

Gerald's Column

by Gerald Fitton

Since writing my articles on monitors and back up storage I have had many interesting letters about those two subjects and suggestions for many more subjects. Sifting through the requests it would seem that what you want me to deal with next is printers. First some other points.

Squashed lines

In Publisher but not in Style you can get the strange effect of lines being squashed vertically (on screen as well as the printed version).

Choose your base (normal) style and edit it with <Ctrl F6>. Click on the Paragraph radio button and you'll see that one of the options is to lock to the line space grid (not available in Style). If you do lock to the grid then you'll find the occasional line is squashed vertically.

Danny Lawrence reported this in last month's Archive (issue 8.9 p10) but attributes the problem to his BJ300. He doesn't say what software he's running, and he may have an unrelated problem, but he does say that he's noticed it in Archive – and I know that Archive is produced with Publisher.

The option to lock to the line space grid does not exist in Style but, if someone sends you a document with that attribute to a style built into it then Style will accept the lock just as if you'd created it – but you can't get rid of it!

A difficulty you'll have with Style is that, if you created such a document in Impression II (where locking to the line space grid worked rather better than it does in Publisher) then you can't get rid of the lock in Style!

A TurboDriver problem

A couple of people who had 2 Mb machines have reported to me that printing anything but the smallest files with their Turbo Driver caused the machine to hang with a variety of error messages. The exact nature of the error message depended on what was running at the time. They fitted more RAM (4 Mb) and the problem went away (almost).

It seems to me that this is another example of memory management problems (by RISC OS?) which (from my correspondence) seems to affect those packages such as Fireworkz and Style which dynamically vary the amount of memory they claim during execution. The memory management problem seems to arise if two packages want to change the amount of memory they are claiming simultaneously (if that's possible). So if you have one package working away hard in the background (eg the printer) wanting to claim (or release) memory and you have another package (say Fireworkz) which also wants to do the same thing, then RISC OS gets mixed up and (if there isn't enough memory to go round) it loses its pointers!

A work around seems to be to avoid doing two things at once! For example, don't try to scroll the screen whilst printing is taking place in background. But doesn't that workaround rather negate the usefulness of background printing?

Fireworkz Pro

The latest version of Fireworkz Pro is version 1.22.

Colton Software have a special offer running between 1st June 1995 and 31st July 1995. If you buy Fireworkz Pro or if you upgrade to Fireworkz Pro from an earlier Colton Software package then during this special offer period they will send you, free of charge, a copy of Fireworkz for Windows (but ask for it). Fireworkz for Windows is usually £99 (plus VAT and postage). At some future date, for a fee, you will be able to upgrade your Fireworkz for Windows to Fireworkz Pro for Windows.

How much have I won on the lottery

It's only a few days since I received my Archive but already I've been asked this question (and other similar or related questions). Perhaps my remark "my second law of gambling will allow you to make an unfair bet" was taken by you to mean that I was justifying to myself that it is OK for me to bet on the lottery.

Some Chinese sayings convey wisdom in the same cryptic way as our proverbs. Perhaps the best known is "May you live in interesting times". This saying has its full impact only when you realise that it is not a good will wish but a curse! Less well known is the saying "May all your wishes come true". Was it in Greek mythology that Midas was granted his wish that all he touched would turn to gold? Unfortunately he embraced his beloved daughter. Perhaps you'll see how this seeming good will wish can also be interpreted as a curse.

I've won nothing on the lottery because I've never bet on it. Winning the lottery is a wish which I don't want to come true! I'm not sure why but Paul's comment on the inside cover of issue 8.9 has helped. Perhaps somebody can explain to me why I don't feel the same way about premium bonds. Maybe I'm just being inconsistent but somewhere deep down I feel the National Lottery is immoral.

Let answer another of your questions briefly. My first law of gambling is "Never bet on certainties". After I've received enough comments (and if Paul allows me space) I might tell you why. By the way, this law, like my second law, is not moralistic but pragmatic and (hint) part of my Management Decision Making course.

