

RISC OS 3 hardware upgrade fitting instructions

Introduction

This document provides fitting instructions for the RISC OS 3 hardware upgrade. The upgrade is intended for the following Acorn computers so that they can run the new operating system:

- R140
- Archimedes 305
- Archimedes 310
- Archimedes 440 (**not** 440/1).

Later models of Acorn computers do **not** require this upgrade.

You need the hardware upgrade to interface the 4Mb ROMs used in the RISC OS 3 software upgrade to the ROM address circuitry on the computer's main printed circuit board (PCB). Note that the existence of 32-pin sockets on the main board does not imply that these machines will accept 4Mb ROMs as standard.

The RISC OS 3 software upgrade comes with its own instructions.

Warning: This upgrade involves soldering and, in some cases, track cutting on the main PCB. It is therefore essential that the upgrade is undertaken by a recommended Acorn Dealer or Service Agent. A charge may be levied for installing the upgrade, which is at the discretion of your Dealer or Service Agent.

Packing list

The upgrade kit should contain the following items:

- upgrade daughter board
- 3-core flying cable
- Owner Registration Card
- these instructions.

If any of these items is missing, inform your supplier immediately. The 4Mb ROMs mentioned in this document are contained in the RISC OS 3 software upgrade kit. Please fill in the Registration Card, and send the prepaid portion back to Acorn Computers Limited.

Equipment required

You will need the following tools to perform the upgrade:

- a soldering iron fitted with a fine tip
- a pair of cutters
- a scalpel or sharp knife
- a de-soldering pencil or machine
- a pair of snipe-nose pliers
- a roll of solder.

An overview of the hardware upgrade

The procedure to fit the hardware upgrade consists of three stages:

- 1 Testing and dismantling the computer.
- 2 Implementing the hardware upgrade:
 - preparing the main PCB
 - installing the upgrade daughter board
 - fitting the new ROMs.
- 3 Retesting and re-assembling the computer.

These stages are described in detail in the following sections.

Testing and dismantling the computer

Before you start the upgrade, confirm that the computer is fully functional using the tests provided in the version of Acorn Dealer test software that is appropriate to your machine. For detailed instructions, refer to the relevant Service Manual for your computer.

When you are satisfied that the computer is completely operational, disconnect the computer from the power supply and all peripheral devices. Then remove the cover of the computer and take out the PCB from the case. For detailed instructions on how to assemble and disassemble a computer, refer to the appropriate Service Manual for your machine.

Warning: Do not attempt to perform this upgrade with the PCB in the case, as it is possible to damage the PCB by working in this way.

Implementing the hardware upgrade

Preparing the PCB

Follow the steps given below to prepare the PCB for the hardware upgrade:

- 1 Remove the plastic support from the centre of the PCB to allow the board to lie flat on the workbench.
- 2 Find the link LK12, which is located near the silk screen compass on the main board. If the compass is not present then look to the right of LK2. Note that on Archimedes 305/310 issue I PCBs, the LK12 position may not be available. In such a case go directly to step 6.
- 3 If the LK12 position is available but the Molex pins are not fitted, check for tracks between pins 1-2 and 3-4. If these tracks are present, you **must** cut them.
- 4 After cutting the tracks, fit Molex pins, which enable the machine to be returned to its original state. You do not need shorting links here, unless you intend to return the board back to its original state (that is, using IMb ROMs without the upgrade board).

- 5 If Molex pins are already present and shorting links are fitted, **you need to remove the links.** Note that LK12 has been duplicated on the daughter board as LK5.
- 6 On Archimedes 305 and 310 machines with issue 1 PCBs, the LK12 position is not available and you need to cut a track (LA18). This track runs between 1C28 pin 18 and pin 24 of the ROM sockets. Figure 1 below shows the location of the track. You will need to re-make this track if you ever want to revert to RISC OS 2.

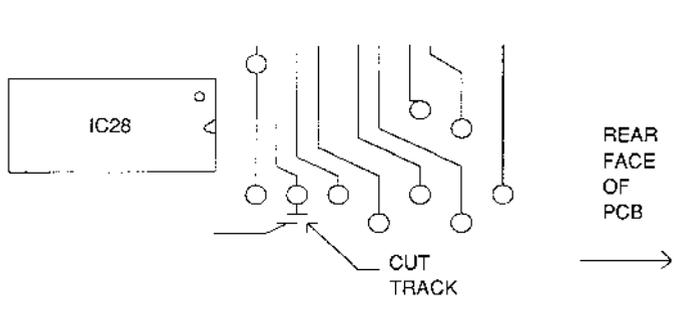


Figure 1 *Position of the track*

- 7 There is a 3-core flying cable supplied with the hardware upgrade kit. One end is terminated with a 4-pin connector and the other is left with bared and tinned ends. You need to connect the free ends to LA18, LA19 and LA20 on the component side of the main PCB (see Figures 2 and 3 below). De-solder the via holes of LA18, LA19 and LA20 on the main board and then solder the cable ends to the holes.



