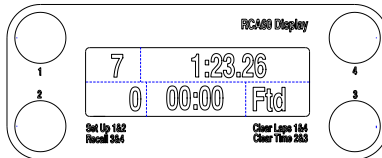


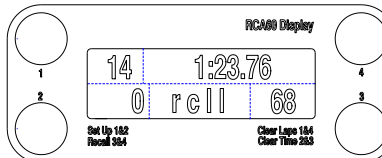
Displaying Your Fastest Lap

Use the top or bottom right hand buttons to scroll the Gauge window beyond Oil Pressure so that the display shows:



Recalling Your Lap Times

Enter Recall Mode by pressing both right hand buttons together. The display changes to:



Showing the last lap was lap 14 with a lap time of 1:23:76. Use the right hand buttons to select the maximum temperatures and minimum pressures in this lap. Here the minimum oil pressure was 68 psi.

Use the left hand buttons to scroll backwards and forwards through the lap time memory.

Press both right hand buttons again to exit Recall Mode.



The RCA 400 Lap Timer and Data Logger User Manual

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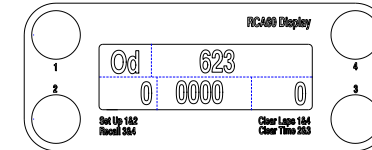
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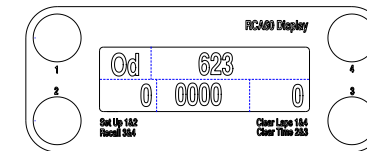
8. Quick Reference

Clearing the Fastest Lap and Preparing the Performance Monitor for a Different Circuit

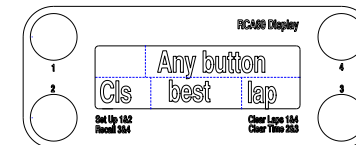
Turn On ignition with any button held pressed. The display will change to:



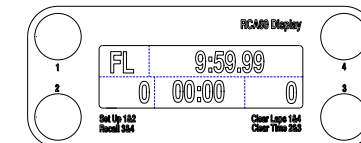
Release the button and the display will change to show your fastest lap (Fastest Time of the Day):



The display will then change to:



As soon as this display appears, press any button and the display will change to:



Now you have successfully cleared the fastest lap and told the system to clear the performance monitor memory. **DO NOT** trigger false laps with the beacon before going out on your first lap of a new circuit.

track. These probably emit very strong IR signals which will saturate your Lap Timer.

ptance cone angle is about 15 degrees. Ensure that the IR Detector will fall within the Beacon's beam and, just as important, be sure that the acceptance cone of the IR Detector includes the Beacon when the car passes it.

- 4.4 Oil Pressure
 - 4.5 Water Temperature
 - 4.6 Oil Temperature
 - 4.7 Fuel
 - 4.8 Battery Voltage
 - 4.9 The Lap Timer
 - 4.10 Recall Mode
 - 4.11 Best Lap (Ftd)
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 - 4.13 The Performance Monitor Option
 - 4.14 Engine RPM Data
- 5. Data Logging
 - 6. Data Analysis
 - 7. Beacon Settings and Siting
 - 7.1 Understanding Infra Red Communications
 - 7.2 Beacon Conflicts
 - 8. Quick Reference

1. Introduction

Thank you for choosing the Farringdon RCA400 Lap Timer and Data Logger. This manual will describe how to use and set up system in your car. Of course, the system will not work properly until it has been loaded with all the essential information about your car—for example the circumference of the wheel. So please take a little time to ensure that you know how to set up the system before you use it for the first time.

2. The Controls and What is Displayed

The Display has four buttons and an Liquid Crystal Display (LCD). The LCD is a graphic type which allows characters of different sizes (or graphics) to be displayed the screen. This section explains how to use the buttons and what is displayed on the LCD.

2.1 The Buttons

Each side of the LCD, there are two push buttons. These buttons will click when pressed and give an “over-centre” feel. They are deliberately stiff and will not respond to very short pushes. This prevents them being pressed accidentally or operated by vibration.

