	The beacon transmitter isn't being powered; the LED on the beacon transmitter isn't on
Action	Make sure the battery wiring is secure, and that the battery is fully charged (12V).

Note: Although a lit LED on the transmitter indicates a good connection to the battery, only a fully recharged battery will supply a strong signal to the car. Make sure you recharge the battery before a day at the track.

Cause	The channels are not correctly set
Action	Make sure that the beacon transmitter (on the pit wall) and detector (on the car) are set to the same channel. They both have a switch with positions 0 to 9

Cause	The transmitter and detector are not lined up correctly
Action	As the car passes the transmitter, make sure that there is a clear line-of-sight between the two.

Cause	Sunlight is dazzling the detector
Action	The sun – a large infrared beacon transmitter! – should not shine into the detector as it passes the pits. Place the detector on the other side of the car and move the transmitter to the other side of the track.

Problem	**Lap times are being corrupted**
Cause	If the wheelspeed sensor is not set up properly, the dash will occasionally read zero road speed and insert pit stops in its data. This shows up with very short lap times (e.g. 2 seconds) and corrupted graph data on the PC Software.
Action	Check and adjust the wheelspeed sensor (see section on wheel speed troubleshooting).

Problem	**The lap times seem wrong**
Cause	The car may be picking up someone else's beacon signal.
Action	Check if any other teams are running with an Omega Dash beacon transmitter on the same channel and agree to use different channels.

Sensor Readings

Problem	**A sensor does not appear to register on the dash. It shows '—' for a value**
Cause	A sensor isn't fitted to your car
Action	If you have purchased a car with the dash fitted, ask your supplier which sensors were fitted to the car. For example, you may not have a fuel injection system which requires monitoring.
Cause	The sensor is fitted but is not connected to the dash
Action	Check the sensor connector and the wiring loom for any obvious damage.

Steering Position (Advanced Mode)

Problem	**The steering trace in the analysis application is erratic and switches from very high to very low**
Cause	The steering sensor may not have been set up correctly or may have gone out of alignment, and is going off-scale during use
Action	While viewing the potentiometer reading on the relevant user channel, align the steering pot so that it reads 2.5 volts when the steering is dead centre. When viewed in the analysis application the steering trace should be centred on 2.5 volts.

Pressures

Problem	**The pressure readings are wrong**
Cause	A sensor is faulty
Action	Check that the connectors on the pressure sensors are correctly fitted, and going to the right sensor. If necessary, change the pressure sensor.
Cause	The pressure sensor wiring is damaged
Action	Check the wiring on the car for visible damage and repair where necessary.

Note: If one pressure sensor seems wrong, try putting its connector onto the other sensor. If the fault moves with the connector, then the wiring or dash is faulty. If the fault does not move with the connector, the pressure sensor needs replacing.

Throttle Position

Problem	**The throttle trace does not show full throttle, or subtle movements of the throttle**
Cause	The 10 mm throttle sensor is not aligned properly with the throttle pedal and as a result is not picking up certain parts of the pedal movement
Action	Ensure that the stroke of the throttle sensor picks up the final (on-power) 10 mm of movement of the pedal.

Accelerometer

Problem	**The accelerometer trace in the analysis software does not show zero along the straight**
Cause	The dash is not mounted horizontally, which distorts the g-force measured by the dash
Action	Check and adjust the mounting of the dash.
Cause	Accelerometer needs to be zeroed.
Action	Zero Accelerometer. see page 12
Cause	The dash is incorrectly calibrated
Action	The dash needs to be re-calibrated. Return the dash to Pi for investigation and reprogramming .

Data Loss or Data Corruption (Omega D2)

Problem	**The Omega D2 dash does not appear to have logged any data**
Cause	The dash did not have time to shut down before it was switched off
Action	Make sure the car stops for three seconds before turning the dash off.
Cause	The wheelspeed signal (which triggers logging) was not working
Action	Refer to wheelspeed troubleshooting.
Cause	The Outing speed was set higher than the maximum speed reached during the outing
Action	Check and adjust the Outing speed..
Action	You can retrieve the data using the manual reset feature at any time before the car is driven again.
Problem	**Only part of the outing has been logged**
Cause	The dash experienced a low battery alarm while the car was being driven, and stopped logging data. Inspect the outing battery telltale to verify low battery voltage.
Action	Check and recharge the battery on the car.
Problem	**Too much data appears to have been logged**
Cause	The dash was not reset before the last outing
Action	Remember to reset the dash before each outing, especially the first time you run at a new track
Cause	The wheelspeed sensor is not working correctly and is inserting pit stops into the data (e.g. when it reads zero speed)
Action	Check and adjust the wheelspeed sensor.

Telltales

Problem	**The dash won't go into Telltale mode**
Cause	The dash cannot go into Telltale mode until the dash has logged an outing.
Action	Drive the car first.

Problem	**The telltales are incorrect or corrupted**
Cause	Incorrect setup or operation of the dash
Action	Refer to the Troubleshooting section on data loss or data corruption.

Remote Driver Switch

Problem	**Remote Driver switch does not work**
Cause	The Switch / LEDs Connector (Waterproof 15D socket) connector on the rear of the dash is not connected
Action	Check the Waterproof 15D socket connector and re-connect if necessary.
Cause	Faulty wiring
Action	Check the Waterproof 15D socket connector wiring.
Cause	Faulty switch
Action	Try swapping the switch to see if that cures the problem. If so, replace the switch.

Restore Factory Defaults

Your Omega Dash has a set of 'Factory Default' settings for sensor inputs and alarms that are suitable for many setups. However, you should check that these defaults are appropriate for your vehicle and system, before making an outing. Also, some sensors (such as the internal accelerometer) should be zeroed before starting an outing.

Follow the instructions in the "Before an Outing" section (see page 9) to check the sensor configuration and channel setup for your dash.

To Reset Your Omega Dash to Factory Defaults

When you reset to factory default settings, this deletes any configuration changes that you have made within the Initial Setup or Pit Lane Setup menus (as well as any stored lap times and learned lap distances). You should only reset to factory defaults if you wish to start setting up your Omega Dash from scratch.

1. Press and hold the Blue and Grey buttons until **INITIAL SETUP** displays on the dash.
2. Click the Red button to view the **SETUP** menu (the first item is **SETUP ▸ DISPLAY MODE**).
3. Click the Blue button to scroll through the menu items until **OTHER** displays.
4. Click the Red button to enter **SETUP ▸ OTHER**. The first item displays (**OTHER ▸ SET**

DEFAULTS).

