



Sound Systems

A second look at the Vic-20's sound capabilities

Last time we looked at the Vic-20 in the Sound And Light series we learnt how the machine's three oscillators can be controlled by POKEing memory locations; how to set the volume levels; and how to control the duration of a note. We investigated how the duration of the notes and the pauses between them can be determined by the use of FOR...NEXT loops or, more efficiently, by using the Vic-20's clock to count in jiffys (60ths of a second). Management of these three musical elements — frequency, volume and timing — enables you to build simple tunes on the Vic-20 and produce useful sound effects.

The Light Program

First steps with the BBC's sophisticated graphics

The BBC Micro is one of the most popular home computers in Britain. Truly stunning graphics effects can be simply achieved in a few lines of BASIC, and the speed at which displays are produced on the screen using BASIC is also impressive.

There are several high resolution commands in BBC BASIC, including instructions to draw straight lines, plot points, and plot and fill triangles. This last function is used to colour in shapes as a series of small triangles as there is no PAINT-type command available. The BBC Micro also lacks a BASIC command to draw circles and ellipses, and has no sprite programming capability. However, it does have several unusual and interesting features that the majority of its rivals do not possess. These include the ability to mix text and graphics on the screen, separately controllable text and graphics cursors, and access to the part of the machine operating system that controls screen display, from within a BASIC program. This is accomplished by the set of VDU or screen commands. Text and graphics 'windows' can also be defined on the screen, enabling the user to divide up the display into separate sections for graphics and text.

Playing Tunes

To construct a tune you must first assemble the required notes. These could be, for example, the notes of the first line of 'Oh, I do like to be beside the seaside'. In the correct order these can be selected as:

D# E F D# C A# G# G G# D# D#

Using the techniques described on page 284, the duration of the notes and pauses can be set by using the TI facility. Our tune can therefore be played by RUNNING the following program (notice the use of variables to simplify the selection of POKEs):

```
10 V = 36878
20 FOR I = 1 TO 11
30 READ N: REM *NOTE*
40 POKE V,7:P=TI: REM *VOL ON*
50 IF TI-P < 15 THEN 50: REM *PAUSE*
60 POKE V-3,N:D=TI: REM *PLAY NOTE*
70 IF TI-D < 20 THEN 70: REM *DURATION*
80 POKE V-3,0: REM *STOP NOTE*
90 NEXT I
100 DATA 203, 207, 209, 203: REM *NOTE VALUES*
110 DATA 195, 187, 179, 175
120 DATA 179, 203, 203
130 POKE V,0: REM *VOL OFF*
140 END
```

Different colours can be defined for each window and each may also be cleared independently.

Display Modes

The BBC Micro has eight graphics modes, three of which support text displays only. There is a choice of 20, 40, or 80 characters across the screen, depending on which mode has been selected. Two, four or 16 colours are available, again depending on the mode selected, but a pleasing feature of the limited colour modes is that two or four colours to be used in that mode are not fixed and can be selected by the programmer from the 16 generally available.

MODE7 is different from all the others in that the standard set of ASCII characters and associated codes are not used. Instead, the display is made up of Teletext characters. Normal graphics commands, such as PLOT and DRAW, do not work in MODE 7.

The following table shows the resolution and colour choices specified by selection of any mode:

Mode	Text	Graphics	Colours
0	80 x 32	640 x 256	2
1	40 x 32	320 x 256	4
2	20 x 32	160 x 256	16
3	80 x 25		2 (black & white)
4	40 x 32	320 x 256	2
5	20 x 32	160 x 256	4
6	40 x 25		2 (black & white)
7	40 x 25		Teletext