While driving, the right hand buttons select the gauge that is displayed in the gauge position on the LCD.

If the Oil P legend is shown, the oil pressure in (psi) is shown next to it. Pressing the bottom right hand button causes the Water legend to be displayed and the water temperature (in degrees centigrade) is shown next to it. Pressing the top right hand button switches the display back to Oil Pressure. In this way, the right hand buttons “scroll through” the gauges.

Pressing both top buttons for about 3 seconds clears the lap count. This is often necessary on the starting grid after passing the lap timing beacon during the parade and warm up laps.

Pressing both bottom buttons for about 3 seconds clears the elapsed time. This may be done at the start of a qualifying session or the start of an endurance race or session.

The remaining combinations are pressing both left hand buttons or both right hand buttons. After holding both left hand buttons for about 3 seconds, the set up mode is entered. (See Section 3) After holding both right hand buttons for about 3 seconds Recall Mode is entered. (See section 5.2)

To look at the data collected, simply remove the SD card and plug it into your lap top. Instructions for the lap top software are supplied with the CD-ROM.

Plots such as the one shown above can be displayed using the Podium Flash Data Analysis package.

7. Beacon Setting and Siting

7.1 Understanding Infra Red Communications

Infra red light (IR) from light emitting diodes (LEDs) can be turned on and off very quickly and it is this property that makes infra red ideal for short range communications. To increase the sensitivity of the receivers, a “carrier” frequency is used to turn on and off the LED. The receiver can then look for light that is being modulated at this frequency amongst other background light. To impose information on the infra red beam, this carrier frequency is itself turned on and off.

There are two ways in which this form of communication can be interrupted, first, by any light source strong enough to saturate the receiver - for example - the sun or another more powerful IR source - and second, other transmissions using the same carrier frequency.

The reason for the recessed lens and photodiode in the IR detector is to shield it from direct sunlight so providing the IR detector will not “see” the setting sun behind the beacon, it will not be saturated by the sun.

However, some other lap timer and data logging systems do use the same carrier frequency and others use much more powerful IR beams and it is for this reason that you must take care where the beacon is positioned.

7.2 Beacon Conflicts

From the explanation given in the previous section it is clear that reliable operation can only be guaranteed when the beacon is sited away from all others. A distance of 5 metres along the pit wall is probably safe. The Lap Timer will ignore all infra red signals on the same carrier frequency that do not contain the Main Channel or IN codes saved in its memory but if you find that lap times are obviously incorrect, look for another Beacon using your channel on the pit wall. With only four channels to choose from, it may be that more than four teams are using Beacons at the same track. In this case agree to use a single beacon and set all the Lap Timers to respond to this channel.

It is especially important to site the Beacon away from other beacons using large external batteries and having a large array of LEDs pointing over the

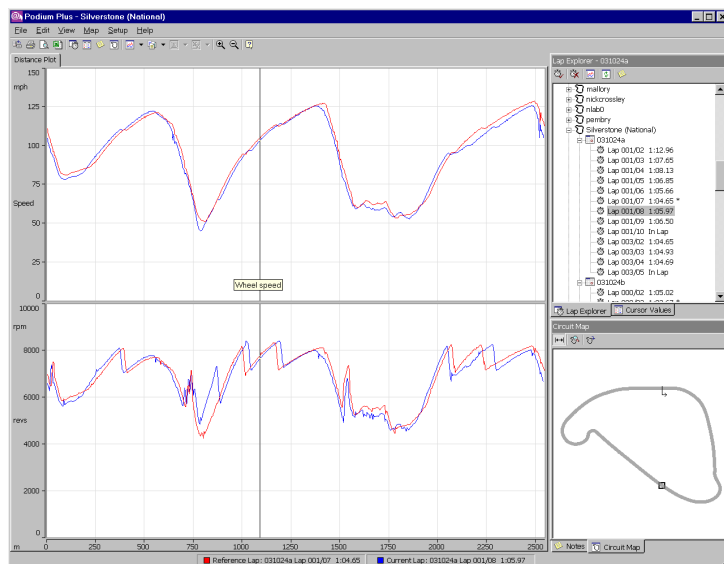
This light every time a sample is taken and is turned on while a file is being terminated. DO NOT remove the card if the LED is on.

