

## **Hardware and software for desktop publishing**

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### **INTRODUCTION**

Desktop publishing (DTP) is a comparatively recent concept which captured the imagination of a large number of microcomputer users. For a time, the enthusiasm for DTP could be described as being over-optimistic, or even worse. Fortunately, this phase in the development of systems for DTP has passed and a more realistic approach is now being taken. DTP, with the appropriate hardware and software, enables documents to be produced at a quality approaching those produced professionally. Microcomputers can be used, but so can other classes of computer. DTP is only coincidentally connected with publishing. Presumably though, if you produce the document yourself in a form suitable for publishing, it is also possible to do this as well.

It has become clear that microcomputer DTP can be regarded as 'just' another application for microcomputers, albeit with some special requirements. In the past, special machines were available for word processing. Now, a general-purpose microcomputer is used and similar equipment can be used for DTP. Thus, it is not normally necessary to purchase completely new equipment for DTP. Rather, individual items such as a screen with higher resolution might be needed. Organisations are generally now acquiring more powerful personal computer (PC) equipment for other purposes.

Another factor with DTP is that it is necessary to consider the computer software packages which will be used to manage or create the data to be printed. It is not sufficient to consider only the packages which are used to make up the page. Word processors, spreadsheets and database packages are, therefore, an essential part of DTP, depending on what needs to be printed. It is impossible

to cover all these areas in any detail in a short paper such as this. What will be attempted is to explain the role that each of the various hardware and software components will play and to outline some of the options. In addition some information on costs will be provided. Hardware will be covered first and then the software.

## **HARDWARE FOR DESKTOP PUBLISHING**

The production of high quality documents can be achieved with computers large and small. However, the field of desktop publishing is normally associated with small computers, such as the ubiquitous microcomputer. Indeed, DTP was born on the Apple Macintosh computer. Discussion will, therefore, concentrate on this area. However, DTP can be carried out on the full range of machines, ranging from the inexpensive home computer to the 32-bit microcomputer and powerful engineering 'workstations' seen today. For professional results, DTP requires a microcomputer with considerable power. This is partly because of the need to process, print and display information graphically. Page make-up software is also becoming more demanding on machine resources.

DTP can be carried out on most brands of microcomputer but normally they fall broadly into four classes:

- Apple Macintosh
- IBM PS2, compatibles with PS2 and the older PC compatibles
- other microcomputers, such as Atari, Commodore
- so-called workstations, e.g. Sun, Apollo, which were originally devised for engineering applications, such as computer-aided design. These now overlap in price to some extent with microcomputers.

Using the IBM PS/2 range of microcomputers as an example (considerations for others will be similar), the following will need to be taken into account:

*Processor power.* A 32-bit processor is recommended. The 80386SX model seems to be a good choice at the moment, as it is priced competitively against the previous 80286 processor. It is also likely to be advantageous to use this chip if the OS/2 operating system is used (see below).

*RAM (random access memory).* Machines are obtainable with a variety of RAM configurations. Two megabytes is probably a reasonable amount, although five are likely to be needed for the new operating system OS/2.

*Fixed disk drives.* Forty megabytes is the minimum amount acceptable and more should be obtained if possible, especially if images are to be stored. Not to be overlooked is the speed of access to the data on the disk.

*The screen.* With DTP, it is essential to have a screen which can display data graphically. In addition, in order to design the page on the screen, it is

convenient (possibly essential) to have a display which can show a whole A4 page, and possibly two on the screen. It will also be helpful to have a screen with a higher resolution than normally seen on a microcomputer. This will enable extremely small font sizes to be seen. A colour screen might also be necessary, if colour images are to be handled. If particular screen fonts need to be employed, it will be necessary to install them.

*Printer.* The printer required depends, in part, on the quality of the output required. Laser printers are able to print a page graphically so that line drawings and halftone images can be printed. The quality of the output is dependent on the resolution (how close the dots can be printed). Normally 300 DPI (dots per inch) is the resolution available, but up to 600 DPI can be obtained, at a price. Other printers can also print graphically, and even the humble dot-matrix printer or the ink-jet printer can be used in some circumstances. The output quality is likely to be less good than the laser printer, however. The speed of printing will also depend on how powerful the laser printer is. They normally contain a microprocessor and RAM memory; if graphical data is to be printed, two megabytes of RAM are likely to be needed. Storage of a range of fonts will also take up memory space in the printer, although they can be downloaded from the computer or stored in plug-in font cartridges. If the laser printer is to be used heavily, it is worthwhile investing in a more expensive model. Pages can be described by a page description language, the best known being PostScript. The language is processed by an interpreter in the printer. Even though PostScript printers tend to be more expensive than other types, there are advantages, such as the fact that fonts of different sizes do not need to be stored. They are generated mathematically from so-called outline fonts. In addition, a PostScript page can be printed on compatible printers with differing resolutions. It is even possible to use a phototypesetting device to produce the page at much higher resolution than the laser printer, all this without changing the actual data. Hewlett Packard produces laser printers which have also established themselves as a popular standard.

