Jupiter Ace

The only low-cost home computer to feature Forth instead of Basic as its standard programming language — a challenge for ambitious programmers

The Jupiter Ace is an enthusiast's machine, and one of the few computers that does not have BASIC as its standard language. Though production was discontinued in 1983, devotees keep up a brisk trade in the Ace and its software.

The built-in language is FORTH and is the distinguishing feature of this machine. But the hardware is cheap enough for anyone who is interested in learning FORTH to buy the Ace rather than upgrade their existing computer. The computer comes with a manual that is an excellent tutorial on FORTH.

The Ace is laid out very much like the Sinclair models. In fact its case is the same white, flimsy plastic that the very first Sinclair computer (the

Introducing Forth

BASIC Version
```
100 REM A BASIC PROGRAM TO PRINT 'SHAZAM!'
110 FOR X = 1 TO 6
120 PRINT "SHAZAM!"
130 NEXT X
140 END
    RUN
```

FORTH Version
```
( A FORTH PROGRAM TO PRINT 'SHAZAM!')
: SHOUT ." SHAZAM! " ; .
: CHORUS 6 0 DO SHOUT LOOP ;
  CHORUS
```

Both the above programs will do exactly the same thing, but the BASIC version resembles a recipe, while the FORTH program looks like a wizard's spell!

FORTH starts with a collection of command words (called the dictionary), and has the ability to learn new words. In our FORTH program two new words are added to the dictionary: SHOUT is defined as a character string to be printed and CHORUS is defined as a mixture of 'primitives' (pre-defined words in the dictionary) and the new word SHOUT.

FORTH also has a memory (called the stack), and the ability to process the numbers in it. The FORTH program does the same arithmetic and logic as the BASIC program, but by manipulating the stack instead of through algebraic expressions.

FORTH is an infuriating 'Rubik's Cube' of a language; it is also a powerful programming method, and a whole new way of thinking. Some programmers love it, some hate it.

It is the ability to define and use new command words that really gives FORTH its power. Effectively, the user can tailor the programming language to suit the application he is implementing. FORTH is particularly suitable for programming domestic robot devices, for example, because the programmer can build up his own dictionary of commands: MOVE, FETCH, FIND, FOLLOW and RETURN for example

Jupiter Ace Keyboard
The 40 moving keys are moulded from one sheet of rubber — much like the Sinclair Spectrum. The top row of keys all have three functions, which are accessed with the SHIFT and SYMBOL SHIFT keys. In addition, seven graphics characters (plus 'space') can be used to construct simple diagrams and graphs
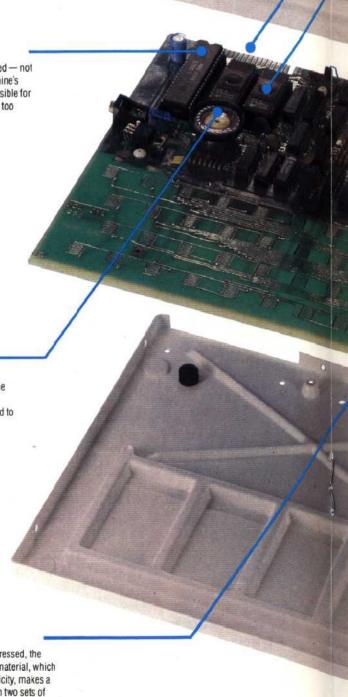
Microprocessor
The Z80A has been used — not surprising as the machine's designers were responsible for the Sinclair Spectrum, too

Speaker
This is a solid-state piezo-electric device (much like the bleepers found on digital watches), which can be used to generate simple sounds

Keyboard Pads
When a key is pressed, the special rubber material, which conducts electricity, makes a contact between two sets of metal tracks on the printed circuit board