

# Gerald's Column

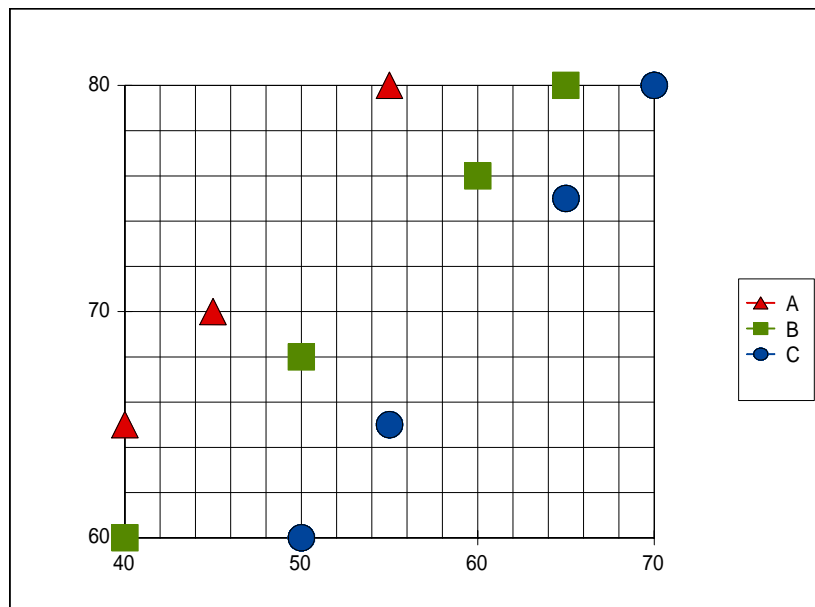
## by Gerald Fitton

It never fails to surprise me when, out of the blue, many people ask me the same question at the same time. The topic which, after what seems like years of hibernation, has emerged from its sleep is Fireworkz Charts and particularly what are called X-Y graphs. These are graphs in which co-ordinates are of the form (x,y). One popular example is the cumulative fuel consumption of a car; a change in slope indicates a change in performance; another example is plotting the closing value of one or more shares and their moving averages.

### A Scattergraph

The difference between a Chart and a Graph is that a Graph has numerical values on both the Y and X axes whereas a Chart can have non numerical values, such as the name of a newspaper, along the X axis.

In this article I describe, complete with worked example, a particular sort of X-Y graph which has no lines! As you'll see in the graphic below, it consists only of points; there are three series of points but no lines. It is a sort of scattergraph which, at least for this month's article, is without lines of best fit (which we'll get around to in a later article along with the effect of changing the grade of fuel from 'standard' to 'premium' unleaded).



In the printed version of the Archive magazine you won't be able to see the colours but, take my word for it, all the points are colour coded!

There are three red triangular, four green square and four blue circular points; these correspond to the A, B and C series respectively. Of course there could be many more data points in each series and you can have more series if you want them. Three will be enough for my example. By using Fireworkz to create the graph, it remains alive. As points, series of points and lines (such as the moving average or the line of best fit) are added, the graph will be automatically updated to show the extra data points and lines.

## The Data file

The part of the file containing the data is shown in the screenshot below. The feint (grey) lines do not print (unless you specifically want them to). I shall refer to the cells by column and row; for example the cell b12 contains the upper case "A".

	a	b	c	d	e	f	g	h	i
1									
2		Series 1 Data			Series 2 Data			Series 3 Data	
3									
4		A Series			B Series			C Series	
5		40	65		40	60			
6		45	70						
7					50	68		50	60
8		55	80					55	65
9		60	85		60	76			
10					65	80		65	75
11								70	80
12		A Series			B Series			C Series	
13									

If you are looking at this screenshot in colour (see below) you'll find that each data series is enclosed in a coloured box, red for A, green for B and blue for C.

