

MultiOS - IDE

Switchable Replacement ROM System

Thankyou for purchasing the new MultiOS system from RetroClinic, for the BBC Master 128. This package allows you switch your operating system between the original 3.20, the upgraded 3.50, and the older OS 1.20 from the Model B, as well as the OS 2.00 from the B+. It allows software that was written only for the earlier operating systems more chance of running on your Master. Whilst it doesn't fix every game or piece of software, it works for most. The Model B and B+ banks of OS also have an array of additional ROMs fitted, for a variety of uses. These will be explained later in this leaflet.

The MultiOS board is effectively a replacement ROM, that allows one of 4 banks to be selected by selecting a position on the rotary switch. It can be configured for use in many different applications, such as selecting different Operating Systems, different ROMs depending on machine usage, or different graphics and programs for Arcade systems that use Mask or JEDEC format 28 pin devices. For our application in the BBC Master 128, the board is hard wired to run as a 1Mbit ROM.

In the package, you will have received along with these instructions, the MultiOS board, and a rotary switch with a lead and plug on.

Performing the Upgrade

Open up your Master case by removing the 4 Philips head screws under the casing, two at the front and 2 at the rear. They are the larger size screw, the three smaller ones hold the power supply in, so don't take those out. Put the lid safely to one side.

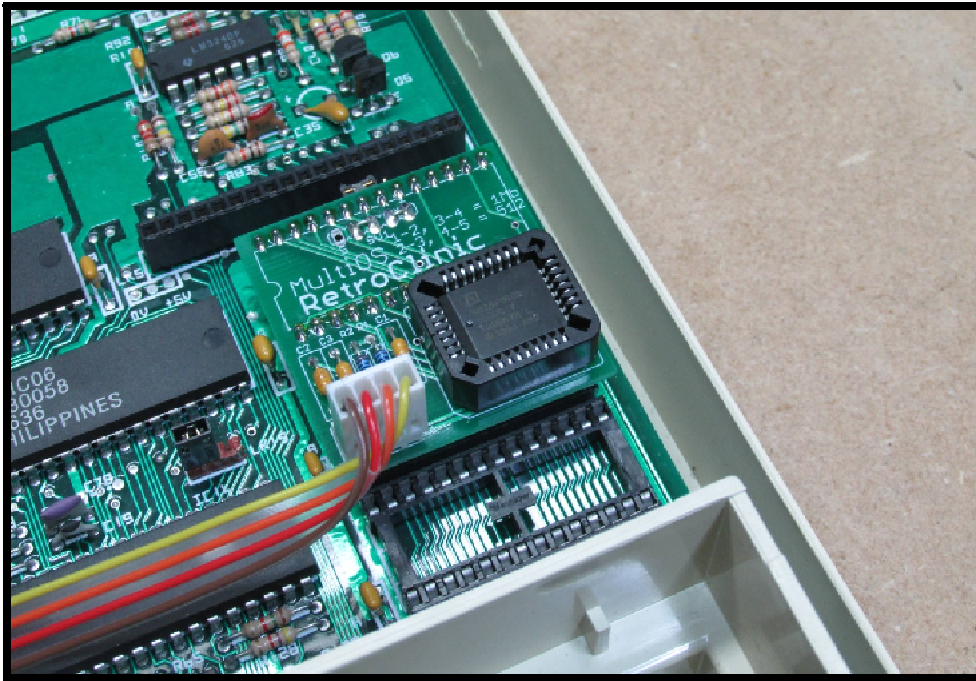


On the right hand side of the PCB, you should see the 4 ROM sockets, as in the above photo. The topmost of the sockets is the 28 pin MOS Chip. It is this one that we will need to remove. Using a small flat blade screwdriver or similar, gently prize one side then the other of the chip, until it comes loose and lift it out of the socket without bending any of the pins. In a few cases, this chip may be soldered directly into the board. If this is the case, you will need to desolder it, and fit the additional socket supplied with the MultiOS kit. If you have difficulty with this, please get in touch and we can help you.

Remove the black foam from the pins of the MultiOS board, and place your old ROM in that foam for safekeeping.

