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PROGRAM POWER PROGRAM POWER

Contents

Editorial

Well, here it is again, the good old Editorial, guaranteed to bore, so I'll keep it short.

I have only had a couple of letters since the last issue of the magazine, that's why there is no letter or errata page in this issue. One of these letters came from Dove Computer Services, congratulating us on becoming the official Nascom Newsletter, and also offering a 5% discount on their products providing that their advert is included with the order. Many thanks, may it be the first of many such offers.

In the next magazine I hope to have another contribution from Nascom and also details of a 32-sprite, full-colour graphics system, stereo sound, AD converter, battery-backed CMOS memory, Z80 CTC, and real-time clock (all on one board), all for under £100!!! Watch this space.

Editor - Ian J Clemmett

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A Nascom Disassembler

by M. Reed

This series of articles sets out to show you how to write a Z80 disassembler for your Nascom. I wrote mine using a NII with Nas-Sys 1 but I do not see different monitors will make any difference, so long as you know your machine. These articles make extensive use of the algorithm in Tony Baker's excellent book "Mastering Machine Code On Your ZX81". Indeed, it was from this book that I wrote my disassembler. The final program, which also includes the option of 'Single Stepping' through a disassembled program, should occupy less than 1800 (decimal) bytes.

It is essential to fully understand the monitor of the Nascom before launching yourself into a task of such mammoth dimensions. My disassembler, named 'The Beast' (and also many unrepeatable words), took 6 weeks to write and involved most of my time during that period. I was at home all day!! I had just finished my A'Levels and was looking for some light relief. Do not despair if you have to scrap your disassembler and start again. Mine is version 3, and each version is always a great improvement on its predecessor!!

This first article will set up the program and start the very beginnings of your disassembler.

The program uses certain variables which must be stored somewhere. Some can be saved in the Z80s very useful alternate set of registers (ie BC', HL' etc). The rest will have to be stored in RAM. One important point to note is the corruption of variables by subroutines, especially those in the alternate registers. So take suitable precautions with your subroutines. None of the Nas-Sys 1 routines I used interfered with the alternate set. But do be careful.

One particular variable that requires some fore thought is that of STRDIS. That is the variable that holds the string of characters that make up the disassembled instruction. This will be printed using Nas-Sys, and so must be stored as a string of ASCII codes.

A method of marking the end of STRDIS must be used or some pointer system. The marker or pointer will have to be easily changed by any part of the disassembler needing to change STRDIS. I used £FF (£ will always represent base 16 or hex) as a marker. The reason for the marker is that the length of STRDIS is unknown. It can vary from, for example, CP B to LD HL,(£1000). So be aware of STRDIS's needs, and make it the last variable in a table, so that it can grab all the RAM it needs!!!

Looking at the bit patterns for the Z80 instruction set (they are nicely tabulated in your Nascom manual ... towards the back), you will notice that many groups of instructions use the middle three bits to represent a register, condition, arithmetic operation, or a number from 0 to 7 (for the bitwise operations)[r, c, a & n respectively].

Bits	r	c	n	a
000	B	NZ	0	ADD A
001	C	Z	1	ADC
010	D	NC	2	SUB
011	E	C	3	SBC A
100	H	PO	4	AND
101	L	PE	5	XOR
110	INDIS	P	6	OR
111	A	M	7	CP

INDIS represents an index register HL, IX or IY (and the displacement if necessary). A similar system operates with register pairs.

Bits	ss	dd
00	BC	BC
01	DE	DE
10	IND	IND
11	SP	AF

Where IND represents one of the index registers (HL, IX, IY) but with no displacements. Make sure that you understand this, because basically disassembley is analysis of bit patterns. I did not, and wrote a disassembler so complex even I could not make head nor tail of it!! These tables will have to go into tables in the computer as they are crucial. You will have to define a character to represent INDIS and IND as we don't yet know which of the index registers to output!! Remember these as if they were arrays, eg. r(0) - r(7) etc.

The disassembler is going to need one vital piece of information before it starts. Elementary - where to start from. This can easily be done using the Nas-Sys routine ARGS. Load this disassembly address into BC' (the alternate registers are identified by '). This piece of your program is the first encountered on a run and is not used again. From now on the disassembley address is always in BC'. It must be the first byte of an instruction or else there will be havoc!! Next thing to do is to set STRDIS to an empty string.

Now there are two more variables - held also in the alternate registers (use D' and E') - to be initialised. Call one INDEX, the print routine will require this. The other call TYPE and this holds information as to whether the instruction began with £CB, £ED or neither. Set both these to zero. Take a deep breath and begin!!!

BC' must be saved somewhere in RAM. I leave its actual position up to you, call it BCSAVE. Do not get this variable corrupted!!

If you remember, when an IX or IY are used with a displacement, the displacement is always the third byte of an instruction. BC' will get altered but the print routine will still need to know this third byte. Get a copy of the first byte of the op-code into the A register. Do not alter BC' - its useful life is not over yet.

This part will test your knowledge of Z80 shifts and other bit-wise operations. Split A into 3 parts F, G and H (not to be confused with the actual register H). These variables must be stored in memory.

F holds bits 7 (MSB) and 6
G " " 5, 4 and 3 [Remember r(0) etc]
H " " 1, 2 and 0 (LSB)

If the byte was £4F -> 01 001 111 then F would be 1 (Not 64), G would be 1 (Not 4) and H would be 7. Got it? Easy wasn't it? Now to do something similar to G. G goes into two parts called J and K (held in RAM). J consists of bits 2 and 1 of G, while K is just bit 0. For the example above ... J=0 and K=1. All these variables must be put somewhere safe. I keep emphasising this because I kept corrupting my variables and caused all sorts of things to happen!!

The next part is fundamental to the program. The print-out routine. Call it PRDIS, print the disassembled string. I will define it, but you can write it.

(1) No registers or variables may be altered (corrupted). You must save them first (stack?) and restore them later.

(2) The routine is a subroutine, and as such must end with a £C9 RET instruction.

(3) Every INDIS in STRDIS is to be output as HL, IX+d or IY+d. Where d is the displacement (BCSAVE is used here). INDEX will hold 0, 1 or 2 respectively.

(4) For every IND, print HL, IX or IY, depending on the contents of INDEX, as in (3)

(5) If you wish you can print the contents of BCSAVE, this will tell you which location in memory the instruction came from. Nas-Sys is helpful here.

Check your subroutine with dummy data to test it.

Well, all I can say now is best of luck and be careful with those variables. The second part of this series will follow in the next issue.

Corn Corner (a cereal)

by Cresby

The best definition of an optimist I had was someone who writes programs in ink. However, since the last full stop I will accept alternatives for 'program' such as articles, jokes, etc. (I had a joke somewhere when I started all this). Well, that's it then, no joke, no schpeel. Unless, of course, there are any wild and wooly chestnuts just oozing off your screens, if so; out with your NASPENCILS and WORDEASELS, or charcoal sticks and don't hide your lampoon under a NASBUS.

Our Editor (feign, fawn, bow, scrape, smirk - oops, what a give-away) says that what we need is feedback from readers, so, plastered about this issue (issue is or issue ain't) you should find a few corns; tread carefully, they may be mine. Now you can do better than those can't you? Well of course you can, so lets hear them. To make me smile they must be short, ambiguous with any amount of political subtlety (if you'll pardon the contradiction). However, they must be vaguely electronic, not refer to PITS or FLAT NBG80K's without copious asterisks, and not liable to libel.
For instance: 'Feedback makes me sick' and while you are digesting that, howsabout 'Parallel digital processing - both hands'.

Commercial examples of humour do exist - anyone remember Mike Rose? (would I invent him?), while for those whose discs are a status symbol need Q-DOS and any day now I am expecting a golf program called NASTEE. Until, dear readers, one of you can better the pun, I shall refer to these as IN jokes (value measured in DB's of course). As the corn is grinding to a halt, instead of flowering, perhaps I should leave you with an anecdote about a colleague we shall recognise by the misnomer - our man Ager.

Whilst debugging the mechanics of a system he was reading out the CPU registers. Much to his credit, this man Ager waited patiently for the right moment to exclaim 'There's OF in L'; was my man ever so plussed? All I could manage was a half-thrust, cross-parry without whip like: 'A bit OE'. Rotherham was proud of him that day but too ashamed of him otherwise to admit it.

Finally, I am forming a personal collection of Pig jokes, please contribute generously. What? Well, its a long story but if I told you the P.M. of N.Z. was effectionately known as Piggy Muldoon, you are knocking on for experts in Kiwi politics.

