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<u>ACORN TECHNICAL MANUAL</u>

System 1 Micro-Computer comprising:-

6502 C.P.U.   200,000

Keyboard   200,001

INTRODUCTION

The Acorn Central Processor Unit employing the 6502 Micro
Processor is a versatile circuit board which may be used
in at least three ways:-

1. As a Single Board Controller with a program in the pair of
   745571 PROM's or in the EPROM socket which may be 4, 8 or
   16 K with single or multiple power supplies. Two RAM/IO
   IC's may be fitted giving 32 individually programmable JO
   lines and 256 bytes of RAM. 1K of further RAM may be
   fitted if required.

2. As a machine code Micro-computer with an 8 digit x 7 segment
   HEX display, HEX keyboard and a cassette interface all on a
   second board, which is accessed by one of the RAM/IO IC's.
   Programs are entered and stored in the K of user RAM space
   under control of a 512 byte monitor program in the 74S571's.

3. As the Central Processing Unit for a complete computing
   system. All the 6502 data, address and control lines leave
   the board via a 32 way D.I.N. connector, which will then
   have access via a parallel back plane to extension memory,
   a Visual Display Unit, floppy disc drive, etc.. The Key-
   Board may be retained for its cassette interface and an
   ASCII Key-Board will also connect on to the HEX keyboard IO
   port. Systems such as this are capable of supporting high
   level languages, e.g. BASIC or PASCAL and may be used at
   home, in business or in the laboratory. Powerful
   peripherals such as high speed printers may be interfaced
   and direct control of external apparatus is possible.

Included in this manual are the construction details necessary
to assemble the C.P.U. board and Key-Board Kit which together
form System 1. Also details on power supplies, cassette
interfaces and address configurations which will be required
however the Acorn is used are provided.

CONSTRUCTION PROCEDURE

Before you start

Before attempting to assemble the Acorn kit check that all
the component parts are present and that none have been
damaged. It is worthwhile taking a few minutes to make sure
that you can identify all the components. Sometimes
components will be substituted in case of supply
difficulties. For instance,ten off 0.047 µF capacitors may
replace the ten 0.1 µF capacitors shown on the parts list.
The components substituted will in no way be detrimental to
the Acorn's operation. Also some manufacturers have similar
but different type numbers e.g. for the CMOS a CD4011 from
R.C.A. may be replaced by an MM5611 from National
Semiconductor.

For capacitors note that the value may be expressed in one
of two ways:-

$$100 \text{ nF} = 0.1 \text{ pF}$$
$$10 \text{ nF} = 0.01 \text{ µF}$$
$$1 \text{ nF} = 1000 \text{ pF}$$
$$0.1 \text{ nF} = 100 \text{ pF} \qquad \text{etc.}$$

Capacitors supplied with the Acorn kit are usually identified by
a 3 digit number, the first two digits being the first two
digits of the value and the third being the number of following
zeroes eg.

$$101 = 10 \text{ and one zero ie. } 100 \text{ pF}$$
$$103 \text{ . } 10 \text{ and three zeroe's ie. } 10000 \text{ pF} = 10 \text{ nF}$$
$$473 = 47 \text{ and three zero's ie. } 47000 \text{ pF} =$$
$$47 \text{ nF} = 0.47 \text{ pF.}$$

If in doubt about the capacitor values, count the number of each
of type supplied in the kit and then identify them using the parts
list quantities.

first band / second band / decade band / tolerance band
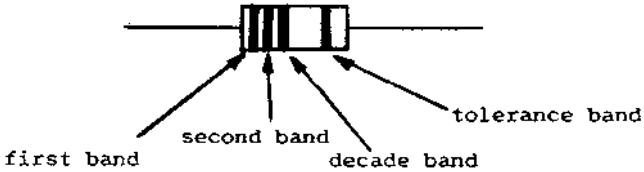
The first and second bands give the resistor value and
the decade band shows the number of zeros following:-

0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Grey
9	White

e.g. Yellow, Violet, Orange
is Yellow, Violet = 4,7 and
Orange = 3 zeros i.e. 000.
So the value is 47000 ohms,
i.e. 47 kilo-ohms or 47K.

The tolerance band is red for ± 2%, gold for ± 5% or silver
for ± 10%, any of these are suitable for the Acorn kit.

Ensure that no components are concealed in the packing
material and retain the packing material in case you have
cause to return the kit.

Assembling the Acorn will require a considerable amount of
soldering and a small electric soldering iron is essential
with a diameter at the end of the bit not exceeding 0.1
inches. The iron should be rated between 10 and 30 watts and
fine 22 guage flux cored solder should be used. If you have
never soldered before we advise you not to try to assemble
the Acorn without assistance as Acorn Computer Ltd. can not
accept responsibility for kits which have been improperly
assembled. When soldering make sure the component is well pushed on
to the board as shown,use a minimum of solder and once the solder
has run remove the iron.

SOLDER
BOARD
COMPONENT
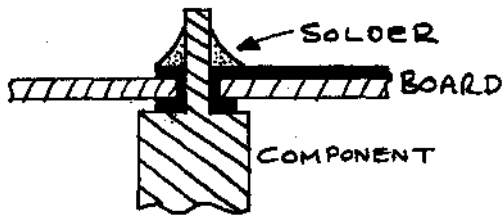
Some of the integrated circuits used in the Acorn employ M. O.S. technology and they can be damaged by static electricity. As a general rule if there is no noticable static charge in the area and no nylon clothes or carpets are present all will be well. An earthed soldering iron should be used when soldering on a board containing M.O.S., I.C.'s.

