

Speed & Route Profiler Manual



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1. Introduction

Speed & Route Profiler is designed to give information to a driver who can then follow a set route at a set speed profile. The interface with the driver is an OLED display with an internal buzzer.

Each **Driver** system will include an OLED display with 4Mb memory to store the route information, an inbuilt buzzer, and special firmware.

In addition a standard VB Micro or other VBOX is required, together with a cable to link the VBOX to the OLED display.

Speed & Route Profiler software is provided with every system to allow either a speed & route profile, a route profile only or a speed profile only to be created. There are four methods of creating a profile;

1. A **Speed & Route profile** can be created by having a person drive the route at the desired speed, in this case the **Reference Driver** will also require a VBOX with digital input (VB2SX, VB3i etc) and a hand held event marker – see **Reference Driver Setup** below.
2. A **Speed Profile** (only) can be created by taking a speed profile from an existing test as defined by Agencies such as EPA (Environmental Protection Agency). This will require the use of MS Excel. See **Speed Profile from existing data**.
3. A **Speed Profile** (only) can be created by entering a speed profile directly, including any wait times during the journey.
4. A **Route Profile** (only) can be created by copying a file from Google earth.

In each case once the profile is created the resultant data file can be downloaded to the OLED.

Note: You will need to be connected to the internet to be able to use the Speed Profiler program

2. Creating a Profile

As stated above there are four methods of creating a profile, the first method is achieved by driving the required route as detailed below.

2.1 Create file from driven Route

The **reference driver** must first drive the route that he wants any future **driver** to follow. During this journey he will normally want to mark any **turn points** that the **driver** is required to make, although for very simple and short routes these **turn points** may be added later.

VBOX with hand held event marker

In order to mark any **turn points** that the driver is required to make, the **reference driver** will need a VBOX with digital input (VB2SX, VB3i etc) and a hand held event marker – RLVBACS009. Ideally a VB3i will be used and the resultant VBO file should be post processed in VBOX Tools using default (mid) Kalman filter settings. For built up areas, the reference driver may use a VB3i with IMU integration to reduce the noise still further. It is assumed that the user knows how to use this equipment, further information can be found in the VBOX Tools manual.

First the **reference driver** should ensure that the equipment is working correctly and is receiving satellites. Next the start of the journey should be noted, before any turns are required by pressing the event marker.

The route should now be driven, such that when the **reference driver** makes any turn, and **just before the turn point**, he, or ideally a passenger, should press the event marker. At the end of the route the event marker should again be pressed, such that the unit does not continue to log time and create an incorrect time variance for the **driver**.

It is possible to drive the route in two or more parts by appending two files together. This is handled by the **Speed & Route Profiler** software. Note the maximum journey length is approximately 8 hours, this is determined by the amount of memory in the OLED.

VBOX without hand held event marker

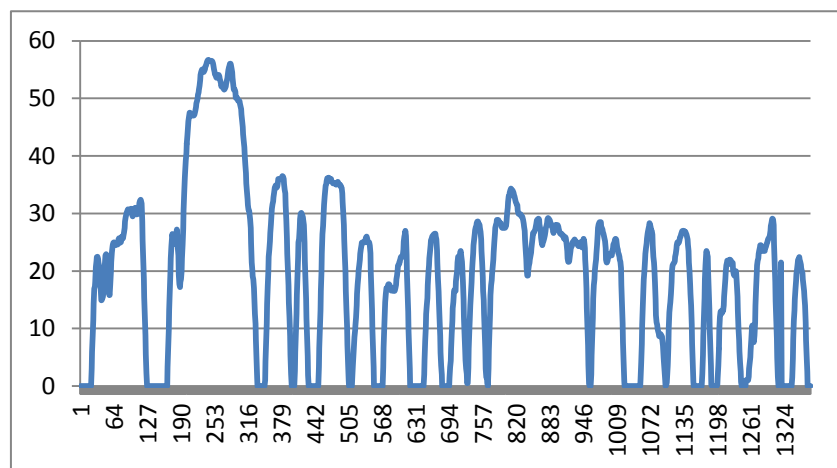
For very simple routes, it is possible to add the **turn points** after the route has been driven using the **Speed & Route Profiler** software. This is only possible when you know the area very well and can identify each turn using the map.

In each case the VBO file which is created is then loaded into Speed & Route Profiler software, and the user can then add or edit each turn point and create instructions for the **Driver**, see **Speed & Route Profiler Software**.

2.2 Speed Profile from existing data

In certain cases a speed profile will already exist in a tabular format, such as that shown below. This information is widely available on the internet.

EPA Urban Dynamometer	
Time (sec.)	Speed (m.p.h.)
0	0
1	0
2	0
3	0
4	3
5	5.9
6	8.6
7	11.5
8	14.3
9	16.9
10	17.3
11	18.1
12	20.7
13	21.7
14	22.4
15	22.5



If the Speed data column only (ignore time data) is copied and pasted to MS Excel, then this can easily be loaded into Speed Profiler software, see **Speed & Route Profiler Software**.

2.3 Create Speed Profile manually

A Speed Profile can be created manually by entering the speed and time figures that you wish to achieve. Thus you can manually create a Speed Profile which;

Accelerates from current speed to 80 KPH in 20 seconds, then
Remains at 80 KPH for 1000m, then
Decelerates to 20KPH in 8 seconds

2.4 Speed Profile from Google Earth

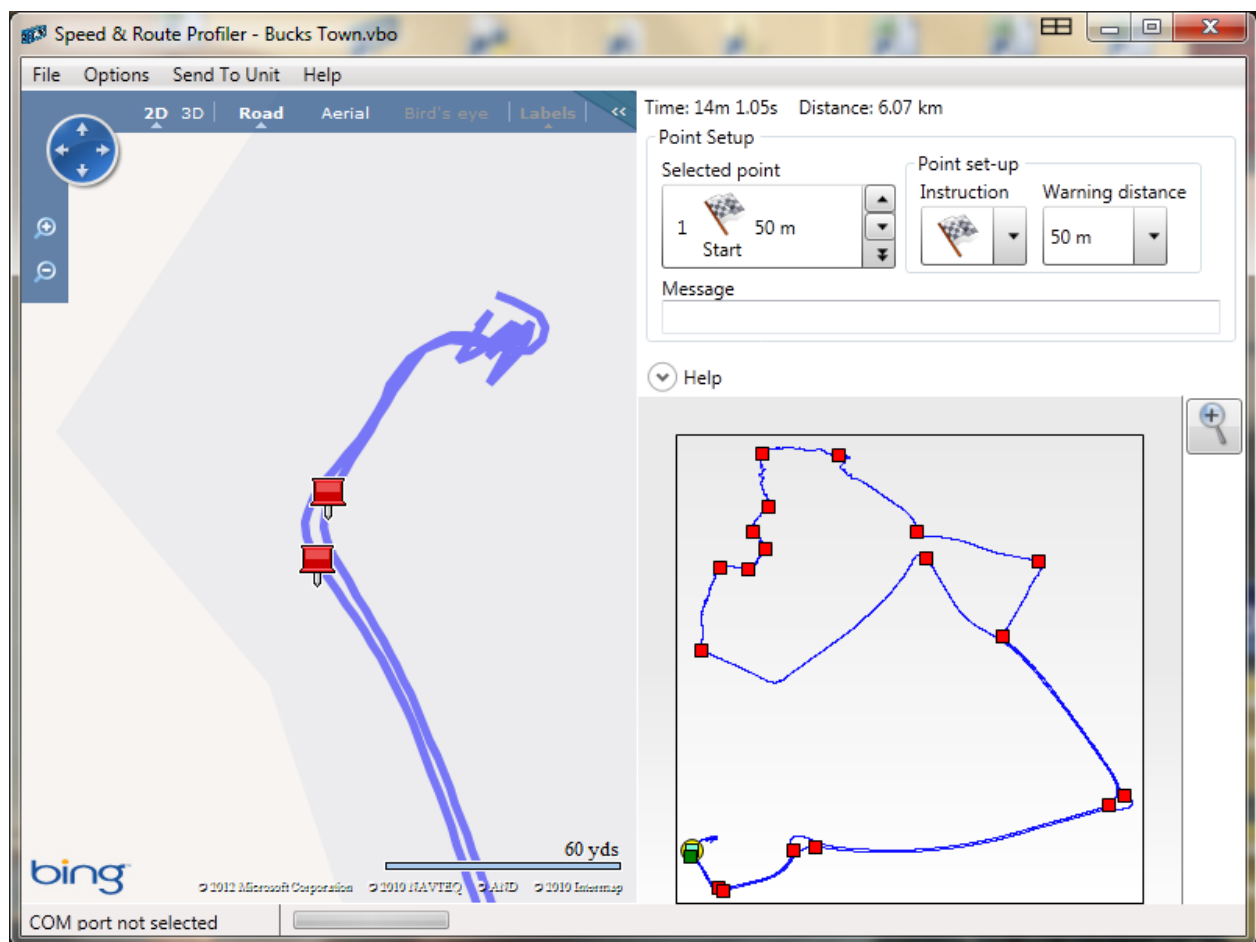
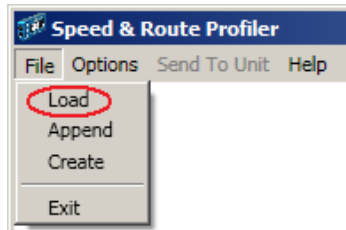
A Route only profile can be created from a Google Earth .KML file and this can then be loaded into Speed Profiler software, see **Speed & Route Profiler Software**.

