

## THE MASTER RAM BOARD INSTALLATION GUIDE

### DISCLAIMER

Slogger Ltd can accept no liability whatsoever for any loss or damage caused by the installation of the MASTER RAM BOARD by unauthorised persons. Each unit is tested and proved working at the factory before dispatch. Slogger Ltd therefore reserves the right to charge a reasonable fee for any testing or returning of the unit.

### PREPARATION

Installation of the board requires both soldering AND desoldering skills and should not be attempted by the inexperienced. The following tools are required to perform the installation:-

1. Fine tipped soldering iron
2. Multi-core solder (approx. 22SWG)
3. Solder sucker or braid or equivalent
4. Drill with 1/4 inch drill bit
5. Phillips screw driver (medium)
6. Pliers (for nut retaining the switch)
7. Stanley knife, scalpel or equivalent
8. Wire strippers or equivalent

The following components are supplied with the kit

- |    |                     |       |
|----|---------------------|-------|
| 1. | Master Ram Board    | 1 off |
| 2. | Double leg link pin | 1 off |
| 3. | Triple leg link pin | 1 off |
| 4. | Shorting connector  | 2 off |

## 1. DISMANTLING THE ELECTRON

1.1 Disconnect the power to the Electron and remove all add-ons, Eg. Rombox, Plus 1, Plus 3 etc.

1.2 Turn the Electron upside down with the expansion connector pointing TOWARDS you.

1.3 Remove the 4 screws retaining the lid.

1.4 Remove the Electron base by lifting and turning away from you, taking care as the cable connecting the keyboard to the main PCB is still attached. Carefully remove the keyboard connector from the board by applying lifting pressure alternately to each end of the connector using your fingers taking care not to bend any of the housing pins and put the lid to one side.

1.5 Turn the Electron the normal way up and with the expansion connector pointing away and remove the power connector (lower right), the two expansion power cables (upper right) and the speaker cable (upper left). Note that the expansion power cables are not coloured and so it is not important which way round they are fitted.

1.6 Remove the four Phillips screws retaining the main PCB to the plastic base and lift the main PCB clear, making sure that the two are in no way attached.

1.7 Whilst the PCB is absent from the case, drill a hole (6.2mm or 1/4 inch) into the left hand side of the Electron case towards the rear, adjacent to the normal position of the speaker.

## 2. DESOLDERING THE MICROPROCESSOR.

2.1 The 6502 Microprocessor chip has to be desoldered from the PCB. THIS PROCESS CAN ONLY BE CARRIED OUT USING A "SOLDER SUCKER" OR EQUIVALENT.

Be very careful when removing the Microprocessor from the board as this device is to be used again in the MASTER RAM BOARD.

Before actually desoldering it is suggested that each of the legs are "tinned". This has the action of cleaning the legs of the device and helps greatly when removing the device from the board. All desoldering and "tinning" should be carried out on the reverse side of the board.

If the solder fails to remove cleanly from a pin on the first attempt then DO NOT apply excessive heat as this will only cause damage to both the Microprocessor and the tracks. Simply allow to cool, resolder the device and repeat the desoldering procedure.

DO NOT lever the device with any force as this will only weaken the printed Circuit Board tracks and can lead to tracks actually being lifted from the board, the results of which are very difficult to rectify.

2.2 With this component removed from the PCB the socket provided is now to be soldered into the vacated position. Note that one end of the socket has an indentation and to ensure consistency this end should be pointing towards the rear of the Electron. Again, soldering should be carried out on the reverse side of the board.

Before continuing with this section, check the issue of your board within the Electron. It will be either an Issue 1, 2, 4, or 6. You will find this issue number, eg. ISS.4, printed on the board beneath the large word "ELECTRON" which is itself situated adjacent to the ULA, the large square electronic component.

### 2.2.1        ISSUE 2 and ISSUE 4 boards

Locate LK8 which is three soldered-in holes on the board to the left of the Acorn ROM. Turn the Electron board over and note that the two holes of LK8 which are furthest away from the keyboard connector are joined together by a track. This track must be cut VERY CAREFULLY using a Stanley knife or equivalent. Remove the solder from these two holes (once again the job can be made easier by "tinning") and then insert the two pin link into the component side of the board with the shorter pins fitted into the board. Solder the link from below taking care that the track between the two pins remains broken.

Locate LK1 which is the three soldered-in holes on the board above the 6502 Microprocessor chip. Turn the Electron board over and note that two of the pads are linked together by a track. This track must now be cut in the same manner as LK8. Remove the solder from all three holes and insert the three pin link into the component side of the board with the shorter pins fitted into the board. Solder the link from below taking care that the track between the pins remains broken.

Fit a shorting connector to the double Link pin at LK8.

Fit a shorting connector to the left hand pair of pins of the triple Link pin at LK1.

### 2.2.2        ISSUE 1 boards (German) and ISSUE 6 boards

Locate LK13 which is to the right of the Acorn ROM in a group of four Links. Turn the Electron board over and note that the left and right hand holes of this Link ( as viewed from the component side ) are joined together by a track. This track must be cut VERY CAREFULLY using a Stanley knife or equivalent. Remove the solder from these two holes and insert the double link pin into the component side of the board with the shorter pins fitted into the board. Solder the link from below taking care that the track between the two pins remains broken.

