

Race Technology

DASH3

Instruction manual



Version 1.2

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1 The DASH3

The DASH3 is a data and lap time display that is designed to work with Race Technology's range of data logging products. It is the smallest display in our range and can be used to provide either supplementary information alongside other instruments, or as the primary source of information in some race applications.



Physically, the DASH3 is housed in a small injection moulded case and is controlled by a sealed membrane keypad. The display is a custom made graphics panel which has been designed to be clear and readable from almost any angle and under any lighting conditions.

The DASH3 comes in 2 versions, the DASH3 and the DASH3lite:

- The DASH3lite is designed primarily as a lap time display, but also displays speed and has the configurable shift lights.
- The standard DASH3 has all the features of the DASH3lite, but in addition can be configured to display almost any combination of numerical displays, graphs and bar charts of any variable and also display warnings etc. This makes it a very flexible solution to all of your data displaying needs.

Read the following sections to get more information on DASH3:

- Lap Timing Features (page 6)
<http://www.race-technology.com/wiki/index.php/DASH3/LapTimingOnDASH3>
- Software support (page 6)
<http://www.race-technology.com/wiki/index.php/DASH3/SoftwareSupport>
- Technical Specification (page 8)
<http://www.race-technology.com/wiki/index.php/DASH3/TechnicalSpecification>
- Typical system (page 9)
<http://www.race-technology.com/wiki/index.php/DASH3/TypicalSystem>

- Installation (page 14)
<http://www.race-technology.com/wiki/index.php/DASH3/Installation>
- Operating the DASH3 (page 16)
<http://www.race-technology.com/wiki/index.php/DASH3/OperatingTheDASH3>
- Displaying data (page 37)
<http://www.race-technology.com/wiki/index.php/DASH3/DisplayingData>
- Lap timing on DASH3 (page 39)
<http://www.race-technology.com/wiki/index.php/DASH3/LapTimingOnDASH3>
- Setting up alarms (page 45)
<http://www.race-technology.com/wiki/index.php/DASH3/SettingUpAlarms>
- Reviewing Max and Min values (page 47)
<http://www.race-technology.com/wiki/index.php/DASH3/ReviewingMaxAndMinValues>
- Configuring the DASH3 unit (page 48)
<http://www.race-technology.com/wiki/index.php/DASH3/ConfiguringTheDASH3Unit>
- Reflashing the DASH3 (page 54)
<http://www.race-technology.com/wiki/index.php/DASH3/ReflashingTheDASH3>
- FAQs (page 58)
<http://www.race-technology.com/wiki/index.php/DASH3/FAQs>

1.1 Lap timing features

Lap timing is one of the most important parameters for every racer. This information can be displayed in a number of ways on the DASH3lite and the standard DASH3 to ensure that the most important information is presented in a clear and concise way, tailored to the user's exact preference.

There are six key lap timing parameters that the DASH3 calculates:

- Lap counter: This is a simple counter to show which lap you are on.
- Sector time: This is the time it took to complete the last sector
- Lap time: This is the time up to that point on the lap
- Delta sector time: This indicates how much faster or slower your last sector was compared with your best overall time for that same sector
- Delta lap time: This indicates how much faster or slower you are going compared with the same point on your best lap
- Predictive lap time: This makes a calculation - based on your current completed sectors in this lap – and displays a prediction of what lap time will be. This prediction is based upon the assumption that you will complete all of the remaining sectors in the same time that it took you during your best lap.

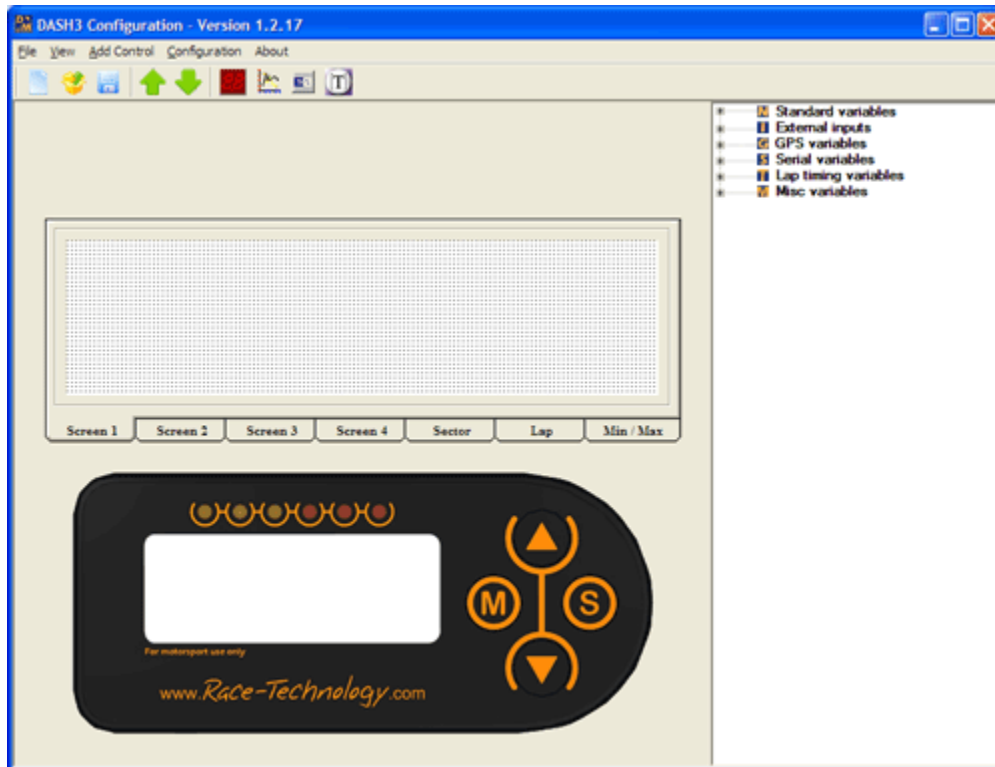
Any combination of these parameters can be displayed as each lap or sector is completed, in a format that is specified using the configuration software. The unit comes pre-configured with the most common options, so that it can be used without any need for reconfiguration.

1.2 Software support

As part of the standard Race Technology software, we supply a comprehensive configuration utility for the DASH3 which allows the user to tailor the display to meet your exact requirements. You can use the software to configure the following features:

- What variables are displayed on the screen and where. Information can be displayed in three differently sized fonts.
- What graphs are displayed and where
- What bar charts are displayed and where
- What lap and sector timing information is displayed
- Any filtering on variables
- Alarm limits on variables

- Units conversions – e.g. from volts to degrees Centigrade, in the case of a temperature sensor
- When illuminated - e.g. based on an analogue sensor, RPM, etc



1.3 Technical Specification

Display	Custom designed monochrome, Transflective “Black on white” full graphics display, resolution 128 x 32 pixels. Backlit with white LEDs.
Case	Full custom designed injection moulded in black ABS, fully sealed
Connections	Single 9-way d-type, for serial communications and power for direct connection to a DL1 data logger
Power supply	Requires 12v at approximately 100mA
Processor	C2000 series 32 DSP running at 150MHz. Internal Flash for program and configuration storage.
Temperature range	Operation between 0°C to 50°C, limited by the LCD display. Storage from -20°C to 80°C.
LEDs	High brightness 3mm LEDs. 20 degree viewing angle. 10 steps of brightness control.
Membrane keypad	Polyester textured membrane to limit reflections. Buttons 12mm and 15mm diameter.

1.4 Typical system

Typically the DASH3 is designed to be used directly with the DL1 data logger. It can, however, also be used with a number of our other products, including the DL2 and SPEEDBOX. It can even be connected directly to an ECU interface to display ECU parameters only.

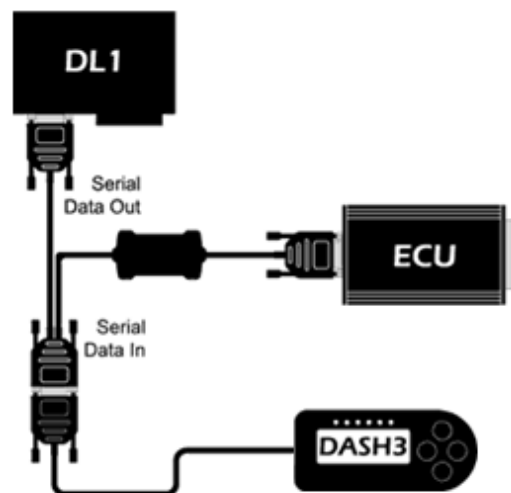
1.4.1 DL1 or DL2, and DASH3



Please note that in this configuration, you must ensure that your DL1 is correctly configured to work with a DASH display, there is more information in the following KB article:

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/DL1ConfigForDASH>

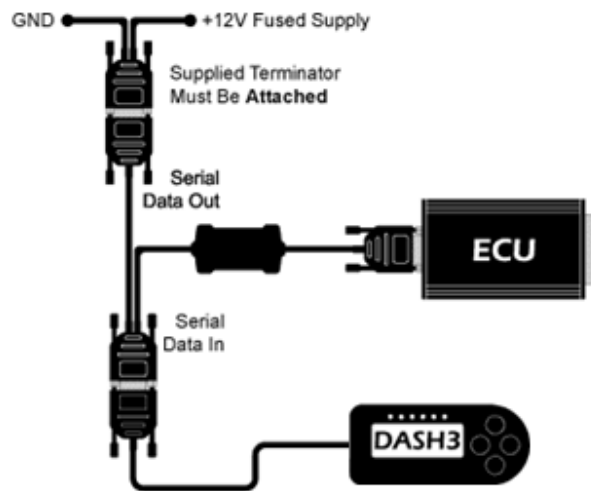
1.4.2 DL1 or DL2, ECU, and DASH3



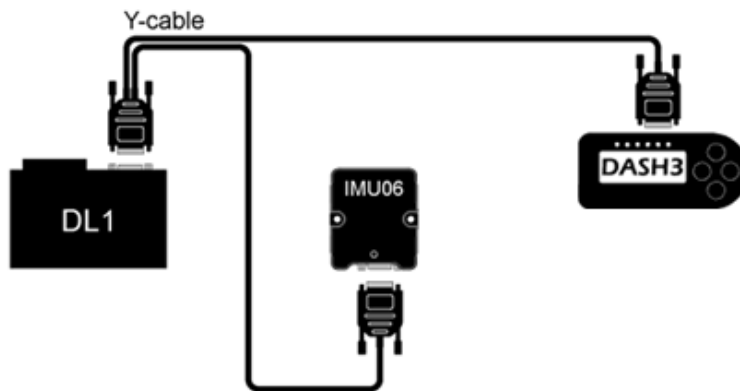
Please note that in this configuration, you must ensure that your DL1 is correctly configured to work with a DASH display, there is more information in the following KB article:

