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Shadow RAM Board User Guide

(Includes fitting instructions)

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The Shadow RAM Board is guaranteed against defect due to manufacture for a period of six months from date of purchase. Any misuse of, or modification made to, the unit during this time will invalidate the guarantee.

This manual was prepared using WORDWISE-PLUS on an Electron computer fitted with a MODE 7 MARK 2 display unit and SHADOW RAM BOARD.

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The section on installation will, of course, only be needed if you are installing the Shadow RAM Board yourself.

Otherwise you can go straight to the section on Operation.

1. Installation

Before starting to install the Shadow RAM Board, read this section carefully. Do not proceed if you are not sure of your ability. Jafa Systems accept NO responsibility for any mistakes you may make, or for any faults that may arise from your attempts, although repairs will be undertaken, if possible, at a cost dependent on the fault. If you decide not to continue, contact Jafa Systems to arrange the fitting service.

To fit the unit you will require: a fine tipped soldering iron, multi-core solder (approx. 22swg), a solder sucker, I.C. leg cutters, a drill with 1/4" drill bit, large and small pliers, a Stanley knife or equivalent, a small Philips screwdriver and wire strippers. You will also need a small length of miniature solid wire, e.g. wire wrap wire.

Before and during the operation, ensure that you have not picked up any static charge by regularly touching some earthed metalwork.

1.1 Opening the Electron

To open up your Electron, first of all remove the Plus 1, ROMBOX+, Plus 3 and any other add-ons. Turn the Electron upside down and remove the four small Philips head screws, two recessed in the front corners and two alongside the edge connector. Turn the Electron over, lift up the keyboard and pull the keyboard connector off its contact strip.

Disconnect the loudspeaker plug, the three pin +5v/0v/-5v connector and the two 18vac contacts. Unscrew the four Philips screws holding the board, and remove the board from the Electron.

While the board is out, drill a 1/4" hole into the left hand rear side of the base, close to the speaker.

1.2 Removing the Microprocessor

The 6502 microprocessor chip must be removed from the Electron circuit board, and will not be needed again. Unless you wish to try removing it without damaging it, the easiest way to proceed is probably as follows:

With a pair of electronic cutters, cut each leg of the microprocessor as close to the body as possible, then discard the body.

With the soldering iron and a pair of fine pliers, remove each pin from the circuit board. Then use the solder sucker to remove the solder from the holes.

The 40 pin socket provided with the Shadow RAM board should now be soldered in place of the microprocessor. To ensure consistency, note the indentation in one end of the socket should point towards the rear of the Electron board.

Now check on the issue number of your board, which will be 1 (German), 2 4 or 6. It will be printed close to the large 'ELECTRON' logo in the front right hand quarter of the board.

1.3 Issues 2 and 4 Boards

Locate LK1 which is three soldered in holes to the rear of the microprocessor. Turn the Electron board over and note that two of the holes are joined by a track. This track must be cut CAREFULLY with a Stanley knife. The solder should then be removed from the three holes on the link with a solder sucker.

With some fine wire, connect the right hand pair (looking from the component side) of holes of LK1.

Locate LK8, which is 3 soldered in holes to the left of the Acorn ROM. Turn the Electron board over and note that two of the holes are joined by a track. Cut this track CAREFULLY with a Stanley knife and remove the solder from the two holes with a solder sucker.

The red and black wires from the Shadow RAM Board now need soldering to the two holes of LK8 that were joined by the track.

The red lead goes to the nearer of these two holes to the keyboard connector and the black lead to the further of the two from the connector.

1.4 Issues 1 (German) and 6 Boards

Locate LK13, which is to the right of the Acorn ROM in a group of four such links. Turn the Electron board over and note that two holes of this link are joined by a track. This track must be cut CAREFULLY with a Stanley knife. Remove the solder from these two holes.

The red and black wires from the Shadow RAM Board now need soldering to the two holes of LK13.

The red lead goes to the left hand hole and the black lead goes to the right hand hole.

1.5 Fitting the Shadow RAM Board

Check all your work to ensure that the previous instructions have been followed and that there are no bits of swarf or solder shorting tracks, or indeed any tracks cut that should not be. Check also that the red and black leads go to the holes on the links that were connected by the track you cut and that the track is still separated.

Replace the Electron circuit board in the case and screw it down. Refit the four connectors, but not the keyboard contact strip.

Then carefully align the pins of the Shadow RAM Board to the socket you have fitted in the Electron board. Push the pins home by applying firm but even pressure to the microprocessor, **taking care not to bend any pins.**

Fit the switch into the hole you drilled in the case, then push the keyboard connector back onto its contact strip.

1.6 Testing the Installation

Loosely fit the lid of the Electron onto the base, connect up your monitor or television and switch on. Try pressing CTRL and BREAK keys with the switch in each of the three positions. You should see each of the following switch on messages:

```
Acorn Electron
BASIC
>
```

```
Acorn Electron TURBO
BASIC
>
```

```
Acorn Electron 64K
BASIC
>
```

If the computer does not display these messages, switch off and examine your work again for any dry joints, shorts, etc., and to see that you have all the cables and links wired correctly. Check also that the Shadow RAM Board is firmly seated in the socket and that you refitted the connectors to the Electron board properly.

If you still cannot get correct operation, then contact JAFA Systems for assistance.

2. Operation

The Shadow RAM Board operates in three modes selected by the switch at the side: Normal, Turbo and 64K modes. The sign on screen that appears when you switch on or press CTRL + BREAK indicates which mode you are in.

You will not be able to change modes without crashing your Electron, requiring a switch off or CTRL + BREAK.

2.1 Normal Mode

This is the normal operating condition of a standard Electron. There is no difference at all in the computer's performance.

Electron games would therefore be played in this mode.

2.2 Turbo Mode

This is the same as Normal Mode except that, by switching in some fast RAM for memory intensive operations, a significant speed increase is achieved; typically 50% faster in screen modes 4 - 6 and **300%** faster in modes 0 - 3.

This mode would therefore be used with programs that need direct access to screen memory but normally run slower than you would wish, e.g. graphics or BBC games programs that run on the Electron but use illegal screen 'pokes'.

The fast RAM memory is located between &0000 and &1FFF in this mode.

2.3 64K Mode

This mode gives both the speed increase of Turbo mode and added memory as well.

A full 32K of fast RAM memory is used for all requirements (programs, data, operating system and filing system workspace) except screen memory. The screen information is held in the original slow memory of the Electron.

This means that HIMEM will be at &8000 in **ALL screen modes**.

You can use this mode with programs that use legal means to access the screen (e.g. PRINT and VDU from BASIC, or OSWRCH from machine code) and you will get significant speed and memory increases. The VIEW word processor also benefits from these improvements.