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NEWSLETTER

VOLUME 2

NUMBER 6

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* * * NEWSFLASH * * *

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PROGRAM POWER

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Contents

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Editorial.

Christmas comes but once a year but it looks as though I've managed to miss it with this bumper Christmas issue. Most of the magazine was put together before Christmas but, unfortunately, due to circumstances beyond my control, (ie. the Christmas rush), I didn't get chance to get it finished and sent out for Christmas as I had intended. I hope you all had a happy Christmas and a very merry New Year.

The results of the survey that I did a couple of issues back are coming in now and they are giving me some idea of what you want to see in the magazine. In general they seem very encouraging but I think I had better clear up a few points:-

1. We are totally seperate from Nascom. Nascom (or rather Lucas Logic) have given us their full support and backing but Micro Power Ltd still maintain full editorial control. The section of the magazine under 'Nascom News' is supplied by Lucas and goes into the magazine unedited in content but the rest of the magazine is made up of a representative selection of the articles that I receive from readers.
2. Quite a large percentage of the replies to the survey commented on the unprofessional finish to the magazine. This is because the magazine is unprofessional. I would much rather use a daisy wheel printer for printing and have the circuit diagrams done professionally but this would involve expenditure which the magazine could not pay for. The magazine is produced very much on a voluntary/amateur basis so if any reader has circuit drawing experience I would be very happy to make contact with him/her and possibly come up with some working agreement.

I will give you more results of the survey, hopefully, in the next issue.

Subscriptions.

This is the last issue of Volume 2 of the Nascom Newsletter/Micropower magazine. This year (1983) I intend to produce 6 issues on a regular basis (I am getting properly organised) with a more consistant balance of news, reviews, hints and letters. I am hoping to set up a section for queries about problems on the the Nascom and related products which I can forward on to the party concerned for a detailed answer which I will be able to print in a subsequent issue. I don't know if this will work but I won't know until I have tried.

I am afraid that the cost of the magazine will have to go up for Volume 3 and the cost now will be £1.25 per issue or £7.50 for a subscription (6 issues) (Europe and Overseas rates are also increased; see the enclosed subscription form for details). The magazine NEEDS subscriptions. We are offering a £2 discount (that works out at £5.50 for 6 issues of the magazine sent anywhere in Great Britain) on the subscription if you also order some Micro Power software/hardware at the same time, before the 21st of Feb.

IJC

Corn Corner

by Cresby

Jolly Good Company.

The revered company owner, my illustrious employer, was asking me about programming and had we sorted out the language. Well, says I, "Would a swear box do?". (Perhaps I should dispense with the "high-level" pun before it can be construed as remotely funny.) He did actually laugh and the work he piled on after could have been his reason for joviality but it might have been a bizarre form of humour, I am not laughing.

He also asked about the second or third language, ("Forth", I prompted). "Close wasn't I? Never much good at numbers", he smiles and, looking me staight in the irises sez, "Now, about your salary". A word of warning, never tell your company chairman how to spell, he may remind you how to keep your tenuous position in the establishment, however insignificant.

One Quick One.

Yes, just when you thought it was safe to run your NAS-CLOCK at 6 MHz, Zilog have invented the Z80H, 'H' for 'H'eight MHz I suppose. Maybe some intrepid hobbyist will figure a NAS-SCHEME to run the Z80H with wait states. At double the 4 MHz it has possibilities but I suspect it is a non-starter. Just as well, I did not fancy pensioning memory off to the DRAMatic (ho, ho) yet, or should I have said RAMparts. Groaning will commence after the next joke (- if you can find it).

Punchline.

Whilst buying discs, I heard tell of a disgusting case of malfunction. Apparently, complaints about disc errors were demostrated by opening the ring-folder they had been bound in. He couldn't understand it, the holes were neatly punched, personally by the complainant.

The Unedited Version.

Has anyone used NAS-SEMBLER? Or, as it was called while wrestling with it - NAS-ASS. Mine has a serial number with 007 as the last three digits, licensed to kill my enthusiasm. Early versions, for those still having difficulty, will not move from editor to assembler clearly and converting ZEAP files, didn't! The solution is to use the COPY command on both editor and assembler which shortens the files and prevents overwriting the code that is calling the overlays. Converting files back to ZEAP was still a hassle till I found my text at 3B00 and not 3A00 as E-manual says. (because its an erratic so-and-so, that's why). Should you need to use it: convert to ZEAP format, cold start ZEAP, revert to Nas-sys, do an I 3B00 zzzz xxyy and warm start

ZEAP. If in doubt use Y in ZEAP but it should not be necessary. zzzz is 2000H for tape or disc ZEAP and 1000H for my EPROM version. xxyy is the length of the buffer found at 3B00 (yy) and 3B01 (xx) and is always found in the first two bytes of ZEAP buffers. Adding the length to the start of the buffer produces a location after an FF (stop byte). Of course the pseudo ops do not all translate and in both types of file I keep hex references with leading 0's and trailing H's. Don't drop 'em - your H's that is.

