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# 305/310 RAM Upgrade Fitting Instructions

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## WARNING

**Ensure that your computer is disconnected from the mains supply before continuing. Failure to do so may cause injury. If you are unsure about fitting this upgrade yourself, then ask your local Acorn service centre to fit it for you. As the fitting of this upgrade is outside our control, no guarantee other than for manufacturing defects of the board can be given and no responsibility can be accepted for any consequential loss or damage caused by its installation.**

**Note: The computer and memory board are static sensitive and excessive handling can damage them.**

**Precautions should be taken to reduce static by wearing an earthed anti-static strap or by occasionally touching an earthed surface.**

## Purpose

To upgrade an Archimedes 300 series microcomputer to 4MB by the fitting of a memory card. When fitted, the memory board disables the existing RAM in the computer and substitutes its own to give a total of 4MB.

Unlike the 400 and A3000 machines, the 300 series was never intended to be upgraded beyond 1MB. Because of this, the operation involves the removal of the computer's circuit board so that three ICs can be replaced with sockets, lifting of 24 resistors and the soldering of three wires to provide all the signals required for the extra memory.

## Tools Required

A small cross-head and a flat-blade screwdriver for removing the case, backplane and mother board.

A 25W soldering iron with fine tip and 22swg tin/lead solder.

A pair of miniature wire cutters and pliers, and a solder sucker to be used in replacing the three ICs with sockets and lifting the 24 resistors.

## Fitting

To fit the RAM upgrade, the main printed circuit board (PCB) must be removed to give access to the memory sockets. This involves the removal of the metal cover, the removal of any podules, the unplugging of the backplane and the disconnection of the cables from the PCB before it can be slid out of the machine.

1) Disconnect the power cable and all other connecting cables from the computer, placing the monitor and keyboard in a safe place. The cover can now be removed by using the cross-head screwdriver to unscrew the two side screws and the three rear screws and carefully sliding the cover to the rear until it clears the rest of the machine. Place the cover in a safe place. (This operation is explained in more detail in appendix B of the Archimedes User Guide : Maintaining the Archimedes computer in the section *Changing the Batteries*.)

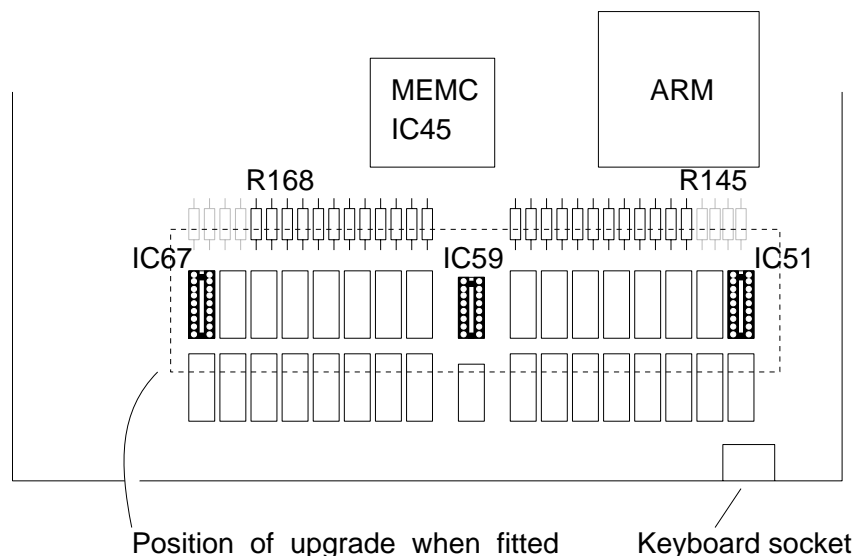
2) Remove any podule cover plates from the rear of the machine and if you have any podules fitted then remove them by following the reverse of the manufacturer's fitting instructions, placing them in a safe place.

3) If fitted, the backplane is now removed by unscrewing the two fixing screws at either end of the backplane bar that attach it to the side of the case and the power supply fixing tab. If there is a large hole in the side of the power supply cover to the side of one of the fixing screws then it is advisable to cover it with a small piece of adhesive tape to prevent the screw from falling into the power supply when it is removed. With both screws undone, the backplane can be unplugged from the main PCB with cables still attached, by easing it carefully upwards. Being careful of the three cables still attached rest the backplane on the top of the power supply to keep it out of the way.

