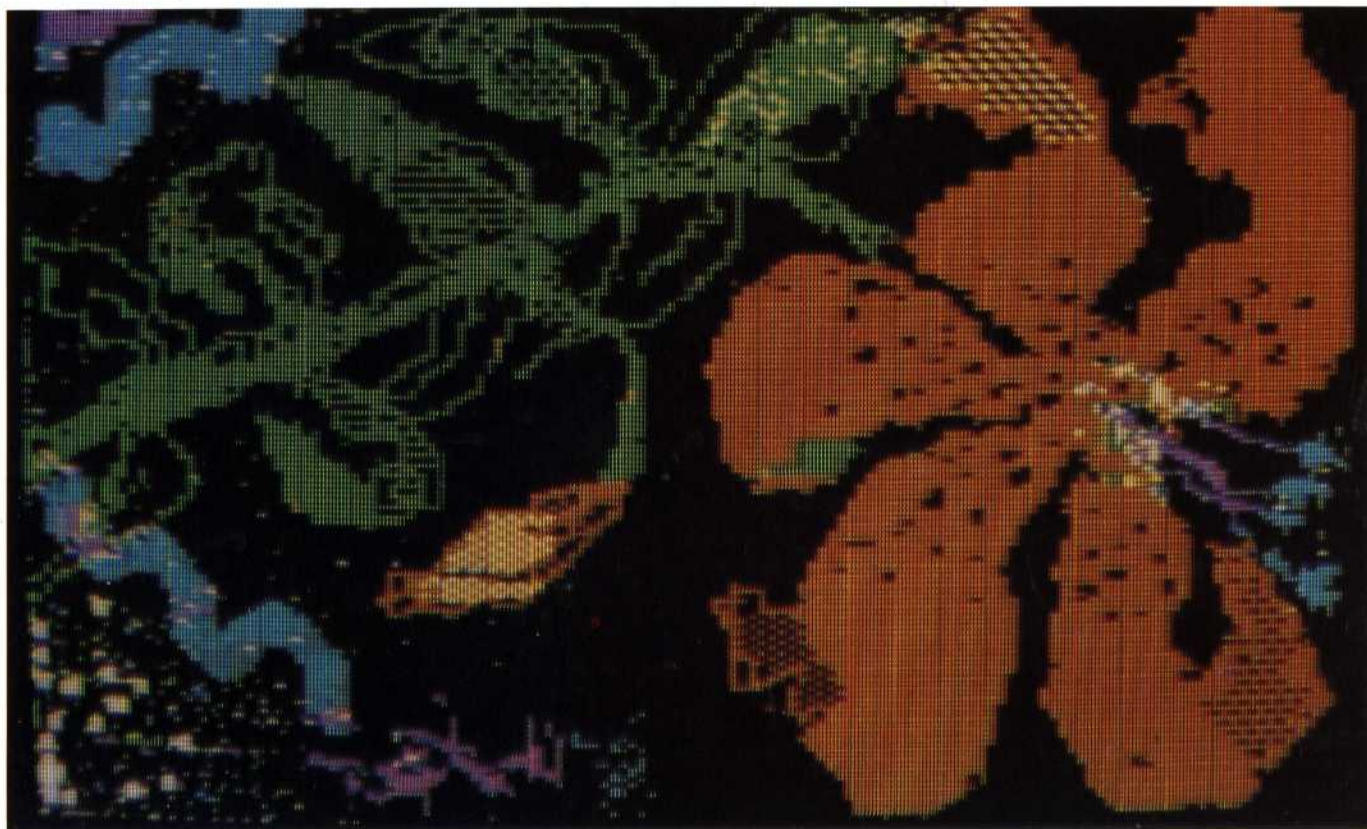




Line Of Sight

Computer Aided Design involves complex calculation and high-quality graphical output. Some of the same principles are employed in packages for home computers



COURTESY OF SOFT

SCREEN SHOT BY IAN MCKINNELL

DIGITISER BY CONNY JUDE

The idea of applying computers to the process of industrial design was first suggested in the early sixties (at the Massachusetts Institute of Technology). However, it was not until a decade later that computer technology enabled the designer to see and interact with a graphic representation of his work, presented on a monitor screen and accessible via a digitiser or light pen, exactly as if he were at a drawing board. These essential peripherals — the digitiser, light pen and plotter — are the basic tools of the Computer Aided Designer's art. With them it is possible to create images in just the same way as an animator does (see page 181), by 'drawing' on a digitising tablet. The designer can modify that image, perhaps using a light pen, incorporating pre-drawn components and sub-assemblies, and then produce a copy of the finished drawing on a plotter. The computer becomes a drafting system similar in principle to a word processor, but working with images instead of text.

We have seen that the quality of the image produced on a computer's monitor depends on two things: the resolving ability of the monitor (that is, the size of an individual picture element or pixel), and the power and memory size of the

computer driving that monitor. When we looked at computer generated images, we saw much the same requirement — a monitor that could resolve to something like $1,000 \times 1,200$ pixels, and a computer capable of processing these 1.2 million picture elements in less than $1/24$ th of a second.

It is useful to continue the analogy between the Computer Aided Design package and the word processor. Instead of moving paragraphs, sentences or individual words around a piece of text — amending, inserting or deleting these at will — the CAD program can be used to move elements of a drawing around the page. The effect may be different, but the principle is exactly the same.

The problem for the program is: how to store this image in such a way as to allow it to be altered and manipulated. If we were to make a physical model of an object, we would use one of two basic methods — additive or subtractive. The additive method is rather like modelling in clay: building up the object piece by piece until we arrive at the final shape. The subtractive method is like that used by the sculptor, who takes away material to achieve the same result. The computer's analogy for a solid block of material is a three-dimensional

Apple Blossom

No matter how sophisticated the software, the most important component of a Computer Aided Design package is the designer using it. Versawriter, the results of which are shown here, runs on an Apple II and requires two disk drives and a digitiser. The flower took an experienced user some considerable time to enter into the machine