D

DROP-IN

A *drop-in* is a piece of unexpected data that appears on a magnetic recording medium, such as a floppy disk or cassette tape. Its signal is picked up by the system even though the data was not intended to be written there. The presence of a drop-in is usually the result of a fault in the recording surface causing the incomplete erasure of data that had previously been recorded there. As with drop-outs, the existence of a drop-in does not usually affect the correct flow of data because most operating systems can identify stray bits and check the information.

One way to prevent the occurrence of drop-ins on cassette tape is to erase carefully the surface before recording new data. It is common simply to record over existing information, but doing so increases the risk of incomplete erasing.

DROP-OUT

A *drop-out* occurs when a piece of magnetic material has flaked off the recording medium — cassette or disk — used to store programs. Cheap cassettes are particularly prone to this, and such drop-outs can render a recorded program useless. This is why magnetic media should always be handled with care.

Floppy disks and cassettes that develop drop-outs are best discarded, but what happens if they occur on a winchester disk, a unit costing a couple of thousand pounds? The answer is that winchester drives have a more sophisticated form of DOS than the less expensive microcomputer disk drives. If a bad block is encountered (i.e. the drive is reading back incomplete data), the DOS keeps a note of its location and doesn't record anything there again.

DUMP

A *dump* is the technical term for a visual listing of the contents of an area of memory. This may be displayed on the screen or output to a printer. A 'binary dump' lists the contents of each specified byte in binary, a 'hex dump' in hexadecimal, and so on. Apart from listing machine code programs in a form that can be easily entered into a monitor program, dumps are very useful for debugging. They allow the programmer to see what effect the program has had on the data held in memory.

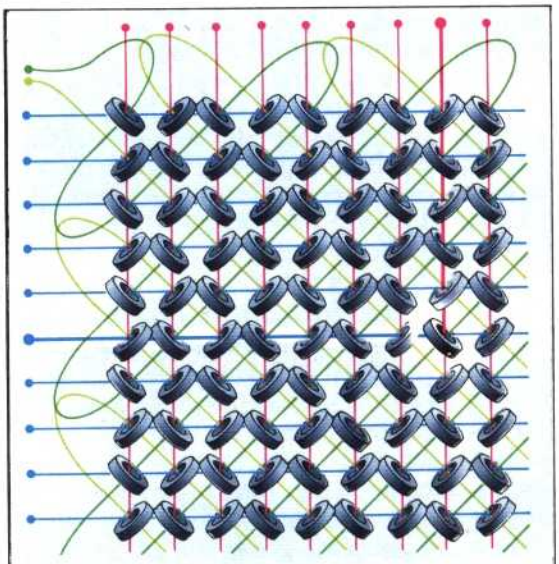
DUPLEX

A communications channel is *duplex* if data can be transmitted in both directions simultaneously. Half-duplex means that data may travel in either direction but not in both at the same time. Many walkie-talkie radios and intercoms work in half-duplex mode, and require that the two parties take turns in transmitting and receiving (hence the need for saying 'over' to mark the end of transmission). Early forms of computer communications over telephone lines were half-duplex only, and some modems still feature a switch to enable duplex or half-duplex options to be selected. Full duplex requires a greater bandwidth (see page 148) for transmission.

It is rare for useful information to be transmitted in both directions at once, but simultaneous data transmission allows the receiving computer to send messages about the incoming signal back to the transmitter. If noise on the line has produced errors in the signal, the receiving device can request that a particular block of, say, 128 characters be sent again.

DYNAMIC RAM

Two types of RAM are commonly found in microcomputer systems — static and *dynamic*. Both are volatile, which means that they will lose their contents if power is disconnected. Static RAM is constructed from bistable circuits (see page 168) — one bistable, or flip-flop, is used for each bit of memory. A static RAM chip requires virtually no additional electronics outside the chip to interface it to the microprocessor.



Core System
The acronym RAM nowadays always refers to electronic microchip devices, but for 20 years the ferro-magnetic core system illustrated here was the cheapest, fastest, most elegant solution to the random access memory problem. Binary data was represented by the magnetic polarity of the iron rings

Dynamic RAMs are more complex in operation, but they are faster, cheaper and allow more bits to be fitted onto one chip. Each bit is really a small capacitor, which is electrically charged to represent a binary one or left uncharged to indicate a binary zero. This charge is not permanent, and special 'refresh' circuitry is used to 'top up' the RAM at intervals of a few milliseconds. Newer designs incorporate the refresh circuitry inside the chip itself, making dynamic RAMs easier to integrate into systems.

If the top is removed from a transistor, the current passing from the emitter to the collector will be affected by light falling on the device. Some early types of dynamic RAM are similarly light-sensitive, and may be used as the basis of low-cost robotic vision systems.