3. Speed & Route Profiler Software

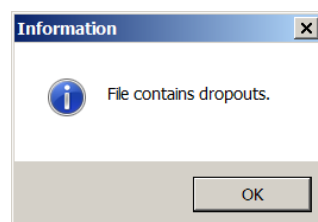
Whatever method you use to capture the data, you will always need to load the **Speed & Route Profiler** software to edit the data and then download it to the OLED unit.

3.1 Create file from driven Route

If you have data from a **Reference driver**, in the form of a .VBO file, you should select **File → Load** and then select the VBO file that the Reference driver has driven. You will see a small help screen indicating how to add or remove points. Click OK to continue. Also see page 9 – Adding or Removing Route Points.

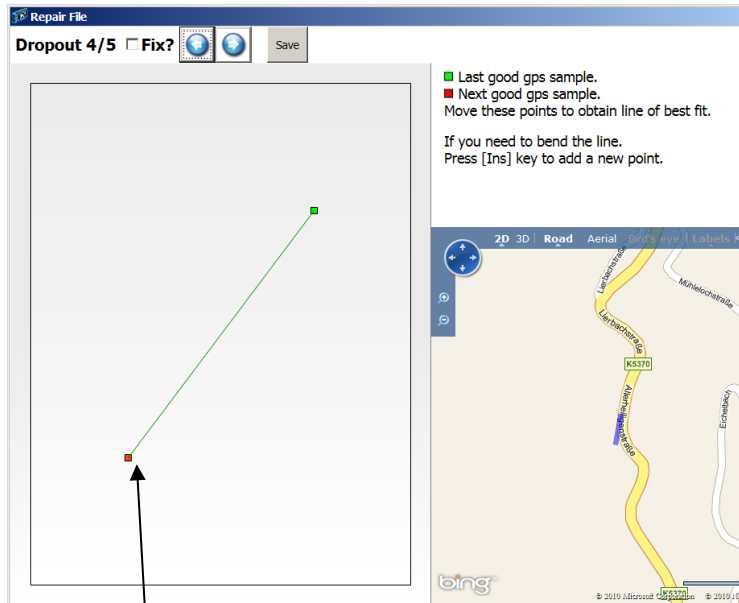


When you load a VBO file, you may notice an information box, warning you that the file contains GPS dropouts.



3.2 File Dropouts

If your VBO file does contain GPS dropouts you will **first** need to repair these by entering the missing data. Click on OK in the information box (shown above), and you will see the following display, indicating in this case that you have 5 dropouts that need to be repaired.

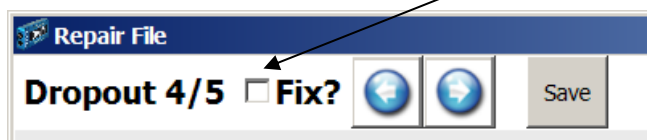


On the left hand side you can see a straight line, indicating the length of the dropout with a green marker showing the **last** good GPS sample, and a red marker showing the **next** good sample. On the right hand side you can see the section of the route where this dropout occurs.

Click on the green or red marker and holding the left mouse key down, move the line such that the dropout appears correctly on your route as shown to the right.



Once you have corrected a point, click on the tick box and you will automatically be moved onto the next point.

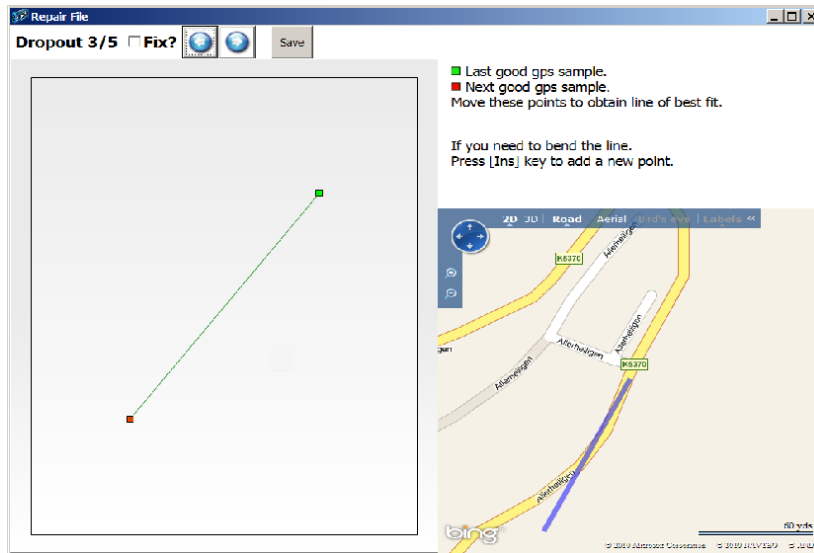


To review each dropout, click on the left or right arrows to move back or forward to the next dropout. You can also check to ensure that you have fixed every dropout, by noting whether there is a tick in the box for each point.

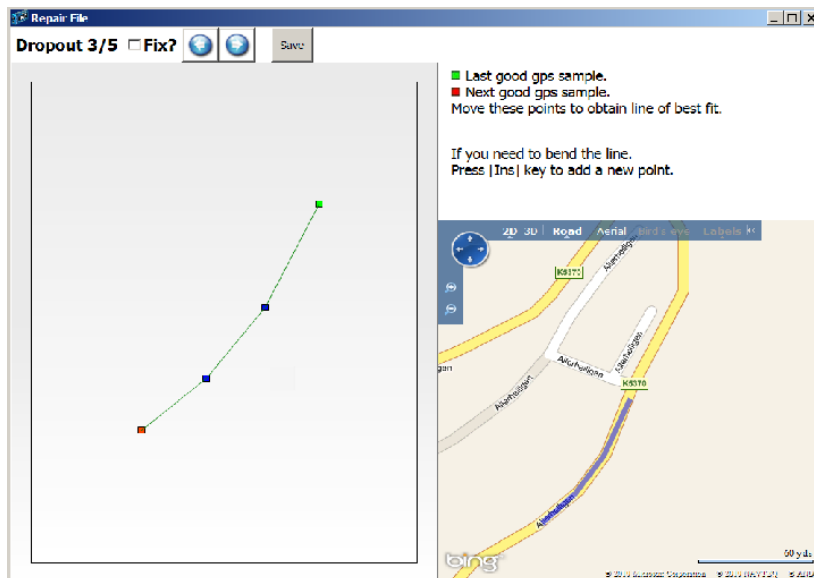
File Dropouts - contd

Insert curved line

In certain cases the dropout cannot easily be fixed by moving a straight line, see the example below.



Press the **Ins** key and a dot will appear in the centre of the line on the left. By clicking on this dot (with the left mouse key), you can move it up or down the line. Alternatively you can press **Ins** again to show two dots, as shown below.

