A.C.C NEWSLETTER VOL 2 ISS6 FEB 75

DEC DEKKO OK

About 40 ACC members attended the meeting at Digital Equipment Corp at Reading in January. DEC laid on a very warm welcome, discussion sessions on all aspects of hardware & software had been organised while a dozen or so PDP8 and PDP11 systems were available for anyone to experiment with. Many thanks to DEC and all who .....

PDP-8 kits

Some months ago DEC announced the PDP8/A. This is the latest in the long and honourable PDP-8 line and has about the same performance as the PDP-8e. It can be purchased as a complete machine (CPU, core or MOS memory, I/O, power supply, chassis & operator's control panel) or as individual boards;

CPU board
Memory - choice of MOS RAM, MOS ROM, MOS PROM or core from 1K to 8K 12 bit words.
I/O option board providing serial & parallel I/O, real time clock and control panel interface.
Extended option board providing power fail/restart, memory extension & time share control and bootstrap.
Power supply, chassis and control panel are also available.

A CPU board plus 1K MOS RAM come to £450, while a machine with 4K MOS RAM, power supply, chassis & simple control panel would be around £1100 (small qty prices w/o VAT).

All boards work with the PDP-8e 'OMNIBUS' interface and can therefore use standard PDP-8e peripherals.

LSI - 11

ACC members at the meeting were treated to a preview of DEC's latest low cost 16 bit LSI microcomputer, the LSI-11. This has since been officially announced by DEC so we are free to publish details.

As with the PDP8/A, the LSI-11 is basically a set of boards which are intended for use by large quantity equipment manufacturers who would build them into their own designs.

It uses the standard PDP-11 instruction set, but the inter-board interface is simpler than the standard PDP-11 'UNIBUS'.

Startling feature is the CPU board, only 8½" x 10½" it contains a CPU (including an Octal Debugging Program, console functions and Bootstrap Loader) in 4 chips, a buffered parallel I/O bus and a 4K word 16 bit MOS RAM. A fifth LSI I/C can be fitted to extend the instruction set to include full floating point arithmetic. Speed is comparable with the low end of the PDP-11 range at 3.6uS register to register add time.

Items available so far are ('one off' prices w/o VAT);

CPU + 4K MOS RAM		£562
CPU + 4K core memory		872
Extra 4K MOS RAM		355
Extra 4K core		508
I/O interface boards	approx	110
Backplane with sockets		99

AGM

ACC ANNUAL GENERAL MEETING

The second annual general meeting of the Amateur Computer Club will be held on;

THURSDAY MARCH 20 1975 7.30pm

@

THE POLYTECHNIC OF THE SOUTH BANK

Borough Road, London SE1

(tube - Elephant & Castle or Waterloo)

AGENDA

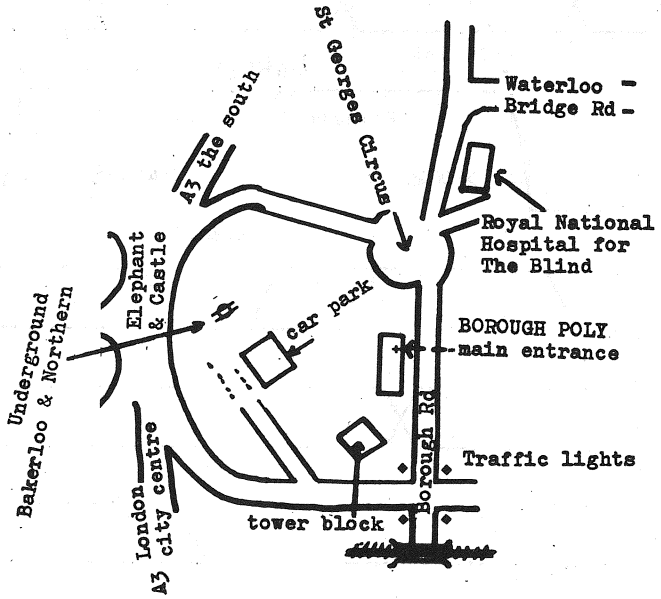
a) Retiring officers' reports and statement of the club's accounts.

b) Election of officers and committee members for 1975.

c) Discussion of special project topics for the ACC in '75.

d) Visit and lecture programme ideas for '75.

e) A.O.B.