Meanwhile, back in NAS-ASS - one bother is removing lines with shift and cursor because empty lines are not entered with the enter key. This may not be obvious till assembly or re-entry to text edit mode. Use CTRL K to be sure. I usually spray edit commands all over the text and then struggle to recall why I used the LDIR mnemonic. What cruel set of circumstances conspired to create this as an editor directive?

The put instruction does not cope if the last line of the inserting code is consequitive with the insertion line.

In the manual LSB and MSB pseudo ops are the LSB (Least Significant Boob). The op itself actually inserts one code byte into the program, what a strange device!

If, like me, you wish to assign any variable with one byte for INT vectors then the LET will let (ha) you - eventually. viz.

```
        LET     LOBYTE=INTLAB & OFFH     ;easy
        LET     HIBYTE=((INTLAB & OFF00H)/256) & OFFH  ;phew
```

Points to remember are that division rounds off after and puts F's in the high byte hence the & OFFH

Now, let me fill you in the rest of the Editor (not you Ed).

ASCII & MAP - remind you of codes for keys and display - nice touch that.
CONSTRUCT - pulls raw data from memory and enters it as DEFB or DEFW - very useful.
D & H - allows decimal to hex and back to be worked out before committing to text. Both these are useful and better than one alone.
ZTC/CTZ - converts to and from ZEAP format (with caution).
EDIT - text edit mode is screen based, mostly cursor controlled. Lines are not numbered on screen like ZEAP but one line number is displayed for the cursor position. Mixed views here.
Find instructions do work well and can be repeated.
Block move commands do well (with one reservation).
/ - loads and executes any file in editor. Some commands (but not all those you would expect) are repeated in the assembler which is an overlay from disc.

Assembler.

Symbol tables can be created, sorted alphabetically, saved and, more importantly, invoked from a pseudo op as an external set of labels on disc in which case there is no check for re-definition and that I do lament.
LIST - has many forms (source listing is done from the Editor by CTRL X).
LINES & MARGIN - control the listing position and length on paper (and in fact).
DIR - directories of your disc can be seen easily but only on one disc.
DISC - allows you to designate a working disc if you want a different one so you don't have to specify which disc all the time. This is more useful than a limitation.
There are two modes of assembly, one (1) for single origin and, my preference, mode 0 for multi-origin assemblies. The latter creates file which can dump the code in many absolute locations when called via the assembler.
One more lament - I haven't been able to execute files like DEBUG direct from assembler. Perhaps I shouldn't try but I would like to have succeeded.

Pseudo Ops.

PUSH's or POP's - can be strung on one line - neat.
NOP 4 - some mnemonics can be repeated by following them with a number. Very nice.
Binary, hex, decimal plus any radix up to 16 can be handled using Q. Octal freaks will like this if there are still any around.
ENDP - listings can be thrown to a new page at will.
PAUSE - nice op to stop assembly. Gives you time to think before ploughing on.
COND/ENDC - gives conditional assembly.
QUERY - requests a value during assembly. Can be used with above to form fancy conditional assemblies.
PRINT - displays during assembly - useful.
FOR/NEXT - creates repetative code with new labels in each iteration.
MACR/RPT - repeats code n+1 times - not as useful as above
INSERT - allows a side file to be inserted from disc during assembly. A good working assembly could be accessed with this one.
DEFL - all the old faithfulls are there plus this one which allows a label to be redefined.
ADDR - reverses the byte order in a word as per 6800. Cross assembly is possible by getting other versions of this assembler.
EXEC - allows a machine code routine to be executed. Strange one this but I could make good use of it given time.
LRRC, etc - logical shifts and inverts can be performed on labels - has possibilities.
NAME - puts the name on every page - date and time if you need - and I do minutes as well!
OPCD - this is a macro but you define the code in hex. The

strangest ommission is the macro that we all know and love. It is not possible to define a macro in memory and invoke it by name elsewhere let alone use dummy arguments. If Mr. Watson is reading this in Bedford I would buy an update or extension doing this.
ORG/PHASE - allows code to be generated to run at PHASE but loaded at ORG for PROM blowing. Nice touch.
PRS - all RST's are handled by name but PRS drops the 00 byte in for you - the manual doesn't say that though.