*Scanners.* Scanners are used to capture data from the printed page. They can be categorised according to the way they carry out the scanning process. One kind moves the paper across the reading device, a second moves the scanner over the paper and the third is portable. Some scanners can handle different shades of grey or colour data. When the data has been captured, it can be treated in different ways. Characters can be analysed and recognised by optical character equipment. Captured images can be processed in a variety of ways (see software below).

*Phototypesetters.* These machines, also known as image setters, give output with a resolution above a thousand dots per inch and hence are used to produce quality output.

*Networks.* Microcomputers can be connected into local area networks

(LAN). This allows different users to work on the same, or related files, which can then be brought into the same document.

## SOFTWARE

Broadly speaking, application software can be divided into three areas:

*The capture of data from outside and its preliminary processing includes OCR and image processing software.* OCR software normally falls into two groups depending on the method of analysis used. One uses a matrix matching technique to match the stored characters with those input. The other analyses the features, such as descenders and circles. The former is useful with fixed width fonts, such as those produced by a typewriter. The latter is more successful with a wider range of typefaces, styles and fonts. Image processing software can reduce the size, crop, rotate, and stretch an image and perform extremely sophisticated processes on individual parts of it. Some of the other software mentioned below can process images, such as painting, and page make-up packages.

*Software which manages data in the computer.* This covers the wide range of packages available for the microcomputer. Examples of package include:

- word processing
- spreadsheet and charting
- database management
- painting
- drawing (including computer-aided design)
- business graphics.

*Page make-up and typesetting software.* Computers were used to assist with typesetting long before DTP became available. Typesetting data is added to the material to be printed using codes. Another, related approach is to use the SGML (Standard Generalised Markup Language). This language is handled by a range of typesetting systems. One advantage of these coding approaches is that they have been developed for the printing trade and therefore offer good control over layout, fonts, etc.

DTP is more normally associated with the so-called WYSIWYG (What You See Is What You Get) approach. The page itself can be seen on the screen more or less as it will appear in print. For magazine design, individual pages can be built up by gradually bringing in the data, e.g. from the packages mentioned above. Thus text would be acquired from the word processor, spreadsheets from the spreadsheet program, images from painting and drawing packages, etc. Style-sheets can be used to force long documents into pages without setting them individually. Some packages also allow typesetting codes to be used.

When DTP packages first appeared, they were far removed from the packages used by professional typesetters. However, they have improved rapidly. In addition, professional packages have also come down in price to compete with them. DTP packages now have a wide range of typefaces, styles and fonts, can undertake kerning (elimination of excessive white space between characters), hyphenation in more than one language with the aid of dictionaries, and allow images to be sized in various ways. They can also handle spot colour and four-colour separation tasks. One important point when acquiring the various packages is to ensure that the data can be transferred to the page make-up package in a suitable format. DTP packages are available for LAN networks, enabling more than one user to work on the document make-up. They are becoming available for the OS/2 multi-tasking operating system, allowing, for instance, several documents to be worked on simultaneously and several other software packages to be opened at the same time. Multiple language support is also improving, e.g. the handling of multilingual hyphenation.

It is not absolutely necessary to use a page make-up package for DTP. Word processing systems continue to improve the quality of their output. This is true of spreadsheets and other types of packages as well. In addition, specialist DTP packages, such as those specifically for designing forms, are available. An example in the IBM world is JetForm, although there are a number of others.

## **COSTS**

In comparison with staff costs, the cost of microcomputer equipment is relatively low. The price of equipment is generally related to the required performance. DTP can be carried out on a machine costing around £1,000. However, a reasonably powerful 32-bit office computer with several megabytes of RAM and a disk size of at least 50 megabytes is likely to cost nearer £3,000, and maybe more. A basic laser printer can be added for around £1,500. The chosen laser printer will depend on the factors described above; it is easy to pay a lot more than £1,500. To this, the cost of a larger, higher resolution screen might need to be added. Scanners start for a few hundred pounds for the hand-held models but there is a wide range of prices, depending on the need for OCR software and the resolution required, grey-scale capture, colour handling, etc. Software costs for microcomputer software are particularly low. Packages rarely cost more than £500 in the United Kingdom and page make-up software is currently around that price, although 'professional' systems can cost a lot more. The best known packages are Ventura Publisher, PageMaker, Interleaf Publisher (various versions) and Quark Express. Some of the packages are available for a range of machines, some are more restricted. Some of them have optional extras for more detailed work, or for network operation. The price indications given are for packages written for the English speaking market. This

does not mean that they will not cope with extended sets of characters. Rather, the instructions themselves are in English. Packages sold in other than English-speaking countries tend to be much more expensive. The least expensive prices can be obtained in the United States.

This paper does not cover the topic of design. Typesetters normally require substantial training to achieve the skills necessary to produce a professional product. Although DTP packages have made it much easier to produce higher quality documents, design skills are important in DTP. It is all too easy to produce a result which detracts from the document's readability, rather than enhancing it. However, some extremely good results can be obtained with quite a low level of skills as long as some basic rules are followed.

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