

BBC PLUG-INS LIFE IN THE OLD DOG YET

By Roger Cullis

The 128K version of the model B + micro, along with an improved disc-operating system and graphics software, keeps Acorn's system abreast of current standards.

Acorn has launched four new products which demonstrate that, despite the traumas of the recent months, it is committed to continued enhancement of the performance of its principal revenue earner, the BBC Micro. The new add-ons are a 64K RAM pack to convert the B + into a 128K model, the long-awaited graphics extension ROM, the advanced disc filing system, and a double-density disc interface.

When the model B + was launched, there were some unexplained features. Only 12 logical sideways ROMs were implemented, whereas its predecessor supported 16, and there was provision for a connector on the right-hand side of the motherboard. Now all is explained with the announcement of the 128K version of the computer. A small daughter board occupies the connector position and adds four 16K banks of RAM which are mapped into the vacant sideways memory pages. A disc-based utility configures the RAM as contiguous memory, with Page at &10000 and Himem at &1FFFF, giving a full 64K for Basic programs. On boot, the shadow mode is forced on and a relocated version of Basic 2 is loaded at &3000.

MORE MEMORY

For existing B + owners who want to stay ahead, the daughter board will be available separately as a dealer-fitted upgrade. It will provide a low-cost alternative to the 6502 second processor, giving even more memory space since none of the extra 64K is needed for second-processor operating system, zero page, stack or Tube communications buffer. The price to be paid is a reduction in operating speed: preliminary Benchmark tests show that 128K BBC Basic runs at not much more than half the speed of the 64K version which is, in turn, only two-thirds of the speed of the 6502 second-processor version.

The Graphics Extension ROM (GXR) is a 16K EPROM which extends the graphics routines already provided in the operating

system of the BBC Micro. It makes direct calls to the existing routines, and for this reason separate versions are required for the model B and the model B +, although they both implement the same commands. Half of the ROM is devoted to extra shapes, patterns and colours using previously unassigned Plot, VDU and GCOL commands. The remainder is used to implement sprites, which can be saved to tape or disc and used later within programs. The GXR may be accessed from any language which supports graphics features and is compatible with all current Acorn second processors.

SPRITE GRAPHICS

The default mode of the GXR varies with the position of the sideways ROM socket in which it is fitted. If an odd-numbered socket is used, then the graphics extension ROM is active on switch-on or hard break, while use of an even-numbered socket has the opposite effect. GXR uses three pages of low memory for parameter storage, with Page increased by &300. Two of these pages are used for the flood-fill routines, which may be turned off leaving the rest of the graphics routines active; in this state the value of Page is increased by only &100.

The GXR provides additional commands for directly constructing some of the most commonly used shapes. The codes for these are in the form of Plot commands, grouped in blocks of eight following the protocol of the Plot commands in the operating system. Individual Plot codes are provided to draw rectangles, parallelograms, circles and ellipses, both in outline and filled, arcs, sectors and segments.

On the BBC Micro there are eight plain colours and eight flashing colours. The GXR allows the colours to be interwoven to give a tremendous range of colour patterns. The GXR provides four default patterns which depend on which display mode is active. Defining a mode 0 pattern is equivalent to setting up a user-defined character.

Another feature of the GXR is the ability to fill the inside of any closed region, however awkward the shape. The method used is to flood fill it. It is possible to start off at any point in its interior and fill the whole shape in one pass. The graphics extension ROM contains two different flood-fill options: Flood to Non-Background can be used on shapes which are in the current background colour and bordered by non-background colours, while Flood Until Foreground achieves a complementary effect. Flood fills may be performed with either pure colours

SPECIFICATIONS

BBC MODEL B+ 128K

Description: 6512-based micro with 128K RAM

Price: £499 including VAT

64K-128K UPGRADE

Description: RAM upgrade for BBC model B+ 64K

Price: £39.95 plus fitting

GXR

Description: graphics extension ROM for BBC model B and B+, providing colour fill, enhanced shape drawing and sprites

Price: £29.90

ADFS

Description: Advanced Disc. Filing System ROM

Price: £29.90

DDDFS

Description: improved disc-interface board; provides double-density operation in conjunction with ADFS ROM

Price: £49.90

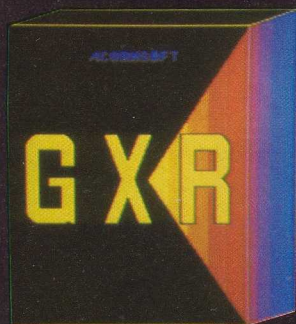
Availability: all the above products are available now from Acorn Computers Ltd, Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PD. Telephone: (0223) 214411

1. The GXR tide.
2. Castle uses many features of the GX ROM.
3. Flood fills can be used for colours and patterns.
4. Patterns may be defined.
5. GXR contains a selection of ellipse and circle drawing routines.
6. The colour range can be extended by mixing colours from the palette.

or colour patterns. The GXR also enables you to pick up a rectangular area of the screen, and either make a copy of it elsewhere or move it to another position.

The GXR comes with a detailed manual and cassette containing a number of utility programs. One of these is Paint, which uses icons selected by means of the cursor and Shift keys. The screen is divided into two parts: the control panel down the left-hand side and the canvas on the right. A control panel is divided into three columns. In the middle column you select whether you want to draw a particular shape, move part of the picture, print text, or whatever. The remaining two columns allow you to specify other details, such as what colour you wish to use.