4) The flat cable connecting the disk drive to the PCB must now be unplugged from its socket. If you have an internal hard disk fitted then detach the two flat ribbon cables from the PCB by carefully easing their plugs from the vertical pin connectors and curl them out of the way.

5) Now detach the fan, battery and speaker/LED connectors, and the four power cables from the board (coloured red, black, yellow and purple).

6) With all connecting cables removed from the PCB, the two small screws securing each end of the rear plate of the board can now be removed allowing the PCB to be slid out of the rear of the machine on its two plastic runners. (The board must be kept horizontal or the sharp end of one of the case screws may scratch the underneath of the board as it is withdrawn possibly causing damage. It is advisable to unscrew them before withdrawal.) On some of the older machines the PCB is secured using three sprung pillars which require the tops to be squeezed together with pliers while the PCB is lifted before it can be slid out.



## Fitting the Upgrade

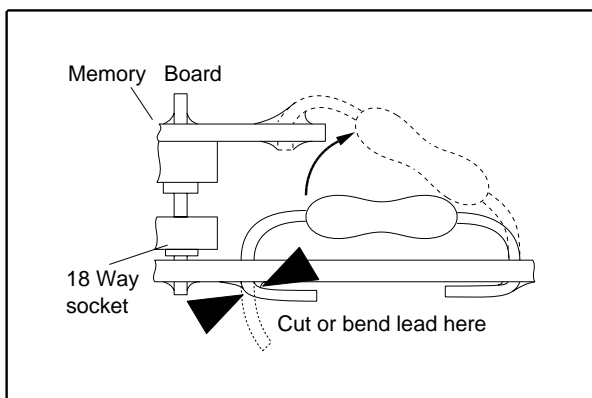
1) Place the PCB on an anti-static work surface. If there is a plastic pillar in the middle of the board then this must be removed to allow the PCB to lie flat.

To fit the upgrade, three chips must be replaced with sockets. As these chips are not used in the upgrade it is advisable that they be cut out rather than desoldered so as to reduce the chances of damaging the PCB in the desoldering process.

2) Now using a pair miniature wire cutters carefully cut each leg of IC59, a 74ALS138, so as not to scratch the board, removing the body when free. Using the soldering iron and solder sucker, clear each of the sixteen holes and then solder the 16 way turned pin socket in position.

Repeat this operation for IC 51 and IC67 soldering two 18 way sockets in their place. If they are already in sockets (as in an upgraded 305) then all chips must be unplugged and the two sockets replaced with the turned pin ones.

3) Locate the 24 resistors R145-168 (68 ohms - blue, grey, black), turn over the PCB to reveal the solder side. Only the ends nearest the RAM chips have to be desoldered by snipping off the excess lead as close as possible to the PCB and finally, working from the component side, desolder them and bend them carefully upright. The four resistors at either end of the row, R141-144 and R169-172, should not be cut or desoldered.



The excess lead can be bent vertically instead of being cut before desoldering to give a simpler fit to the expansion board, but this increases the chance of damaging the PCB.

4) Now unwrap the memory board, and with the row of holes facing the resistors, plug the pins of the board into the three sockets on the computer PCB. Use even pressure without bending the PCB unduly, paying great attention to the alignment of the pins and sockets. Push home the board as far as it will go, bending any decoupling capacitors on the PCB out of the way if they interfere.

5) Now bend the resistors to the 24 holes along the edge of the memory board (they should fit perfectly with their bent ends) and solder them.

6) Finally, take the three flying leads round the front of the PCB to the underside, and solder them onto the three pins of the MEMC chip (IC45) as shown in the diagram overleaf. Check that the wires connect to the correct pads of underneath of the PCB and that the 'red' conductor is attached to the 'square' pad on our memory board.

7) The PCB can now be returned to the chassis. Be careful not to catch the top of the memory board on the underside of the disk drive bridge as it is slid home. On some of the earlier machines the bridge is too low to easily refit the PCB and it may need unbolting (or if riveted, the rivets drilling out and replacing with M3 bolts). The PCB can be flexed if the bridge is too low but this is not recommended.

The computer can now be reassembled by following the instructions in reverse.

Take great care to reconnect all cables making sure that the multi-way connectors are plugged in the right way round without displacing them sideways.