Systems – Some General Principles

Now to printers.

If there is one piece of general advice which you should heed above all others it is that you should think in terms of the whole system rather than just the computer box.

By this I mean think of the monitor, printer, back up storage and your software packages not as isolated parts but as elements which contribute to the efficient functioning of your whole system.

Back in the days of the BBC (around 1980) the things you could do with a computer were very limited compared with the range of things that you can do now. Features which we almost take for granted now such as multitasking, high screen resolution, millions of colours, high resolution printouts were dreams of the distant future. With these new features you can do new things—but only if the rest of your system is of a standard such that you can take advantage of them.

The cost of the average home computer system has increased but this is not just because of the increase in the cost of the main box. Let me explain by using the monitor as an example. The cost of a monitor suitable for an Archimedes is much higher than the cost of the monitor for my old BBC B. This increase is not because the price of a 50 Hz 14" Microvitec (suitable for a BBC) has increased but because such a Microvitec would not be suitable for an Archimedes. Fitting a cheap old fashioned (modes 0 to 7) monitor to an Archimedes would drag down the performance of the overall system to an unacceptable level. To take advantage of the Archimedes you need at least a 17" multisync monitor and a larger one would be even better (if you can afford it).

To a slightly less extent the same thing applies to back up storage (floppy discs, hard discs and the like). If you want to store large, multi coloured sprites then, if your only back up storage is floppies and a 40 Mb hard disc then this will unacceptably limit your creativity.

Now to printers. Perhaps you are one of the few but growing number of Archimedes users whose main output is video or music, perhaps you use your Archimedes to do sums and just want to see the answer, but, if not, then it is almost certain that you don't generate documents or pretty pictures just to be viewed (or photographed) on screen. No! You want to print them out and you want to print them out to a standard which reflects the quality of the rest of your system. It is false economy to hook up your Archimedes to a low quality printer!

Early Printers

At the College where I have my day job we still have a golf ball printer! We also have a few daisy wheel printers. Every character is perfectly formed and, particularly if a carbon ribbon is used, the print quality is excellent. Even though they use the serial rather than the parallel port, printing is fast; this is because the printer receives 8-bit character codes rather than building up the letters dot by dot. By the way, the golf ball uses EBCDIC rather than ASCII coding so we have an old BBC computer which acts as an ASCII to EBCDIC converter between the word processor and the printer!

One shortcoming of these early machines is that printing is usually mono spaced (like Corpus) and usually at only one point size. Such a printer is fine if you are happy to limit your output to mono spaced, single size text (without graphics)—if you use one regularly then I expect that you have a simple word processor as your major piece of software. Perhaps you don't really need a high powered Archimedes—probably you aren't reading this! But let me know if you are.

The Dot Matrix Printer

Moving on, in the early days of PCs (early 1980s) the definitive dot matrix printer was the 9-pin Epson FX80. I still have one and I do use it with my Archimedes for tractor feed labels. I remember how pleased I used to be with the graphics output but, when I open my dusty files (usually to look up an old college assignment) I find that they don't look as good to me now as they did at the time! I'm a lot more critical now.

Under my high power laboratory microscope (a present from Jill) some many years ago I measured the dot diameter of my 9-pin printer and found it to be about 0.015" (which is about 0.35 mm). The FX80 has a graphics printing mode which professes to produce 216 dots per inch vertically. To save you doing the arithmetic, $1/216$ " is about 0.0046", one third of the dot diameter! At this dot pitch the 0.015" dots overlap. This overlap gives the impression that the image is smudged—you don't really get a resolution of $1/216$ ".

During the late 1980s I received documents printed on 24-pin printers and I subjected them to the same microscopic treatment. What I found was that the dot diameter is about 0.005" and, at a nominal resolution of $1/216$ " the dots appear to just touch. A 24-pin printer does give a better graphics output than a 9-pin at the same dot pitch because the dots don't overlap. It does give a genuine resolution equivalent to about 200 dpi.