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/DL1ConfigForDASH>

1.4.3 ECU and DASH3 display (in standalone mode)



1.4.4 Connecting to DL1 and IMU06 with DASH3



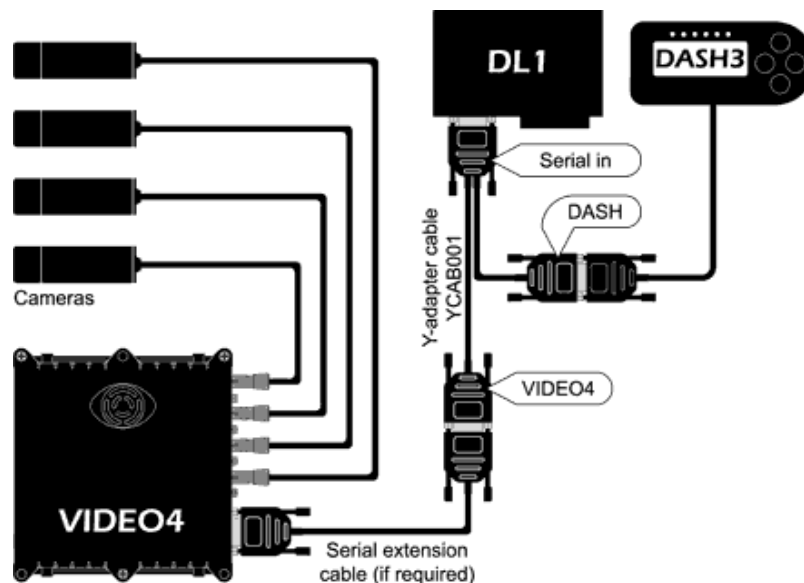
A Y-cable is required to connect the IMU06 to multiple units. When using this installation, ensure that the “Pass through RT message format” option is enabled in the configuration.

Serial	
Update rate for gyro messages	100Hz
Update rate for accelerometer messages	100Hz
Pass through RT message format	<input type="checkbox"/>

If additional ECU interfaces or CAN adapters are used in conjunction with the IMU06, they can be daisy chained on either side of the unit.

In the DL1/2 configuration, ensure that the internal accelerometers are turned off for both storage to the memory card and to the serial port. Enable decoding of serial messages and logging of incoming serial data to the memory card and transmission to the serial port.

1.4.5 VIDEO4, DL1 and DASH3



Please note that in this configuration it is important that both the DL1, DASH display and the VIDEO4 are configured to work together correctly. There is more information in the following KB articles:

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/DL1ConfigForVIDEO4>

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/VIDEO4ConfigForDASH>

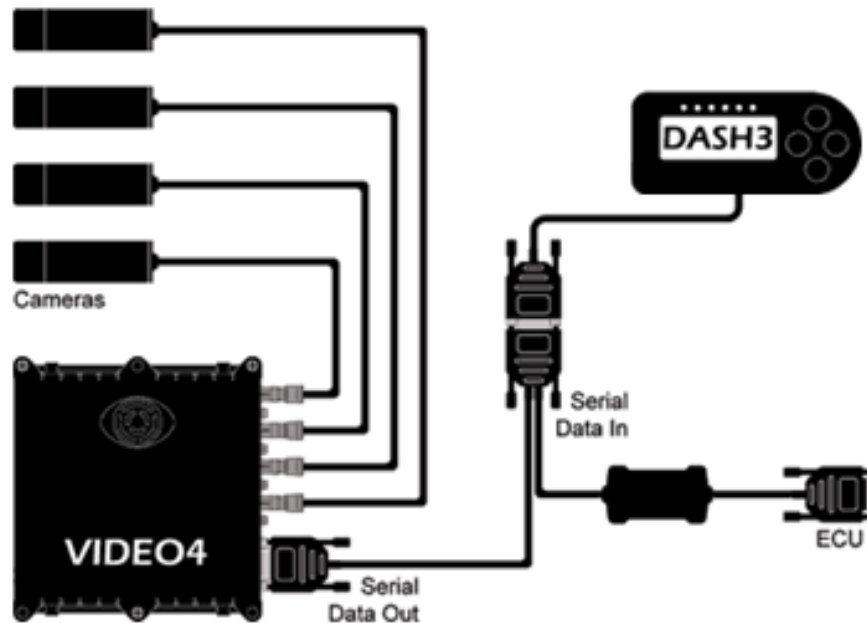
IMPORTANT:

When connecting a dashboard to a VIDEO4, it must be running firmware that has been published since the release of the VIDEO4 so it correctly decodes the new VIDEO4 data. In particular:

- DASH1s must be running firmware version 9.1.5 or later
- DASH2s must be running firmware version 9.1.5 or later
- DASH3s must be running firmware version 1.31.18 or later

For full compatibility with the VIDEO4, the DL1/2 must be running firmware version 25 or later. If this is not the case the remote start/stop and add lap marker will not work.

1.4.6 VIDEO4, ECU and DASH3



Please note that in this configuration it is important that both the DASH display and the VIDEO4 are configured to work together correctly. There is more information in the following KB article:

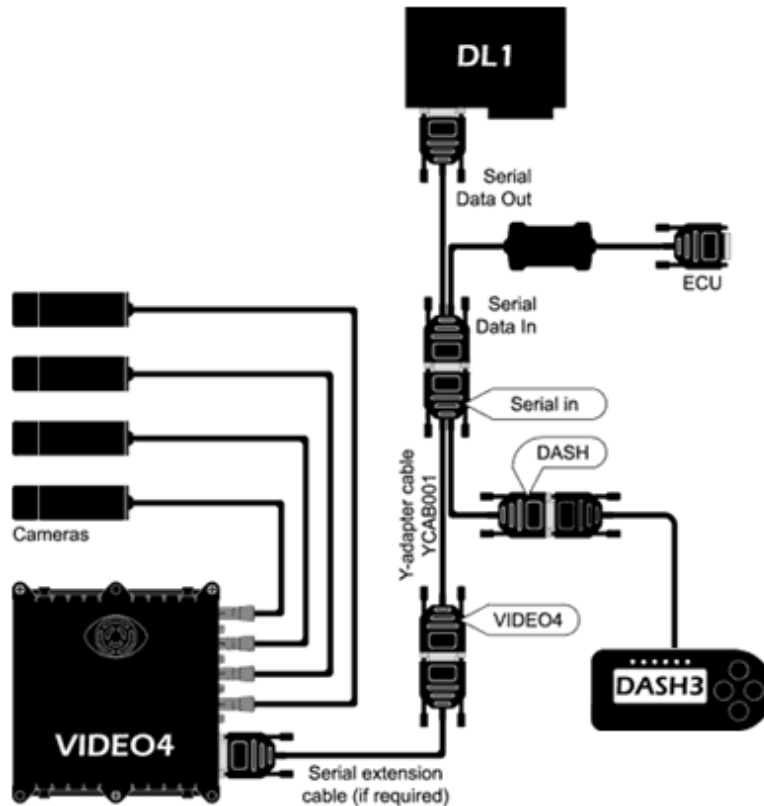
<http://www.race-technology.com/wiki/index.php/UnitConfigurations/VIDEO4ConfigForDASH>

IMPORTANT:

When connecting a dashboard to a VIDEO4, it must be running firmware that has been published since the release of the VIDEO4 so it correctly decodes the new VIDEO4 data. In particular:

- DASH1s must be running firmware version 9.1.5 or later
- DASH2s must be running firmware version 9.1.5 or later
- DASH3s must be running firmware version 1.31.18 or later

1.4.7 VIDEO4, DL1, ECU and DASH3



Please note that in this configuration it is important that both the DL1, DASH display and the VIDEO4 are configured to work together correctly. There is more information in the following KB articles:

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/DL1ConfigForVIDEO4>

<http://www.race-technology.com/wiki/index.php/UnitConfigurations/VIDEO4ConfigForDASH>

IMPORTANT:

When connecting a dashboard to a VIDEO4, it must be running firmware that has been published since the release of the VIDEO4 so it correctly decode the new VIDEO4 data. In particular:

- DASH1s must be running firmware version 9.1.5 or later
- DASH2s must be running firmware version 9.1.5 or later
- DASH3s must be running firmware version 1.31.18 or later

For full compatibility with the VIDEO4, the DL1/2 must be running firmware version 25 or later. If this is not the case the remote start/stop and add lap marker will not work.

2 Installing the DASH3

2.1 Physical mounting of the DASH3

There are 3 mounting options:

1. For temporary mounting in a car there is a suction mount that can be used on the vehicle windscreen. The suction mount screws into a standard tripod mount that is also commonly found on bullet cameras, this is a 1/4" 20 UNC thread.
2. For mounting in a race environment onto a flat surface we recommend using scotch lock tape onto the rear of the unit. The weight of the unit is only about 120g so in practice only a small area of scotch lock tape is required.
3. For permanent mounting the unit has 4 blind holes which are designed to take a 2.9mm self tapping screw (No 4) with a maximum penetration of 6.5mm

In all cases the rear of the case has been designed so that the cable can exit from the top or bottom of the unit for maximum flexibility. In race applications the exact mounting location has to be chosen carefully to maximise visibility of the screen - in particular you need to minimise reflections and have the unit at the correct angle to ensure that the full brightness of the LEDs can be seen.



2.2 Connecting the DASH3 to a data logger

As standard the DASH3 comes fitted with a single 9 way d-type which takes both data and power when connected directly to a DL1. If the DASH3 is to be connected to anything else (for example a DL2 or SPEEDBOX) then please inquire with Race Technology for the correct lead.