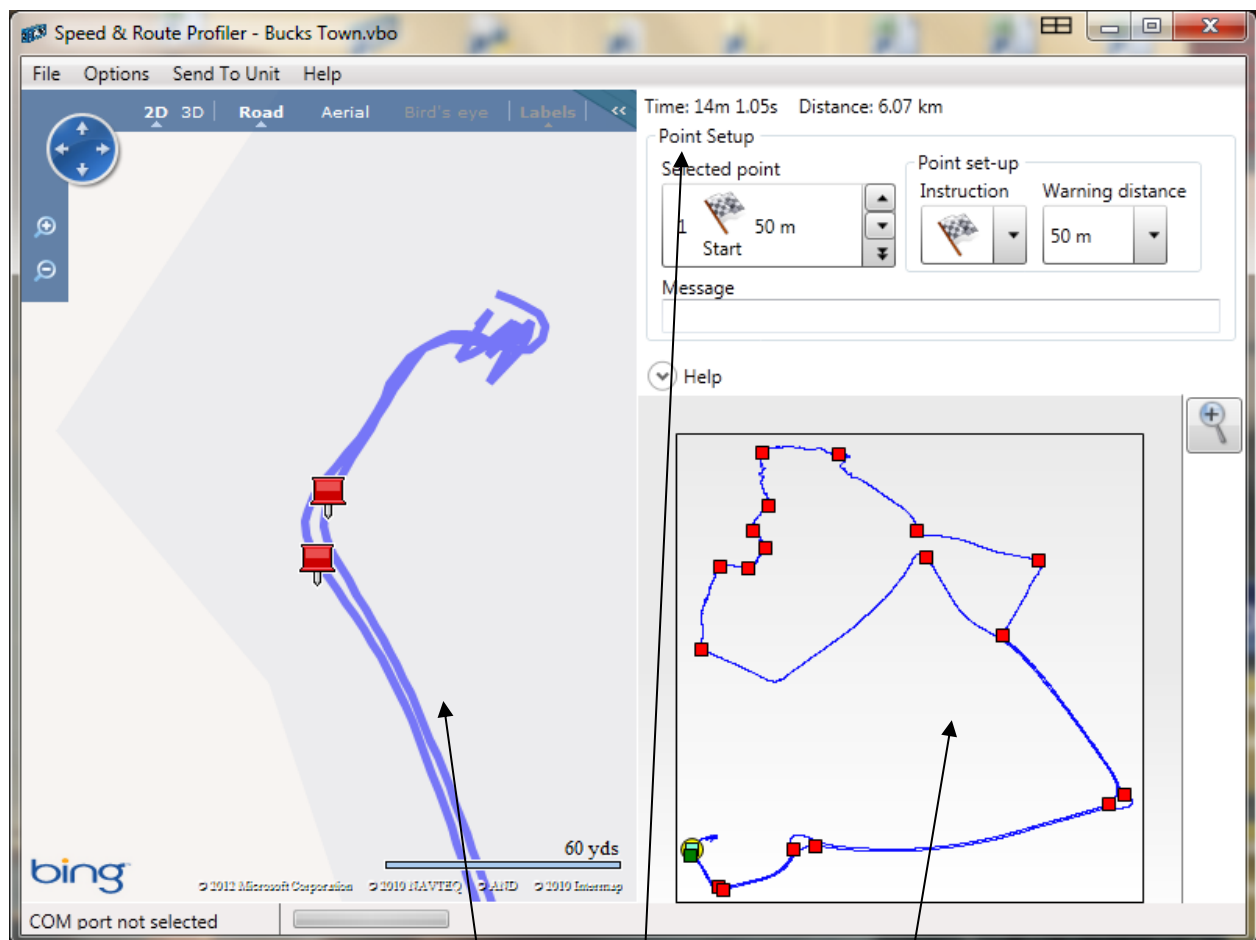


Each of these dots can then be moved up or down the line and can then be pulled to reflect the actual shape of the road. As before left click on the dot and then drag it, to reposition the line correctly on the map.

Once you have fixed all the dropouts, click on **save** and the file will then be repaired and you will be returned to the main screen

3.3 Main screen

When you have loaded a VBO file, and repaired all the GPS dropouts, you will see the screen as below, with the filename displayed at the top, in this case “Bucks Town.vbo”.



The screen is split into three segments; **detail map**, **point setup** and **route summary**.

The first segment, referred to as the **detail map** requires that you have an internet connection and it shows the first part of your route zoomed in and superimposed over a Microsoft Bing map. You will note a number of place markers which are the digital inputs logged on the reference driver's route.

The second segment is on the top right of the screen and this shows information about the **point setup**. This determines what instructions should be given to a driver when he arrives at this point, and what warning should be given before arriving at this point.

On the bottom right of the screen can be seen the third segment which shows a **route summary** with all the logged points shown.

- Red markers denote a point for which there is no point setup information.
- Green markers show points which do have data regarding point setup.
- Blue point, shows the currently selected point – in this case point number 1.
- Yellow circle on the **Route Summary**, shows where the **detail map** is currently centred on, this may not be on any point – as here.

3.4 Add and Remove route points

Add Point

To Add a new route point, click on the nearest point on the **Detail map** and then **pan** around this map by pressing the left mouse key whilst moving the cursor around to find the exact place where you wish to insert a new route point. If necessary

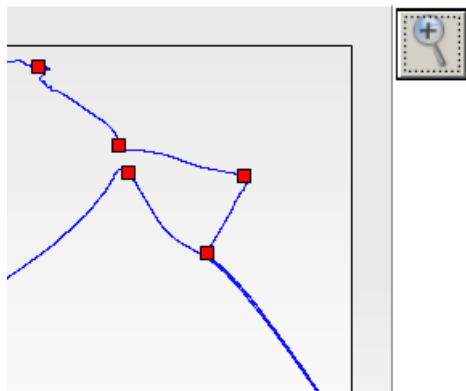


click on the + - zoom button on the **detail map** to see the position more clearly. Once you have found the place where you wish to **Add** a new point, double click the left mouse key to centre on this new point, and then press **Insert** and you will see a new point inserted at this location.

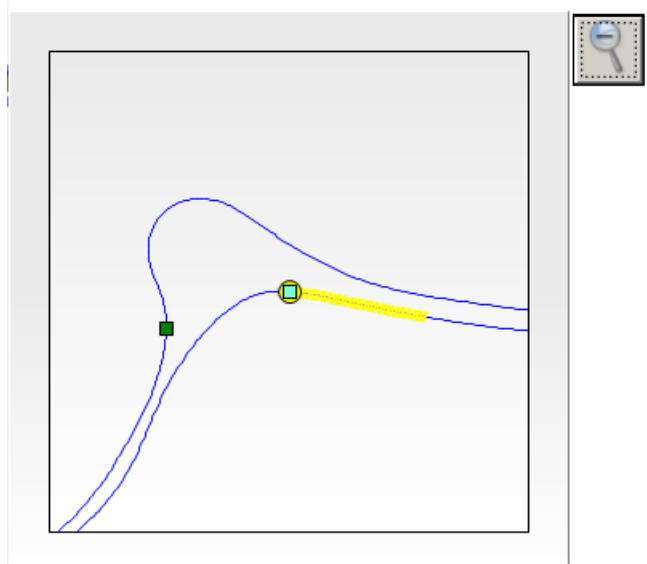
Remove Point

To delete a point, click on the point in the **route summary** so that the point is highlighted, and then press the **Delete** key. Note, you may need to press the **zoom** button to see the points more clearly.

Zoom Route summary



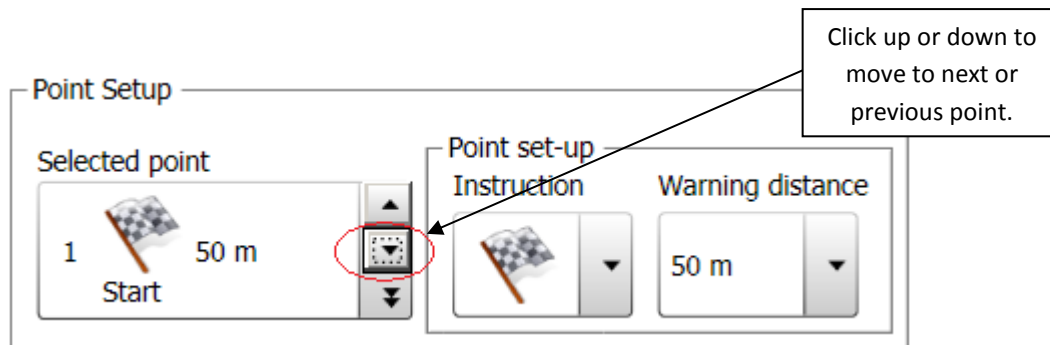
If you click on the zoom button you will see a portion of the Route Summary in much more detail. This will be centred on the point you are currently reviewing. Note you can see the direction of travel by the yellow trail which shows the direction of the previous point. Just click on the zoom button again to go back to the full route summary.



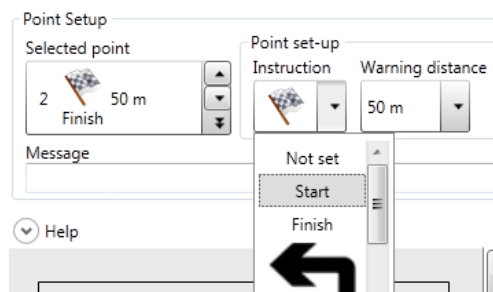
3.5 Point Setup

Whether points have been added using the hand held event marker or by **adding points** as detailed above, you will now need to provide instructions for the **Driver** which will appear on the OLED display. These instructions include an icon which will appear on the OLED, such as a left turn or a roundabout sign and also the warning distance before the **driver** should make the turn.

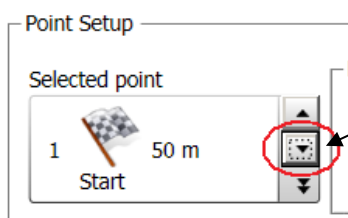
Select the first point, either by clicking on it on the **route summary** or by clicking on the up or down arrow in the Point set-up screen, until you see Selected Point 1.



The first point should always be setup as a **start** as shown. This can be selected by clicking on the arrow below the **Point set-up Instruction** box, as shown below. Next you should setup the warning distance, so that the **driver** is warned this distance before arriving at the actual the point. You can choose between 50m, 100m, 250m, 500m and 1000m.



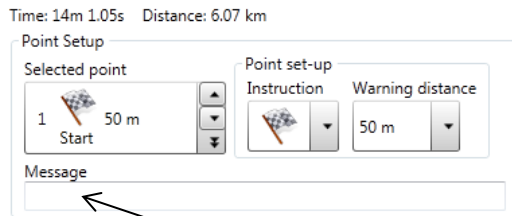
When you have completed setting up the point, you will note that the point in the **route summary** now shows green. To move on to the next point click the down arrow in the **selected point** box.



You will need to set up details for every point on your route. Select both **Point set-up Instructions** and **Warning distances** for each point. The warning distance will be estimated by the program, dependant on the speed of the reference vehicle before this warning point. This warning distance can of course be changed as required.