Engine Life Statistics

Pressing buttons 1 and 3 together switches the system to show engine life statistics. The display first shows the total engine life since this timer was reset. Pressing button 3 shows the time over the highest rev limit assigned to the engine, pressing it again shows the time over the next lowest. Time is recorded for four levels of rpm and these can be scrolled through with buttons 3 and 4. This information should be shown to your engine builder in case of an accidental over revving of the engine.

6. Data Analysis

Data analysis is provided by PC software package supplied by PolyLogic called Podium Flash.

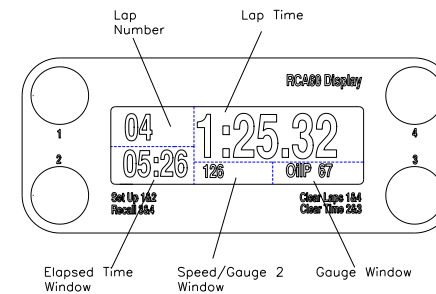


2.2 The Display

The layout of the display changes depending of what is displayed. There are three "screens" each divided into "windows". These are shown below:

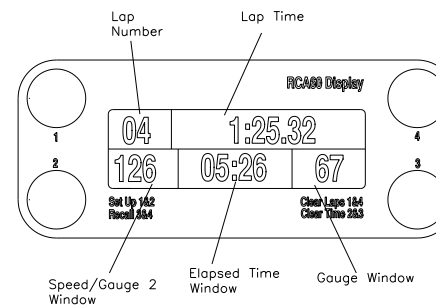
2.2.1 Screen 1

Screen 1 is displayed when the lap time is the principal display. The lap time is shown in large characters, the lap number and elapsed time in medium characters and the speed/gauge2 window and the gauge window in the smallest characters. These are not meant to be read during racing but rather when setting up the system.



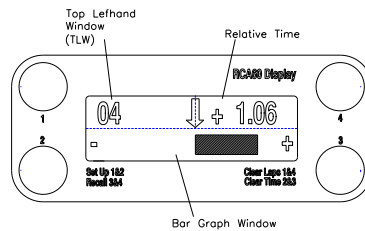
2.2.2 Screen 2

Screen 2 is displayed when ever any warnings are shown or when the system is in set up mode.



2.2.3 Screen 3

Screen 3 is used when the performance bar graph is shown. In set up mode, the bar graph or a simple + or—time can be chosen for the performance display. If the numeric option is chosen, then screen 1 is used.



2.3 The Windows

2.3.1 Lap Number Window

This shows the number of completed laps. Remember that it will show lap 1 when the beacon is first seen. The lap number can be cleared by pressing buttons 1 and 4 at the same time.

2.3.2 The Lap Time Window

The lap time window displays the lap time, either frozen after passing the beacon until the hold time has expired, or as an increasing time after switch on or after the hold time has expired.

If the Performance Monitor is switched on and no bar graph is chosen, then after the Hold Time has expired (see Section 5) the Lap Time Window shows the difference in time into the lap between the current and best laps as a time prefixed with a + or—sign. (If the bar graph option is selected in set up, then screen 3 is displayed.)

2.3.3 The Speed/Gauge 2 Window

Shows the Speed in MPH or KPH. Speed can be shown only over a minimum value that will depend on the wheel circumference and the number of wheel pulses detected in a full wheel revolution. Alternatively this window can display a gauge reading. If a gauge reading is displayed here, speed can be shown by holding the top left hand button down for 3 seconds. The speed is then shown alternately with the letters SPd to remind you that speed is being displayed. This is designed for pit lane use and window can be

the data was recorded. The clock can only be set through Podium Flash. First make sure that the clock on your PC is correct then in the setup dialogue tick the Set Time check box.

About the files recorded on the SD card.

The files are numbered sequentially from 1 to 999. This number will not reset unless the non-volatile memory becomes corrupted in which case everything is set to the default state and the file number is set to 0. The files have a created and last modified date and time, these are the dates and times at which logging starts and ends.