Lets hear it for the joke party, remember, much is groan from A corn. Keep 'em klean.

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ScreenCopy

by B. Johannessen

After reading an article in Computing Today written by Don Thomasson, I got an idea to write a program which can copy the contents of the Nascom screen directly to an Epson MX80 F/T type 2 printer by means of 'Bit Image Mode'.

Graphics and alphanumerics are directly transferred and you can choose between black on white or white on black.

The usual MX80 F/T type 1 may only be used if it is equipped with GRAFTAX. The GRAFTAX may need some other initialisation.

The first thing to be done is to place a copy of the Nascom CHARACTER and NAS-GRA EPROMs into the Nascoms memory space. In my case it resides from 9000H to 9FFFH.

The main program resides in ROM from A000H . To start the copy I have used the L command in Nas-sys and altered it to point to A000H and if I add an 'F' as ARG1, the copy will be inverted. The program can also be called from BASIC with a USR routine call to A003H.

The problem I had in writing the program was that the Nascom characters have 16 lines and the printer only has 8 needles in 'bit image mode'. The printer has to go 2 lines for each Nascom line so I had to use a buffer to store the 'bit image' of one Nascom line before it is sent to the printer.

The program contains its own printer routine since my usual routine rejects Linefeed code 0AH.

ZEAP Z80 Assembler - Source Listing

```
0000                0010          ORG   0
                    0020 ;
                    0030 ; ************************
                    0040 ;  SCREENCOPY FOR NASCOM
                    0050 ; ************************
                    0060 ;
                    0070 ; for the Epson MX80 F/T type II
                    0080 ;
                    0090 ; by Bjorn Johannesson
                    0100 ;   August 14, 1982
                    0110 ;
0000 0C0B           0120 ARGN    EQU   £0C0B
0000 0C0C           0130 ARG1    EQU   £0C0C
0000 0C0E           0140 ARG2    EQU   £0C0E
0000 0028           0150 PRS     EQU   £28
                    0160 ;
0000 001B           0170 ESC     EQU   £1B
0000 000D           0180 CR      EQU   £0D
0000 000A           0190 LF      EQU   £0A
0000 0017           0200 CH      EQU   £17
```

```
0000 0013      0210 CUU     EQU  £13
0000 0020      0220 SPA     EQU  £20
0000 9000      0230 CHRGEN  EQU  £9000 ;Copy of NASCHAR+NASGRA
               0240 ;
0000 B000      0250 INVERT  EQU  £8000 ;Start of workspace
0000 B001      0260 RETURN  EQU  INVERT+1
0000 B002      0270 CHRBUF  EQU  INVERT+2
               0280 ;
               0290 ; **Printer Ports**
0000 0004      0300 ADATA   EQU  £04
0000 0005      0310 BDATA   EQU  £05
0000 0006      0320 ACTRL   EQU  £06
0000 0007      0330 BCTRL   EQU  £07
               0340 ;
A000           0350         ORG  £A000
               0360 ;
A000 CD2BA1    0370 SCRPR   CALL CLEAR ;Clear command off scree
A003 C5        0380         PUSH BC    ;Save all registers
A004 D5        0390         PUSH DE
A005 E5        0400         PUSH HL
A006 F5        0410         PUSH AF
A007 DDE5      0420         PUSH IX
A009 3EC9      0430         LD   A,£C9 ;A RET instruction
A00B 320180    0440         LD   (RETURN),A ;Load to RAM
A00E CD13A1    0450         CALL INTEST ;Test command
A011 CDECA0    0460         CALL PRINIT ;Initiate printer
A014 DD21CA0B  0470         LD   IX,£0BCA ;Screen start
               0480 ;
               0490 ; **Set 8/72" linespacing
A018 3E1B      0500         LD   A,ESC
A01A CDFFA0    0510         CALL PRINT
A01D 3E41      0520         LD   A,"A
A01F CDFFA0    0530         CALL PRINT
A022 3E08      0540         LD   A,8
A024 CDFFA0    0550         CALL PRINT
               0560 ;
A027 0E30      0570 NLIN    LD   C,48 ;Characters per line
A029 37        0580         SCF
A02A 3F        0590         CCF  ;Reset carry flag
A02B 1102B0    0600 START   LD   DE,CHRBUF ;Point to buffer
               0610 ;
A02E 210090    0620 ST1     LD   HL,CHRGEN ;Point to NASCHAR+GR
A031 DD7E00    0630 ST2     LD   A,(IX) ;Put character in A
A034 DD23      0640         INC  IX     ;Point to next characte
A036 D5        0650         PUSH DE     ;Save DE
A037 5F        0660         LD   E,A    ;Multiply by 16
A038 1600      0670         LD   D,0
A03A CB13      0680         RL   E
A03C CB12      0690         RL   D
A03E CB13      0700         RL   E
A040 CB12      0710         RL   D
A042 CB13      0720         RL   E
A044 CB12      0730         RL   D
A046 CB13      0740         RL   E
A048 CB12      0750         RL   D
A04A 19        0760         ADD  HL,DE ;Calculate position ROM
A04B D1        0770         POP  DE
A04C 0610      0780         LD   B,16
```

```
                0790 ;
                0800 ; **Put bit image of character in buffer
A04E 7E         0810 BUFF   LD   A,(HL)
A04F 12         0820        LD   (DE),A
A050 23         0830        INC  HL
A051 13         0840        INC  DE
A052 10FA       0850        DJNZ BUFF
                0860 ;
A054 0D         0870        DEC  C ;Decrease character count
A055 79         0880        LD   A,C
A056 B7         0890        OR   A :Is it the 48th character?
A057 20D5       0900        JR   NZ,ST1 :If not go back for nex
A059 CDA7A0     0910        CALL SKRIV :Print one line
A05C CD9EA0     0920        CALL INCIX :Point IX to next line
                0930 ;
                0940 ; **Test for end of screen
A05F DDE5       0950        PUSH IX
A061 E1         0960        POP  HL
A062 7C         0970        LD   A,H
A063 FE0C       0980        CP   £0C
A065 280B       0990        JR   Z,CONT
A067 FE08       1000        CP   £0B
A069 20BC       1010        JR   NZ,NLIN
A06B 7D         1020        LD   A,L
A06C FECA       1030        CP   £CA
A06E 20B7       1040        JR   NZ,NLIN
A070 1806       1050        JR   EXIT
                1060 ;
A072 DD210A08   1070 CONT   LD   IX,£080A
A076 18AF       1080        JR   NLIN
                1090 ;
                1100 ; **Reset line spacing and exit
A078 3E1B       1110 EXIT   LD   A,ESC
A07A CDFFA0     1120        CALL PRINT
A07D 3E32       1130        LD   A,"2
A07F CDFFA0     1140        CALL PRINT
A082 DDE1       1150        POP  IX
A084 F1         1160        POP  AF
A085 E1         1170        POP  HL
A086 D1         1180        POP  DE
A087 C1         1190        POP  BC
A088 C9         1200        RET
                1210 ;
                1220 ;
                1230 ;
                1240 ; **Set printer for Normal bit image mode
A089 3E1B       1250 PINIT  LD   A,ESC
A08B CDFFA0     1260        CALL PRINT
A08E 3E4B       1270        LD   A,"K
A090 CDFFA0     1280        CALL PRINT
A093 3E80       1290        LD   A,£80
A095 CDFFA0     1300        CALL PRINT
A098 3E01       1310        LD   A,1
A09A CDFFA0     1320        CALL PRINT
A09D C9         1330        RET
                1340 ;
                1350 ;
                1360 ; **Increase IX by 16
A09E C5         1370 INCIX  PUSH BC
```

```
A09F 0610       1380          LD   B,16
A0A1 DD23       1390 INC1     INC  IX
A0A3 10FC       1400          DJNZ INC1
A0A5 C1         1410          POP  BC
A0A6 C9         1420          RET
                1430 ;
                1440 ;
                1450 ; **Print one line from buffer
A0A7 210280     1460 SKRIV    LD   HL,CHRBUF ;Point to first 8 bi
A0AA CDB0A0     1470          CALL SKR
A0AD 210A80     1480          LD   HL,CHRBUF+8 ;Point to lower 8
A0B0 CD89A0     1490 SKR      CALL PINIT ;Initiate printer/line
A0B3 0630       1500          LD   B,48  ;48 characters
                1510 ;
                1520 ; **Convert bits from horizontal
                1530 ; ** to vertical
A0B5 C5         1540 SKR1     PUSH BC
A0B6 0608       1550          LD   B,8
A0B8 C5         1560 J4       PUSH BC
A0B9 0608       1570          LD   B,8
A0BB CB16       1580 J5       RL   (HL)
A0BD 17         1590          RLA
A0BE 23         1600          INC  HL
A0BF 10FA       1610          DJNZ J5
                1620 ;
A0C1 CD0080     1630          CALL INVERT ;NOP or CPL
                1640 ;
A0C4 CDFFA0     1650          CALL PRINT ;Print it
A0C7 C1         1660          POP  BC
A0C8 CDE4A0     1670          CALL HLDEC ;Speaks for itself
A0CB 10EB       1680          DJNZ J4    ;Continue for all bits
A0CD CDDCA0     1690          CALL HLINC
A0D0 CDDCA0     1700          CALL HLINC
A0D3 C1         1710          POP  BC
A0D4 10DF       1720          DJNZ SKR1 ;Continue for all chars
A0D6 3E0D       1730          LD   A,CR ;Newline
A0D8 CDFFA0     1740          CALL PRINT
A0DB C9         1750          RET
                1760 ;
                1770 ; **Increase HL 8 times
A0DC C5         1780 HLINC    PUSH BC
A0DD 0608       1790          LD   B,8
A0DF 23         1800 HLI      INC  HL
A0E0 10FD       1810          DJNZ HLI
A0E2 C1         1820          POP  BC
A0E3 C9         1830          RET
                1840 ;
                1850 ; **Decrease HL 8 times
A0E4 C5         1860 HLDEC    PUSH BC
A0E5 0608       1870          LD   B,8
A0E7 2B         1880 HLD      DEC  HL
A0E8 10FD       1890          DJNZ HLD
A0EA C1         1900          POP  BC
A0EB C9         1910          RET
                1920 ;
                1930 ; **Set PIO for printer
A0EC 3ECF       1940 PRINIT   LD   A,ECF
A0EE D306       1950          OUT  (ACTRL),A
A0F0 AF         1960          XOR  A
```

```
A0F1 D306       1970          OUT   (ACTRL),A
A0F3 3ECF       1980          LD    A,ECF
A0F5 D307       1990          OUT   (BCTRL),A
A0F7 3E01       2000          LD    A,1
A0F9 D307       2010          OUT   (BCTRL),A
A0FB 3C         2020          INC   A
A0FC D305       2030          OUT   (BDATA),A
A0FE C9         2040          RET
                2050 ;
                2060 ; **Output directly to printer
A0FF F5         2070 PRINT    PUSH AF
A100 DB05       2080 TEST     IN    A,(BDATA)
A102 CB47       2090          BIT   0,A
A104 20FA       2100          JR    NZ,TEST
A106 F1         2110          POP   AF
A107 F5         2120          PUSH  AF
A108 D304       2130          OUT   (ADATA),A
A10A AF         2140          XOR   A
A10B D305       2150          OUT   (BDATA),A
A10D 3E02       2160          LD    A,2
A10F D305       2170          OUT   (BDATA),A
A111 F1         2180          POP   AF
A112 C9         2190          RET
                2200 ;
                2210 ; **Test command for arguments
A113 3A0B0C     2220 INTEST   LD    A,(ARGN)
A116 B7         2230          OR    A ;Are there any arguments?
A117 2005       2240          JR    NZ,TEST1 ;If yes, then jump
A119 AF         2250 NONINV   XOR   A
A11A 320080     2260          LD    (INVERT),A ;NOT inverting
A11D C9         2270          RET
                2280 ;
A11E 3A0C0C     2290 TEST1    LD    A,(ARG1)
A121 FE0F       2300          CP    E0F ;Is it an E0F?
A123 20F4       2310          JR    NZ,NONINV ;Jump if not
A125 3E2F       2320          LD    A,E2F ;Code for CPL
A127 320080     2330          LD    (INVERT),A ;Set inverting mode
A12A C9         2340          RET
                2350 ;
                2360 ; **Reset command
A12B F5         2370 CLEAR    PUSH AF
A12C EF         2380          RST   PRS
A12D 13172020   2390          DEFB CUU,CH,SPA,SPA,CH,0
     1700
A133 F1         2400          POP   AF
A134 C9         2410          RET
                2420 ;
                2430 ; **END
```