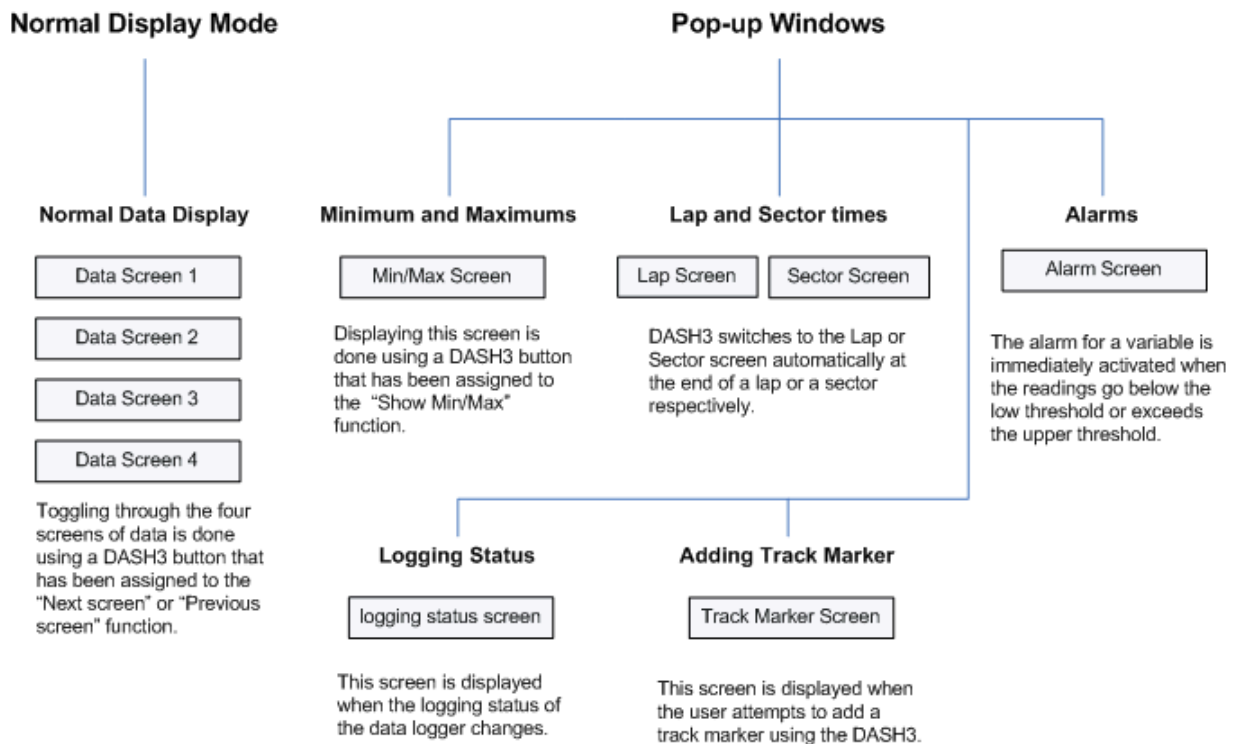
3 Operating the DASH3

The DASH3 display unit is operated using a simple menu system, using the UP, DOWN, SELECT and MENU buttons. Pressing UP and DOWN moves between the menus or cycles through settable values, pressing SELECT enters a submenu or sets a value, and pressing MENU exits the current submenu without setting any values.

There are two operating modes in the DASH3, Normal Display mode and Menu Display mode. MENU button is used to switch from normal display mode to menu system display mode and vice versa.

3.1 Normal Display Mode

This is the default display mode that the DASH3 enters into after power up. This mode allows you to view the data being logged by the attached logger. During this mode DASH3 also monitors the current status of the variables for alarm conditions.



3.1.1 Normal data display screens

There are four user-configurable data display screens on DASH3 that can be used to display the data being logged. The screens can be configured by the DASH3 configuration program on the PC. Once the screens are configured, the programmable buttons can be used to select which screen to display. This enables toggling through the four screens of data. To set up a button to do this, see the section “Editing button functions” on page 22 and assign the “Next screen” or “Previous screen” functions. When changing between screens, the screen number is briefly indicated on screen. “Read Displaying data” section on page 37 for more details on this.

3.1.2 Pop-up Windows

Pop-up windows can be triggered by a user input (e.g. pressing a button) or due to data received from a data logger (e.g. device changed logging status).

3.1.2.1 Min/Max data screen

Using the Min/Max data screen, you can view the maximum and minimum values for selected variables while data is being logged. Minimum and Maximum values get updated continuously while logging. DASH3 retains these values after logging is over and until another session starts. Min/Max Screen is configured with DASH3 Configuration software. To display this screen you have to setup one of the programmable buttons on the DASH3.

Read “Reviewing Maximum and Minimum data values” section on page 47 for more details.

3.1.2.2 Lap and Sector times

Lap and Sector screens display the lap and sector specific data during the logging. DASH3 switches to the Lap or Sector screen automatically at the end of a lap or a sector respectively. Read the “Lap and sector screens” section on page 42 for more information on this.

3.1.2.3 Alarms

Alarms are visual warnings given by DASH3 when a particular variable goes out of bounds. The alarm for a variable is immediately activated when the readings go below the low threshold or exceeds the upper threshold. Setting up low threshold or upper threshold is done using the DASH3 configuration software. Read “Setting up Alarms” section on page 45 for more details.

3.1.2.4 Logging Status

This pop-up screen is displayed for a short duration (600 ms) when the logging status of the attached data logger changes from logging to not-logging and vice-versa. Users can exit this screen and get back to normal display mode by pressing the SELECT button.

3.1.2.5 Add Track Markers

When the user attempts to add a track marker through the DASH3, this screen will be displayed. The DASH3 will first send a add track marker command to the data logger and wait for a response. The data logger will inform the DASH3 if a marker was added successfully or not. If the operation was unsuccessful, the reason for the failure will be displayed as well.

3.2 Menu Display Mode

This allows the user to configure some aspects of the DASH3 display unit including change button functions, change brightness or contrast of the display unit and shift lights, and set or configure other options. The MENU button is used to switch between menu display and normal mode.

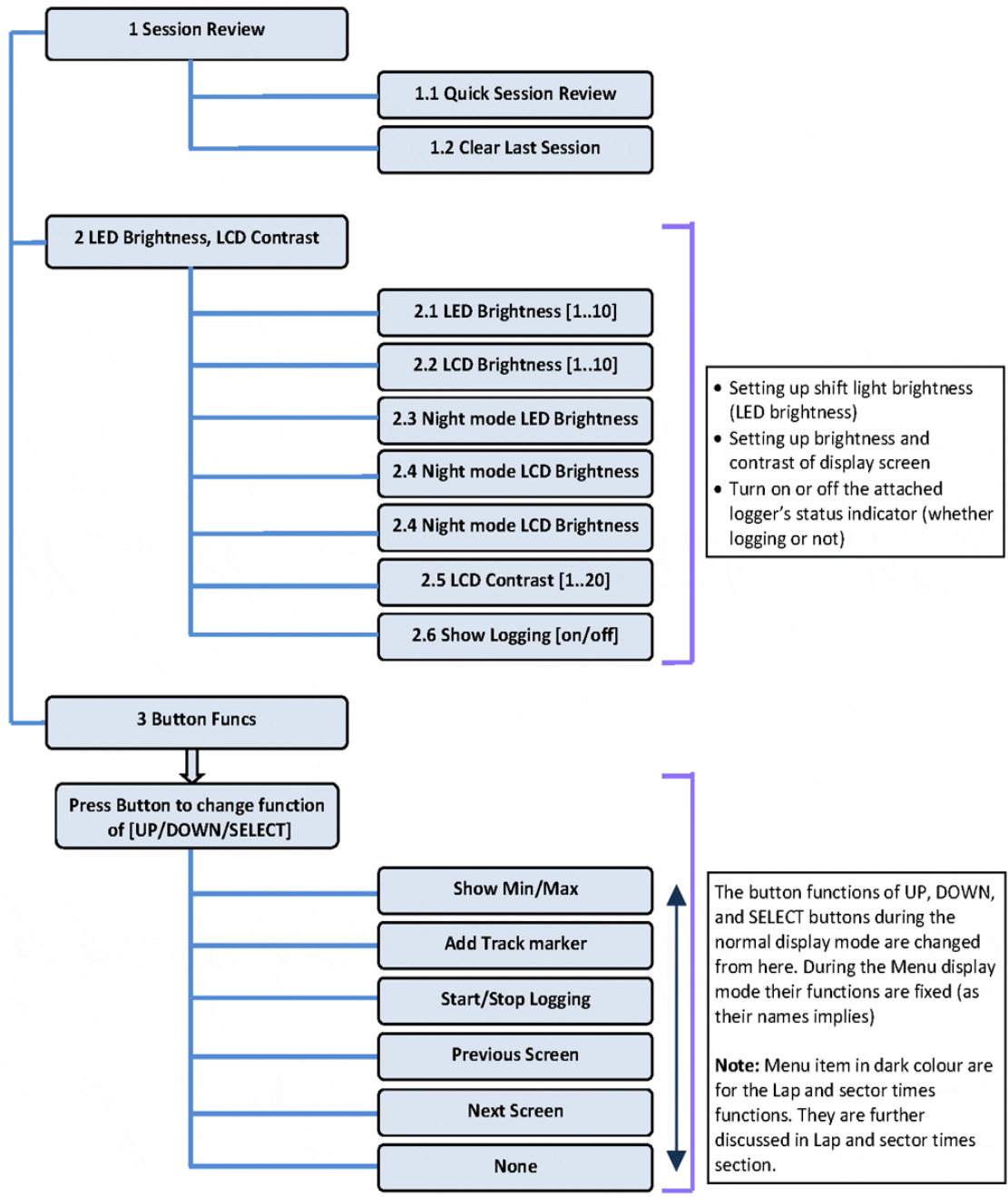
Other than the configuration options provided by the DASH3 itself, there are many options available from the computer, using the DASH3 Configuration software. For more information on this aspect of the operation, read the DASH3 configuration software instruction manual (<http://www.race-technology.com/wiki/index.php/Configuration/DASH3AndDASH4Configuration>).

3.3 Operating modes and button functions

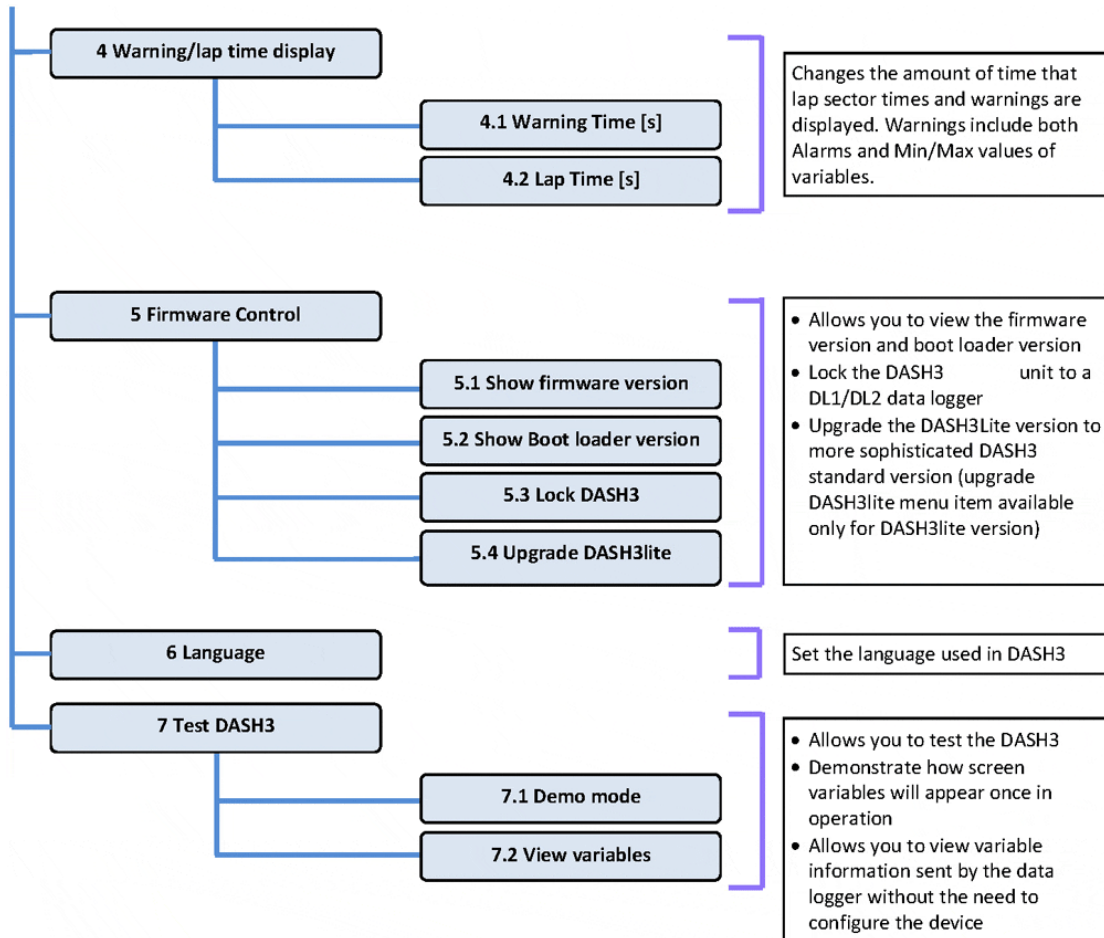
To learn how to assign the shortcut functions to the programmable buttons read the “Editing button functions” section on page 22.