The first three characters of the card's Volume Name (set when the card is formatted) is included as characters 2, 3 and 4 of the file name. This allows the race engineer to label the cards for each car so that files from one car are not confused with files from another. Characters 5, 6 and 7 are the file number and character 8 is either L or N. Files ending in L are files containing Laps of data—that is a qualifying or race session. Files ending in N are files created with No laps—that is warming up or engine test sessions. These letters help in identifying data when files are transferred to Podium Flash.

The files are read only and cannot be deleted. When the card is full you must re-format it with Podium Flash. If you are logging at a sample period of 100 milliseconds, a single 512M byte SD card will last you at least a season so you may wish to keep this and buy a new one at the start of the next season.

There are SD cards and SD cards! If you use less than the best you may not be able to sample data fast enough and the data will be corrupted. **Also you will need to format the card with Podium Flash before you use it.** Podium Flash will write a setup file to the card at the end of the formatting procedure and it is sensible to check the setup before using a new card.

Warning, the data logger continues to write data to the SD card until the power to the data logger (and steering wheel) is switched off. The logger then requires some time to write data held in buffer memories to the card and to complete the file. Do not remove the card before at least 4 seconds has elapsed after the power has been switched off.

In order for the system to complete a file, the back-up battery in the data logger enclosure must be charged. If you are having trouble writing files to the card, try leaving power connected to the data logger for an hour or so to charge the battery. If the battery is not charged, the real time clock and calendar will not be able to maintain the data and time.

Tip: A small LED shines from behind the SD card slot under the card door.

5 Data Logging

Data logging with the RCA400 completely different from previous Farringdon systems. Data is logged against time, that is every so many milliseconds, all the channels are read and the results stored on the SD card.

The data collected for each sample is as follows:

- Time into lap (time from beacon)
- Speed
- RPM
- Oil Pressure
- Water Temperature
- Oil Temperature
- Fuel Level or Pressure
- Battery Voltage
- Lateral G
- Axial G
- Data Logger Temperature
- User 1
- User 2
- ...
- User 8

In addition at the end of each lap the following data is collected and stored on the card.

- Lap Time
- Lap Number
- Session Number
- Minimum Oil Pressure
- Maximum Water Temperature
- Maximum Oil Temperature
- Minimum Fuel Level or Pressure
- Minimum Battery Voltage
- Maximum RPM for the lap
- User 1 reading at the beacon
- User 2 reading at the beacon
- ...
- User 8 reading at the beacon

To use the data logging you must set up the tachometer pulses, the wheel pulses and circumference and you must decide on the rate at which you want to record data and what criterion should be used to start logging. These parameters can be set up on the steering wheel or from Podium Flash, the data analysis software.

You should set the real time clock in the data logger so that you know when

returned to the gauge reading by pressing the bottom left hand button.

2.3.4 The Elapsed Time Window

If lap times are shown in the lap time/rpm window then elapsed time from power on is shown in this window. Pressing both bottom buttons for about 3 seconds will clear this time. It is used to show time into a qualifying session or an endurance race or driver session.

If RPM is shown in the Lap Time/RPM window, then this window shows lap time but only the seconds. For example a lap time of 1 minute 2.38 seconds will be displayed as 2.38.

2.3.5 The Gauge 1 Window

The gauge 1 window shows the value of the selected Temperature, Pressure or Level as selected by the right hand buttons. Scrolling past Oil Pressure cause other measurements to be shown in the Lap Time Window and an appropriate label in the Gauge Window such as tac, Ftd, bat, or US1. (See Section 2.2.3.4)

3. Set Up

3.1 General

The system may be set up either from your laptop or through the buttons on the display. The set up state is held in memory in the control box and on the SD card. If the SD card is in the control box, then the setup is taken from this. If you change the setup with the SD card in the control box, the setup on the card is changed as well.

To set up the system using your laptop, start the data analysis program, Podium Flash supplied with the system, and click on the top menu SETUP. Insert the SD card into the laptop (the Sandisk cards supplied fold in half to reveal a connector that plugs into your laptop's USB sockets). Now click on Logger and the set up pages are displayed. Change the setup to suit your requirements and click OK. Wait for a few seconds for the setup file to be written to the card. Remove the card and insert it in the control box. When the system is switched on, the new setup will be copied to the system.