You will find the original file, [Data], complete with graph on the Archive monthly disc and also at <http://archive.abacusline.co.uk>. I encourage you to experiment with (a copy of) this file and to contact me at [archive@abacusline.co.uk](mailto:archive@abacusline.co.uk) if you need further guidance.

## Adding Points

Click on the empty cell b7 and enter the value 50. Tap the <Tab> key to move the 'input focus' (the cell holding the cursor) to the right. The value 50 will appear in cell b7. Enter the value 75 (into cell c7) and tap <Return>. The value 75 will appear in cell c7 immediately. After a short delay a new red triangular point will appear on the graph at coordinates (50,75).

If you add values to the Series 2 block then extra green square points will appear on the graph. Similarly, values entered into the Series 3 block will add blue circular points.

You do not have to enter the new data 'in the right place'. You could have entered the point (50,75) in (b10,c10) or (b11,c11) rather than (b7,c7) and the result on the graph would have been identical.

## **Adding and Deleting Rows**

Place the cursor anywhere in row 8 and tap the <F7> key three times. Three new rows will be inserted into the data block above row 8.

If you fill these extra rows with extra data then extra points will appear on the graph. The whole spreadsheet is 'live' so that the graph will always be up to date.

Place the cursor anywhere in row 8 and tap <F8> three times. This action will delete three rows starting with row 8 and working down the document. If any of these three rows contain data then that data will be deleted as well; the points corresponding to the deleted data will be removed from the graph.

## **Sorting**

Mark the block h5i11 and bring up the Sort menu by tapping <F6>.

Sort on column h in Ascending order (no tick in the Descending order box).

You will find that the data in the block h5i11 will be sorted with blanks at the top and the data at the bottom. The data will be sorted on column h. Of course the graph does not change because the block h5i11 still contains the same data as it did before sorting!

## **The Document**

I shall describe this document, [Data], in three parts. The data extends down to row 12; the graph appears approximately over rows 14 to 27; and there is text in row 29. If you look at the last screenshot of this article you will see what it looks like when it is printed.

One of the features which makes Fireworkz so popular is that you can print a page (or many pages) containing data, graphs (as many as you like, exactly positioned on the page where you want them) together with the text which is illustrated by the data and graphs.

## **Effects**

Those of you who have followed my writings over the years will know that I am averse to using an Effect when I can use a Style. In this document I have had to use Effects to create the red, green and blue boxes which enclose the data - as far as I know there is no way of creating a 'Box Style' (but I'm willing to learn)! With the exception of the coloured 'Boxes' the appearance of the document is controlled entirely by applying nine Styles.

## **The Document [Data0]**

On the Archive monthly disc and on the website, I have included a file called [Data0]. It contains the data but no graph and no coloured boxes. You can use it to repeat the process of adding the coloured boxes and creating the chart.

Use a copy of [Data0] and not the original!

I suggest that as you experiment you should have both files, [Data] and [Data0], on the screen at the same time. Keep comparing what you produce with my version!

## **Coloured Boxes**

Although it is not essential to construct fancy coloured boxes to surround the different data series, you will be surprised how much easier to read, modify and even understand what is happening if you do take some care with your layout. If you are going to print, in colour of course, your document (data, graphs and comment) and use it in a presentation then your readers or audience will really appreciate this feature of Fireworkz.

Of course, instead of printing out the Fireworkz document you can arrange to display it page by page to illustrate a spoken presentation. I receive much correspondence from users for whom Fireworkz is their first choice for live presentations - remember, the graphs are 'live' and change as points are added, edited or deleted from the data. Also, remember that you can prepare your presentation using RISC OS and then use the file on a Windows machine (with Fireworkz for Windows loaded) to make your presentation!