4 Menu structure

Following figure illustrates the structure of the menu system. The following sections describe the details and operation of each function.



Continued on next page...



4.1 Operating the DASH3 Menu

Press MENU button to enter menu system display mode. Using the UP/DOWN buttons you can then scroll through the menu items. To enter a menu item press SELECT.

Some menu items contain sub menus. You can enter into the next lower menu level by navigating to the required menu item and pressing SELECT.

All the menu items are numbered. Each menu item has a unique ID. For example the top most menu items have IDs ranging from 1 to 7, while the first item in the submenu contained under menu item 1 is menu item 1.1

To change settings:

1. If you're in normal display mode, press the MENU button and enter into menu mode
2. Navigate to the menu item in question using the UP/DOWN buttons and press SELECT.
3. If required use UP/DOWN to change the function settings

4. Press SELECT to save the new setting and return the DASH3 to its normal display mode.
5. If you want to return to normal mode without saving, press MENU button. Pressing MENU button anywhere inside the menu, always return you back to the normal display mode

4.2 Session Review (1 Session Review)

4.2.1 The Quick Session Review Screen (1.1 Quick Session Review)

The DASH3 also functions at a lap timing display. In addition to this the DASH3 is able to store and display lap time statistics of the current session. This information is kept in the DASH3 until power down, or a new session is started.

Once a data logging session has completed (the user started data logging on the data logger and subsequently stopped logging), if valid lap timing information is available, the quick session review screen will pop-up.

This screen displays statistics such as the best lap, number of laps, average lap time, total lap time as well as allowing the user to scroll through the lap time for each individual lap.

You can scroll through the available pages by pressing the UP or DOWN buttons. By pressing the SELECT or MENU buttons you can leave the session review screen.

In addition to this you can also view the quick session review screen by the following method.

1. Press the MENU button while in display mode to enter the menu
2. Navigate to menu item 1 Session Review
3. Press the SELECT button
4. Navigate to menu item 1.1 Quick Session Review and press the SELECT button to bring up the quick session review screen
5. Press UP and DOWN buttons to look at the different pages of the quick session review screen. You can return to normal display mode by pressing either the SELECT button or MENU button.

4.2.2 Clearing Session Information (1.2 Clear Last Session)

If your data logger has stopped logging and session information is available on the DASH3, and if you restart logging, the session information will be automatically cleared. Additionally you can clear the session data manually by the following method;

1. Press the MENU button while in display mode to enter the menu
2. Navigate to menu item 1 Session Review

3. Press the SELECT button
4. Navigate to menu item 1.2 Clear Last Session and press the SELECT button

4.3 Editing Button Functions (3 Button funcs)

The UP, DOWN, and SELECT buttons and MENU+UP, MENU+DOWN and MENU+SELECT button combinations can be programmed to perform many different ‘shortcut’ functions in normal display mode. This does not change the function of the buttons from their standard purpose in menu display mode.

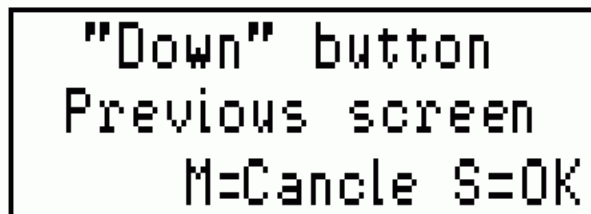
To change a button function:

1. Press MENU button to enter the menu display mode.
2. Use UP/Down button to navigate to the menu item “3 Button Funcs” and then press the SELECT button.
3. You will be asked to press the button you wish to change the function of. Press either the SELECT, UP or DOWN button. Alternatively you can hold down the MENU button, press and release one of the other buttons and then release the MENU button. This has the effect of selecting the MENU + UP/DONW/SELECT button combination.



```
Press button to
change function of
M=Cancle S=OK
```

4. The display will change to show which button is selected (on the first line) and the current function assigned to that button (on the second line). For an instance if you select the DOWN button, and currently it has the “Previous Screen” function been assigned to it then the display would look as follows.



```
"Down" button
Previous screen
M=Cancle S=OK
```

Then use UP/DOWN buttons to select a function to assign to this button. Second line of the display changes as you select the function.

"Down" button
Add Track Marker
M=Cancel S=OK

Following are the shortcut functions that can be assigned to the SELECT, UP or DOWN buttons or MENU+SELECT, MENU+UP or MENU+DOWN button combinations.

- Next Screen
Scrolls through the screens in ascending order.
 - Previous Screen
Scrolls through the screens in descending order.
 - Start/stop logging
Starts/stop the DL1/DL2 logging function from the DASH3
 - Add track marker
Manually add the track marker at present GPS coordinates
 - Show Min/Max
Shows the Minimum and Maximum values for the user selected variables for the current logging session.
 - Toggle night mode
Toggle night mode on and off. The brightness of the LCD backlight and LED lights are dimmed in night mode to suit low light conditions
 - None
If the button is assigned with this function, nothing happens when you press the button outside in normal display mode
5. Press SELECT to assign the selected function to the button. Then DASH3 will be return to the normal display mode.
 6. To cancel assigning the button function, press MENU button.

4.4 Configuring the shift lights

There are six LEDs on the face of the DASH3 (from left to right three amber and three red lights)

You can set shift lights to illuminate based on any variable sent by the data logger to the DASH3 (ex. an analog variable, engine RPM, etc.). You will be allowed to set threshold levels for the selected variable at which a given LED will be lit up.

If the shift lights are lit based on engine RPM, then you have the added option of setting threshold levels based on both the engine RPM and current gear. In this configuration a tachometer input or a RPM sensor will have to be connected to the data logger.

Configuring the shift lights are carried out using the DASH3 configuration software. Read the Section on “Configuring shift lights in DASH” Configuration software manual for more information on this:

<http://www.race-technology.com/wiki/index.php/UsingConfigurationSoftware/ConfiguringShiftLights>

4.5 Changing the shift light brightness (2.1 LED Brightness)

The brightness of the shift lights can be changed to suit personal preference.

1. Navigate to the menu item 2.1 LED Brightness and press SELECT. The shift lights will then be illuminated at the current brightness setting.
2. Use the UP and DOWN buttons to move the on screen slider and adjust the brightness to the desired level.



3. Press SELECT to save the brightness setting. DASH3 will return back to the normal display mode.

4.6 Changing the brightness of the Display (2.2 LCD brightness)

1. Navigate to the menu item 2.2 LCD Brightness and press SELECT.
2. Use the UP and DOWN buttons to move the on screen slider and adjust the brightness of the LCD to the desired level.



3. Press SELECT to save the brightness setting. DASH3 will return back to the Normal display mode.

4.7 Changing the Contrast of the Display (2.3 LCD Contrast)

1. Navigate to the menu item 2.3 LCD Contrast and press SELECT.
2. Use the UP and DOWN buttons to move the on screen slider and adjust the LCD contrast to the desired level.



3. Press SELECT to save the contrast setting. DASH3 will return back to the Normal display mode.

4.8 Displaying the Logging status (2.4 Show Logging)

The status of an attached logger(whether logging or not) can be displayed on the DASH3.

1. Navigate to the menu item **2.4 Show Logging** and press SELECT.
2. Use UP and DOWN button to select the **2.4.1 Show Logging ON** option.
3. Press SELECT button to save the setting and return back to the normal display mode.

When Show Logging is On, the left-most shift light operates as a logging status indicator. The remaining five shift lights operate as normal.

When the data logger starts logging, DASH3 briefly displays Start Logging message in the middle of the screen and left most shift light will be illuminated.

4.9 Setting Warning and Sector display times (4 Warning/lap time display)

The amount of time that warning messages or Lap/sector times are displayed on the screen can be configured from the DASH3 menu system.

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons to display **4 Warning / Lap time display** in the main menu and press SELECT.
3. Then use the UP/DOWN buttons to select the **4.1 Warning time** or **4.2 Lap time** option and press SELECT.
4. Use the UP/DOWN buttons to move the on screen slider and select the desired display duration. The minimum settable time duration is 1s while the maximum level is 99 seconds. If you attempt to set the duration to grater than 99s, the settable time will appear as **On** (which means that the screen will be permanently on).

Note: The duration that the Min/Max screen will be displayed is also equal to the warning time

5. Press SELECT to save the new setting. Display will be return back to the normal display mode.

4.10 View Firmware Version Information (5.1/5.2 Show firmware/boot loader version)

In certain cases it might be necessary to find out the firmware version that's currently on the DASH3. Functionality for this purpose can be found under menu item **5 Firmware Control** by following the steps given below;

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to **5 Firmware Control** in the main menu. Press SELECT button to enter into Firmware Control sub-menu.
3. Then use the UP/DOWN buttons to navigate to menu item **5.1 Show firmware version** or **5.2 Show boot loader** version depending on whether you need to look at the firmware version or bootloader version.
4. When press SELECT button the screen will display the currently used firmware/boot loader version.

