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## **BBC B+ revealed**

by Bruce Smith THE BBC B + , first described in the March issue of Acorn User, was due to have been launched last week at £499 with disc interface and 64k of

memory as standard. The B + is not seen by Acorn as a new micro, but as a development of the BBC system — and the company has left room for a model C.

Acornsoft will be releasing some software to exploit the new features 'by Christmas', but other companies we contacted were unaware of the B+

Compatibility was an over-ding consideration in riding developing the machine, but there are several major changes. First, RAM is increased to 64k, giving about 26k free for programs no matter what screen mode is used.

Second, a disc interface is fitted as standard using the new 1770 controller chip. The filing system has been expanded, but is essentially

the same as the old one. Finally, the number of sideways ROM sockets has of



been increased to six, with

four free for the user. Externally there is no differ-ence from the model B. It is only when you take the lid off that it is revealed as something different.

The most noticeable feature ROM sockets are located at the top-left hand corner of the board in two banks of three. The 64k of RAM sits to the riaht

of the machine while the main microprocessor chips sit in a neat row along the front under the keyboard.

A new processor, the 6512, sits at the heart of the B + , but this is fully software compatible with the faithful 6502. The only slight difference between the two chips is in the clock-drive circuitry — which improves performance with the second brocessor.

A new board - issue 1 inside a standard BBC case - is where the B+ changes can be seen.

Top left, six sideways ROM sockets (two rows of three). Two occupied by combined Basic/OS and DFS 2.1. Two other sockets for voice synthesis

Bottom right, eight RAM chips giving 64k.

Middle front, 6512 processor, 1770 disc controller and user VIA.

As already mentioned, the 32k of RAM is used in two blocks. The first 20k handles the shadow screen memory, in a similar way to the Aries B20 board. This allows about 26k for programs in any mode.

shadow RAM The is selected with the command \*SHADOW after which any subsequent mode change will select the shadow RAM. \*SHADOW 1 will reset the user RAM as selectable for screen RAM (as is normal on current B models), this is also the default state thus ensuring software compatibility.

The shadow screen memory may also be specified by selecting a mode value in the range 128 to 135. Thus MODE 128 is the equivalent of:

\*SHADOW MODE 0

The 20k shadow RAM may also be used for data storage but not programs. Acorn will not actively support this use of the shadow RAM, but no doubt some games houses will find a use for it.

The remaining 12k of RAM is mapped into the sideways RAM area from &8000 to &AFFF and is free for user applications and service ROM software under 12k in length. However, it will not support language ROM software, even if it will fit into 12k.

The six sideways ROM sockets are mapped as two 16k images, giving a single ROM space of 32k. Basic II and

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▶ from page 7 OS1.2 are combined into a single ROM to provide OSBA-SIC and is situated in socket 15 (which is mapped as 14 and 15!) – though altering a simple link setting allows it to be mapped as socket 0/I.

The DFS, version 2.1, sits in any socket, leaving four empty. The DFS includes several new commands such as \*FORM(at) and \*VERIFY, both rather embarrassing exclusions from the original DFS firmware - although users are still stuck with 31 files per disc surface.

Other new commands in-clude \*FREE and \*ROMS which will supply details of status and ROMs present within the micro.

The DFS is 8271compatible but some problems might occur due to protection on discs. Acorn admits that problems do exist for early dual format 40/80 discs, but stresses there will be an exchange service for Acornsoft products. No problems have been problems have been encountered with standard 40-track, disc based software.

The ROM sockets will

accept 8k, 16k or 32k chips, though this must be hardware selected via a bank of links. The sideways RAM memory

The sideways RAM memory may be 'overlaid' into any ROM socket. Once the socket has been selected the top 4k of the 16k bank into which the sideways RAM is mapped, ie memory from &B000 to &BFFF is also available. Thus it is possible to have 4k of firmware controlling its own firmware controlling its own sideways RAM!

Several new OS routines are supplied to provide a machine code interface to the new hardware. Most notable of these are OSWRSC (OS Write Screen) and OSRDSC ( OS Read Screen) to give access to the shadow RAM.

At £499 the B+ may seem expensive, but in the long run expensive, but in the long run it certainly works out a lot cheaper than expanding a model B (even at discount prices) with screen RAM plus sideways ROM and RAM. Future developments for the B+ will probably include the addition of the ADFS ( advanced disc filing system) which will allow the 1770 disc controller to be used to its full ( controller to be used to its full double density capabilities. More details of the BBC B+

in next month's Acorn User.