The last point should always be selected as the **Finish** point.

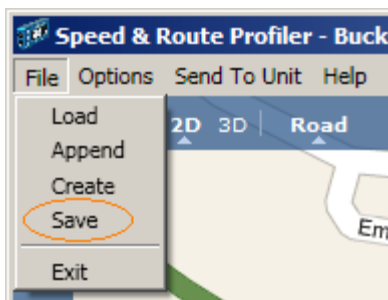
You will notice an option to enter a message below each route point.



Do not enter anything here unless you are intending to create a **Route only Profile**.

3.6 Saving the route

When you have finished editing the points you must **save** the route by selecting **File → Save**, note the file will be saved with suffix SPD (speed Profiler Datafile)

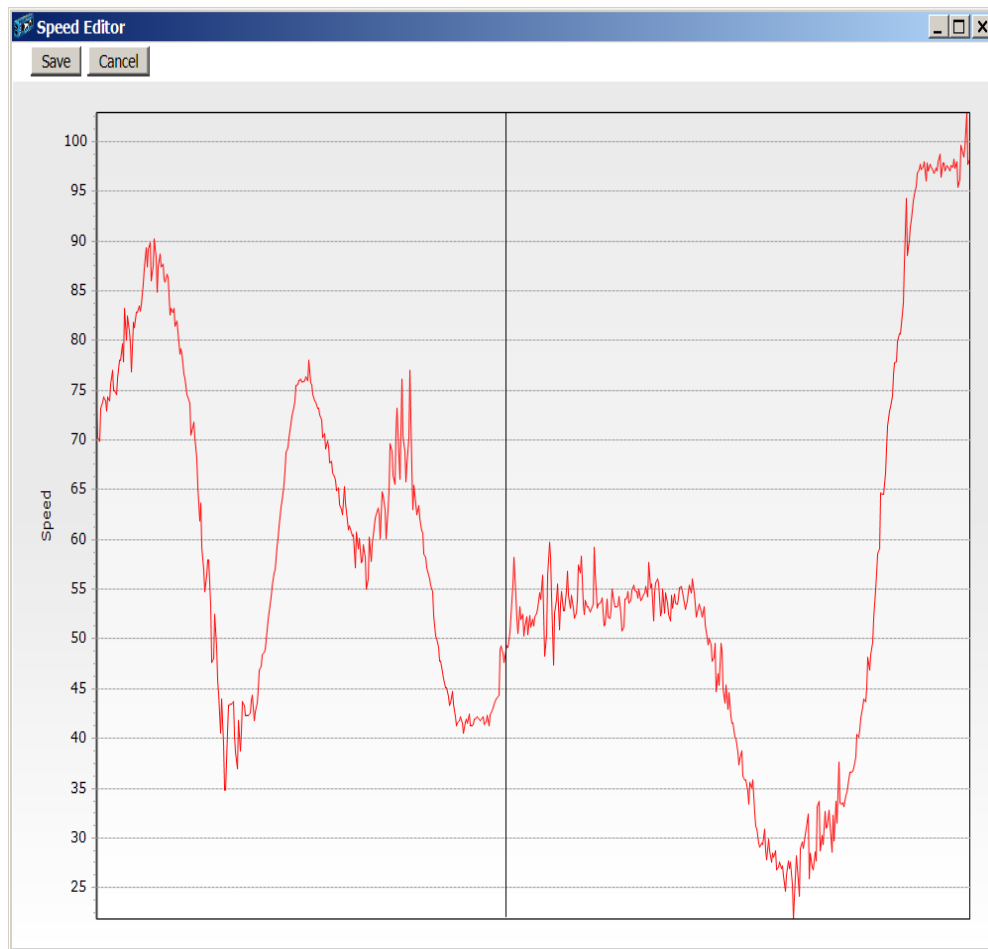


3.7 Editing Speed

Short distance

Under certain circumstances it may be necessary to edit the speed for a small section of the route. This will perhaps be due to a slow moving vehicle driving in front of you on a major road where it is not your intention for a driver to slow down at this point.

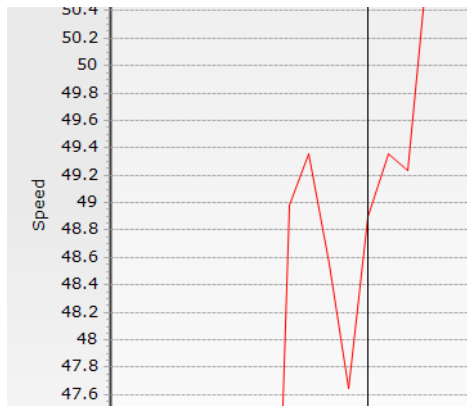
First load an .SPD file into S&R Profiler software (it will not work with a .VBO file) and then select the nearest point on the **detail map**. Next scroll to identify where the speed was reduced. Double click to centre the map, and then press the spacebar to bring up a **speed profile** for this point – and for 500m on either side of this point. The vertical black line shows the speed for the position selected.



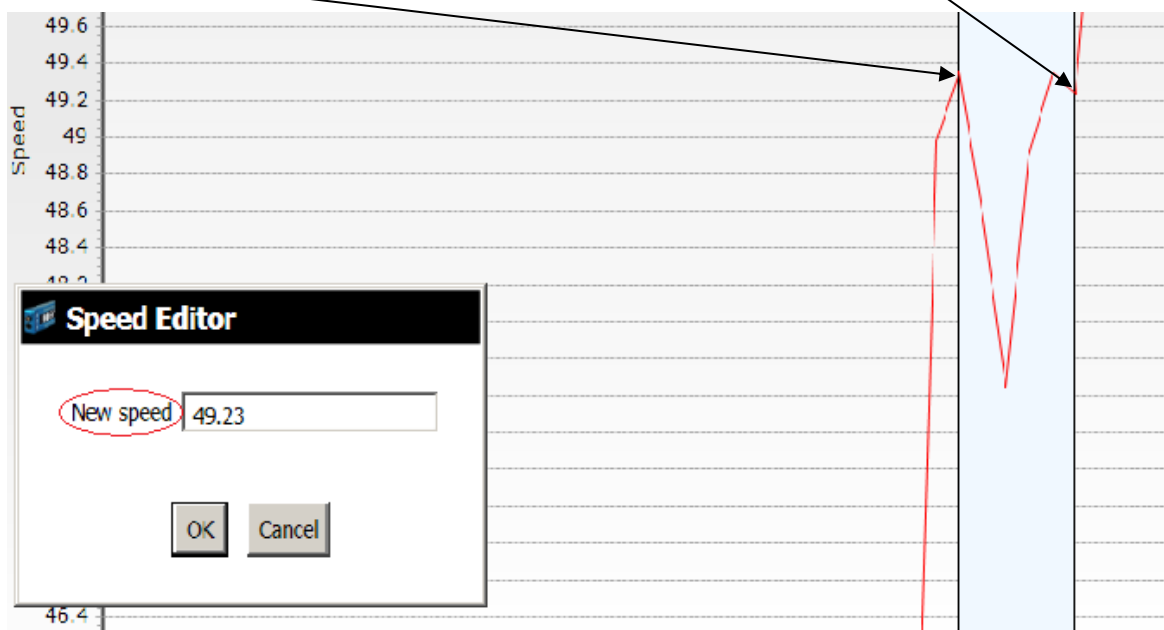
You can zoom in on the graph by holding the left mouse button down whilst scrolling around the graph, this might result in the new graph being displayed as shown on the next page.

Editing Speed - contd

Once you have zoomed in on the graph you will see something like the graph as shown below.

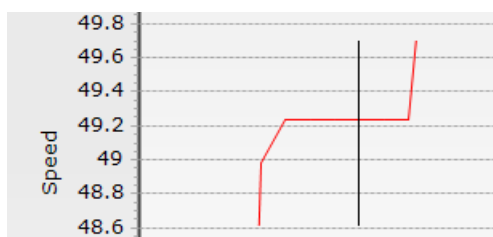


Next, hold down the **shift key** and click with the left mouse key on the start point, where you wish to adjust the speed and then click on the finish point. Then let go of the Shift key.



This will highlight the area as shown above. A Speed Editor box will then appear, indicating the new speed for this section. If you wish to change this speed, simply type it into the New Speed box, and then click OK to accept.

The speed graph will then be redrawn to take this new speed into account, in this case set to 49.23 Km/hr. Remember to click on **Save** to save this changed speed section.