The Acorn Printed Circuit Boards are double sided, through hole plated glass fibre and are manufactured to the highest standards. A layer of green solder resist ensures that accidental solder splashes do not stick to the tracks and a clearly marked white silk screen indicates component positions. Examine the two boards for faults or damage before proceeding. It is not necessary to solder through holes which connect one side of a board to the other and do not have a component lead in them and attempting to do so can break the through hole plating and thus the connection. All soldering should only be done on the opposite side of the board to the components (i.e. side 1).

Assembling the Acorn will take an hour or two, so clear a space and continue as follows.

Integrated Circuit Sockets

The Acorn is supplied with a full set of integrated circuit sockets and these should be fitted to the two circuit boards. The sockets must be fitted the right way round, on the circuit board viewing it from the top pin 1 of an I.C. is identified as shown:-
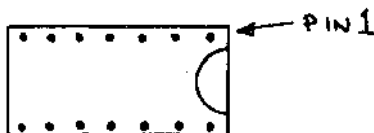
PIN 1

The sockets will have either a 45^0 chamfer for pin 1 or a semi-circular cut out as shown:-


PIN 1
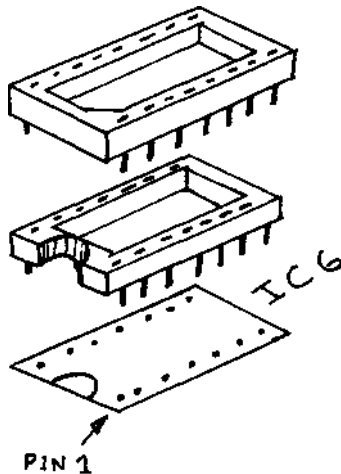
Note that on the Central Processor Board IC1 is the opposite way round to the other sockets nearby. Fit the sockets one at a time and ensure that they are pressed fully down with no leads bent under the socket before first soldering two diagonally opposite pins at the corners. Check that the socket is the right way round and successfully fitted before soldering the rest of the pins.

There is no need to snip off the excess of the socket pins.

Other Components on the Boards

Resistors and capacitors are next fitted to the circuit boards. Identify the component from the component lists and fit it to the board. Some capacitors will need to be fitted as shown.
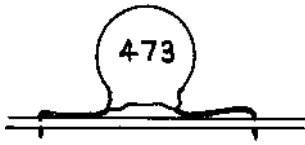
Do not crack the
capacitor body when
bending the leads.

The 15 µF electrolytic capacitors are polarised and the positive
end marked + must be located as shown.

KEY. BOARD

C. P.u. BOARD
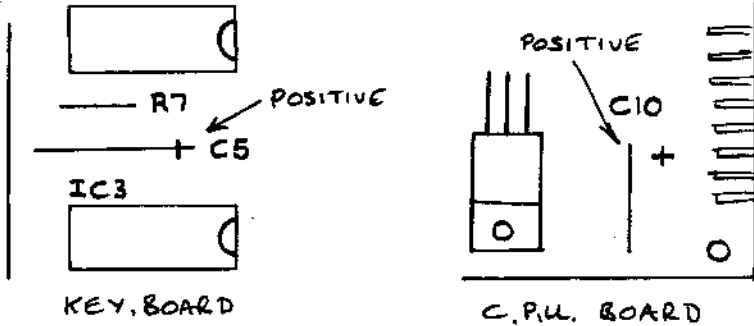
After soldering in the capacitors and resistors snip off any
excess leads under the boards.

Voltage Regulator

The Voltage Regulator is fitted as shown:-
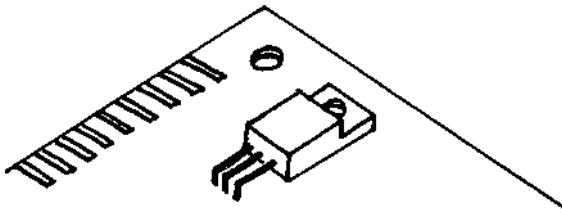
Bend the leads taking care not to break them as they enter
the body of the regulator. Screw down the regulator with the
nut and screw supplied and then solder the three leads under
the board. Snip off any excess leads under the board.

Crystal

The crystal is fitted as shown:-
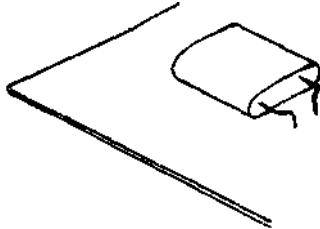
Again bend the leads away from the component body and lay the
Crystal down on the board before soldering. Snip off any excess
leads under the board.

Switch

One switch is supplied with the Acorn kit. The essential Reset
switch is also on the keyboard and so the switch supplied may be
fitted in IRQ, NM1 or duplicate RST on the Micro Computer board as
required. When fitting ensure that the flat on the switch body
faces into the board.
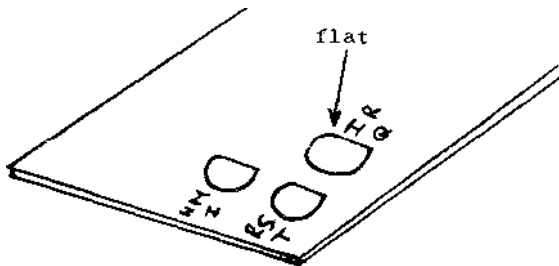
There is no need to fit the switch if it is not immediately
required.

Keyboard

To assemble the keyboard first wipe the circuit board over to
remove any dirt and then avoid fingering the area of the board
where the keys go. Take the cage and peel off the back cover-
ing its adhesive. Carefully stick the cage on to the keyboard
so that it lines up precisely with the outline on the printed

circuit board.