intel® 2107A

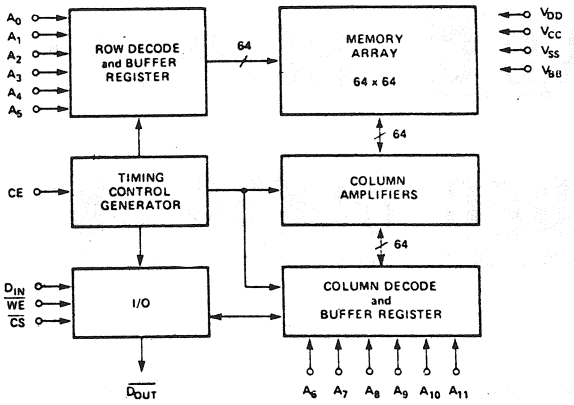
The INTEL 2107A is a 4096 word by one bit dynamic n-channel MOS RAM. Information is stored as charge on very small capacitors in the device. New information is stored by charging or discharging the appropriate capacitor through an internal arrangement of MOS transistors. To read out the voltage on the appropriate capacitor is sensed by an MOS transistor and amplified. Again a decoding matrix picks out the required bit as selected by the 12 bit address (A_0 to A_{11}).

As the capacitors will eventually discharge, the internal circuits are designed to refresh the charge on all 64 capacitors in one row (the memory is internally arranged as 64 rows x 64 columns) whenever any one of the bits in that row is read. To ensure that all bits of the memory are kept 'refreshed' one read cycle must be performed on each of the 64 row addresses at least every 1 mSec. (2 mSec for the slightly more expensive devices in ceramic - instead of plastic - packages. The memory is refreshed whether Chip Select is '1' or '0'.

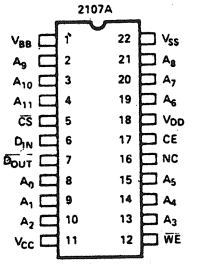
All inputs except for Chip Enable are more or less TTL compatible - the 'high' level is 3.5V min, which means that you must use a pull-up resistor to +5V as standard TTL I/C's often give less than this. The CE input line must be swung between approx 0V & +12V. All input currents are less than 100uA.

The output is effectively open when CE is at 0V or $\overline{CS}$ is 'high', otherwise it can drive one TTL load.

Average supply currents are;
I_{DD} 18mA I_{CC} 2.5mA I_{BB} 1uA



PIN CONFIGURATION



CE	CHIP ENABLE
$\overline{D_{OUT}}$	DATA OUTPUT
V_{CC}	POWER (+5V)
NC	NOT CONNECTED
D_{IN}	DATA INPUT
A_0-A_{11}	ADDRESS INPUTS*
$\overline{WE}$	WRITE ENABLE
$\overline{CS}$	CHIP SELECT

*Refresh Addresses A_0-A_5.