Fixed Speed Section

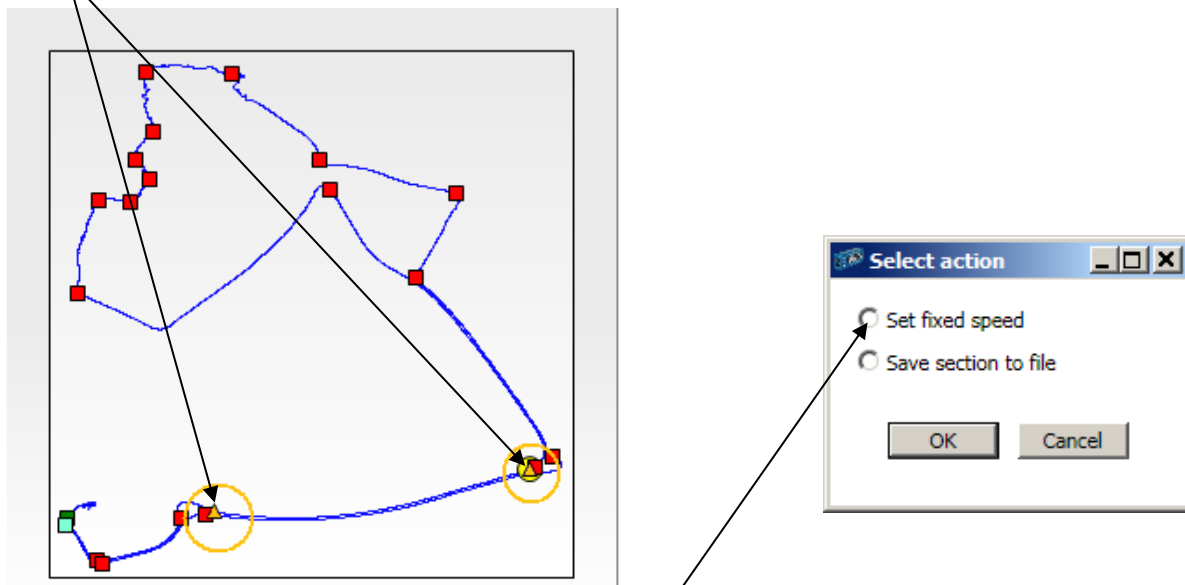
Long distance

Certain tests require a driver to remain at a fixed speed over a long distance, perhaps on a motorway. Whilst the **Reference driver** may attempt to maintain this speed, it may prove difficult, due perhaps to slow moving traffic, yet it is required for the **driver** to try to maintain this fixed speed where possible.

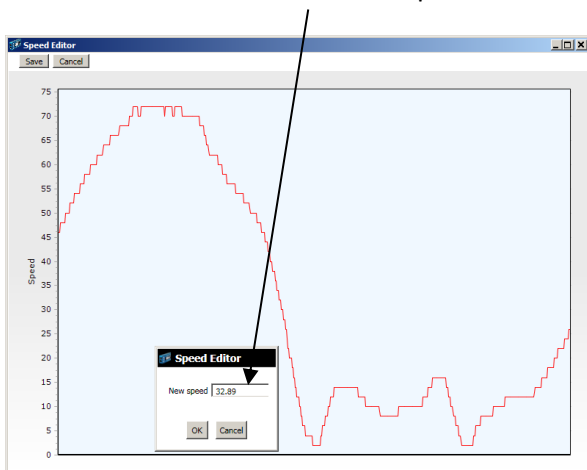
It is possible to set this up within the software by setting a fixed speed between two points.

Having loaded an .SPD file into S&R Profiler software, scroll around the **detail map** to identify the exact start point for the fixed speed section and then **double click** on the mouse to centre the map on this position.

Next, mark the start point, by pressing the **S** key. Now do the same thing for the end point for this fixed speed section. Double click to centre the map again, but this time press **E**. You will notice a small yellow triangle appearing at both the start and end point on the **route summary**.



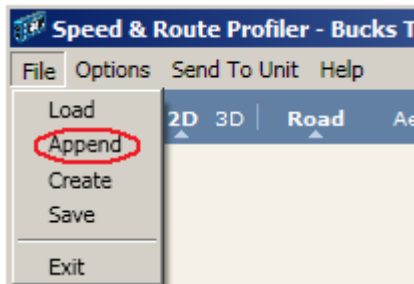
Now press the spacebar, and click on **Set Fixed speed**, followed by **OK**. This will bring up a **speed profile** between the start and end points. You will see the Speed Editor box appear, just enter the speed that you wish to maintain in this box. Then press **Save** to save this **speed profile**.



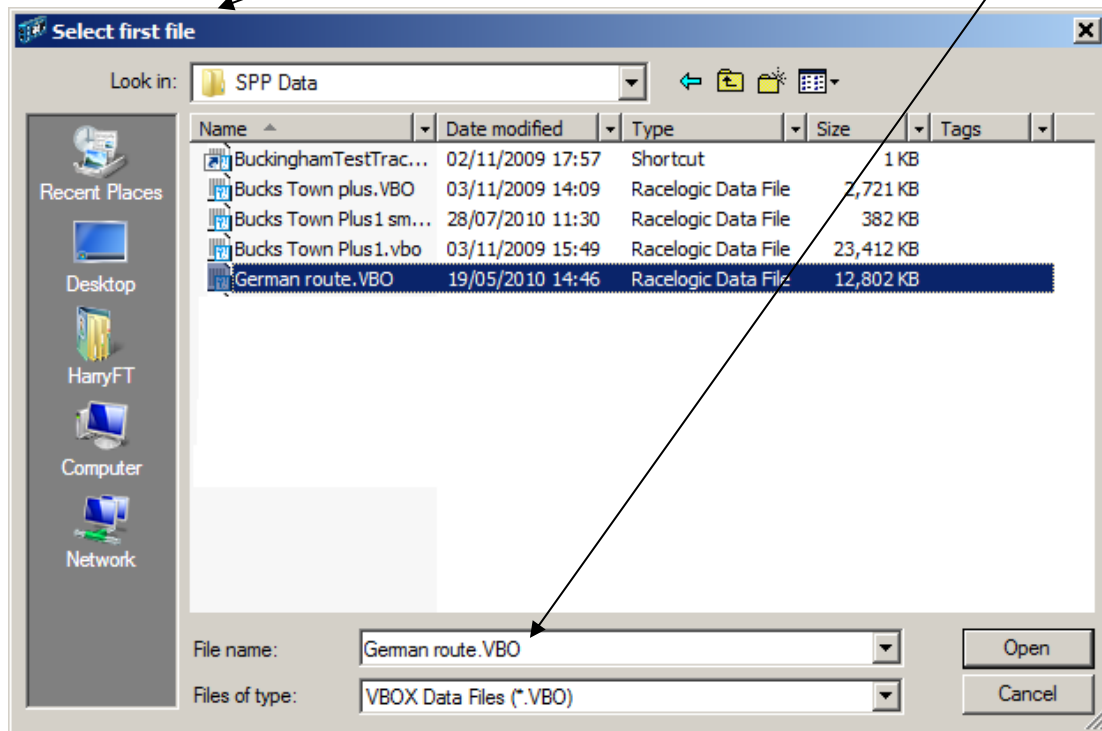
Once the SPD file has been created, any GPS dropouts are repaired and any speed adjustments made, you are now ready to download the file into the OLED display. See page 20 **COMM Ports**.

3.8 Appending VBO or SPD Files

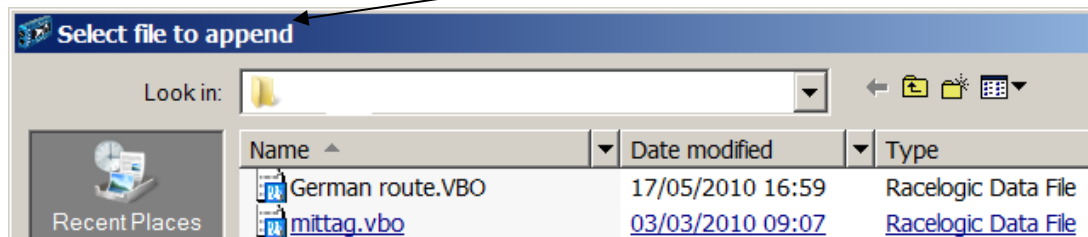
If you wish to join two VBO **or** SPD files together, due to the Reference driver stopping for any reason, then the file option **File** → **Append** should be selected.



At the top of the box, you will see **Select first file**. For now, just enter the name of the first file or click on one of the files in the list.



When you have done this you will see the display at the top change to **Select file to Append**, again enter the required filename into the file name box.

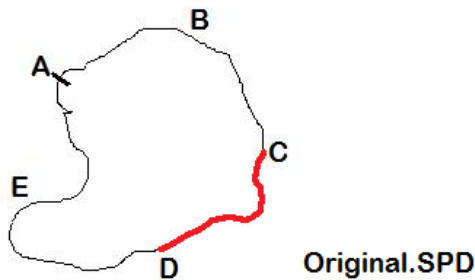


You will now be asked if you wish to append another file. If you do not want to append another file, then select 'no' and enter the filename for the new appended file. **Note** you cannot add an SPD file to a VBO file or vice versa. Just VBO files to VBO files or SPD files to SPD files.

3.9 Editing SPD files

It may be necessary to cut a large SPD file into a number of pieces, or to replace a section of an SPD file where the route has been changed due to a diversion.

Take an example of a simple circuit as shown below, which started and finished at point A, this circuit might be called **original.SPD**. Suppose the route between point C and point D has been changed, so we want to replace this section.

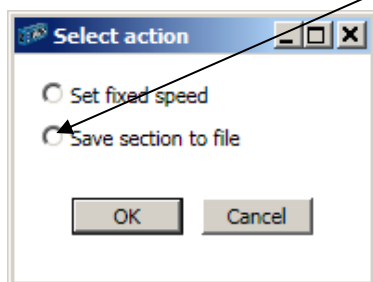


First, load **original.SPD** file into Speed Profiler in the usual way.

