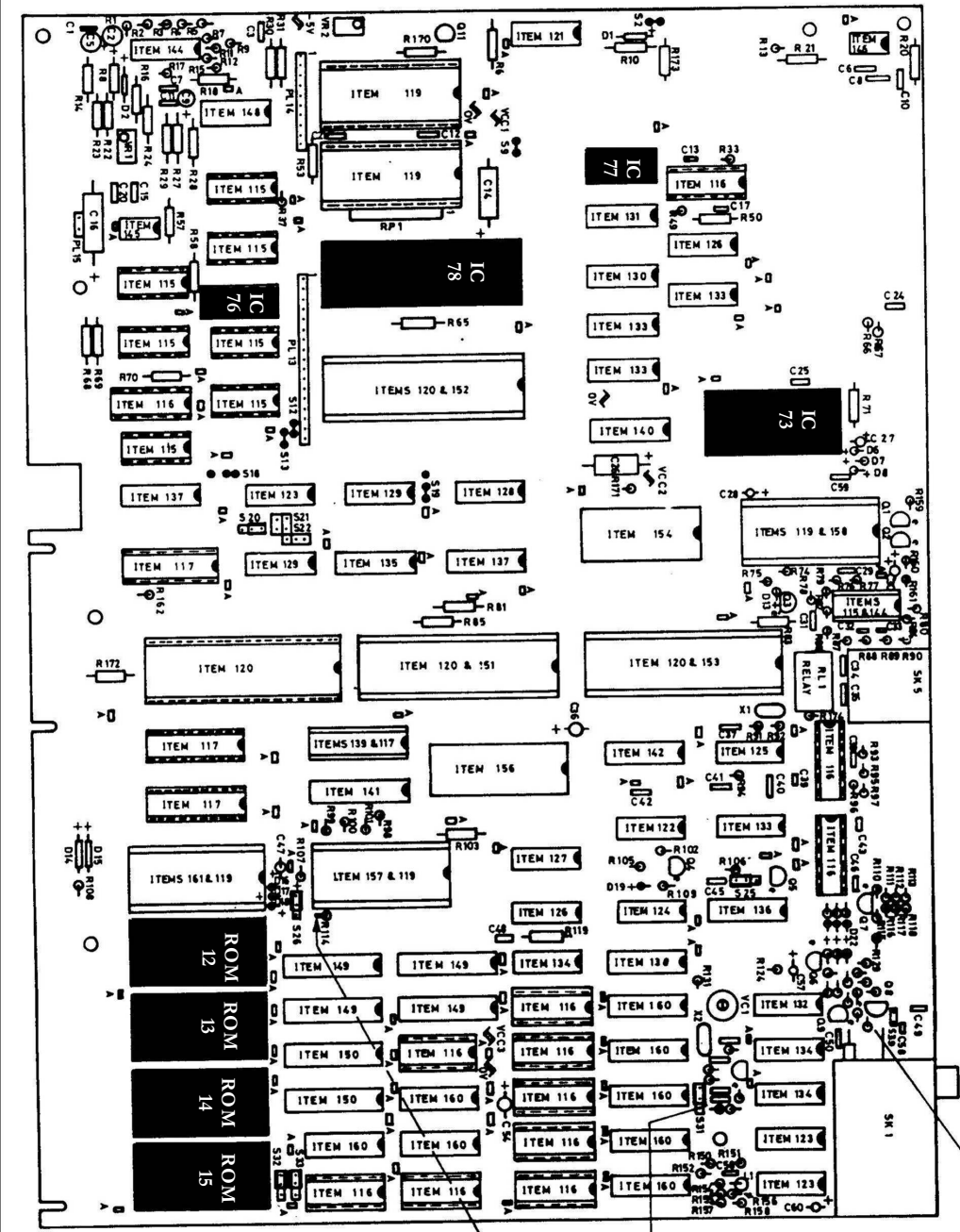


BBC Model B 32K Sideways RAM Module Fitting Instructions



Component Location inside the BBC Microcomputer

The diagram above shows the location of the ICs referred to in these instructions inside the BBC microcomputer. These are shaded black and give the IC or ROM socket number for each.

IMPORTANT NOTE

The BeebMaster BBC Model B Sideways RAM Module provides 32K of sideways RAM for use on a BBC Model B, arranged as 2 banks of 16K each. The ability to address the RAM chip as two separate RAM banks and to write data to the module is achieved by connecting the two flying leads to positions on the BBC B motherboard. As these must not come into contact with the ROM socket, pins 1 and 27 has been cut to prevent this. This is intentional and does not mean that the module is damaged.

WARNING: This upgrade is intended for a use with a standard BBC Model B microcomputer. It is not suitable for use with the BBC Model B+ or BBC Master Series. It may be used with BBC Model B machines with ROM expansion boards fitted but the BeebMaster Sideways RAM module must be fitted to a socket on the BBC motherboard and not the ROM expansion board.

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Fitting the BeebMaster 32K Sideways RAM Module to a BBC Model B Microcomputer

1. Switch off the computer and unplug it from the mains. Switch off and unplug any peripherals connected to the computer.
2. Remove the computer's lid by unscrewing the four screws marked "FIX" - two at the rear of the computer and two underneath.
3. Remove the two (or three in some cases) fixing bolts holding the keyboard in position.
4. Unplug the keyboard connector and speaker connector from the main PCB and remove the keyboard.
5. Carefully insert the RAM module into a free sideways ROM socket. The notch on the module must be facing the rear of the computer and the two connecting leads will be towards the top of the module when the module is correctly positioned.

