a distortion-free signal, not 0, as might be expected. With experimentation the careful use of distorted sounds can provide interesting tones and is particularly useful for special effects.

Volume 'V' can be set between 1 and 15 and a reasonable average level would be 7 or 8. Note that there is no convenient way of timing the duration of notes or the pauses between them. The usual method under these circumstances is to use carefully timed FOR...TO...NEXT loops.

To illustrate the use of SOUND, the following commands play an undistorted 'G' in octave 3 on oscillator 1 at a volume of 8 for 50 FOR...TO...NEXT steps:

```
10 SOUND 1,40,10,8
20 FOR N=1TO50:NEXT N
30 END
```

The END in line 30 turns all oscillators off. Alternatively, a new SOUND command for the same oscillator stops the old note and immediately plays the new one. A program to play a simple tune could be constructed like this:

```
10 REM*DIXIE*
20 FOR I=1TO7
30 READ N:REM*NOTE*
40 SOUND 3,N,10,7:REM*PLAY NOTE*
50 FOR P=1TO400:NEXT P:REM*PAUSE*
60 NEXT I
70 DATA 219,162,128,144:REM*D G B A*
80 DATA 162,193,162:REM*G E G*
90 END
```

It is possible to access the sound capabilities of the Atari's POKEY chip from BASIC by POKEing numbers into memory locations 53760 to 53763. With this method, sound routines run faster and all oscillators can be started at one time. All information necessary to accomplish this, plus more adventurous machine code techniques, are contained in *De Re Atari*, available from the Atari Program Exchange (APX), and also the excellent *Atari Sound And Graphics*, published by John Wiley & Son.

allow the user to specify vertical as well as horizontal positions using the PLOTx,y,A$ command, where x and y are the co-ordinates of a particular character position and A$ is the word or phrase to be PRINTed. The following short program demonstrates how this facility may be used to write a name vertically.

```
10 REM VERTICAL LETTERS
20 CLS
30 LORES0
40 A$="STEVE"
50 FOR X=1TO5
60 B$=MID$(A$,X,1)
70 PLOT16,11+X,B$
80 NEXT X
90 END
```

The command HIRES allows the user to enter the Oric's high resolution mode. In HIRES mode the screen has its origin in the top left-hand corner of the screen.

There are several commands in Oric BASIC to help specifically with graphics: CURSETx,y,k positions the cursor at the point with co-ordinates (x,y). The third number 'k' allows different functions to be employed with CURSET.

Value Of k	Function
0	plots pixel in background colour
1	plots pixel in foreground colour
2	inverts colours
3	does nothing

CURMOVx,y,k is similar to CURSET, except that the cursor movement is relative to its previous position. DRAWx,y,k draws a straight line from the current cursor position to a point x units across and y units up. CIRCLEr,k is a command that will draw a circle of radius 'r' on the screen. PATTERNn is an unusual and interesting command. PATTERN breaks up lines or circles drawn into a series of dots or dashes. The exact pattern is defined by the number 'n', which lies in the range 0 to 255. The Oric takes this number and uses the bit pattern of its binary equivalent to produce a repeating pattern of dots, dashes or spaces. Here are two examples to illustrate its use:

Value Of n	Binary Equivalent	Pattern Produced
170	10101010	- - - - - - - -
15	00001111	— —

Finally, there is the command FILLa,b,n. Each row of every character space on the Oric screen has a number associated with it that relates to the foreground and background colours, the character present and whether the character is flashing or not. This number is known as the 'attribute' of that row. FILLa,b,n fills 'b' character cells by 'a' rows with the attributes represented by the number 'n'.

```
10 REM CONE
20 HIRES
30 CURSET120,0,3
40 PAPER3 : INK4
50 FOR R=1TO65
60 PATTERN 200-R
70 CURMOV0,2,3
80 CIRCLE R,1
90 NEXT R
100 END
```

Cone PATTERN

This program demonstrates some of the high resolution capabilities of the Oric-1. A cone shape is drawn using a set of circles of increasing radius. Note also the use of the PATTERN command to break up the circumference of the circles as they are drawn