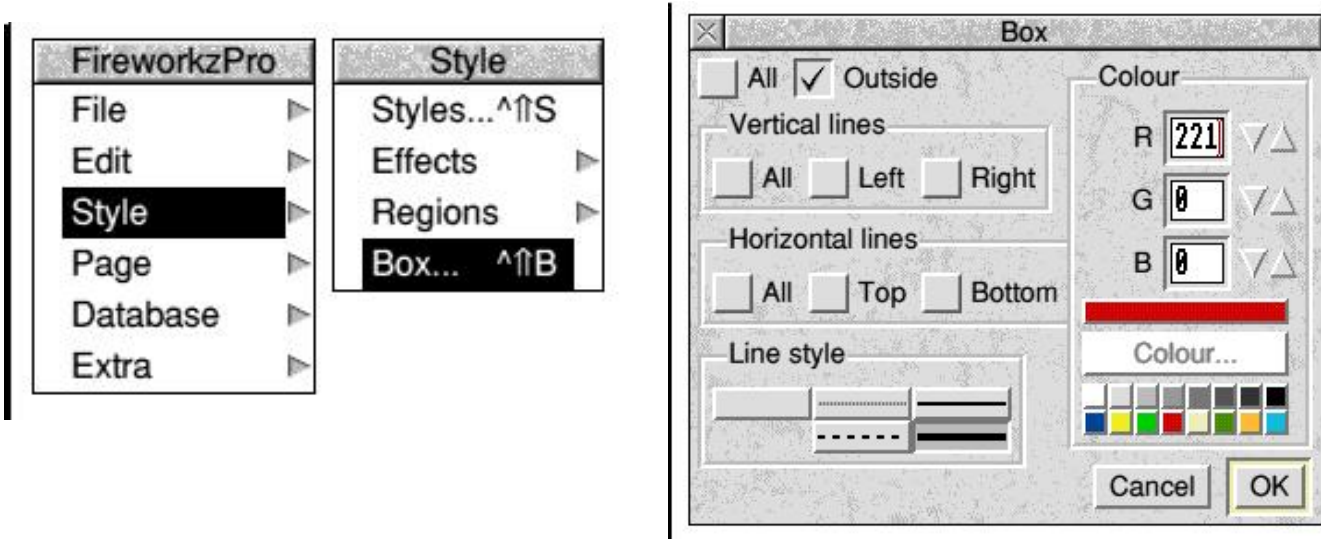
It is the data in b5i11 which is used to produce the graph. The three blocks of data for the series A, B and C are contained within 'boxes' which, as I look at my screen, are coloured red, green and blue respectively. These coloured 'boxes' are Effects rather than Styles.

If you wish to Sort the data (see above under the heading Sorting) or if you wish to add or remove rows then you have to be careful about the way in which you select and define the coloured borders of the boxes.

I suggest that you use [Data0] as your starting point for the exercise which follows.

Mark the block to which the 'Box Effect' is to be applied.

The first 'Box' for the Series 1 Data is the box around cells b4c12. Mark this block and then call up the Box sub menu with either <Shift Ctrl B> or through the Style - Box... menu shown in the screenshot below.



From the screenshot of the Box sub menu (above) you will see that I have selected Outside lines (surrounding the block b4c12); the lines are to be red; the Line style I have chosen is the thick continuous line (the choice at the bottom right of the Line style selection).

Click on the OK button and the block b4c12 will be surrounded by a red box.

Now to the tricky bit.

Mark the block b4c4. Then, in the Box sub menu, select the Bottom radio button from the Horizontal lines section of this Box sub menu. Retain the thick continuous line and retain the red colour; click on OK.

Mark the block b12c12 and select Top (also remove the tick from Bottom). Retain the thick continuous line and retain the red colour; click on OK.

Let me explain why this is the 'tricky bit'.

If you use some other sequence to draw these red boxes then you are likely to finish up with (for example) a red line attached to the Top of the block b5c5. If you do this and Sort the data and, if as a result of the Sorting, the data in Row 5 moves down, then the data (from Row 5) will bring down with it the red line which is 'attached' to its Top! You do not want these spurious horizontal red lines to appear when you Sort the block. Some other operations (such as inserting a row) will do unwanted things to horizontal or vertical red lines if you vary from this sequence.