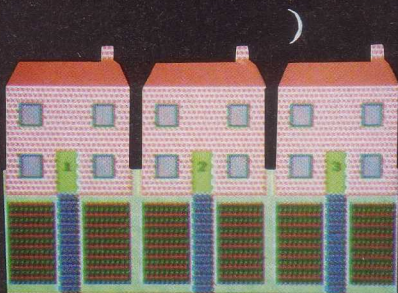
Another feature which brings the BBC Micro up to date is the implementation of sprite graphics. The definitions of sprites used in a program are stored in memory at a known location, so space must be reserved in a manner analogous to the Dimensioning of arrays. This memory is allocated in units of



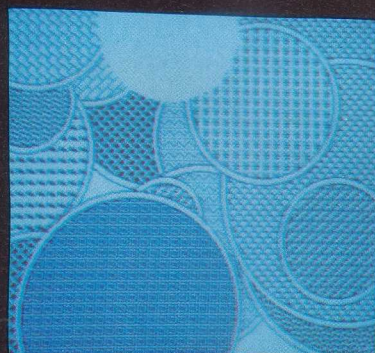
1



2



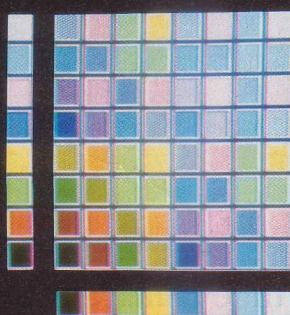
3



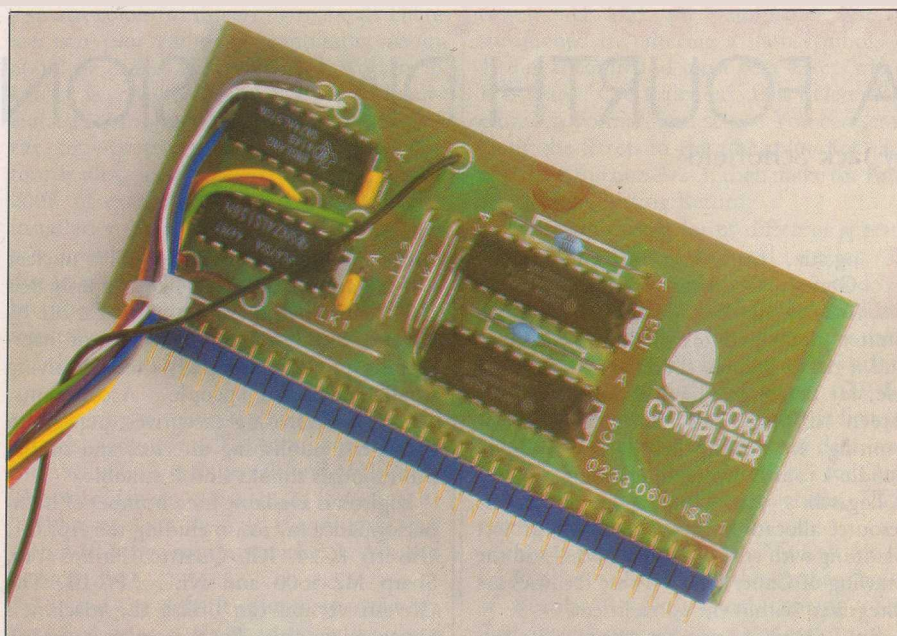
4



5



6



The daughter board adds 64K of RAM to the BBC B + , but it slugs the operating speed.

one page, located below the bottom of user program area. Sprites may be designed using a sprite editor which displays two versions of the sprite. One is actual size, and the other a much enlarged version to illustrate the modifications as they are carried out.

What the B + User Guide describes as "the disc-filing system for all future file operations" has now been implemented for floppy discs on the BBC Micro. Previously it was only used for Winchester and for the Electron disc-filing system. The reason for the delay in implementing the Advanced Disc Filing System (ADFS) was the need for a disc controller which could handle the modified frequency-modulation system used in double-density recording. With the advent of the new version 1.3 of ADFS, floppies can be intermingled with hard discs.

With the ADFS comes an hierarchical file structure and out goes the old limitation of 31 files per disc. The arrangement of files is based on a root directory which can hold 47 objects, each of which may be further directories or actual files.

DISC CONTROLLER

The old Intel 8271 floppy-disc controller chip has finally come to the end of the line with the announcement of the 1770 disc filing system (DDDFS) for the model B. Based on the Western Digital 1770 chip it supersedes the previous Acorn DFS and is considerably cheaper than the interface it replaces. The new interface comprises a small printed-circuit board bearing three capacitors and four chips, a sideways DFS ROM, a couple of wire links, two further integrated circuits, the DFS User Guide and a manual of fitting instructions.

The PCB plugs into the 8271 socket; for Issue 4 and Issue 7 motherboards, installation is quite straightforward but earlier circuits require modification which is best left to a dealer. The ROM is identical with that of the model B + DFS. The 1770 DFS operates only in single-density mode and may not run all protected software which makes use of direct I/O calls. For double-density operation it is necessary to install the ADFS ROM.

The launch of the DDDFS removes one of the obstacles to a 16-bit business upgrade for the BBC Micro. With a suitably modified DFS ROM it will be possible to make existing model B machines read and write in MS-DOS format. Acorn already has the capability in the 80286 version of the ABC, so perhaps we may see its response to the challenge of the Apricots and the Research Machines Nimbus in the near future.

CONCLUSIONS

- Each one of these is an upgrade I would happily install.
- The GXR includes some quite remarkable features. It is an important extension to the operating system.
- The 64K version of the model B+ will probably quietly disappear; the minimal extra cost for 128K will deter nobody.
- ADFS and DDDFS will justify their price by savings in floppy discs.