The "How to fit 64K of EPROM" to your Nascom Mods & "How to Page It"

by Paul Anderson

By special request (and much pestering after seeing my system - sorry chaps) I will proceed to enlighten those of you that asked for details of how it's done - it is in fact quite easy to do and forms the basis of a very flexible system especially when using 64k of RAM , however I modified my system so that I always had a full 48k of RAM available - this of course meant that all firmware must reside between D000 and FFFF - which by the by means that all software needs to be relocated ..... After many hours I have produced source listing for most of the software and ended up as follows....

Page 1 contains ZEAP , NAS DIS , DEBUG , NAS PEN and optionally DCS DOS / NAS DOS / nothing.

Page 2 contains general utilities and other debugging aids. (not yet full)

Page 3 contains BLS PASCAL and NAS DOS at the wrong address which I load to the correct address when needed.

Page 4 contains BASIC (8k ROM) and a miscellanious mass of TOOLKITS and BASIC EXTENSIONS.

Page switching is very easy and consists of outputting to Port FF the page number which incidently are NOT 1, 2, 3, 4 - but 0 to disable the card and 1, 3, 5, 7 for each of the pages. This provides the simplest modifications with maximum flexibility.

Now to the "Nitty Gritty" - the mods are in two parts, firstly to allow the fitting of 4k EPROMs, and secondly to provide the switching under software control.

MODIFICATION TO FIT 2732 EPROMS

Ready - REMOVE all capacitors which are situated along side the EPROM sockets and with the following numbers 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58. This frees the highest address line (which normally goes to the +5v suppy).

With reference to fig 1 wire each of the link blocks as shown, each one being wired the same way. Identify the track plate through hole near IC8 and link it to the right-hand centre pin of all the link blocks. This provides the new highest order address line.

Selection of address blocks is just as before except that each block is now 16k long (not 4/8k). If for any reason you decide to start a block on an odd numbered address (ie B000) then the address locations of each EPROM in the block will not

be quite as expected - each EPROM location within a block will remain at an address relative to a 16k block address. ie. a typical 16k block would be C000 D000 E000 and F000 for posiions 1 2 3 4 respectively if however the block address started at B000 then they would run as follows for 1 2 3 4 - D000 E000 F000 and then B000 respectively - does that make sense.

I think that is all you need to know with regard to addressing - except that it is quite O.K. to only access part of a page without any side effects.

MODIFICATIONS TO PROVIDE SOFTWARE PAGING

First the bad news - you will need to buy a CMOS IC type MC4053 or CD4053 or similar (about 50p) and, if you haven't got one fitted, a 24-way dil plug to save B.....g oops, messing up the address selection dil socket.

With reference to Fig 2 - STICK the IC with its legs SKYWARD so that pin 1 of the IC is next to pin 24 of the dil plug. Pins 1, 4, 6, 7, & 8 can the be (bent) straight and soldered directly to the dil plug as shown. The remainder of the connections can then be made - I would suggest using THIN single stranded wire for this job as there is NOT A LOT ROOM and solder bridges can occur all too easily. Then wire pins 9 & 10 to IC32 pins 15 & 7 respectively these wires pick up the latched addresses from the FF port bits 2 & 3 (bit 1 turns ON or OFF the card - hence the odd page address). Finally connect pin 16 of your I.C. to +5v which is conveniently available on the link blocks and is shown in fig 1. When using 2732 it is essential to use WAIT STATES as very few if any are fast enough to go at 4 MHz without, I have therefore shown the link fitted.

That's it folks it should all happen by typing 0 FF 03 to select page (2) 03 etc. and remember pressing reset will select page (1) 01. Selecting new pages will CRASH the computer if any $UIN or $UOUT jumps are operating so type N FIRST to disable them otherwise you will have to do a RESET anyway and you also risk SCRIBBLING UPON YOUR PROGRAMS, if in doubt press RESET and reselect your page.

FINAL NOTES

In my own system and that shown 8k of EPROM on page (4) 07 has been replaced by the BASIC ROM (link to R on the dil plug) this can be altered simply by moving that wire link to the apropriate bank select. With a little ingenuity or another BIT A LOGIC the additional EPROM locations could be paged in or put at another address. If all this paging is getting complicated "Why not write a MENU program to select the pages and start the progs for you and load them into RAM when and if required" - I did and it took 1k to do it all!!!!!!!!!.

