USER MANUAL

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1 DigiDash Introduction

The DigiDash is easy to use and install. Most people will get the hang of the unit in a few minutes. This manual is provided as guide and reference.

Before cutting any holes or wires, please read through this manual.

The DigiDash has multi-purpose displays to show a variety of vehicle parameters.

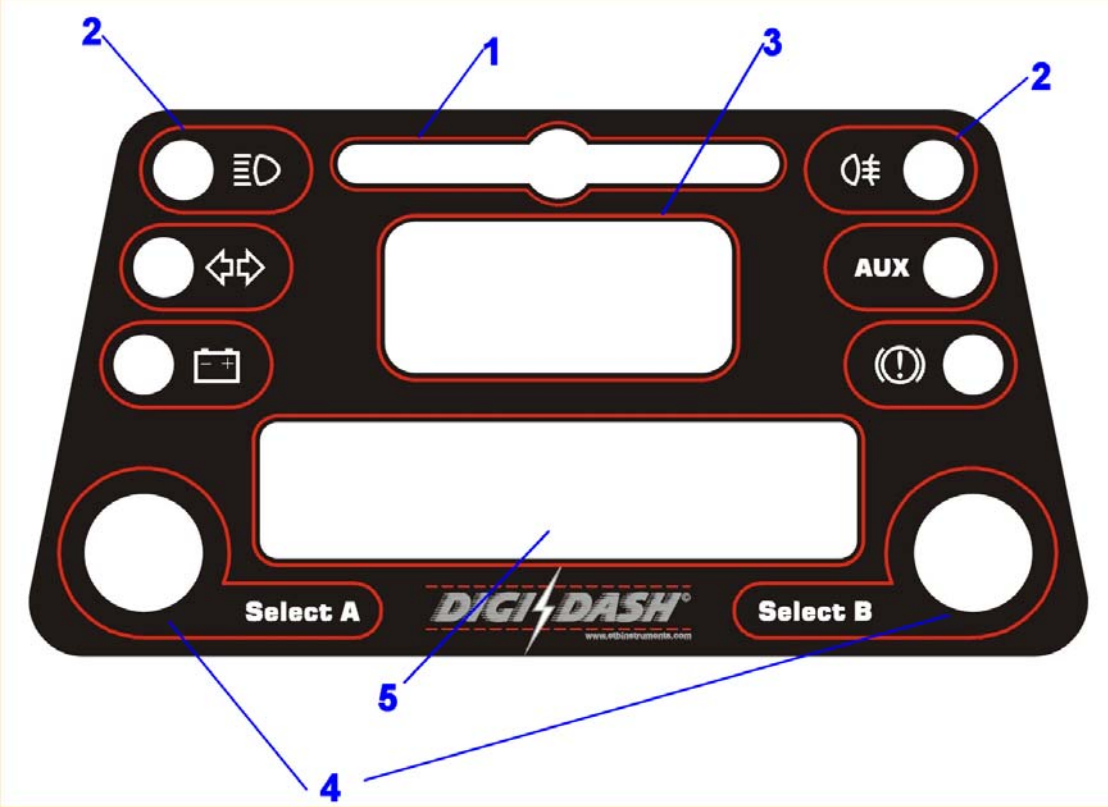
The displays include:

- Engine Revs (RPM);
- Sequential gear shift-up lights;
- Speed (MPH or KMH);
- Gear;
- Water Temperature in °C;
- Oil Pressure in PSI;
- Oil Temperature in °C;
- Fuel Level;
- Battery Voltage;
- Lap Times;
- Acceleration/Deceleration Time;
- Trip Time and Distance Display;
- Max Holds on all Key Parameters;
- Odometer;
- Alarms for Oil Pressure, Oil Temperature, Water Temperature and Fuel Level.

The DigiDash also integrates all of the basic warning lights found in race and kitcars:

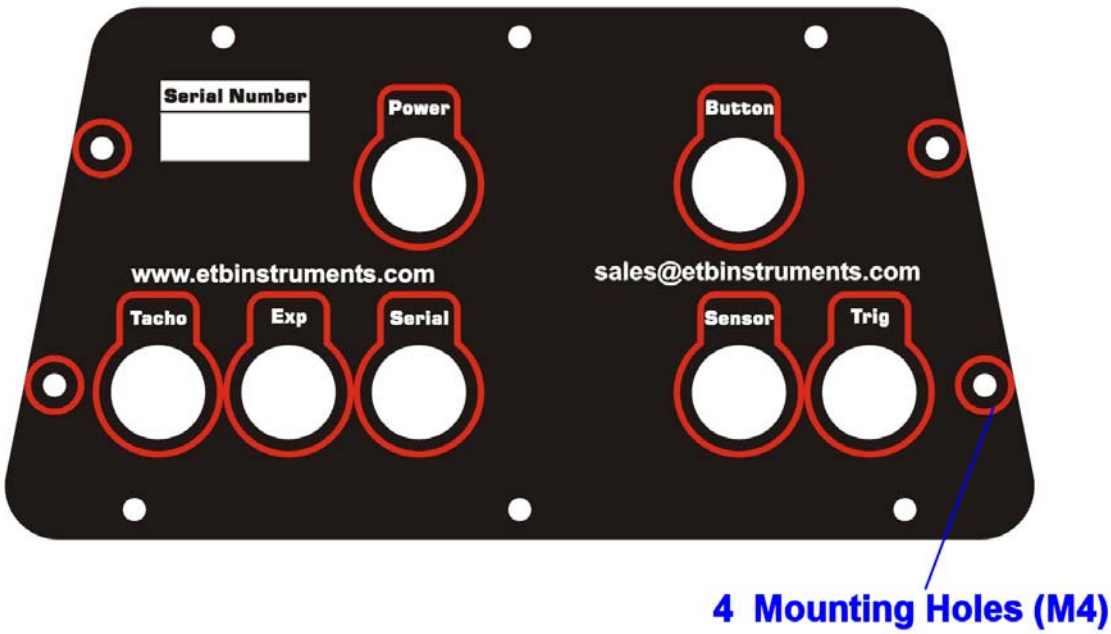
- Main Beam;
- Fog Lights;
- Direction Indicator;
- Ignition/Low Battery;
- Brake Warning;
- Auxiliary – usually used for data logging on/off but is software configurable.

1.1 Front View



1. Sequential gear shift up lights – can be used in two different modes
2. Dashboard warning lamps – Aux displays the status of the data-logger
3. Large 3 digit 7 segment (Red) LED display for Speed, Gear, RPM or warnings
4. Simple 2 button controls
5. Large backlit (Green) LCD display for sensor readouts, menus and warnings

1.2 Rear View



See Appendix 1 for the full details of the wiring.

1.3 Packaging Checklist

Standard Items:

	Qty
DigiDash Unit	**1**
Speed Sensor on flying lead	**1**
Water Temperature Sender	**1**
Oil Temperature Sender	**1**
Oil Pressure Sensor	**1**
Fuel Level Sender	**1**
Magnets for prop shaft	**2**
Wiring Looms (different connectors for each)	**6**
Floppy Disk *(Includes software for data analysis, set-up & speedometer set-up calculator)*	**1**
2.5mm AF Hex Key	**1**
Manual (this)	**1**

2 DigiDash Installation

2.1 Wiring the DigiDash

The DigiDash has 7 multi-pin sockets on the rear of the unit. All connections to sensors, power and communications are made via these sockets.

To ensure easy wiring each of the sockets have a different number of pins, ranging from two pins up to eight pins. For every socket there is a matching plug with leads attached. Some of the leads are bare ended wires, and some have the DigiDash sensors.

These leads must be joined into the existing wiring of the vehicle. The joints can be made in several ways, including ScotchLocks and soldering. Simply twisting the wires and covering with tape is NOT a good method of wiring the DigiDash and will result in unreliable joints. A well-soldered and insulated joint or crimp connectors are the best means of wiring the vehicle.

There are numerous help sites available on the Internet. Below are a couple of sites:

www.users.globalnet.co.uk/~bunce/solderit.htm

www.bath.ac.uk/~ns8rl/solder.html

See Appendix 1 for the full details of the wiring.

2.2 Ignition Systems / Tachometer Wiring

The DigiDash RPM monitor is designed to connect directly into a variety of different ignition systems. There are a huge variety of systems used in vehicles. The feed for the RPM tacho wire (red wire) should come from a Low Voltage Connection (e.g. the negative (-ve) side of the ignition coil).

On many vehicles this will most likely be from the IGNITION COILS LT connection. On engines that feature modern ECU's (also called CDI's with bike engines) there may be a dedicated TACHO output. This is usually routed to the car's rev-counter and is the ideal position to which to connect the tacho wire.

If you experience interference problems that are related to RPM, connect the black shield wire to the vehicle's chassis ground.

WARNING

Under no circumstances should the tacho feed be taken from a High-Tension circuit (from the HT side of a coil, or a spark-plug). This will DAMAGE the unit and will invalidate the product's guarantee.

2.3 Mounting the DigiDash

Before cutting any holes in the dashboard, make sure that the location of the DigiDash is easily visible from the driver's final position. Also ensure that there is sufficient clearance behind the unit for the connectors and loom.

Note : The DigiDash should be directed towards the driver. If the dash is mounted at too steep an angle the shift lights will not be easily visible.

The DigiDash has been designed to mount either on top of a flat dash panel or sunk into a flat dash panel. Templates for easy viewing and panel mounting are supplied in Appendix 2.

If you prefer to mount the DigiDash flush into the dash this can be done providing you are prepared to make some 'S' shaped brackets.

SVA Requirements for DigiDash mounting:
Please note that if you are building a new vehicle that must pass SVA, the unit must be positioned behind the steering wheel. If this is not possible the next and most preferable method is to mount the unit flush into the dash panel. If the unit is mounted on top of the dash panel and outside the exempt radius test area (this area is a circle determined by the radius of the steering wheel plus 127mm) it is likely to fail the Minimum Radius Test. However, this can still be bypassed by affixing some edging strip around the dash front.

2.4 Sensor Installation

2.4.1 Speed sensor

The DigiDash is supplied with a solid state speed sensor and this must be used to provide the speed signal for the DigiDash. The sensor consists of a hall-effect magnetic pickup housed in an M12 Nylon threaded rod.

Two magnets are provided for attachment to either a propshaft or a wheel hub. The magnets should be fixed in position using Epoxy Resin Adhesive, sometimes known under the trade-name of 'Araldite'. If you have the choice it is recommended to install the speed sensor on the propshaft as accuracy will be improved.

The speed sensor should be fixed firmly to the vehicle's chassis on a metal bracket. Using the threaded body and nuts supplied, the sensor should be adjusted until the gap between the sensor and magnets is approximately 1mm. The magnets have small 'dots' on one face. These denote the magnets North and South poles. The magnet MUST be mounted with the dot facing down. For further help in setting up the speed sensor and magnets, please refer to Appendix 1 (Sections 5.7.5 & 5.7.6).

To check that DigiDash speed sensor and magnets are providing a good signal you can use the Test Mode described in Section 3.3**.**

2.4.2 Oil & Water Temperature Sensors

Oil and water temperature senders are supplied as standard. To ensure accuracy in the display it is essential that these senders are used with the DigiDash. Use of other senders is not permitted and will result in inaccurate readings.

Note : The DigiDash is calibrated to provide accurate readings over the range 40ºC to 140ºC only. If the sensor is not connected properly or the external temperature is below the lower calibrated range (40ºC), then the display will show NC (Not Calibrated or No Connection).