V_{DD} = +12V ± 5%, V_{CC} = +5V ± 5%, V_{BB} [1] = -5V ± 5%, V_{SS} = 0V

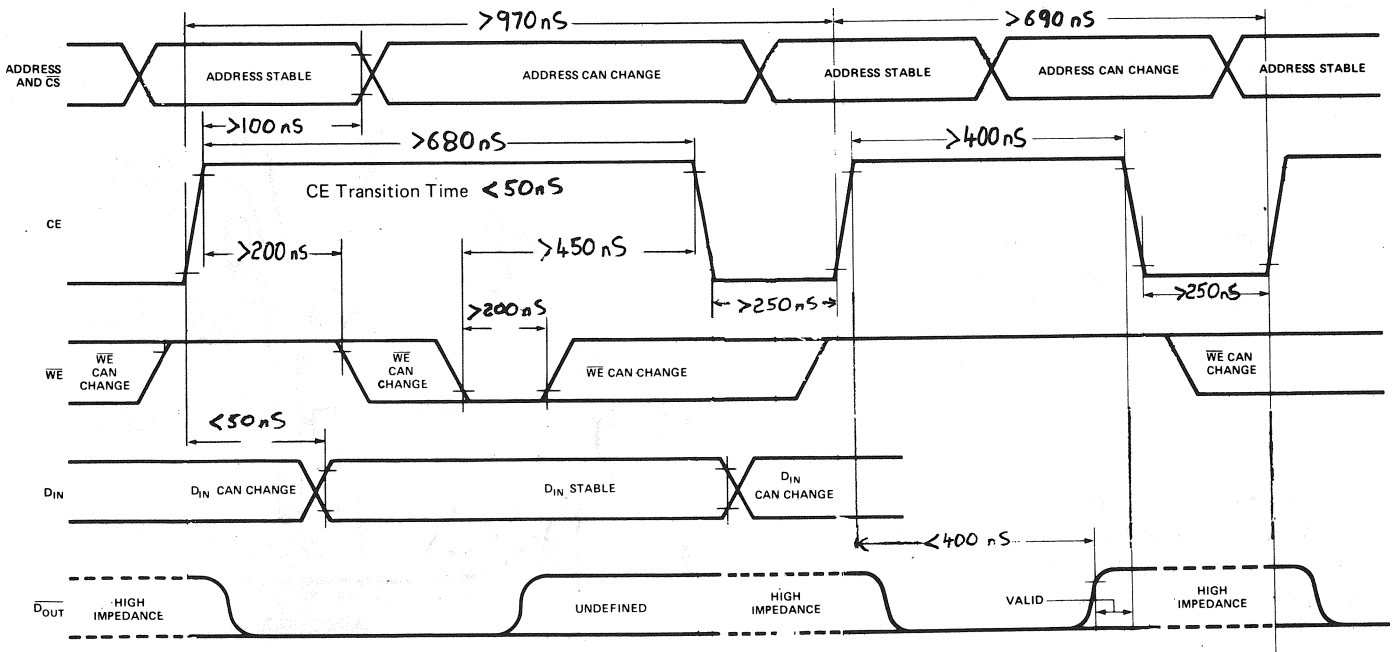
INTEL sell several selections, as shown in the table below. Cheapest is the 2107A-8 at £9.93 for one-off, falling to £6.00 for 100 up (plus VAT). Timings shown are for the 2107A-8.

2107A 4K RAM FAMILY

PART NO.	ACCESS (ns MAX)	READ CYCLE (ns MIN)	WRITE CYCLE (ns MIN)
2107A-8	420	690	970
2107A-4	350	570	840
2107A	300	500	700
2107A-1	280	450	550

Write Cycle

Read and Refresh Cycle



ANOTHER LIFE

I have developed a method of programming LIFE which I think is efficient both in storage requirements & in generation time. The program was conceived for use on a 1906A; consequently it uses 8 regs. and is organised round a 24 bit word. The no. of registers is not very important, but the word length must be a multiple of 3 bits.

The original philosophy was one bit per cell, with characters deposited one by one onto the output buffer: this necessitated a linear scan of the matrix, & to economise on registers & core transfers, it was decided that each cell would be expanded to three bits (say 'abc'). 'b' would be the actual cell, 'a' a copy of the cell above, & 'c' a copy of the one below. This does not play havoc with the store needed, in fact it only multiplies it by 3/2; as each cell is duplicated 3 times, only one of which is changed, a simple update procedure on one matrix only protects the old generation from corruption, and duplicates the new generation, with each word accessed only twice. More about this later, now back to calculating the new generation.

We have a bit pattern of, say, 'abcdef ghij...' To calculate a new cell we need only find how many of the adjacent 8 are 1's. This is done with two reg.s and 32 words of indexed storage:

X	X*	operation
-vwxyz	abcdef-	calculate the sum of the 1st 4 bits for b
-wxyza	bcdefg-	SLL XX* 1, & transfer xyza to another reg, say B

now add to a reg. Q the value table1+B (see below), and shift Q left 2 bits.

-yzabc	defghi-	SLL XX* 2. we are now calculating the 2nd sum for y. zabc goes into B'.

repeat the algorithm above, & we know the address of the 2nd bits sum (see below). We now have:

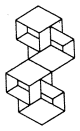
-bcdef | ghijklm-

and we can execute an algorithm for calculating the new cell (E'):

```
table1+B=3(ie Q⩾12):B':=0:E':=1
                    else:E':=0
table1+B=2(ie Q⩾8):
                 table2+B':E':=0
                    else:E':=E
table1+B=0(ie Q⩽4):B':=0:E':=E
                    else:E':=table2+B'
```

& loop. Table1 & table2 are as follows:

B,B'	table1	table2
0000	0	0
0001	0	2
0010	0	2
0011	2	0
0100	0	2
0101	2	0
0110	2	0
0111	3	0
1000	0	2
1001	2	0
1010	2	0
1011	3	0
1100	2	0
1101	3	0
1110	3	0
1111	0	0



E' is moved into a register, which is shifted left 3 bits (E=0 or 2 to get the position right), and after 8 E's have been calculated the reg. is superimposed on a word in store & a new word is put into X*

Advantages of this method include automatic toroidalization of the matrix sideways (although skew). After the whole new generation is calculated an update routine is executed. I can't find a way of combining the two operations as one of them scans row-by-row and the other column by-column. The method used is as follows:

. .

