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DECREMENT

To *decrement* something is to reduce it in value, and in computing terms it usually means to decrease a figure by exactly 1. Thus, the variable A in BASIC is decremented by the expression:

```
LET A = A - 1
```

The most common use of decrementing is in counting loops. A value is decremented on each pass of the loop, and a condition is inserted to test for zero and terminate the loop. Most BASICS, however, feature several high-level structures for implementing loops more directly, such as FOR...NEXT, REPEAT...UNTIL and WHILE...WEND.

In machine code it is a different matter, and decrementing the value in a byte is so common that a special op-code is usually provided. DEC will take one from the value in a specified byte — a function that would otherwise entail half a dozen op-codes. DEX and DEY decrement the X and Y index registers respectively. The other main use of decrementing is in indexed addressing, where the program has to perform the same function on a whole sequence of stored bytes.

DEGAUSSING

After prolonged use, the read/write head on a tape recorder gradually becomes magnetised. Eventually, this magnetic build-up becomes serious enough to cause permanent distortion of the signal stored on the tape. Hi-fi enthusiasts have traditionally coped with this problem by using a *degaussing unit*, which is merely another name for a de-magnetiser.

For the home computer owner who relies on a tape recorder for program storage, tape care is extremely important. Tape heads and drive mechanisms should be cleaned regularly to remove the deposit of iron oxide that accumulates with regular use, and if a degaussing unit is available it should be applied to the tape head at intervals of a few months. These units are usually the size of a small torch with a metal probe at one end. They are mains-powered and cost only a few pounds. In use, the metal probe is placed on the read/write head, the power switched on, and the probe slowly withdrawn to a distance of a few feet before the power is switched off. This is an extremely effective way of removing magnetic build-up from the tape machine.

DELIMITERS

Delimiters are used to mark the start and finish of a block of data in RAM memory. They are also used in disk files to separate records.

A good example of the use of delimiters is in the way BASIC program lines are stored. The first two bytes form a 16-bit integer to represent the line number (this is why you can't have line numbers greater than 65,535). The next two give the address in RAM where the next line is stored; this speeds up the search for a line number in a GOTO or GOSUB statement. Then comes the text of the line, usually in a compressed form to save space.

Finally, there is a delimiter, which is frequently a byte containing zero, to signify the end of the line.

It is important that the delimiter value does not appear as part of the data. In the above example, zero cannot appear in the text of the line. This is not a problem, because if a 0 features in a line like:

```
B = A*10 + 2
```

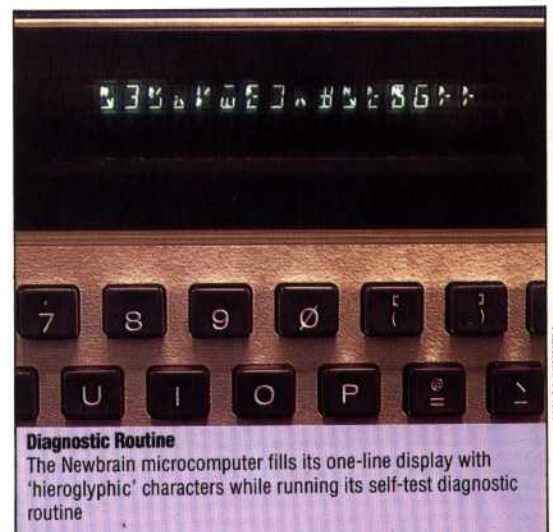
the 0 will be stored as its ASCII value, which is 48.

DIAGNOSTIC ROUTINE

The idea of a computer being able to tell you if it is malfunctioning is a very appealing one, though it would destroy the fundamental plot of many science fiction novels! That's exactly what a diagnostic routine does. Sadly, few computers feature diagnostic routines, but those that do range from micros to mainframes.

No system can be totally self-diagnosing. If the power supply has failed, this won't be diagnosed, because the diagnostic routine can't run. Diagnostic routines can, however, check the operation of all of the memory, interface chips and main logic boards in the system. Most micros feature a very simple routine that checks out the main RAM by storing a value in each byte and then reading it back again. This serves not only to identify any faulty locations, but to ascertain how much RAM has been fitted to the system.

The best example of diagnostics on a microcomputer is on the DEC Rainbow. Each board is fully tested by software, and, if a fault is identified, the location of the unit or board is shown graphically on the screen. The physical design of the Rainbow is such that any board can be removed and replaced with ease.



DIGITAL

A *digital signal* is one whose voltage at any particular time must be one of a group of discrete levels. In computing, there are two such levels — each bit in the computer's memory may be considered as a switch that is either on or off. In contrast, an analogue signal is one in which the range of possible values varies continuously.