The key domes may now be located into the holes in the cage,

if pressed with a finger a positive click should be felt as
the dome contacts to the board.

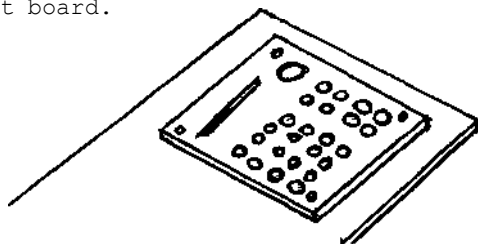Check that all the domes are correctly fitted and then peel
off the backing of the L shaped adhesive film for retaining
the domes. This also acts as a dust cover. Stick the film
over the cage thus retaining all the domes. Ensure that none
of the domes have moved during this operation.

Next take the keyboard legend panel and lay it face
downwards. Trim any excess plastic moulding from the keys and
lay them top downwards in the panel. Now place the keyboard
on top of the keys and panel and holding them together put
two diagonally opposite screws through them and loosely do up
two nuts. With the assembly secured in this way the other two
screws may be put through properly with spacers between the
keyboard and the top panel, these can now be tightened before
undoing the first two screws and re-fitting these with
spacers also.

On later issues of the Acorn kits the 25 keys may all be
moulded in one piece ready to fit directly into the top panel
without separating the keys off individually.

The keyboard may be permanently secured, after testing by
lightly fusing the nuts on to the screws with a hot soldering
iron.

Display

The Acorn display has 9 digits of which the extreme left hand
end one is not used. A short piece of 16 way Spectra-Strip
connects the display to the keyboard. First feed the Spectra-
Strip through the slot in the keyboard into the printed
circuit board. Solder leads 1 and 16 first and then, if all
is well, solder the rest of the leads.

two unused holes
at L.H.S.
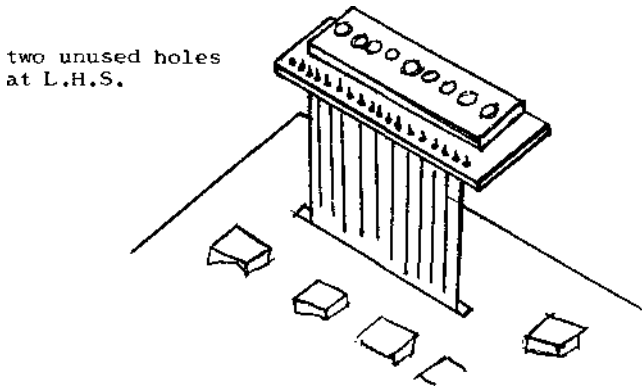
Lay the display face upwards on the Spectra-Strip and
solder the strip into the display. Note that the two left
hand end connections on the display are not used.

The display may be pushed down on to the keyboard taking
care not to over-stress the solder joints on the Spectra-
Strip.

Connecting the two boards

Connection between the Micro Computer and keyboard is achieved using a piece of 20 way 'Spectra-Strip' approximately 6 inches long. In order that the keyboard can be mounted above the Micro Computer the 'Spectra-Strip' must enter the keyboard from the bottom and the Micro Computer from the top as shown:-
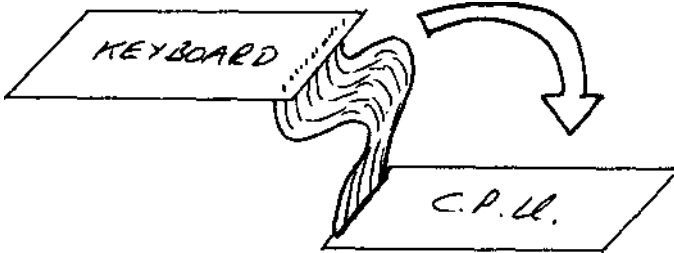
Before insertion check that the ends of the Spectra-Strip are properly stripped off and then with the strip pushed well home solder the connections to pin 1 and 20 first. If all is well continue and solder the other 18 connections. Repeat for the other end.

Integrated Circuits

These may now be fitted in their sockets pin 1 is identified by either a semicircircle or a dot as shown:-
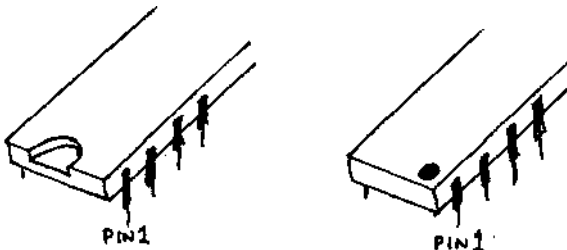
Identify the I.C. type from the components list and plug it
into the appropriate socket. If the leads are splayed out
press them all in together as shown until the I.C. fits easily
to the socket.
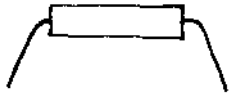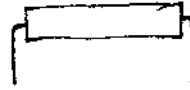
SPLAYED LEADS   READY FOR INSERTION

Take care that no I.C. pins get bent under the I.C. when
inserting and remember that I.C.1 on the C.P.U. board is the
opposite way round to its neighbours.

Mounting the Boards together

Four sets of screws, nuts and spacers are provided to mount
the keyboard on top of the Micro Computer board. This is
advisable as it stops the interconnecting 'Spectra-Strip'
from being continually flexed and strained. The screws
should have their heads on the bottom of the keyboard with
the nuts on the top of the C.P.U. board.

