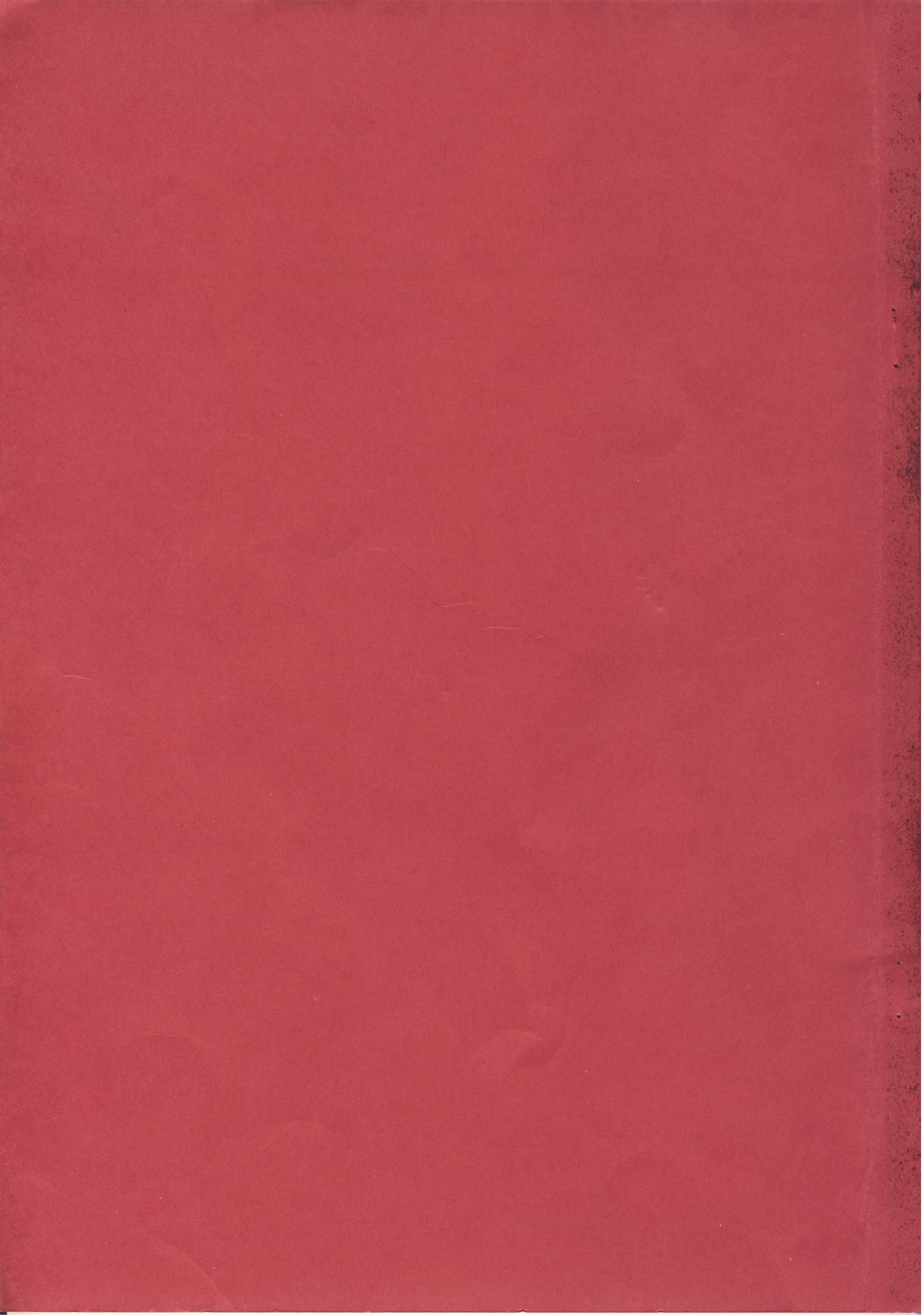




OPERATING INSTRUCTIONS FOR THE
FINAL INSPECTION AND TEST SYSTEM FOR THE
BBC MICROCOMPUTER USING A CASSETTE



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SECTION 1

=====

INTRODUCTION

1.1:GENERAL

This manual is intended to provide all the instructions necessary to operate the Final Inspection Testing system (FIT) for the BBC microcomputer, both of which are designed and manufactured by Acorn Computers Ltd. of Cambridge, England. The FIT is intended to be used by subcontract manufacturers and the Acorn dealers who will be servicing the BBC machine. No part of this manual may be copied or communicated to anyone other than dealers or manufacturers approved by Acorn. Any comments or suggestions on the contents of this manual will be appreciated and should be sent in writing to the Test Engineering Department of Acorn Computers. This manual and the items described therein may be subject to change from time to time, and although it is intended to supply updating information as necessary, no responsibility can be accepted for any errors and/or omissions.

1.2:THE BBC MICROCOMPUTER

The BBC machine is currently available in two versions, Model A or B. They are both powerful, self-contained computer systems with the ability to generate high resolution colour graphics and synthesise music. The Model B is an enhanced version of the A, and both are capable of being greatly expanded, either on purchase or at a later date, to include such options as Floppy Disc Interface and high-level language ROMs. There is also a selection of external, plug-in options, such as printers and additional processor systems. This is not intended to be an exhaustive description of the BBC computer systems, but should the reader require such it is suggested that they consult the service manual.

1.3:THE FINAL INSPECTION TESTING SYSTEM (FIT)

The FIT is designed to test the BBC machine after it has been fully assembled and just before it is packed and dispatched, whether by a manufacturer or a dealer who has serviced it. As such it therefore requires no connection to the computer other than those readily available. In the case of Model As this is simply the cassette and video/monitor ports, whereas the B types require a small circuit board with links to the 1MHz bus, printer, user I/O, and analogue ports and a plug with links for the RS423 output as well.