EPROM CARD MODIFICATIONS

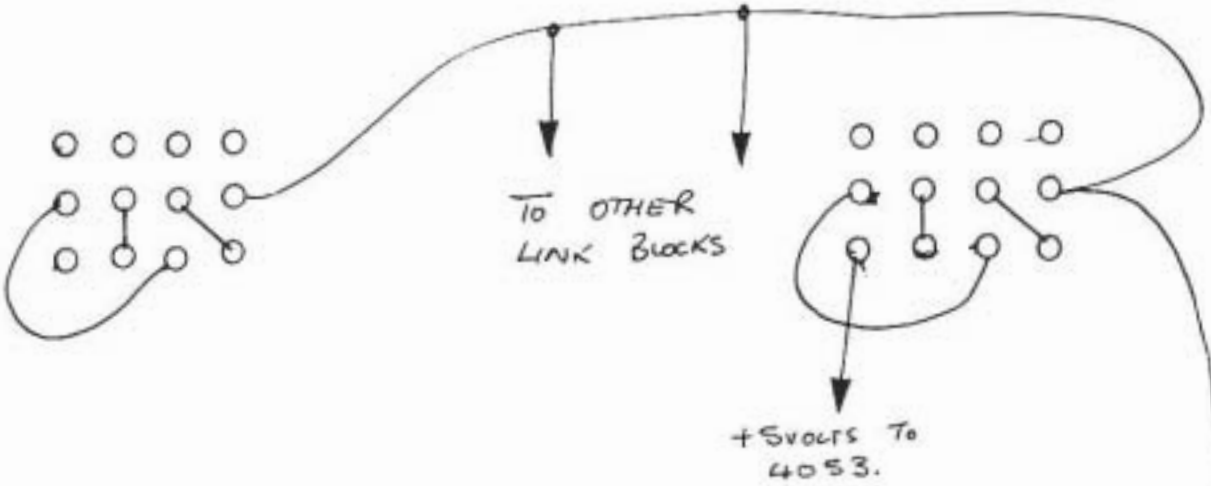
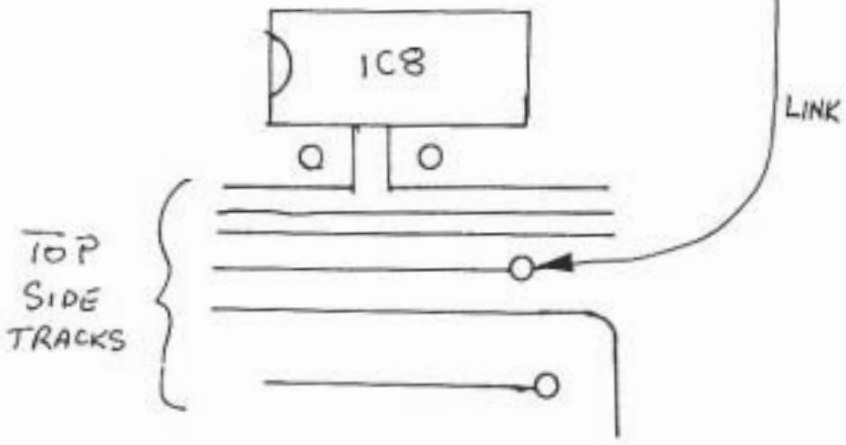
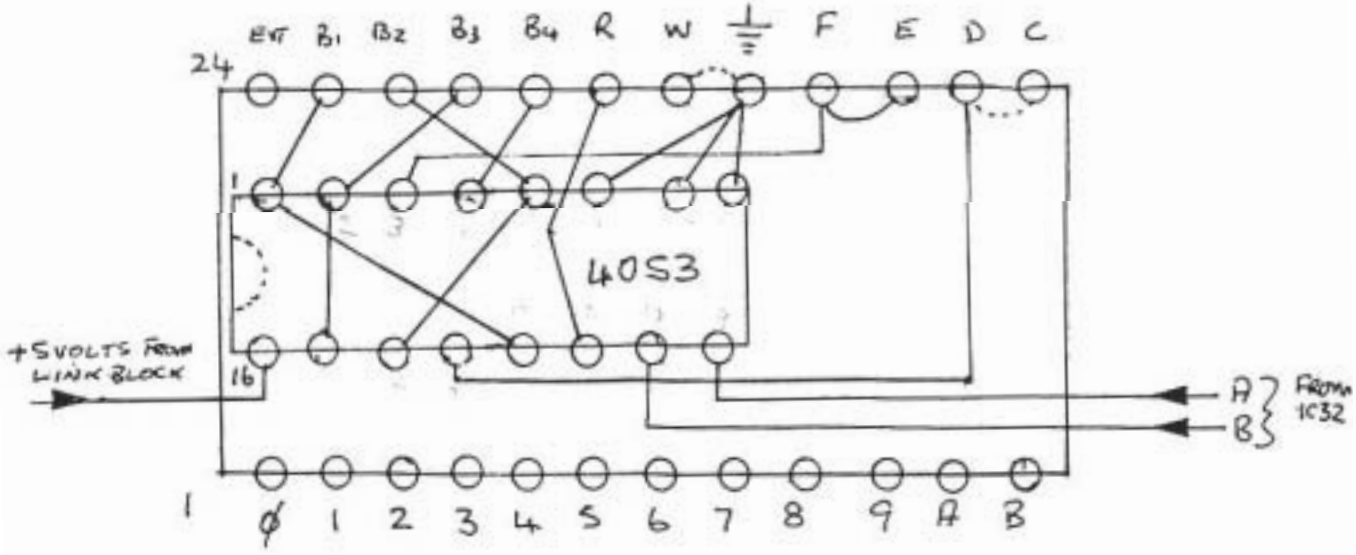


FIG 1

TOP VIEW OF P.C.B SHOWING FITTING OF NECESSARY LINKS





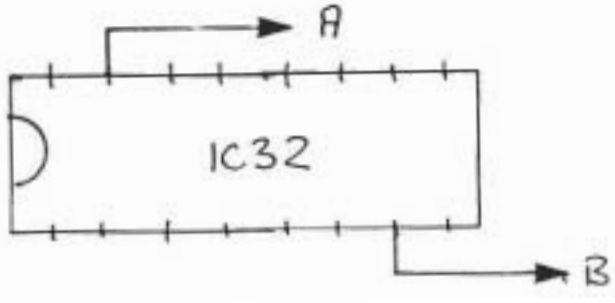


FIG 2

CONNECTION OF HEADER BLOCK TO 4053

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3) Micro Power Ltd. reserve the rights to publish any of the designs tendered at the appropriate contributors fee.
4) The judges' decision is final.
5) No correspondance will be entered into.
6) The employees of Micro Power and Microcode are ineligible.
7) The results of the competition will be announced in the Nascom Newsletter magazine.
8) Commercially marketed designs or designs for which marketing contracts already exist are not acceptable.
9) No further rights, conditions or agreements other than these rules may be accepted with any entry.

The Poor Man's Disc, part 2
or, a Review of IKON's "Hobbit", a Mini-Digital Cassette system for Nascoms

by Les Pickstock.

Unable to afford the divorce that would accompany the purchase of a floppy disk system I had for a year or more been looking for a superior alternative to the normal tape system of the NASCOM. I was not after speed so much (I'm fairly content with the 2400 baud/zero errors I get with the Cottis/Blandford tape interface on my N-1) as software control of read/write, named programs and files and above all the ability to have true file-handling with the standard ROM BASIC.

The Philips Mini-Digital Cassette Recorder had caught my eye a few times and seemed to offer great potential. It has a transfer speed of 6000 baud, uses digitally-certified mini-cassettes, is about 4ins cube in size and has a very good name in industry for reliability and low error rates (the irrecoverable error rate is quoted as 1 in 10 to the power 9- a thousand times better than floppy discs!).

The only company that originally produced a full working system seemed to be Currah, but only for 6502 based systems. The basic cost of just the Mini-DCR was about £90, but this needed an interface and control software. I felt rather daunted by this task and so for a while gave up the idea, using various software patches to try and overcome the inherent drawbacks of the standard tape system.

Then almost simultaneously two Mini-DCR systems appeared for the NASCOM. One by C.I.E.L. of Edinburgh, the other by Grange Electronics of Nimhorne in Dorset. Both appeared to be fairly close to what I was after except for two things;

1) price- they're both about £200
2) neither have file-handling extensions for BASIC, just the ability to store named programs.

Then about two months ago an advert appeared in PCW offering a system for Nascoms for an incredible £99 plus Maggie's bit. So after ringing the firm, IKON COMPUTER PRODUCTS and speaking to a very friendly Dave Tucker, the owner, I ordered one.