Fit a shorting connector to the double Link pin on LK13.

### 3. INTERMEDIATE TEST.

3.1 Replace the Electron PCB into the case and refit the four retaining screws\* Reconnect the power lead to the connector at the lower right hand side and also the two power leads to the tags at the upper right hand side. Note that the expansion power cables are not coloured and so it is not important which way round they are fitted.

Reconnect the speaker connector, facing in either direction, and then the keyboard connector. Now fit the micro-processor into its socket with the notch towards LK1 taking care not to bend any pins out of place.

Loosely fit the lid of the Electron over the base and reconnect the lead to your monitor or television and switch on your computer. You should see the usual sign-on message. If this is not the case then see the section on fault finding.

### 4. THE MASTER RAM BOARD.

Having successfully fitted both the socket for the Microprocessor and the Link pins which will be used for the ROM Control Link, the final phase of the installation is entered.

4.1 Disconnect the power to the Electron and remove the keyboard as in section 1.

4.2 Carefully remove the 6502 Microprocessor chip from the socket in the Electron by gently prising from either end with an electrical screwdriver. This chip should now be soldered into the MASTER RAM BOARD. Note the orientation of the chip should line up with the white "silk screen" on the MASTER RAM BOARD with the indentation in the chip closest to U10. Note also that the row of pins towards the centre of the board in this case should be soldered on the component side as the main connector on the reverse side interferes with access. A socket is NOT provided for the 6502 since the overall height would then be too great and would interfere with the lid when fitted.

### 4.3 Fitting the ROM control link.

The ROM control link from the Master Ram Board (the twin coloured wire) is now to be connected to the Electron board.

#### 4.3.1 ISSUE 2 & 4 boards

Remove the Shorting connector from the left hand pair of pins of the triple Link pin at LK1 and refit to the right hand pair of this Link.

Remove the Shorting connector from the Link pins of LK8.

Locate the Link pins of LK8 and solder the red lead to the pin closest to the keyboard connector and the black lead to the pin furthest from the keyboard connector. Ensure that there are no shorts between these two pins.

#### 4.3.2 ISSUE 1 & 6 boards

Remove the Shorting connector from the Link pins of LK13. Locate the Link pins of LK13 and solder the red lead to the left pin and the black lead to the right pin.

4.4 Before fitting the MASTER RAM BOARD into its socket, it is best to check that all the instructions have been complied with. Once ensured that everything has been completed correctly, carefully align the pins of the MASTER RAM BOARD to those of the socket already in place in the Electron, ensuring a tight fit by applying firm but even pressure to the micro-processor.

Finally fit the switch into the hole drilled and tighten the nut to hold firmly.

## 5.TESTING.

5.1 Carefully reconnect the keyboard connector and loosely fit the lid of the Electron over the base. Now connect up the lead to your monitor or television and switch on your computer. You should see one of the following sign-on messages :

```
Acorn Electron $  
BASIC  
>
```

```
Acorn Electron TURBO  
BASIC  
>
```

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

If your computer fails to sign-on with any of these then see the section on fault finding. Change the switch to each of the three possible positions pressing CTRL-BREAK after each change. The computer should sign-on with the appropriate message.

## FAULT FINDING.

### Stage 3 faults

If a fault is developed at stage one then the following checks should be made.

- a) Check that the power cables are connected correctly.
- b) Check that there are no dry solder joints.
- c) Check that there are no solder splashes between solder joints.
- d) Check that the micro-processor is inserted correctly.
- e) Check the Link pins and the shorting connectors.

### Stage 4 faults

- a) Check that the MASTER RAM BOARD is firmly inserted in the socket and that no legs are bent or displaced.
- b) Check that there are no dry solder joints.
- c) Check that there are no solder splashes between solder joints.
- d) Check that the ROM control Link wires are connected correctly.
- e) Check the Link pins and shorting connectors.

## MASTER RAM BOARD INSTALLATION

### UPDATE

From the experience gained in performing a myriad of installations the following is recommended:

1. Cut each of the 40 legs of the Microprocessor on the Electron board close to the 'black body'<sup>1</sup> and remove the black body leaving the 40 legs standing proud and intact. Hold the cutters vertically in order to achieve a clean cut.
2. Using the soldering iron remove each of these legs from the board. A magnetised soldering iron is useful here, else some pinchers to pull the leg clear whilst melting the solder.
3. Clean each of the holes using a desoldering tool or desolder braid.
4. Solder in the 40 pin socket supplied.
5. Locate LK8 (issue 2 & 4) or LK13 (issue 1 & 6) and cut the link according to section 2.2.1 or 2.2.2 (LEAVE LK1 INTACT...issue 2 & 4).
6. Solder the Red and Black leads from the Master RAM Board directly to LK8 or LK13 according to section 4.3.1 and 4.3.2

Following the above in conjunction with the installation guide should ensure a successful installation.

## PLUS1 MODIFICATION

RECOMMENDED MODIFICATION TO PLUS1 UNITS WHEN USED WITH  
ELECTRON COMPUTERS INSTALLED WITH MASTER RAM BOARDS

IC6 74LS175 (underside of board)