Most engines have the water temperature sender located either in the radiator, or in the cylinder head. To maintain accuracy please use this sensor in the standard location for your engine.

Oil / Water Temperature Sender 1/8" NPTF Thread	ETB Part# 470010

Thread adapters are available separately from ETB to suit the many engine variants.

2.4.3 Oil Pressure Sensor

An oil pressure sensor is included with the DigiDash and measures oil pressure to a maximum of 140 PSI. The DigiDash is designed to work correctly with this sensor only. To ensure accuracy in the display it is essential that this sender is used with the DigiDash. Use of other senders is not permitted and will result in inaccurate readings.

Note : For motorcycle engined cars, it is essential to remote mount the oil pressure sensor rather than directly onto the engine block. This is to prevent premature failure of the sensor caused by the high frequency vibration generated by high-revving motorcycle engines. A remote mount kit is available separately from ETB – please telephone +44 (0)1702 711127 for details.

!! Important - ETB Instruments will not replace faulty oil pressure sensors under warranty unless it can be proved that the sensor was correctly remote-mounted!!

Oil pressure Sender (with low pressure switch built in) 1/8" NPTF Thread	ETB Part# 38007025053

The body of the sensor must be earthed for the sensor to function correctly. If the sensor is not connected properly the DigiDash will display ‘NC’.

2.4.4 Fuel Level Sensor

The DigiDash is designed to work correctly with the supplied sensor only. To ensure accuracy in the display it is essential that this sender is used with the DigiDash. Use of other senders is not permitted and will result in inaccurate readings.

This sensor requires calibration by bending the arm of the sender to suit your fuel tank. Additional instructions are provided with the ETB sensor.

Fuel Sender	ETB Part#
Top Mount (6 hole Smiths type)	45003

If the sensor is not connected properly the DigiDash will display 'NC'.

2.4.5 Lap Timer Receiver (optional extra)

The Lap timer module uses an infra-red sensor similar to that used in television sets. This is designed to be used with any common track beacon, or the optional infra-red beacon from ETB.

The lap timer receiver module is housed in a small plastic box, which has a cut-out with the sensor clearly visible. This sensor should be firmly fixed to the side of the vehicle that is exposed to the trackside beacon.

The range of the sensor is around 20 metres so should be sufficient for most tracks.

Problems with the lap timer can be diagnosed using the DigiDash Test-Mode (Section 3.3), and your TV remote control.

Please see the drawing in Appendix 2 for mounting details.

Note: If there are no beacons available or working then you can use the lap timer in manual track day mode. Disconnect your lap trigger module and select 0 for the lap enable time. This will then convert button 4 to be a manual trigger rather than the lap reset button.

For details on wiring please see the wiring section at the end of the document.

3 Configuring DigiDash

The DigiDash has 3 modes used for configuring the DigiDash unit.

1. SETUP MODE - This mode allows the user to define all essential parameters when setting up the DigiDash to match the vehicle's specifications. It also allows the user to turn on or off certain functions, or to set the required DigiDash display brightness level.

(NOTE- If you have a Windows based personal computer, you can use the software supplied to directly change all the parameters that can be normally accessed via SETUP MODE. To do this, please refer to the section headed "PC Software" on page 20 under Section 5.)

2. DATA TRANSFER MODE - When connected to a PC this allows the user to download data from DigiDash memory or upload setup parameters using the software supplied.

3. TEST MODE - This mode is used for checking that the Speed Sensor and the Lap Timer Receiver Module (*not supplied*) are functioning correctly after installation on the vehicle.

All of these modes are accessed by holding down certain buttons, whilst powering the unit on.

To enter **SETUP MODE:**

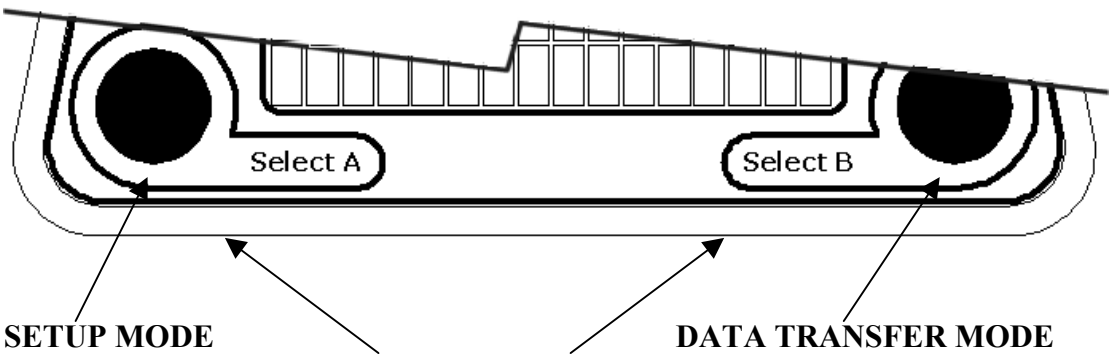
- Ensure DigiDash is turned off;
- Hold down the LEFT dash button (Marked SELECT A);
- Turn the DigiDash on while keeping the button held down.

To enter **DATA TRANSFER MODE:**

- Ensure DigiDash is turned off;
- Hold down the RIGHT dash button (Marked SELECT B);
- Turn the Dash on while keeping the button held down.

To enter **TEST MODE:**

- Ensure DigiDash is turned off
- Hold down BOTH dash buttons at the same time
- Turn DigiDash on while keeping both buttons held down



3.1 Setup Mode

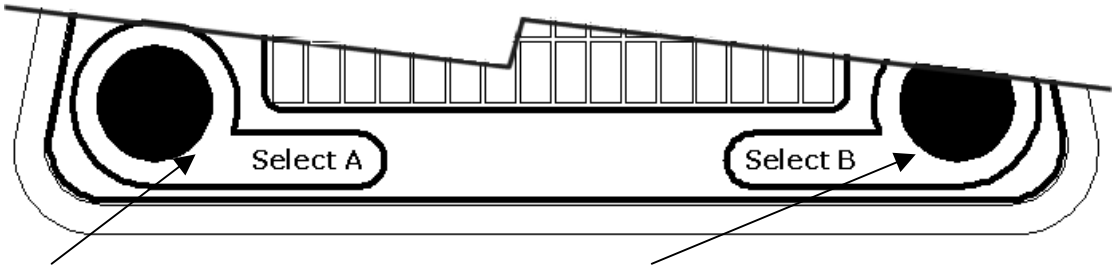
After selecting SETUP MODE you will see the first of the menu options on the main LCD display that the can be adjusted (*MPH OR KMH*). You can either *EDIT* the displayed menu option by pressing SELECT A, or continue to the *NEXT* menu option by pressing SELECT B.

The are 31 menu options as shown below.

MPH OR KMH EDIT NEXT	BRIGHTNESS EDIT NEXT	LAP ENABLE TIME EDIT NEXT
ACCEL TEST START EDIT NEXT	ACCEL TEST STOP EDIT NEXT	LAP TIMER ? EDIT NEXT
ACCEL TIMER ? EDIT NEXT	MAX HOLDS ? EDIT NEXT	TRIP TIME/DIST ? EDIT NEXT
WATER TEMP ALARM EDIT NEXT	OIL TEMP ALARM EDIT NEXT	OIL PSI ALARM EDIT NEXT
RPM/OIL ALARM EDIT NEXT	FUEL LEVEL ALARM EDIT NEXT	SPLIT 1 DIST (M) EDIT NEXT
SPLIT 2 DIST (M) EDIT NEXT	SPLIT 3 DIST (M) EDIT NEXT	SHIFT LIGHT MODE EDIT NEXT
SHIFT LIGHT RPM EDIT NEXT	SHIFTLIGHT DELTA EDIT NEXT	PULSES/CYCLE EDIT NEXT
SPEEDO CAL EDIT NEXT	GEAR CAL EDIT NEXT	PRIMARY RATIO EDIT NEXT
NUM GEARS EDIT NEXT	GEAR 1 EDIT NEXT	GEAR 2 EDIT NEXT
GEAR 3 EDIT NEXT	GEAR 4 EDIT NEXT	GEAR 5 EDIT NEXT
GEAR 6 EDIT NEXT		

If you choose to *EDIT* a menu option, two alternative choices can be made:

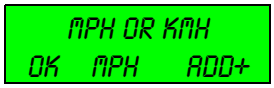
1. Accept the value displayed, and return to the Options Menu. This is done by pressing SELECT A.
2. Change the value of your chosen parameter. This is done by pressing SELECT B. To increase the value in larger increments, just hold down SELECT B.



SELECT-A accepts the value and returns to the menu selections

SELECT-B increases the value. Hold down the button to increase the value in larger step sizes.

3.1.1 MPH or KMH

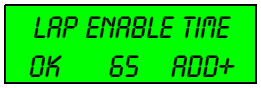


Configures the DigiDash for either Miles per hour, or Kilometres per hour.

3.1.2 Brightness

This value sets the display brightness for the large 7-segment displays AND the shift lights. The range is from 0 (very faint) to 7 (very bright). The default is 4 (medium brightness).

3.1.3 Lap Enable Time

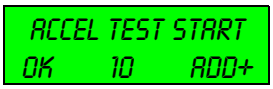


The Lap Receiver Sensor available separately from ETB for your DigiDash is designed to use any form of trackside infra-red beacon. These are present at all tracks. For accurate results, it is important that you pick up a signal from only one beacon at a time. To do this, the DigiDash must be set to reject other beacons. This is done by setting the Lap Enable Time which is the time (in seconds) that the DigiDash will wait before it starts to look for beacons again.

For example: If you are lapping in around 1min 30secs set the Lap Enable Time to 75 (1min 15secs). In other words, after DigiDash registers a beacon, it will wait 1min 15secs before looking for a beacon again.

Note : If there are no beacons available or working then you can use the Lap Timer in Track Day Mode. Disconnect your lap trigger module and select 0 for the lap enable time. This will then convert external Button 4 to be a manual trigger rather than the lap reset button.

3.1.4 Acceleration/Deceleration Test Start/Stop



These two options allow the setup of the acceleration timer start and stop speeds.
Acceleration Timer: If the start speed is lower than the stop speed an acceleration run is timed.
Deceleration Timer: Conversely, a higher start speed than stop speed implies a deceleration (braking) run.

3.1.5 Lap Timer?

This allows the lap timer system display to be turned off for road driving.

3.1.6 Acceleration Timer?

For track driving this allows the acceleration system display to be turned off.

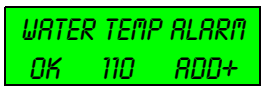
3.1.7 Max Holds?

This allows the display of the max hold data to be turned on or off.

3.1.8 Trip Time/Distance ?

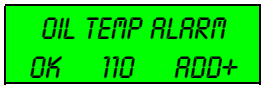
This allows the trip time and distance display to be turned on or off. Turning it off while on a racetrack will give a faster menu system.

3.1.9 Water Temperature Alarm



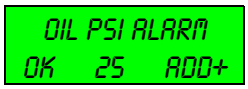
This allows the user to program a warning alarm point for the Water Temperature in °C steps.
To turn off the alarm (not recommended) set the value to 0.

3.1.10 Oil Temperature Alarm



This allows the user to program a warning alarm point for the Oil Temperature in °C steps.
To turn off the alarm (not recommended) set the value to 0.

3.1.11 Oil Pressure Alarm



This allows the user to program a warning alarm point for the oil pressure.
To turn off the alarm (not recommended) set the value to 0.

NOTE – The ETB oil pressure sensor supplied with the DigiDash has a mechanical low-pressure switch built-in should a separate dashboard warning light be required. This is calibrated to operate when oil pressure falls below 7.5 psi.