Next, we need to cut out section A to C, and save it to file, which we might call **Section 1.SPD**. Very much as we do with the **Fixed speed section**, page 14. Scroll around the **detail map** to identify the exact start point for the fixed speed section and then **double click** on the mouse to centre the map on this position. Next, mark the start point, by pressing the **S** key. As we want to mark the start of the file, we can simply do **shift S**, that is hold the **shift** key down whilst pressing the **S** key. This automatically marks the start of the file as the start point. Note this only works if the first point has been setup as **Start** point within point setup.

Now do the same thing for the end point for this fixed speed section. Double click to centre the map again, but this time press **E**. You will notice a small yellow triangle appearing at both the start and end point on the **route summary**.

Now press the spacebar, and click on **Save Section to file**, followed by **OK**. You can now save section A to C of the route to file name **Section 1.SPD** (or any other name).



Now do the same thing for section D to A, but this time you can mark the end of the file by doing Shift E. Save this file to say **Section 3.SPD**. Note, Shift E will only mark the end of the file, if the last point has been designated as **Finish** point within point setup.

Now add these file sections together as detailed in the section before on page 15 – **Append SPD files**.

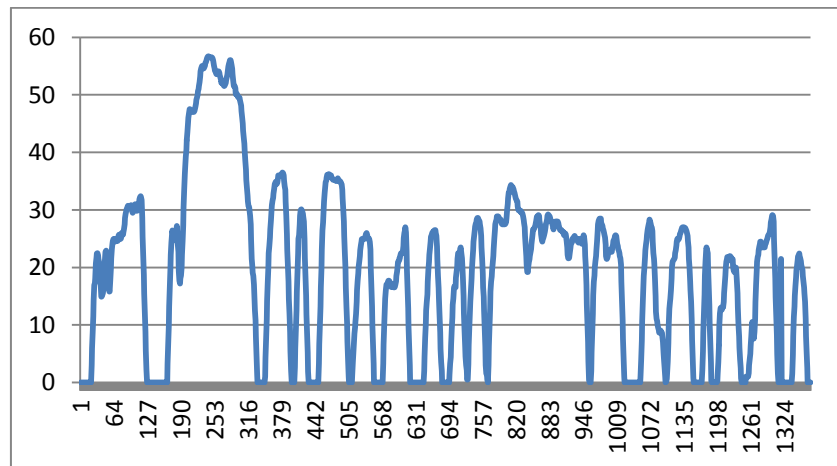
Select the File → Append option and take **Section 1.SPD** file first, then append the new section D to C file. Next append, **section 3.SPD** and save the whole file as **New file.SPD**.

Note, be careful to leave as small gaps as possible at the junction points when you join files together.

3.10 Speed Profile from existing data

In certain cases a speed profile will already exist in a tabular format, such as that shown below. This information is widely available on the internet.

EPA Urban Dynamometer	
Time (sec.)	Speed (m.p.h.)
0	0
1	0
2	0
3	0
4	3
5	5.9
6	8.6
7	11.5
8	14.3
9	16.9
10	17.3
11	18.1
12	20.7
13	21.7
14	22.4
15	22.5
16	etc...



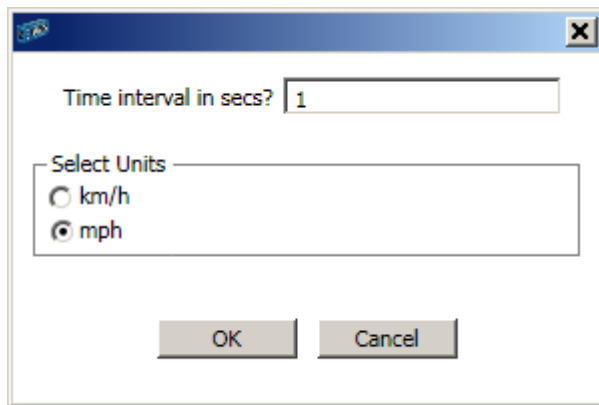
Copy the speed data only into a MS Excel spreadsheet, and then save the file with a suitable name – perhaps ***EPA001.xls***.

The screenshot shows a Microsoft Excel spreadsheet with the following data:

C25	
A	B
1	0
2	0
3	0
4	0
5	3
6	5.9
7	8.6
8	11.5
9	14.3
10	16.9
11	17.3
12	18.1
13	20.7
14	21.7
15	22.4
16	22.5

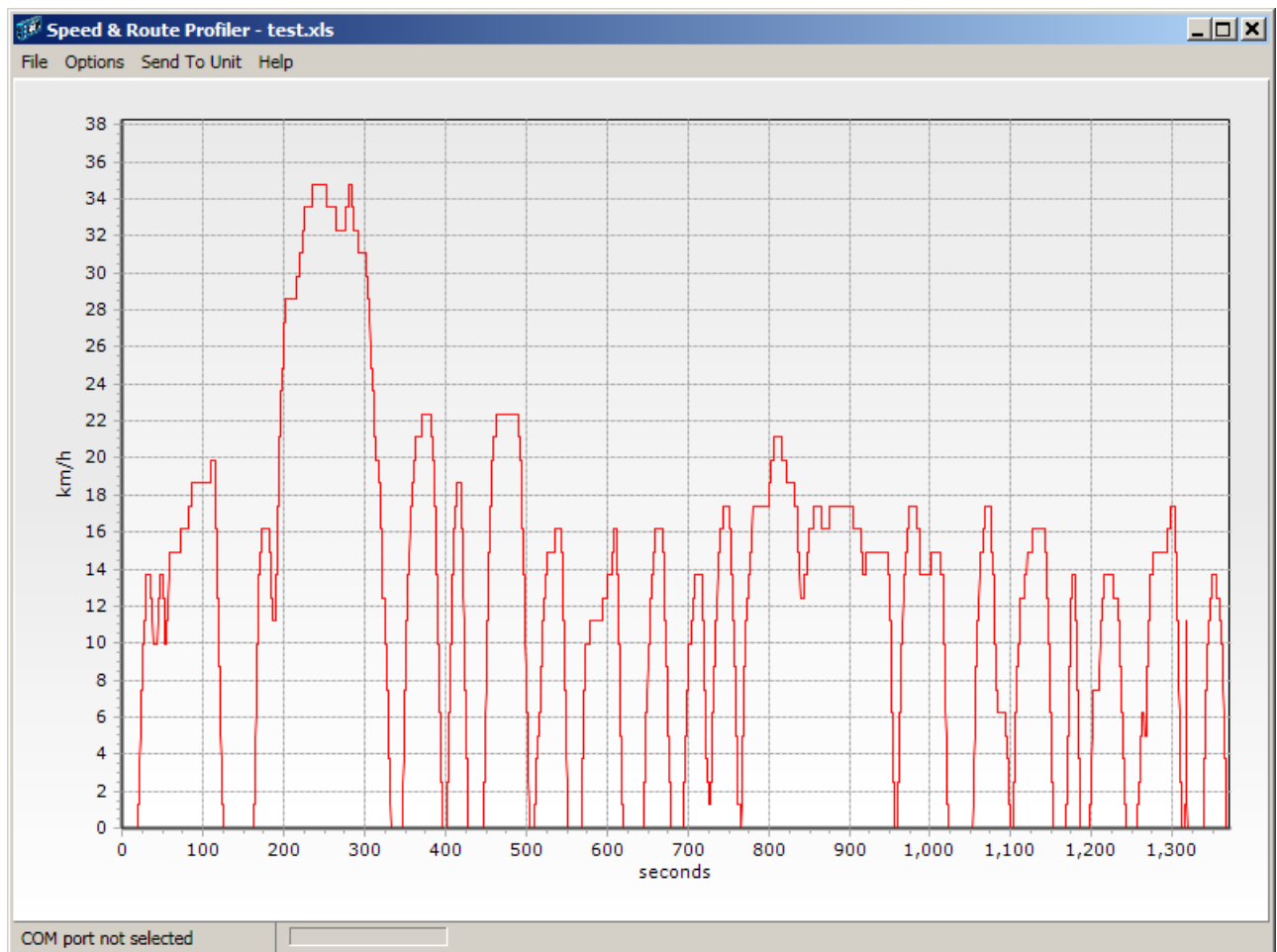
Speed Profile from Existing data – Contd

Now load Speed & Route Profiler software and select **File → Load**, enter the name of the MS Excel file. You will see the box below. In this case the time interval is 1 second and the units are miles per hour.



A dialog box titled "Speed & Route Profiler" with a close button (X) in the top right corner. It contains a text field labeled "Time interval in secs?" with the value "1" entered. Below this is a "Select Units" section with two radio buttons: "km/h" and "mph". The "mph" radio button is selected. At the bottom are "OK" and "Cancel" buttons.

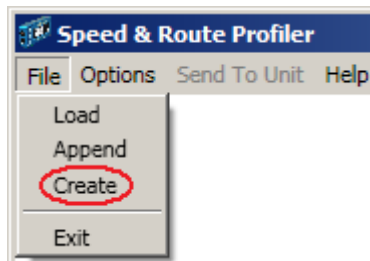
Click on **OK** and the data will then be loaded into the program and the graph of speed versus time will be displayed.



