FLOWER POWER

Daisy wheel printers produce print of a far higher quality than their dot matrix rivals, and allow useful features such as proportional letter-spacing. For a home computer owner, however, the need for quality print-outs may be overshadowed by the comparative expense and slow speeds of these printers.

At first sight, a daisy wheel printer might seem a strange buy for a home computer owner. It is not really suitable for listing programs, it is slow, and it costs more than a dot matrix printer. Nevertheless, for some applications it is a good choice. The area in which a daisy wheel printer wins hands down is in the quality of the print. A dot matrix printer builds up each character by printing a pattern of dots: no matter how many pins are used in the print head, the individual dots can still be seen in the printed text.

With a daisy wheel, on the other hand, the characters are produced by a type block hitting an inked ribbon — just like a typewriter. These type blocks, one for each character, are arranged in a circle rather like the petals in a flower — hence the name *daisy wheel*. The resulting print is easier to read and also looks more 'professional'.

The penalty to be paid for this higher quality print is in the printer's speed: daisy wheel printers are much slower than comparably-priced dot matrix printers. The reason for this lies in their different printing methods. To print a character using a daisy wheel printer, the print wheel is first spun until the required 'petal' is at the top, then the print hammer hits the type block, and the carriage is moved on to produce the next character.

Compare this with a dot matrix printer, where the dots are printed as the carriage moves across the paper, and the difference in speed between the two types of printer is understandable. A £400 daisy wheel prints about 20 characters per second (cps); an Epson FX-80 dot matrix printer costs about the same, yet can print at a speed of 160 cps. Some daisy wheel printers are faster, but they cost more — over £1,000 for an 80 cps model.

To increase the print speed, both daisy wheel and dot matrix printers often have two extra features: bi-directional printing and logic seeking. *Bi-directional* simply means that one line of text is printed from left to right, and the next line is printed from right to left. The printer does not have to wait for the carriage to return and it can therefore print faster. *Logic seeking* means that the carriage skips spaces to reach the next word in the text — less sophisticated printers take the same time to 'print' a space as any other character.

Dot matrix printers have their character shapes stored in ROM memory inside the printer; daisy wheel printers have the character stored as type blocks on the print wheel. Each method has its advantages: with a dot matrix printer, the character shapes can be re-defined by sending suitable escape codes to the printer from your micro. With a daisy wheel printer the process is much easier: simply swap the current daisy wheel for a different one.

Daisy wheels come in a variety of type styles and pitches; the *type style* refers to the design of the characters, and the *pitch* refers to their width. Some of the more common type styles are Courier, Roman, Gothic and Italic. The pitch is normally 10 or 12 characters per inch. A plastic daisy wheel costs about £5, whereas a metal version costs over £20; metal wheels have the advantage over plastic of lasting much longer.

The one problem with all these different type styles is that few of them are exactly the same as the character set used by a micro. This means that some of the characters on your micro keyboard will be printed out as something completely different. Often the 'hash' character ('#') prints as a pound sign ('£'), or a square bracket ('[') prints as a fraction ('½'). With many type styles the number '0' (zero) is indistinguishable from the capital letter 'O' and similarly the lower case letter 'l' may be mistaken for the number '1'. While the more expensive daisy wheel printers have 127-character print wheels, most can only print 92 or 96 characters, and it's these that suffer most from this type of problem.

As you can imagine, trying to debug a program is not made any easier if you are not sure which characters are 1's and which are l's. For this reason, and also because of its slowness, a daisy wheel printer is not recommended if you use your computer mainly for programming.

SPECIAL EFFECTS

A daisy wheel printer can be programmed to produce a variety of special effects, just like a dot matrix printer. Although the number of these effects is limited, the method of programming the printer is identical to that used for a dot matrix printer, namely by sending escape codes (see page 324). For example, on a Diablo daisy wheel printer the ESC-E code turns on the automatic underlining, and ESC-R turns it off again. Using standard Microsoft BASIC, you would type LPRINT CHR$(27);"E"; and LPRINT CHR$(27);"R"; to send the above codes to the printer. Other codes include ESC-1 to set a tab stop; ESC-9 to set the left margin;