3.1.12 RPM/Oil Alarm

This allows the user to set a minimum RPM value below which the oil pressure alarm (as set in the previous menu option) will NOT operate. This is especially useful should you wish to set the oil pressure to a value lower than normally experienced when a hot engine is idling and not have the alarm displayed unless the engine RPM is above a certain limit.

To turn off the RPM/Oil disable feature set the value to 0.

3.1.13 Fuel Level Alarm

This allows an automatic warning of low fuel level, measured as a percentage (%) of a full tank. To disable the alarm, set to 0.

3.1.14 Split Distances, 1-3

When the lap timer is enabled and is being used, these allow the user to program split distances around a lap. These then allow sector timing to give the driver a quick indication if the current sector is faster or slower than it was on the previous lap. The easiest way to set the distances is to divide the total lap distance by 4 and use each quarter distance as the split distance.

For Example: For a track with a lap distance of 2.0 Km, set the split distances to be 500m, 1000m, 1500m. You can set these to any distance value you prefer as long as the distance is less than the track length.

3.1.15 Shift Light Mode

The sequential shift lights can be programmed to come on in two different styles.

Style	LED Pattern displayed
0	Shift Lights OFF
1	Fully sequential
2	LED's change 3 blocks at a time

3.1.16 Shift Light RPM

This allows the user to program the final shift light LED RPM trigger point. The shift RPM is set in 100 RPM steps.

3.1.17 Shift Light Delta

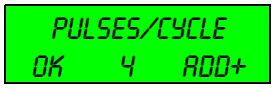
This allows the user to set the RPM change required to light the next LED. The shift delta RPM is set in 100 RPM steps.

Note that this RPM setting works for each LED or set of LED's and is dependent on the shift light mode chosen.

For Example: If the user sets Shift Light Mode = 1 (fully sequential), with a final Shift Light RPM of 10,000 RPM, each of the lower shift lights will illuminate at the RPM increment below this. If this is programmed to, for example, 500 RPM, the shift lights would illuminate at:

First LED			7000 RPM
Next LED			7500 RPM
Next LED			8000 RPM
Next LED			8500 RPM
Next LED			9000 RPM
Next LED			9500 RPM
Shift Light RPM Set Value	-	Final LED	10000 RPM

3.1.18 Pulses per Cycle



The DigiDash will run with various different ignition systems. This menu option allows the user to tailor the system to their engine. On older engines with standard ignition systems, the number of pulses per cycle is usually half of the number of engine cylinders. For example, a 4-cylinder, 4-stroke engine fires twice for every revolution of the crankshaft, and therefore the pulses per cycle parameter would be set to 2. The unit can be set to 1,2 or 4 pulses per cycle.

Note : Often the easiest way to set this parameter is to run the engine at an idle and read the RPM display. Most engines idle around 1000RPM when cold. If the reading says 500RPM then change the pulses-per-cycle to <u>half</u> of its current setting.

3.1.19 Speedo Calibration & Gear Calibration

These are key numbers for the system and define the calibration of the speedometer, odometer and gear display. Note that for legal reasons the MPH displayed on the DigiDash reads 3% high at all speeds. If you have problems with the calculations we will be on hand to help.

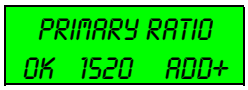
Before the DigiDash can be used the user must calculate and input the Pulses per mile and prop ratio figures. To do this a computer program is supplied on the floppy disk supplied. If you do not have access to a computer or need advice on the best place to measure the vehicle's speed please contact ETB Instruments for help.

Information you need to calibrate the unit:

- Wheel & tyre size
- Differential Gear ratio (when the speed sensor is fitted to propshaft)
- Details of the cars transmission system (RWD, FWD etc)

<u>Note - You MUST use the TWO magnets supplied with the kit.</u>

3.1.20 Primary (gear) Ratio



This is the primary reduction gear ratio of the vehicles engine. For car engines this should be set to 1000 (1:1). For Bike engines the ratio is generally around 1.5:1 – which is entered as 1500 here. Check your service manual to get the correct ratio values for your particular engine.

3.1.21 Number of Gears

Allows the number of gears in the vehicle to be entered. The valid range is between 4 and 6.

3.1.22 Gear Ratios 1-6

This allows the entry of the vehicles gear ratios.
It is shown as a 4-digit number. The first digit represents the integer, whilst the others represent the three decimal places.
E.G: for a ratio of 2.769 : 1 you enter 2769

3.2 Data Transfer Mode

The Data transfer mode allows the user to download the logged data to a PC computer via the built-in RS232 serial port.

To use the data logger you must run the supplied data logging software on a PC running Microsoft Windows (95, 98, ME, 2000, NT, XP).

Note that you do not have to do anything on the DigiDash itself. Simply use the PC software – this is the controller for the data download.

You can manually clear the logging memory if you have filled the memory and you want to record another session by pressing Select A, this will clear the memory and you will lose the data currently stored in the DigiDash memory. You can also do this from the PC software.

This program allows the capture and display of the data from the DigiDash on a PC. For further information see the "PC software" section later in the manual.

3.3 Test Mode

The test mode is provided to give a quick and easy check on whether the propshaft speed sensor, and lap timer receiver are working correctly.

You can turn the propshaft by hand and see the prop count increase.

Similarly, the lap timer receiver module (available separately) can be checked by using any standard TV remote control handset. Simply point this at the installed lap timer module and you should see the lap count increase.

If one of the interfaces will not count up check the installation of the sensors and the wiring to them. Note that the speed sensor on the propshaft should be around 1mm from the magnets on the propshaft.

4 Operating DigiDash

There are two main display areas on the DigiDash. These can be cycled through various displays using the Select A or B buttons during normal use.

The DigiDash is also provided with a link harness (connected to the "Button" socket on the rear side of DigiDash) that allows the user to remote-mount 4 control buttons (for example on a steering wheel). Two of the external buttons function as extensions for the Select A or Select B control buttons, whilst buttons 3 & 4 enable the user to access extra DigiDash features as highlighted below.

(Note : A Steering-Wheel 4 button kit is available from ETB Instruments separately. Part Number DD-4B.)

4.1 RED 3 Digit LED Display

The large three-digit (7 segment) display in the middle of the DigiDash is used to display one of four things:

1. Speed (MPH or KMH)
2. Gear
3. RPM
4. Warning Alarms (OIL for oil pressure warnings, H20 for water temperature warnings and GAS for the fuel level alarm)

The display can be switched between gear, speed and RPM with the SELECT-B button in normal use.

4.2 GREEN LCD Character Display

This is the main display for most sensor readouts. The LCD has several different "screens" of information available.

Depending on which display options are enabled (see the SETUP section of the manual for details) there can be between 3 and 10 display screens. These are cycled using the SELECT-A button.

Note: By connecting external buttons 3 & 4 to the DigiDash you will find that button-4 provides extra control in certain screens.

OILP: 45 | WATER OILT: 90 | 103	Oil Pressure in PSI Oil Temperature in °C Water Temperature in °C
ODO: 3450 | FUEL BAT: 13.3 | 87%	Vehicle Odometer in miles Battery Voltage Fuel Level as a percentage of full

RPM: 4500 | GEAR MPH: 78 | 5	RPM Speed in MPH Gear 'N' for neutral, 'C' for clutch-down
LST: 08 01:34.55 BST: 04 01:32.33	Lap Timer times showing Last lap number and time, and Best lap number and time

Button-4 acts as a lap timer reset and will reset all of the information stored on the laps.

D: 3455M SPLIT: 2 L: 4 ++++ 23.43	Split time/distance display, showing: D: current distance on the lap SPLIT: current split sector you are in L: Lap number you are on

Button-4 acts as a reset and will reset all of the split time information.

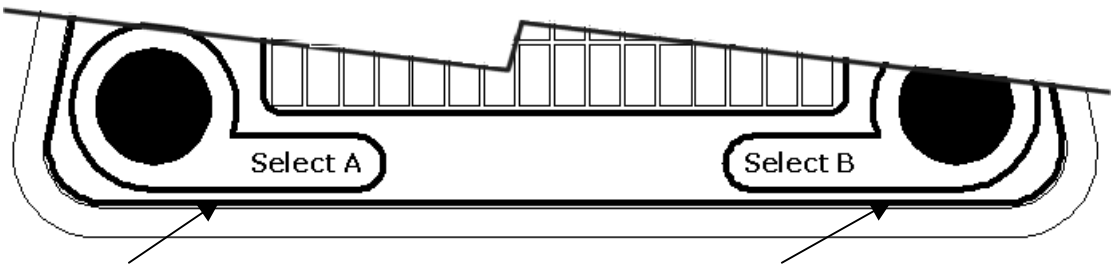
ACCEL: 000->060 TIME: 00:05.4	The acceleration timer display, showing the start and stop speeds and the time achieved.

Button-4 acts as an acceleration timer reset or abort.

MAX OP: 123 PSI MAX OT: 88 DEGC	Max Holds menu 1 shows the maximum oil pressure and temperature reached during the run.
MAX WT: 79 DEGC MAX BC: 13.5 VDC	Max Holds menu 2 shows the maximum water temperature and battery voltage.
MAX RPM: 8900 MAX MPH: 105	Max Holds menu 3 shows the maximum engine RPM and vehicle speed attained.
TR TIME: 0:10:23 TR DIST: 00005.1	Trip time (in hour/minutes/seconds) and distance (in miles)

Button-4 acts as a reset for the trip timer.

4.3 Button Summary



Cycle the Main LCD screen

Cycle the Three-digit 7-segment display between Gear, Speed & RPM

5 PC Software

New to the ETB Instruments DigiDash is a comprehensive PC software package.

This software is designed to run on any Microsoft Windows 32bit operating system (Win95, 98, ME, NT, 2000 & XP). Minimum specification for the PC is a P133 with 32MB of memory, and an 800x600 SVGA display.

This package comprises a main program with three subprograms:

- DigiDash Calculator;
- DigiDash Setup;
- DigiDash Log Analysis.

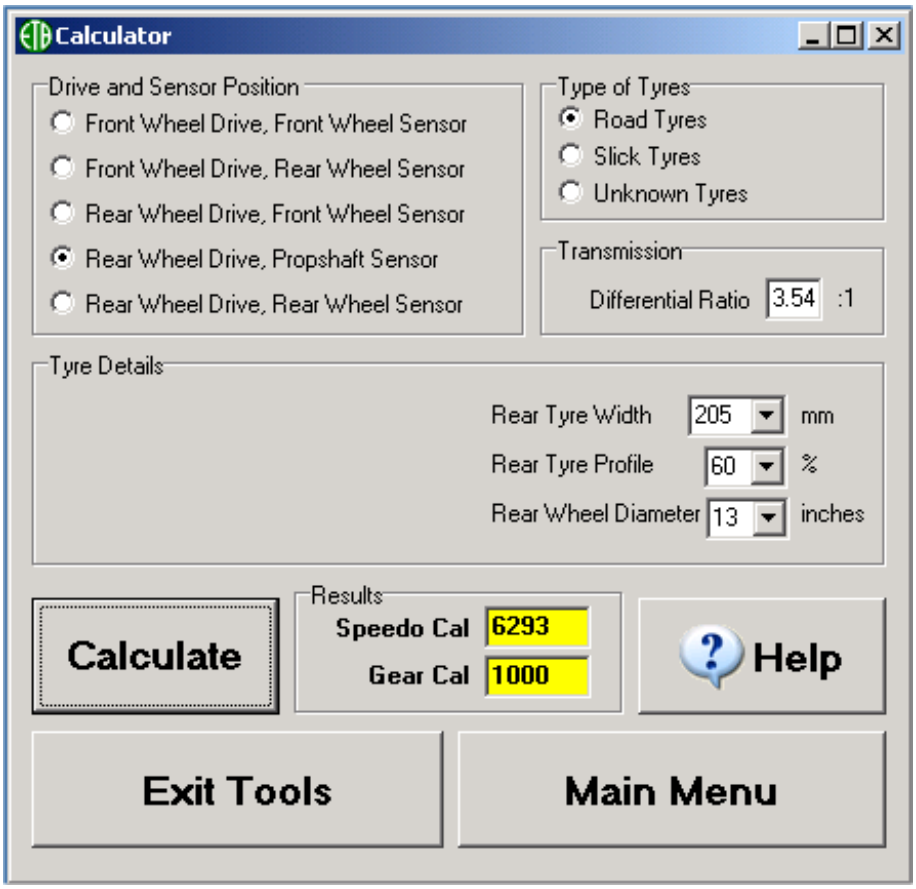
5.1 DigiDash Calculator

The DigiDash calculator is used to calculate the important configuration values for the dash.

