Jet Propelled

Full colour printed output is available at a realistic price, thanks to a printer that sprays coloured inks onto the paper, one dot at a time

The different types of printing mechanism available to the home computer user produce print of variable quality. The best results are achieved by full-character impact printers (the daisy wheel is an excellent example of this type); and the poorest reproduction comes from electrostatic and thermal printers. However, the dot matrix printer (see page 74), though noisy and producing typography of only moderate quality, is the most popular system for home computer use.

When printer/plotter devices like the Tandy CGP 115 first appeared, the limitations of the dot matrix printers became more apparent. The printer/plotter machines use miniature ballpoint pens to create complete characters and line graphics on the paper, and these are often in four colours. But the printers most likely to surpass the popularity of the dot matrix printer operate on the principle of firing a stream of microscopic drops of ink in controlled patterns at a sheet of paper. These machines are called 'ink jet' printers.

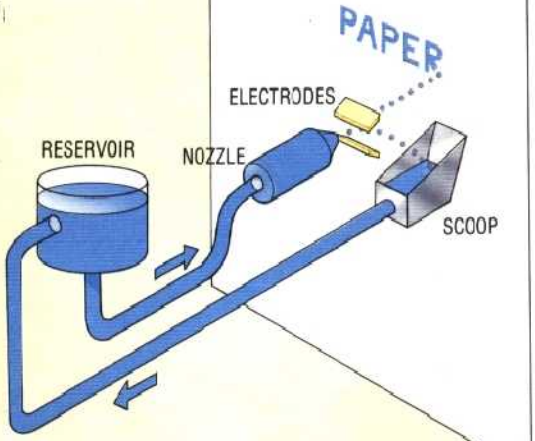
Already well established in the industrial and commercial sectors (alongside the equally sophisticated laser printer), these devices are now beginning to make an appearance on the home computer market. The system works by pumping liquid ink from a reservoir to the tip of a very fine jet. Here minute droplets of ink are charged to a high voltage before being ejected. The valve mechanism is commonly made of piezoelectric material, which allows the droplets to be shaped by very high frequency vibrations.

As the droplet leaves the jet it is suspended by an electric field, which also propels it towards the paper. The sheet of paper is stretched over a sheet of metal (and not a hard rubber roller or platen as it would be with an impact printer). The metal sheet is charged to the opposite potential to that held by the droplet and, as opposite charges attract, helps to pull the ink into the paper. This technique may seem unreliable, but surprisingly little mess occurs. About the worst that can happen is the jet getting clogged or the ink drops becoming oversized.

In principle an ink jet printer works in the same way as a dot matrix printer with only one hammer. The string of ASCII characters arriving at the printer is stored in a buffer until either it is full or a Carriage Return is received. The printer then examines the characters one by one and looks up their corresponding patterns in ROM. Generally, each character will be made up of a number of dots arranged on an eight by eight grid, and the printer builds these patterns up on the paper. It takes eight

Guided Missiles

The first ink jet printers used a more sophisticated system and were very expensive. Inside the nozzle, a piezoelectric device emitted a constant stream of charged ink droplets. These could be guided vertically by two electrodes, as the head moved across the paper. When no mark was required, the droplets could be steered into a scoop and then recycled back into the main reservoir



Priming Pump
This manual pump is used to force ink through the nozzles should they start to become clogged, or simply to get the ink flowing

Circuit Board
This printer contains its own 6809 microprocessor, ROM and RAM. All the incoming data needs to be buffered, because the mechanism prints only one line of dots with each pass of the head

Print Head Lock
An ink jet mechanism is far more delicate than other printing devices, and the head must be locked in the rest position when not in use. The correct operating procedure used immediately after it is turned on is not complicated, but failure to observe it could result in damage to the machine

Sparkling Characters

An interesting variation on the theme of liquid ink jet printers is the 'dry ink' printer. Available both as an Olivetti product and as Acorn's dedicated printer for the BBC Micro, the unit is based on the principle of spark erosion. Printers of this type usually employ a high voltage spark to burn a hole in special silvered paper (the ZX Printer is a typical example). The Olivetti system, however, uses the spark to carry minute particles of carbon from the tip of a replaceable rod to make an impression on the paper.

The printer has several advantages over conventional matrix printers: it is almost silent, the printhead is very light (doing away with the need for powerful motors), and almost any kind of paper will work with the system. The only real drawbacks are that the printing speed is slow, the head prints only one line of dots on each pass across the paper, and the 'ink' tends to smudge