What you get for the money is a Mini-DCR wired to a very simple 1-chip-and-a-few-resistors interface, 2 2708's with the control software and a cassette. Also a small but adequate instruction manual. A case is available as an extra, though as far as I know it will only take one drive. Connexion (British Telecom standard spelling-Honest!) is very simple. It requires 120mA @ +12v and 10mA @ +5v, so can easily be driven by any existing PSU. Control is via one port of the PIO. Two DCRs can

be connected, the second using the other port. The standard EPROMs are addressed at D000, though other addresses can be supplied. If you're running at 4Meg a wait state has to be inserted.

To enter the HOBBIT MONITOR, as its called, type ED000 x y, where x is a 1 for T2, T4 or T-Bug, or 0 for Nas-Sys, and y is 1 for 2Meg and 0 for 4Meg clock speeds. So all monitors are supported. On execution HOBBIT tests the extent of RAM and takes the top 1.5K for its buffer and tape directory (or 3K for 2 drives). So if BASIC is initialised ensure you answer its "SIZE" question and don't just press NewLine, or the directory and buffer will be overwritten.

As supplied the DCR monitor has 15 commands, the first, like disks, being FORMAT, called, as are all commands by the first letter of the command name, ie. in this case "F". All new cassettes need formatting, and like disks, this will destroy any previously-recorded data if you accidently format a used tape.

Each tape, when loaded into the DCR, has to be M)ounted. This transfers the directory to RAM. This is perhaps the most frustrating command as it takes so long - up to about 140 seconds. This delay is because the directory is stored in the middle of the cassette, and a cassette must be rewound (the E)nd command) before it is removed. So if you wish to use the other side of the cassette the tape has to be completely rewound (though it is done automatically) which takes about 95 seconds and then the directory half way through has to be read, a further 45 seconds.

Once M)ounted the N)ame command lists to the screen the names of the files on that tape. The names are listed five at a time down the screen, with an asterisk after each five to indicate more, and for you to press NewLine to print them. Finally the number of free "blocks" left on the tape is shown. Each tape can hold 50.5K or up to 69 blocks (or files, if each file is 1-block long) per side. It would be far better if the directory was listed across the screen in groups of, say, 4 filenames.

Each file name can be up to 6 characters long, with no restrictions. This is a little short as you really need at least 6 characters for a name, with perhaps a further 4 for a description, eg. S/TREK.BAS or Hobbit.M/C

The K)ill command deletes all the files on one side of the cassette, whilst D)elete purges just one specified file. C)hange alters a file name. This is one command I thought I'd never use, but it's surprising how useful it's become. S)elect and T)ransfer are used with a 2-drive set-up and are self-explanatory. The X)it, ie EXIT, command returns to the standard NASCOM monitor via MRET.

Just as in the standard monitors, the W)rite command requires the start address and the one-after-the-finish address. However, a third argument is needed by HOBBIT, the address at which execution takes place. For when a program is R)ead, it executes from the specified address. If execution is not wanted, or if a file is required to be read to a different address than its logical one, then it can be L)oaded down to anywhere on supplying the L command with a single argument.

The two final commands go a long way to support standard NASCOM software, whether it is in EPROM or RAM-based. The "Z" command requires two arguments. The first is the address of the start of a file, where that address holds the length of the file. The second argument is the execution address. For example, if you have ZEAP in EPROM, then Z 1000 D003 would store the source code and when R)ead would warm start ZEAP. Similarly, for NASPEN, Z 101A 8806 would do the same. The "B" command also requires two arguments, but in this case the first one is the address of the first byte of the file which also holds the address of the end of file plus one. Microsoft BASIC files are of this nature, for the ROM version B 10D6 FFFD saves the program. The RAM versions of both ZEAP and BASIC are thus also supported, if you know their relevant addresses.

There are 6 error traps in the system. They are indicated only by a single letter, but 6 are not too difficult to remember. The errors indicated are:-

A Filename already exists
B Bad file structure, ie. your program
C Hard read error
D Tape full
E A file of that name does not exist
G Cassette write protected

To date I've had no hard read errors, in fact the system appears to read/write perfectly, with no errors at all.

The documentation also explains the function of the major routines in the software, together with their addresses, so that they can be called by your own machine code routines or programs. It is a pity that the original source code is not available (ie. for sale) as there is obviously a certain amount of redundancy in the operating system due to its wide support of all monitors and speeds, and other things, like the directory could do with altering.

Actually, I can understand the author's reluctance to release his source code. The Philips Mini-DCR requires phase-encoded data and, as far as I am aware, all previous designs have accomplished this in hardware. Dave Tucker has managed to perform this in software, which is why the interface is so simple, and presumably why the system has been kept so

cheap.

Incidently, if you read the May 1981 copy of Personal Computer World there is a very good description of implementing a Mini-DCR on a NASCOM, which led, I believe, to the C.I.E.L. system. One of the reasons why this system is so dear is the use of an S.I.O. and an 8"x8" P.C.B. with 2K RAM.

On initialisation a pointer to the system's command table is written to 0C80H, 0C81H (a slightly inconvenient address, I've moved mine to immediately below the tape system buffer), which means that you can set up your own command table and expand the "HOBBIT" monitor to a full system monitor. The manual explains how to set up your own command table, and this feature, together with the information on the addresses and routines within "HOBBIT" make the system extremely flexible and easy to expand. Of course it would be a lot easier if that source code was available...

As mentioned earlier I have found the system very reliable. However, the price of the mini-cassettes is a bit off-putting at about £3 each for the Philips certified tapes, so I've tried lots of different makes of dictating tapes, all with complete success. The cheapest, so far, from Dixons is £1-23. One drawback is that they are longer than the Philips tapes. This does not increase the amount of storage but does increase the time it can take to Mount a tape as considered earlier. Another is that the tapes require a "write-enable" plug, and these are not supplied with dictation tapes.

So far I have said nothing about the file-handling facility in BASIC. The "HOBBIT" system itself does not support this, but IKON sell, for an extra £10, a "Microsoft BASIC Upgrade Kit", which is a cassette (for the Mini-DCR)(not forgetting the cassette itself is worth £3) containing 4 different versions of a routine to add full file-handling routines. One routine each for Nas-Sys 1 with either tape or ROM BASIC, and repeated again for Nas-Sys 3. In this case the old monitors are not supported (is there anyone still using them?). Also, generously, the source code is included, (in ZEAP format), for it to be *individually adapted.*

The facilities provided are (from the command mode of BASIC, or within a program):- Select a drive (ie. supporting a 2-drive system), Open a named file for writing to, Writing a string of up to 80 characters to a file, Closing a file, Open a named file for reading and finally Getting a line of text from a file. Error trapping includes an "X" legend to denote a different error from the ones described above, which are also supported. The error code is followed by the program line number where the error occurs.

This program also works quite well, its only restrictions

being those of the HOBBIT system. As it works by intercepting all output to the screen to check for the new file-handling commands it does mean that it is incompatible with "Toolkit"-like extensions to BASIC. Also the program resides in RAM from 0C82, so there are potential conflicts with any of your USR routines. These are minor niggles compared with the advantages gained.

I am quite happy with this system and it will do me until I can afford those disks. There are a few shortcomings but if you remember that, like all tape systems this is serial and so there are finite times between the first and last file, and you can put up with the frustration of the "M" command and its directory, then it is worth considering.

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by J.A. Hart

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```
0C80  EF 0C 00                        ;CLEAR SCREEN
0C83  01 11 00    LD    BC,£0011      ;
0C86  11 D6 0B    LD    DE,£0BD6      ;DISPLAY
0C89  21 07 0D    LD    HL,£0D07      ;  TEXT
0C8C  ED B0       LDIR                ;
0C8E  3E 4F       LD    A,£4F         ;MAKE PORT 4
0C90  D3 06       OUT   (6),A         ;  INPUT
0C92  21 00 00    LD    HL,£0000      ;FREQUENCY COUNT = 0
0C95  01 CA 20    LD    DE,£20CA      ;TIME COUNT
0C98  16 00       LD    D,£00         ;
0C9A  03          INC   BC            ;6 T STATES
0C9B  DB 04       IN    A,(4)         ;11 T STATES
0C9D  CB 47       BIT   0,A           ;8 T STATES
0C9F  CA 9A 0C    JP    Z,£0C9A       ;10 T STATES
0CA2  23          INC   HL            ;6 T STATES
0CA3  03          INC   BC            ;6 T STATES
0CA4  C8          RET   Z             ;5 T STATES
0CA5  03          INC   BC            ;6 T STATES
0CA6  DB 04       IN    A,(4)         ;11 T STATES
0CA8  CB 47       BIT   0,A           ;8 T STATES
0CAA  C2 A5 0C    JP    NZ,£0CA5      ;10 T STATES
0CAD  78          LD    A,B           ;4 T STATES
0CAE  BA          CP    D             ;4 T STATES
0CAF  C2 9A 0C    JP    NZ,£0C9A      ;10 T STATES
0CB2  7C          LD    A,H           ;IF UNDER
0CB3  FE 40       CP    £40           ; 16.384KHz(AT 2MHz)
0CB5  38 18       JR    C,£0CCF       ; THEN JUMP
0CB7  21 00 00    LD    HL,£0000
0CBA  01 CA 20    LD    BC,£20CA
0CBD  16 00       LD    D,£00
0CBF  03          INC   BC            ;6 T STATES
0CC0  DB 04       IN    A,(4)         ;11 T STATES
0CC2  CB 47       BIT   0,A           ;8 T STATES
0CC4  CA BF 0C    JP    Z,£0CBF       ;10 T STATES
```