The program used by the FIT can be supplied in three forms, cassette, disc, or ROM. This manual covers the use of the FIT with a cassette, which it is intended should be generally used, but high volume manufacturers will probably have a separate BBC computer as a test station with the special ROM. The operation of the FIT requires no special skills, as it is totally automatic, but it will pause at various points to allow the operator to approve displays or sounds. The next step of the test is then started by pressing the space bar.

The use of the FIT should enable both manufacturers and dealers to be confident that the computer they are about to dispatch is fully operational.

1.4:LIMITATIONS AND CONSTRAINTS

There are only two areas where the FIT is not effective. The

first, and most obvious, is where a computer is incapable of communicating or being communicated with. The FIT is not intended to be used as a fault diagnoser but as a final check system to ensure confidence in manufacture or repair. Acorn Computers can supply a module, called the PET, which can be used with an apparently "dead" machine.

The second area in which the FIT is limited is RAM testing. This was omitted from the software design because a full test would take between 5 and 7 minutes and, in our experience, the majority of malfunctioning RAM chips tend to have an easily visible fault. If we hear of major problems in this area we will, of course, take the appropriate action.

SECTION 2

=====

EQUIPMENT DETAILS

Your FIT should arrive packaged with all leads attached. The only other items in the box should be this manual, a cassette and a 5-pin DIN plug with internal links for the RS423 socket on Model Bs. Should anything be missing or damaged, please contact Acorn Computers immediately. It is strongly recommended that you mark the ends of the leads connected to the FIT in case they become disconnected later on.

The full FIT assembly consists of the following items:

- (a) The main FIT board, measuring 255mm x 95mm, with four headers and two 7-pin DIN sockets attached.
- (b) 34-way ribbon cable with two IDC sockets, connected to (a) PL1 (
- c) 20-way ribbon cable with two IDC sockets, connected to (a) PL2 (d)
- 26-way ribbon cable with two IDC sockets, connected to (a) PL3 (e)
- 20-way ribbon cable with one IDC socket, connected to (a) PL4,
- and one 15-way "D" type connector
- (f) One 5-pin "Domino" DIN plug with shorting links.