Let me make it clear, I am not saying that the method I have described is the only one which works (I can think of other methods); I am saying that I think it is the easiest if you want to understand what's happening. Whatever method you use you must ensure that:

- (a) you avoid attaching red lines to cells which might be moved;
- (b) you must have a red Vertical line covering both of the two cells between which you wish to insert a row;
- (c) you must not delete a row to which a wanted Horizontal red line is attached.

When you are satisfied that you know how to produce the red boxes have a go at the other two series, Series 2 and Series 3, selecting green and blue colours respectively. By the way, the green I have chosen is the green three from the right of the colour picker and not the second from the left.

## **Protection**

As we shall see later, the data block includes rows 4 and 12. We do not want these to be corrupted in any way. To ensure this I have applied the Style 'Protect On' to both.

Of course the text (eg "A Species") has to be inserted before the protection is applied. If you wish to change the wording from "A Species" to something else then you will need to remove the protection by applying the Style 'Protect Off'. If you don't do this then you will get an error message advising you that the cell is protected.

To apply protection to a complete row, double click on the row number (the number 4 in the left margin) to highlight the row, click on the Style button (the S which is the eighth button from the left on the second row), click on the Protect On Style followed by Apply.

## **Row 2**

If you look carefully at Row 2 you will see that I have 'merged' the cells b2 and c2. In my view (and after much experience of trying to correct unwanted Effects) I have concluded that the best way of creating wide cells like this is to use a couple of Styles.

Most of the cells are 2 cm wide. That is because the BaseSheet Style defines the column width as 2 cm. I have applied the Style 'Col Wdth 0' (which has zero width) to c2 and the Style 'Col Wdth 4' to the cell b2. The cell b2 is 4 cm wide and c2 is of zero width.

Similarly I have 'merged' e2 with f2 and h2 with i2.

To jump ahead more than somewhat I have applied the Style 'Col Wdth 16' (16 cm width) to the cells in row 29; I have applied the zero width Style to c29c29.

I find this method much 'safer' than the drag,<shift> drag or <adjust> drag techniques suggested in the Fireworkz User Guide. I agree that it does take longer to define Styles to do this but, if anything goes wrong, or if you wish to change your mind, then corrections and adjustments are much easier and can be executed much more reliably.

## **Now Check Your Work**

Try inserting rows, deleting rows, sorting rows 5 to 11 (inclusive) and make sure that the coloured boxes remain intact and that they behave as you want them to. Only then are you ready to create the graph from the data.

