

Econet upgrade instructions for approved Econet Service Centres

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Foreword

These upgrade instructions are for the use of persons fitting the Econet upgrade kit to any model of the BBC Microcomputer. The Econet upgrade kit should contain the following component parts (see assembly drawings on pages 9 and 10).

1. These instructions.
2. Econet System User Guide.
3. 1K $\frac{1}{4}$ w 10% resistor (3 off, R46, 52, 61).
4. 1M5 $\frac{1}{4}$ w 10% resistor (3 off, R36, 44, 64).
5. 1K $\frac{1}{4}$ w 2% resistor (R48).
6. 1K5 $\frac{1}{4}$ w 2% resistor (R47).
7. 10K $\frac{1}{4}$ w 2% resistor (4 off, R34, 35, 45, 51).
8. 56K $\frac{1}{4}$ w 2% resistor (4 off, R59, 60, 62, 63).
9. 100K $\frac{1}{4}$ w 2% resistor (4 off, R38, 39, 40, 41).
10. 22K \times 8 resistor pack (RP2).
11. 2n2 plate ceramic capacitor (C17).
12. 10n plate ceramic capacitor (C23).
13. 10 μ tantalum capacitor, 6.3v (C18).
14. 100pF plate ceramic capacitor.
15. IC 74LS74 (IC97).
16. IC 74LS132 (IC91).
17. IC 74LS244 (IC96).
18. IC 75159 (IC93).
19. IC 68B54 (IC89).
20. IC LM319 (2 off, IC94, 95).
21. IC 74LS163 (IC76).
22. 74LS123 (IC87).
23. IC NFS EPROM (2764, IC88).
24. 5-pin PCB socket (SK7).
25. 8-way wafer plug (2 off, S11).
26. Mini-shunts (7 off).
27. Econet lead.

Please read the following instructions carefully before starting the upgrade.

1 Introduction

record on your hard disk
before you start working on it
with a backup program

1.1 General

The BBC Microcomputer main Printed Circuit Board currently stands at Issue 7. There should be no Issue 1 PCBs in the field, so this instruction booklet will only cover upgrading Issues 2, 3, 4 and 7. There are no track modifications required for the Issue 4 and 7 boards, whereas Issues 2 and 3 require various cuts and links. It is therefore important to identify the issue of the PCB before starting the work. The issue number appears on the PCB in the silk screen legend just to the left of the board centre. If you look there you will see:

COPYRIGHT 1982 203,000 Issue X
ACORN COMPUTERS Ltd

where X is the issue number.

1.2 Component location

It is also necessary to understand the Acorn notation for locating a point on the PCB. This is done by considering the board as a compass. Position the PCB so that the components are facing upwards and the IDC headers (PLs 8, 9, 10, 11 and 12) are closest to you. The edge furthest away from you (with the DIN sockets and modulator on it) is then *north*, to your right is *east*, to your left is *west* and nearest is *south*. Don't forget! When you turn the board over, east and west are reversed!

1.3 Replacing ROMs

The rules for when to replace the Operating System are simple. They are:

- If a machine has the OS 0.1 in four EPROMs then OS 1.2 in ROM must be fitted.
- If a machine needs a version of the OS higher than 0.1 (ie if additional ROMs are to be fitted, whether they be DFS, NFS, Speech, View or any other) then OS 1.2 in ROM must be fitted.

This should only leave the case where a straight Model A with OS Ø.1 is being upgraded to a straight Model B. In this case the OS Ø.1 ROM must not be replaced.

Note: Every attempt has been made to reduce the static sensitivity of the ROMs and other devices. As long as normal anti-static precautions are taken (eg avoid wearing or standing on materials like nylon) then there should be no problem. It is not necessary to have a full anti-static workstation with earthing straps etc.

2 Main PCB upgrade

2.1 Component insertion

Insert all the components detailed on the parts list (see Foreword). The two assembly drawings for Issues 2/3 and 4/7 are also included (see pages 9 and 10).

If you are upgrading a Model B machine, IC76 (74LS163) is spare and may be kept as repair stock.

If the machine you are upgrading contains a disc interface, then, as well as IC76, IC87 (74LS123) will also be spare.

If the PCB is at Issue 2 or 3 then:

- C17 (2n2) is a replacement for the fitted C17.
- The 100pF capacitor should be soldered between pins 8 and 9 of IC26.

On Issue 4 PCBs these are not necessary.