In order to toroidalize the matrix vertically, there is one spare row before it onto which the last row is copied, & one spare row after the matrix for the first row. Then, column-by-column, a word is loaded into a register (abcdefghi), masked to remove the old cells (-b--e--h-), right-shifted (--b--e--h), and CRed into another reg. containing (cc-cc-cc-), ie new cells extracted before. This word is stored in the previous row and then left shifted (cb-ce-ch-). The algorithm is repeated n+1 times for an n row matrix, with the update reg initially loaded with a word in row 0 (a 'spare' word).

I believe that this method of programming LIFE is the most efficient way (in PLAN at any rate), having done some calculations based on instruction time for a 1906. The program appears to be fairly concise: the main new generation loop, excluding new cell decision, will take up about thirty words, and the decision bit about 15, of which 5 are used on each cell. For the update routine, the main loop is 9 commands long. As to development, I have not completed the program in detail, and there will be a lot of debugging to do. Also, I am looking for ways of decreasing the matrix area to be worked on each generation. The simplest one would be to run counters for use in the update routine, indicating max &min words to scan. Unfortun ately, this won't work in the main routine as the bit order has to be conserved exactly. Any ideas,anyone?

O.Morgan,
The College,
Winchester.

LETTERS

WHITHER ?

In answer to the request after G.Simpson's letter last issue for ideas, here are some of mine;

QUESTIONAIRE

My ideas involve large scale member participation, so to weed out nonstarters some kind of census of members' depth of interest and spending habits etc. will be needed. This could be a tear-out form in the newsletter, each non-reply assumed to be from a member of passive tendencies.

BULK BUYING COMBINE

A basic system would be that individuals (not exclusively members ; the more the cheaper) send in a list of components, a postage container and more than enough money to pay for the parts and the service. The club buys what it can, puts the parts in the container with a cheque for the change and a breakdown of money sent, and posts it back.

This will involve a great deal of responsibility but I don't see any way round this for the system to be effective (any system will involve a lot of money).

Different people will be prepared to wait different lengths of time for their order to be filled. A maximum delay could be built into the system so that an order will not necessarily wait until 1000 units are wanted. Obviously the longer the maximum delay the larger the possible accumulated bulk order and so the cheaper the order. Equally obviously most orders will not have to wait for their maximum delay to get in on a fair size bulk order.

In any such system the users must implicitly trust the officers running the system, both with their money and in their (the officers') market judgement.

If legally simple it might be possible to charge service costs only to non-members and remove all running overheads from members' bills.

It is of course inconceivable that this computer club would implement the clerical work this system would require other than by computer. This suggests the possibility of consumer advice statistics on the performance and quality of service of the dealers dealt with (and even, through members' reports those not dealt directly with).

A SENSE OF PURPOSE

How about, mainly by reader participation, designing a class of machines which can start small & grow gradually, reusing all the components of the original and subsequent stages. Possibly, for variety and efficiency in different modes, the machines could be of variable architecture (like a Meccano set) either through software (virtual machine operation) or rewiring module connections. Between designing architecture, electronics and software, suggesting improvements in design, new lines of thought etc. comment and participation from all shades of interest should be attracted.

Which brings me to my last point, that the club's function is, and should continue, as the meeting place of like minds. To this end the letters section of the newsletter should be expanded.

I realise that this set of ideas will cost money, and that unless non-member component buyers can be made to show a sizeable profit, this money must come from subscriptions. I am a student (⇒poverty) but I don't think raising subscriptions to £3 a year will raise many moans.

R.H.Kirkby 12-2-75

CORE ▪ VDU

I have received a letter from Messrs Greenweld Electronics of 51 Shirley Rd.,Southampton, which states that they have (or had) available 8 core storage units type AW661.