Switching On

Check that all components are properly fitted, that all IC's
are in the right positions and the right way round. Check that
the power supply polarity is correct, as in the section on
Power Supplies following. Switch on and press the RST button
which should cause the display to show eight dots. It should
now be possible to examine the contents of a memory location by
pressing the M key which, should result in the display of the
form :-

A.3dE1

The address of the desired location may be keyed in as four
hex digits giving for instance

```
| A.0200 |
```

Now pressing M again will display the contents of the location
as two hex digits

```
| A.0200.46 |
```

If the address is a byte of R.A.M. the contents may be changed
by keying in two new hex digits.

Should the kit not function switch off immediately and feel each I.
C. to see if it is exceptionally hot. If any are, check that they
are correctly inserted. Check the power connections and check that
all the assembly steps have been followed correctly. Do not
attempt to unsolder any components or �sockets with 4 leads or
more as the printed circuit board may suffer. Instead cut out
faulty components so that their leads may be removed one at a
time.

The Acorn users manual should now be read from the beginning in
order to operate the micro computer fully.

POWER SUPPLY

The Acorn Micro Computer and Keyboard require a supply
between 7 and 35 v DC at a current rating of 500 mA. A large
9 v battery may be used or a suitable mains adaptor is
available from Acorn Computers Ltd.

A recommended 'home-brew' circuit is given:-
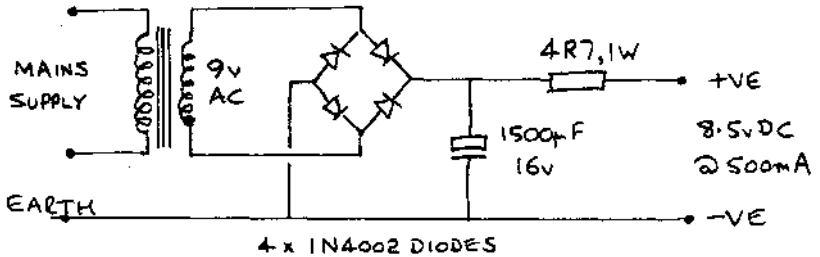
Using other circuits when the supply voltage exceeds 9 volts,

or using the above circuit without the 4.7 resistor will
require that a heat sink is fitted to the voltage regulator.
A piece of aluminium 1" x 2" square is suitable.

Connect the +ve supply to pin 31 of the edge connector and
the -ve (0V) to pin 32 as shown.
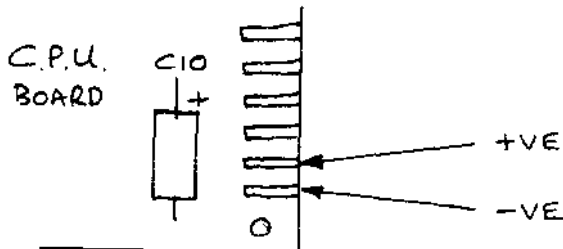
When using the Acorn mains adaptor the white wire is
positive and connects to pin 31.

CASSETTE RECORDER INTERFACE

Eventually a program that is going to be required again will need to be stored on an Audio Cassette recorder. On the keyboard is a Computer Users Tape Standard interface which connects to the recorder as shown:-

DIN PIN 1 , OUTPUT TO RECORDER
DIN PIN 2 , OV
DIN DIN 3 , INPUT FROM RECORDER
OV

BACK VIEW OF DIN PLUG. ie CABLE SIDE.

IC 7

C8
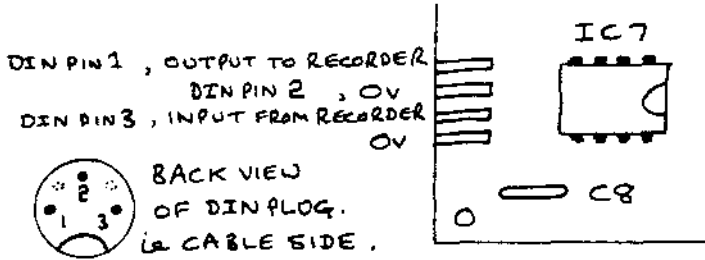
This recorder output consists of one of two tones, 2.4 KHz represents a logic 1 and 1.2 KHz a logic O. Each bit i.e. 0 or 1 lasts for 3.3 mS giving an operating speed of 300 bits/ second.

Both recording and playback are crystal controlled giving a low error rate and except on very cheap recorders whose speed may vary, no trouble should be experienced in transferring tapes from one machine to another.

We recommend the use of a recorder with an input and output dedicated to external connection to an amplifier as opposed to the microphone and external loudspeaker connections on the cheaper recorders. These types usually have a 3 or 5 pin circular. DIN connector which is wired as shown above.

The input and output recorder levels as supplied are both 300 mV r.m.s. The output may be adjusted by changing R3 and input by changing R12 on the keyboard. The output should be adjusted so that the tones play back at a comfortable audio volume without excessive distortion. The input is then adjusted for reliable operation or using an oscilloscope, to give a waveform at pin 7 of IC7 which is in excess of 2 volts peak to peak but is not being clipped.

ADDRESS SELECTION

The Acorn has a versatile Address Mapping selection
system able to support many different operating
configurations. The terminology employed is that the 65,
536 address's capable of being specified by AO thro' A15
are denoted by a four digit hexadecimal number in the
range 0OO0 to FFFF. The most significant Hex digit, i.e.
A12 thro' A15, specifies one of 16 BLOCKS'of addresses,
i.e. Block 0 thro F, and these are further subdivided
into pages. There are a total of 256 pages, each of 256
bytes specified by A8 thro' A15, i.e. pages OO thro' FF.