4.11 Locking the DASH3 to a data logger (5.3 Lock DASH3)

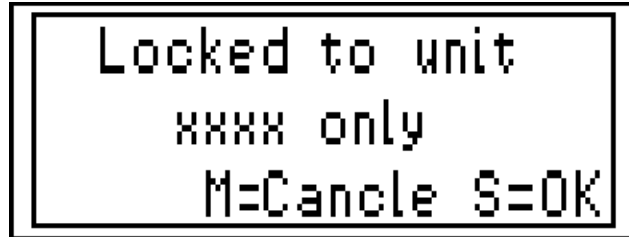
Just after production the DASH3 is programmed to operate with any data logging product from Race Technology (such as the DL1 or DL2). It is however possible to lock the DASH3 to work with only one data logger (DL1/DL2)

Note: Before progressing any further please make sure that you know the serial number of you Race Technology data logger. The serial number of the data logger can be found on the base of the unit. Alternatively you can find the serial number by loading a run file created by your logger into the RT Analysis software and going to the Run Manager. The serial number will be displayed under Run details. For more information about Run manager, read the KB article: <http://www.race-technology.com/wiki/index.php/ManagingData/RunManager>

The following method should be employed to lock the DASH3:

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **5 Firmware Control** in the main menu. Press SELECT button to enter into Firmware Control sub-menu.
3. Then use the UP/DOWN buttons to navigate to menu item **5.3 Lock DASH3**.

4. If the device is already locked to a data logger it will display “Locked to unit xxxx only” on screen. Here “xxxx” denotes the serial number of the data logger that the DASH3 is locked into.



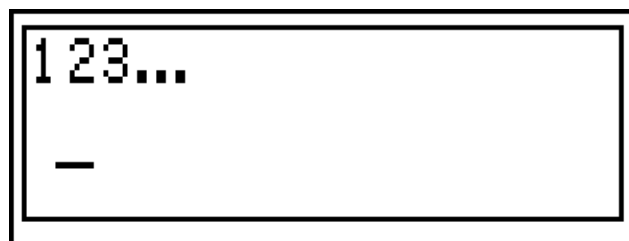
Locked to unit
xxxx only
M=Cancel S=OK

If the DASH3 is not locked it will display a random number. You should note down the random number and exit the menu by pressing the MENU button. You should then contact Race Technology to obtain an authorization key.



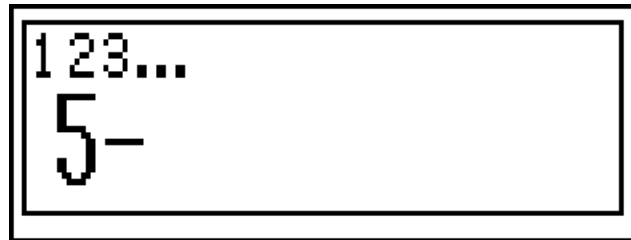
Random code
yyyyy
M=Cancel S=OK

5. Once you receive the authorization key you should you should repeat steps 1 to 3 and when presented with the random code, should press the SELECT button. Then the message “Enter Authorization code” will be displayed on screen. Press the SELECT button to continue.
6. A number entry screen will be displayed, into which you have to enter the authorization code.

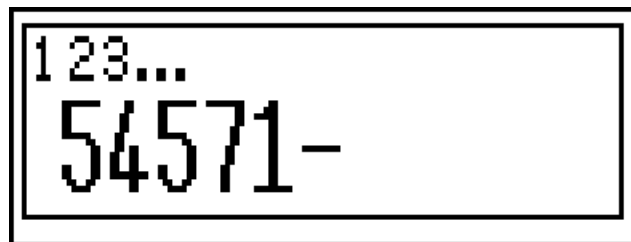


123...
—

At first a flashing cursor will appear. Press the UP and DOWN buttons and select the appropriate number. Press the SELECT button to confirm the entered number. The cursor will progress to the next position to accept the next number.



If you made a mistake at any point in the number entry procedure, press the MENU button to exit the menu screen. You can then repeat stages 1 through 6 and re-enter the correct authorization code. Once the authorization code has been fully entered, press the SELECT button again to confirm the entered code.



7. If the authorization code you entered is incorrect the “Invalid authorization code” message will be displayed. In such a case please recheck your authorization code.
If you entered the correct authorization code you will be asked to enter the serial number of the data logger. Following this the DASH3 will be locked to your data logger.

4.12 Upgrading a DASH3lite to a DASH3 (5.4 Upgrade DASH3lite)

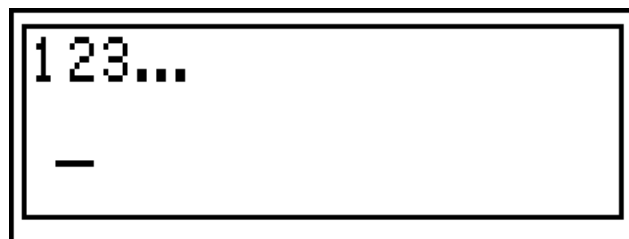
The DASH3lite is a stripped down version of the DASH3 that can be used as a lap timing display. The DASH3 on the other hand is a fully functional dash board display unit that is intends to work with Race Technology data loggers. Users can upgrade their DASH3lite devices to DASH3 by using menu item 5.4 Upgrade DASH3lite. Also note that this menu is only available on DASH3lite units

The following method should be employed to upgrade a DASH3lite;

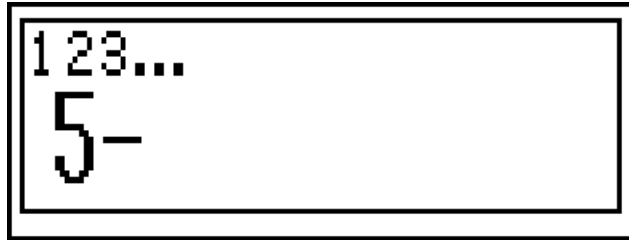
1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **5 Firmware Control** in the main menu. Press SELECT button to enter into Firmware Control sub-menu.
3. Then use the UP/DOWN buttons to navigate to menu item **5.4 Upgrade DASH3lite**.
4. A random number will be displayed on screen. You should note down the random number and exit the menu by pressing the MENU button. You should then contact Race Technology to obtain an upgrade key.



5. Once you receive the upgrade key you should you should repeat steps 1 to 4. When presented with the random code, press the SELECT button. Then the message "Enter Upgrade code" will be displayed on screen. Press the SELECT button to continue.
6. A number entry screen will be displayed, into which you have to enter the upgrade code.

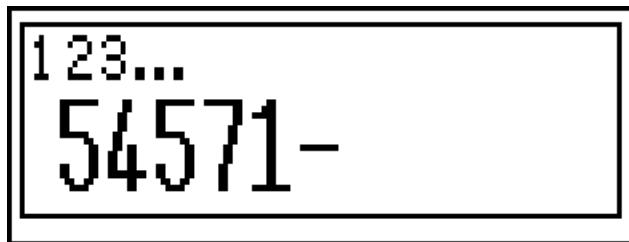


At first a flashing cursor will appear. Press the UP and DOWN buttons and select the appropriate number. Press the SELECT button to confirm the entered number. The cursor will progress to the next position to accept the next number.



If you made a mistake at any point in the number entry procedure, press the MENU button to exit the menu screen. You can then repeat stages 1 through 6 and re-enter the correct upgrade code.

Once the upgrade code has been fully entered, press the SELECT button again to confirm the entered code.



7. A countdown will commence, at the end of which your DASH3lite will be upgraded to a DASH3. If the unlock code you entered is incorrect the “upgrade success” message will be displayed at the end of the count down. In such a case please recheck your upgrade code.

4.13 Changing the DASH3 language (6 Language)

The DASH3 supports multiple languages. By changing the DASH3 language, you can view the menu text and other text labels to be displayed in your native language.

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **6 Language** in the main menu. Press SELECT button to enter the menu item.
3. Use the UP/DOWN buttons to change the language used on the DASH3 and press the SELECT button to confirm the change.
4. The DASH3 will save the changes and will from that point onwards display all text in the new language

4.14 Demo Mode (7.1 Demo Mode)

You can get an idea on how the DASH3 will look like in actual operation, by looking at the DASH3 demo mode screen. In essence the demo screen is a simulation of the DASH3 in action if the display objects were configured to show a sinusoidal signal. Once you enter this mode, four display objects will be shown.



To view the demo screen:

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **7 Test DASH3** in the main menu. Press SELECT button to enter the Test DASH3 sub-menu.
3. Use the UP/DOWN buttons to navigate to menu item **7.1 Demo Mode** and press the SELECT button to enter the Demo mode menu item.
4. You can leave the demo screen at any time by pressing any of the buttons.

4.15 Night Mode (2.3 Night mode LED brightness & 2.4 Night mode LCD brightness)

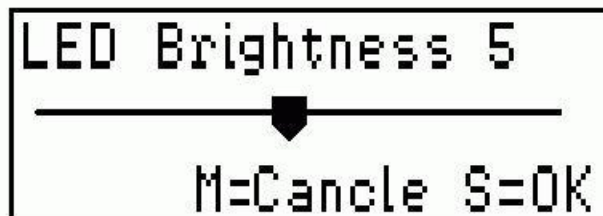
The user can toggle night mode on and off using a button press. During the night mode, the LED and LCD backlight brightness are dimmed to suit low light conditions

4.15.1 Setting up a button for night mode

By accessing menu item **3 Button func**s, set up a key or key combination to toggle night mode on and off. Refer section on Editing Button Functions on page 22 to learn how this is done.

4.15.2 Setting LED brightness for night mode

1. Navigate to the menu item **2.3 Night mode LED brightness** and press SELECT. The shift lights will then be illuminated at the current brightness setting for night mode.
2. Use the UP and DOWN buttons to move the on screen slider and adjust the brightness to the desired level.



3. Press SELECT to save the brightness setting. DASH3 will return back to the normal display mode.

4.15.3 Changing the brightness of the Display for night mode (2.4 night mode LCD brightness)

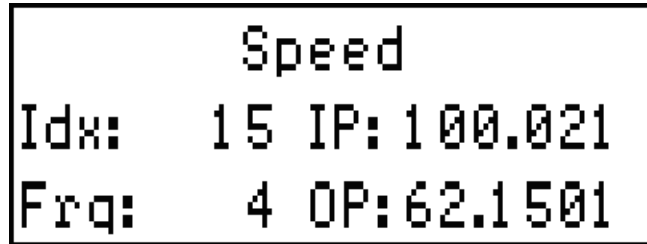
1. Navigate to the menu item **2.4 Night mode LCD brightness** and press SELECT.
2. Use the UP and DOWN buttons to move the on screen slider and adjust the brightness of the LCD to the desired level.



3. Press SELECT to save the brightness setting. DASH3 will return back to the Normal display mode.

4.16 Monitoring Variables (7.2 View Variables)

This menu item is used to ensure that data transmitted by the data logger is being properly received by the DASH3 and that this data is being decoded, converted and filtered properly.



```
Speed
Idx:  15 IP: 100.021
Frq:  4 OP: 62.1501
```

To monitor variables:

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **7 Test DASH3** in the main menu. Press SELECT button to enter the Test DASH3 sub-menu.
3. Use the UP/DOWN buttons to navigate to menu item **7.2 View Variables** and press the SELECT button to enter the Demo mode menu item.
4. You can leave the demo screen at any time by pressing any of the buttons This screen is the DASH3 equivalent of the Rac-Technology Lite Monitor software. The screen displays the following information:

- Name of variable

In the above example the name of the variable is given as speed

- Idx – Variable Index

A unique variable index that is used to refer to this variable in all Race Technology products

- Frq – Frequency or Rate

Approximate rate at which information regarding this variable is received by the DASH3 in Hertz (Hz) – i.e. the rate at which messages containing information on this variable are being sent by the data logger to the DASH3

- IP – Input value

This is the value contained in messages sent by the data logger – i.e. the decoded value. On the Lite Monitor software this value would come under native units. In the given example the value of speed is reported in km per hour (kph).

