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INTEGRATED CIRCUIT

An *integrated circuit* (IC) is one that is etched onto a single silicon chip, and performs a specific task. The development of the integrated circuit has revolutionised the electronics industry. ICs have various advantages over discrete devices on a printed circuit board; fundamentally, the miniaturisation that is achieved makes possible an increase in the speed of operation and a reduction in power consumption. Furthermore, once the chip has been designed and developed, manufacturing costs are drastically reduced.

The first integrated circuits were developed in the late 1950s by Jack Kilby, an employee of Texas Instruments. Since then, four generations of integrated circuits have been developed. These are: small scale integration (SSI), medium scale integration (MSI), large scale integration (LSI) and very large scale integration (VLSI). Many scientists now estimate that the limits in the refinement of such miniaturisation have probably been reached and the search is on for a replacement technology.

There are essentially two types of integrated circuit. *MOS* (Metal Oxide Semiconductor) integrated circuits are the more commonly used in microcomputers, since they can be highly packed with the necessary diodes and transistors, and they consume very little power. They also have the advantage of being fairly easy to manufacture.

The other type, *bipolar* integrated circuits, are more commonly used on mainframes and minicomputers. These are constructed by the more traditional technology of using positive and negative junction semiconductors to etch the circuitry on the layers of silicon that make up the chip. This makes bipolar ICs more difficult to construct. Other disadvantages are that they have a much lower packing density, and they consume much more power. However, their operating speeds are faster than MOS circuits.

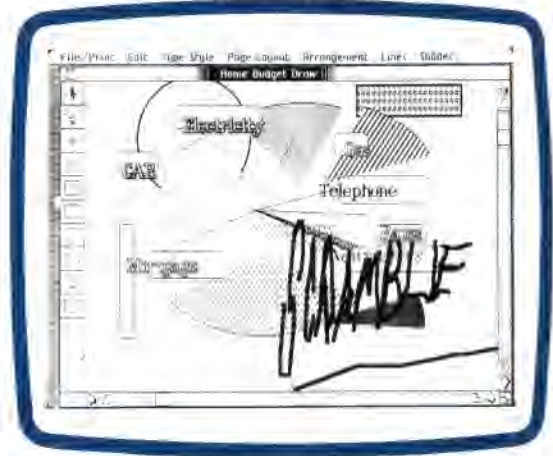
INTELLIGENT TERMINAL

An *intelligent terminal*, usually consisting of a keyboard and screen, is one that is able to perform its own processing — the results of which can then be transferred to a larger computing network, such as a mainframe. Intelligent terminals have a microprocessor onboard to perform tasks such as simple calculations and screen editing — tasks which would otherwise occupy the valuable computing time of the mainframe computer.

INTERACTIVE GRAPHICS

A computer system in which pictures and graphics can be altered and amended in immediate response to an input by the user is said to have *interactive graphics*. The use of such systems is becoming increasingly widespread on microcomputers, particularly with the introduction of integrated software packages such as Lotus 1-2-3, which allows information in a spreadsheet to be displayed instantly as pie, line or bar graphs. In these applications, interactive

graphics are used as an aid to understanding the data. Interactive graphics also encompasses such areas as computer aided design (see page 235) and the creation of graphic displays.



ZETT/WORLDJAN

INTERFACE

An *interface* is a hardware device or a software program that provides a boundary between systems or programs, allowing them to pass data. Almost by definition computer systems use signals or data that cannot be understood by other systems. An interface therefore, will contain some method of translating the information into a form that can be understood by the target system.

A hardware interface consists of the cables, plugs and circuitry needed to connect devices together. A software interface is the part of the program that connects mutually exclusive modules or code together. Generally a software interface will pass parameters and variables between one part of the program and another.

INTERPRETER

The central processor units of computers operate in logical fashion on the binary patterns of current that swirl through the system; the people who use computers like to use the words and ideas and symbols that comprise thought. This antithesis is resolved in the programming language, but that still has to be translated for machine consumption. *Interpreters* — machine code programs that translate higher-level languages — are cheap, frugal and effective translation devices — popular with microcomputer manufacturers for those very reasons. When the source program is entered into the system the interpreter intercepts the command keywords and translates them into command codes; otherwise the program is left untouched. When the program is executed the interpreter can act on the keyword codes directly but must translate the rest of the program text by rather clumsy methods; when a program line is executed only action is produced — there is no stored machine code output. This means that in a loop, for example, the interpreter may interpret and execute a line and then repeat this process immediately afterwards as if the instruction had never been encountered before.