To enter Set Up Mode, press both left hand buttons for about 2 seconds. The display will change to screen 2 and show "SetuP" in the Lap Time Window and for a moment shows what the three bottom windows will contain. The Speed Window will display the Function Number, the Elapsed Time Window will show a hint at what function has been selected (as far as possible with the 7-segment displays used on the steering wheel display) and the Gauge Window will show the value of the function. This value can be changed with the right hand buttons. For Example, Function 2 is the Hold Time (the time the lap time should be frozen in the Lap Time Window after passing the beacon). When setting up this time, the Speed Window will display 2, the Elapsed Time Window will display "Hold" and the Gauge Window will display the time set. Pressing the top right hand button will increase the time and pressing the bottom right hand button will decrease it.

Some Functions are On or Off. These are changed by pressing the top right hand button for On and the bottom right hand button for Off.

Once all the changes have been made, the Set Up Mode can be left by pressing both left hand buttons together for about 3 seconds.

A table listing the various parameters to set up is shown below. Once you have used it a few times you will find that the hints are enough to guide you through the Set Up process.

shown in the gauge window. The best lap is shown also during the power up sequence and can be cleared by pressing any button at the next point in the sequence.

4.12 Displaying RPM

As an option available in Set Up, the Lap Time/RPM window can be made to show RPM rather than lap time. If this option is selected, then the lap time is shown in the elapsed time window as seconds. After reaching 59.99 the display rolls over to 0.00. Although the minutes are not shown this display is adequate for lap timing.

4.13 The Performance Monitor Option

The Performance Monitor provides the "unfair advantage" that every driver is looking for! Further, if you are prepared to entrust your car to someone who you know will drive faster than you, the Performance Monitor becomes a very powerful training aid.

The system works as follows:

The best lap must be cleared at the start of a session at a new circuit. During the first complete lap and on all subsequent laps, the time into the lap is stored in memory every few metres along the track. After the hold time has expired, the lap time window then displays the difference between the time at this point on the circuit for this lap and the time for the best lap. This difference is recalculated every few meters and the display updated.

The difference between these times is displayed either in the large lap time window, or as a bar graph in screen 3. To use the Performance Monitor, set function 7 (Perf) to ON. Make sure that you clear the best lap at the start of the session.

4.1.4 Engine RPM Data

The later versions of the RCA400 contain a simple engine rpm monitor. Pressing buttons 1 and 3 together for 3 seconds displays this feature. Once entered, pressing buttons 3 or 4 scroll through the times that the engine has exceeded certain rpm. A total engine running time is also kept and available in this mode. To exit, press buttons 1 and 3 together for 3 seconds or turn off the power.

4.6 Oil Temperature

Oil Temperature is the third highest priority. Its alarm is also “Hot” but the Oil Temp legend OilT will be shown.

4.7 Fuel

Fuel level or pressure is the lowest priority and its alarm is “Fuel”.

4.8 Battery Voltage

Battery voltage can be displayed in the Lap Time/RPM window by pressing the top right hand button until “Bat” is shown in the gauge window. There is no warning for battery voltage.

4.9 The Lap Timer

When switched on the system enters its power up sequence before reaching its normal state. The lap time starts at 00:00.00 and increments continuously until it sees the beacon for the first time. The lap time is then frozen for the “hold” time. The hold time is adjustable in Set Up. The number of laps completed is shown in the two digit lap window. (The number rolls over from 99 to 0.)

The Lap Time may be displayed in the large Lap Time/RPM window or alternatively, in the centre bottom window in place of elapsed time. (See Set UP for details.)

If the IN channel has been set up correctly, your car can be called into the pits by switching the beacon to the IN position. The word “Pits” is shown flashing in the Lap Time/RPM window.