Now you need to fit the MultiOS board into the newly vacated socket. The MultiOS board comes with an additional 28 pin socket fitted. This is to protect the pins soldered into the MultiOS board itself, and also to allow you to stand the board higher in the machine should you wish. If you want the board to sit as low as possible, you may carefully remove this socket, being careful not to damage any tracks or bend any pins on the board.

Following the photo below, place the pins carefully and line them up with the socket, and gently press in the centre area, just above the "C" in "RetroClinic". You may need to press quite firmly to make the board stay in position, depending on what sockets you have fitted, but do not force it, as you may break a pin.



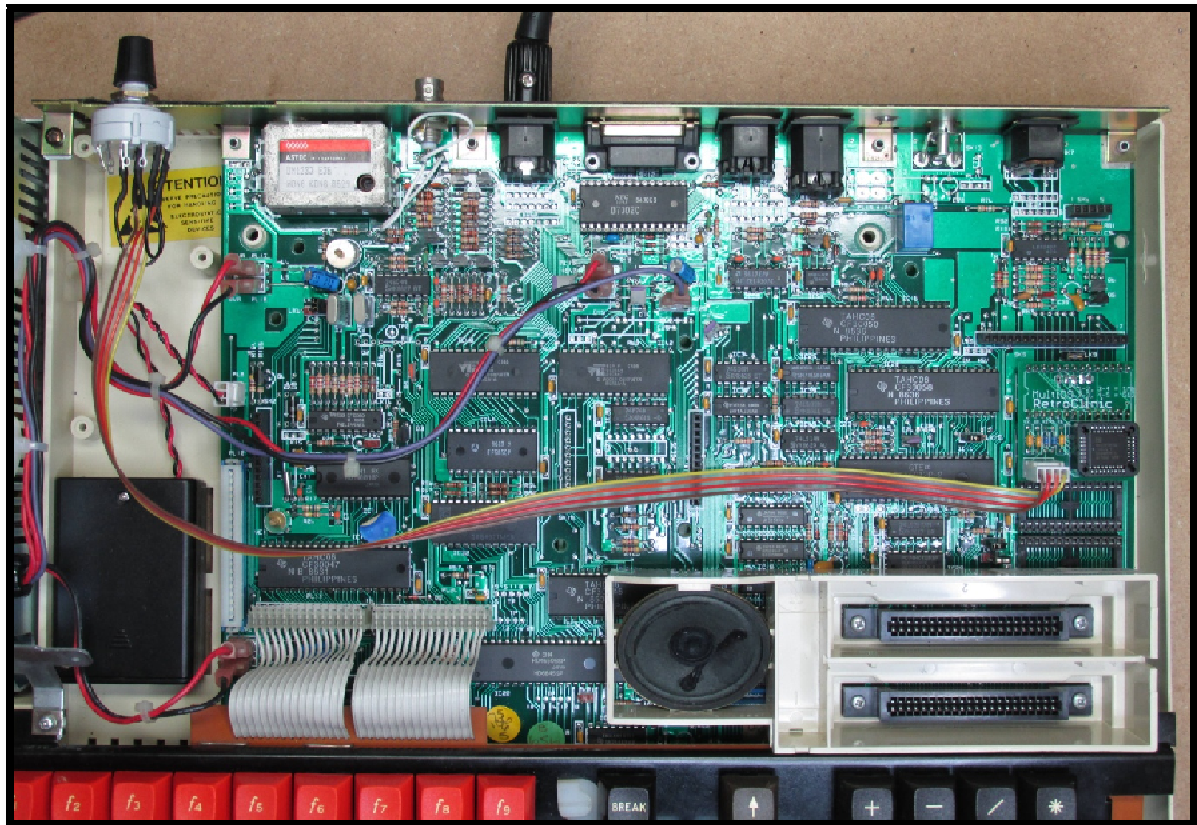
Try and look underneath the MultiOS board to ensure that the pins are lined up with the socket, and that none have been bent out of position. If you're happy with your work so far, it's a good idea to test the Master at this stage, without connecting the switch. Connect it to a monitor and power it up, and it should boot as it did before, but you will notice the "ACORN MOS" now in all capitals. Type:

***HELP**

And check that you have MOS 3.50, and the suite of utilities as before, but with updated versions.