The connection details are contained in the next section.

SECTION 3

=====

CONNECTING THE FIT TO UUT

3.1: GENERAL

This section will cover the connection details for the two test situations in which the FIT is used. It is therefore important that you identify the correct section before starting to connect your FIT.

3.2: USING THE FIT WITH A CASSETTE

This is the simplest method of testing a BBC machine, but is limited to testing models A & B.

3.2.1: MODEL A

Connect the UUT to a cassette, colour TV and B/W monitor via the appropriate ports. It is then ready to be tested.

3.2.2: MODEL B

In addition to the connections in 3.2.1, attach the FIT as follows:

- (a) Plug 34-way ribbon cable from PL1 to 1MHz bus port.
- (b) Plug 20-way ribbon cable from PL2 to user port.
- (c) Plug 26-way ribbon cable from PL3 to printer port.
- (d) Plug 20-way ribbon cable from PL4 to analogue port.
- (e) Connect RGB monitor to RGB port.
- (f) Plug the 5-pin DIN plug into the RS423 port.

The instructions for running all these tests are included in the next section.

SECTION 4

=====

RUNNING THE FIT

4.1: GENERAL

This section covers the methods for starting up and running the FIT in all its possible modes. Again, care must be taken to ensure that the correct instructions are followed for your particular setup.

4.2: LOADING THE FIT FROM A CASSETTE

There are two programs stored on the FIT cassette, CFTESTA (for model A) and CFTESTB (for model B). The load and run method is identical for both types except for the filename, therefore this manual will only detail the instructions for model B. In order to test model As, replace CFTESTB by CFTESTA.

Load the cassette into the recorder and turn on the UUT. The display on the monitor should read:

BBC Computer XXK

BASIC

>_

where XX will be 16 or 32, depending on the model.

On the UUT type:

```
CHAIN "CFTESTB" {RETURN}
```

and the computer will reply:

Searching

Rewind the tape to a point before the start of CFTESTB and then press the "PLAY" button. CFTESTA is on one side of the tape and CFTESTB on the other. After a few seconds the computer will display:

Loading CFTESTB

00

and the numbers will slowly increment until CFTESTB is fully loaded (by which time the numbers will have become 4-digit). If your recorder does not have motor control do not forget to turn it off! As soon as the program is fully loaded it will start to run automatically. See sections 4.3 & 4.4 for details of running the programs.

4.3:MODEL A TEST SEQUENCE

Upon starting the display on the UUT will show:

BBCpu MODEL A TEST

PASSED BASIC ROM CRC

PASSED OS ROM CRC

CHECK SOUND OK, THEN PRESS SPACE

if the computer has passed both ROM tests. If either of these has failed (e.g. the OS ROM) the appropriate line will be replaced by:

FAILED OS ROM TEST

printed in red. This does not stop the remainder of the tests, so note any failiures and continue. If speech is fitted it will be tested here. The message "PASSED SPEECH ROM CRC" will appear and the computer will say: "Another Acorn PHROM found. Program running.". Next is the sound test which consists of a sequence of five notes played through the computers own loudspeaker. The operator should check that these are being reproduced correctly and with no background noise. Then press the space bar, as instructed, to continue. The screens on the UUT will then be filled with vertical bars of the 7 available colours, with shortened versions of their names at the top (WHITE, RED, GREEN, YELO, BLUE, MAG, CYAN).

After confirming that these are correct (or noting any errors) continue to the next section by pressing the space bar. This will cause a sting of characters, i.e. letters, numbers and symbols, to scroll up from the bottom of the screen, headed by the legend "MODE 4". The characters are the full keyboard, both lower and upper case, in mode 4 format. After checking that the scroll worked properly and that the characters are of the correct shape, proceed by pressing space. The display will then become a repeat of the last, but in mode 6. Check as before and press space.