Basically the 65O2 Micro Processor requires that page FF is
Read Only Memory and in particular address FFFC is used after a
reset. Also it requires that page O1 is used for the stack
starting at address 01 FF and extending downwards. It is usual
to also make page 0O Random Access Memory as this is
particularly easy to access for Scratch Pad use. Note that the
bottom 32 bytes of page 00 are reserved for use by the system
monitor.

A 16 pin location called ADR SEL configures the Address Map.
Decoded address signals feed to this and these are connected
to the Chip Select lines of the IC's on the board. Using the
recommended addressing schemes block 0 and F are used for IC'
s on the circuit board and blocks 1 through E are left
completely free for circuits external to the processor board.

low for pgs 8-F of Blk F only

low for pgs 0-7 of Blk F only

A9 low for pgs 0,1,4,5,8,9,C,D of all blocks

low for pgs 8,9,A&B of blk O only

low for pgs C,D,E&F of blk 0 only

high for pgs 0,1,2,3,C,D,E & F of blk 0 only

A8 low for pgs 0,2,4,6,8,A,C,E of all blocks

A7
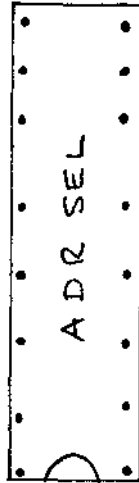
O volts

$\overline{CE}$ of Monitor ROM's

low for pgs 0,1,2&3 of blk O only connected to CS of IK RAM's

$\overline{CS}$ of EPROM

$\overline{CSO}$ of RAM/IO, IC8

M/$\overline{IO}$

CS1

$\overline{CSO}$

RAM/IO IC2

(diagram labeled ADR SEL 2)

CS1 of 1C8 is always on A8 i.e. high for pgs 1,3,5,7,9,B , D & F

M/IO of 1C8 is always on A7.

C.P.U. boards from issue 2 onwards have tracks connecting the ADR SEL on side 2 of the board to provide the standard address selection scheme as shown.

ADR SEL

Earlier boards require wire links to be fitted as appropriate before they will work. The address selection may be changed if desired by breaking these tracks and fitting new wire links.

Block F is decoded into two halves of 8 pages each,
ie 2048 bytes each. Two schemes are possable giving
page FF in either the pair of 74S571's or the EPROM.—

FF	ROM IC 5&6
FE	
FD	ROM IC 5&6
FC	
FB	ROM IC 5&6
FA	
F9	ROM IC 5&6
F8	
F7	
F6	
F5	EPROM IC 7
F4	
F3	
F2	
F1	
F0	

EPROM IC 7	
ROM IC 5&6	
ROM IC 5&6	
ROM IC 5&6	
ROM IC 5&6	
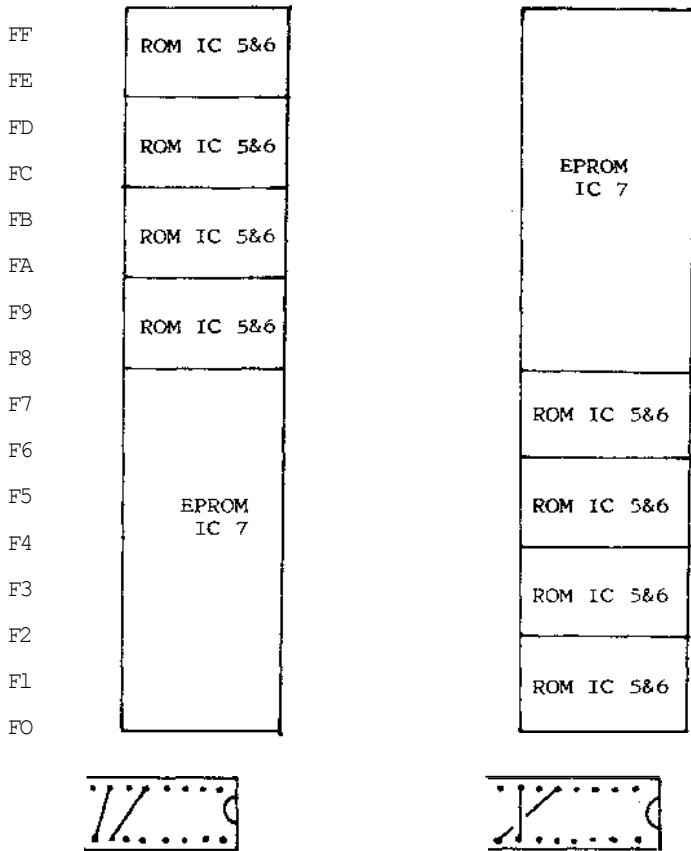
Note that the 512 byte ROM's appear four times. A 2048 byte
EPROM is fully decoded but if desired a 1024 byte EPROM may
be used in which case it will appear twice.

Block O is decoded so that pages 00 and 01 may be Random Access
Memory contained in IC's 3 & 4, IC's 2 and 8 or IC 2 alone. When
using IC2 alone care must be taken that the stack is not
overwritten by the Scratch Pad.

Memory map diagram (top view of address select). Page column labels ØF through Ø0.