Please refer to the diagram overleaf for the location of the sideways ROM sockets. Keep a note of the ROM number where the module is located as this will be required when using the loading software.

6. The clip on the RIGHT HAND SIDE of the module (connected to pin 27) must be attached to one of three positions on the BBC microcomputer motherboard. Pressing the wired end of the clip will reveal a hook for attaching to an IC pin on the main circuit board.

The possible pins are:

IC 77, pin 8: this is the easiest to locate. It is the pin in the bottom right-hand corner of the microchip, ie. the pin nearest the keyboard on the right-hand row of pins.

IC 73 (7002 Analogue to Digital Converter), pin 24: this is the fifth pin counting from the top of the right-hand row of pins.

IC 78 (8271 disc controller), pin 10: the tenth pin counting down from the top of the left-hand row of pins.

7. The clip on the LEFT HAND SIDE of the module (connected to pin 1) must be attached to either pin 12 or pin 11 of IC 76. These are the FIFTH and SIXTH pins on the right-hand side row of pins counting down from the top of the IC.

Please refer to the diagram overleaf for the locations of these components inside the BBC Microcomputer.

8. Ensure that the clips are fully hooked around the appropriate pins and do not come into contact with adjoining pins when the spring loaded mechanism is released.
9. The probe connected to IC76 will fit underneath the keyboard ribbon cable when the computer is reassembled. In some cases, the keyboard ribbon cable may need to be re-shaped slightly to ensure that the ribbon cable clears the probe clip.
10. Reassemble the computer and switch on. If the BBC micro fails to start up normally, switch off immediately and check all the above steps
11. If data cannot be written to the BeebMaster 32K Sideways RAM module, switch off the computer and check that the flying lead from pin 27 is correctly connected to one of the three positions given at 6 above.
12. If data already loaded into one RAM bank in the module is overwritten when trying to load data into the other bank, switch off the computer and check that the flying lead from pin 1 is correctly connected to IC 76 as described at 7 above.

Using the BeebMaster 32K Sideways RAM Module

The BeebMaster 32K Sideways RAM Module provides 32K of sideways RAM which appears as two 16K banks in the BBC Micro's ROM Table. The bank numbers depend upon the location of the module inside the BBC Micro and which pin of IC 76 is used.

The first bank will appear as ROM 12, 13, 14 or 15 depending on which sideways ROM socket is used, as shown on the component location diagram overleaf. The second bank will be in the range 8-11 if pin 12 of IC 76 is used, and in the range 4-7 if pin 11 of IC 76 is used:

<i>First Bank in all cases</i>	<i>Second Bank (pin 12 IC 76)</i>	<i>Second Bank (pin 11 IC 76)</i>
ROM 12	ROM 8	ROM 4
ROM 13	ROM 9	ROM 5
ROM 14	ROM 10	ROM 6
ROM 15	ROM 11	ROM 7

If bank numbers 0-3 are used then this will overwrite the contents of the second bank. If numbers 4-7 are used when IC 76 pin 12 is being used, or numbers 8-11 are used when IC 76 pin 11 is used, the contents of the first bank will be overwritten.

Using the BeebMaster Sideways RAM Utility Disc

The BeebMaster Sideways RAM Utility Disc is a 40/80T disc and as such each of the utilities have been compressed to enable all the data to fit onto track 0 of the disc for use with 40-track and 80-track disc drives. The utility disc can be supplied as a 3½" floppy disc, and is available for download as a DFS Disc image at the following location for writing to a 5¼" or 3½" floppy disc:

[http://www.BeebMaster.co.uk/downloads/SRAM Utils 1.3.rar](http://www.BeebMaster.co.uk/downloads/SRAM%20Utils%201.3.rar)

The current edition of the Utility Disc contains three utilities, RAMLOAD, RAMCLR and RAMTEST. These are written in BASIC and can be LOADED or CHAINED.

RAMLOAD - allows you to load a ROM image or other data into a sideways RAM bank. You will be prompted for the filename and ROM socket number of the image to load. The ROM image will be recognised after the next hard reset.

RAMCLR - clears any data from a bank in the sideways RAM module. You will be prompted for the ROM socket number of the sideways RAM bank to clear.

RAMTEST - tests for the presence of sideways RAM banks and report a ROM listing from 0 to 15 displaying either "ROM" or "RAM".

Compatibility with the Tube

Although the BeebMaster Sideways RAM module is fully compatible with the Tube, the software on the utility disc will not work across the Tube. To load a ROM image into sideways RAM for use across the Tube, you must first turn off the Tube, run RAMLOAD and then turn the Tube back on and press CTRL-BREAK.

Other Sideways RAM Utilities

The Acorn 1770 DFS has built-in commands for use with sideways RAM. Other third-party software provides facilities for loading data into sideways RAM, such as *MOVE or *MLOAD in the Advanced Disc Toolkit ROM, or machine-code RAM loading utilities such as the disc version of *SRLOAD. The BeebMaster 32K Sideways RAM module is fully compatible with these commands.