



Acorn Computers Limited, 4a Market Hill, Cambridge CB2 3NJ, England. Telephone 0223 312772

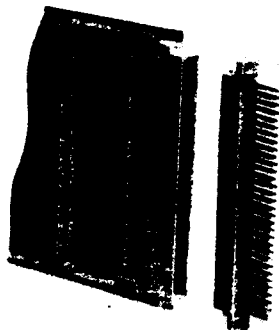
Expanding Acorn Systems

Using the system 1 with its 512 byte monitor connection can be made to extra memory cards, VDU cards, serial and parallel interface cards etc. These cards are then used under control of the system 1 monitor using the hexadecimal keypad and display with programs to control the VDU being loaded into RAM from cassette tape every time the system is switched on.

The technical manuals supplied with the VDU, VIB etc contain listings of the software needed to drive them and this may be keyed in initially before saving it on the cassette for future use in system 1.

For an economy system interconnection of the cards may be achieved using pieces of wire but connectors are usually used.

The connectors used on Acorn products are two part 64 way DIN connectors as shown:-



Side A of the plug on the circuit card carries the essential data, address and control signals whilst side B is for optional connections, ie. extra I/O lines, interrupts etc. The sockets on the back plane have the side A pins connected all the way along whilst side B pins are connected using wire wrapped joints allowing the user to configure a system to meet his requirements. On the circuit card the side A connections only are also available on fingers for edge connectors.

A low cost back plane may be constructed using parallel strip board with 0.1" pitch holes. This will short out the side A and B connections and so single sided 32 way sockets should be used. With this method the 6502 CPU can be connected to the memory and VDU cards retaining the 20 way spectra strip for connecting to the cassette interface. Of course connection to some VDU, VIB and 6502 CPU options on side B is not possible but the system will run.

The 6502 CPU card can drive up to three other Acorn boards after which two octal buffer IC's are required on the address lines. No data bus buffering is needed. The Acorn backplane allows for 8 circuit cards at 1" spacing and has provision for the buffer IC's and a power supply connector at one end.

System 2 consists of four cards, the 6502 CPU, cassette interface, memory card and a VDU interface card which are all connected via the back plane. A new monitor/operating system ROM is used which does not recognise the hexadecimal keypad and display as I/O devices. Instead I/O is via a parallel ASCII keyboard and the memory mapped VDU interface. The VDU interface can drive a video monitor directly with a 1 volt/75 ohm monochrome signal or with T.T.L. level Red, Green Blue and synch signals. Connection to the aerial socket of a T.V. is via a monochrome UHF modulator or via a P.A.L. colour encoder and modulator combination.

The keyboard connects to port B of IC2 on the front of the 6502 CPU card and a ribbon cable connector may be fitted for it. A low for any key pushed strobe is required.

The system 2 Cassette Operating System allows files to be saved on and read from an audio cassette using the Computer Users Tape Standard as for system 1. The C.O.S. also drives and scrolls the VDU and reads the keyboard. Using the C.O.S. programs in hexadecimal may be entered and run or control may be passed to other programs eg. a BASIC interpreter which may employ the C.O.S. input/output routines.

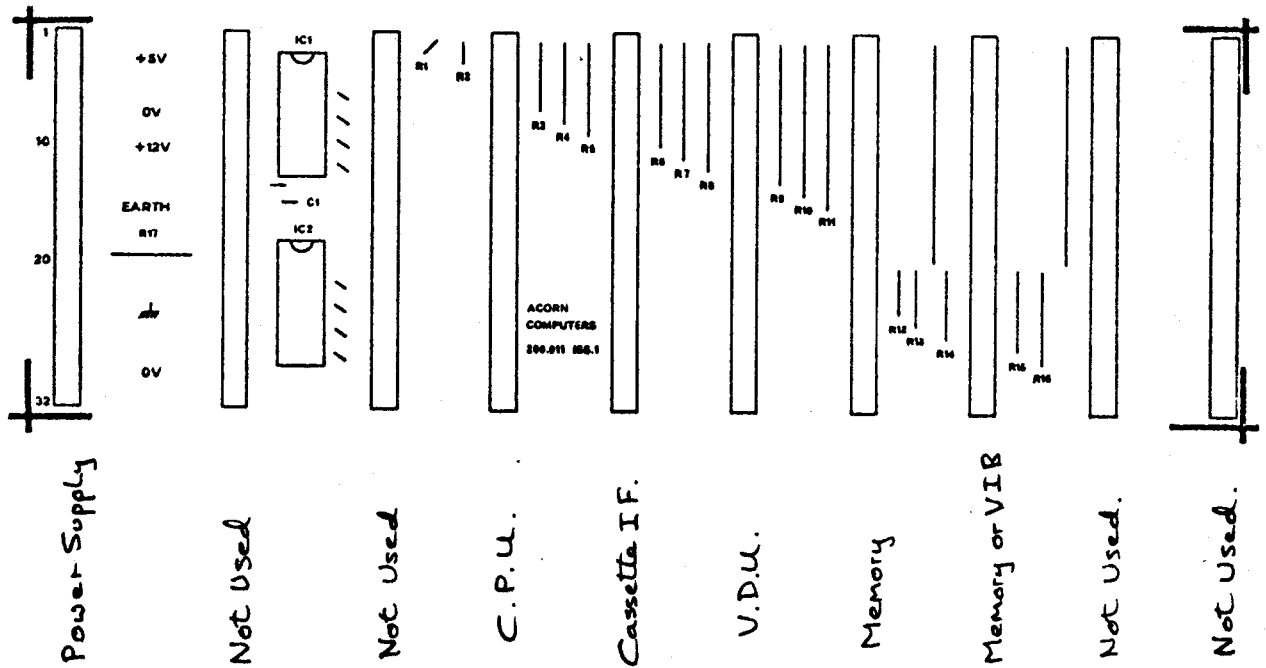
System 3 users the convenient mini-floppy disc as its storage media. A comprehensive Disc Operating System program deals with files on the disc and again allows I/O via the parallel keyboard and memory mapped VDU. The cards provided are the 6502 CPU, memory card, VDU card and a floppy disc controller. The disc drive is mounted within a 7" module with the controller card on its left handside. This module always goes on the right of the backplane with the controller card plugged in to the extreme right hand socket. A 34 way ribbon cable connects the controller card to the disc drive inside the module.

