

# Graphics ROM

★ **FILL** will fill ANY shape on the screen with colour. This includes irregular shapes, spirals, U-bends etc.



★ **PATTERN** is a complex routine allowing a large variety of patterns to be drawn — ovals, squares, triangles, solid circles, almost any regular multi-sided shape.



★ **PLOT**. In the real world all objects have 3 dimensions X, Y and Z and not just the two X and Y. This command allows the use of all the normal plot commands but in three dimensions, by specifying the X, Y and Z points, giving the illusion of 3D.



We specialise in producing quality ROM based software for the BBC machine and the GRAPHICS EXTENSION ROM is added to our range alongside the already renowned products WORDWISE, GREMLIN, DISC DOCTOR.

Like our other products this is supplied with a very thorough manual explaining in plain English how to use the ROM. Step by step fitting instructions are also given so that even an inexperienced user can fit the chip in a few minutes.

Available direct from us (mail order only) or from any good BBC dealer, who will also be able to fit the ROM.

★ **GFX**. This special graphics FX command returns values back to the calling program, such as the current SPRITE status, TURTLE size, position, etc. There are seven separate GFX commands.

**MODE 8**. Not a 'star' command but, like the normal MODE statement, this gives a new screen mode. 16 colours with a resolution of 80 by 256 and only occupying 10k of memory.



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**COMPUTER CONCEPTS**

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# Specification for Graphics ROM



The graphics extension ROM for the BBC micro



# Graphics ROM

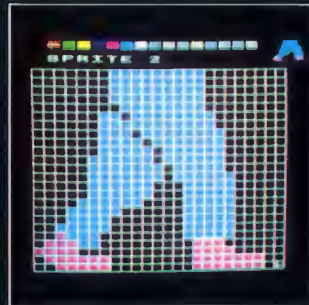
The GRAPHICS EXTENSION ROM is a general purpose utility ROM for the BBC Micro-computer. It adds 30 new commands to the BBC machine. All (with the exception of mode 8) are accessed with 'star' commands such as ★FX or ★CAT and can be used freely in BASIC programs. The ROM contains a full help menu listing all the commands and their syntax.

The commands are split into three distinct areas:

The first group consists of SPRITE manipulation commands. A SPRITE is much like a user definable character except that it can be much larger (up to 24 dots across by 24 dots down), it can contain all of the allowable colours for any mode and it can be moved around the screen with the utmost ease. A SPRITE can also be part of a FILM — a sequence of frames allowing animation. Each frame can be any of the defined SPRITES.

★RESERVE reserves memory for the SPRITE definitions. The larger the section of memory reserved, the larger the number of SPRITES and FILMS allowed — up to a maximum of 32.

★DATA tells the user the current status for all SPRITES and FILMS defined, i.e. mode, size, film length, etc.



★DESIGN displays a grid on the screen for definition of the SPRITE shape. The user simply fills in the squares with any of the

colours chosen from the palette.

★FILM defines a FILM. This command is followed by a string of numbers representing the SPRITE numbers for each frame in the FILM sequence. A FILM can contain up to 47 frames.

★ALTER. This is like the ★DESIGN command except that it allows the user to alter or edit an already existing SPRITE.

★RESET will reset or delete any SPRITE or FILM from the reserved memory.

★PUT will save one or a number of SPRITES or FILMS onto tape or disc for later retrieval.



★GET does the opposite, it loads SPRITE or FILM definitions back into the reserved SPRITE memory.

★IN is the command that actually plots the SPRITE onto the screen. The user specifies the SPRITE number and the X,Y location on the screen. For example ★IN 1 640,512 would put SPRITE number one in the centre of the screen. If number one was a FILM, then this would plot in the next frame from the film sequence.

★OUT does the opposite, namely it removes the SPRITE from the screen. It is not necessary to ★OUT a SPRITE to move it. Every ★IN command automatically removes

the SPRITE and plots it in its new position.

★IMAGE is like ★IN except that this leaves a copy of the sprite on the screen.



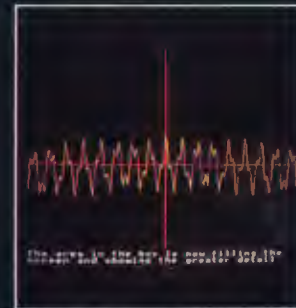
The second set of commands deals with the 'TURTLE' graphics. By using simple LEFT, RIGHT, FORWARD, BACKWARD commands a 'turtle' can be moved very quickly around the screen, producing intricate patterns by the most user friendly means. The popularity of the LOGO language is largely due to the fact that it contains 'turtle' graphics.

★TURTLE defines the size and shape of the turtle. This is normally a small arrow shape although it is possible to have no visible turtle which speeds up the movement considerably. This command also controls the type of trail the turtle leaves. Normal lines, dotted lines, triangles, etc.



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★SCALE allows true scaling of the screen. This enables any part to be magnified to fill the whole screen, thus showing more details of graphs etc. It is also possible to increase the scale so that the screen covers a larger area. For example 0 to 10,000 for the X and Y axis instead of the normal 0 to 1000 scaling of the BBC. This will tend to reduce the size of object plotted.



★POS will position the turtle at any absolute screen coordinates pointing in the specified direction.

★PENDOWN will put the 'PEN' onto the PAPER so that all subsequent movements leave a trail.

★PENUP does the opposite. No lines are left after this command.

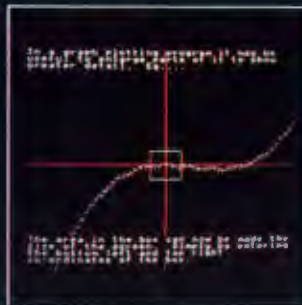
★LEFT turns the turtle left by the specified number of degrees.

★RIGHT turns the turtle right by the specified number of degrees.

★FORWARD moves the turtle forward by any distance. If the 'pen' is down then it will leave a line behind it.

★BACKWARD moves the turtle back the specified distance.

The last, and largest, set of commands are general purpose ones covering a variety of uses.



★ROTATE. This will rotate any plotting, drawing etc on the screen. It will affect all subsequent PLOT, MOVE, DRAW commands so that they are rotated by any angle around any point on the screen.

★PIXEL allows the user to draw multi sized pixels on the screen. These can be at any angle when used with the ★ROTATE command.



★PRINT allows text printing on the screen in a variety of sizes and colours. When used with the ★ROTATE command, text can be at any angle.



★CIRCLE is a fast circle drawing routine. The user simply specifies the size and position.



★ARC allows arcs or parts of circles to be drawn, any angle, any size.