4.10 Recall Mode

If the right hand buttons are pressed together for 3 seconds Recall Mode is entered. The last lap time is shown in the Lap Time/RPM window together with the lap number in the Lap window. The right hand buttons may be used to select a gauge. The gauge reading is the minimum or maximum for that lap. Minimum pressures and maximum temperatures are recorded. Use the left hand buttons to scroll through the laps retained in memory.

Pressing both right hand buttons together for 3 seconds causes the system to exit Recall Mode.

4.11 Best Lap (Ftd)

The best (lowest) lap time is stored and can be displayed by using the right hand buttons to scroll up to the point where “Ftd” (fastest time of the day) is

Function Number	Hint in Elapsed Time Window	Function Description	Default Value
0	Tach SPd OilP Cool OilT Fu P	Display tachometer in Lap Time Window Display Speed in the Speed/Gauge 2 Window Display Oil Pressure in the Speed/Gauge 2 Display Water Temp in the Speed/Gauge 2 Display Oil Temp in Speed/Gauge 2 Window Display Fuel Pressure (or level) in S/Gauge 2	OFF ON OFF OFF OFF OFF
1	def	Set Everything to Default Values	OFF
2	SESS	Session Number—this automatically increases every time the system is turned on.	0
3	Hold	Hold Time in seconds. Time that the Lap Time is frozen after passing the beacon.	30
4	blnc	Blank Time in seconds. Time that the IR receiver ignores any other input after seeing its beacon.	10
5	IrCh	Channel Number for IR Detector. Choose 0 to receive PI beacon at UK Tracks.	1
6	InCh	IN Channel Number. Set this to IN code of beacon.	100
7	PerF	Performance Monitor Display ON or OFF	OFF
8	rCA4	RCA400 Special Set Up see Section 3.10	0
9	Hour	Elapsed Time in Hours and Minutes (normally in Minutes and Seconds).	OFF
10	PPt	Pulses per Turn from Wheel Sensor	2
11	Circ	Wheel Circumference in centimetres	180
12	tps	Turns per Sample. Number of wheel turns between PM sample. DO NOT CHANGE	2
13	Per	Sample Period in milliseconds	100
14	Strt	Start Data Logging Trigger. 0 = never, 1 = when powered on, 2 = when engine started and 3 = when min. speed reached. Logging stops when power is turned off.	
15	tach	Number of Pulses per Two Engine Revolutions.	4
16	Filt	Tacho Pulse Filter—units are usecs + 50	100
17	POSP	Tacho Pulse Polarity—Positive	ON
AL	Lirn	Alarm Limit for Fuel.	10

Function Number	Hint in Elapsed Time Window	Function Description	Default Value
18	Fu n	Fuel Sensor Output Inverted	OFF
19	Fu d	Fuel Sensor Delay. Delays fuel alarm for 10 seconds so that fuel alarm is not triggered by cornering.	OFF
AL	Lim	Alarm Limit for Oil Temperature	110
AL	Lim	Alarm Limit for Water Temperature (degrees C)	95
AL	Lim	Oil Pressure Alarm Limit (psi)	20
tac	LedS	Shift Light Settings—Green LED 1 to Red LED 9 (rpm x 100) (see note 1)	10 to 90
20	G ip	Electrical Gear Input Connected (see note 1)	OFF
21	N ip	Neutral Switch Input Connected (see note 1)	OFF
22	Gr 1	Gear 1 mph/5000 rpm (or pot reading) (see note 1)	-
23	Gr 2	Gear2 mph/5000 rpm (or pot reading) (see note 1)	-
24	Gr 3	Gear 3 mph/5000 rpm (or pot reading) (see note 1)	-
25	Gr 4	Gear 4 mph/5000 rpm (or pot reading) (see note 1)	-
26	Gr 5	Gear 5 mph/5000 rpm (or pot reading) (see note 1)	-
27	Gr 6	Gear 6 mph/5000 rpm (or pot reading) (see note 1)	-
28	Gr n	Potentiometer reading for neutral (see note 1)	-
29	Gr r	Potentiometer reading for reverse (see note 1)	-
Monitor Mode			
30	X g	Displays value read from x G sensor	-
31	Y g	Displays value read from y G sensor	-
32	Usr1..8	Displays value read from User (1 .. 8) Input	-
33	Gear	Displays Gear potentiometer reading (see note 1)	
34	-CL-	Clears Memories. Set to 1 to clear tell-tale Set to 2 to Clear Lap End Memory Set to 128 to Clear Odometer. To clear more than one item enter sum of codes. E.g. to everything enter 131. (1+2+128).	

