

Sound Advice

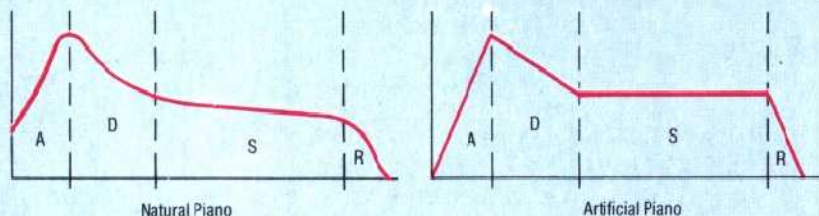
Continuing our explanation of computer music jargon

As part of our series on generating sound on a microcomputer we now look at some of the most advanced features on home computers.

Envelope Generators

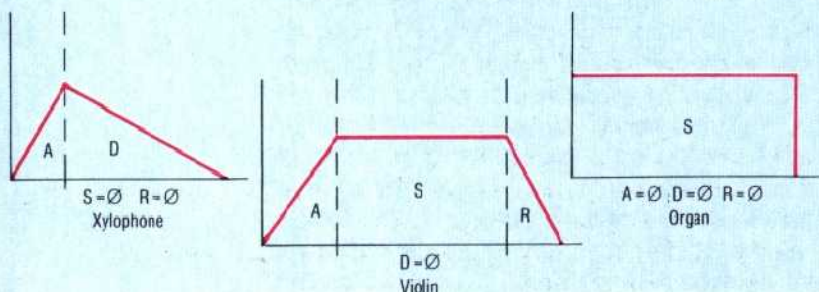
The envelope of a sound is the pattern of its volume changes, from the instant it is played until it dies away. Envelopes similar to those of a piano note and other instruments are shown in the diagram. Envelopes are commonly divided into four parts, usually called Attack, Decay, Sustain and Release (ADSR). In the case of the piano, volume rises rapidly to its highest level after the piano key is pressed (attack), then settles down more slowly (decay) to the roughly constant volume (sustain level) while the key is held down, and finally falls rapidly to zero (release) when the key is let go. Notice that sustain is a volume level, whereas attack, decay and release are intervals of time. A device that can control all four aspects of an envelope is called an ADSR generator.

Any device that can turn a sound on and off is an envelope generator of sorts.



Most computers have nothing more sophisticated than a 'beep' generator, which is just a switch to turn on the sound at a constant volume for a specific time. In this case the A, D and R elements are equal to zero.

The Oric-1 provides some envelope control, but the most versatile home computers in this respect are the BBC Micro and the Commodore 64, both of which have ADSR generators that can imitate the envelopes of most common instruments, as well as some 'unnatural' ones.



... Light Reading

Simple animation using the POKE and PRINT commands

Having looked at the basic principles of computer graphics, we're now going to see how some simple animation can be achieved. First, however, it will be necessary to detail the ways in which characters can be made to appear on the screen and how their positioning can be controlled using a BASIC program. Two main methods are available to the programmer: the POKE command, and the PRINT command with its associated functions.

The POKE command places a number in any specified memory location. There is a special series of memory locations inside every computer, each relating to a specific character position on the screen. On a standard 25-row by 40-column screen, 1,000 locations are set aside for this purpose. Each location holds a number that corresponds to a particular character in that machine's character set. This may be the standard ASCII code of the character (see page 214) or a code designated by the machine's manufacturer. In addition to these character code locations there is usually another set of locations that hold information about the colour of a character displayed in any screen position.

On the Commodore 64, for example, there are very few graphics commands in BASIC to help the programmer, and the POKE command is often used to create screen displays. The addresses of the locations that hold character codes run from 1024 to 2023, and the locations that hold the colour information have addresses from 55296 to 56295. For the Commodore, the character A has a screen code 1 and the colour black is represented by a colour code of 0; thus the commands required to place a black letter A in the top left-hand corner of the screen are:

```
10 POKE 1024,1
20 POKE 55296,0
30 END
```

Simple modifications can be made to display a row of black A's on the top line of the screen:

```
10 FOR X = 0 TO 39
20 POKE 1024+X,1
30 POKE 55296+X,0
40 NEXT X
50 END
```

The A's are produced by the FOR...NEXT loop, which increases the character and colour location addresses by one each time. If we incorporate a command to rub out an old A every time a new one is created then the A will appear to move across the