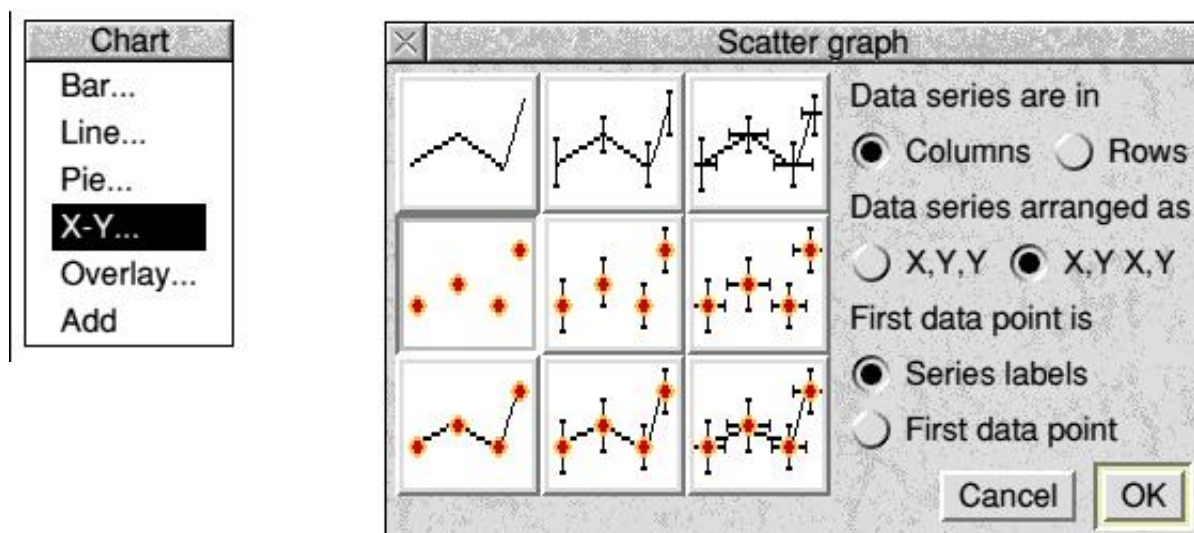
## Mark the Block of Data

Mark the block b4i12. This is the block which contains all the data. Note that it includes the 'header' in Row 4 and the 'footer' in Row 12. A 'Data series' is defined by its start and end points. Including Row 4 ensures that a new row inserted between Row 4 and Row 5 will be included in the 'Data series'. If we had excluded Row 4 from the block and then inserted a row (between Rows 4 and 5) then this new row would not be included in the 'Data series'

The more observant of you will have noticed that Column d is blank. d4d12 contains no data. Fireworkz is 'intelligent' enough to notice this and it ignores the blank column.

## Choosing the Type of Chart

Having marked the block click on the Create chart button (the sixth button from the left on the top row) which looks like a bar chart. The Chart menu will appear.



Click the mouse <select> (left) button on the X-Y... option and the "Scatter graph" sub menu will open. As a by-the-way, when you see an option with three dots at the end of it such as X-Y... then clicking on it will open a sub menu (and the menu containing the option with the three dots will close; my screenshot has been slightly faked - both the Chart and Scatter graph menus can not be on the screen at the same time).

The type of Scatter graph we want is points with no lines, the first option of the second row. Now let's look at the options on the right of the Scatter graph sub menu.

The Data series are in Columns. Click on Columns.

The Data series are arranged as X,Y X,Y (and not X,Y,Y). Choose the second option.

The letters A, B and C in cells b4, e4 and h4 are the labels for each of the three series. We could have had longer words (eg a name such as "Fuel Used" for the series) if we wanted. These three cells are referred to as the "First data point" and they are Series labels rather than a First data point (which, in any case, would have to be a numerical value).