The next section of tests checks the colour backgrounds and mode 5 text. This is done by displaying the background colours, one by one, with the legend "RED BACKGROUND" etc. in mode 5 text at the top. The sequence of colours is: Red, Green, Yellow, Blue, Magenta, and Cyan. Then there is a sequence of 3 identical tests consisting of a black background test, followed by a flashing black/white background test. It is important to check that all these tests produce solid backgrounds with NO interference from any other colours. Skip from one to the next with the space bar.

The final section of the test is concerned with the keyboard. After the white background test press space, and the screen will show a map of the keyboard. In order to check the operation of every key, press all of them in turn and they will clear from the display. Be sure to leave the "BREAK" until last, or else you will delete the program and have to start again!

4.4:MODEL B TESTS

The sequence of model B tests includes all those performed on the model A, plus a few others. The first part will display:

BBCpu MODEL B TESTS

```
PASSED 1MHz BUS
PASSED PRINTER LINES
PASSED USER I/O OUTPUT
PASSED USER I/O INPUT
PASSED A/D CHANNELS
PASSED RS423
PASSED BASIC ROM CRC
PASSED OS ROM CRC
```

CHECK SOUND OK, THEN PRESS SPACE

or FAILED ,as for model A. The sound test is identical to model A.

This is followed by the colour bar test, as model A, and then the text mode tests which are the same as for A except the order of displays is:

```
MODE 0
MODE 1
MODE 2
MODE 3
MODE 4
MODE 6
```

These are followed by the background/mode 5 and keyboard tests which are identical to the model A versions.

If the computer passes all tests it can be packaged and dispatched, if not it should be sent to the repair department, with a note of the failiures, for correction.

SECTION 5

=====

ERROR MESSAGE INTERPRETATION

As mentioned in Section 1 the FIT is only intended as a final confidence tester for the BBC microcomputer and will only deliver Pass/Fail messages. The appearance of any Fail message should be noted, as must any abnormalities in the sound and screen tests, and the repair department informed. It is then intended that the Progressive Establishment Tester should be used to locate the exact area of the fault.

SECTION 6

=====

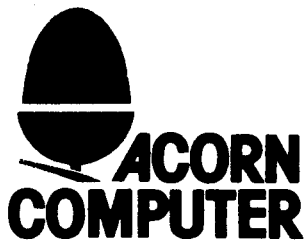
SERVICE REPORT

It is compulsory to fill in a copy of the following form and return it to the Service Department at Acorn Computers every time a BBC machine is repaired. Outside of the United Kingdom, the forms should be used as directed by the national dealer.

In the case of repairs under warranty, this form provides the mechanism by which the service organisation can be reimbursed for work done and restocked with servicing spare parts. The warranty period is 26 weeks from the date of despatch from Acorn Computers customer order fulfilment house. The warranty period is extended by 26 weeks from the date of repair, but only for those new parts used.

For repairs outside the warranty period, the form is used to report faults back to Acorn and the customer is charged at the agreed rate by the service organisation.

The form may also be used at any time to report modifications which have been carried out as directed by Acorn computers for which the service organisation should be reimbursed. For instance, the replacement of the early EPROM operating system with the later ROM version.



Acorn Computers Limited

Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Telephone 0223 245200 Telex 817875 ACORN G

DEALER:

SERVICE REPORT

No:

Date:

Serial Number:

Customer's Name:

Machine Type:

Description of fault:

Repair carried out:

Time taken:

Costs

Parts used: Labour:

..... Parts:

..... Total:

DEFECTIVE PARTS TO BE RETURNED WITH THIS FORM.

£

Customer's receipt reference:

Customer's signature:

Maintenance Engineer's signature:

Warranty*/Non-Warranty* Repair

* strike out as appropriate.