Left block (IC2 alone):
- ØF: IO IC2
- ØE: IO IC2
- ØD: IO IC2
- ØC: IO IC2
- ØB: IO IC2
- ØA: IO IC2
- Ø9–Ø2: FREE
- Ø1: IO IC2
- Ø0: RAM IC2 (×8)

IC2 APPEARS EIGHT TIMES

Middle block (IC's 2 and 8):
- ØF: FREE
- ØE: IO IC2
- ØD: FREE
- ØC: IO IC2
- ØB: IO IC2
- Ø9–Ø5: FREE
- Ø4: RAM IC8
- Ø3: IO IC8
- Ø3: RAM IC2
- Ø2: RAM IC8
- Ø1: IO IC8 / IO IC2
- Ø0: RAM IC2

IC2 APPEARS FOUR TIMES
IC8 APPEARS TWICE

Right block (IC's 3 & 4):
- ØF: RAM IC2 / IO IC2
- ØE: RAM IC2 / IO IC2
- FREE
- RAM IC8 / IO IC8
- FREE
- RAM IC8 / IO IC8
- FREE
- USER'S RAM
- STACK
- PAGE Ø

IC2 & IC8 APPEAR TWICE
IC 2 & I.O IS TO KEYBOARD
1K RAM IC's 3 + 4
TOP VIEW OF ADR SEL

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FITTING EPROM's

Read Only Memories with pin out systems similar to the 2708,
2758 and 2716 EPROM's may be used for firmware storage. As
supplied the board is ready for a 2716 PROM to go in the
lower 2 K bytes of block F, changing the address select links
as on page V, will place it in the upper 2 K bytes including
the Reset Address.

To use the 2758 it is only necessary to ground pin 19. This
is done by breaking a track on side 1 of the board as shown
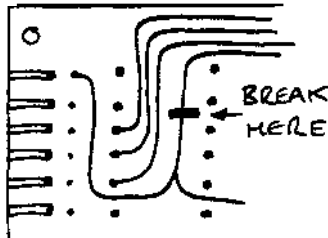
A wire link is then soldered to the board from pin 19 to pin
12 of the ROM socket or 0v is connected to pin 1 of side B on
the p.c.b. connector.

To use the 2708 which requires +12v (Vdd) and -5v (Vbb) the
track above is broken and also pin 21 is disconnected from +5v
by breaking a track on side 1 as shown:-
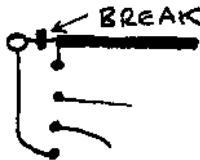
The two extra supplies are then fed in on pins 1 and 2 of side
B on the p.c.b. connector.

When a 1K byte PROM of the 2708/2758 type is used will appear
twice in the selected 2K bytes of block F.

If desired a 4K byte ROM of the 2732 type may be used in which case the track to pin 19 (A1O) is left unbroken but the track to pin 21 is broken as above and pin 21 is linked to All on pin 13 of IC 10. Neither of the block F address select links are used but instead another link is made from pin 20 of the PROM to IC9 pin 6 which is low for block F.

When using the Central Processor Card with other boards in the
Acorn range the voltage regulator is no longer required as a
separate 5 volt supply will be in use. Pin 31 on sides A and B
of the connector is then used to connect the Block 9 signal to
the back plane. To modify the board in this fashion the
regulator and C10 must be removed from the board and a wire
link fitted from IC10 pin 15 to pin 13 of the edge connector.
PCB's from issue 2 onwards have a position marked for this
link from the regulator pin hole nearest the edge connector to
an adjacent empty hole. C8 should be replaced by an
electolytic capacitor, the one previously fitted for C10 may
be used.

The C,P.U. and keyboard may be fitted in a Eurocard rack
with other boards to form the Acorn system 2. The usual
Acorn backplane has a 1 to 1 etc. connection all along side
A of the connectors and single sided (32 way) connectors may
he used.

However most p.c.b.'s will have optional connections on side
B, eg. the second T0 chip on the C.P.U. board, and to use
these double sided (64 way) connectors are fitted with the
side B connections wire wrapped as required by the particular
system configuration.

The simplest way of fitting the keyboard, which in a VDU/QWERTY
keyboard system is retained for its cassette interface, is to
leave it attached to the C.P.U. card by the spectra-strip and
slide it into the next board location in a rack. In this way it
remains connected to 1C2 on the C.P.U. board. However, keyboards
from issue 2 onwards can have a 64· way connector fitted to them
(if the unused pins are cut off the plug) and the CASIN, CASO
and 0_2 pins appearing on side B may then be linked as desired on
the back plane).

A QWERTY keyboard will usually be fitted to the system using
IC2 on the C.P.U. board. Removing the NSA 1198 display and the
7445 I.C. frees connections to I.C. 2 allowing for a 7 bit
parallel ASCII input together with a strobe connection. The 2O
way spectra strip may be retained and the QWERTY keyboard
wires soldered to the fingers on the C.P.U. board as shown,
leaving the cassette interface as before:-
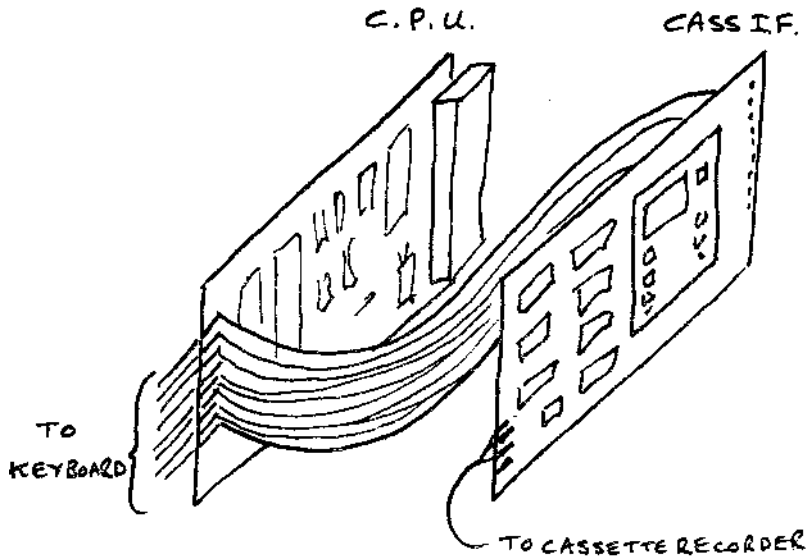
C.P.U. boards from issue 3 onwards also have provision for
fitting a 20 way ribbon header plug for the I/O lines to 1C2.
QWERTY keyboards may be connected via thy*' plug but the
spectra-strip to the old keyboard can not be fitted with the
header and so if a cassette interface is needed it must be
accessed via the backplane.

