



### GRAPHICS

The bit mapped high resolution screen is 320 by 160 pixels in size, and the multi-colour screen gives a resolution of 160 by 160. The GRAPHIC mode command is obviously easier to invoke than the 64's POKEs and PEEKs, as is the split screen, although with this text is limited to the bottom five lines. However, text may be placed anywhere on a graphics screen by using the CHAR statement, so

```
CHAR 1,0,0, "THIS IS THE TOP LINE"
```

will print along the top of the screen, 1 being the colour selected, and the two zeros referring to column and row positions. The string can be printed in inverse video if it is flagged with a '1'; this is turned off with '0'. Any syntax error in any of the graphics modes will return the user to GRAPHIC 0, the 'pure text' screen.

The DRAW command is something of a compromise between the fairly limited straight lines available on the Amstrad and the LOGO-like MSX DRAW. For example, a square can be drawn with:

```
DRAW,10,10 TO 10,60 TO 60,60 TO 60,10 TO 10,10
```

In this case the first parameter is not defined, so the colour of the square will be the last colour set. This colour can be changed by inserting the relevant value. There is also a BOX command, which is used specifically to draw rectangles by specifying the positions of the four corners, with a 'fill' parameter to paint the box with colour.

The CIRCLE command will draw ellipses, octagons and even diamonds and triangles as well as 'proper' circles, depending on the parameters specified. The non-circular shapes are chosen by specifying 120° angles between segments for a triangle, 90° for a diamond, and 45° for an octagon. The default setting is 2°. PAINT will fill the shape so created, either with the same colour as the shape outlined or with a definable foreground colour, and shapes can be SAVED or recalled to or from disk by use of the SSHAPE and GSHAPE commands.

Colours are specified from BASIC by allocating one of 16 values to background, foreground, multicolour 1, multicolour 2, or border, with an optional luminance parameter of 0 to 7. The default luminance is 7, the brightest. In all drawing commands, the colour parameter has to be chosen from one of the five areas already defined.

### SOUND

After the sophistication of the sound commands possible with the 64's SID (Sound Interface Device) chip, the Commodore 16's two-channel sound is something of a disappointment, especially since the current generation of competitive machines utilising the General Instruments's sound chip — Amstrad, MSX, Einstein — offers three channels plus noise.

However, the SOUND command doesn't require figures to be POKEd into locations 54272 to 54296,



**Kernel ROM**  
This chip holds the software routines for input and output control and general housekeeping

**TMS 4416 Video Chip**

**RAM**  
This is the single 16K RAM chip of the Commodore 16

### Welcome Change

After numerous complaints from programmers about the deficiencies of their BASIC ROMs, Commodore has finally issued a version comparable with those already commonplace on other home micros. All the additions, including graphics, toolkit, structure and disk access commands are welcome. User-defined procedures are inexplicably omitted from what is now otherwise an acceptable BASIC. New commands, including those from BASIC 4, are shown below

Functions	Toolkit	Structure	Graphics	From BASIC 4
RGR	AUTO	DO	GRAPHIC	DIRECTORY
RGCL	TRON	WHILE	SCNCLR	DSAVE
RLUM	TROFF	LOOP	PAINT	DLOAD
JOY	HELP	UNTIL	CHAR	HEADER
RDOT	MONITOR	EXT	BOX	SCRATCH
INSTR	DELETE	ELSE	CIRCLE	COLLECT
DEC	RENUMBER	PUDEF	GSHAPE	COPY
HEXS	KEY	USING	SSHAPE	RENAME
SOUND	ERRS		DRAW	BACKUP
VOL	TRAP		LOCATE	
	RESUME		COLOR	