- OP – Output value

This is the value of the variable as shown on a data display screen – i.e. the input value is converted to user specified units and filtered using a rate of change filter and a smoothing filter. On the Lite Monitor software this value would come under user units. In the given example the value of speed is reported in miles per hour (mph)

Note: Some variable information, such as gear and lap timing information are calculated on the DASH3 itself. Therefore, the frequency or rate information for these variables is not displayed.

Note: On this DASH3lite, this screen only displays valid information for the speed and engine rpm variables, since all other variables other than the lap timing variables are disabled on the DASH3lite.

4.17 Starting and stopping a data logging on a data logger from the DASH3

When suitably connected and configured, the DASH3 can be used to start and stop data recording on an attached logger. To enable one of the buttons on your DASH3 display act as a start/stop logging switch follow the procedure described below.

1. Set up one of the buttons on your DASH3 to the Start/stop logging function as described in the Editing button functions section on page 22.
2. Enter the DL1/DL2 configuration tool, and make sure that the "Decode serial data" option is ticked. The data logger must be configured with this option is ticked. Without enabling the Decode Serial data option on the data logger the commands from the DASH3 will be ignored.

Note: from version 7 of the configuration tool, the Decode serial data option is ticked as a default. In earlier versions of the software, the option will be labelled "Enable GSM modem mode", and you will need to tick it yourself.

3. Insert a correctly formatted compact flash card (in FAT16 format) into the data logger.
4. Press the Start/stop logging button on the DASH3.

Whenever it is pressed, a command will be sent to the data logger to start or stop logging. If logging starts, the logging status pop-up window will appear and display the "Logging Started" message on screen. If the "Show Logging" function is enabled (on), the left most LED will be lit up.

5. If logging has started, you can stop data logging by pressing the start/stop logging button on the DASH3.

When logging stops the logging status pop-up window will appear and display the "Logging Stopped" message on screen. If the "Show Logging" function is enabled (on), the left most LED will be turned off.

To learn how to enable the show logging function read the Displaying logging status section on page 26.

5 Displaying Data

There are four user configurable screens in DASH3 that can be used to display the data receiving from the attached logger. They are named from SCREEN 1 to SCREEN 4. Data screens have lower priority than Lap/Sector screens and Alarming messages. When DASH3 has to display lap/sector information or Alarms it temporarily stops displaying the data screens and switch to the high priority screen.

Data to be displayed on these screens are configured using the DASH3 configuration program. It allows you to add controls to the screens, arrange them, and format. Each screen can hold up to 10 controls. Following are the controls available.

- **Numeric Display** Represents the data in numerical form.
- **Graph** displays information in the form of a graph which updates itself as data is logged. Note that only one graph per screen is allowed.
- **Bar-chart** displays the information as a progress bar, which updates as data is logged.
- **Text** control allows you to add static text to the display. It is possible to show or hide this control based on the value of the variable that has assigned to it.

For more information on how to configure a DASH3 read the following KB article:

<http://www.race-technology.com/wiki/index.php/Configuration/DASH3AndDASH4Configuration>

For information on how to send configuration information to a DASH3, please refer the section on “Configuring the DASH3” on page 48.

5.1.1 Switching between Data screens

Switching between Normal data screens can be done either manually or automatically. Manual switching is described below. For information on Automatic switching read the “Automatic Switching between Normal Data Screens” section in the DASH3 Configuration Software manual:

<http://www.race-technology.com/wiki/index.php/UsingConfigurationSoftware/AutomaticSwitchingBetweenDataScreens>

You can toggle between the data screens by the pressing a button or button combination that has been programmed for the “Next Screen” or “Previous Screen” functions.

When you change the screen, the new screen number is briefly displayed on the LCD. If the selected screen does not have any thing to display (i.e. screen has no controls in it), it will give

a message “Skipping screen n” and jump to the next screen, where ‘n’ is the screen number (1..4)

Note that when DASH3 is shipped from the factory, UP and DOWN buttons are normally assigned with the “Next screen and “Previous screen” functions. Later on you may assign one of these buttons for another function. Read the “Editing button functions section” on page 22 to learn about assigning DASH3 functions to programmable buttons.

6 Lap timing on DASH3

To use the DASH3 lap timing functions the unit must be connected to a Race Technology DL1 or DL2 data logger. The data logger monitors when the vehicle has passed a track marker and sends the lap or sector timing information to the DASH3 which displays the data and stores best lap and sector times. The lap timing functions only operate when the data logger is logging data. If the logger is just monitoring sensors and sending this information to the DASH3 no lap or sector times will be displayed. The lap timing functions use GPS data from the data logger, so can only function correctly when the logger has a valid GPS lock.

Lap timing functions use GPS coordinates as track markers to define sectors and laps. These markers can be added either by setting up a button on the DASH3 to add a marker, by using a dedicated button connected to the data logger, or by adding them to data using the Race Technology Analysis Software and saving the resulting .lap file to the memory card for transfer to the data logger. Following sections explain each of these options detail.

6.1 Adding Track Markers from the DASH3

1. Set up one of the buttons or button combinations on your DASH3 to the **Add track marker** function as described in the “Editing Button Functions” section on page 22.
2. Enter the DL1/DL2 configuration tool, and make sure that the "Decode serial data" option is ticked. The data logger must be configured with this option is ticked. Without enabling the Decode Serial data option on the data logger the commands from the DASH3 will be ignored.
Note: from version 7 of the configuration tool , the Decode serial data option is ticked as a default. In earlier versions of the software, the option will be labelled "Enable GSM modem mode", and you will need to tick it yourself.
3. Insert a correctly formatted compact flash card(in FAT16 format) into the data logger and turn it on.
4. Make sure that data logger’s internal GPS system has obtained a good positional lock. GPS Lock light on the data logger flashes when the GPS system is locked on. It flashes once slowly then a quick blink for each satellite it has locked onto.
5. Start logging the data.
6. Press the track marker button to add a marker. The DASH3 will jump to the track marker screen.

7. The DASH3 will show the “Adding marker” message on screen and a command will be sent to the data logger to add a track marker to the marker file.



Adding Marker

8. The DASH3 will wait for a response from the data logger. If a response is not received in time – i.e. if response timeout occurs – the DASH3 will report this to the user



Failure! Command
Timeout

If a response from the logger was indicating the marker was not added, the reason for marker failure will also be reported to the user.



Failure! Too many
Markers

If a response from the logger was indicating the marker successfully added the “Track marker added” messages will be shown on screen



Track marker
added

9. The DASH3 will then switch back to the normal display mode

6.2 Adding track markers from the DL1/DL2 data logger

To use a DL1/DL2 switch to add markers, connect a switch to the data logger as described in the documentation provided with the data logger itself. When the data logger is in operation, a track marker will be added each time the logger button is pressed.

Please refer the DL1/DL2 documentation for more details:

- DL1 documentation (<http://www.race-technology.com/wiki/index.php/Hardware/DL1>)
- DL2 documentation (<http://www.race-technology.com/wiki/index.php/Hardware/DL2>)

6.3 Adding track markers from the Analysis Software

Adding track markers can be done using the track marker files. To generate a track marker file from raw data, please refer to the section on Adding Track Markers in the Analysis Software documentation or Race Technology On-line Help System.

Lap files must have the following naming conventions.

- The file names **MUST** be in 8.3 format, meaning that it must have no more than 8 characters before the decimal point and 3 characters after the decimal point.
- The file extension **MUST** be .LAP
- Entire file name must be in UPPERCASE letters, including the extension.

If the files are not named in this way the data logger will not recognize them.

The resulting .LAP file should be saved to compact flash card for transfer to the data logger. The .LAP file must be placed in the root directory of the Compact Flash card. It is advisable not to have multiple .LAP files with similar marker locations in this directory to avoid the possibility of the data logger selecting the wrong lap marker file if multiple .LAP files are present.

6.3.1 Using lap marker files with the DASH3

The data logger stores the lap markers in a .LAP file in the root directory of the compact flash card. At the start of a run, the data logger will check its current position against the reference positions in any .LAP files on the memory card. As such, you can have 10 different .LAP files on the card, and so long as they were not started within about 15km of each other, the data logger will pick up the correct one for the current location. For this reason, it is very important that the data logger has a GPS lock at the start of the run; otherwise it will just pick up the first file found. If there are no files on the compact flash card, then it will write to the file

MARKER01.LAP, if MARKER01.LAP already exists, it will go to MARKER02.LAP, and so on.

6.4 Lap and Sector Screens

Lap and Sector screens are two special screens that are used to display the lap and sector specific data during logging. DASH3 switches to the Lap or Sector screen automatically at the end of a lap or a sector respectively. The amount of time that these screens are shown can be changed using the DASH3 menu system. Read the Warning and Lap time display section on page 26 for information on changing warning and lap/sector display times.

Using the DASH3 configuration software users can configure these screens any way they like just as other user configurable screens in the DASH3. Please refer the “DASH3 configuration software user manual” for more details:

<http://www.race-technology.com/wiki/index.php/Configuration/DASH3AndDASH4Configuration>

Following are the lap and sector specific variables. Each of these variables are explained in Lap timing operation section.

- Best Sector time
- Best Lap time
- Predictive Current lap time 1 (predictive lap time, based on actual lap time)
- Predictive Current lap time 2 (predictive lap time, base on theoretical lap time)
- Number of current lap (Lap counter)
- Number of current sector
- Best sector delta
- Best lap delta
- Last lap time
- Last sector time

6.5 Lap and Sector time statistics

Lap timing operation will start automatically when you pass a track marker for the first time with the data logger on, with GPS lock and logging data.

After this, when you complete each sector data logger outputs a time and DASH3 updates the following.

- best sector time

This is the best sector time that has been achieved for the sector that was last completed. This is updated as each sector is completed (as each sector marker is passed).

- Best lap time

This is the best lap time that has been achieved. This is updated each time that lap is completed (as the lap marker is passed).

- Predictive current lap time 1

This is an estimate of the final lap time, and is calculated using the actual times from the sectors that have already been completed and assuming that all the remaining sectors are completed in the same time that it took you during your best lap. This is updated as each sector is completed (as each sector marker is passed).

- Predictive current lap time 2

This is an estimate of the final lap time, and is calculated using the actual times from the sectors that have already been completed and assuming that all the remaining sectors are completed in the best times achieved for each individual sector. This is updated as each sector is completed (as each sector marker is passed).