These units are made by Mullard and consist of 50 planes of 64x64 bits in a temperature controlled cabinet. I have since ordered one of these devices, costing £20 + carriage + VAT and will forward any further details when available.

I also have an ex-BEA VDU (as advertised in Wireless World recently by Messrs Chiltmead Ltd.) So far I have only been able to determine the coding of the buttons. This is negative logic and conforms essentially to ASCII format except the following which are control buttons;

```
'M' = 60          'PAD' = 66
'F' = 61          'SBY' = 69
'C' = 62          'GOS' = 6A
'I' = 63          'BKD' = 6C
'INFO' = 28 (normally = '(' )
'CLEAR'= 82
'ACTION' = CO
'←' = 84 (normally = 5F)
```

The buttons 'X1','X2','X3' are not operative.

The pins of the plug are connected thus;

```
code MS bit   J
     LS bit   A
```

in the order J,H,F,E,D,C,B,A

Pins M & N are shorted when any button is depressed. Pin K is not used.

Pin c is the sync pulse input and pin d is the shield for the latter.

As yet I haven't fully unravelled the remaining circuitry.

I hope all the above will be useful to other members, also, if anyone has further information I would be grateful to hear from them.

C. Gill
50 Braybon Ave., Patcham
Brighton, Sussex

PERIPHERALS

I recently had to write an essay on microprocessors, so, what with that and the bias that my electronics degree places on the computer I think I must be hooked onto the idea of building my own machine. It is good to see these 'wee beasties' appearing in the ACCN.

I get the idea that you may be in a quandary about the club's direction. Myself, I enjoy both soft and hardware aspects. Several articles have appeared describing home-made machines, their assembly languages and so on. But what about the machines' link to the outside world ? in a word - peripherals !

During compilation of my essay I read of an American who had used ; a microprocessor as a CPU, a TV for read out, a cassette recorder for program loading, plus a small keyboard for entry. He happily played games and performed calculations on his domestic computer. Maybe the ACC has members who have converted household electronics to their computer systems. The aim of such articles would be to make a cheap (very,very cheap) system.

For the really keen hi-fi (= high finance) members (have we got any ??) there are several sophisticated peripheral devices eg the light pen, wire less keyboards, touch control keyboards, digital clock, a modified ball pen, ADC's DAC's, the remote control of domestic appliances, and even computer speech (both directions !!)

Myself, I am particularly interested in speech communication. I have no idea, save a whimsy of a glimmer, about the workings of the available speech recognition interfaces. Still it would be valuable to see members' ideas.

Presently I am designing a BASIC translator for a small (4K, 16 bit, 32 instruction) college built computer. The translator squeezes into half the store- apparently leaving lots of room for the BASIC program. The remaining store will be utilised by some low level bootstrap loaders & debugging programs, but since the BASIC I have proposed is a very limited subset, the restrictions of space in the store are not too confining. I would be interested to hear from members just how much they have crammed into machines of small storage. For example, what sort of useful and demonstrative programs can be performed with a 256 word, 8 bit store ? ... RAM's of 1 - 4K are reaching nicely low prices now.

To summarise ; we might like to encourage members' letters, ideas and articles on;

cheap peripherals
sophisticated peripherals
small store capability

Hoping my ideas will be useful to future ACCN issues.

S.L.Thompson

ADS

As a newcomer to the computer club perhaps I should not criticise any aspect of the organisation yet. But may I express my surprise at the lack of the 'all important' communication with the suppliers of the equipment likely to be used by the club members in their computing activities.

I thought perhaps that although a newsletter is, as its name implies,for the distribution of news, surely a page or even half a page of advertisements from manufacturers, at a low rate or possibly even at no cost would be appreciated by many of your members, especially those like myself who are interested in building a computer.

I am sure this could clear up your problem of software information and perhaps bring in some extra funds to the club.

S.A. Vaughan

SALE!

I have for disposal 16 4K memory planes in one stack, for which I would like £23.

G.Evans 15 Beaufort East,Bath BA1 6QD

CHEAP COMPONENT PURCHASING

One of our members has offered to organise a scheme for the purchasing of components at the reduced, high quantity prices.

Initially the service will be for SN74 TTL integrated circuits only, but if the response is good it can quickly be extended to include DTL, CMOS etc. and perhaps even discrete devices.