```
0CC7  23          INC  HL          ;6 T STATES
0CC8  03          INC  BC          ;6 T STATES
0CC9  C8          RET  Z           ;5 T STATES
0CCA  78          LD   A,B         ;4 T STATES
0CCB  BA          CP   D           ;4 T STATES
0CCC  C2 BF 0C    JP   NZ,£0CBF
0CCF  00          NOP              ;(ADD HL,HL FOR 4 MHz)
0CD0  01 E0 0B    LD   BC,£0BE0    ;PUTS
0CD3  3E 30       LD   A,£30       ; £30
0CD5  02          LD   (BC),A      ; INTO
0CD6  03          INC  BC          ; £0BE0 TO
0CD7  79          LD   A,C         ; £0BE4
0CD8  FE E5       CP   £E5         ; (SCREEN
0CDA  20 F7       JR   NZ,£0CD3    ;  RAM)
0CDC  7C          LD   A,H         ;IS
0CDD  B5          OR   L           ; HL=0
0CDE  28 14       JR   Z,£0CF4     ;
0CE0  2B          DEC  HL          ; INCREMENTS
0CE1  E5          PUSH HL          ; THE
0CE2  21 E4 0B    LD   HL,£0BE4    ; CONTENTS
0CE5  34          INC  (HL)        ; OF ADDRESS
0CE6  7E          LD   A,(HL)      ; £0BE4
0CE7  FE 3A       CP   £3A         ; IF CONTENTS
0CE9  20 06       JR   NZ,£0CF1    ; = £3A
0CEB  3E 30       LD   A,£30       ; SET TO
0CED  77          LD   (HL),A      ; £30 AND
0CEE  2B          DEC  HL          ; INCREMENT
0CEF  18 F4       JR   £0CE5       ; CONTENTS OF
0CF1  E1          POP  HL          ; PREVIOUS
0CF2  18 E8       JR   £0CDC       ; ADDRESS
0CF4  21 E0 0B    LD   HL,£0BE0    ;
0CF7  7E          LD   A,(HL)      ;REMOVE
0CF8  FE 30       CP   £30         ; LEADING
0CFA  20 09       JR   NZ,£0D05    ; ZEROES
0CFC  3E 20       LD   A,£20       ;
0CFE  77          LD   (HL),A      ;
0CFF  23          INC  HL          ;
0D00  7D          LD   A,L         ;
0D01  FE E5       CP   £E5         ;
0D03  20 F2       JR   NZ,£0CF7    ;
0D05  18 8B       JR   £0C92       ;REPEAT