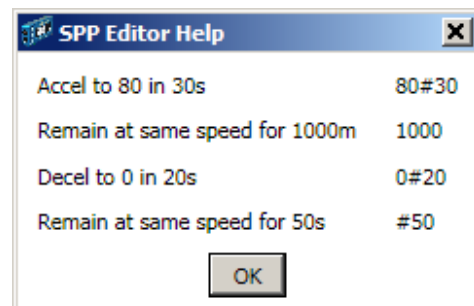
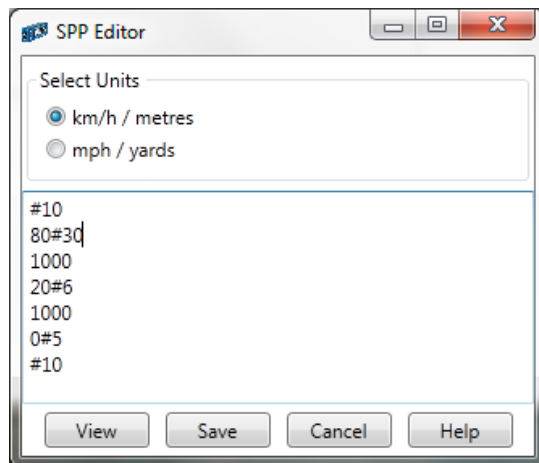
You are now ready to download the file into the OLED display. See page 20 **COMM Ports**.

3.11 Create Speed Profile manually

Another method of creating a Speed Profile is to create it directly by entering the speed and time figures that you wish to achieve. To do this, load the **Speed & Route profiler** software and select **File → Create**.

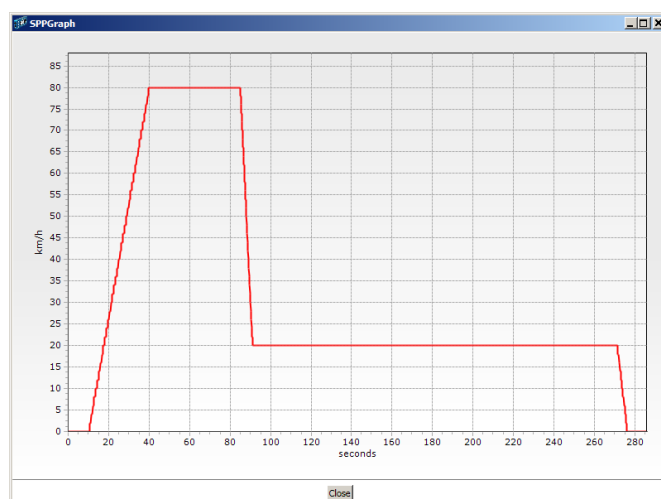


You will see the screen below, and if you click on **Help** you will also see the display on the right.



This will create a speed profile as follows;

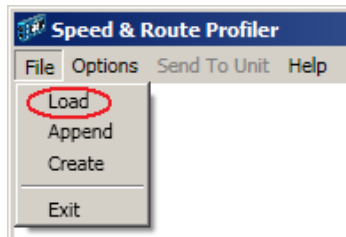
#10	Wait for 10 secs
80#30	Accelerate to 80 KPH in 30 seconds
1000	Remain at 80 KPH for 1000 metres (If mph / yards had been selected, 1000 yards)
20#6	Slow to 20 KPH in 6 secs
1000	Remain at 20 KPH for 1000 metres
0#5	Slow to 0 KPH in 5 secs
#10	Remain at 0 KPH for 10 secs



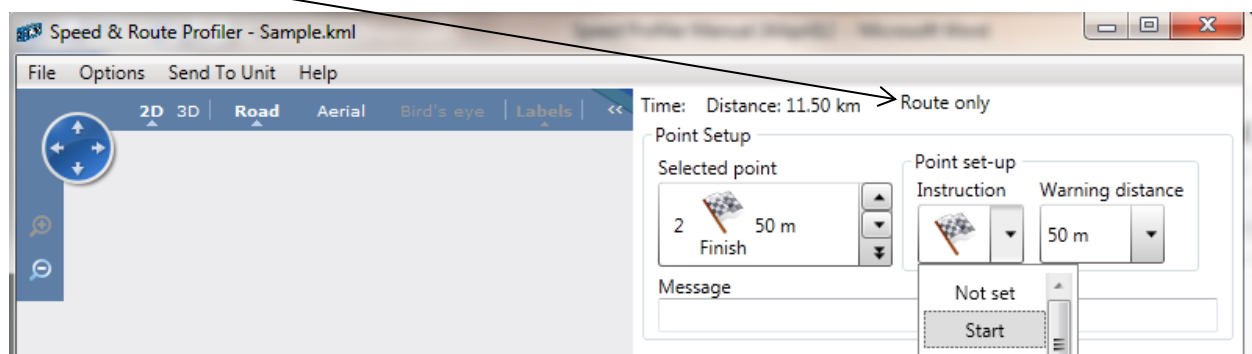
In this case there is no **Route** profile information, only **Speed** profile, so the file is saved as **.SPP** file type. Use **File → Save** to save the file. Once the **.SPP** file has been saved, you are now ready to download the file into the OLED display. See page 22 **COMM Ports**.

3.12 Create Route Profile from Google Earth

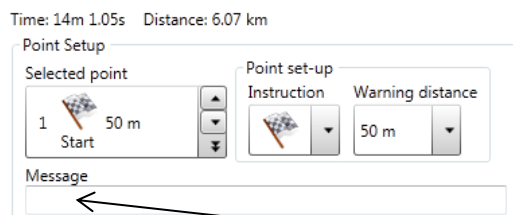
If you wish to create a **Route** profile, where there is no speed profile required, this can be done by loading a .KML file from Google Earth. To do this, load the **Speed & Route profiler** software and select **File → Load**. Then load in the .KML file directly.



Once the file is loaded you will see a note above Point Setup, indicating that the profile is a **Route Only** Profile.



You will next need to **Add route points**, see section 3.4, and then setup each point as detailed in section 3.5, **Point Setup**.



For Route only profiles, it is also possible to add a short message which will be displayed on the left hand side of the OLED display, for instance **Turn Left onto B739**. This message will be displayed at the warning distance for each point.

Note, you must add a minimum of two points, that is **Start** and **End** before you can **Save** the file.

3.13 Options Menu

There are 4 choices under the Options menu; Fix file, COM Ports, Distance units and Language.

3.13.1 Fix file

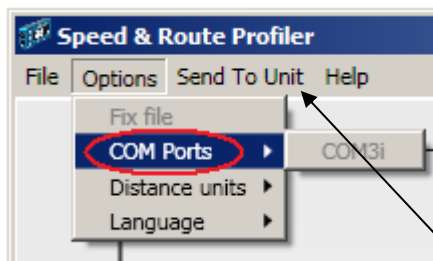
When you load a VBO file you are warned if there are dropouts within the file. If you ignore this warning you can later fix the dropouts by selecting **Fix file** under the **Options** menu.



3.13.2 COM Ports

Once a **Speed & Route profile**, or a **Speed profile** has been setup, you will want to send the data to the OLED display.

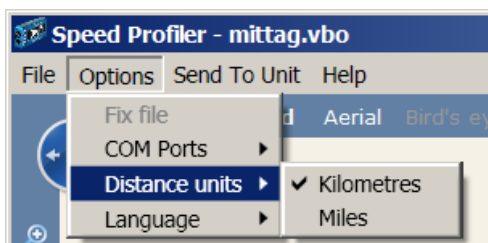
- 1 Connect a serial cable from the PC (you may require a USB to serial convertor) to the OLED
- 2 Click on the **Options** menu, followed by **COM Port** menu option. This will show the available COM ports. Click on the required port to select it so that it becomes active.



- 3 Finally, click on **Send to Unit** in the toolbar, see section 3.12. The file will then be uploaded to the OLED and will erase any previously loaded data.

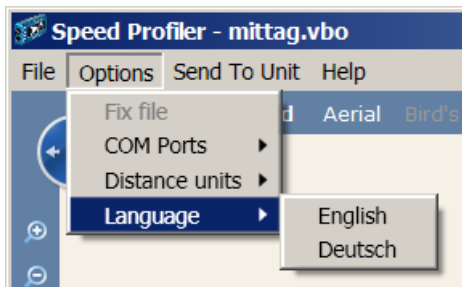
3.13.3 Distance Units

You may either select metric (kilometre) or imperial units (miles)



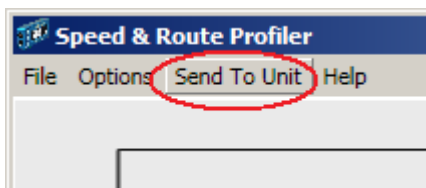
3.13.4 Language

This option allows you to select between Deutsch and English language. Selecting this option changes the language to Deutsch and will cause the program to restart.