RETURN TO: ACORN COMPUTERS LTD

ATT: CUSTOMER SERVICE DEPT

As per above address.

APPENDIX A

DIAGRAMS ETC. OF THE FIT

The following diagrams are included in the BBC Service Manual to assist with the operation of the FIT:

- 1:FIT circuit diagram.
- 2:FIT assembly diagram.
- 3:FIT parts list.
- 4:FIT Program listings

MODEL A FIT TEST "CTESTA3"

```

10*TV255
20MODE7:PRINTSPC9"BBCpu MODEL A TEST":s=0
30DATA0,&FF,&EB,64,64,64,76,67,166,160,200,199,128,247,254
40j=&FFF4:k=&C0008000:F=&FFFF:c=&80:IF?&E000<>159READX%,Y%,A%: s=(
    USRj AND&FFOO)DIV256=&FF:IFS GOSUB210:FORZ=0TO4:A%=&9F:READY%:
    CALLj:NEXT:!c=k:CALLI:PROCn(NOT((c!4ANDF)=&5420),"SPEECH"):
    FORZ=0TO6:READA:SOUND-1,A,0,0:NEXT:s=0
50GOSUB210:!c=k:CALLI:T=(c!4ANDF):R=NOT(T=&EB04ORT=&4274): PROCn(
    R,"BASIC"):!c=&FC00C000:CALLI:!c=&FF00:CALLU:T=(c!4ANDF): R=NOT(
    T=&49EEORT=&4018ORT=&73B7):PROCn(R,"OS"):PRINT':VDU&84: PRINT"
CHECK SOUND,THEN PRESS SPACE":*FX15
60REPEATRESTORE80:FORZ=1TO5:READA:SOUND(Z MOD3+1),-15,A,7:PROCW:
NEXT:SOUND0,-15,5,5:PROCW:UNTILINKEY(0)=32:CLS:FORX=&7C00TO&8000
STEP40:FORY=0TO7:Z=Y*5:X!Z=&9D00+Y:NEXT:NEXT
70PRINT"WHITE RED GREEN YELO BLUE MAG CYAN":PROCP:FORZ=4TO6STEP2:
READX,Y:MODEZ:PRINTTAB(0,X)"MODE"Z:PROCI(Y):NEXT
80DATA120,128,111,80,92,30,1200,23,920,RED,GREEN,YELLOW,BLUE,
MAGENTA,CYAN
90MODE5:FORZ=1TO6:CLS:READA$:VDU19,0,Z,0,0,0:VDU19,7,0,0,0,0:
PRINT "A$:PROCP:NEXT
100FORC%=1TO3:D%=3-C%:COLOUR128+C%:VDU19,C%,0,0,:COLOURD%: VDU19,D%,
7,0,:CLS:PRINT'" BLACK : TEST ";C%:PROCP: VDU19,C%,15,0,:VDU19,
D%,8,0,:CLS:PRINT'"FLASH WHITE : TEST ";C%: PROCP:NEXT