**Note: The four power cables are connected to the spade terminals on the PCB in the following way:-**

**RED to the +5v terminal, BLACK to the 0v terminal, YELLOW to the +12v terminal and PURPLE to the -5v terminal.**

**Permanent damage to your computer will occur if these connections are not correct.**

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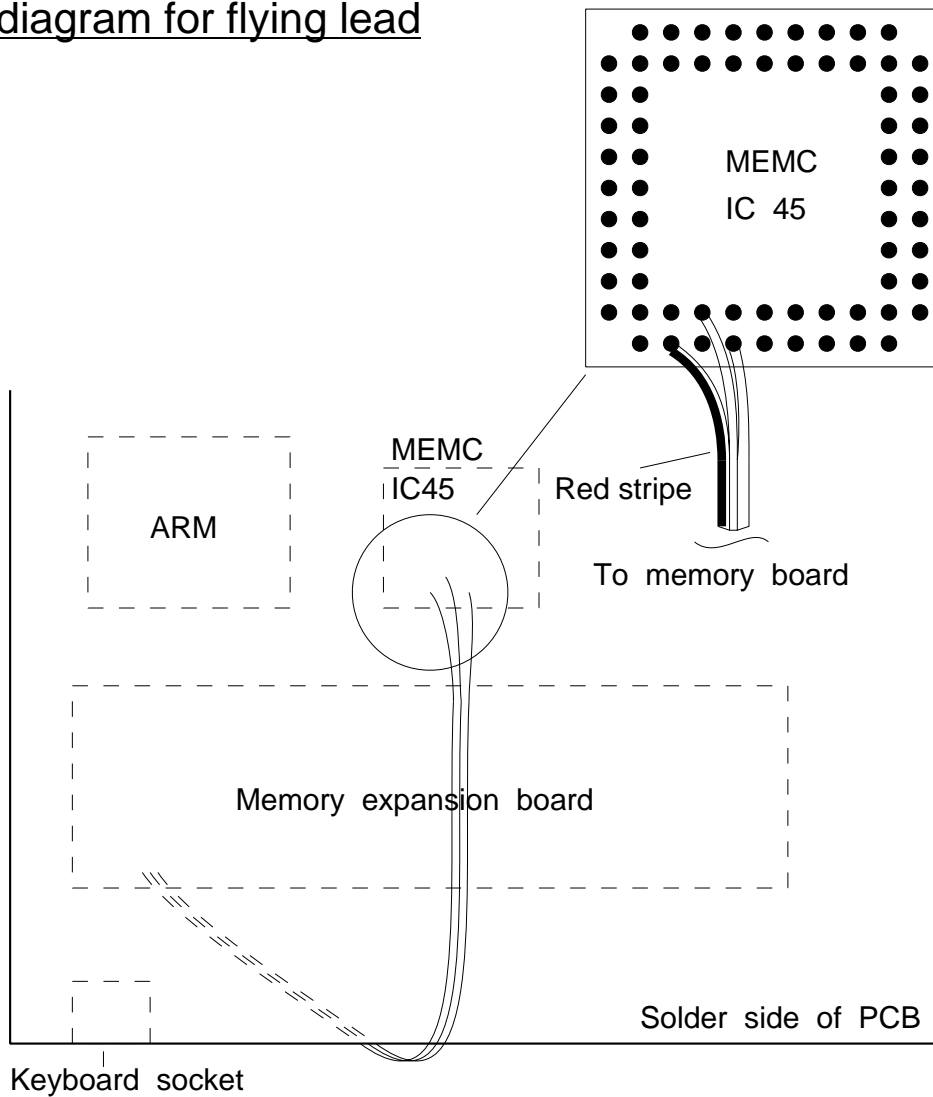
Before replacing the cover check once more that all cables have been reconnected and that all screws have been replaced. You may wish to take the opportunity of changing your fan-filter and batteries before the computer is fully assembled.

When the computer is completely reassembled and the monitor and keyboard are connected, the machine can be switched on with the <Delete> key depressed to initialize the CMOS battery backed RAM. All should now be well and the configuration of the machine can be changed to the original values. If nothing happens or the computer *freezes* when switched on then turn off immediately and remove the cover to recheck the connections.

**Remember to set the 'Real time clock' and change back the CMOS Ram settings as they are forgotten when the battery connector is removed !**

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### Wiring diagram for flying lead



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