Figure 2 Connecting the *free ends*

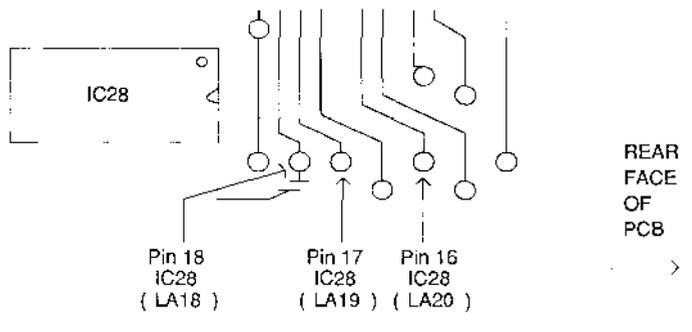


Figure 3 *Via holes on the main board*

Installing the upgrade daughter board

- 1 Remove the current set of ROMs from their sockets.
- 2 Push the tantalum capacitor that lies between the backplane and the ROM sockets so that it leans toward the backplane connector.
- 3 Position the upgrade daughter board with reference to the computer as shown in Figure 4 below. Place the daughter board over the empty ROM sockets, taking care that the pins on the daughter board line up with the sockets on the main printed circuit board (mother board). Push down gently on the daughter board until the pins move into place with the ROM sockets. Then push down firmly and evenly so that all the connections are made at the same time and the pins fit securely in the sockets.

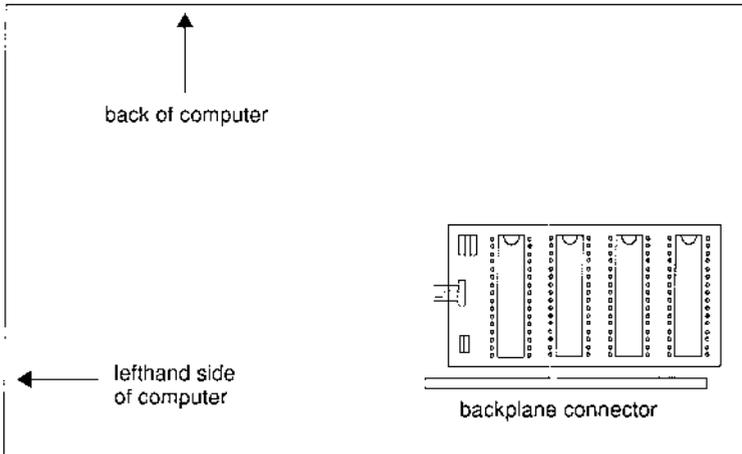


Figure 4 Orientation of the upgrade daughter board

- 4 Now connect the 4-way connector to LK4 on the upgrade daughter board, ensuring that the wires are not twisted. Figure 5 overleaf shows the correct way to connect the cable and board.

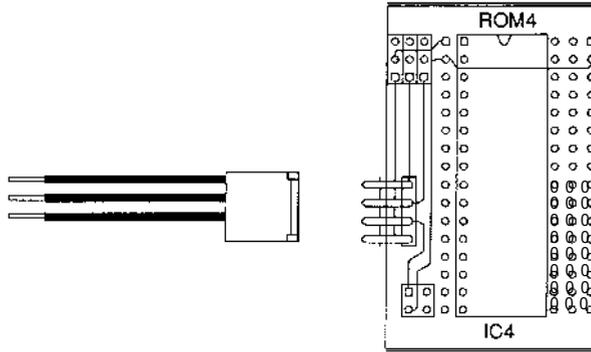


Figure 5 Connecting LK4 on the daughter board

Installing the new ROMs

You can now insert the new ROMs into the sockets on the upgrade daughter board.

- I Identify the ROM chips according to the following table:

ROM	Markings
1	0296,041 -xx
2	0296,042-xx
3	0296,043-xx
4	0296,044-xx

(where *xx* is a 2-digit number corresponding to the issue number).

Each socket on the daughter board is marked with a ROM number and its IC socket number. ROM 1 corresponds to IC1, ROM2 to IC2 etc.

- 2 Take the chip that you have identified as ROM I and, holding it by its plastic case, align it with socket IC1 as described in the following steps.

- 3 Each of the RISC OS 3 4Mb ROMs has a semi-circular notch at one end. When inserting a chip, position this end towards the notched end drawn on the silk screen of the socket of the daughter board, as shown in Figure 6 below.