5. Click the Red button. An '**ARE YOU SURE?**' message displays.

6. Click the Red button to confirm the reset.

The dash then resets, restores all of the factory default settings (while deleting any stored lap time and distance data), briefly displays the Power-up page and then moves onto the first display of sensor inputs (as if you had powered-down the dash).

To Format Your Omega Dash SD Memory Card

When you format your SD memory card, this deletes any data you have stored on the card. You should only format the card if you wish to start data logging from scratch.

1. Press and hold the Blue and Grey buttons until **INITIAL SETUP** displays on the dash.

2. Click the Red button to view the **SETUP** menu (the first item is **SETUP ▸ DISPLAY MODE**).

3. Click the Blue button to scroll through the menu items until **OTHER** displays.

4. Click the Red button to enter **SETUP ▸ OTHER**. The first item displays (**OTHER ▸ SET DEFAULTS**).

5. Click the Blue button to scroll through the menu items until **FORMAT SD CARD** displays.

6. Click the Red button. An '**ARE YOU SURE?**' message displays.

7. Click the Red button to confirm the reset. The SD card is then formatted and all data on the card is deleted.

8. Click the Grey to exit.

Until you are completely familiar with your Omega Dash, you may encounter certain difficulties. This Section lists the most common sources of problems and how to correct them.

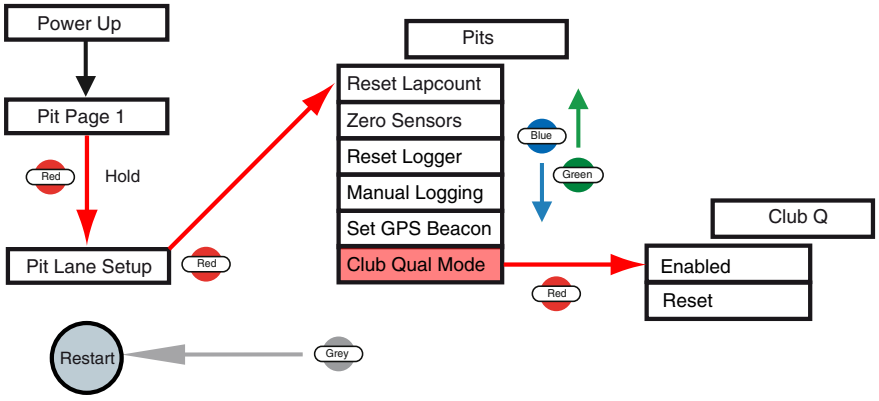
If the remedies suggested have no effect, please contact Cosworth Electronics or your local Pi representative (addresses are given at the back of this manual).

WARNING: Do not attempt to repair Pi equipment yourself. All units must be opened and reassembled in clean conditions by trained personnel.
The Warranty will be invalidated if any parts of the system have been tampered with.