One last idiosyncracy - mnemonics which load a two byte value into a one byte register cause a fatal error. Most assemblers I know pull the first byte and warn only.

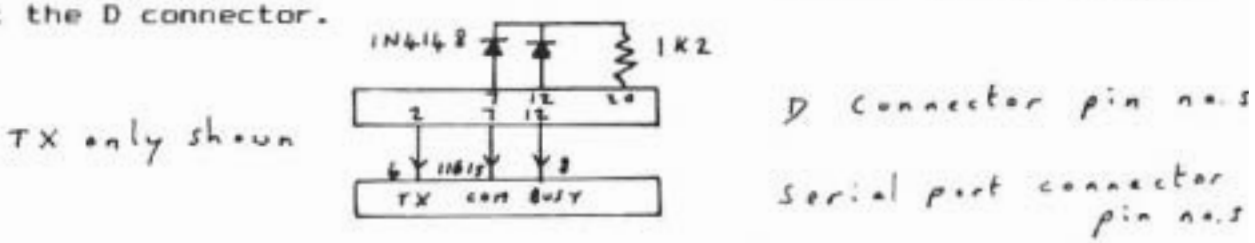
In summary I would say a very good assembler but it was a wrench loosing the line numbers and display of errors while editing, as in ZEAP.

With any system the most disappointing things are not its limitations but the errors in the manual. The errors here are few and fairly minor but frustrating till you know them.

Thanks to B&L Kenilworth (nice guys) for being patient and helpful while I got used to NAS-ASS.

Standing Wave or Handshake.

Now something else that came to light via the same stable is that the Nascom 3 CPU board has a link from test point 3 to pin ? on the serial port connector and you won't find that in the manual. This is for the printer busy signals to run in the same cable as the serial data. To make it work for RS232 (instead of TTL handshaking) you need a 1K2 resistor and two 1N4148 diodes at the D connector.



Of course, its no use unless the software handles it but this routine does - provided you have executed 0C80H and U is invoked to turn it on. (N turns it off).

```
            ORG   £0C80
            LD    HL,SPRINT
            LD    (£0C78),HL
            SCAL  £5B
SPRINT      PUSH  HL
            PUSH  AF
SPRDY       IN    A,(0)
            RLA
            JR    NC,SPRDY
            POP   AF
```

```
        PUSH AF
        SCAL £6E
EXIT    POP  AF
        POP  HL
        RET
```

The reason for all this is to run a printer at 1200 baud even if it is slower at printing, thereby making sure the printer does not waste time waiting for the transmission. Most printers have a handshaking line (not the 'how do you do' variety though).

RAMpart Memory.

I recently suspected memory as the cause of execution failure. Naturally, the RAM test in the RAM B manual was called in (and entered in hex because the other sympton was assembly object code and listings being different). When the execution was finally tricked into running this test, the RAM passed. Using a RAM A card cured the problems. Using the RAM B card in another system produced no failures either. Fault find that one if you dare! The upshot of this is: we haven't solved that problem but working versions of DEBUG reside above 8FFF, tape version won't read in; so I jammed the cassette interfaces from two machines together and Wrote and Read perfectly ("hi" to "in" works). So, if swapping programs, folks, bypass the cassette to save all that hassle. The reason the PROMs could not be swapped was because the various systems are configured for 2708, 2716 and 2732's and they didn't work in the wrong slots. You probably realized I am a 3 Nascom-a-day man, mind you, the first one always makes me quaff.