Systems 1, 2 and 3 contain monitors or operating systems which are resident in 512 byte, 2K byte or 4K byte Read Only Memories. The system 2 and 3 operating systems provide facilities to allow the running of programs such as BASIC interpreters, Assemblers etc. These programs may be loaded from cassette or disc into R.A.M. when required or they can also be permanently resident in R.O.M.

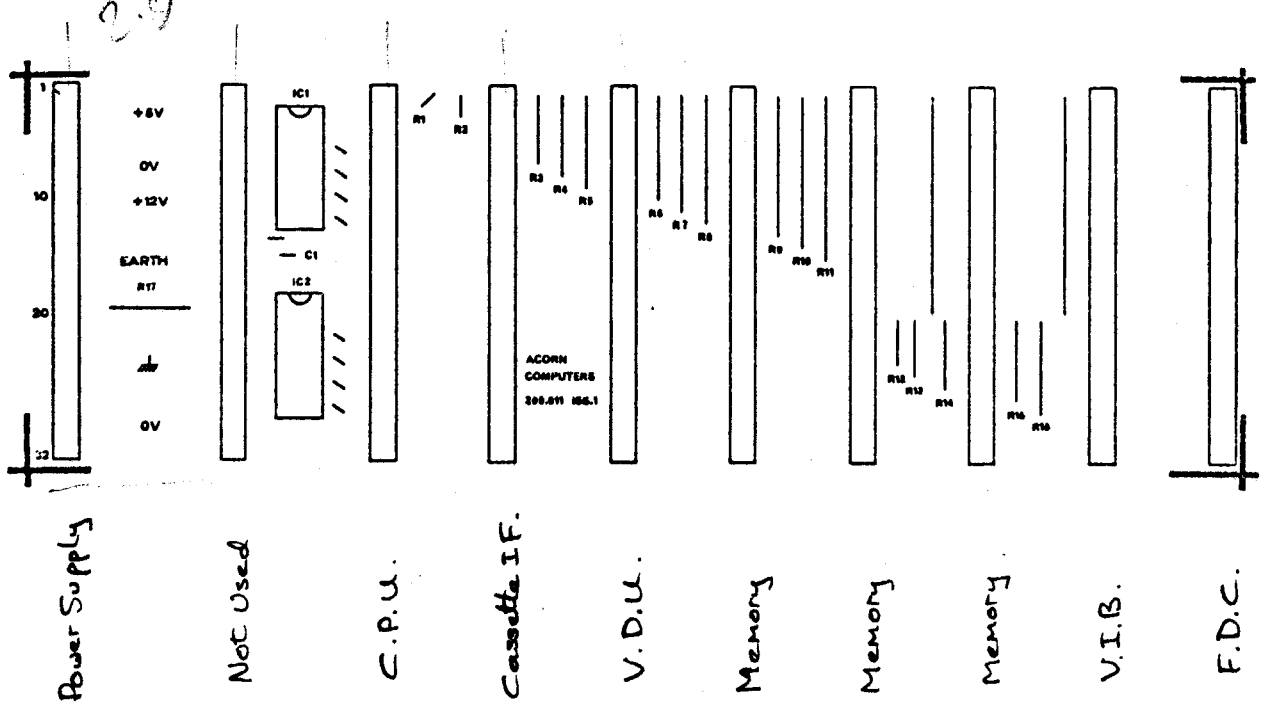
On the backplane the following wire-wrap connections are usually required:-

CPU pin A29 to cassette interface pin	B11 for $\phi 2$.
" B19 "	B12 for CASIN
" B20 "	B13 CASOUT
" B21 "	B14 Not High tone
" B29 to floppy disc controller pin	B29 NMI
" B28 to versatile interface	B28 IRQ

Viewing the backplane from the front the card locations are as follows for an un-buffered system.



When the buffers (2 x 74LS244) are used the configuration



The cassette interface, VIB and the two empty locations may all be used for memory giving a 40K byte of RAM system. When fitting the buffers 9 wire links and a decoupling capacitor are also required on the front of the backplane.

A further wire link connects the 0v rail to the chassis earth this may be left out if desired or a low value resistor (R17) may be fitted.

The resistors R1 to R16 are 4K7 pull up's to +5v on the address bus. They are not usually required but may be fitted to improve bus loading and timing in some applications.

In their basic form both systems 2 and 3 consist of circuit cards (and the disc module) which are mounted in a 19" card frame using pairs of card and module guides. The backplane screws into the rear of the frame. The peripheral devices are connected by soldering wires to the front of the appropriate card or optional connectors and front panels may be used. A case is available to enclose the open card frame.

Power supplies are not supplied with the systems but are available as options from Acorn. System 2 requires 5 volts at 2 to 3 amps and system 3 requires 5 volts at 3 to 5 amps together with 12 volts at 3 amps. The power supplies may be contained within a 2.8" module on the left side of the card frame or they can be constructed in the rear of the 19" case.

Dual disc drive systems are constructed using two card frames, one above the other. The top frame carries the two 7" disc modules without controller cards and in the lower frame an extended back plane can provide for a fully expanded system including a single floppy disc controller card.

C B T Feb. 80.