Here you select the configuration of drive and location of speedometer sensor for your vehicle, along with the type and size of wheels/tyres you use.

This generates two key values that must entered using the DigiDash SETUP MODE, via the SPEEDO CAL and the GEAR CAL menu screens.

Online help is provided within the application.



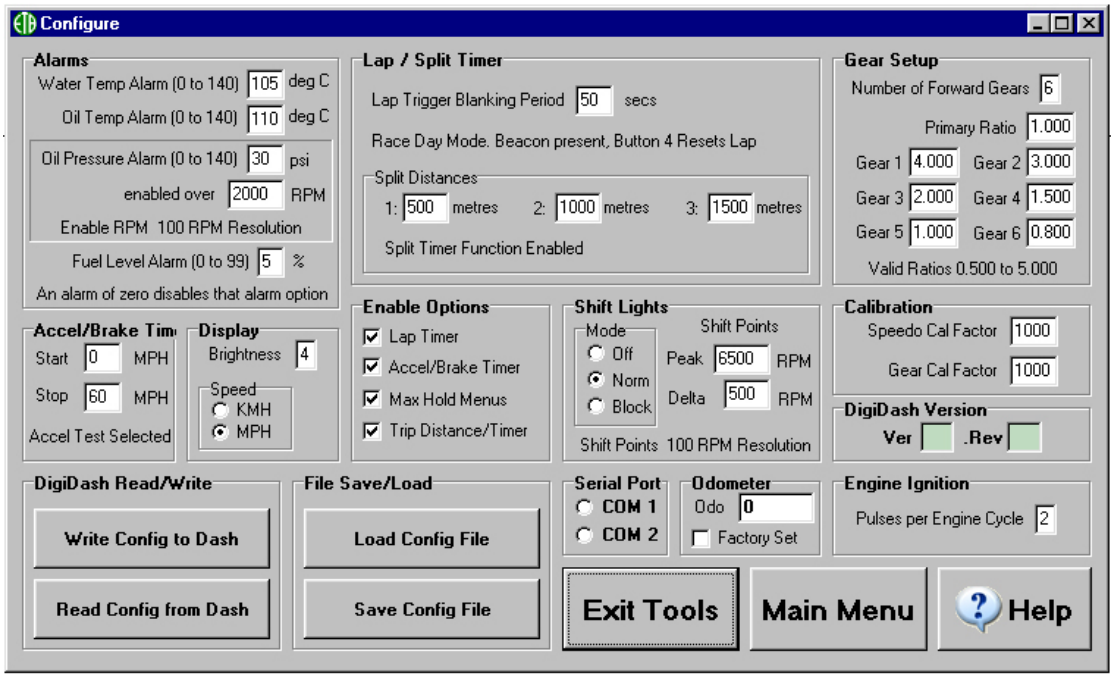
5.2 DigiDash Setup

As an alternative to using the built in setup menus within the DigiDash, the user can configure the dash from the PC application.

This allows different dash configurations to be saved and restored from files on the PC.

Once you are happy with the information you can write the configuration into the DigiDash by simply plugging the dash into the PC via the supplied serial cable.

Online help is provided within the application.



5.3 DigiDash Log Analysis

All DigiDash units have 1Mbit of internal data logging memory as standard. This logs the vehicles parameters when it is enabled. This is done using by pressing the external Button-3.

The vehicle parameters that are logged are:

- Speed
- RPM
- Gear
- Brake Switch Position
- Oil Pressure
- Oil Temperature
- Water Temperature
- Lap times & split times

5.3.1 Using the Data Logger

To enable the Data logger you will need to wire up Button-3 to your button loom. This button is used to toggle the data logger on and off. When the data logger is enabled the AUX LED display LED will be lit. If the AUX light on the DigiDash does not come on then the logging memory is full.
.

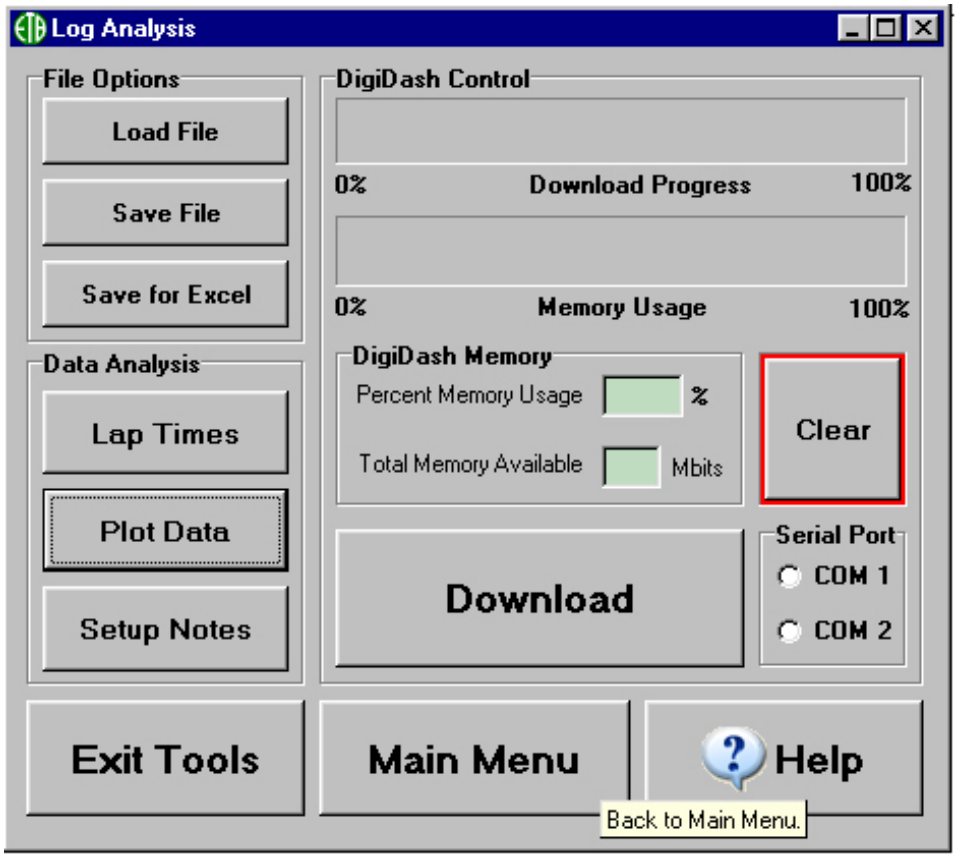
To download a datalog from the DigiDash:

- Plug the dash into the PC via the supplied serial cable;
- Turn the DigiDash on with the Select-B button held down to go into Data Logger mode;
- Run the PC software, choose Log Analysis;
- Select the desired PC serial port, and press the DOWNLOAD button.

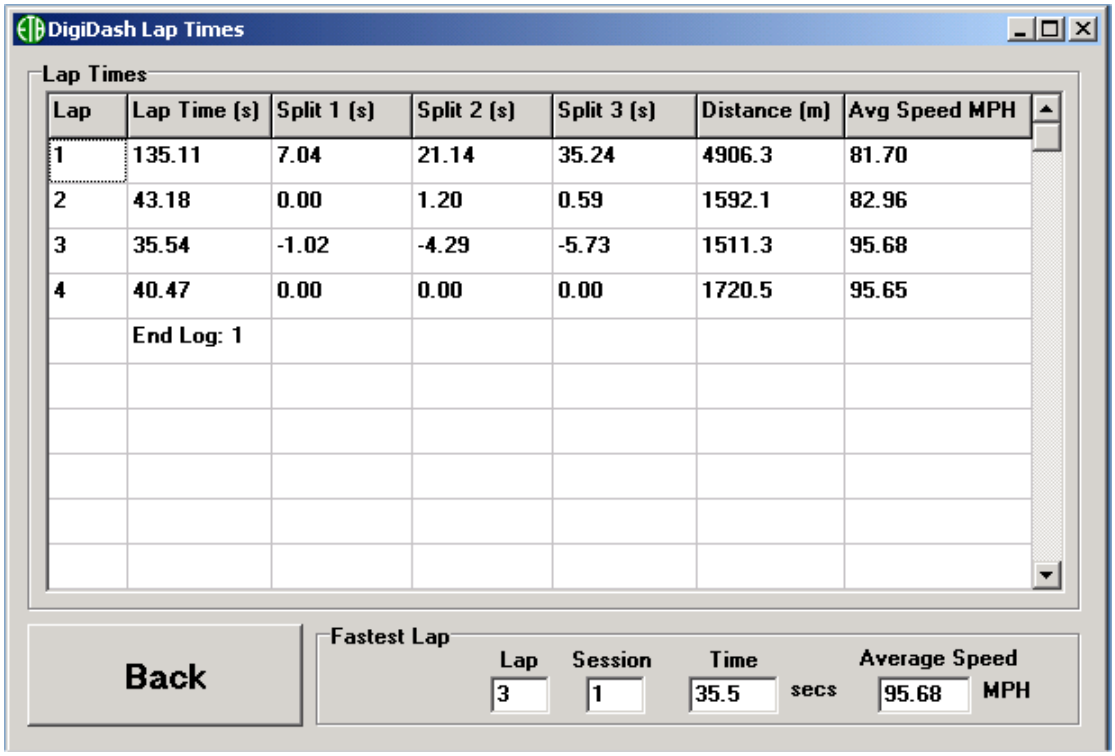
A progress bar shows the download of the data to the PC.

Once the data is loaded you can add notes and save the data to a file for later.