Reference Pages

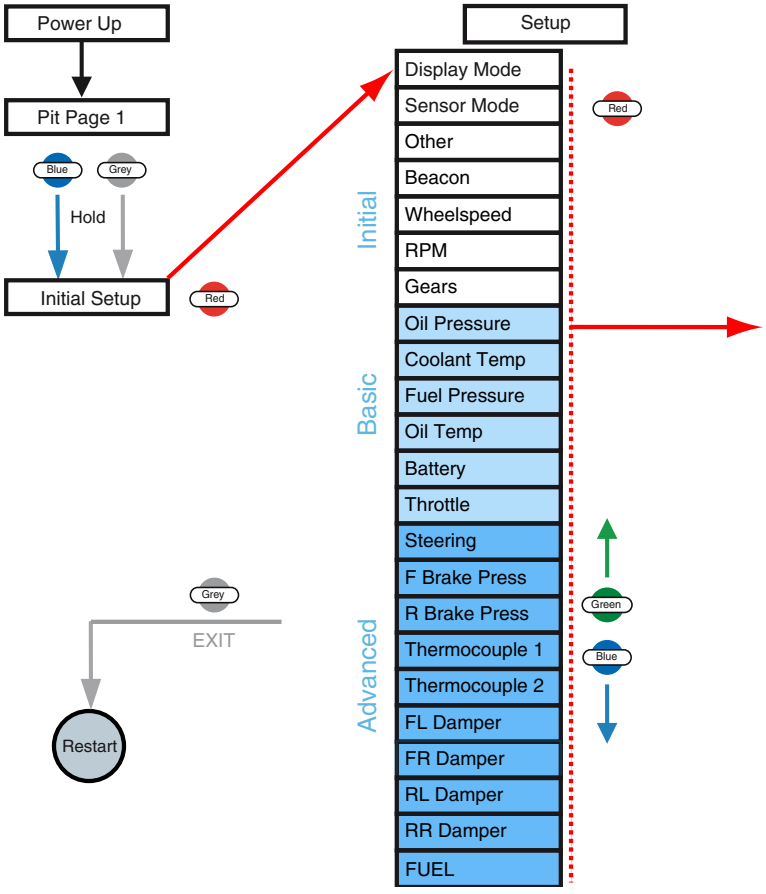
Pit Lane Setup

see page 11



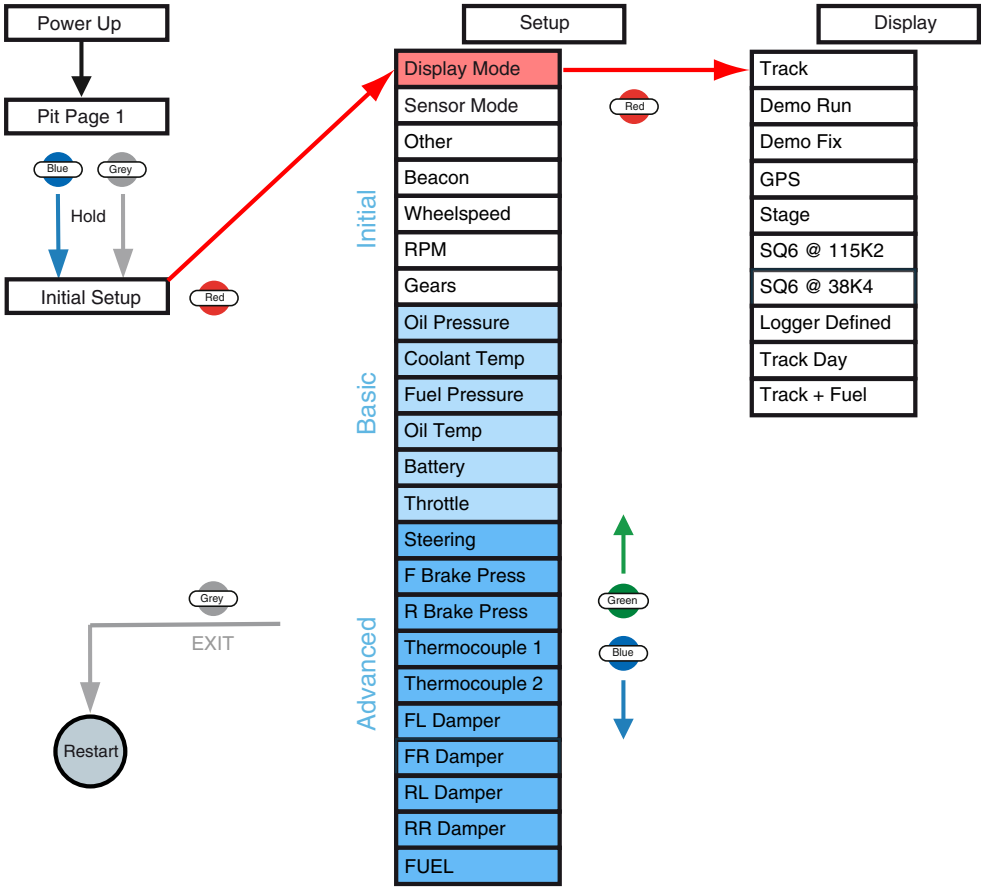
Setup Overview

see page 31



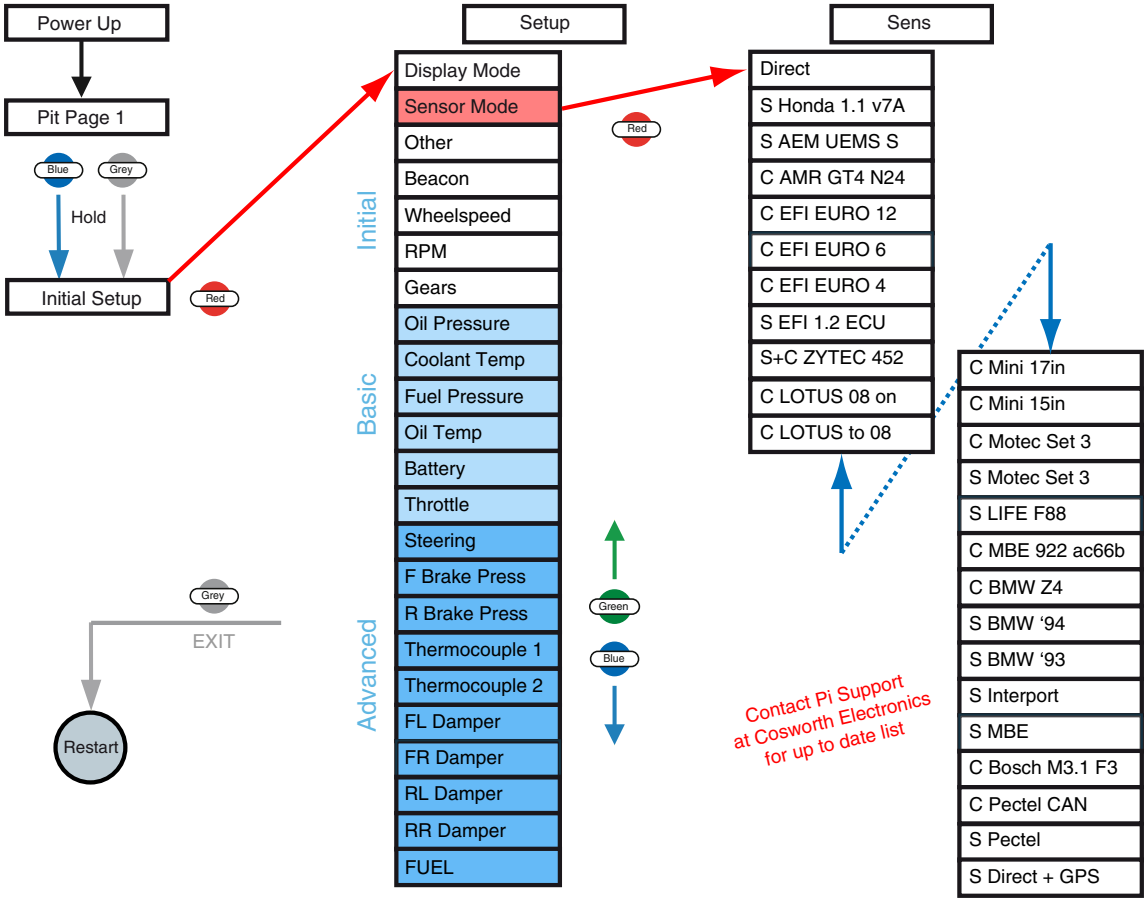
Initial Setup – Display Mode

see page 33



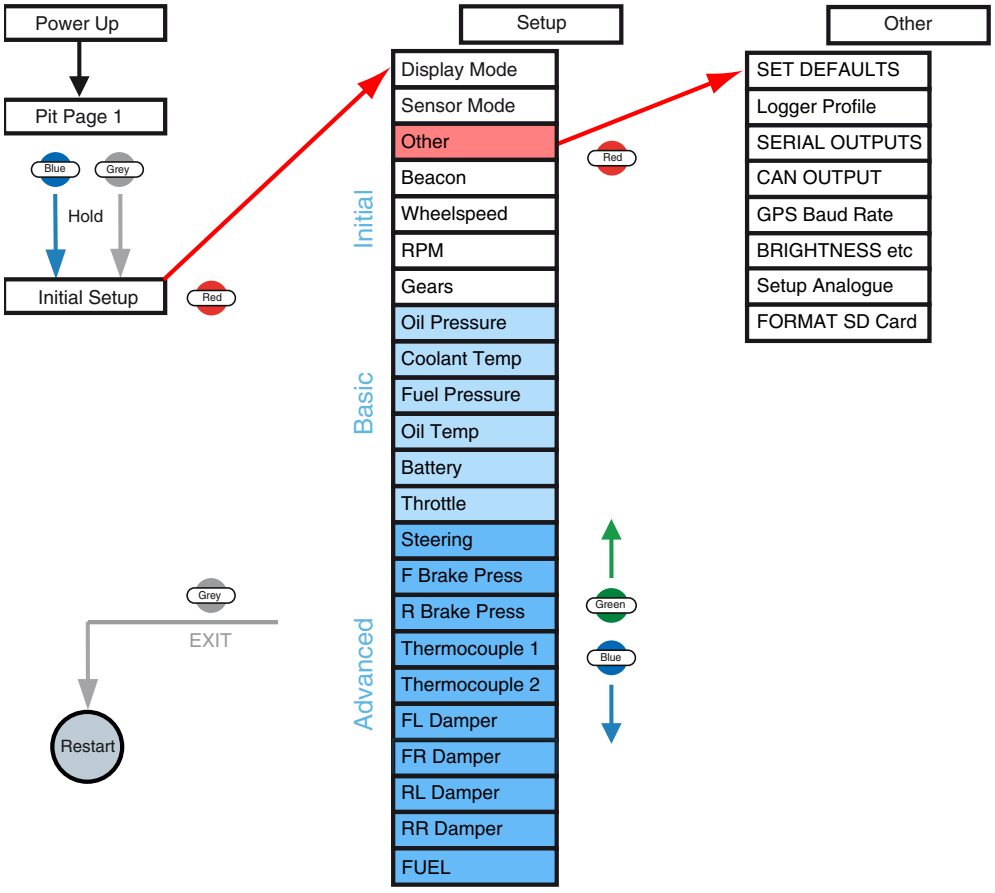