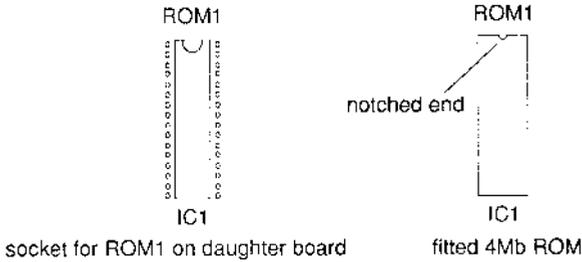
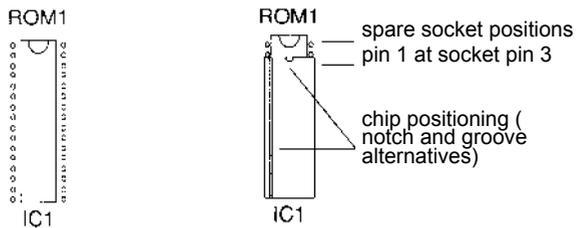


Figure 6 Positioning a 4Mb ROM

- 4 If you are re-using the RISC OS 2 1Mb ROMs, you will notice that each socket on the daughter board has 32 pins whereas each chip has only 28, leaving four pin positions unused. Align the chip so that the four free positions are at the notched end of the socket, as shown in Figure 7 below, taking note of the following rules:

- If the chip has a semi-circular notch on one end, position this end towards the notched end drawn on the silk screen of the socket on the daughter board.
- If the chip has a groove down one side, position it so that the groove is on the left side of the chip (see Figure 7).



socket for ROM1 on daughter board fitted 1Mb ROM Figure 7

Positioning a 1Mb ROM/EPROM

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- 5 When you are sure that the chip is positioned correctly and that the pins are straight and placed properly in their sockets, apply firm pressure to the chip to press it home. Don't force the chip, as when it is in place it should be slightly raised from its socket.
- 6 Insert the remaining ROMs into the sockets IC2, IC3 and IC4.
- 7 If you have inserted the new **4Mb** ROMs provided in the RISC OS 3 software upgrade, you need to fit the plastic shunts to the daughter board as shown in Figure 8 below. Remove the shunts from LKI2 on the mother board.

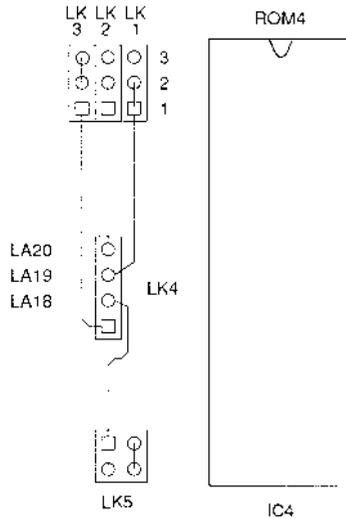


Figure 8 Links for RISC OS 3, 4Mb ROMs

- 8 If you have re-used the original **1Mb** ROMs you need to fit the plastic shunts to the upgrade daughter board, as shown in Figure 9 overleaf. Remove the shunts from LK 12 on the mother board.

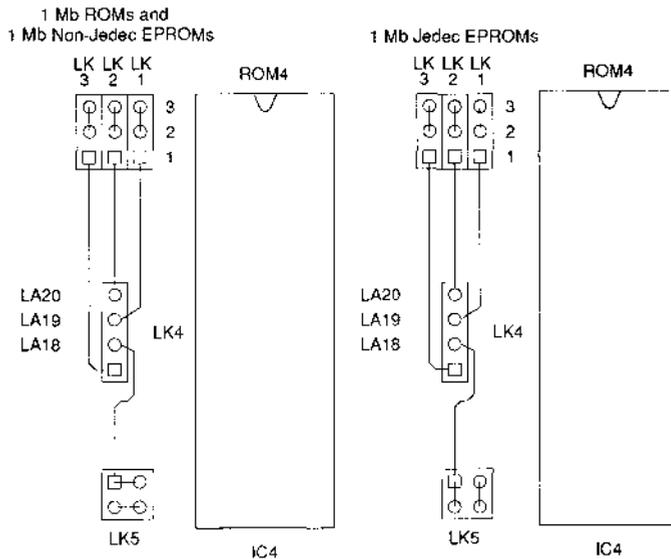


Figure 9 Links for RISC OS 2, 1 Mb ROMs

Retesting and reassembling the computer

Reconnect the plastic support to the centre of the main PCB and replace the board in the computer case. Reconnect your computer to the power supply and all peripheral devices to the computer.

To reboot your computer and reset all CMOS RAM settings to their initial default values, hold down the Delete key and switch on the computer. Keep Delete held down for several seconds after you have switched on.

The RISC OS 3 *software upgrade fitting instructions* leaflet contains more information about restarting and configuring the computer.

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