0D07  46 52 45 51 55 45 4E 43      ;FREQUENCY =
0D0F  59 3D 20 20 20 20 20 48      ; SP SP SP SP SP
0D17  7A                           ; Hz
```

Notes - the RET Z instruction is a dummy instruction used purely as a 5 T State delay.
- input is on port 4 bit 0 (SKA pin 1 on Nascom 1)
- counts frequency up to 24KHz at 2 MHz or 48KHz at 4 MHz but wait states must not be used in either.

Nasprint 80 Review

by A.C. Dickens

Nasprint 80 is a printer drive and formatting package for use with the Epson MX80 series of printers, although it can be used with other printers. Details of interfacing are included in the manual. The package runs under Nas-sys 1 or Nas-sys 3. I was lucky enough to be given a pre-release version for evaluation purposes. There now follows my review of this invaluable piece of software.

Nasprint 80 is a 2K package supplied in 2x2708 or 1x2716 EPROM. It is located at B000H in the Nascom memory map so it resides just below Naspen. The package can be purchased for £12.95 from Program Power. Apart from the EPROM, a comprehensive 23 page manual is included. This contains full information about the operation of Nasprint. Nasprint has been designed to operate with all the standard Nascom packages; Debug, Nasdis, Nas-sys, Naspen and Zeap.

There are two modes of initialisation, a cold start at B000H and a warm start at B003H. When initialised, a list of options appears on the screen. These allow the software package which is to be used to be selected. Various options can then be specified if required. These are:

C - centre the title
D - print dividers between pages (for seperating pages when using roll paper)
F - modify format (see later)
N - page number
O - output codes (allows you to output Hex codes directly to the printer)
P - paginated (divides the output into pages)
T - title (prints a user defined title at the top of each page).

The format option allows the exact layout of each page to be specified. This is done in a very neat and easy way. A list of parameters followed by their current values is displayed on the screen. By moving the cursor around and modifying the relevant values, the printer output format can be changed. The number of line feeds, page length, line length, margin length and first page number can all be modified in this way. The spaces for the page number, title and between the top of the page, title, page number and bottom of the page can all be specified as well.

At this stage, all of the Nasprint options have been specified so program execution continues under whichever package was selected. With Nas-sys, Nasdis and Debug, everything typed at the keyboard is output to the printer (unless the printer is

disabled with the Nas-sys 'N' command). If the relevant options are set, the printed output will now appear with a title and incrementing page number. This produces a nice visual effect from the program listings.

With Zeap and Naspen, everything typed at the keyboard is not echoed to the printer. The command to print must be given before output commences.

Nasprint is a very handy piece of software for use with Nas-sys, Nasdis, Debug and Zeap, but it is with Naspen that it really scores. In the days before Nasprint, I found Naspen to be a fairly useful wordprocessor but it was impossible to utilise all of the special print modes available on the Epson. Nasprint changed this because it allows special printer control codes to be embedded into the text. Codes between '<' and '>' are intercepted by Nasprint and are not sent directly to the printer. The special codes which can be embedded in the Naspen source text are:

C - centre the line
D - double line spacing
H - hold (stops printing until any key is pressed. Useful for changing paper in the printer when using single sheets)
L xxx - changes line length to xxx
M xxx - changes margin width to xxx
N xxx - changes page number to xxx
O xx yy .. .. - outputs Hex codes xx, yy, etc directly to the printer (useful for turning on/off double width, enhanced, condensed, etc printing modes)
P - finishes off current page with spaces and starts a new one
S - sets single line spacing

If invalid codes are used Nasprint will detect them and print an error code.

All in all Nasprint 80 is an extremely versatile printer facility for anyone using a Nascom and printer. Together, Nasprint and Naspen form a really good wordprocessing package. I have used it to print all of my letters and reports since I installed it and have been very pleased with the results.

ASCII Rules 4F 2E 4B 3F

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News from Kenilworth

Mike Ayres, Product Manager,
Nascom Microcomputer Division

We are pleased to be associated with Micropower and to appoint it as the official Nascom Newsletter. Over the next few months we hope to be making a significant contribution to the editorial pages.

This contribution will be mainly from our technical people, both hardware and software products, but we are always interested to hear from you if you wish to include other subjects.

Perhaps it is worth explaining our involvement with the Micropower magazine, as this will help you understand the role it has to play. Micropower will continue to be owned and managed by the existing people and all production and editorial matters will remain their responsibility. We have agreed to support them more actively in both advertising and editorial contributions. Essentially we see this as your Newsletter and I expect as much contribution from you as from any other source. I am sure that it will prove of immense benefit in communicating our plans to you and getting your reaction to them and forming a focus on Nascom users.

In the past few months we have been concentrating our efforts towards the introduction of many new products, both hardware and software. We are convinced that the present products offer an extremely wide choice for use with your Nascom and represent very good value for money. In this edition, you will find mention of some new offerings in our advertising copy, but you would be better advised to visit your dealer to see it demonstrated.

Over the last 18 months since Lucas aquired Nascom, we have developed the original Kit product into a fully-fledged, desk-top computer. It now offers the range and sophistication of the best 8 bit microcomputers and is certainly a powerful performer.

In the coming months we hope to see this Newsletter become your platform with a whole range of subjects and contributors including a very active club corner.

Mike Ayres,
Product Manager

Nas-Dos News No. 2

Nascom Microcomputers

Nas-Dos News is an information sheet for users of the Nas-Dos disc operating system on Nascom microcomputers. This second issue, the first for the magazine, is also being sent to registered owners of the DCS-Dos disc operating system.

This issue has been released in time for the start of the Autumn computing season (if there are seasons in computing!). In particular we would like to give you news of a special offer which should be particularly interesting for those with less than four drives - prices are being reduced so you can afford to buy additional drives. This offer will ONLY apply for November, and while stocks last, and each purchase must be accompanied with the advert from this issue of the Nascom Newsletter, so act quickly if you want more drives. The drives are normal production units and production will continue with the same drives after the end of the offer period, so there are no catches. Please mention this offer to your friends who have not got discs yet - it is an offer you can't afford to miss.

We have now released new disc-based software, some of which was mentioned in the last Nas-Dos News. We include more information on this software later on in this Newsletter.

This is also the start of the exhibition season and we have a stand at the Compec (Olympia) Exhibition, 16-19 November, 1982. We hope very much that you will come and visit us to see our new products. All the new products mentioned in this newsletter should be on display, so it should give you a chance to see them running. Once you have seen them we are sure you will want to buy them.

Any comments which you may have on this edition or suggestions for future editions would be welcomed. I apologise for the rather disjointed nature of this newsletter, but it is all prepared in one evening - and I must admit I would rather be writing programs than newsletters!

Mike Hessey,
Technical Manager

DCS-DOS

For those of you who are wondering from the introduction what DCS-Dos is, we will explain. For those of you who own DCS-Dos please read on, there are some comments here directed specifically at you.

DCS-Dos is a disc operating system which was originally developed by Steve Parrish of Dove Computer Services for use with the old G***** disc drives connected to the Nascom via the Henelec controller and the PIO. A much improved version of this disc operating system became Nas-Dos for use with the Nascom disc drives and the Nascom Floppy Disc Controller card. Steve has now upgraded the original DCS-Dos to DCS-Dos 2, which is generally similar to Nas-Dos but still for use with disc drives fitted with the old Henelec controller connected via the PIO.

To DCS-Dos owners we would like to suggest that you consider changing to Nascom discs and the FDC board. This will give you the following advantages:

Double disc capacity (quadruple if you go for the double-sided drives)
Media compatibility
Access to all standard Nas-Dos software

The obvious problem is that you will need to buy new disc drives and the controller card. As we have already mentioned, there is a special offer on until the end of November so if you are considering a change, now would be a good time. We regret that, as we had no involvement with the sale of the original drives, we are unable to make any other additional offer ourselves with respect to your existing disc hardware. However, we have agreed with DCS that if you send us your DCS-Dos chips we will upgrade these to Nas-Dos for a charge of only 10 pounds. This software swap should be done through ourselves rather than dealers in order that the serialising and registration can be performed correctly and the original DCS-Dos registration can be cancelled.

We are looking into the possibility of making some Nas-Dos software available in DCS-Dos 2 format for those users retaining DCS-Dos. This may not prove possible and such software will only be available to special order at an additional charge of 5 pounds per software package. If you need such software ask your dealer to contact us.

This edition of the Newsletter has been sent to DCS-Dos owners via DCS. If, as a DCS-Dos owner, you want to be put on our mailing list then please write to me giving your name, address and DCS-Dos copy number.

CLANGERS

Not suprisingly after this period of time, there are no reports of any problems with Nas-Dos itself other than the occaissional failure to determine the top of memory correctly (see Nas-Dos News, Issue 1, for details).

It has been pointed out by one user who has Nas-sys 1 that the instructions provided with the Nas-Dos utilities package specify incorrectly the byte to be changed for use with Nas-sys 1. As I know that several different versions of the utilities have been issued (it is a development package) the best solution is to look at the enclosed listing of the relevant section of the utilities and make the change shown when you have found out which byte it is which needs changing in your copy. The byte should be within 6 bytes of the position shown. Sorry about this, but as explained, this is a developement package provided free rather than an integral part of Nas-Dos and, as I never run Nas-sys 1, the need to record the change of this byte keeps getting overlooked. If you come to the exhibition that we are attending on a day on which I am on the stand, and you have a disc with you, I will make sure you have a copy of the latest edition of the utilities.