All you have to do is send your order , together with a cheque or PO for the approximate amount plus an allowance for postage to;

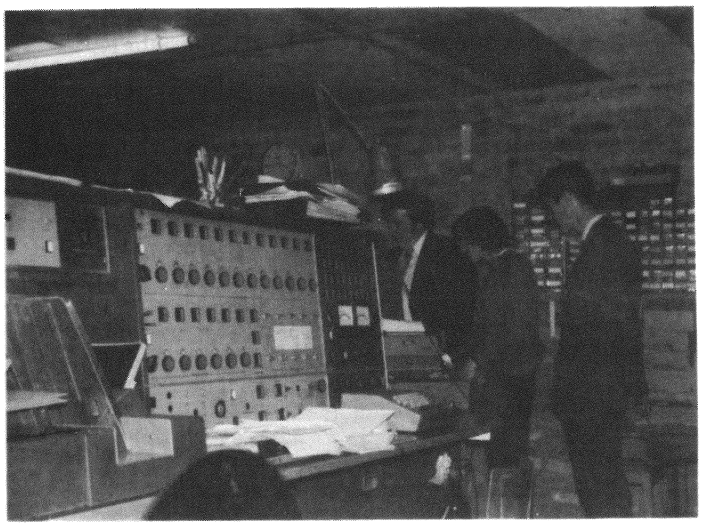
D.McLoughlin
5 Ashdowne Court
56 Lansdowne Rd.
Tottenham
LONDON N17

Any excess money will be credited to the orderer.

This service is for the exclusive use of members of the ACC and your reference number should be quoted in all correspondence.

ICT OLD RANGE

The Galdor Company's ICT 1301 being examined by ACC members during our visit last May.



the abc of computer buying

By Jonathan Aslett.
803B & 1500 Computer Centres, Huddersfield.

TRACKING A SYSTEM DOWN

For low price systems (under £500)most brokers are not interested but I can suggest three that should have information where cheap systems can be found:
Reliance Computer Brokers, Sheffield 79061;
Data Resales, Shirenewton 213.
Webster DP Services, 01 859 2919.

A more fruitful avenue that I have been using is to watch trade adverts in papers like Computer Weekly for companies seeking new staff for a new computer, a letter or telephone call not about the jobs but the old computer will usually reveal whats happening to the machine. This can achieve early notice of a computer becoming available.

Also if you know what computer system you want then look up all local users in the Computer Users Year Book and then write to them all to see if any are releasing equipment . (Might take a vast number of letters if you want a 360 or 370.)

But be warned go and look at the system on offer, check on power, air conditioning and similar service requirements. Check on how the equipment is to be removed and the weights of the various parts. Also check that the seller is including all the software required to run the machine and maintenance imformation to keep it working. Spares for any machine over 7 years old are very expensive, so it may be wise to purchase two machines one to run and one for spares. The way the computer is laid out on site may or may not be the smallest area it will fit into so use your loaf!

PRICE GUIDE TO SECOND HAND ELECTRONIC COMPUTER SYSTEMS

Note: The prices quoted are only a guide systems may be obtained for sums lower than those quoted but brokers may charge more.

SYSTEM	SIZE	CORE	TAPE	DISC	C	S	£
ICL							
1301	Huge	2-16K	x		x		50
1500	Medium	20K	x		x	x	500
803B	Small	4-8K	x			x	100
503	Medium	8K	x		x	x	500
4100	Medium	24K	x		x	x	700
LEO III	Huge	32K	x	x	x	x	100
KDF 9	Huge	32K	x	x	x	x	250
1901	Small	16K	CPU ONLY		x	x	200
1902	Medium	32K	CPU ONLY		x	x	500
1905	Large	64K	CPU ONLY		x	x	750
Digital							
PDP 8/	Small	8K			x	x	1000
IBM							
1401	Small	16K	x		x	x	1000
1440	Medium	40K	x		x	x	2000
1130	Medium	32K	x		x	x	5000
1800	Medium	32K	x	x	x	x	5000
360/20	Medium	32K	x		x	x	10000
360/30	Medium	32K	x	x	x	x	20000
HONEYWELL							
H200	Medium	32K	x		x	x	2000
NCR							
500	Medium	½K	x		x		500

KEY
Small=Should fit area 15x15 ft.
Medium=Should fit area 20x20 ft.
Large=Should fit area 25x25 ft.
Huge=Should fit area 35x35 ft. i.e.HUGE.
C=Commercial with software like cobol.
S=Scientific with software like fortran or basic.
Tape=Mag tape system included in price.
Disc=Disc system included in price.