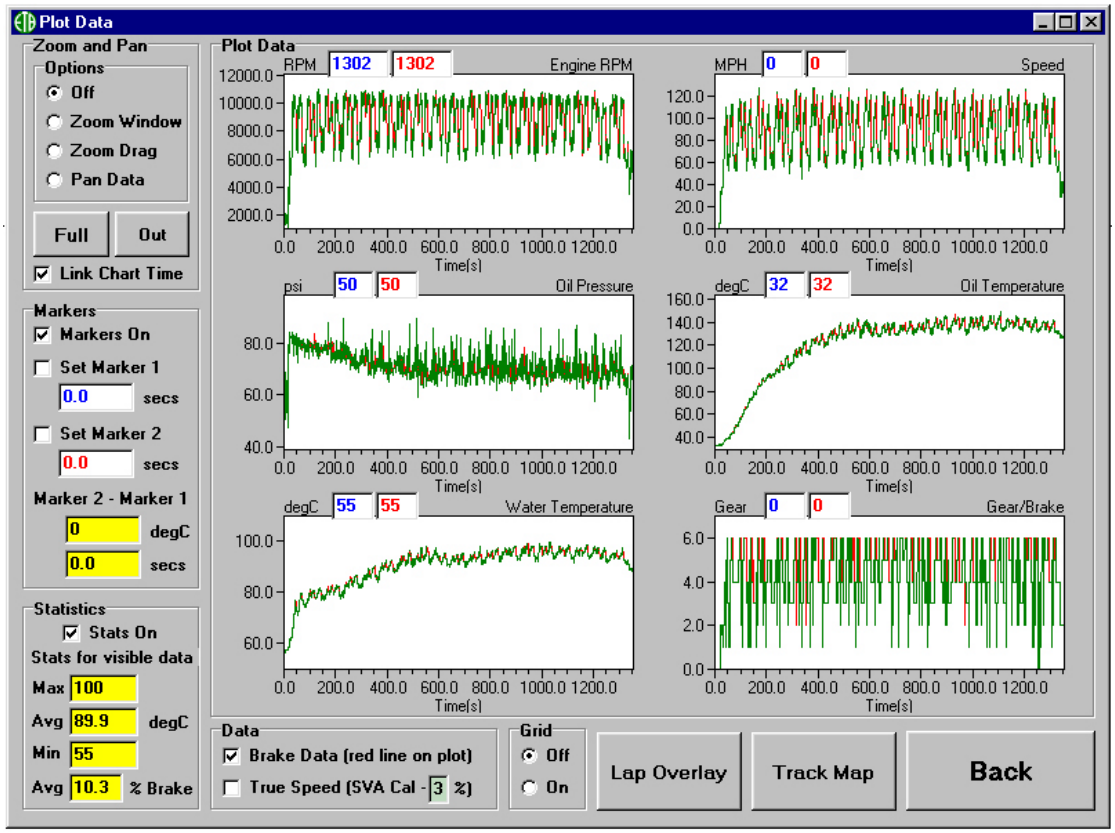
There are two different analysis options available, the user can look through lap times, or look at the captured data plots.



5.3.2 Lap times Analysis



5.3.3 Data Plot Analysis



Context sensitive help is provided within the application – simply hover the mouse pointer over an area of interest for a popup description.

The main control of the views is done using the tools listed at the top left. These allow zooming and panning of the data. As you zoom and pan in one window all of the other windows move in unison.

Statistics are available for the whole data log, or for the window that is currently zoomed.

5.4 Lap Timer

The Lap Timer system can be triggered either manually by connecting an external button to the DigiDash (via the button 4-pin harness), or by connecting an infra-red receiver module (available separately).

5.4.1 Manual Lap Timing

The lap timer can be triggered manually by the driver after connecting an external, push-to-make-contact momentary action switch to the Button-4 input. (One side of the switch should be connected to ground, with the other to the blue wire on the 4 pin "button" harness.)

Using the SETUP MODE screens, the LAP ENABLE TIME must then be set to 0 (zero).

5.4.2 Lap Timer Receiver (Optional Extra)

The lap timer receiver module (available separately) must be mounted at the side of the vehicle such that it will be aligned to the trackside beacon when the car passes by. Note that some tracks have their beacons on the left-hand side of the track, whilst others have it on the right. If you intend to attend many different circuits it is convenient to ensure that the mount is easily changed from side to side.

To ensure the unit only responds to one beacon on a track it is important to set the LAP ENABLE TIME correctly in the DigiDash setup. As you approach your beacon to start the first flying lap then press button 4. This will reset the lap times and arm the lap timer ready for the beacon. The symbols >>> will appear in the lap timer window indicating the first flying lap.

For example: If you are lapping in around 1min 30secs set the Lap Enable Time to 75 (1min 15secs). This will ensure any spurious infra-red beacons detected in the first 75 seconds of a new lap are ignored.

Note: If there are no beacons available or working then you can use the lap timer in manual track day mode. Disconnect your lap trigger module and select 0 for the lap enable time. This will then convert button 4 to be a manual trigger rather than the lap reset button.

5.5 Acceleration Timer

This allows the measurement of different acceleration and deceleration (braking) runs. By default the unit is configured to perform a 0-60mph run.

Using the timer is simple:

5.5.1 Acceleration runs:

Ensure the vehicle is starting below the start speed you have entered. For standing starts ensure the vehicle is stationary.

Use the SELECT-A button to choose the Acceleration-Timer Display. If you are overwriting a run hold down Button-4. This will zero the stored value on the display.

The timer will start as soon as one of the propshaft magnets passes the speed sensor. The timer will automatically stop when the chosen stop speed is reached, and the time will be displayed.

5.5.2 Braking runs:

Perform the same setup as above, making sure that your starting speed is higher than the chosen start speed. As you apply the brakes and the vehicles speed drops below the start speed the timer will be enabled. Once you have reached the desired stop speed the timer will stop and hold the deceleration time.

If you want to view the acceleration curve on a PC later, make sure you turn data logging on before you start the run. You can log multiple runs by turning the data logging on and off for each run.

Warning

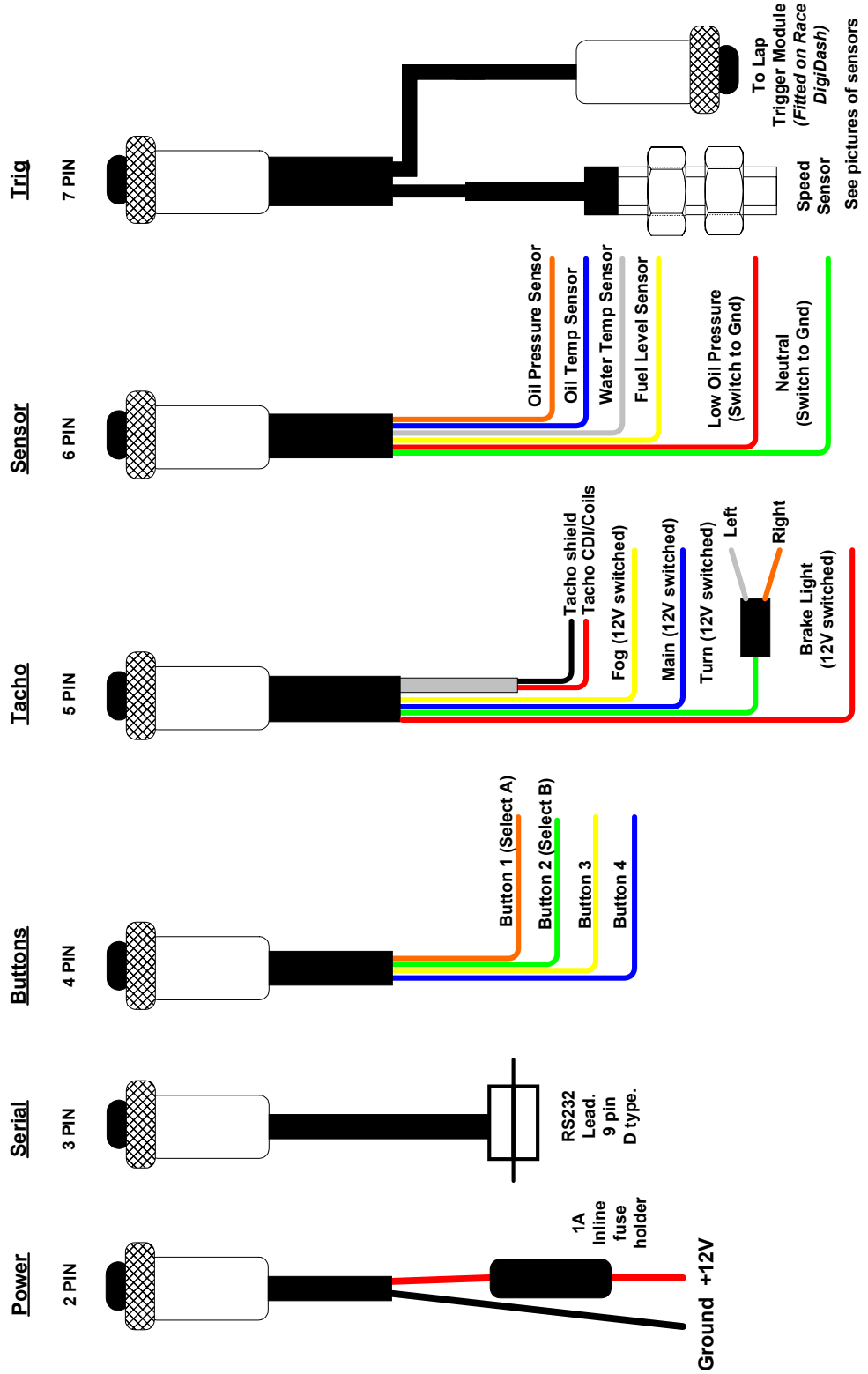
The acceleration timer should be used with great care.
Do not use the timer on public roads.
Please ensure you give due consideration to the safety of other road users whilst using this feature.
Accidents resulting in the improper use of this feature invalidate the product guarantee.

5.6 Troubleshooting

Problem	Solution (try in order)
Nothing on the display	1. Check the power connections (the 2pin socket) 2. Check the Fuse
Speedo doesn't work	1. Check magnets North-South orientation ('dot' must face down) 2. Check distance to sensor (1mm) 3. Check Loom Plug is tight 4. Try the Testmode
Speedo is erratic or poor at high speeds	1. Distance between magnets and sensor is too great 2. Magnets are mounted on a vehicle part that has lateral movement.
The lights are too bright	1. The brightness of the displays is variable. Use the SETUP-MODE to change the brightness
I get interference when the engine is running	1. Check the connections are tight 2. Use the CDI or ECU tacho output if possible 3. If you use the LT coil tap, try connecting the tacho shield wire (black) to chassis ground, or the other LT side of the coil
Display sensors show 'NC'	1. Check wiring to sensor 2. Check that there is a good ground connection for the sensor (this is made via the sensors body)
There is a rattling at the back of the dash	1. Ensure the connector locking rings are tight