4. Using the RCA400

4.1 Odometer

The odometer (total distance travelled) is displayed when the system powers up. It can be cleared back to zero by using function 34 in the set up procedure. It shows the total number of whole miles (or kilometres) travelled since it was last reset.

4.2 Speed

Speed can be shown all the time or on demand in the in the Speed/Gauge 2 window . (see Set Up) The speed is calculated from the time between the pulses coming from the wheel sensor. Because this timer can measure only small times, speed cannot be shown until some minimum value is reached. This value depends on the number of pulses per wheel turn from the wheel sensor and the diameter of the wheel. Typically the lowest speed that can be displayed is between 10 and 30 mph.

If the Speed/Gauge 2 window is displaying another gauge, then pressing the top left hand button for about 2 seconds causes the Speed/Gauge 2 window to show speed. This function has been added to monitor your speed in the pit lane. To confirm that speed is being displayed, the speed is shown alternating with the text SPd. To clear the speed display, press the bottom left hand button.

4.3 Elapsed Time

The elapsed time is displayed in the bottom centre window and can be reset to zero by pressing both bottom buttons for a second or two. The units are normally minutes and seconds but can be changed to hours and minutes in Set Up.

4.4 Oil Pressure

Oil pressure is the measurement of the highest priority and an oil pressure warning will overrule any other. When the engine is not running an oil pressure warning can be turned off (in the normal way by pressing either right hand buttons) but when the engine is running this alarm cannot be turned off. The alarm given in the Lap time/RPM window is a flashing "Oil".

4.5 Water Temperature

Water temperature is the second highest priority. Its alarm can be turned off at any time. The alarm is displayed in the Lap Time/RPM window as "Hot"

3.18 Tacho Filter

Often pulses from the ignition system are noisy and have to be filtered to give reliable tacho readings. This function sets the minimum pulse widths that are counted as tacho pulses. The units are in microseconds plus 50. Set this to 100 as a start.

3.19 Tach Pulse Polarity

This is set to positive by default. (Positive Polarity ON.)

3.20 Fuel and Other Alarm Limits

Set the fuel pressure/level, oil temperature, water temperature and oil pressure limits at levels at which you want an alarm to be given.

3.21 Shift Light Set Up

There are no shift lights on the LCD display, so this function is not applicable to the RCA400

3.22 Gear Indicator Set Up

There no gear position indicator on the LCD display, so this function is not applicable to the RCA400

3.23 Monitoring Inputs in Set Up Mode

A very useful Monitoring Mode is available in Set Up. Functions 30 to 33 read out the values of each axis from the Accelerometer, all 8 User Channels and the gear pot. Use the values to check the working of any sensors you have connected to the User Channels and to check the accelerometer. The figures displayed are the outputs of the system ADC and range from 1023 for an input of 5 volts (the maximum) and 0 for ground voltage. (The display wraps round after 999 so 1024 reads as 23.)

3.24 Clearing System Memories

Function 30 allows three memories to be cleared. Setting the function to 1 will clear the tell-tale reading, setting it to 2 will clear the Lap End memory and setting it to 128 will clear the Odometer. To clear more than one at a time, simply add the values together. For example to clear the tell-tale and the Lap End memory, enter 3.

3.2 Tachometer and Other Display Options

The tachometer option is the first to be accessed so that the Lap Timer may be switched off and replaced by a digital tachometer. Set to On to display RPM. This is followed by options for the Speed/Gauge 2 window. The hint shown in the Elapsed Time window are as follows:

SPd = Speed
OilP = Oil Pressure
Cool = Water Temperature (or CHT)
OilT = Oil temperature
FuP = Fuel Pressure (or level)

3.3 Set Defaults

Setting this Function to On sets all functions back to the factory settings. Set to yes then leave set up mode by pressing both left hand keys.