INTEL CPU & RAM I/C

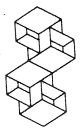
Are now available from Rapid Recall Ltd., 9 Betterton St., London WC2H 9BS

One off prices (w/o VAT) are;

C4004	4 bit CPU	£18.90
C4040	4 bit CPU	£23.75
C8008	8 bit CPU (20 uS)	£36.00
C8008-1	8 bit CPU (12.5 uS)	£47.00
C8080	8 bit CPU (2 uS)	£129.60
P1103A	1024x1 dynamic RAM	£6.48
C1402A	256x4 dynamic SR	£4.87
P2102	1024x1 static RAM	£4.92
P2111	256x4 static RAM	£6.92
C2107A-8	4096x1 dynamic RAM	£10.37

(memories shown are the slowest - and hence cheapest - of each type)

THE COST OF MAKING IT



How much to make a computer ? my estimate is as follows;

CPU

From £15 for a simple, serial, unit to say £250 for a fast 16 or 24 bit number cruncher.

MEMORY

Shift register storage is cheapest for a very small store (≤ 2K bits) - but gives you access times of the order of 200uS, which is tolerable for an amateur machine. 1403's (2 x 512 bit S/R are around £3.50 each.

For something a little larger the 4096 bit dynamic RAM's (eg. 2107A-8 ; see last ACCN) give much better access times at around £10 each.

If you don't want the complication of shift register or dynamic RAM stores then static RAM are now reasonably cheap, eg the 2102 (1024 x 1) at around £5.20 or for a small store the 2111 (256 x 4) at about £7 each.

Overall, allowing for support circuitry, you can allow from £12 for a 256x8 store using shift reg to say £180 for a 4Kx16 fast parallel store.

MISC

Control panel & mounting hardware, case and power supply will cost anything from £15 to £100.

PERIPHERALS

It is possible to play with a simple machine using only the control panel switches and lamps, but for any serious work an alphanumeric keyboard & printer are needed.

Cheepest is the CREED 7B teleprinter (£15 - £30) which will work but has a very limited character set and a non-standard (in computer terms) code.

Better teleprinters or the Friden Flexowriters will set you back £50 - £150 while the 'standard' computer peripheral the ASR33 (Teletype using 8 bit code with its own paper tape reader/punch) costs from £350 to £600.

If your machine has more than 4000 bytes, the standard teleprinter paper tape reader & punch are too slow and unreliable for saving & loading programs. One alternative is a faster (> 50 cps) reader & punch - from £50 each, or a standard cassette tape recorder can be interfaced to the machine for around £5 giving a transfer rate of around 100 bytes/sec.

British Amateur Electronics Club computer is now in the design stage. For details write to;
C.Bogod
'Dickens' 26 Forrest Rd
Penarth Glam.

ED'S BIT

So we've come to the end of the second year in the life of the ACC. During the past year membership has grown to 280, 6 issues of the newsletter have been produced with unfailing tardiness, and many members have benefitted from an excellent series of meeting arranged by Jon Aslett.

For the forthcoming year we've decided to keep the subscription at its current level and I would like to keep our Vol 2 figure of 6 issues. However huge increases in printing & postal charges do make this difficult and the matter will be raised at the AGM where it may be decided that members will be best served by reducing the number of issues somewhat.

A major factor in determining the number of issues we can produce is the number of members we have - the cost to the club per issue per member falls as the membership increases - so please do all you can to support the ACC's membership drive. Persuade your friends / enemies/teachers/students that their life is not complete without the ACC, and, most important, don't forget to renew your own subscription - forms are included with this issue.

This next year promises to be an interesting one for the computer nut. Advanced microprocessors are now coming onto the market and it can't be long before their prices drop to reasonable levels. More & better computer equipment is appearing on the 'surplus' market while the contest between bright school children and time sharing company's security systems is hotting up. We may even get the ACC records onto computer file !