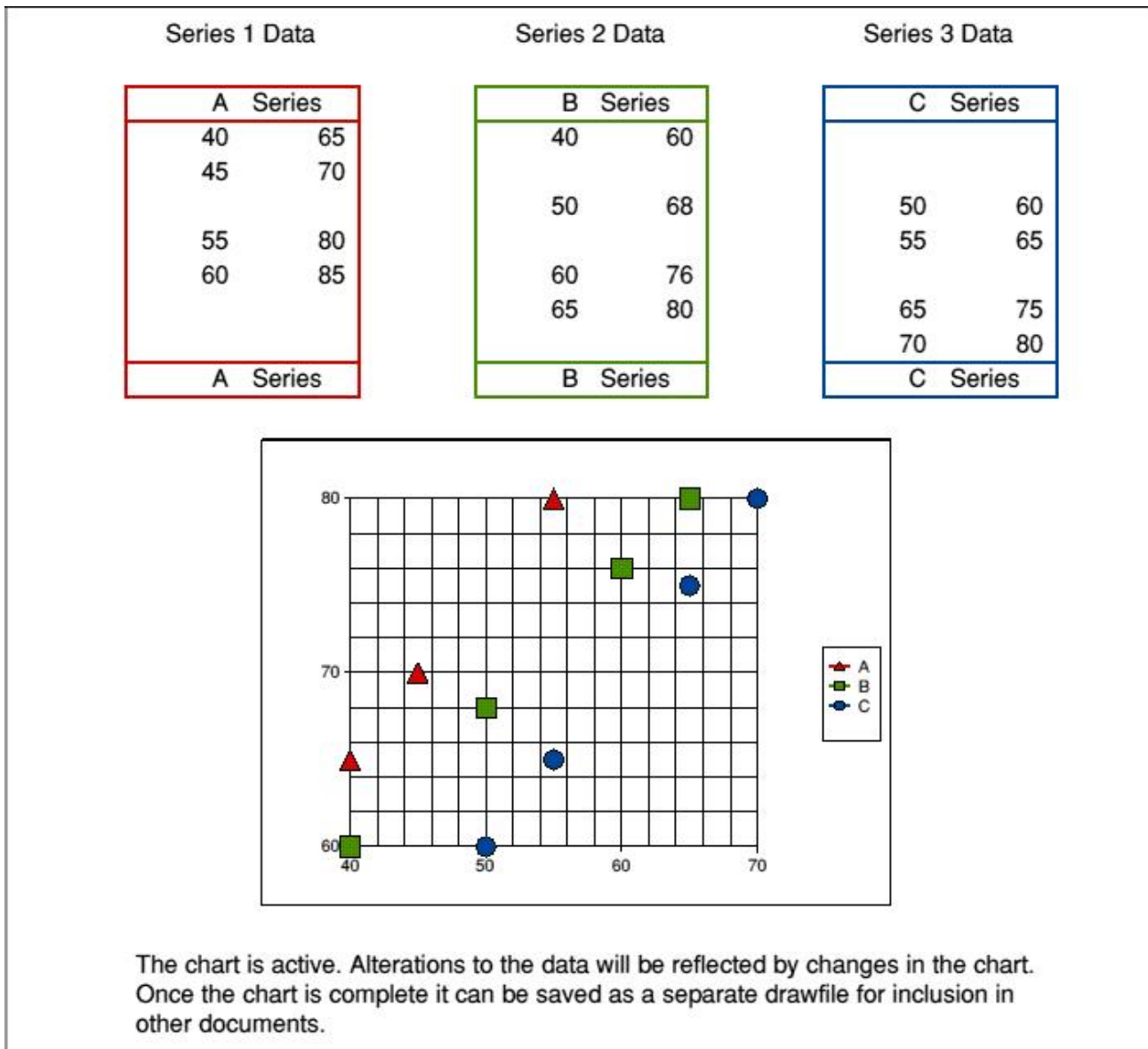
Fireworkz is 'intelligent' in its selection so it will get many of these options right.

Click on OK and the Scatter graph will appear just below the data. It can be repositioned by selecting it and dragging it around the page as you might do in Draw. You can position it with more precision if you hold down the <Ctrl> key whilst dragging.

## In Use

I shall continue from this point in next month's article. In the meantime here are a couple of things to think about.

The screenshot on the next page is the sort of thing you would print or use for your projected display. You will see that I have removed the faint grid lines but I have left the (coloured) lines surrounding the blocks of data. You do not need to do this for printing; the faint lines are not printed but they will show in a display.





You can use Fireworkz for RISC OS to create this document and, when you come to do your presentation, you can use Fireworkz for Windows for the (projected) display or on the machines used by your audience. Of course you can print it out using either RISC OS or Windows machinery.

The graph is 'live' so you can edit individual points or series during your demonstration. Using a feature such as `set_value(destination,source)` or by loading a CSV file you can easily add additional series to the chart in front of an audience.

## **Communication**

For Archive correspondence, please write to me at <archive@abacusline.co.uk>. For Living with Technology, please use <lwt@abacusline.co.uk>. Finally, for technical assistance with PipeDream or Fireworkz, please write to <goldline@abacusline.co.uk>.

You will find copies of all the files used in this article at <http://archive.abacusline.co.uk>. In order to access the password protected area you must enter the username "archive" and the Password "amusement".