Initial Setup – Sensor Mode

see page 36



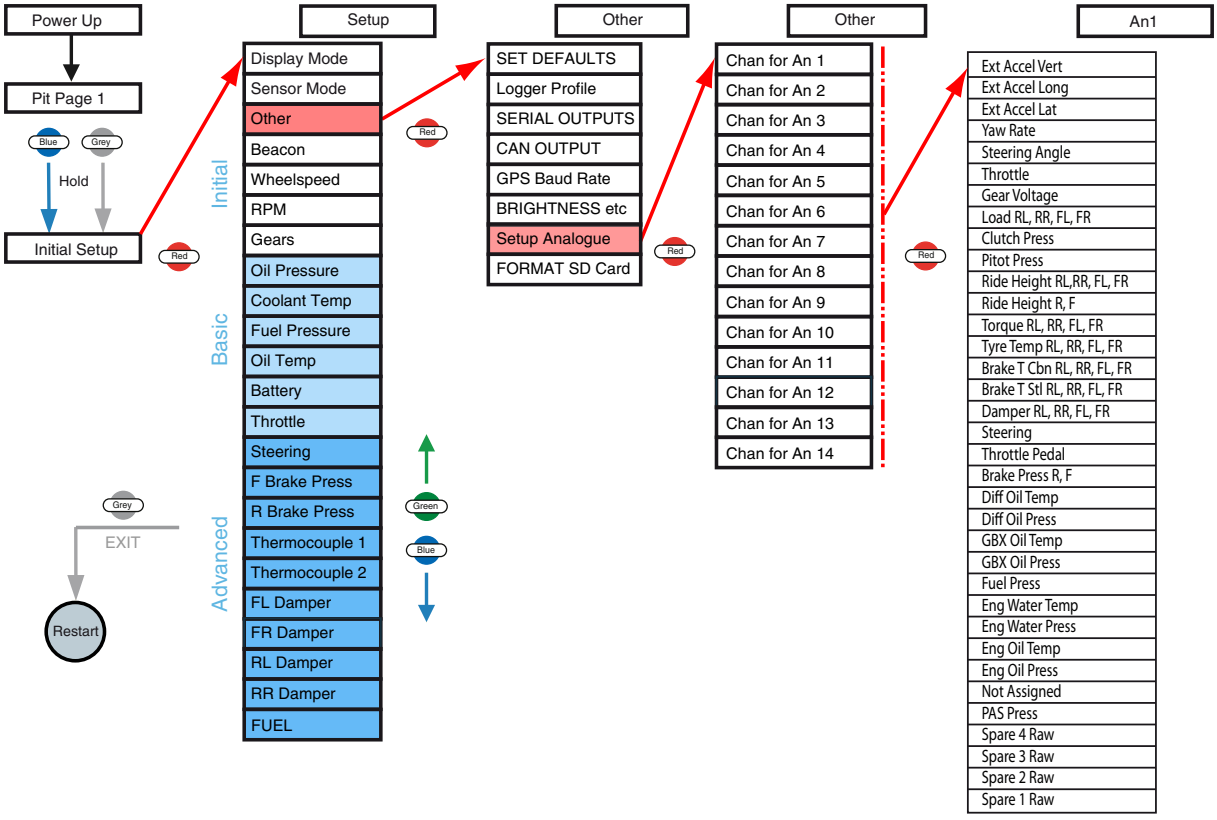
Initial Setup – Other

see page 50



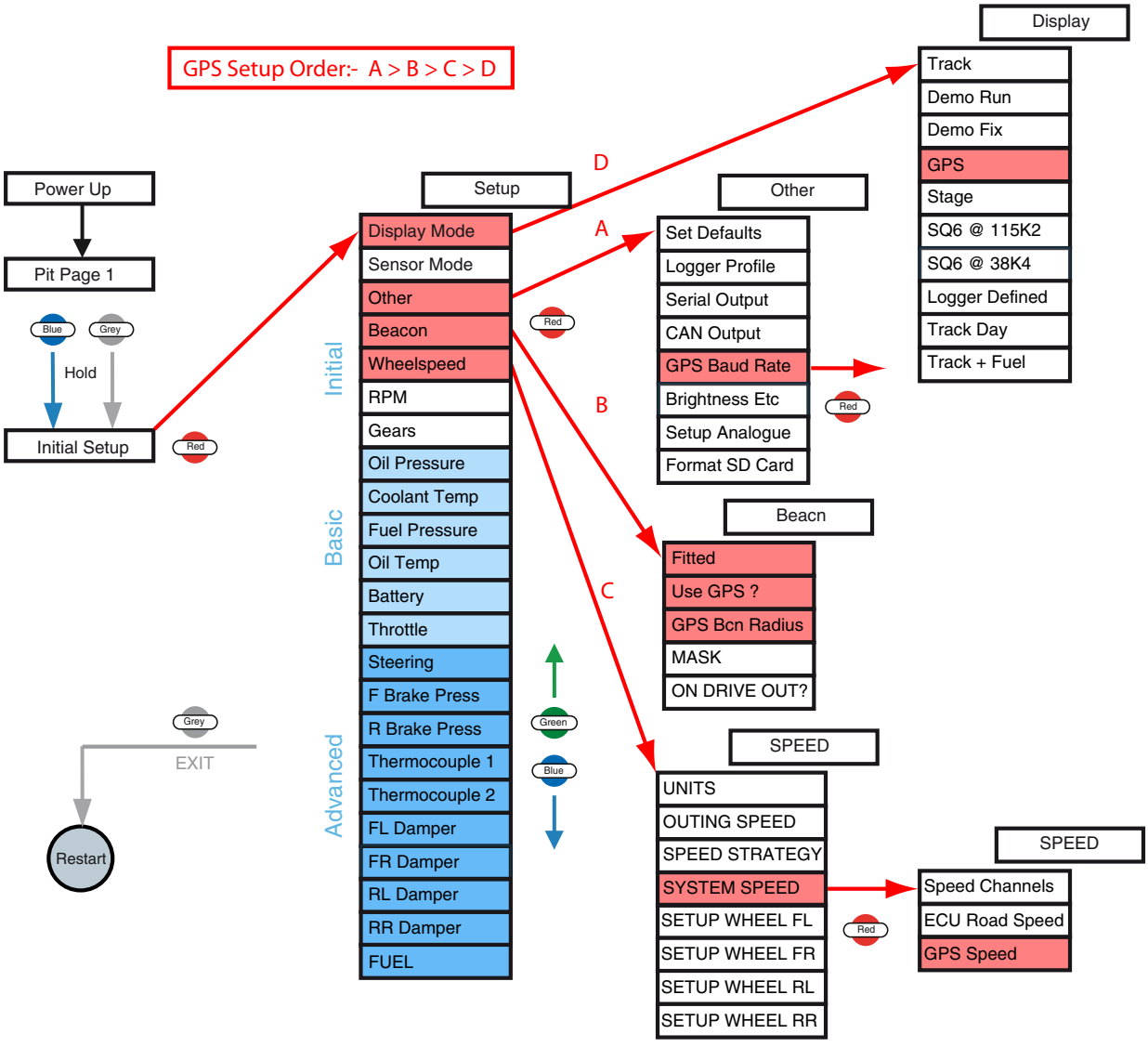
D3 Analogue Channel Setup

see page 56



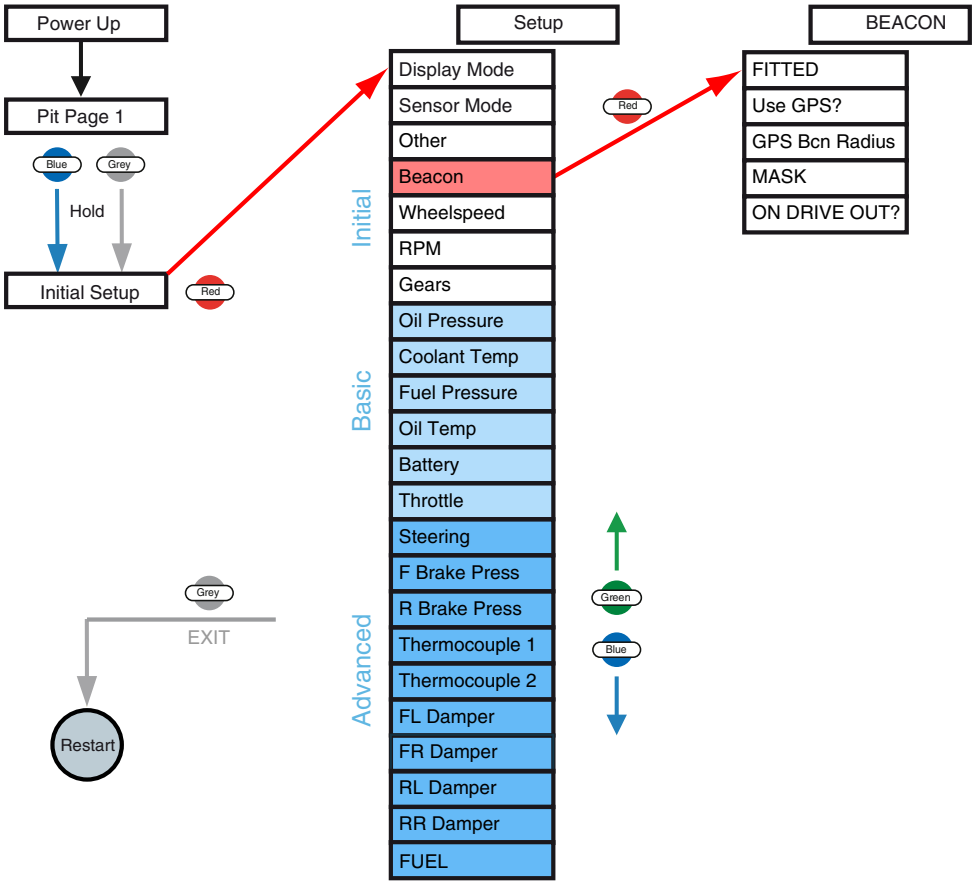
GPS Setup

see page 38



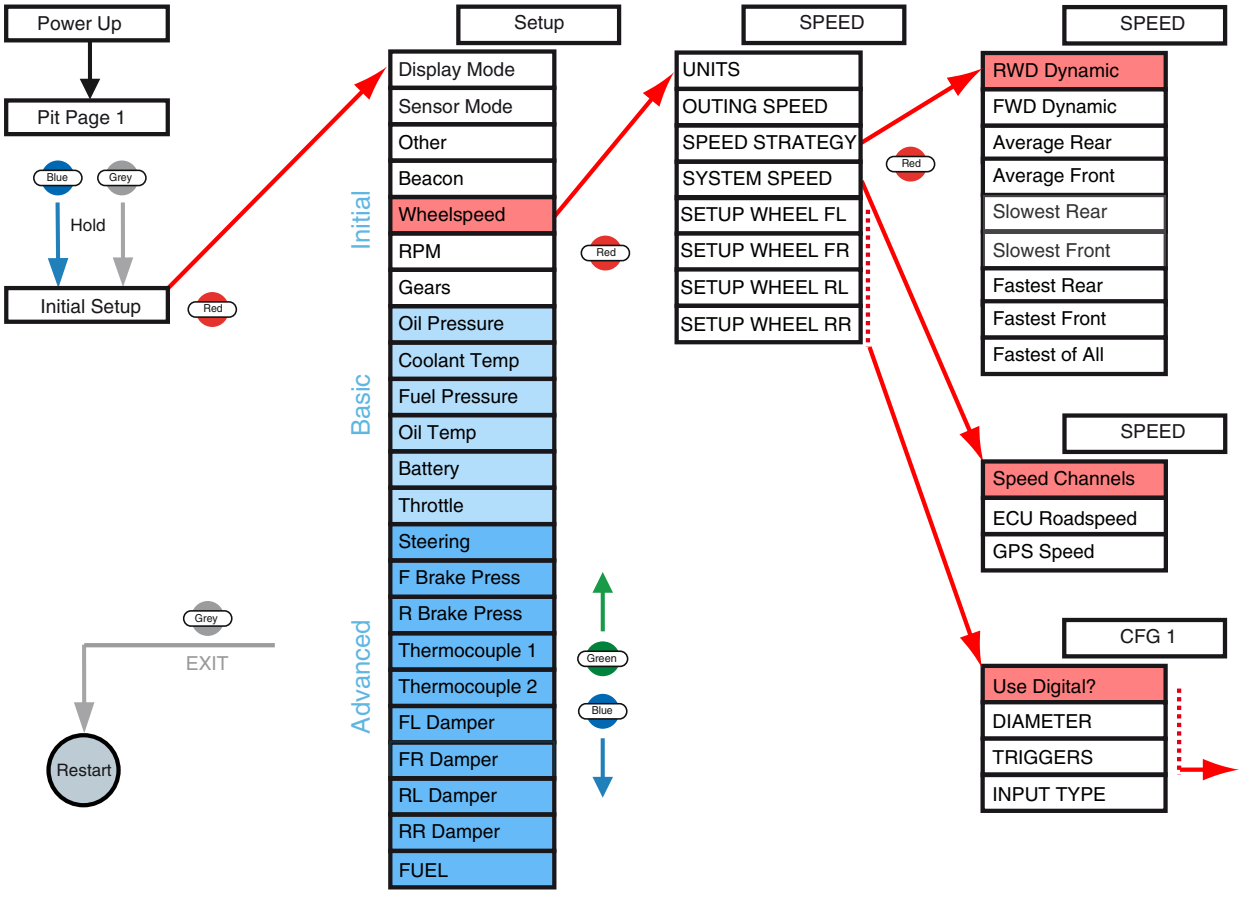