During the last five years I have received many documents produced on 24-pin colour printers. The better ones have a ribbon containing four colours. I will deal in more detail with printing in colour and in shades of grey later in this article. For now let me say that it is difficult to produce the right colour balance with a dot matrix printer unless you use a new (or nearly new) ribbon.

You can still buy dot matrix printers. The prices vary from £150 to £500; the usual difference is the number of internal fonts. If your interest is mainly character printing in monochrome then dot matrix printers are fast and economical. However, if you want to print graphics in monochrome or colour then you may be disappointed.

The Laser Printer

Laser printers used to be much more expensive than they are now. Generally the price included a set of Postscript fonts held within the printer. For home DTP use, Postscript printing on the Archimedes has never been as popular as it is on other machines; however, if your interests are in professional printed output (through a print bureau) then you will need Postscript so that you can test the output.

I think it was at the end of the 1980s or early 1990s that I noticed laser printers (without Postscript fonts) being offered for the Archimedes at £1500 upwards. I bought an Epson laser printer model GQ 3500 (at about half price because they were just bringing out a new model) which is capable of a resolution of 300 dots per inch. Under the high power microscope the dots showed a slight overlap and measured just over $1/300$ ". The black is always the same colour of black. Unlike the ribbon of the dot matrix printer, the colour on the laser does not go grey as the toner runs out.

I have much experience of using a wide range of paper types with this laser printer and I have received documents from others who have 300 dpi lasers and the quality is totally consistent. The only differences I have found with different paper types is that some tend to curl more easily than others; some are totally unsuitable for double sided use; some papers tend to leave a lot of fluffy residue inside the printer. As far as I can determine these differences never affect the quality of the print.

Some time ago I 'lent' that printer to my son David. He services computer systems for a living so I asked him about laser printers. He says "For home use don't get one of the types where the toner, collector and drum are separate (they're separate in the GQ 3500 he's borrowed). Although running costs on such machines are cheaper than the ones with an all-in-one cartridge, they tend to go wrong more often and in a more expensive way than the all-in-one types. When the all-in-one types go wrong you can usually fix it by buying a new cartridge." My son also says "Don't buy a clone; buy a known brand such as an HP or Epson and buy branded cartridges. Budget for £700 to £900" The reason for buying a known brand, even if it is more expensive, are: (a) that you're more likely to still be able to buy cartridges into the distant future (b) branded cartridges tend to have a more consistent toner quality (ie diameter of grain) and (c) they tend to have photosensitive drums which last longer than the toner (rather than failing before the toner runs out)!

Unless you want to spend a lot of money laser printers are limited to monochrome printing.

Finally, although I have yet to receive any documents produced on a 600 dpi or 1200 dpi laser, logic tells me that, provided the resolution is real and not fictitious (cf the 1/216" line spacing on the 9-pin dot matrix) then the only problem you'll have in realising this resolution is memory, speed of processing and higher cost toner cartridges!

The InkJet Printer

Well, after 'lending' my laser printer to David I had to fall back on a printer which I had bought primarily to experiment with colour, an Integrex ColourJet Series 2 printer. It is a Hewlett Packard 500C clone with a nominal resolution of 300 dpi. You can fit a standard HP 51626A black cartridge or, separately, a standard HP 51625A three colour cartridge. You can't fit both the black and the colour cartridge at the same time.

Unlike the laser printer I have found that the (effective) dot diameter does vary with paper quality. When I use some of the cheaper papers I find that the ink runs along the fibre of the paper, not very much but, when I look at the printed output under my microscope, I find that the dot isn't round but it has elongated, sometimes as much as threefold, along the grain of the paper. Sometimes the ink runs out from the dot along the paper fibres so that, under the microscope, it looks a bit like a spider!

The dots on paper designed for ink jet use are just over 1/300" whereas, with poor quality paper, the dots can be up to three times that size. Generally, with an inkjet you need to buy inkjet paper if you want the best (monochrome) quality.