Cursor Line Shift

by G. Rowland

This short routine grabs the up/down cursor key before CRT is called. Enabled by the Nas sys 'U' command and disabled by the 'N' command. The routine is initialised by entering the 'CULSH' subroutine address into 'UOUT' (found in Nas sys workspace at 0C78H).

```
: TEST FOR SHIFTED UP/DOWN CURSOR KEY PRESS
0D00  21 01 0C   CULSH   LD HL,KMAP
0D03  CB 66              BIT 4,(HL)
0D05  C8                 RET Z
0D06  FE 15              CP 'CUD'+1
0D08  D0                 RET NC
0D09  D8                 CP 'CUU'
0D0B  D8                 RET C
: GET ARGUMENTS FOR NAS SYS 'ICOPY'
0D0C  F5                 PUSH AF
0D0D  2A 29 0C           LD HL,(CURSOR)
0D10  DF 7C              RST SCAL CPOS  :GET START OF LINE
0D12  EB                 EX HL,DE
0D13  21 7A 0B           LD HL,0B7AH
0D16  B7                 OR A
0D17  ED 52              SBC HL,DE
0D19  FA 39 0D           JP M,EXIT
0D1C  E5                 PUSH HL
0D1D  C1                 POP BC :LENGTH OF COPY
0D1E  21 40 00           LD HL,0040H
0D21  19                 ADD HL,DE :DESTINATION & SOURCE
0D22  F1                 POP AF :ACCORDING
0D23  F5                 PUSH AF    :TO CURSOR
0D24  28 01              JR Z,MOVE :KEY
0D26  EB                 EX HL,DE  :PRESSED
0D27  DF 49      MOVE    RST SCAL ICOPY
: CLEAR LAST LINE COPIED
0D29  11 FF FF           LD DE,FFFFH
0D2C  F1                 POP AF
0D2D  F5                 PUSH AF
0D2E  28 02              JR Z,CLRLIN
0D30  13                 INC DE
0D31  13                 INC DE
0D32  06 30      CLRLIN  LD B,30H
0D34  19         SPC     ADD HL,DE
0D35  36 20              LD (HL)," "
0D37  10 FB              DJNZ SPC
0D39  F1         EXIT    POP AF
0D3A  AF                 XOR A      :EXIT WITH NULL
0D3B  C9                 RET        :TO SKIP CRT SUBROUTINE
```

Animated Graphics Board for under £100

It was about 4 months ago when I was over at the Liverpool Nascom club that I saw for the first time this superb board in operation. The board had started off as a private project but when completed it was in such demand that it became very commercial. The main designer was Stuart Holmes and most of the software was produced by Joe Savlini.

For my money I got a 12x8 board, an I/O decode PROM, reasonable design and construction notes and a cassette containing some short programs which test the different features of the board and also give an insight into how to program it. The programs are in Pascal which makes using the procedures to access the various parts of the board very easy.

Features of the Graphics Animation Board.

1. Nas-bus compatible on an 8"x12" double-sided board. The board is not through-hole plated and approx. 325 track-pins need to be put in before construction can start. Hard work but it has kept the cost of the board down.

2. Fully buffered data and address bus.

3. All functions are decoded as I/O by the provided PROM including the Nascom I/O ports therefore the board does not take up any address space.

4. The heart of the video section is the TMS9929 graphics processor together with 16K of dynamic RAM.

5. The processor can produce a resolution of 256 by 192 with 16 colours with the output from the board being in the form of R-Y, B-Y and Y buffered to 75ohms. This means that the output from the chip must be processed further to provide a signal capable of driving a TV or colour monitor. The luminence signal (Y) can be directly connected to the input of a black & white monitor to give a shades of grey picture but this is a waste when the chip is producing 16 beautiful colours.

6. The processor also produces 32 sprite planes containing thirty-two 8x8, 16x16 or 32x32 pixel sprites.

7. The position of each sprite on the screen is given by specifying its XY co-ordinate.

8. If two sprites collide ie. one sprite is moved so some of its 8x8, 16x16 or 32x32 pixels overlap another sprite, a sprite collision flag is set allowing immediate collision sensing without 'peeking' the screen RAM. This makes the programming aspect of moving graphics very easy.

9. Magnification and size factors for each sprite are loaded in the sprite attribute table enabling a change from 8x8 to

16x16 or 32x32 pixel sprites by simply changing a number in the sprite attribute table of the sprite in question.

10. The 32 planes can be regarded as one 'above' another so that a higher order sprite will eclipse a lower order sprite giving a 3D effect.

11. Both sprites and 8x8 pixel blocks on the pattern plane are called up by naming their shapes in a table, hence any shapes which are the same are only defined once with a consequential saving in memory.

12. The 16K of on-board screen memory is directly interfaced to the TMS9929 and is loaded via an I/O port and an auto-incrementing address register. This memory is primarily the screen RAM for the processor but it could be used to supplement the user's own memory area.

13. The sync output from the TMS9929 is fed to a CTC so that timing may be triggered from field fly-back. This could be useful in split screen applications, since for many systems a number of screens can be held in the 16K memory and simply swapping internal pointers flips from one screenful of information to another.

