K

K is short for 'kilo-', a prefix indicating a multiple of 1,000. In computer terminology, however, K stands for a slightly different value — 2^{10}, or 1,024 decimal. Thus, 1 Kbyte equals 1,024 bytes; while 64 Kbytes equals $64 \times 1,024$, or 65,536 bytes. K by itself is commonly used to mean 'kilobytes', particularly in reference to a computer's memory. Thus, home computers are often advertised as possessing, for example, 64K RAM.

KARNAUGH MAP

A *Karnaugh map* is a graphic representation of a truth table in two dimensions. Similar to a Venn diagram, which shows how related sets intersect and overlap, Karnaugh maps provide a visual guide to logic expressions with up to six elements. The purpose of such a representation is to make clear how a Boolean statement, or other logical expression, can be simplified. This is then used to draw up circuit diagrams, comprising data lines and logic gates, which perform these procedures.

Map Making
Complicated Boolean expressions can be simplified by the logical operations of Boolean algebra, but this is often tedious and usually error-prone; a Karnaugh map (see page 92) gives an immediate picture of the expression and allows simplification by inspection. The map shown is that of the expression A AND C
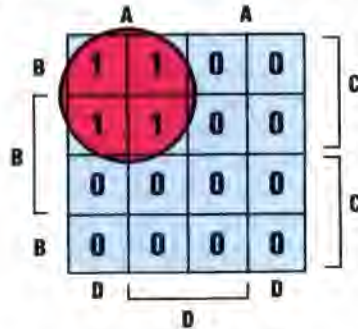
KERNEL

The *kernel* is a set of commands that forms the nucleus of a computer's operating system. As such, the kernel is the lowest layer of the operating system — it must be present and it must be working properly for the system to function. Giving commands directly to the CPU, the kernel program makes sure that appropriate parts of the system are set aside to deal with instructions from the rest of the operating system program.

KEY

The word *key* has several meanings relevant to computer operation. The first is the most obvious: a key is a switch on a computer keyboard that, when pressed, sends a value to the CPU that is interpreted as a specific character.

In a database, a 'key' is one item of information that acts as a pointer for sorting. Information is stored in records, which are complete sets of data for individual items, sorted by field or category. In an address book database, for example, the name, address and telephone number of one person constitutes a record, where the data is stored in the name field, the address field and the telephone field. When sorting the database, you indicate the field that is to be sorted — this is called the 'key' for the sort.

Some database programs let you search on more than one field. In this case, the first level of the sort is called the 'primary key', and the next level the 'secondary key'. To complicate matters, some sophisticated database packages allow you to enter sentences, or even paragraphs, of descriptive text within a field. For the program to sort on that field, you must identify a key word or phrase within the text that it can search for.

A 'key' can also be the identifier that allows access to secure information — the term is derived from the expression 'lock and key'. A file is locked from unauthorised users and can be opened only with the proper key, which is usually a password or code number. This is especially important on networks or multi-user systems, where many people have access, but some files must be restricted.

Finally, an encryption code requires a 'key' on which messages are based and can be decoded. For example, in a substitution cipher, the key indicates the letters to be substituted for the actual message, or vice versa. Recent ciphers have used computer-generated random substitutions, which are virtually impossible to crack without the proper key.

KEYBOARD

A *keyboard*, simply, comprises a set of switches, each of which generates a unique signal when pressed. In the early days of computer systems, the keys were mechanical, using levers and punches to create holes in punch cards. Modern keyboards send signals electronically, and they vary from the membrane units used on the Sinclair Spectrum, to typewriter-style consoles with moulded plastic keys.

KEYPAD

A small keyboard with a specific function — such as entering data — is called a *keypad*. The most common form found on microcomputers is a numeric keypad, which has numeric and mathematical function keys in the same pattern as those on an electronic calculator or 10-key adding machine. The purpose of the keypad is to simplify fast entry of numbers for people who are accustomed to adding machines.

Numeric keypads can be incorporated into an alphanumeric keyboard by providing certain keys with a dual function — as in the Tandy Model 100. In this case, the letter keys M, J, K, L, U, I and O double-up with the values of the digits 0 to 6. These keys lie directly below the 7,8 and 9 keys on the top row of the keyboard, and the 10-key group resembles a numeric pad. Microcomputers like the ACT Apricot and IBM PC, which are used extensively in business, have a separate pad incorporated into the main console and located just to the right of the alphabetic keys. The Apple II range has no keypad built in, but one can be connected through the joystick port.