I have tried cartridges other than the HP brand. Some are OK some are not. What goes wrong with the poorer quality cartridges is that, after a while, the jets become partly blocked. This can either reduce the quantity of ink squirted into the dot or it affects the direction of the jet so that the ink is deposited slightly out of place on the paper.

I have had no problem with the branded HP cartridges but they are slightly more expensive than some of the other brands.

Many of my correspondents refill their black cartridges. So have I. Often I'm successful. Occasionally I'm not. By unsuccessful I mean that at least one (and often more than one) of the jets becomes blocked before the ink runs out. If the cartridge doesn't work then the recommended cleaning process (essentially pressurising the cartridge to blow the debris out of the blocked jets) provides only a temporary solution. I don't know why but the jets soon block again. My best guess is that the ink is no good!

Over the last few years I have studied with my microscope (thanks again to Jill) many documents I have received from correspondents with both 300 dpi and 360 dpi inkjet printers. There is no doubt in my mind that the nature of the paper used (its absorbency) is the single most important factor which determines quality and not the subtle difference between the 300 dpi and 360 dpi printers. That is not to say that the difference is immeasurable. Not only can the difference be measured with a suitable microscope (the dot size is smaller for the 360 dpi printers) but, for the same quality of paper, it is also noticeable to the naked eye; I would describe this characteristic as crispness.

Cannon were one of the first companies to introduce inkjet printers. They chose as their standard 360 dpi whereas, when HP came into the inkjet market they felt that it was important that the printer programming language which they used on all their lasers should run with their new inkjets. Consequently, HP (followed by Epson) chose to retain the 300 dpi standard for their new inkjets.

So far as prices are concerned £300 to £500 will buy you a monochrome inkjet printer; colour versions cost £50 to £100 more than the mono equivalent. Generally the price differences relate not so much to the quality of the print (nor the ink usage) but to such things as the capacity of the blank paper tray, whether there is a facility for feeding single sheets (eg envelopes) and whether there is a straight through path. This latter is important if you want to print labels since if the sheet of labels wraps around a roller as it passes through the machine then you may find the labels unpeeling around a roller.

In spite of many reports to the contrary in other magazines, it is my experience (and that of others who have written to me) that, even allowing for using slightly more expensive paper for the inkjet (than is needed for the laser printer), the running costs of monochrome printing using the inkjet are less than that of the laser printer.

Monochrome Summary

Don't buy a dot matrix printer unless your only interest is fast text printing. If you are interested only in the best quality and definitely don't want colour then you should consider buying a laser printer rather than an inkjet. Lasers are just under double the price of an inkjet so you will have to have a definite need for the slight improvement in quality if you are to justify the extra initial and extra running cost.

If you decide that you want to print at least some of your pictures in colour then it is almost certain that you'll find colour laser printing too expensive and I suggest that you buy a colour inkjet instead. Read the section below.

Colour and Shades of Grey

Colour is built up from mixtures of the three colours. A painter can create shades of grey (or colour) by diluting black (or the colour) with white. You can't do that with the inks from an inkjet. As far as I am aware (if it's working properly) the inkjet delivers the same volume of ink every time it is activated. Shades of grey and shades of colour are achieved by the optical illusion of leaving out some of the dots.

What this means in practice is that, although the resolution of your printer might be 300 dpi, the printer driver uses blocks of four or more dots at a time to create a shade. Taking the case of four dots per block, this effectively reduces the resolution from 300 dpi to 150 blocks per inch; there are 150 of these four pixel blocks per inch. To generate more shades you need more dots per block. If the driver uses sixteen dots per block then this reduces the resolution to 75 blocks per inch.

I find it interesting that, to my eye, for pictures which are coloured or consists of shades of grey, poor quality paper which smudges the coloured dots gives a better overall impression than the best quality paper (which allows me to see the individual, 75 bpi, blocks). Let me put it another way; coloured pictures don't have to be crisp! I have discussed this effect with a professional artist who has explained to me that the eye detects edges (in monochrome) but prefers blended changes between the crisp edges. She tells me that artists know and use this fact by emphasising edges, perhaps even lining them in with black, but deliberately blurring all the rest of the painting.