Once you've done that, and it all works, then you can proceed to fit the switch. It should be fitted in an appropriate place so the plug end can plug into the socket on the MultiOS board. I recommend on the rear panel, where there is a cutout for the modem wiring. The switch fits neatly in there. You may need to trim the polarity peg that protrudes slightly from the front. Also, once you've taken off the nut and washer, be careful not to lose the ring that restricts the switch to 4 positions. If it falls out, simply replace it without moving the switch, placing the lug in the 3rd hole clockwise. You can place the switch elsewhere if you like, under the keyboard is another option.

Below is a photo showing my suggested installation



Once you've fitted the switch and connected it, you can test the system.

PLEASE NOTE: *You **MUST** switch the machine off before selecting a different operating system. Not doing so will not cause the machine any damage, but it **WILL** crash it, needing a power down reset, or a wipe of the CMOS data.*

The switch has 4 positions, and following a clockwise pattern, it selects:

- OS 1.20
- OS 2.00
- OS 3.20
- OS 3.50

The OS 3.20 is most likely the one you had in your machine originally. Some very late machines came supplied with OS 3.50. Both versions of these operating systems have been patched to support IDE hard drives under ADFS, as well as bug fixes for things like the Y2K bug. As an initial setup, I would suggest you turn the switch to the most clockwise position, to select MOS 3.50, and run the control panel utility on the Master Welcome Disk to set the time and date. Note that as the Control Panel has not been updated, you will need to set the year 100 years back, so for 2016, you set 1916. Once set, if you request the time in basic by typing:

PRINT TIME\$

You will notice the year is correct.

Now you just need to reinstall the lid, taking care not to trap any of the wires for the power supply, or MultiOS switch in the screw mounting posts.

Software in the ROM Banks

Let's look at what ROMs are in each of the 4 banks of operating systems

OS 3.50 - The updated last OS for the Master 128

- MOS 3.50 - The main operating system utility commands. The sideways RAM commands have been moved here, away from the 1770 DFS
- Terminal 1.20
- VIEW B3.3
- Advanced DFS 2.05 - This has been patched to use IDE drives instead of SCSI, so for instance, you can use Compact Flash drives through the RetroClinic DataCentre. This version also has the FORMAT and VERIFY commands built in, instead of needing to use the ones from the Welcome Disk.
- BASIC 4r32 - This version of Basic auto-relocates to the "hi" position when used with a 6502 co-processor
- EDIT 1.50r - This version of Edit also auto-relocates
- ViewSheet B1.01
- DFS 2.45 - The main 1770 DFS

It's this configuration that's you'd use the most. It contains the last images and ROMs for the Master 128 released by Acorn. There are later OSs, including 4.00, 5.00 and 5.10, but these are for the ET and Compact, so are not suitable for use in a 128. The MOS 3.50 also solves some of the problems of games and other software not behaving under OS 3.20.

One other feature of this version of OS is that it will automatically fill the CMOS configuration with default data, instead of all zeros, like MOS 3.20 did. Doing an <R> power on resets the CMOS under 3.50 to a set of sensible values, but you may want to reconfigure the filing system back to DFS by typing:

***CONFIGURE FILE 9**

OS 3.20 - The standard OS supplied in the Master 128

- OS 3.20 - The main operating system utility commands
- Terminal 1.20
- VIEW B3.0
- Advanced DFS 1.53 - This version is also patched for IDE Hard Drives.
- EDIT 4
- ViewSheet B1.0
- DFS 2.24 - The main 1770 DFS, patched for a known double density bug
- SRAM 1.04 - These are the Sideways RAM manipulation commands.

If you prefer the original MOS, then this is the one to use.

OS 2.00 - The OS from the 64K or 128K BBC Micro B+

- DFS 2.26
- SRAM 1.05
- VIEW A3.0
- The Basic Editor 1.32
- Advanced Disk Toolkit 2.00 - An extended set of commands for using disks, and for manipulating files between filing systems.
- EXMON II 2.02 - A machine code monitor to help with debugging assembler routines
- Advanced ROM Manager 1.13 - A useful set of commands for managing ROMs, and also building ROM Filing System ROMs.
- OS 2.00

This image was put together with these ROMs for the more serious programmer in mind. The memory display when this OS is booted will either display 64K, 96K, or 128K, depending on the way links 18 and 19 are set. If they are both set for sideways RAM (to the left), then it will show 128K, if they are both set for mapping to the ROM sockets (to the right), then it will show 64K, and if each is set different, you will get 96K displayed. The SRAM commands, in ADT, ARM and SRAM are useful for creating your own ROM images.