- Number of the current lap

This is the lap number that you are currently on, this starts at 0 and is incremented by 1 every time the lap marker is passed.

- Number of the current sector

This is reset to 1 when the lap marker is passes and is incremented by 1 every time a track marker is passed.

- Best sector delta

This is the difference between the time that has just been achieved for the sector and the previous best time for that sector. This is updated as each sector is completed (as each sector marker is passed).

- Best lap delta

The best lap delta is the difference between the current lap time, and the lap time from the best lap at the same point. This is updated as each sector is completed (as each sector marker is passed).

- Last Lap time

Last lap time is simply the time for the last lap to be completed. This is updated each time that lap is completed (as the lap marker is passed).

- Last Sector time

Last sector time is the time taken to complete the last sector. This is updated as each sector is completed (as each sector marker is passed).

- Current lap time

This is the time up to the last sector on the lap, also sometimes referred to as a “split time” for the lap. This is updated as each sector is completed (as each sector marker is passed).

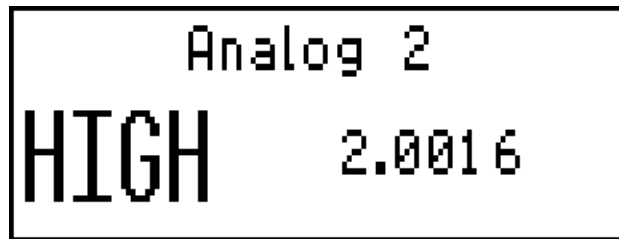
7 Setting up Alarms

If you want to be visually warned when a particular variable goes out of bounds, i.e. above or below a preset limit then you can configure the alarm settings for that variable.

- **Low alarm** – This is an alarm that will be displayed in the form of a message on the DASH3 screen if the value of the variable falls below the level that you have set.
- **High alarm** – This is an alarm that will be displayed in the form of a message on the DASH3 screen if the value of the variable increases over the level that you have set.

Alarms have the highest priority among all other screens and messages. This means if an alarm has to be displayed, it does so immediately and displaying of other messages or screens will be delayed or cancelled until the alarm display time expires. However you can cancel or clear the alarms during a logging session. Read the Cancelling and Clearing alarms section on page 46 for more details on this.

The following is an example of what the alarm screen.



For information on how to set up alarms please refer the “Variable tree” section in DASH3 software user manual:

<http://www.race-technology.com/wiki/index.php/UserInterface/VariableTree>

7.1 Cancelling and Clearing Alarms

- An Alarms is immediately activated when the reading goes below the lower threshold (low alarm value) or exceed the upper threshold value (high alarm value).
- The alarm then displayed for the time that has been set using the DASH3 menu item “4.1 Warning Time” (see page 26).
- All alarms checked after every 30 seconds since they were last displayed. If they are below or above the lower or upper thresholds, then alarm message is displayed again for each variable.

7.1.1 Cancelling Alarm messages

If you press any button on the DASH3 during the time that the alarm is displayed on screen, alarm message will be cancelled giving the message Alarm Cancelled.

After the 30 seconds from the cancellation, DASH3 again check for the alarm conditions for that variable. If the one of the conditions are met alarm will be shown again.

7.1.2 Clearing and disabling alarms until DASH3 restarts

If any button is pressed and held for more than one second (long button press) then the alarm will be cleared and not shown again unless it goes through an upper or lower threshold. Just staying above or below a threshold will not cause it to be displayed again.

If an alarm is cleared with a long button press twice in succession during a session, then it will be de-activated until the DASH3 restarts. A message Alarm disabled will be shown. Note that this disables the alarm that has displayed and has no effect on other alarms.

If there are multiple alarms and wanted to cancel them all, you have to cycle over them to make sure all are displayed.

8 Reviewing maximum and minimum data values

The DASH3 can display maximum and minimum values for each of its variables. These values can be reviewed by setting one of the buttons to the **Show max/min** function.

1. Set up one of the buttons on your DASH3 to **Show Min/Max** function as described in the “Editing button functions” section on page 22.
2. Using the configuration software, place numeric display controls on the Min/Max screen and associate them with variables that you want to view the maximum and minimum values.
3. Send the configuration to the device.
4. Press the **Show Max/Min** button on the DASH3 while data is being logged.

When this button is pressed for the first time, it will display the Min/Max screen and shows the maximum values the variables have had so far. The duration where this screen displayed can be changed by navigating to the “4.1 Warning Time” menu.

If the Show Max/Min button is pressed again while maximum values are being displayed the screen will change to show the minimum values.

A third press of the button will clear all Max/Min values and return to the normal display mode.

9 Configuring the DASH3 Unit

The DASH3 configuration software can be used to control the behaviour and operation of the DASH3 provided that only the relevant data is visible and presented in the most helpful format. Following is a list of things that you can do with the configuration tool.

- Which variables are displayed (this includes adding, arranging and formatting controls to the DASH3 screens)
- The names of the variables
- The units displayed
- The scaling of the variables
- The number of decimal places displayed
- Whether the variable is displayed as a value, Graph or a bar graph
- The lower and upper warning levels for the variables (setting up alarms)
- Setting up Gear indicators
- Setting up the shift light indicators

For a detailed discussion of configuration tool read “DASH3 configuration software” manual:

<http://www.race-technology.com/wiki/index.php/Configuration/DASH3AndDASH4Configuration>

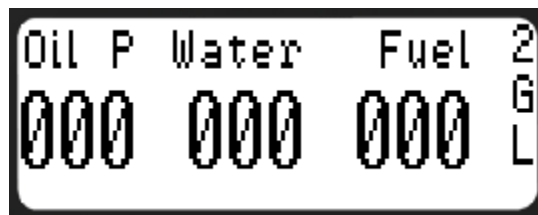
9.1 DASH3 standard configuration

The DASH3 is highly configurable and can be set up to display almost any combination of information on multiple screens using the PC software provided. However, the DASH3 is supplied with what we would consider to be a very typical configuration and in many applications this setup maybe used without modification. On the four data screens we have:

1. On screen 1 a large display of speed and gear, this is the information that is most typically requested for display during a race.



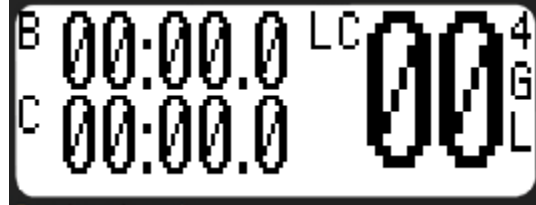
2. On screen 2 we are displaying critical vehicle data, **Oil pressure**, **Water temperature** and **Fuel level**. Note that this is set up assuming that oil pressure is on analogue input 1 of the DL1, water temperature is on analogue input 3 of the DL1 and fuel level is on analogue input 4 of the DL1. Oil pressure and water are assumed to be standard Race Technology sensors, however fuel level is left to be calibrated by the user.



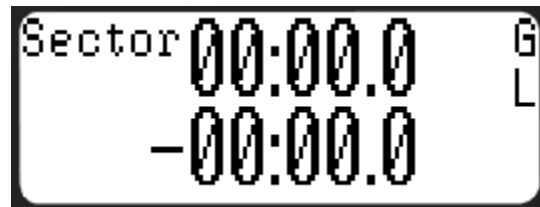
3. Screen 3 is set up to show both the absolute level of longitudinal (acceleration/braking) acceleration, and lateral (cornering) acceleration as both a fixed scale bar graph (0 to 1.4g) and a simple text display. This screen is typically used for driver instruction.



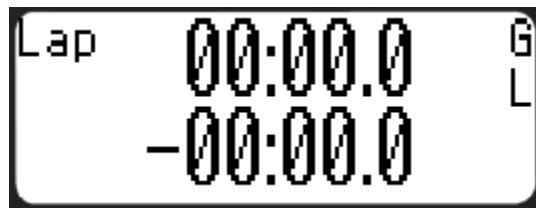
4. Screen 4 is set up with lap timing information, at the top left we have a display of the **best lap time** that has been achieved, at the bottom left we have the **predictive lap time for the current lap** and on the right of the screen a **lap counter**.



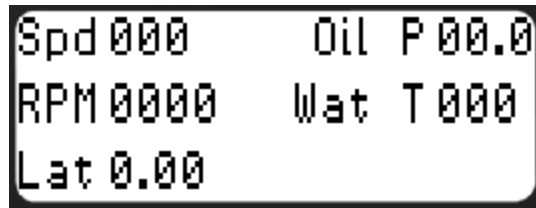
Note that on each of the 4 data screens there is additional information setup on the far right of the screen. From the top we have a display of the **screen number** that is currently displayed, below that we have “G” displayed when the DL1 has a GPS lock and below that we have an “L” displayed when the DL1 is logging. The **sector screen** that is displayed at the end of each sector is set up to display the sector time that has just been achieved and below this a how much faster or slower this was compared with the best time for that sector.



The **lap screen** that is displayed at the end of every lap, is very similar to the sector screen – it displays the time for the last lap and how much faster or slower this was compared with the best lap.



Finally on the **minimum and maximum displays** shows some of the parameters that it might be useful to check after a race, or track session. These are Speed, RPM, Lateral acceleration, Oil pressure and Water temperature.



```
Spd 000    Oil P 00.0
RPM 0000   Wat T 000
Lat 0.00
```

9.2 Creating a custom configuration

The DASH3 is supplied with a default configuration suitable for many typical applications. This will allow display of all the basic features after connection to the data logger. If you want to make the custom configuration changes read the “DASH3 configuration software manual” for more details.

<http://www.race-technology.com/wiki/index.php/Configuration/DASH3AndDASH4Configuration>

9.3 Changing the existing configuration

If you want to change the existing configuration and you already have the current configuration information saved into a DH3 file, simply load it using the **File -> Load Layout** command of the configuration software.

If existing configuration is not present as a DH3 file, then use **File -> Read Configuration from Device** command to read the configuration from the DASH3. After the reading, make changes to the configuration and remember to save it for one of the following two formats.

DH3 format:

If you need to load and change the configuration later you must save the configuration into this format.(Use **File -> Save Layout** command. There are no restrictions on the file name.)

HEX format:

When updating the DASH3 configuration using the Data logger, saving to this format is required. Files in HEX format cannot be loaded into the Configuration software for further changes.

9.4 Sending Configuration to the DASH3

Once all the Configuration information has been entered into the configuration software then those information has to be transferred to the DASH3 unit. This can be done in one of 2 ways:

9.4.1 Using the Data logger:

If the DASH3 is connected to the data logger then:

1. Click on the **File -> Save configuration file** menu item to save the configuration settings to a disk file. File name must be "DASH.HEX" (All capital letters including the file extension)
2. Copy the file to the root directory of an empty, formatted, compact flash card
3. Turn on the display and the logger
4. Insert the compact flash card with the "DASH.HEX" file in to the data logger.
5. Once the card is inserted then the information will be automatically read and transferred and the display configured. While transferring DASH3's backlight will be turned off and gives a message *Programming....*

When configuration is successful the device will display the message **Configuration Success** on screen. When process is completed, backlight will be turned on again and it comes to normal display mode.