110MODE7:DIMC 100,XT 122,YT 122:FORZ=0TO121
1201F(Z AND&F)=10 Z=Z+5:NEXT:ELSE:READX,Y:XT?Z=X:YT?Z=Y:NEXT: P=
&FE40:FORY=0TO1:P%=C:[OPT0:.S SEI:LDA#0:STAc:LDA#&FF:STAP+2:
LDA#&7F:STAP+3:LDA#3:STAP:LDY#&7F:.L STYP+1:LDAP+1:BMIG:CPY#&10:
BNEQ:LDY#2:.Q:DEY:BPLL:JMPS
130.G STYC:RTS:]NEXT:MODE6:PRINTTAB(8,2)"f0f1f2f3f4f5f6f7f8f9BR"
TAB(4)"ES1 2 3 4 5 6 7 8 9 0 - \ a b" TAB(4)"TAQWERTYUIOP@
[ cd"'
TAB(4)"CLCTASDFGHJKL; ]RE"'
TAB(4)"SLSHZXCVBNM, . /SHDECO"TAB(17)"SP"
140DATA6,6,6,5,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,7,4,10,3,12,3,14,3,
16,2,20,3,22,2,26,3,28,3,32,3,8,2,9,4,11,4,15,4,18,3,21,4,22,3,
24,3,31,4,35,4,6,3,8,3,12,5,13,4,16,3,19,4,23,4,25,4,29,4,33,4,
4,5,8,5,11,6,14,5,17,4,19,5,21
150DATA5,27,4,27,5,31,5,4,6,10,5,13,6,16,5,18,5,19,6,23,5,25,5,29,
5,30,6,4,4,9,6,17,7,15,6,17,6,21,6,23,6,25,6,26,6,32,6,4,3,10,2,
12,2,14,2,18,2,20,2,24,2,26,2,30,3,34,3
160REPEAT:CALLS:X^XT??c:Y=YT??c:PRINTTAB(X,Y)" ":
IF?c=0PRINTTAB(28,6)" ":UNTIL0:ELSE:UNTIL0
170DEFPROCW:FORs=1TO650:NEXT:ENDPROC
180DEFPROCI(z):FORY%=1TOz:VDU(y%MOD72+32):NEXT:PROCP:ENDPROC
190DEFPROCP:FORs=1TO2000:NEXT:*FX15
200REPEATUNTILINKEY(0)=32:ENDPROC
210FORZ=0TO1:P%=&2E00:[OPT0:.I:lDY#0:styc+5:styc+4:.u:lDY#0:jmpq:
.e:ldx#8:.b:lsrA:rolc+4:rolc+5:bcca:pha:ldac+4:eor#&2D:stac+4:
pla:.a:dex:bneb:incc:bneD:incc+1:.d:ldac:cmPC+2:bneq:ldac+1:
cmPC+3:bneq:rTS:.q:]
220IFs[OPT0:lda#&9F:ldy#&10:jsrj:lda#&9E:jsrj:tYA:jmPe:]ELSE[OPT0:
lda(c),Y:jmPe:]
230NEXT:RETURN
240DEFPROCn(N,A$):IFN A$=" FAILED "+A$+" ROM
"ELSEA$=" PASSED "+A$+" ROM"
250PRINTA$:R=0:ENDPROC