5.7 APPENDIX 1 – Wiring Loom Diagrams

5.7.1 Standard Wiring



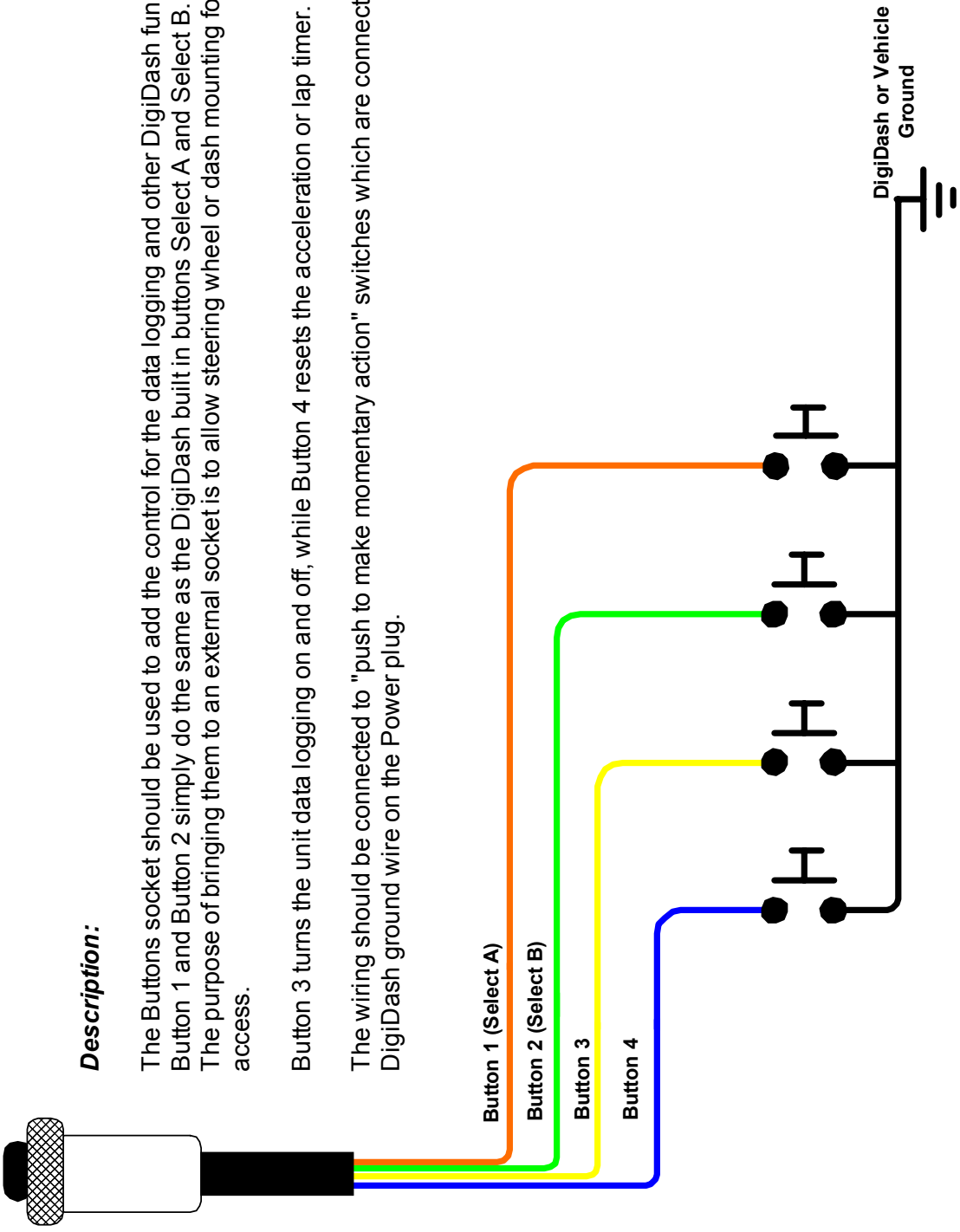
5.7.2 Buttons Plug Wiring (4 pin connector)

Description:

The Buttons socket should be used to add the control for the data logging and other DigiDash functions. Button 1 and Button 2 simply do the same as the DigiDash built in buttons Select A and Select B. The purpose of bringing them to an external socket is to allow steering wheel or dash mounting for ease of access.

Button 3 turns the unit data logging on and off, while Button 4 resets the acceleration or lap timer.

The wiring should be connected to "push to make momentary action" switches which are connected to the DigiDash ground wire on the Power plug.

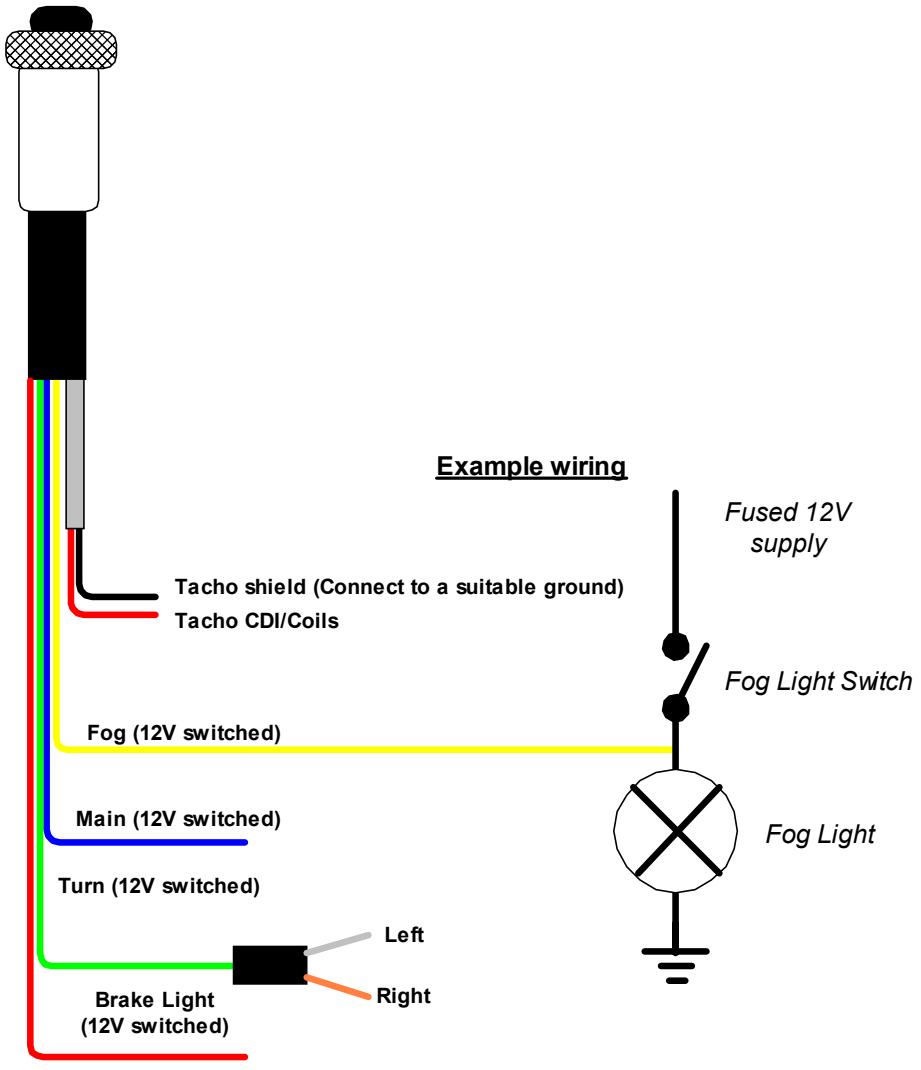


5.7.3 Lights/Tacho Plug Wiring (5 pin connector)

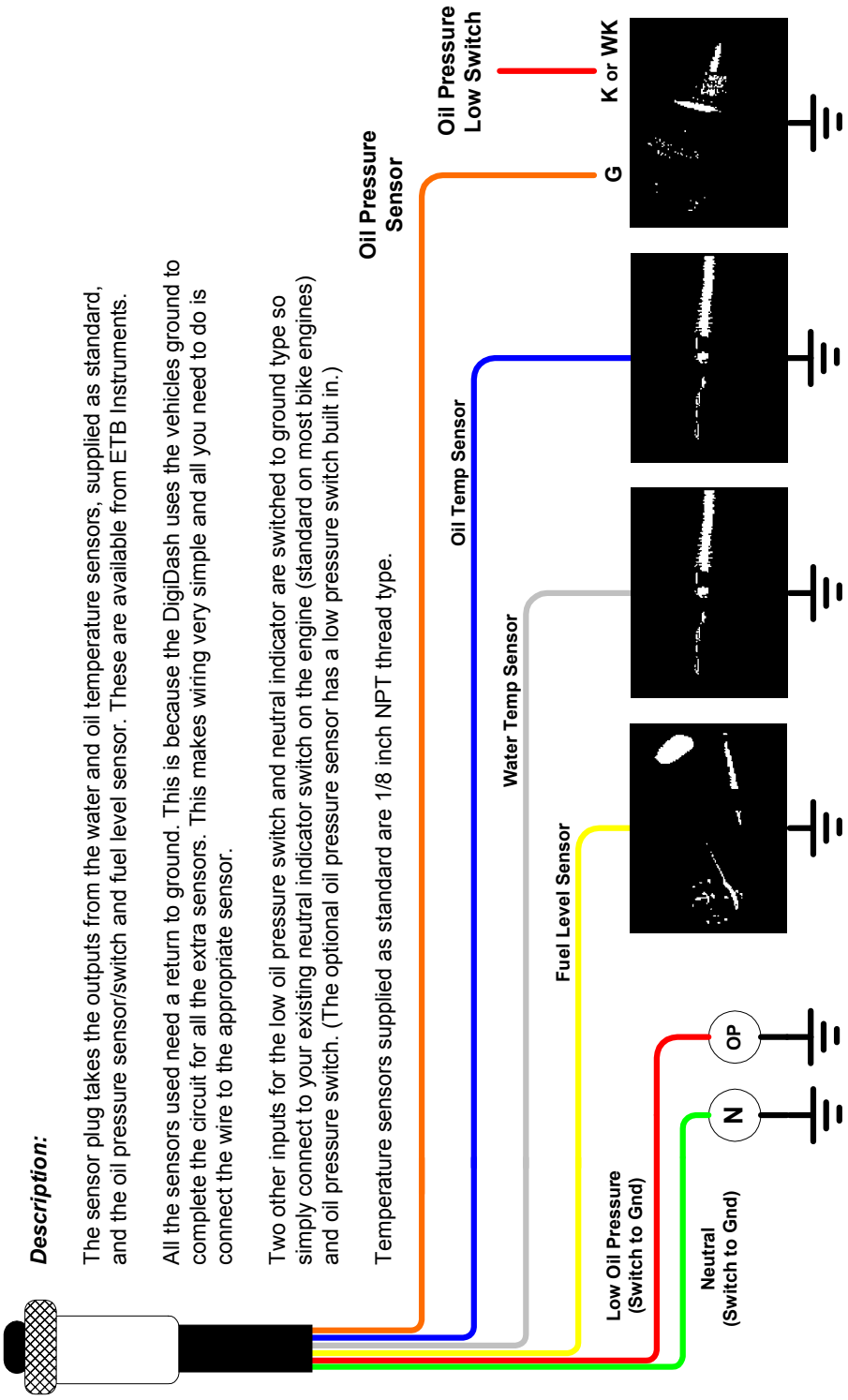
The main purpose of this plug is to pickup the tachometer signal from the engine. Connect the tacho shield to ground and the tacho CDI to the tacho output from your engine management module or across the coils. The red wire going to the non-ground side of the coil.

The Fog, Main Beam and Turn signals are used to light the indicators on the DigiDash. These will illuminate when 12V is applied to the wire. You can pickup off your original wiring loom for these lights, or wire them in to the switched side of 12V going to your vehicle lights. Note that the turn signals are on separate wires. You will not short-out the indicators connecting them up, as there are diodes in circuit.

