Sounds Incredible

The BBC Model B's ENVELOPE command gives almost unlimited control

In an earlier part of the course, the format of the BBC Micro's SOUND command was discussed. However, it is only when it is used in conjunction with the versatile ENVELOPE command that the sound capabilities of the BBC are fully explored. ENVELOPE enables the user to shape up to four sounds to the extent that quite passable emulations of conventional instruments can be programmed. In addition, sound effects for games can be refined to sound much more like the explosions or gunfire that they represent.

ENVELOPE is constructed as follows:

ENVELOPE N,T,PS1,PS2,PS3,NS1,NS2,NS3,
AR,DR,SR,RR,FAL,FDL

The first parameter, N, sets the envelope number and serves to identify the envelope to the related SOUND or SOUND & commands. One of up to four envelopes can be substituted for the fixed volume (V) set with a negative number (0 to −15, see page 388) by SOUND.

T (0 to 127) & (128 to 255)

This is the master timing control for the command. It sets the duration of each 'step' in the construction of the envelope in hundredths of a second. Therefore, T=5 means that each envelope step lasts for five hundredths of a second (0.05 seconds). By adding 128 to the step duration

required, the auto-repeat of the pitch envelope will be suppressed, so that T set to 5 + 128 = 133 gives a step duration of five hundredths of a second in a pitch envelope that occurs once within the note.

Pitch Envelope
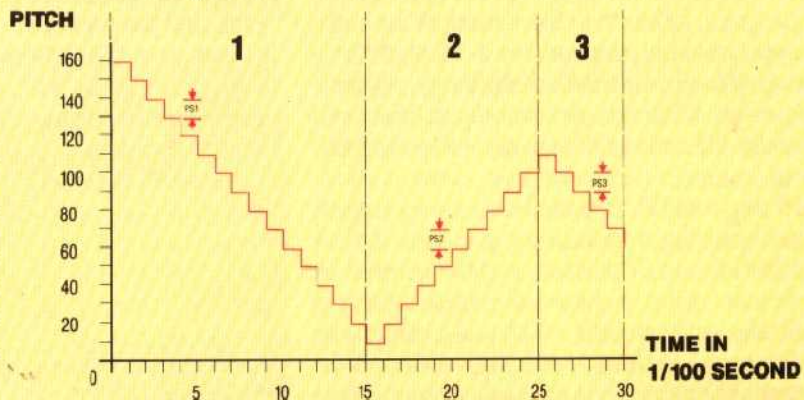
The use of the term 'pitch envelope' may seem a little confusing as envelope has previously been used in terms of volume, but in this case it refers to the variation of pitch over the duration of a note. This facility has little value in musical terms unless a 'vibrato' is required, but it can be useful to give sound effects interesting 'warbles'. As shown in the diagram, the pitch envelope is divided into three sections. The response of each section can be set by the associated PS and NS number as follows:

Light Relief

Using sprites on the Commodore 64

One of the most exciting features of the Commodore 64 is its ability to use sprites. Sprites are built up in the same way as a user-defined graphic character, but are much larger, consisting of 21 rows of 24 pixels. Sprites are not displayed in the normal character screen matrix and this allows them to be moved a single pixel at a time, rather

than requiring eight pixels to move a character from one cell to the next. Up to eight sprites can be displayed at any one time on the screen and each sprite has the following individually programmable characteristics:

Shape And Colour

A sprite is defined in much the same way as an eight by eight pixel character, but 63 bytes are needed to hold the patterns encoded in binary form. Once the shape has been defined in this way, it is held in a block of 63 consecutive locations. Each sprite has a data pointer that points to the area from which the sprite derives its shape. This means that more than one sprite can 'look' at the same area of memory; i.e. sprites can be identical. Also, a sprite can change its shape by switching its pointer to look at a different area of memory.

Each sprite may be coloured in any one of the 16 colours given. Sprites can also be multi-coloured with the usual penalty of halving horizontal resolution.

Size And Movement

Sprites can be expanded horizontally or vertically, or in both directions, to double the original size. A fully expanded sprite is 48 × 42 pixels. Again there