NAS-DOS 1.2

Rev 1.2 of Nas-Dos is now being released. However, as mentioned in the last issue, the changes from 1.1 are very minor - correct detection of top of memory, faster seek times and file write protection facility (using a new utility program). If you really feel you need these changes then send us your existing Nas-Dos chips and utilities disc, together with a cheque for 10 pounds, and we will send you back Rev 1.2 and the additional utility program. Note that this is an upgrade service; you will still only own a single copy of Nas-Dos (with the original serial number) which must only be used on a single machine.

One important cautionary note: the improved seek speed will work only with later disc drives with metal side plates. If you attempt to use Rev 1.2 with older (plastic sided) drives you will get disc access errors. If your drives have a horizontally mounted trimpot in the centre of the board mounted over the drive, you should be able to adjust this to get satisfactory results. Unfortunately, one batch of drives was supplied by the drive manufacturer with fixed resistors in this position and in this case you can not run Rev 1.2. You have my deepest sympathy - I too bought one of this batch of drives, which is how I discovered the problem.

NAS-SEMBLER

Nas-Sembler is the new disc-based assembler for the Nascom with Nas-Dos. Some of the highlights are:

Full range of disc commands for file loading, storage, directories, etc.

Ability to assemble from multiple source files, eliminating any problems of source files becoming too large to fit in memory.
Significantly faster than ZEAP.
Greatly extended editing facilities.
Many additional facilities within the assembler:

- Macros
- Conditional assembly
- Keyboard entry of assembly control parameters
- Multiple operand statements eg. PUSH AF, HL, DE etc.

Nas-Sembler is available NOW with the Z80 assembler. There are also cross-assemblers to allow you to prepare programs for 6502 and 6800 microprocessors and we hope to have a cross-assembler for the Motorola 68000 very soon.

Please read the spec. sheet for more details, or better still, ask your dealer for a demonstration, or come and see us at the exhibition.

ZEAP will continue to be available for both disc and tape users.

NAS-CALC 1

Nas-Calc is a computerised spread sheet which allows you to create a 'sheet' of rows and columns of data on the screen. These can be edited, stored and printed. A wide range of mathematical relationships can be specified allowing, for example in the simplest case for automatic calculation of the sum totals of the respective columns. Up to 99 rows and 99 columns of data can be manipulated.

Nas-Calc is so versatile it is difficult to know where to start in suggesting applications but these include:

- Balance sheet analysis
- Costing
- Delivery schedules
- Fixed asset register
- Forecasting
- Investment appraisal
- Parts list
- Personnel records
- Price lists
- Salary data
- Sales planning
- Scheduling
- Tax returns

Nas-Calc is already on sale. Again we suggest you look at the data sheet and then see a demonstration at your dealers or at an exhibition.

A tape version of Nas-Calc is also available as well as the disc version.

MANOR

Modesty prevents me extolling the virtues of Manor at any great length, suffice to say, it is an extremely versatile data management system which no Nas-Dos owner (or DCS-Dos owner) can afford to be without! Again, applications are almost unlimited but include:

Cataloguing (records, books, discs, etc)
Customer records
Drawing files
Exhibition enquiries
Hire records
Maintenance schedules and records
Parts lists
Personnel records
Stock control
Supplier files
Tool records
Warranty registration
(Software registrations are, for example, recorded using Manor)

Manor is written almost entirely in BASIC. While this does limit spped of operation, it does mean that you can get into the program yourself very easily if you want to modify it for more specialised applications.

Please ask for a demonstration. We think that once you have seen it, you will buy it. Manor is available now in disc form and a tape version is under preparation.

WORD PROCESSING

As mentioned in the last edition of the newsletter (Nas-Dos not Nascom), B and L Microcomputers in Kenilworth (0926 512127) have developed some useful extensions to Naspen for the Nas-Dos user. However, as the more perceptive reader may have realised, we are evaluating a new word processor with many new features which is specifically written for use with Nas-Dos. The whole of this Newsletter (Nas-Dos not Nascom) was originally* produced using this package. (* I am afraid that everything in the magazine has to be churned through Wordease which makes showing what a wordprocessor can do very difficult - Ed.) Incidentally, typing errors in the documentation and newsletter are my fault, not the word processor's! (I use the opposite argument for my excuses - Ed.)

This new program is not yet on sale but we hope to have it available within the next 3 months. If you come to the exhibition you will be able to see a demonstration.

PASCAL

B & L have made further improvements to their Pascal disc extensions and, by all reports, this is now a very good package and substantially better than my own, rather crude, Pas-Dos package. As I am not personally a great fan of Pascal (no reflection on our Pascal or B & L's extensions!) I still have not got round to trying it but, if you are into Pascal, it would be well worth looking at. We will try to obtain the latest copy so that those of you attending the exhibition can give it a try if you want to.

EXTENDED BASIC

The new BASIC is now available for tape users. The version for Nas-Dos users, with disc support commands, should be available in a few weeks time. If in the meantime you want to try the tape version, we will offer an upgrade service, for a modest charge, to allow you to change the tape version for the Nas-Dos version when it is available. Incidently, a translation program is provided to allow ROM BASIC tapes to be converted to XBASIC format.

We will give more details of the features of the Nas-Dos version, and some thoughts on memory usage, in the next issue of Nas-Dos News.

POLYSYS 4

For those users continuing to use the ROM BASIC we have adapted PolySys 4 to provide many useful additional features. These include:

Renumber
Delete
Pack (remove spaces and REMs)
Trace
Printer support

We have chosen this package as being, in our view, the best of the 2K aids to programming in BASIC which is available. In operation it adjusts the input and output tables, which disables Nas-Dos keyboard commands. In practice this is not a problem. All you need to do is to 'JL' your program in the usual way, JE:POLYSYS and type Z to warm start BASIC with the additional commands active. When you have finished using the additional commands, you just press RESET to restore Nas-Dos.

An invaluable aid to program development in BASIC, and one which I use extensively during preparation of programs in ROM BASIC.

PolySys 4 is available now in tape form (all alternatively EPROM for the non-disc user) and we suggest you see a demonstration.

A V C

AVC's (Advanced Video Controller cards - the high resolution colour graphics card, if anyone hasn't yet heard of it) are now in the shops, although demand far exceeds supply. Those of you who already have one deserve an apology for the extremely preliminary documentation. The documentation is now almost complete, and both you and new buyers will now recieve what is, bar some colour illustrations, the final documentation.

The results are really fantastic, and the software support from BASIC is, we think, going to be at least as much of a selling point as the hardware performance. The PAL encoder has been removed from the AVC board itself, as we were not satisfied with the quality of result that can be obtained from a simple on-board modulator. It will, unfortunately, be a few weeks before the seperate PAL encoder board appears. Users intending to use a normal colour television should bear in mind that, however good the AVC and PAL encoder, the bandwidth of colour televisions is restricted and resolution will therefore be affected.

Come and see the AVC at the exhibition. If you have technical queries, look out for Peter Horton who has done nearly all the hardware and software.

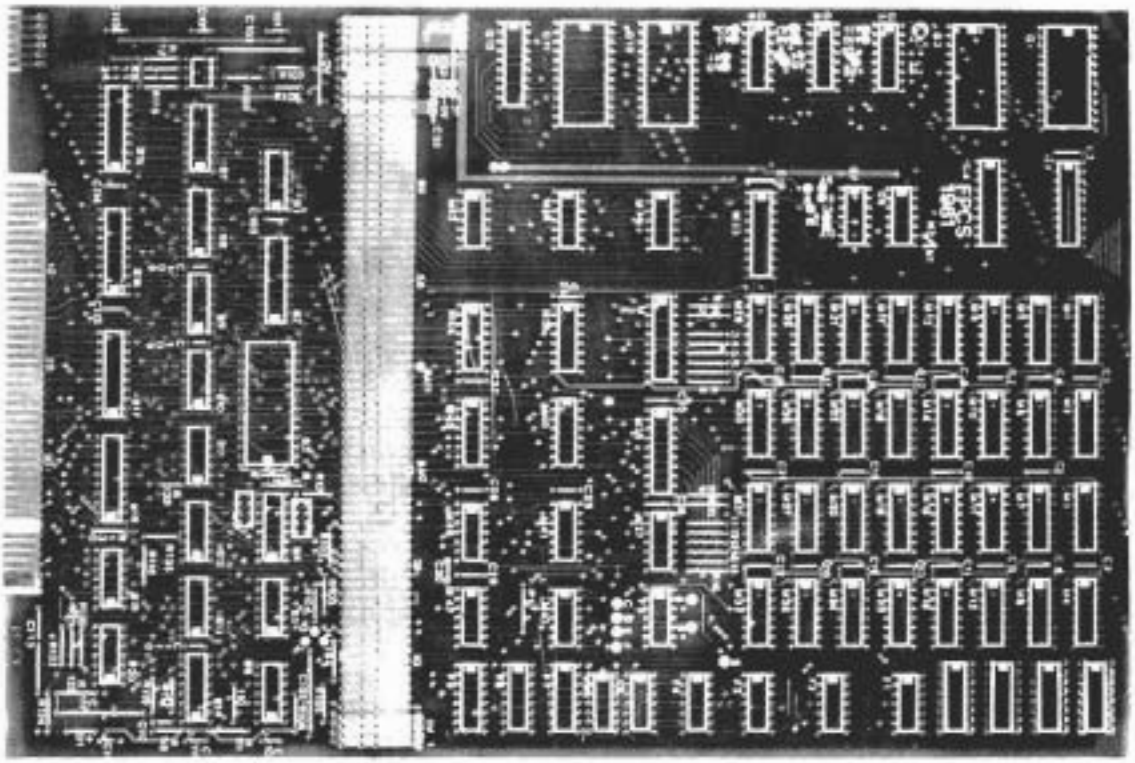
NAS-NET

Nas-Net is a very low-cost networking system which allows up to 32 Nascoms to share a disc under Nas-Dos. The satellites have access to all the facilities of the Nas-Dos disc operating system, including data file handling. Messages and programs can be broadcast from the 'master' station to the satellites and the 'master' can inspect the memory and screen contents of any satellite. A parallel printer can be connectedto the 'master' and the satellites can make use of this via a spooling system.

The satellites are connected to the 'master' via a multiplexing unit, although, if you just want to link two Nascoms, the multiplexor is not necessary. The UART on each satellite and the 'master' is used for the communication system, but, by suitable switching arrangements, the tape cassette facilities of any of the machines can still be used in a local mode.

Nas-Net is an exceptionally powerful system for a very low cost. If you are looking for a networking system you need look no further.

Well, that's the first contribution to the magazine from Nascom themselves. Because of the copy deadlines for the magazine (yes - we do have them) this contribution is a repeat of the latest Nas-Dos news so some readers may have already seen it. Sorry. The next issue should have something better organised in it, wait and see. IJC



64 KILOBYTE RAM
and
BUFFER CARD
with PROGRAMMABLE GRAPHICS

This 64K RAM card is suitable for the Nascom 1 or 2. The double sided glass-fibre P.C.B., 302 mms (12 ins.) by 203 mms (8 ins.), holds up to 4 blocks of 16 Kb dynamic RAM (4116). When all four blocks are fitted the whole of the 28Q address field is occupied by RAM. The on board mapper allows parts of this address field to be selectively inhibited in either read or write mode, or both. The mapper divides the address field into 4K blocks, and any two selected blocks can be further subdivided into 2 x 2K blocks.

The graphics section is entirely separate from the dynamic RAM, but it can be mapped in at any chosen 2K boundary. It can use an EPROM (2716) to give a pre-programmed character set, or static RAM (2 x 4118, or 6116) to provide user-programmable characters.

For the Nascom 2 the memory and graphics section can be separated from the "buffer" section; the resulting 8 x 8 card can be plugged into a standard Nasbus (80-bus) edge connector For the Nascom 1 the bottom 8 x 4 ins. section of the card provides full buffering between the Nascom 1 43-way connector and Nasbus. In addition the following extra facilities are also provided:-

1. Power-on jump; this allows the processor to execute a program at any preset 4K boundary on power-on or reset.
2. Synchronised Reset; the reset pulse is synchronised with the processor M1 cycles, to prevent corruption of data in dynamic RAM
3. Wait state generator; one wait state can be added to memory or input/output access
4. ROM socket; a 28 pin or 24 pin socket can be placed at position B3, and via a series of links this can accommodate a 2716, 2732, 2764 or the standard Nascom Basic ROM
5. Input/output; a partial decode is provided which allows for 64 input/output addresses.

The 64K RAM card is available now, price £39.50, from

MICRO POWER Ltd.,
8/8A, Regent Street, Leeds LS7 4PE
Tel. (0532) 683186
Please add 55p p/p and V.A.T. at 15%.