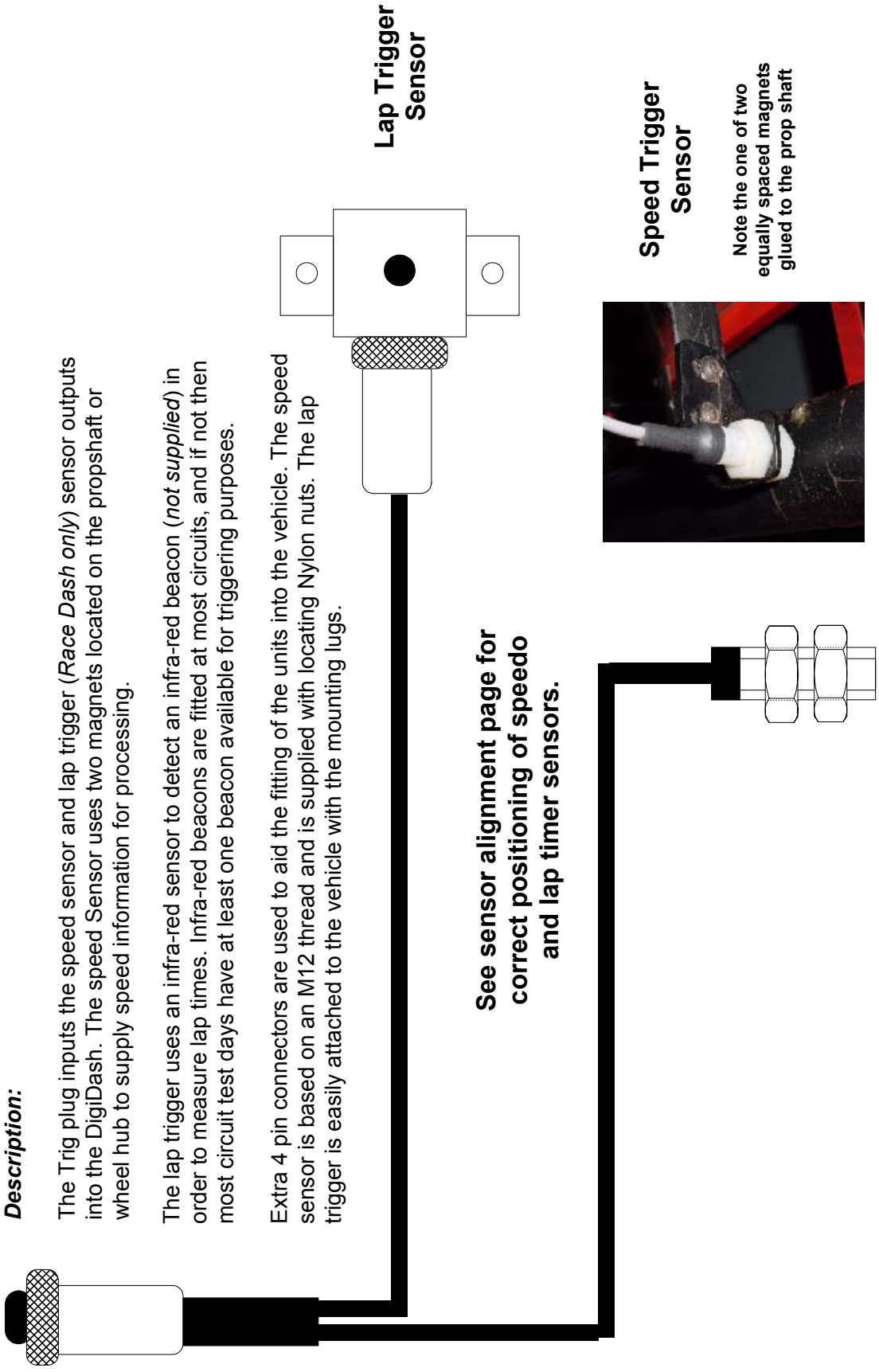
The brake light on your car can be wired to the brake light input. You could also use a separate brake pressure switch to give the DigiDash 12V on this input when the brake pedal is pressed. This is used for the data logger and will record where and what time on the track or road the brake pedal was pressed.



5.7.4 Sensor Plug Wiring (6 pin connector)



5.7.5 Trigger Plug Wiring (7 pin connector)



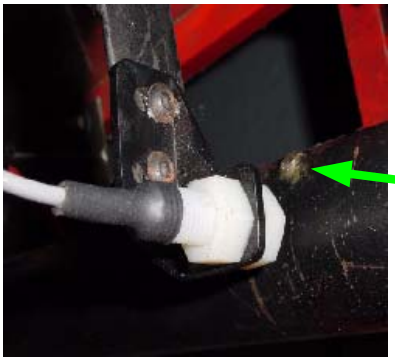
Description:

The Trig plug inputs the speed sensor and lap trigger (*Race Dash only*) sensor outputs into the DigiDash. The speed Sensor uses two magnets located on the propshaft or wheel hub to supply speed information for processing.

The lap trigger uses an infra-red sensor to detect an infra-red beacon (*not supplied*) in order to measure lap times. Infra-red beacons are fitted at most circuits, and if not then most circuit test days have at least one beacon available for triggering purposes.

Extra 4 pin connectors are used to aid the fitting of the units into the vehicle. The speed sensor is based on an M12 thread and is supplied with locating Nylon nuts. The lap trigger is easily attached to the vehicle with the mounting lugs.

5.7.6 Speed Sensor Alignment



magnet
With the dimple on magnet face down and araldited to the propshaft

Air gap should be 1mm

Propshaft

Side View

cable

speed sensor

bracket

magnet 1
(make sure dimple on magnet is face down to the propshaft and secured in place with Araldite)

magnet 2
(make sure dimple on magnet is face down to the propshaft and secured in place with Araldite)