Initial Setup – Beacon

see page 41



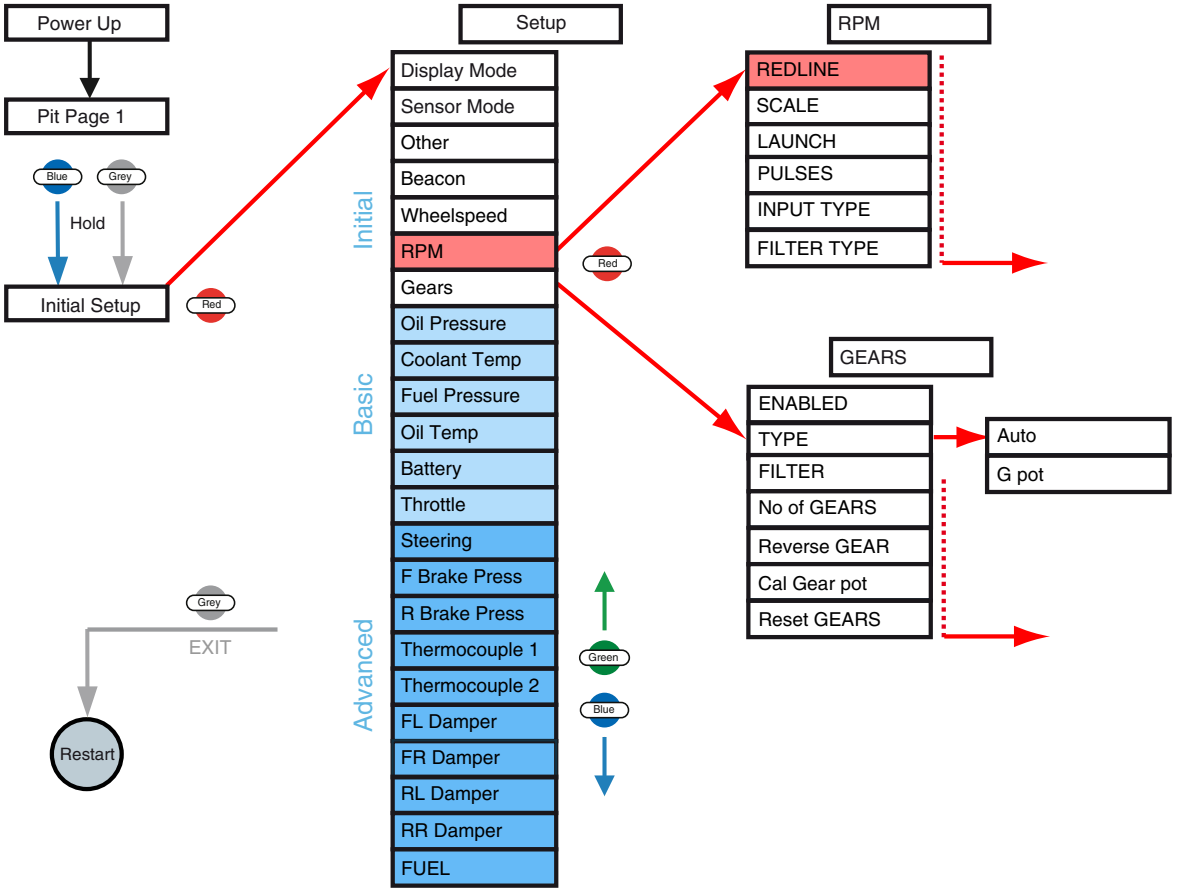
Initial Setup – Wheelspeed

see page 43



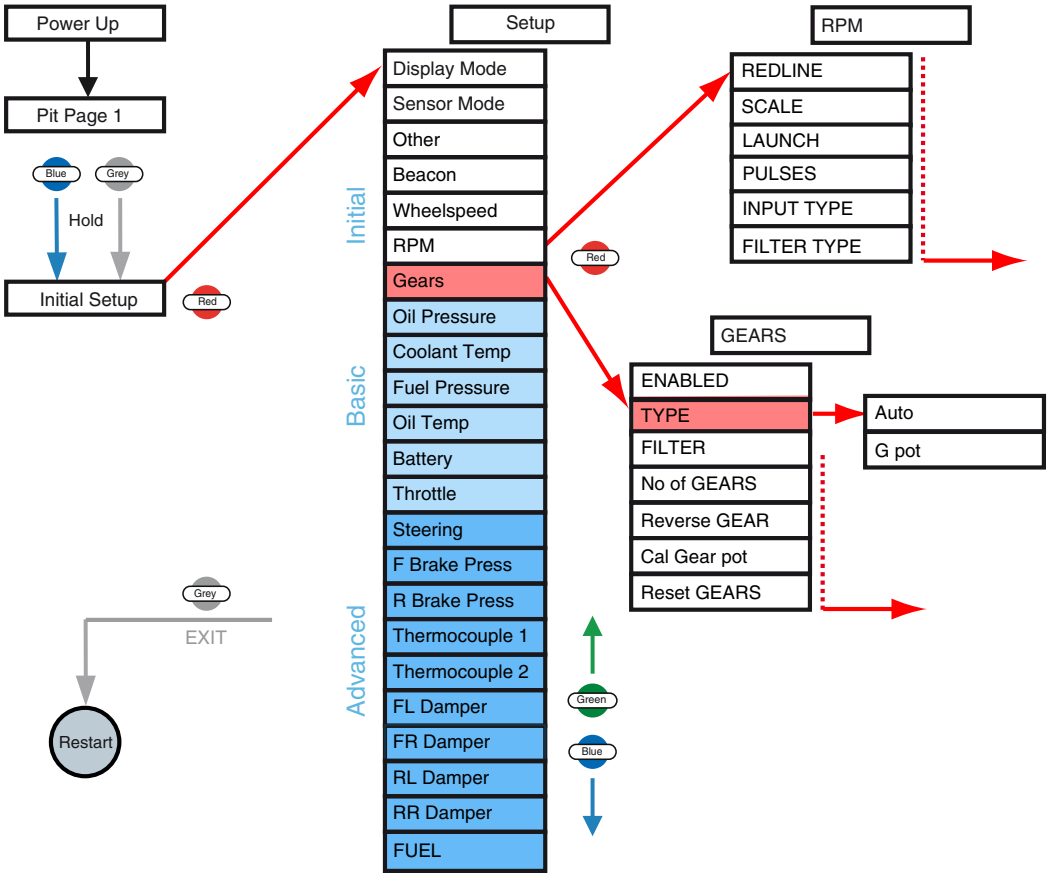
Initial Setup – RPM

see page 45



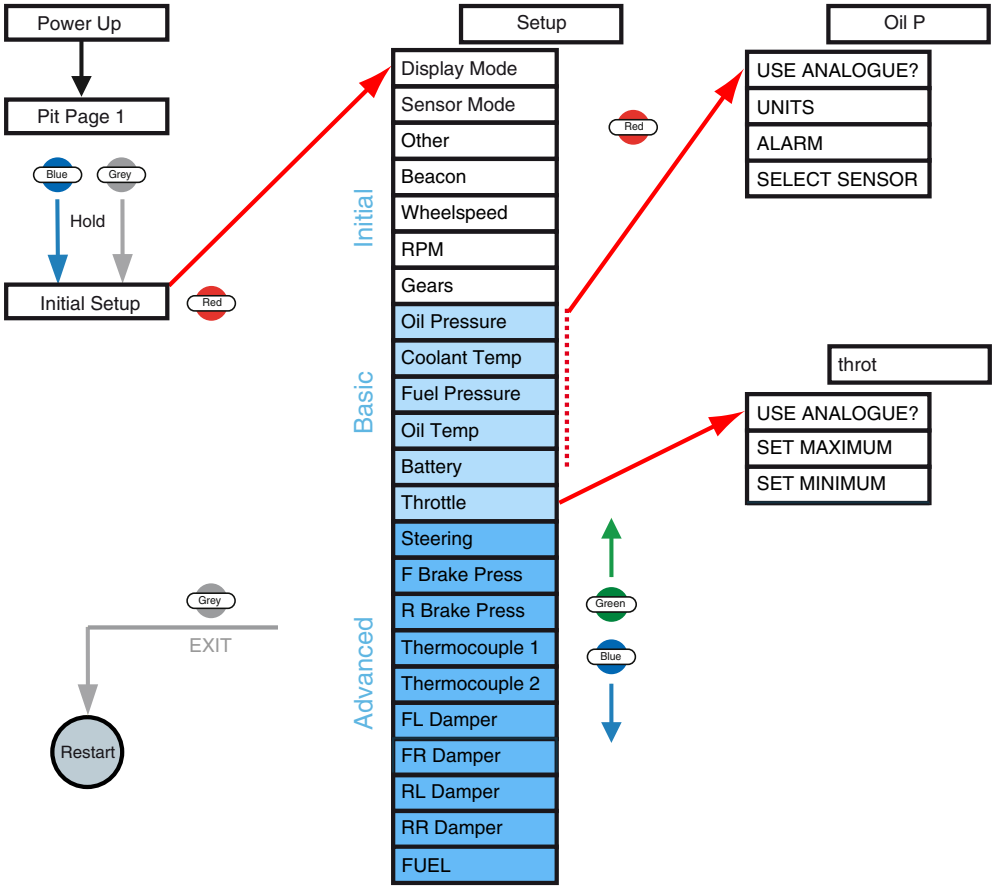
Initial Setup – Gears

see page 47