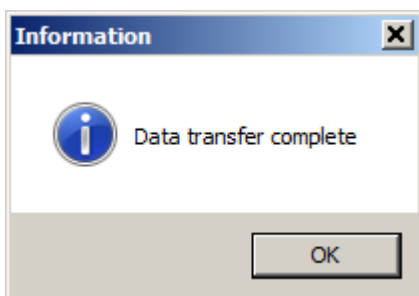
3.14 Send to Unit

To download either a **Speed Profile .SPP** or a **Speed & Route profile.SPD** to the OLED, click on **Send to Unit** in the toolbar. Note, you must first have setup the correct COM port, see section 3.11.2 above.



Note, Speed & Route Profiler is able to store a maximum of 10 routes, subject to a total maximum of 8 hours. Therefore you could have 10 off 48 minute routes, 2 off 4 hour routes or 1 off 8 hour route. The choice is yours. However, you can only store routes of the same type, that is either **Speed Profile.SPP** files or **Speed & Route Profiles.SPD** but NOT a mixture of both.

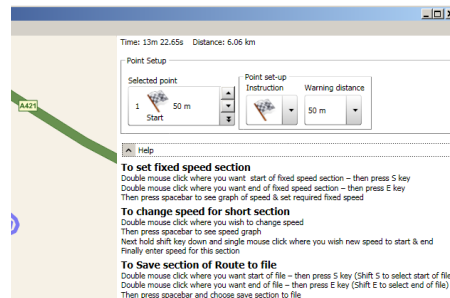
Providing there is space on the display unit, subject to the 8 hour limit mentioned above, the file will then be uploaded to the OLED. The OLED screen will show **Updating Map Information**. Once the Speed Profile has been sent to the OLED a small screen will show that data transfer is complete, as shown below.



3.15 Help

There are two options under the **Help** menu option. These are **About**, which shows the version number of the software, and **manual** which loads a PDF copy of the manual.

In addition you will see a help menu just below the Selected point information. This helps with the Various double click options.



4. Equipment Setup

The driver should fix the OLED display to the vehicle windscreen such that the vision of the road is not impaired. The OLED should be connected to the VB Micro using a CAB077 cable, and the VB Micro should then be connected to the cigar lighter power supply using a CAB060 cable. Finally connect the GPS antennae ACS018, and fix it using the magnetic mount to the centre of the vehicle roof where it has a clear view of the sky.

5. Menu options on Speed & Route Profiler

There are a number of options on the **Speed & Route** profiler which enable the user to set the **language**, **brightness** and the **distance units** etc.

Press the down arrow on the OLED display, followed by the **square button** to select these Menu options.



Contd

5.1 Language

Press the **square button** to change the language from German to English.

5.2 Brightness

Press the **square button** to change the brightness of the display screen. 1 is least bright and 5 is most bright.

5.3 Invert screen

Pressing **the square button**, changes the display from white print on black screen, to black print on white screen.

5.4 Tolerance

Pressing the **square button** takes you into a sub menu, and allows you to set **Over** and **Under Speed** ranges, and a **Route Deviation** distance.

The **Over** and **Under speed** ranges allow a tolerance before the Speed up/slow down arrow is shown on the OLED display. Pressing the square button allows you to cycle between 2, 5 & 10 Km or MPH /hr tolerances.

It is also possible to alter the distance before the OLED display reports **Wrong Route**. This **Route Deviation** distance is originally set to 30m but may be increased to 50m or 100m, by again pressing the square button. This is useful where the GPS SATS were low or in a built up area such that the positional accuracy is poor.

Select **Back** to return you to the other menu options.

5.5 Clear Journey

This allows the user to clear journey information and start again. Once this is pressed the user will be returned to **Drive to Start**.

5.6 Show % Time variance

If this is activated (by pressing **square key**), then the percentage time variance will be displayed on the right hand side of the display. This information will disappear if a route direction is required.

5.7 Show Actual Time Difference

If this is activated, then the actual time variance in seconds will be displayed on the right hand side of the OLED display.

Note, both of these time functions cannot be used at the same time, as there is not enough space on the display

5.8 Display Graph

This allows you to select two different display screens for the OLED. If you do not select **Display Graph**, you will then see the display below;



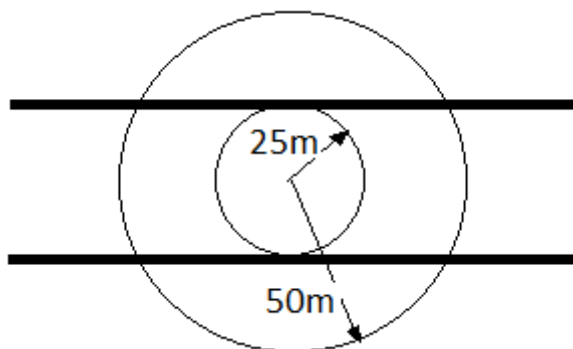
On the left you can see the actual speed of the vehicle with the ideal speed in the circle to the right. There is an arrow indicating slow down or speed up between the two speeds.

If you do select **Display Graph**, you will then see the ideal speed profile shown for the past 4 ½ seconds and the next 4 ½ seconds. This shows you more clearly how the speed profile will change over the next short period of time.

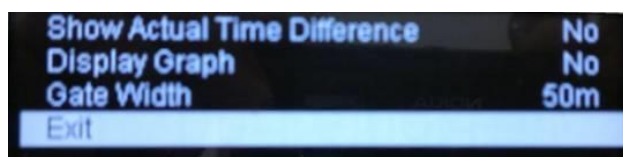


5.9 Gate width

Each point on the route, including the start and finish, is effectively a point anywhere within a 25m or 50m radius circle. Normally this area, or gate width, should be set to 25m, in areas of bad or noisy GPS reception however you may need to set the gate width to 50m.



This setting can be changed in the Menu. Press the square key to toggle between 25m and 50m.



5.10 Routes

Speed & Route Profiler is able to store a maximum of 10 routes, subject to a total maximum of 8 hours. Therefore you could have 10 off 48 minute routes, 2 off 4 hour routes or 1 off 8 hour route. The choice is yours. If you select the Routes option, you can then see the names of each route. Cursor down to the required route, and then press the square button to select that route.

5.11 Exit

Returns the User to **Drive to Start** or to **Menu**.

6. Driver Operation

Initially you may see LOW SATS on the display. However, once more than three satellites (SATS) are received on the unit, the driver will be prompted to **Drive to the Start**.

Alternatively the driver may press the down arrow and then the **square button** to select the menu option. Then cursor down to **Routes** (or any other option) to choose which route they wish to follow. Cursor down to exit, and you will see the **Drive to start option**.

He/she should then follow the instructions on the screen as shown below, or on the alternative graph screen (see display graph option on the previous page);



In this example, the driver is driving at 60 KPH and is being advised to slow down to reach the target of 55 KPH. In addition the driver is being warned that he will need to turn left in 110m.

The current speed is shown on the far left, with the ideal speed to be achieved shown in the circle in the middle of the screen. If the driver is going faster than the set speed, then an arrow will point down, indicating that the driver should slow down. If the driver is going less than the set speed, then the arrow will point up, indicating that the driver should increase their speed. This arrow can be configured to appear when the actual speed is 1, 2, 5, or 10 Km/h away from the reference speed. See page 22, **Tolerance → Over & Under Speed range**.

6.1 Route Instruction

When the driver reaches a set distance from the marked point then the display beeps and turn instructions will appear on the right hand side of the display alongside a bar graph which will count down from this set distance. The warning distance is variable for each point and can be set within the Speed Profiler software. At the turn point, the display beeps twice.

If the driver misses this turning by more than 30m, (this distance can be altered, see page 22 **Tolerance**), then the system will show **WRONG ROUTE** until the driver returns to the correct route. Note that the display will not direct you back to the set route. See page 25 for all **Display messages**.

At the end of the route, the OLED shows the total time variance from the reference driver's journey.

During the route you can choose to have either the percentage time variance or the actual time variance in seconds displayed on the right hand side of the screen. You can choose to hide or display this information under the Menu options, see page 23, **Show % age Time Variance**. This information will be interrupted by any route instructions that have been set as a marked navigation point is approached.

At the end of the journey the driver should press the square button on the OLED display to **start a new journey**.

6.2 Journey pause

Should the driver wish to pause the journey for any reason, then the square button should be pressed on the OLED, this will pause both the route and variance time. Once the journey is to be started again, and after SATS are received, the square button should be pressed again to resume operation. Before the journey is resumed, you must ensure that you are in the same physical location as when the journey was paused.

7. Display messages

Wrong Direction	The driver is on the right route, but is going in the wrong direction.
Wrong Route	The driver is NOT on the right route, but was on the right route within the last 120 seconds.
Low Sats	This is displayed If satellites (SATS) are less than or equal to 3.
Locating your position	The driver is OFF the route completely and more than 120 seconds have passed since the driver was on the route.
Journey cancelled	The driver is on the route now, but the driver had previously been off the route for more than 120s. Note, remember to press the pause button (see page 24) if you need to pause your journey for any reason. Journey cancelled will be displayed if the driver has taken a detour or if the driver perhaps took the wrong route but then found his/her way back to the right route. If this detour took longer than 120 seconds, then the display will show Journey Cancelled as any time variance from the master route will be invalid.