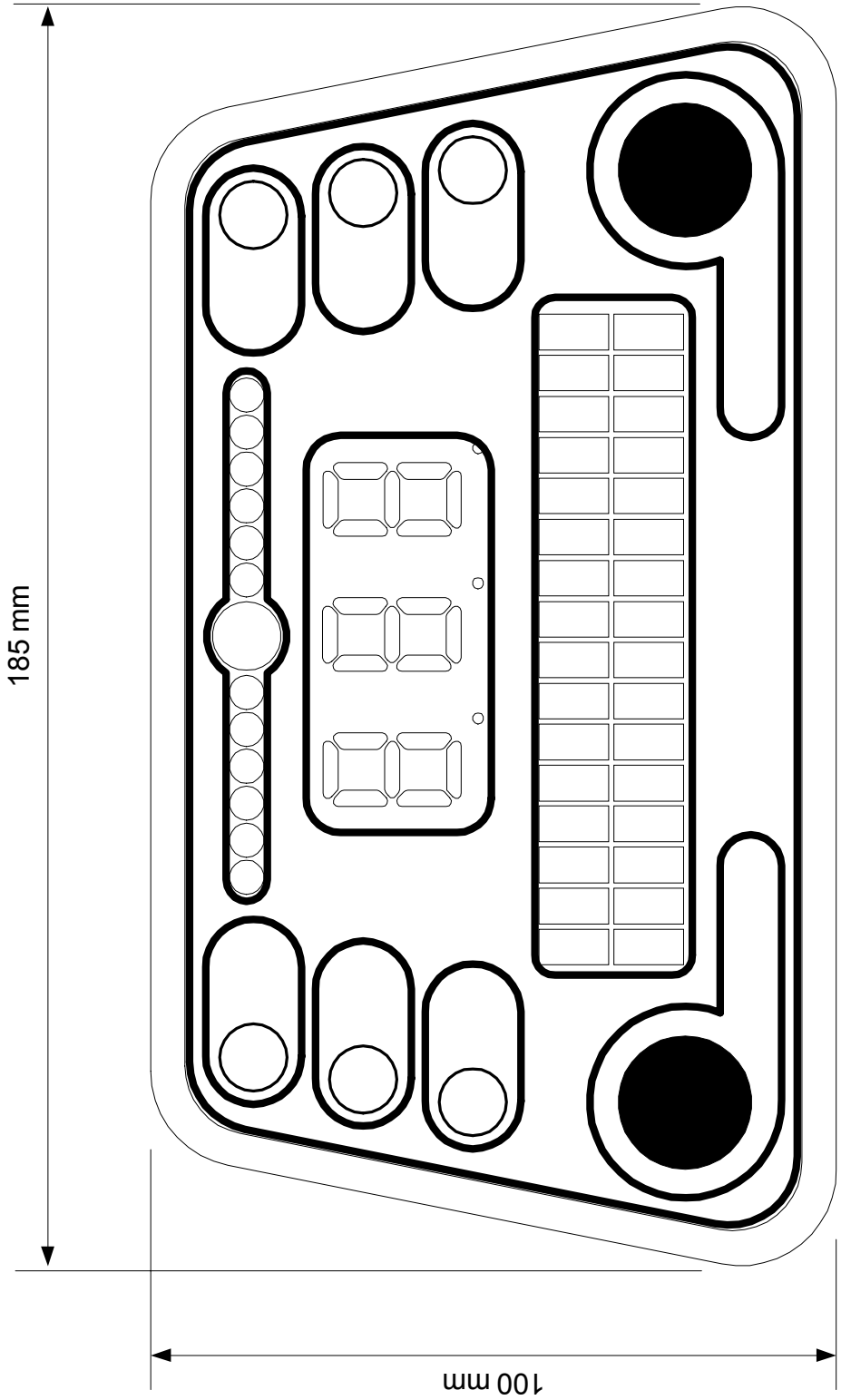
Propshaft

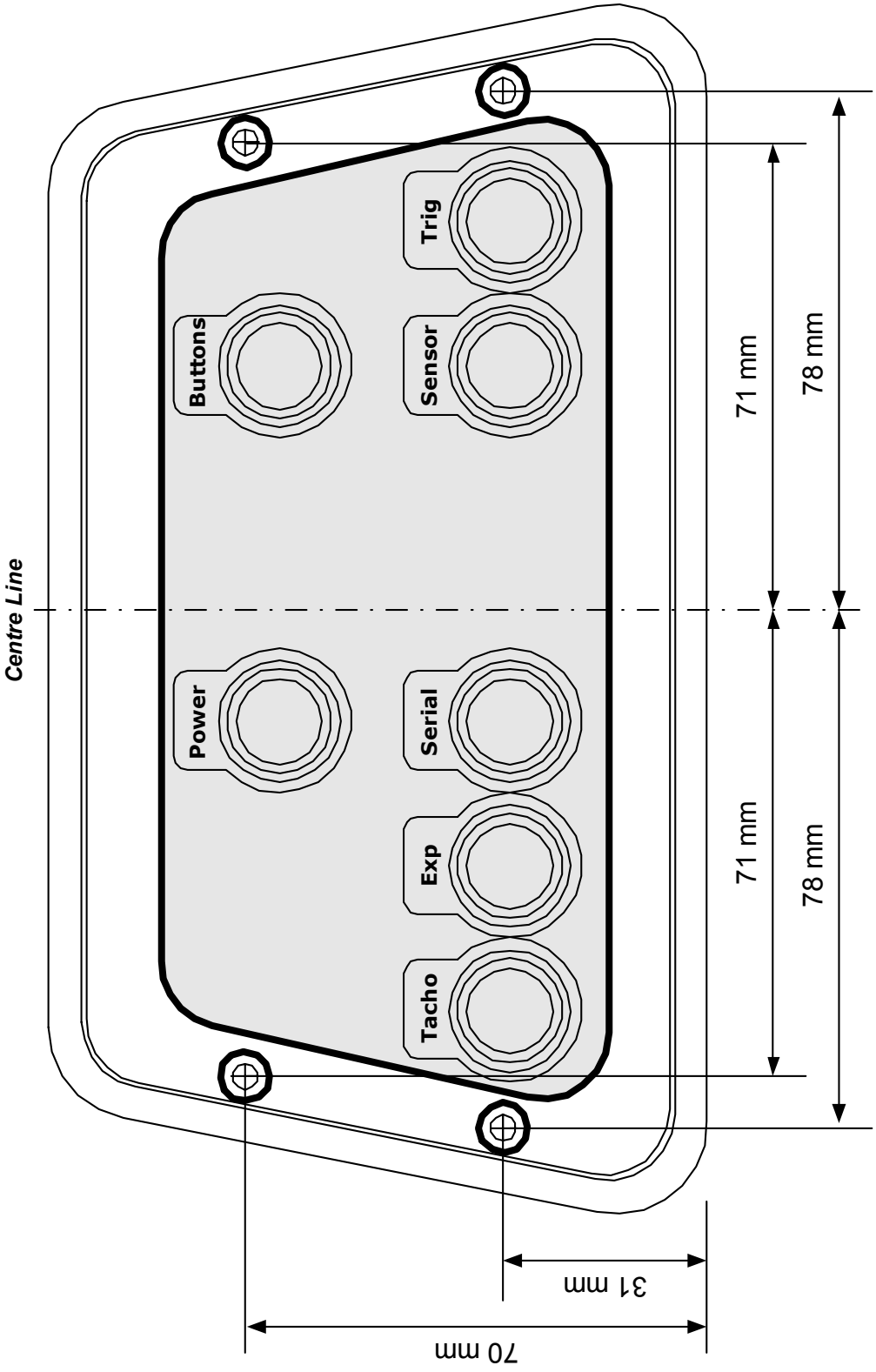
Section View

Air gap should be 1mm

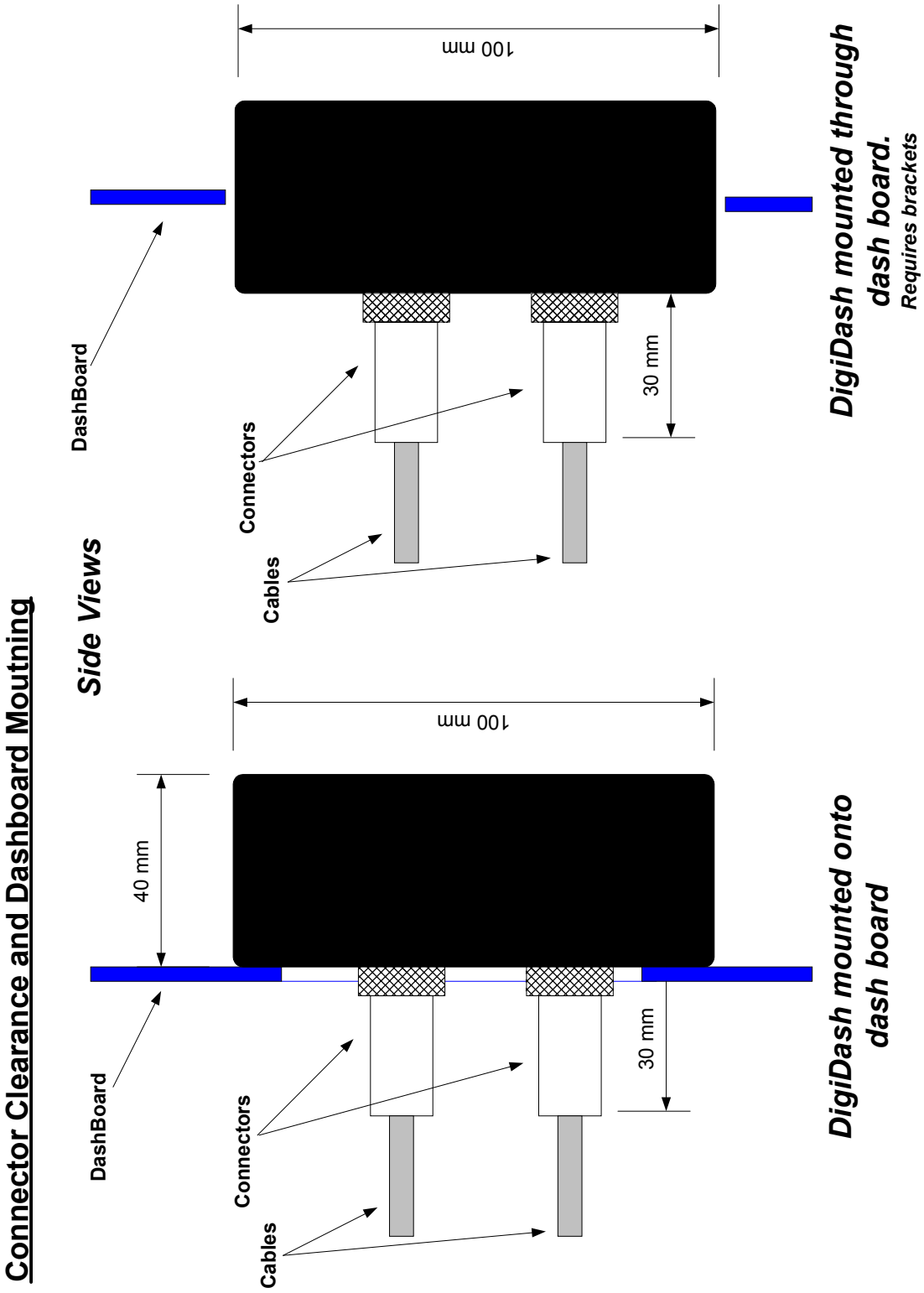
Directions:
Place the magnets with the dimple side face down to the propshaft. Place the magnets so that they are opposite each other on the prop. e.g. 180 degrees apart. Then use a fixing agent such as Araldite to secure the magnet to the prop. Try not to get any fixing agent on the top of the magnet. Only apply around the bottom face and sides. Then adjust the sensor so that there is a 1mm air gap between the magnet and sensor face.

5.8 APPENDIX 2 – Mounting Template (to scale)





Four M4 Allen screws are supplied for fitting the unit to the dash board
Simply print the drawing to scale and mark out the dash board for drilling and cutting.
Cut-out the shaded area to allow the connectors to go through the dash board.


Connector Clearance and Dashboard Moutning
Side Views
100 mm
DashBoard
Connectors
Cables
30 mm
DigiDash mounted through dash board.
Requires brackets
100 mm
40 mm
DashBoard
Connectors
Cables
30 mm
DigiDash mounted onto dash board

Lap Trigger Alignment

Directions:

The lap trigger uses an infra-red detector to sense when the lap has been completed by starting and stopping a timer when it sees an infra-red source. The infra -red source (beacon) is commonly found at most circuits and is not supplied with the DigiDash. The DigiDash will trigger off any infra-red source. This includes other beacons at track or test days and the circuits own split-time beacon(s) if it has one.

In order to stop the lap trigger giving mulltiple readings due to multiple beacons a **lap timer enable time** can be programmed into the DigiDash. This stops the DigiDash, once triggered, looking for any other beacons until the preset time has elapsed.

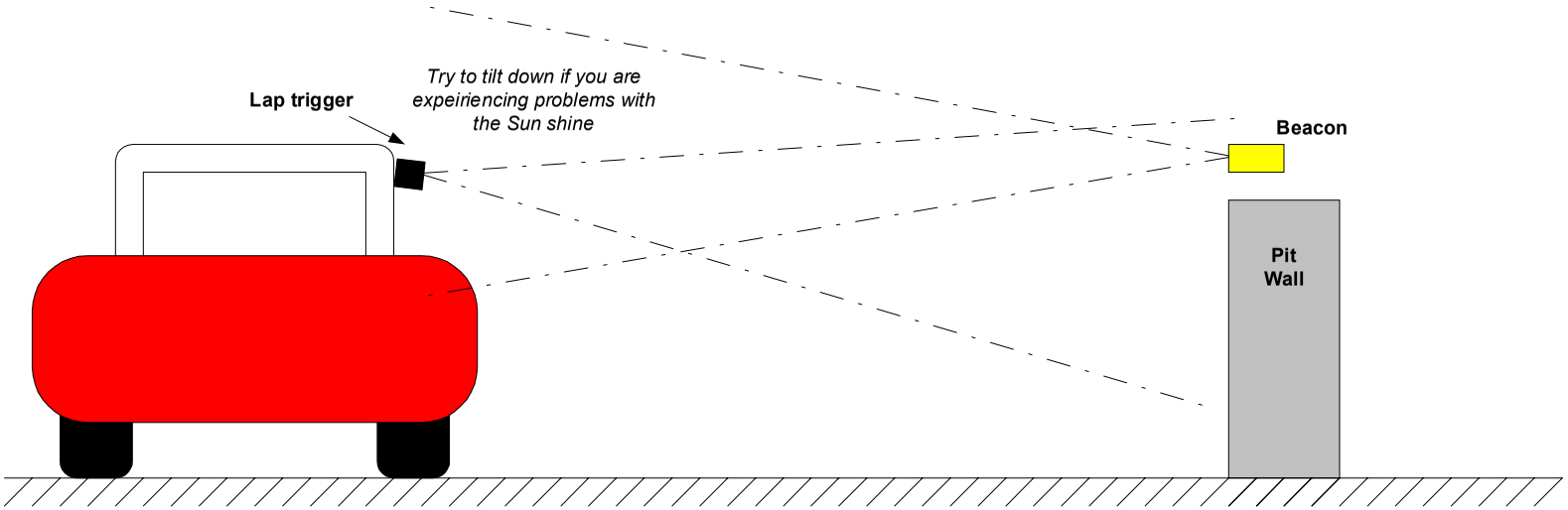
For example

The Digidash will trigger off the first beacon on the pit wall, whether it is your beacon, another competitors or the circuit beacon. Set the lap enable time to a value less than your fastest lap so that the unit cannot trigger until you are just about to complete a lap. This stops any false triggers on split time beacons.

If people are using split time beacons then as you are about to start your first timed lap, press button 4. This will reset your lap timer to be ready for a new timed session. You only have to do this if people are using split beacons because on your first lap out your DigiDash may trigger on a split beacon and your lap enable time will prevent the DigiDash triggering at the start and finish line.

Potential Problems:

The Sun is the biggest infra-red source around and may cause the unit to false trigger if pointed directly at it. Try to keep your lap trigger pointing horizontal and if possiible tilted down slightly. The problem only really occurrs when the Sun is low in the sky and shining directly across the start and finish line where your beacon is situated. The lap enable time preset value will stop the Sun triggering the unit at other points on the circuit.



5.9 APPENDIX 3 – Specification

5.9.1 Power Supply

7V - 14V DC Negative Earth only
Maximum current consumption 400mA
Fuse value: 1A

5.9.2 Environmental

Ingress Protection Level : IP54
Operational temperature range 0 °C to 40 °C
Storage temperature range -10 °C to 60 °C
Avoid contact with Oil, Petrol and other solvents.

5.9.3 Physical

Dimensions: 185mm x 100mm x 40mm
Weight: 600g

5.9.4 Cleaning/Care

Use a damp cloth to clean the unit. Do not use abrasive cleaners or chemicals.
The unit is splash proof to water, however it is not designed for submersion.

5.9.5 Warranty

ETB Limited Warranty

ETB Instruments Limited warrants all merchandise against defects in factory workmanship and materials for a period of 12 months from date of purchase. This warranty applies to the first retail purchaser and covers only those products exposed to normal use or service. Provisions of the warranty shall not apply to an ETB product used for a purpose for which it is not designed, or which has been altered in any way that would be detrimental to the performance or life of the product, or misapplication, misuse, negligence or accident. On any part or product found to be defective after examination by ETB Instruments Limited, ETB Instruments Limited will only repair or replace the merchandise through the original selling dealer or on a direct basis. ETB Instruments Limited assumes no responsibility for diagnosis, removal and/or installation labour, loss of vehicle use, loss of time, inconvenience or any other consequential expenses. In the event of merchandise being returned to ETB Instruments Limited, The responsibility for payment of delivery rests with the customer. The warranties herein are in lieu of any other expressed or implied warranties, including any implied warranty of merchantability or fitness, and any other obligation on the part of ETB Instruments Limited, or selling dealer. Your statutory rights as a consumer are not affected.