Again, over the last few years I have studied colour prints sent me from a wide range of correspondents and I have no hesitation in saying that those who use a four colour machine (three colours plus black all in the machine at the same time) produce better pictures than my three colour machine.

My experiments with colour at 300 dpi on my three colour machine (no black when I'm running colour) is that drawings produced by drawing packages such as DrawPlus (with blocks of colour created by filling with the same colour) look good but prints taken from digitised colour photographs (where the colour is graduated across the sprite) are generally disappointing. I also have a copy of ProArtizan (a package I recommend to you). With it I can produce excellent pictures on the screen but, when I print them out I am disappointed.

My conclusion (but I'm willing to be told I'm wrong) is that, for digitised colour photos or paintings produced by ProArtizan (or similar packages), my 300 dpi colour printer does not have sufficient resolution.

Colour Summary

If you produce your pictures from DrawPlus (or a similar package) there are areas of constant colour which are large enough for the optical illusion of mixing to work. A 300 dpi or 360 dpi colour printer will probably suffice.

If you are going to do a lot of colour printing then, for reasons of economy, it is definitely better to buy a machine which uses four separate cartridges rather than all three colours in one cartridge.

The yellow in my three colour cartridge always seems to run out before the other colours. Because the colour cartridges are separate I recommend the Canon rather than the HP or Epson machines. Yes! I know that the HP DeskJet 1200C uses separate cartridges but it costs over £1400 (because it can take Postscript?); most other HP and Epson machines use a three colour cartridge.

The Canon BJC600 series costs about £450 and cartridges cost about £10 a time (you'll need four—black, cyan, magenta and yellow). Quite a few of my correspondents have sent me documents produced on the BJC600, many in colour. I have looked at the paper and it seems to me that the inks used by the Canon must dry more quickly than the HP inks I use because, for the same quality paper the dots are much smaller than I would have expected. That said, the documents I receive on quality inkjet paper are noticeably better than those on standard photocopying or laser paper.

My Recommendations

If you have no interest in graphics printing then try to get hold of an old golf ball or daisywheel printer. If you can't find one then maybe a 24-pin dot matrix printer will do all that you need. You can still buy them and they're cheap.

If your only interest is monochrome and if quality is essential then you need a laser printer. Buy the highest resolution you can afford.

Most of you will want to get into colour printing; the extra cost of colour is small compared with the benefit and pleasure. Printing drawings created in ProArtizan (or a similar package) may disappoint you unless you buy a 600 dpi or higher resolution; on theoretical grounds I'm not convinced that 600 dpi is enough! Sketches produced in DrawPlus where the same colour fills a large enough area reproduce well at 360 dpi.

For all the reasons given above then, for most of you, I recommend that you buy the Canon BJC600 (four colour 360 dpi) at about £450. [To Paul: I think that this is the price including VAT and Postage etc from NCS but I don't know whether you get the colour cartridges thrown in! Please add something appropriate.]

Multiple Copies

A comment I've received is "many users want to produce at least two copies of many of their documents. If you want to produce multiple (RISC OS printed) copies then you'll find that most laser printers do this more quickly than an inkjet. The reason is that the laser stores the whole page in its own memory and then prints the extra copies (after the first one) from memory. The inkjet has to recreate the page anew for every copy." My response is that, with an inkjet you should print to a file as one copy (as I've described in a previous issue of Archive) and then drag the Printout file to the Printer icon as many times as necessary for the multiple copies. Even if you want only two copies you'll find that this 'print one copy to file' method will half the time that the machine is tied up.

Correspondence

Please write to me direct at the Abacus Training address rather than via Archive. Return postage and an address label help more than you might at first think; my thanks to all of you who do send address labels and stamps.