3.4 Session Number

The session number is stored with lap times and data. It is incremented every time the beacon is seen on the out lap but can be set manually with this function.

3.5 Hold Time

The Hold Time is the time in seconds that the lap time is frozen in the Lap Time Window after passing the beacon. Set this to be long enough for you to reach a suitable place on the track to glance down and read it.

Setting the Hold Time to 0 changes three aspects of the display. First the lap time remains displayed throughout the lap, second, the Performance Meter is shown in the Elapsed Time window and third, gauge warnings are signified by a flashing gauge window until the car is moving.

3.6 Blank Time

This is the time that the Infra Red Detector ignores all signals after seeing its beacon. 10 seconds is a good time to use but it can be extended to blank out other beacons placed around the track in order to generate segment times on some other systems.

3.7 Infra Red Channel Number

Set this to the channel number you are going to use. If you wish to use the PI Beacons on most UK circuits and you have a dual channel IR Detector, then set the channel number to 0.

3.8 "IN" Channel Number

All Farringdon Beacons come with an channel number from 1 to 250. Set this channel number to that of your beacon. This is most easily done by pointing the beacon, switched to "IN" at the IR Detector while at this point in the set up procedure. The Gauge Window will show the channel number detected.

3.9 Performance Monitor Display

The Performance Monitor shows the time difference in the Lap Time Window between the time to the current point on the track and the time taken in the Best Lap to reach the same point. It is shown only after the Hold Time has expired. If you turn this display ON, then the data logging must be ON; so setting this function ON also sets the Data Logging function ON. Remember to clear the best lap when you visit a different track.

3.10 RCA400 Special Set Up

This parameter sets up various aspects of the RCA400 as follows:

Value	Bar Graph For PM	Top Left Window	Bar Graph Range
0 to 3	no	Performance Time in Large Chrs	N/a
4	yes	Speed	0.5 secs
5	yes	Speed	1.0 secs
6	yes	Speed	2.0 secs
7	yes	Speed	4.0 secs
8	yes	Lap Number	0.5 secs
9	yes	Lap Number	1.0 secs
10	yes	Lap Number	2.0 secs
11	yes	Lap Number	4.0 secs
12	yes	Elapsed Time	0.5 secs
13	yes	Elapsed Time	1.0 secs
14	yes	Elapsed Time	2.0 secs
15	yes	Elapsed Time	4.0 secs

3.11 Elapsed Time Units

Elapsed Time can be measured in minutes and seconds or hours and minutes. The latter is useful for endurance races.

3.12 Number of Wheel Pulses per Turn

Enter the number of pulses the wheel sensor will generate for each tuen of the wheel—the number of targets.

3.13 Wheel Circumference

Enter the wheel circumference in centimetres. The circumference is best measured by marking the tyre on the wheel to which the sensor is attached and rotating it at least twice, measuring the distance covered and dividing by the number of times the wheel was turned.

To show the speed in KPH, divide the circumference by 1.6 and enter this value.

3.14 Wheel Turns per Sample

The Performance Monitor (if fitted) will calculate the number of wheel turns counted between sampling the time from beacon. This function displays the result. Do not change.

3.15 Sample Period

Enter the sample time you want to use. A good figure for comparing driving style would be 100 msecs. If you have suspension potentiometers on the User channels, you may wish to sample much faster. The maximum sampling speed is 500 samples per second—for this enter a sample period of 2 milliseconds. At this rate you should be able to see frequencies of 100 HZ.

3.16 Start Logging Trigger

Enter the code as follows: 0 = never. 1 = when ever power is applied, 2 = when a speed of 40 mph is reached and 3 = when the engine has started. We recommend the latter as it gives important diagnostic data while the engine is being warmed up. [Data logging stops when power is removed.](#)

3.17 Number of Tachometer Pulses for Two Revs. Of the Engine

The number entered depends on your ignition system. If electronic ignition is used, then there will probably be a tacho pulse output. If not it may be necessary to purchase an HT sensor which clips on to a plug lead which will produce just one pulse per two turns for a 4 stroke engine.