     To access the cassette interface via the backplane connect
two wires on the back of the C.P.U. board from IC2 pin 16 to
pin 19B (CASIN) and from IC2 pin 17 to pin 20B (CASO). Next
connect these two pins on the back plane to pins 12B and 13B
respectively of the cassette interface connector. Finally
connect 02 on the cassette interface by linking pins 11B and
29A. Fit the 64 way connectors to both the C.P.U. and the
cassette interface.

The usual pin connection scheme for the new keyboard and header is as shown:-

OLD USE	NEW USE	SPECTRA STRIP PIN	RIBBON HEADER PIN
+5v	+5v	20	13
NRST	NRST	19	15
dp	strobe	18	17
g	D6	17	19
f	D5	16	20
e	D4	15	18
d	D3	14	16
e	D2	13	14
h	D1	12	12
a	D0	11	10
0_2	0_2	10	8
CASIN	CASIN	9	6
CASO	CASO	8	4
2	7	2	
1	6	5	
0		5	1
C		4	3
B		3	7
A		2	9
0V	0V	1	11

It is important to realise that a monitor program is written around the keyboard and display system in use and that alter ing the hardware, environment by adding a V.D.U., QWERTY keyboard etc. will require different monitor P.R.O.M.'s.

P.C.B. LAYOUTS

ACORN K.B.1

IC1

C10

IC8

R2

R10
R9

R1

IC2

C1

IC4

R7

C5

C2

R8
R15

IC3

C8

IC5

R3
R4

R8

R14

C4

C3

R13

C6

R5

IC7

IC6

C9

C7

R12

R11

DISPLAY

R16

ACORN 6502

IC2

C1

IC1

IC3

IC5

IC7

IC6

R1

IC4

C7

IC6

C9

C5

ADR. SEL.

C2

XTAL

IC9

R2

IC12

C10

IC11

C6

IC8

C8

IC10

R3
C3
R4

C4
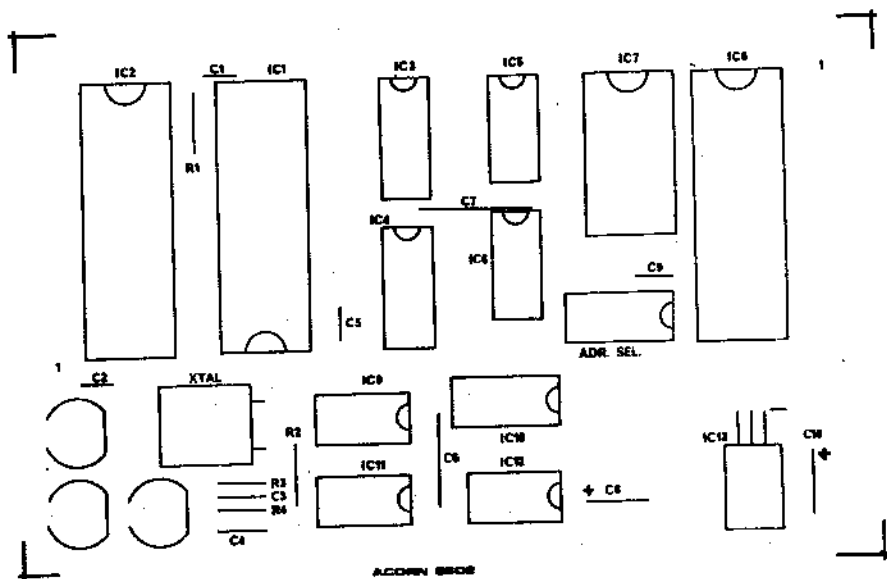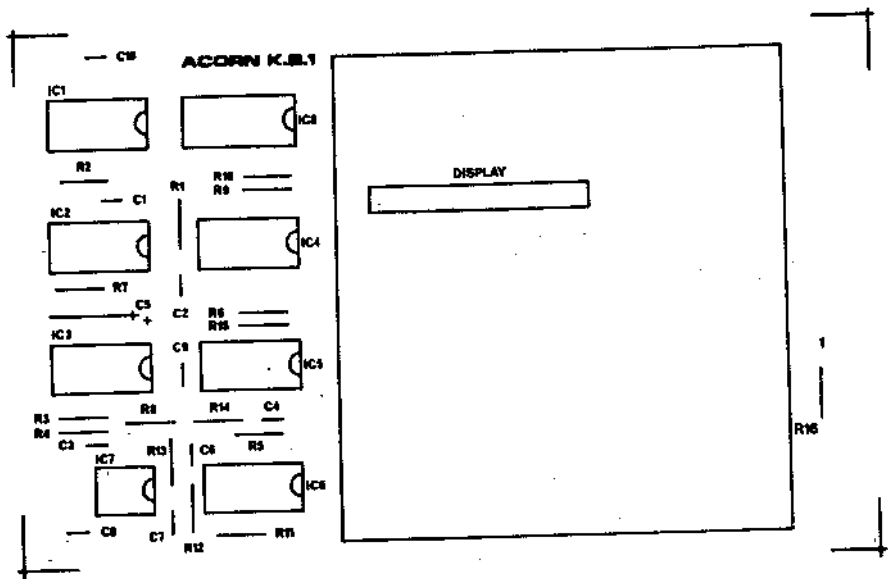
PARTS LIST FOR 6502 C.P.U. BOARD

Sold with keyboard assembled and tested or as a kit.