2.2 Setting the links

Ensure that the links listed below are set as detailed. If not, reset them:

- S2 Open.
- S5 South.
- S9 (Issue 4 and above only) Open (disc machines), otherwise closed.
- S12 Open.
- S13 Open.
- S18 North.
- S19 East.
- S20 North.
- S21 Two off: east/west.
- S22 North.
- S32 West.
- S33 West.
- S11: This sets the Econet station number. This is done in a binary mode, as follows.

Starting from the north end of S11, the pairs (east/west) of pins have the following values:

1 2 4 8 16 32 64 128

In order to set a station number leave *open* the links whose values will equal the station number when added together. For example, if M = made and O = open, then:

OMMMMMMM is station 1 and

MMOOOMMO is station $4 + 8 + 16 + 128 = 156$.

If no station number has been specified, then set it to 1.

Note: Station number 99 will not pass the FIT test with a test station! This is because the test station is number 99.

2.3 Modifying the Printed Circuit Board

Modifications are only necessary on Issue 2 and 3 PCBs. See the modification drawings on pages 11 and 12.

Note: The description below must not be used on its own. *Always* consult the modification drawings before cutting or linking.

On the component side of the PCB:

- Cut the track that emerges eastwards from between pins 19 and 20 of IC7, between the IC and the through-hole.

On the solder side of the PCB:

- Cut the track adjacent to IC89 pins 27 and 28.
- Cut the track adjacent to IC95 in *two* places.
- Link IC26 pin 9 to IC96 pin 19. (115mm long.)
- Link IC26 pin 9 to IC97 pin 4. (130mm long.)
- Relink the two ends of the cut track adjacent to IC95, but keep the link away from IC95 (to avoid crosstalk). (14mm long.)

Link wire is not included in the kit. It is recommended that you use a wire with a minimum size of $\emptyset 0.15\text{mm}$ (34AWG) plus an insulating sheath (eg 'wire wrapping wire').

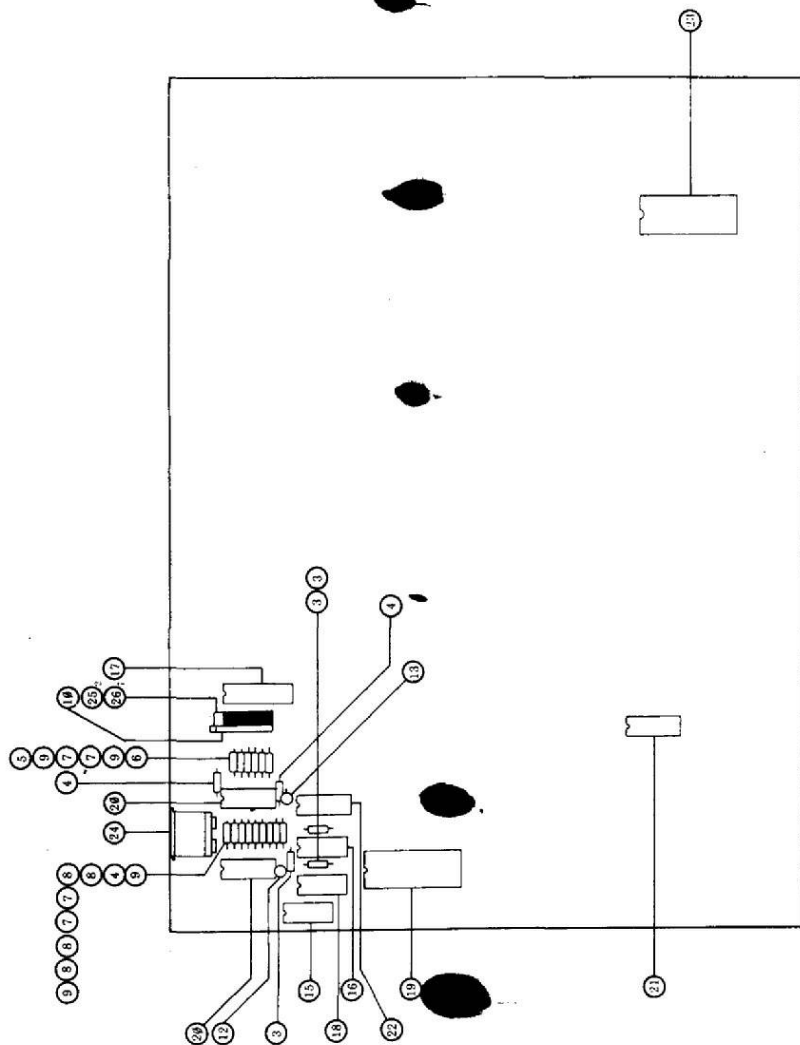
3 Testing the finished product

When the modifications are complete, the machine must be tested using the FIT. It should then be left turned on for four hours and re-tested using the FIT before it can be returned to the customer. Re-package the computer, including the User Guide and lead.