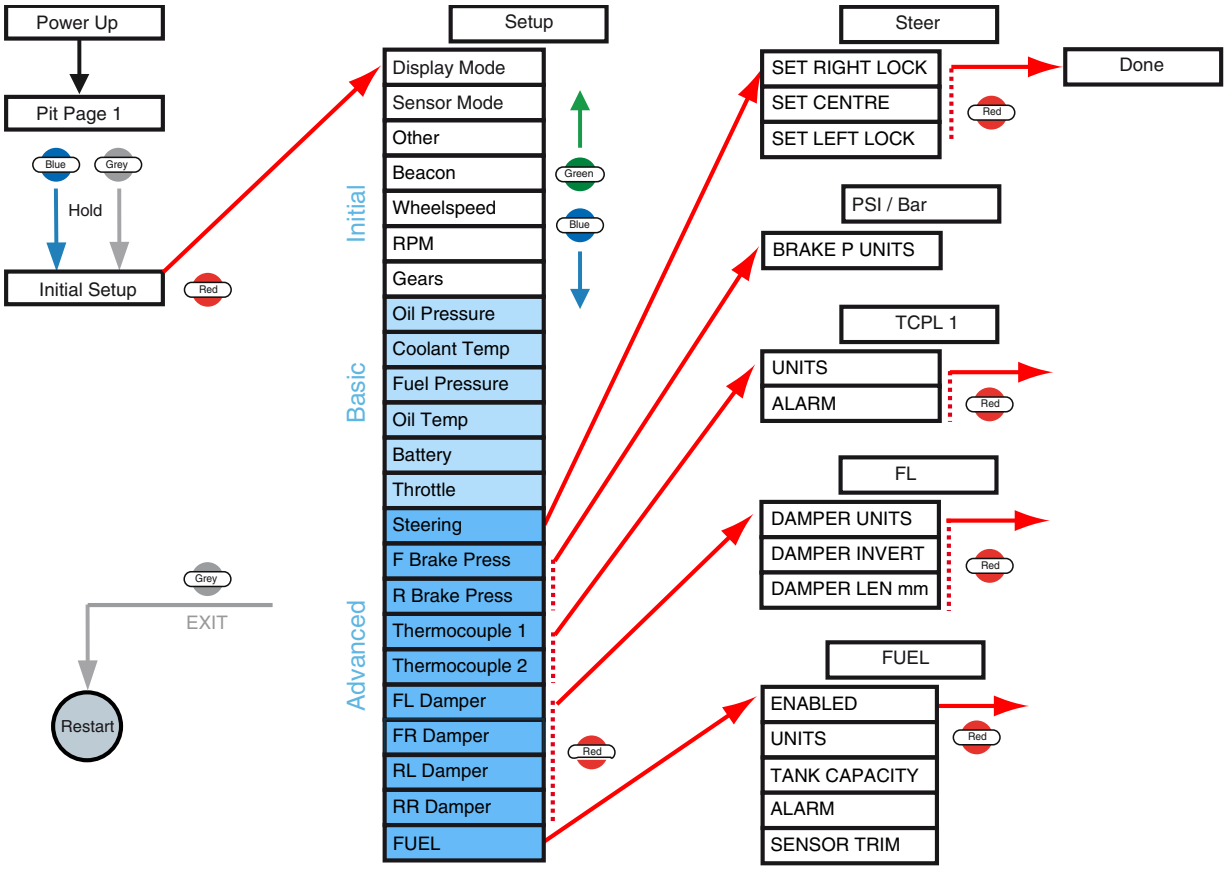
Basic Setup – Overview

see page 60



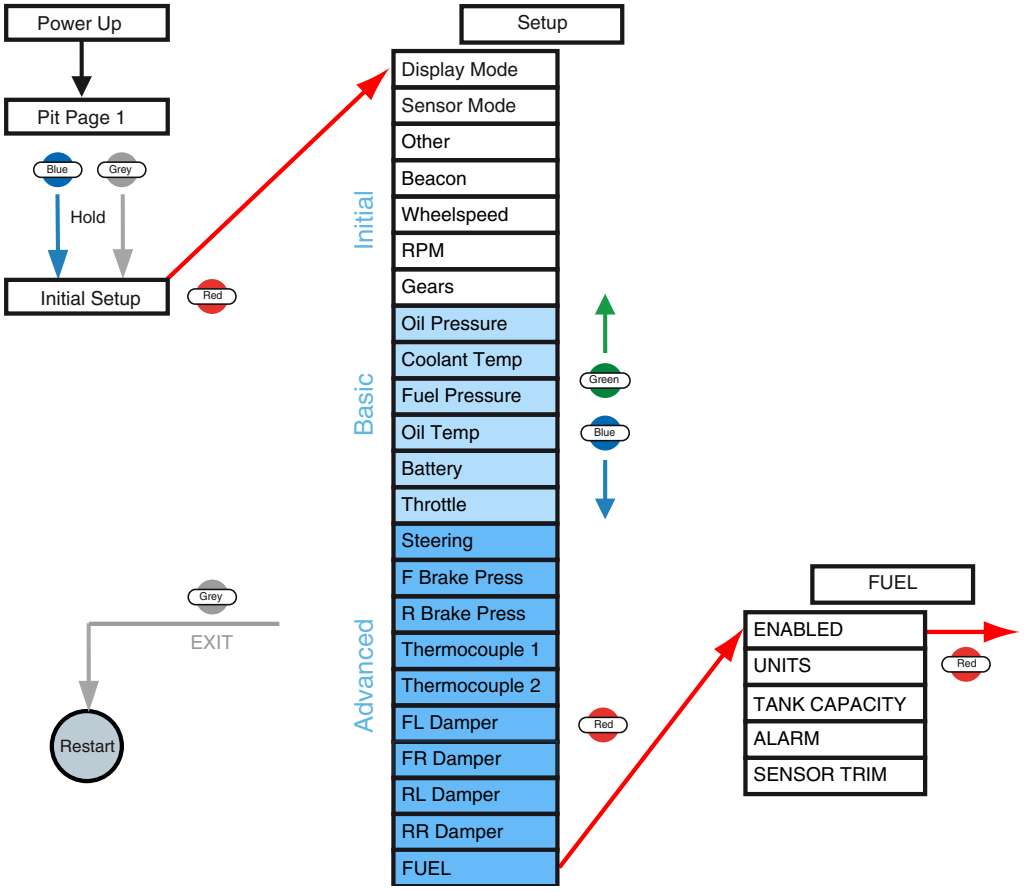
Advanced Setup – Overview

see page 66



Advanced Setup – Fuel

see page 70



Contact Information

COSWORTH

Pi Research

For more information about Cosworth Electronics, Pi Research products, and details of world-wide authorized agents, please contact:

Cosworth Electronics Limited

Brookfield Technology Centre
Twentypence Road
Cottenham
CAMBRIDGE
UK Customer Support Tel +44 (0) 1954 253600
CB24 8PS Fax +44 (0) 1954 253601

Cosworth Electronics LLC.

8250 Haverstick
Suite #275
Indianapolis
IN 46240 Tel +1 (317) 259-8900
USA Fax +1 (317) 259-0137

Document Part Number: 29D-071613-2E Issue 1.0 October 2009

Pi and the Pi logo are trademarks of Cosworth Electronics Limited

© Cosworth Electronics Limited, 2009

www.cosworth.com

Advanced Technologies ◆ Evolving Performance