A 20K RAM BOOST FOR THE 'B' WITH A UNIQUE PAGING SYSTEM

Aries B20 20k RAM expansion board, BBC model B, Cambridge Computer Consultants, £99.95

THE first thing to consider with any board such as this is how easy it is to fit inside a BBC micro: You might have heard horror stories with other boards about soldering to chips and bending pins, but not in this case. As long as you can take the lid off your BBC and remove chips carefully, you'll have no problems with the Aries B20: You first remove the 6502 chip and refit it to the Aries board, then fit the board back into the empty' socket. Finally, the special ROM supplied is slotted into one of the spare sideways ROM sockets. Detailed information on fitting and using the hardware is supplied with the kit.

The first thing to notice is the new screen message 'BBC Computer 52k': This in itself is gratifying and if nothing else will astound your friends, but this is an impressive piece of equipment in its own right and deserves to be taken seriously:

The additional RAM can be switched in or out using *XON or *XOFF, which means you need never remove the board: This is extremely useful in software development to check if a program runs on a standard machine: given, of course, that it was designed to do so. A hard break will always invoke the 52k, but a soft break will maintain the current state of the system:

The burning question is: 'How much memory is *really* available?' And, secondly: 'Is all of the extra available to run large programs?' The short answer is *yes:* The additional memory is paged as normal, but this is done in a unique way.

With most other add-ons, their paging mechanisms will not allow a large program which resides in both normal and extra memory to be run directly: 'You would have to store the main program in normal memory and call down other chunks of program from the extra memory to be run as and when required — not an ideal method: The Aries B20, however, pages in an entirely different way: As you may be aware, the normal screen area is between &3000 and &7FFF, and HIMEM is set according to the mode being used: The additional 20k RAM of the Aries board is also positioned from &3000 to &7FFF in parallel with normal memory (figure 1). The Aries ROM intercepts all references to the area above &3000 (excluding the screen) and diverts them to the extra RAM: This is dealt with entirely automatically: Hence HIMEM remains set at &3000 while the Aries is switched on and, even allowing for the little extra required by the operating system software, this provides usable memory slightly in excess of 28k, irrespective of screen mode: This won't sound a great

deal if you are working in mode 7 as it only provides an additional 1k, but in modes 0 to 2 you get the full 20k extra.

You might feel the expansion is not of great value if you use only low resolution, and to a certain extent for programming purposes this is true: However, it can still provide extra memory for data storage: First you set HIMEM to &3000 to ensure the Basic stack and workspace are not in parallel memory. Having done so there are two data areas available — one which is normal memory from &3000 to &7BFF, and a second which is the Aries RAM from &3000 to &7FFF. If you include the area below &3000 this provides an impressive 47k for data:

Acorn have provided a special command for selecting the data area you wish to access — *FX111,0 selects data area 0 and "FX111,1 selects area 1. Data may be stored or loaded from files into either area and all indirection operators can be used to access either set: The Aries manual even provides a simple routine which allows the two areas to be considered as contiguous memory from &3000 to &CBFF:

When programming in machine code, operating system vectors can be modified as required, as long as you follow the rules. The only exception is that interrupt routines must be located below &3000. Another thing to consider is that because the Aries uses 256 bytes of private workspace, when it is activated it increases OSHWM by &100 (I wondered at first why PAGE was automatically reset from &1900 to &1 A00).

The special system call is also useful in machine code programming. Calling OS-BYTE with A=&6F (111) and setting X appropriately will allow you not only to select the RAM area to be used, but also to read and write the Aries state and to push or pop this to or from the stack:

The Aries manual also provides some basic information on its use in conjunction with the Torch Z80 Disc Pack using CPN or MCP—for those lucky enough.

An advantage to View users is that without recourse to the EDIT facility a total of 25k of text can be resident at once — a fourfold increase in mode 0: In addition to View, the Aries is claimed to work with both versions of Basic, the second processors, all Acornsoft languages and any software that is written correctly — which of course means it is difficult to estimate what proportion of commercial software will run with the system on. Not that this matters a great deal — you just switch the board off before loading. Wordwise will also run, but because of the way it is written it cannot take advantage of the extra RAM.

Unfortunately, you cannot use most of the ROM boards available (eg Watford, Sir, ATPL) with the Aries board — they just won't

Figure 1.
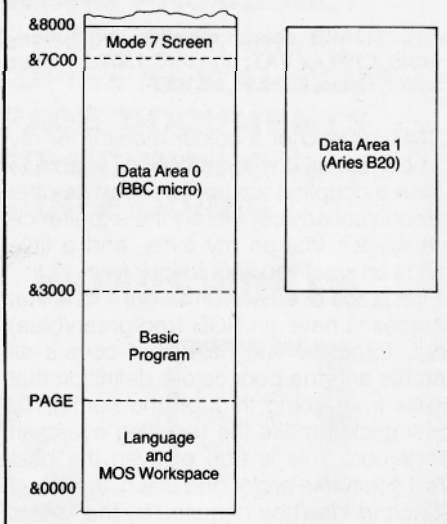
fit. On the question of additional ROMs, it is impossible to say whether the majority that are available will work with the Aries switched on. I found that some of the facilities (ie *MZAP and *MSEARCH) of the Disc Doctor ROM would not work at all with the Aries switched on, which is more than a little annoying: Still, if you do fit a number of add-ons produced by different manufacturers you can't expect them all to ,be compatible.

With regard to the effect of the Aries system on processor speed, it is claimed that it makes no difference except with some system calls. This is quite true. Tests show that such calls only reduce the speed by between 0:5 and 1.6%:

In conclusion, for those with a serious requirement for 'usable' extra memory this is a good buy, albeit a trifle expensive: Don't be put off if you also need extra ROM — Cambridge Consultants will be producing an expansion ROM board for use with the RAM board. This will support 12 ROMs. The company also intends to produce an external ROM board with its own power supply, which I feel will be of considerable interest. After all, you can't just keep shoving things in — the poor old Beeb can only support so much.   **Ian Rowlings**