The PET may also be used, but it will not test the Econet area.

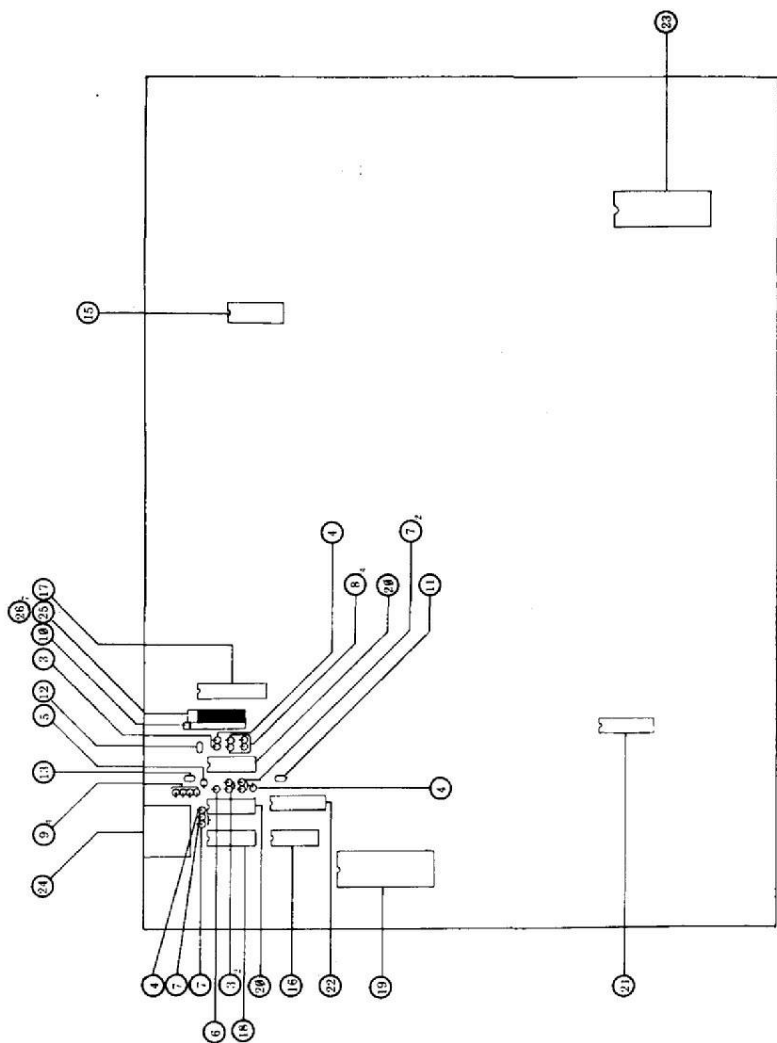
Note: IT IS NECESSARY TO USE A BBC MICROCOMPUTER FIT TEST STATION TO CHECK THE INTERFACE FULLY. SELECT 'E' FOR THE ECONET TESTS.

∞ Econet upgrade Issues 4 and 7 assembly drawing



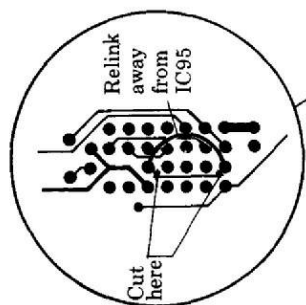
Numbers refer to parts listing – see Foreword.