14. Loading the screen memory and control of the TMS9929 is completely asynchronous with screen access, hence one screenful of information can be displayed whilst another is being assembled in the 16K address space without any disturbance in the displayed video.

15. A CTC is resident on the board with three of its outputs/inputs brought to a plug, enabling any desired timing/counting operations to be used.

16. An eight channel eight bit A-D converter is also resident on the board with eight channels available to the user, read as I/O ports. These are general purpose and would probably be used for such things as josticks for games or to read sensors for control applications.

17. Although the A-D reference voltage is normally the 5 volt supply, there is a link option to allow the user to fit a precision 5 volt reference if a specific number of millivolts per bit of resolution is required.

18. Twin sound generators are included on the board to enable either stereo sound to be formed or else a larger variety of individual sounds. These generators are again accessed via the I/O ports. The output from the generators does need to be amplified by some external means. Not too difficult.

19. The sound generator clock may be defined either by dividing down from the 2/4 MHz system clock or by an on-board crystal oscillator, the frequency of which may be chosen by the

user.

20. 2K bytes of CMOS static RAM are addressable via the I/O ports resident on the stereo sound generators. A re-chargeable battery can be included to power the RAM during shut-down, hence, the RAM is effectively non-volatile.

21. The CMOS RAM chip enable line is protected against switch on/off transients with power up/down mute circuitry to avoid corruption during the initialisation and powering down operation.

22. Two real-time clocks are laid out on the board to permit the choice of one of two manufacturers. Both clocks are accessed via one sound generator's I/O ports and are powered from the on-board battery, hence time, together with a calendar, are constantly available to the user.

23. If the Mullard clock IC is used, an alarm line is brought out to a plug and can be used to bring the system out of standby at any required time or date.

These are the main features of the board and they all combine together to give the Nascom user all those twiddly bits that aren't present on a standard Nascom.

Construction of the board is quite straight forward once you have made sure that all the track pins are in. The board can be built up in stages once the port I/O has been added along with the buffering. This means that it can be used solely as a video board or sound board, etc and the other parts added as and when needed. All the chips are reasonably easy to get hold of. A list of suppliers of the 'rarer' chips is supplied with the documentation to make things easier. The most expensive chip is the video chip at about £30 and to populate the complete board costs in the region of £70 which means that to add all the above features to your Nascom will set you back by between £95 and £100 which can't be bad. Some savings can be made by using a less accurate A-D converter. The one specified costs around £8 but for most uses the less accurate version at about £2 will suffice.

Programming the board is reasonably straight forward but it does involve sending everything through the ports. Routines to provide easy port and chip register access are pretty essential to make the most of the board.

All in all the board is very good and value for money it has to be bargain of the year. The main feature that I would like to have seen included on the board would have been some circuitry to provide a directly useable colour output, either ready for a colour TV or colour monitor. Bar this though, I do not think that the board can be faulted. Well worth the money.

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BASIC Bugs and Wordease Mods. for CP/M

Rudd Thornton

In his excellent article on labels for Xtal BASIC in Vol. 2, No. 4, Stephen Hope calls for reports on bugs in Xtal. I wasn't going to respond because I have had such fun and practical use from it in the last 3 and a half years that it seems like treachery to slight it. The program is excellent and it was two years before I uncovered a single bug. What prompts this letter is the TWO MINUTES it took to find a bug in the prestigious M-BASIC. Discussions at my local club suggest that there are plently more!

So, having made it clear that I think that Xtal is in a class of its own, here is my solitary bug:-

In expotential, the interpreter accepts an expression like
4.6789**0.5 (O instead of 0)
and returns a value of 1 (ie. the figure to the power zero)

Just for the record, the "2 minute bug" in M-BASIC5, try this:-

```
10 DEFBL A,B,C
20 A=3:B=4:C=B/A
30 PRINT C
```

As expected, C prints out as 1.3 recurring to 15 places. Now,try replacing line 10 with 'DEFINT A,B: DEFBL C' and see what happens - the last eight places are rubbish! This begs the question, why do people want double precision? To do maths of course. What functions does one use in maths? Why the numeric ones of course. (Yes, like log, sin, etc). And what is only available in single precision in M-BASIC? Yes, you've quessed!!!! Incredible but true, the internal functions are only single precision - a PET is as good at maths as that.

Wordease Mods.