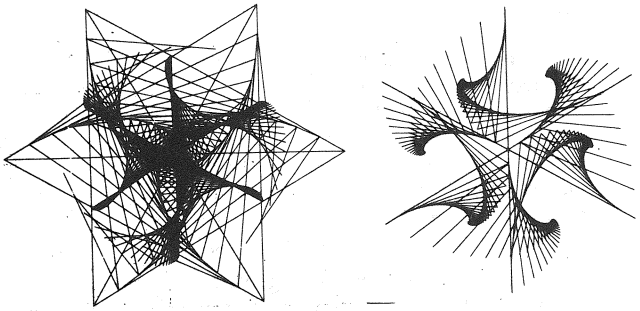
In the meantime, one of our members has offered to run a bulk-buying service for ACC members (see page 5). In the end the success of such a service will depend on the efficiency of the service and the trust placed by members in the person responsible. Anyway I wish the scheme luck.

Taking up an idea that has been floating around for some time - that of a 'communal' design of some piece of equipment - I have an idea I'd like to put forward. It is that we should, through the newsletter, design a very basic (cheap) stored program computer. A simple slow 8 bit machine would cost around £40 - £50 (without peripherals) and should (I think) be capable of;

- being used to demonstrate hardware & software principles.
- interfacing with a numeric keyboard and oscilloscope (used as a VDU) as a 4 function calculator or simple graphic display.
- being programmed to act as a code converter & controller to interface, say, a CREED 7B to an 8 bit ASCII data line.
- playing simple games (NIM)
- being expanded by the addition of more memory & peripherals.

Comments ?

mike lord



R J Baker

HUDDERSFIELD 1500

Jon Aslett, Secretary of the ACC and well-known lover of Elliot 803 systems, has now obtained an ICL 1500 for his Huddersfield Computer Centre.

The ICL 1500 is a medium scale commercial and scientific machine made in 1966 by RCA and sold by ICT (now ICL).

It is a 7 bit character machine, and uses a magnetic tape based operating & programming system. Time sharing of up to 2 (!) input/output functions is made possible by simultaneous mode control logic. Store cycle time is 7uS (for two characters) and the instruction cycle time is 35uS. Original cost was £150K.

Software available includes FORTRAN, FAS, COBOL, RPG, PERT, SORT 31 & PLT

CHEAPER KITS

Rapid Recall (see page 6) also sell the microprocessor kits mentioned in the last issue of the ACCN. Prices are now;

MCS-4 kit A	£48.25 + VAT
MCS-40 kit A*	£54.00 + VAT
MCS-8 kit A	£130 + VAT
MCS-80 kit A	£249 + VAT
MCS-80 kit B	£198 + VAT

*similar to MCS-4 kit A but with the 4040 CPU

2ND 8008

An 8 bit CPU, equivalent to INTEL's 8008, is now made by Microsystems International and distributed through Semiconductor Specialists (UK) Ltd., Premier House, Fairfield Rd.,Yiewsley, Middlesex.

One off prices (w/o VAT) are;

MF8008R (20 uS typical cycle) £27.00
MF8008-1R (12.5 uS typ. cycle) £33.75

SUPER MOON LANDER

Dear Mr. Lord

Some time ago I visited UMIST (University of Manchester Institute of Science & Technology) and was able to look at the various departments. Of interest to me was the Computing facilities, and by subtle persuasion managed to obtain the "Moon Lander" program, enclosed. This is a computer game in which you have to try to land a 'rocket' on the moon.
I have not had time (and computer facilities aren't particularly easy to come by either) to operate the program myself, although I saw it working at UMIST, so I decidee to pass it on to you as perhaps you, or someone you know, may be able to get it operational.

It is written in algol and some notes are added for your help & guidance. The program may have to be modified to suit the computer & peripherals being used, but I will leave this to the future programmer.

A lot of the program is unnecessary and is just to make it 'General Public Proof'.

Another good book I can recommend is; 'Computer Science - a first course' by Forsythe, Keenan, Organick & Stenberg published by John Wiley & Sons.

This teaches the student how to develop simple algorithms & flowcharts and has some interesting information on list & string processing and on the various simplified aspects of compiling.

P.D.Maddison

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Anyone wanting to borrow the program please drop me a line.
M.Lord *****

1103 BUGS

In their realease publicity for their new version of the 1103, ITT Semiconductors have identified the following problems with older designs;

- a tendency for repeated operations on one column to discharge an unaddresses '1' in that column.

- critical timing relationships between the precharge & chip enable clocks.

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