P.C.B.   ...   Acorn Computers Ltd. pt no 200,000
ICI   ...   6502 Micro Processor ... and 40 pin socket
IC2   ...   8154 RAM/IO   ... and 40 pin socket
IC3   ...   2114 RAM   ... and 18 pin socket
IC4   ...   2114 RAM   ... and 18 pin socket
IC5   ...   74S571 Blue ROM   and 16 pin socket
IC6   ...   74S571 Yellow ROM   and 16 pin socket
IC7   ...   2516 EPROM. NOT SUPPLIED but 24 pin socket is.
IC8   ...   8154 RAM/IO. NOT SUPPLIED but 40 pin socket is.
IC9   ...   74LS2O   ... and 14 pin socket
IC10   ...   74LS139   ... and 16 pin socket
IC11   ...   74LSO4   ... and 14 pin socket
IC12   ...   74LSO0   ... and 14 pin socket
IC13   ...   LM34O-T5   ...   5v REGULATOR
XTAL   ...   1MHz CRYSTAL
RESET SWITCH
                   SWITCH TYPE D6. ONLY ONE SWITCH SUPPLIED IN KIT
                    Not fitted to assembled and tested version.
IRQ SWITCH
 NMI SWITCH
 EUROCONNECTOR 32 way PLUG. NOT SUPPLIED
 Nut and screw for IC13

```
R1        ...    4K7        0.33 or 0.5 w 5 or 10%

R2        ...    4K7                    "

R3        ...    4K7                    "

R4        ...    4K7                    "

C1        ...    100nF

C2        ...    100nF

C3        ...    10nF

                 NOT SUPPLIED

C4        ...    10nF

C5        ...    100nF

C6        ...    100nF

C7        ...    100nF

C8        ...    100nF

C9        ...    100nF

C10       ...    15µF @ 16 v
```

<u>PARTS LIST FOR ACORN KEY-BOARD</u>

Sold with C.P.U. assembled and tested or as a kit

P.C.B.   Acorn Computer Ltd. pt no 200.OO1

ICI   CD 4024B   and 14 pin socket

IC2   CD 4024B   and 14 pin socket

IC3   CD 4011B   and 14 pin socket

IC4   CD 4013B   and 14 pin socket

IC5   CD 4001B   and 14 pin socket

IC6   CD 40248   and 14 pin socket

IC7   LM 358 Dμal Op-Amp and 8 pin socket

IC8   7445   and 16 pin socket

DISPLAY NSA 1198

Specra strip for display

Specra strip for connecting to Acorn Microcompμter

PCB. Key contact domes, 25 off.

Key Bμttons, 25 off.

Key Board cage.

Dome retainer adhesive film.

4 off Keyboard top panel spacers, nμts and screws.

Keyboard top panel (with legend on).

4 off spacers, nμts and screws for moμnting to Acorn PCB.

```
R1      3K9         0.33 or 0.5 w 5 or 10%
R2      47K                 "
R3      4K7                 "
R4      1K                  "
R5      10K                 "
R6      4K7                 "
R7      4K7                 "
R8      47K                 "
R9      4K7                 "
R10     4K7                 "
R11     10K                 "
R12     47K                 "
R13     4K7                 "
R14     470K                "
R15     4K7                 "
R16     4K7                 "
C1      100pF
C2      1nF
C3      1OnF
C4      1nF
C5      15µF @ 16 v
C6      100nF
C7      NOT SUPPLIED
C8      22nF
C9      100nF
C10     100nF
```

```
PCB    ...    Acorn Compμters Ltd. pt no 200,0OO
ICIq   ...    6502 Micro Processor and 4O pin socket
IC2    ...    8154 RAM/IO and 4O pin socket
IC3    ...    2114 RAM NOT SUPPLIED BUT 18 pin socket is.
IC4    ...    2114 RAM     "           18    "
IC5    ...    74S571 ROM   "           16    "
IC6    ...    74S571 ROM   "           16    "
IC7    ...    2516 EPROM   "           24    "
IC8    ...    8154 RAM/IO  "           40    "
IC9    ...    74LS20                and 14 pin socket
ICI0   ...    74LS139               and 16 pin socket
IC11   ...    74LSO4                and 14 pin socket
IC12   ...    74LS00                and 14 pin socket
IC13   ...    LM34O-T5 ... 5 v REGULATOR
XTAL   ...    82pF capacitor sμpplied instead of Crystal
RESET SWITCH Switch type D6
IRQ SWITCH Switch type D6    ONLY ONE SWITCH SUPPLIED
NMI Switch Type D6
```

Nut and screw for IC13

```
RI       ...    4K7      0.33 or 0.5 w 5 or 10%
R2       ...    4K7                   "
R3       ...    4K7                   "
R4       ...    4K7                   "
Cl       ...    100nF
C2       ...    100nF
C3       ...    10nF
C4       ...    10nF    NOT SUPPLIED
C5       ...    100nF
C6       ...    100nF
C⁻       ...    100nF
C8       ...    100nF
C9       ...    100nF
C1C      ...    15µF @ 16 v
```