Econet upgrade Issues 2 and 3 assembly drawing

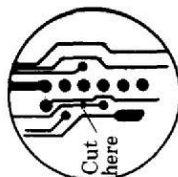
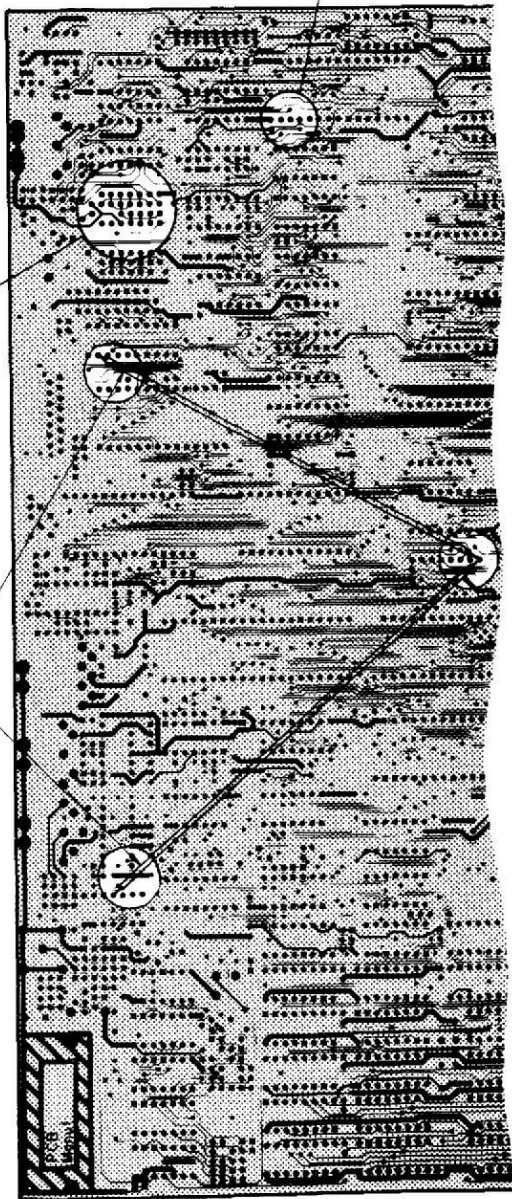


Numbers refer to parts listing – see Foreword.

Econet upgrade solder side PCB modifications



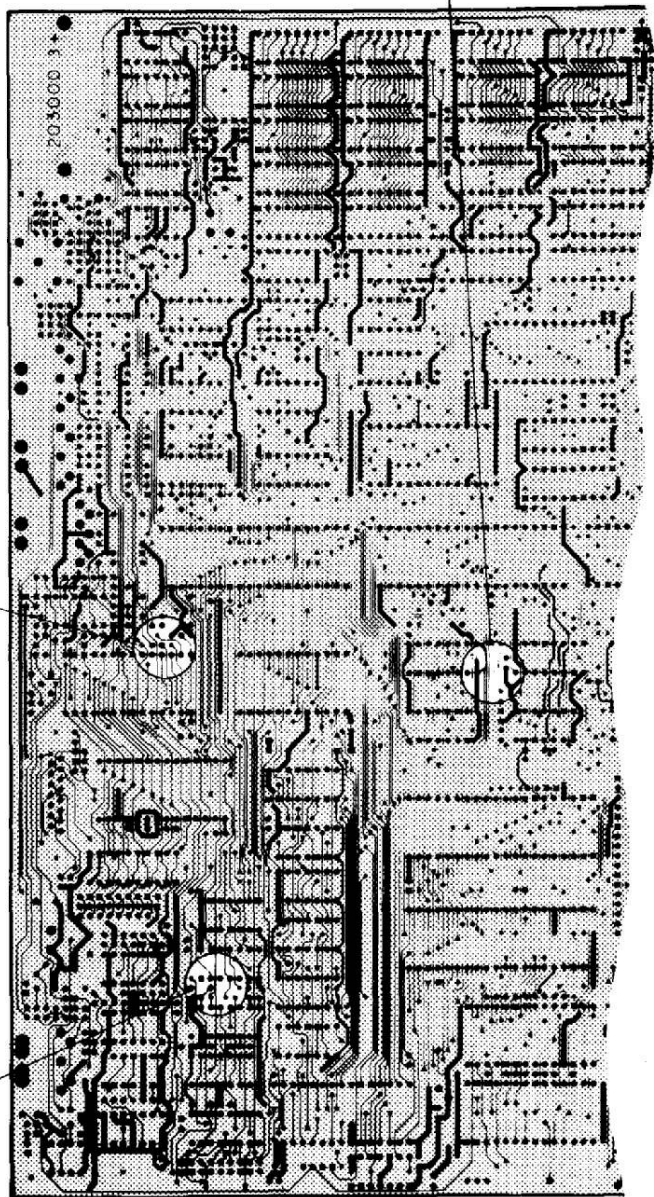
Wire links



Econet upgrade component side PCB modifications

C17 change
if required (item 11)

Cut track here



Fit 100pF
capacitor here
(item 14)