Shadow screen modes are available in OS 2.00, so you have the extended modes 128 through 135, which use shadow memory rather than main memory, freeing up space for your programs. This is the same behaviour as the later Master OSs.

In this bank, Issuing the command ***GOROM 9 A000** will bring up our logo along with names of contributors, and give you the version number of the build at the top right of the screen.

OS 1.20 - The original OS for the 32K BBC Micro Model B

- DFS 2.26
- SRAM 1.05
- VIEW A3.0
- The Basic Editor 1.32
- Game ROM - Snapper
- Game ROM - Hopper
- Game ROM - Rocket Raid
- OS 1.20

This bank has been designed for the gamer. It provides OS 1.20, the most compatible of OSs for the early games. Games that did not run on OS 3.2 or 3.5, will most likely run when you select OS 1.20. However not all will. The Master has a different CPU to the Model B, with a slightly different instruction set. In the early days, some programmers didn't adhere to the rules when they wrote software, especially games, and used what's known as "illegal instructions" to make their software perform better. The later CPU doesn't like these instructions, as some of them have now been implemented to do different things. One example game of this is ZALAGA. The early version will still crash, but there is a later version of the game available, which will run under OS 3.20 and up.

This bank also has three of our popular Acornsoft Game ROMs fitted. To use any of these, you simply type a * then the name:

- ***SNAPPER** - Plays Snapper. Add the letters **A** through to **O** to start on levels 1 thru 15.
- ***HOPPER** - Plays Hopper
- ***ROCKET** - Plays Rocket Raid

Instructions for the keys used in each game are given once loaded.

It should be noted that under OS 1.20, the 4 banks of sideways RAM, if available, are usable as in OS 2.00, however, the other 32K of shadow memory is not.

Other things to note

Using Disk Drives

The Master can come fitted with one of two disk controllers - a 1770, or the later 1772. These are command compatible, and to all intents and purposes work the same, with one exception. The later 1772 chip has a faster head stepping rate, and therefore is faster at reading and writing disks. It is preferred for use with later disk drives, especially 3.5" drives that can keep up quite happily, however some very early disk drives won't be able to step their heads as fast, and will give disk read or write errors. In MOS 3.20 and 3.50 the speed of the disk head stepping can be selected using the *CONFIGURE FDRIVE <n> option. On a Model B or B+, this speed setting is usually made with DIP switches on the front of the keyboard, usually switches 5 and 6 (or binary bits 4 and 5).

Because OS 1.20 and OS 2.00 do not have access to the CMOS configuration data, and the Master doesn't have a set of keyboard switches, the decision was made to implement these OSs with the DIP switches 5 and 6 set by default. This selects the fastest speed on a 1770 controller, but the slowest on a 1772, which are both 6ms. If you have a very early 40 track drive, it may not be able to keep up with a 1772 at any speed, but if your machine has a 1770, the speed can be backed off with a *FX255,255, then a soft break to 30ms. This will be reset to back to 6ms when you do a control-break.

Using Co-Processors

The code for second processors is disabled in OS 1.20 and OS 2.00 modes. If you have a co-processor internally or externally, it will not function under these OSs. This is because when the system is used as a tube host, there is no need for it to be running a downgraded OS, as the main software runs on the second processor. If you want to use your co-processors, please use OS 3.20 or OS 3.50

If you have any questions, or have experienced difficulties or issues during or after installation, please don't hesitate to get in touch. I'm here to help if I can! If you do encounter problems that seem frustrating, there is usually a solution, I'm only an email or a phone call away.

Reprint manuals for all of the ROMs in this MultiOS are available separately, please contact us for more details.

Thanks once again for your purchase.

RetroClinic
07976 112407

eMail: mark@retroclinic.com

Facebook: facebook.com/retroclinic



For build IDE 1.05 – May 2020