```


MODEL B FIT TEST "CTESTB3"

```

100N ERROR GOTO30
20*FX232
300N ERROR OFF
40*TV255
50DATA0,&FF,&EB,64,64,64,76,67,166,160,200,199,128,247,254
60s=0:f=&FFFF:MODE7:PRINTTAB(9)"BBCpu MODEL B TEST":c=&80:
  GOSUB310:P=&FE60:T=&FC00:!c=&FE00FC05:CALLI:R=(c!4ANDf)<>&B0BA:
  PROCn(R,"1MHz BUS"):P?3=&FF:FORZ=0TO7:A=2^Z:P?1=A:PROCd(50):R=(
  ?T<>A)ORR:NEXT:PROCn(R,"PRINTER LINES")
70T?3=&BB:P?12=&09:P?2=&FF:T?3=&9B:FORZ=0TO7:A=2^Z:?P=A:PROCd(50):
  E=T?1<>A:R=E ORR:NEXT:PROCn(R,"USER I/O OUTPUT"):P?2=0:T?3=&99:
  FORZ=0TO7:A=2^Z:T?1=A:PROCd(50):E=?P<>A:R=E ORR:NEXT:PROCn(R,"
  USER I/O INPUT")
80Q=ADVAL(2):R=ABS(Q-11680)>1000:P?12=0:P?3=&FF:FORV=0TO3:P?1=V:
  FORZ=0TO500:NEXT:D=V+1:FORZ=D TO(D+3):R%=Z MOD4+1:i=ADVAL(R%)
  /(Z-V):E=ABS(Q-i)>300:R=E ORR:NEXT:NEXT:
  PROCn(R,"A/D CHANNELS")
90M=&FE08:?&FE10=&64:FORZ=0 TO5:A=M?1:NEXT:?M=3:?M=&1E:FORW=0TO7:
  X=2^W:Y=0:REPEATY=Y+1:UNTIL(?M AND2)=2ORY>100:IFY>100R=R+1:W=8:
  GOTO120
100M?1=X:Y=0:REPEATY=Y+1:UNTIL(?M AND1)=1ORY>100:IFY>100R=R+1:W=8:
  GOTO120
110Z=M?1:IFZ<>X R=R+1
120NEXT
130PROCn(R,"RS423"):j=&FFF4:k=&C0008000:IF?&E000<>159READX%,Y%,A%:
  s=(USR&FFF4 AND&FF00)DIV256=&FF:IFs GOSUB310:FORZ=0TO4:A%=&9F:
  READY%:CALLj:NEXT:!c=k:CALLI:PROCn(NOT((c!4ANDf)=&5420),"SPEECH
  ROM CRC"):FORZ=0TO6:READA:SOUND-1,A,0,0:NEXT
140s=0:GOSUB310
150!c=k:CALLI:T=(c!4ANDf):R=NOT(T=&EB04ORT=&4274):
  PROCn(R,"BASIC ROM CRC"):!c=&FC00C000:CALLI:!c=&FF00:CALLu:T=(c!
  4ANDf):R=NOT(T=&49EEORT=&4018ORT=&73B7):PROCn(R,"OS ROM CRC")
160PRINT'CHR$&84"CHECK SOUND OK, THEN PRESS SPACE":*FX15
170REPEATRESTORE180:FORZ=1TO5:READA:SOUND(Z MOD3+1),-15,A,7:PROCW:
  NEXT:SOUND0,-15,5,5:UNTILINKEY(30)=32:DIMC 100,XT 122,YT 122:
  MODE7:FORX=&7C00TO&8000STEP40:FORY=0TO7:Z=Y*5:X!Z=&9D00+Y:NEXT:
  NEXT:PRINT"WHITE RED GREEN YELO BLUE MAG CYAN"
180DATA120,128,111,63,92,30,2400,30,1200,30,600,23,1840,30,1200,23,
  920,RED,GREEN,YELLOW,BLUE,MAGENTA,CYAN
190PROCP:FORZ=0TO6:IFZ=5:NEXT
200READX,Y:MODEZ:PRINTTAB(0,X)"MODE"Z:PROCI(Y):NEXT:MODE5:FORZ=1TO6:
  CLS:READA$:VDU19,0,Z,0,0,0:VDU19,7,0,0,0,0:
  PRINT" A$" BACKGROUND":PROCP:NEXT
210FORC%=1TO3:D%=3-C%:COLOUR128+C%:VDU19,C%,0,0,:COLOURD%:VDU19,D%,
  7,0,:CLS:PRINT'" BLACK : TEST ";C%:PROCP:VDU19,C%,15,0,:VDU19,
  D%,8,0,:CLS:PRINT'"FLASH WHITE : TEST ";C%:PROCP:NEXT:
  RESTORE240:FORZ=0TO121
220IF(Z AND&F)=10 Z=Z+5:NEXT:ELSE:READX,Y:XT?Z=X:YT?Z=Y:NEXT:
  P=&FE40:FORY=0TO2:P%=C:[OPT0:.S SEI:LDA#0:STAc:LDA#&FF:STAP+2:
  LDA#&7F:STAP+3:LDA#3:STAP:LDY#&7F:.L STYP+1:LDAP+1:BMIG:CPY#&10:
  BNEQ:LDY#2:.Q:DEY:BPLL:JMPS
230.G STYc:RTS:]NEXT:MODE6:PRINTTAB(8,2)"f0f1f2f3f4f5f6f7f8f9BR"
  TAB(4)"ES1 2 3 4 5 6 7 8 9 0 - ^ \ a b" TAB(4)"
  TAQWERTYUIOP@ [ c d"
  TAB(4)"CLCTASDFGHJKL; ]172E"
  TAB(4)"SLSHZXCVBNM, . /SHDECO" TAB(17)"SP"