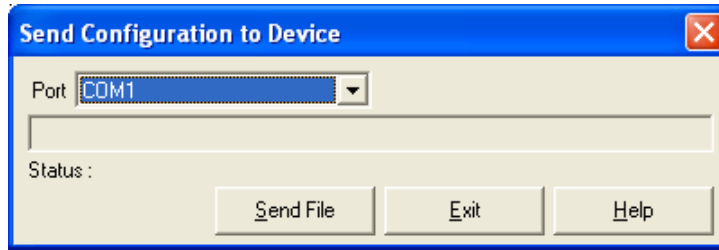
Note that the display will remember its configuration - there is no need to repeat the operation every time the display is used. This is only necessary when making changes to the configuration settings.

9.4.2 By connecting DASH3 to a PC

Note: You will require a special connector to connect the DASH3 to the PC (not shipped with the DASH3). For more information please contact Race Technology.

Connect the DASH3 unit to a COM port on your computer. Make sure to switch off the device whilst connecting. Connection is made using the adapter supplied by the Race Technology on request. (if you haven't got the adapter, please contact Race Technology sales.)

1. Turn on the display and check whether it is operating
2. When you are ready, click on the **File ->Send Configuration to Device** menu item or toolbar button with the similar functionality. Send Configuration to Device dialog box will be opened.



3. Select the correct serial port number and press the Send File button.

When configuration has started DASH3's backlight will be turned off and DASH3 display a message **Programming...**

When configuration is successful the device will display the message Configuration Success on screen. When it finishes the backlight will be turned on again, and device comes to its normal display mode.

10 Re-flashing the DASH3

PLEASE DO NOT ATTEMPT TO REFLASH YOUR DASH3 UNLESS YOU ARE ABSOLUTELY CONFIDENT IN THE REQUIRED PROCEDURE AND HAVE READ THE REFLASHING INSTRUCTIONS IN FULL.

Re-flashing is the process of updating the DASH3 firmware (program that is responsible for controlling the operation of the DASH3).

Firmware can be re-flashed to take advantage of any software changes or new features introduced. New firmware upgrades will be introduced from time to time as new features are implemented. Firmware files will be available for download and installation from the Race Technology website.

Please note that it is not routinely necessary to re-flash products from Race Technology, it should only be carried out for one of the following reasons:

- There has been a new release of the firmware containing new features you wish to make use of.
- When you try to connect the data logger to the software you get a message saying that your firmware is out of date.
- There is a problem with the data logger and after contacting the factory, you've been asked to reflash the logger.

Both Configuration and Re-flashing can be done either through a connection to a Race Technology data logger or through serial connection to a PC (i.e. using the configuration software).

10.1 Using the Data logger

In this case, either a DL1 or DL2 can be used as the reflashing tool.

1. Insert a compact flash card into the flash card reader attached to your computer and format it into **FAT16** file format.
2. Copy the required firmware upgrade file to the card. For the DASH3, the firmware file will be called DASH.HEX. it should be the only file present on the flash card. The presence of other files can confuse the logger and lead to unpredictable results.
3. Connect the DASH3 to the data logger as normal. Then turn on the data logger.
4. Wait until data communications between the logger and DASH3 has been established. This will be evident by the message *Start Logging...* being displayed on the DASH3 display.
5. Insert the compact flash card into the logger.
6. Reflashing will be automatically started. While the DASH3 is being reflashed, it will turn off the backlight and displays the message *Programming....* Do not turn off the data logger while the reflashing procedure is underway.
7. When reflash completes successfully, backlight will be turned on again and it gives the message Reflash success. Once finished the firmware upgrade, file should be removed from the CF card.

Note: Do not leave dash.hex on the CF card, otherwise it slows down startup time and increases the risk of a unit failure.

8. If for any reason reflash fails, DASH3 displays the following message

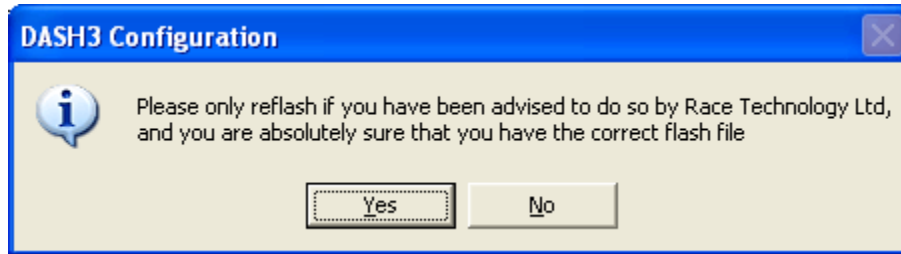
*Invalid Main App
Please Restart*

Turn off the data logger and turn it again and start the reflashing procedure from the beginning.

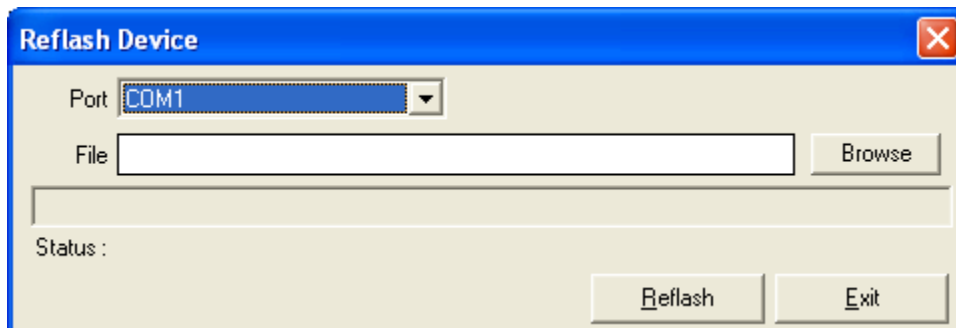
10.2 Using the Configuration Software

Note: You will require a special connector to connect the DASH3 to the PC (not shipped with the DASH3). For more information please contact Race Technology.

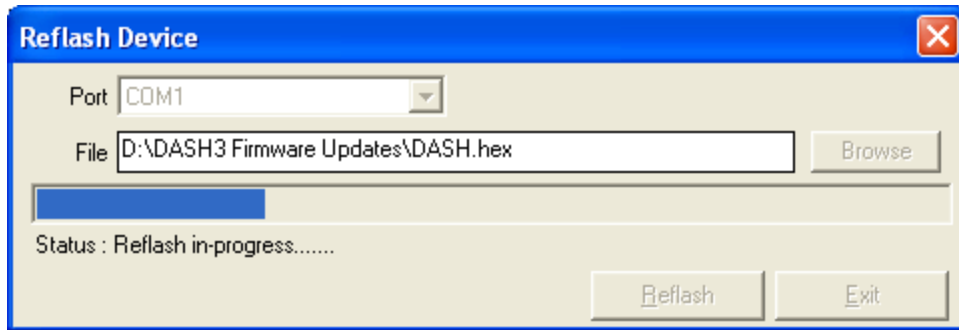
1. Start the DASH3 configuration programme and click on the **File -> Reflash Device** option from the menu. It will bring up the following message.



2. If you are sure you need to re-flash the DASH3, click on Yes. The following dialogue box will appear:



3. Select which serial port the data logger is connected to.
4. Click on the browse button to select the firmware file that should be used to re-flash the DASH3. It is essential that you select the correct firmware file, if you do not, then the reflash will fail.
5. Once you click the Reflash button, the program will attempt to re-flash the DASH3. The procedure may take a couple of minutes, the progress of the reflashing will be shown in the status field of the dialogue box:



6. During reflashing DASH3's turns off the backlight and displays the message *Programming...*
7. When reflashing completes successfully, DASH3 turns on the backlight and following message appears is given by the software:



If for any reason reflash fails, DASH3 displays the following message.

*Invalid Main App
Please Restart*

Restart the DASH3 and start the reflashing procedure from the beginning.

11 FAQs

1. What type of LCD display does the DASH3 use?

The DASH3 uses a “transflective” monochrome graphics LCD. “Transflective” means that any light that hits the display is reflected from its’ back. This means it can be read in bright sunshine. We use a graphics type, so that we can display a range of font sizes, as well as graphs, bar charts and bitmaps.

2. Can I use the DASH3 at night?

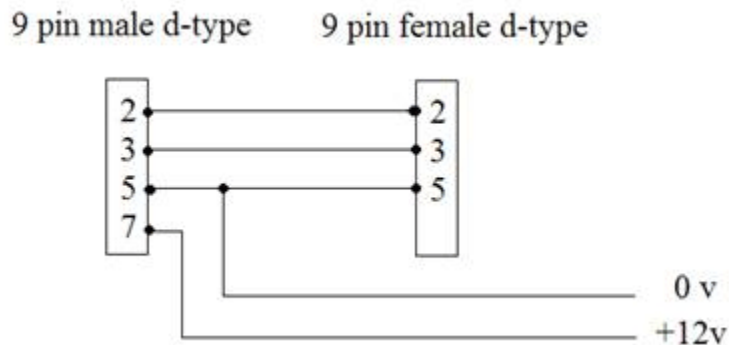
Yes. The DASH3 is backlit and the LEDs are dimmable so they are not too bright for night time use.

3. Can the DASH3 be used as a standalone display?

The DASH3 accepts data either from one of our data loggers, or from an ECU interface. It cannot be used as an entirely standalone display in the way that the DASH2 can.

4. How do I connect the DASH3 to a PC?

For direct connection to a PC you need to be able to give it a separate power supply by making up an adapter as shown here:



And then you can use a null modem cable for connection to a PC. Note that if required this cable can be purchased from Race Technology as a special order item.

5. Can I use the DASH3 with my optical beacon?

No. The DASH3 is designed for use with the GPS system that is built into our data logging products.

6. Is the DASH3 waterproof?

Yes. The DASH3 is a fully sealed unit.

7. What are predictive lap times?

Predictive lap times are estimates of your lap time that are calculated before you finish the lap.... i.e. they will give an estimate of what your lap time will be if you complete the lap that you are currently driving?

8. Can the DASH3 display predictive lap times?

Yes. The DASH3 can calculate and display lap and sector times in a number of common formats.

9. How do I tell if it is a DASH3 or DASH3 lite?

To find out whether you have a **DASH3lite** or **DASH3 Standard version**, follow the steps below.

1. Enter menu display mode by pressing the MENU button.
2. Use the UP/DOWN buttons and navigate to menu item **5 Firmware Control** in the main menu. Press SELECT button to enter into Firmware Control sub-menu.
3. Then use the UP/DOWN buttons to navigate to menu item **5.4 Upgrade DASH3lite**. If the menu item exists then you have a DASH3lite. If the menu item is not in the sub-menu then you have a Standard DASH3.