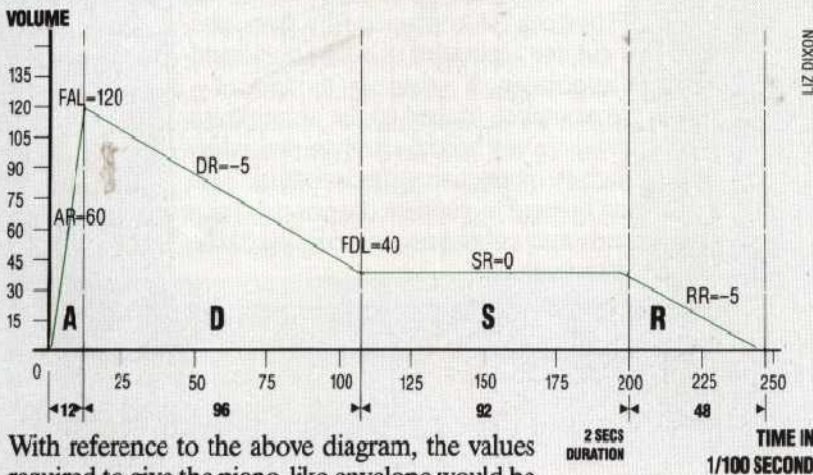




phase, even if it has been programmed in. Release begins when Duration is complete. Volume falls to zero at the set rate unless a new note is started on the same oscillator, which means that Release is cut off unless 'H' has been set to '1' by means of a new SOUND & command.

Volume Envelope



With reference to the above diagram, the values required to give the piano-like envelope would be as follows:

graphics part of the screen. Modes 3 to 8 are graphics modes and allow points and lines to be plotted on the screen with varying degrees of resolution and a choice of colours. This table shows the complete range of options available to the user:

MODE	TYPE	ROWS	COLS	COLOURS
0	text	24	40	2
1	text	20	20	5
2	text	10	20	5
3	graphics	20	40	4
4	graphics	40	80	2
5	graphics	40	80	4
6	graphics	80	160	2
7	graphics	80	160	4
8	graphics	160	320	1

The choice of mode will depend on how much memory there is available for screen display. Mode 5, for example, requires almost twice as much memory to support four colours as mode 4 needs to support two.

Basic Commands

There are a number of commands in Atari BASIC to help with graphics. These commands also work in modified form in the three text modes.

SETCOLOR a,b,c

There are five colour registers to control the use of colour on the screen, but not all of them are used in every mode. SETCOLOR is used to select the colours used by these five registers. In this command a is the colour register number, 0-4; b is the colour number to be used, 0-15; and c enables each colour to be displayed in one of eight levels of brightness, by choosing an even number between 0 and 14.

T=6 AR=60 SR=0 FAL=120
DR=-5 RR=-5 FDL=40
SOUND duration=40 (two seconds)

Resulting in:

ENVELOPE 1,6,0,0,0,0,0,60,-5,0,-5,120,40

The following program employs all the sound associated BBC BASIC commands to play a well known sequence of notes with the piano volume envelope, and a short triangular repeated pitch envelope on the final chord.

```

10 REM**COSMIC**
20 ENVELOPE 1,6,0,0,0,0,0,60,-5,0,-5,120,40
30 ENVELOPE 2,6,1,-1,1,2,1,60,-5,0,-5,120,40
40 FOR I=1 TO 4:READ N
50 SOUND 1,I,N,20:REM**PLAY A B G G**
60 SOUND &1001,0,0,5:NEXT I
70 SOUND &201,2,77,40:REM**FINAL**
80 SOUND &202,2,89,40:REM**D MAJOR**
90 SOUND &203,2,109,40:REM**CHORD**
100 DATA 137,145,129,85:REM**A B G G**
    
```

COLOR n

This command works in two ways, depending on whether a text or a graphics mode has been selected. In modes 0, 1, and 2, n is a number in the range 0 to 255. In its binary form this number is made up of eight bits: the first six bits relate to the ASCII code of the character being PLOTted, and the other two bits are reserved for the colour information about the character.

In the graphics modes, n takes on a value between 0 and 3, and is used to select a particular colour control register when PLOTting a point.

PLOT x,y

The origin of the Atari screen is placed in the top left-hand corner of the screen. PLOT illuminates the graphics point with co-ordinates (x,y). Similarly, the POSITION command:

POSITION x,y

places an invisible cursor at the point (x,y) on the screen.

DRAWTO x,y

draws a straight (or as straight as is possible in the lower resolution modes) line from the old cursor position to the point (x,y). Finally the line:

X10 18,#6,0,0,"S:"

employs the Atari input/output command X10, which allows the user to fill or paint a shape drawn on the screen. It is rather complicated, but can produce some good results if used carefully. Once a closed shape has been drawn on the screen, then the cursor should be set to the bottom left-hand corner of the area that is to be coloured in. The colouring will start from the top of the shape and will fill it in, between the boundaries, until the cursor position is reached at the bottom. The colour is set by POKE 765,C where C is 1, 2, or 3, as used in the COLOR command.

XL Size

Atari graphics can be quite interesting but are not particularly easy to use. Limited colour choice and the lack of many of the 'standard' high resolution commands, such as CIRCLE, mean that the programmer has to work fairly hard to achieve good results. Atari does have the advantage, however, of a large range of text modes. The following program demonstrates the use of double size characters, in conjunction with the POSITION command, to PRINT a familiar message on the screen:

```

10 REM* BIG LETTERS *
20 GRAPHICS 2+16
30 SETCOLOR0,3,6
40 FOR X=19 TO 8 STEP-1
50 POSITION X,1
60 FOR J=1 TO 100: NEXT J
70 PRINT#6;"HOME "
80 NEXT X
90 FOR X=19 TO 6 STEP-1
100 POSITION X,3
110 FOR J=1 TO 100: NEXT J
120 PRINT#6;
"COMPUTER "
130 NEXT X
140 FOR X=13 TO 7 STEP-1
150 POSITION X,9
160 FOR J=1 TO 100: NEXT J
170 PRINT#6;"COURSE "
180 NEXT X
190 SETCOLOR 0,5,5
200 FOR Y=9 TO 5 STEP-1
210 POSITION 7,Y
220 PRINT#6;"COURSE "
230 NEXT Y
240 GOTO 240
    
```

Note that when a mode is selected, the split screen effect can be overridden by adding 16 to the mode number