```

```

240DATA6,6,6,5,0,0,0,0,0,0,0,0,0,0,0,0,0,0,7,4,10,3,12,3,14,3,
    16,2,20,3,22,2,26,3,28,3,32,3,8,2,9,4,11,4,15,4,18,3,21,4,22,3,
    24,3,31,4,35,4,6,3,8,3,12,5,13,4,16,3,19,4,23,4,25,4,29,4,33,4,
    4,5,8,5,11,6,14,5,17,4,19,5,21 250DATA5,27,4,27,5,31,5,4,6,10,
5,13,6,16,5,18,5,19,6,23,5,25,5,29,
    5,30,6,4,4,9,6,17,7,15,6,17,6,21,6,23,6,25,6,26,6,32,6,4,3,10,2,
    12,2,14,2,18,2,20,2,24,2,26,2,30,3,34,3
260REPEAT:CALLS:X=XT??c:Y=YT??c:PRINTTAB(X,Y) " ":
    IF?c=0PRINTTAB(28,6) " ":UNTIL0:ELSE:UNTIL0 270DEFPROCW:
FORz=0TO650:NEXT:ENDPROC 280DEFPROC I(z):FORy%=1TOz:VDU(
y%MOD72+32):NEXT:PROCP:ENDPROC 290DEFPROC P:FORz=0TO2000:NEXT:
*FX15,0 300REPEATUNTILINKEY(0)=32:ENDPROC 310FORZ=0TO2:P%=&2E00:[
OPT0:.I:ldy#0:styc+5:styc+4:.u:ldy#0:jmpq:
    .e:ldx#8:.b:lsrA:rolc+4:rolc+5:bcca:pha:ldac+4:eor#&2D:stac+4:
    pla:.a:dex:bneb:incc:bned:incc+1:.d:ldac:cmpc+2:bneq:ldac+1:
    cmpc+3:bneq:rts:.q:] 320IFs[OPT0:lda#&9F:ldy#&10:
jsrj:lda#&9E:jsrj:tya:jmpe:
    ]ELSE[OPT0:lda(c),Y:jmpe:]
330NEXT:RETURN
340DEFPROCn(N,A$):IFN A$=" FAILED "+A$ELSEA$=" PASSED "+A$
350PRINTA$:R=0:ENDPROC
360DEFPROCd(d):FORh=0TOd:NEXT:ENDPROC

```

APPENDIX B

DIAGRAMS ETC. OF THE BBC MICROCOMPUTER

All diagrams necessary are included in the Service Manual.

APPENDIX C

ASSOCIATED DOCUMENTS

The following is a list of other documents produced by Acorn Computers which may be of interest:

1:Service Manual for the BBC microcomputer. This contains extensive details of the hardware operation of the BBC micro, as well as a comprehensive selection of circuit diagrams and layouts of the computer and associated test equipment.

2:Operating Instructions for the Progressive Establishment Testing System. This is the middle stage in the test equipment supplied by Acorn (between the FIT and the ICE). It is capable of locating faults on an apparently "dead" main board, thus speeding up the entire repair operation.

3:Operating Instructions for the In-Circuit Emulator. The "last resort" in the repair chain. The ICE is capable of running an extensive range of tests on the BBC machine which allow a good test engineer to locate the most awkward of faults in a relatively short time.

4:FIT manual for a Test Station: This details the use of a BBC computer, in conjunction with the FIT board (plus various other items) as a Test Station for testing Econet and Disc Interfaces as well as standard Models A & B.