Now for something more constructive. Here are the addresses to change to get Wordease working under CP/M on a Nascom with its screen mapped to F800H:-

12EB/EE/F8
1301/07/58/5E/63/99/AA
1474/D6
1554/5A/5D/65/6B/83/93/9B/A2/A5
1656/66/6F/97
1704/07/22/17/21/30/C6
1907/16
1B48/4E/51/59/6B
1C30/3D/5B/61/64/6C/7F/85/88/90/A4/B6/C8
1D53

And of course change 1010 to 7D if you have made a Nas sys 3 version of MONITOR.COM (what better name for this than NAS.COM?). With these mods. one can read in old tapes and print them, or save them to disk using the NAS.COM routines. I am working on a full CP/M version, perhaps next Xmas...

Easy 4000 Baud on a Nascom 2

Paul O'Higgins

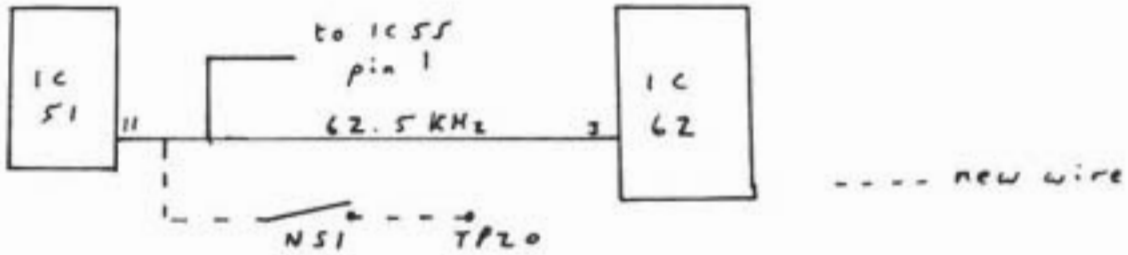
This article describes a very simple method of producing a high speed interface for the Nascom 2 enabling a whole 64K of memory to be dumped or recovered from tape in about 2 and a half minutes with the minimum of fuss.

The modification includes the commonly carried out 2400 baud conversion which, briefly, involves connecting:

TP21 to TP5
and TP20 to TP4

on the main board and then setting LSW2 switches 1 & 6 in the UP position.

A glance at sheet 2 of the Nascom 2 circuit diagram will show that IC22 generates a signal of 38.4 KHz to control data transfer and receive rates, thus is the limiting factor in the above 2400 baud modification. At IC51 pin 11 there is a signal of 62.5 KHz and by simply connecting a wire between IC51 pin 11 and TP20 we have effectively removed this constraint and the cassette receive and transmit rates are nearly doubled. (Purists, quite rightly, tell me that pin 1 of IC22 should be disconnected from it's socket to avoid problems with beat frequencies but I have not done this because of the bother of a second switch and have had absolutely no ill-effects.)



If the link between IC51 pin 11 and TP20 has a switch (NS1) then the following cassette speeds are available:-

Baud Rate	NS1	LSW2 1 2 3 4 5 6
300	OFF	D D D D D D
500	ON	D D D D D D
1200	OFF	U D D U D D
2000	ON	U D D U D D
2400	OFF	U U U U U U
4000	ON	U U U U U U

(D = down, U = up)

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A Neat Hardware Solution to fitting CP/M

Yet another article by P. Anderson (by request!!)

This article covers hardware modifications to a standard(??) Nascom 2 to provide the following functions. They don't sound much but it does provide single bit logical control either by switch or port control (and enables compatibility with EPROM/ RAM A cards where fitted).

Features.

1. Switch in CP/M Boot ROM.
2. Switch out Monitor ROM.
3. Move Video/Work RAM.
4. Automatic Reset on 'switchover'.
   This avoids over-writing due to a 'wandering' CPU and avoids the necessity on doing a Reset on each change-over.
5. Automatic 'switching' of restart address.
   This allows restarts at F000H plus any other Dil switch selected address of your choice.

These modifications have been found useful in fast changing from one system to another without the risk of corrupting the contents of memory so enabling the Nascom to get at CP/M!!

The modifications outlined (which are open to variation) also cover re-arrangement of the use of the workspace RAM and the BASIC ROM positions for those using EPROM cards. These enable a complete CP/M system on N2 & RAM cards whilst still retaining the use of the normal RAM / EPROM sockets for more useful applications than JUST CP/M.

CP/M / Nascom Switching.

Fig. 1 shows the physical wiring arrangements. The 74LS157 is a Quad 2-line-to-1-line data selector and provides 4 'change-over' switch functions (operating active High). These are:

1. Disable Monitor ROM.
2. Enable CP/M ROM.
3. Move Video & Work space.
4. Change Reset address.

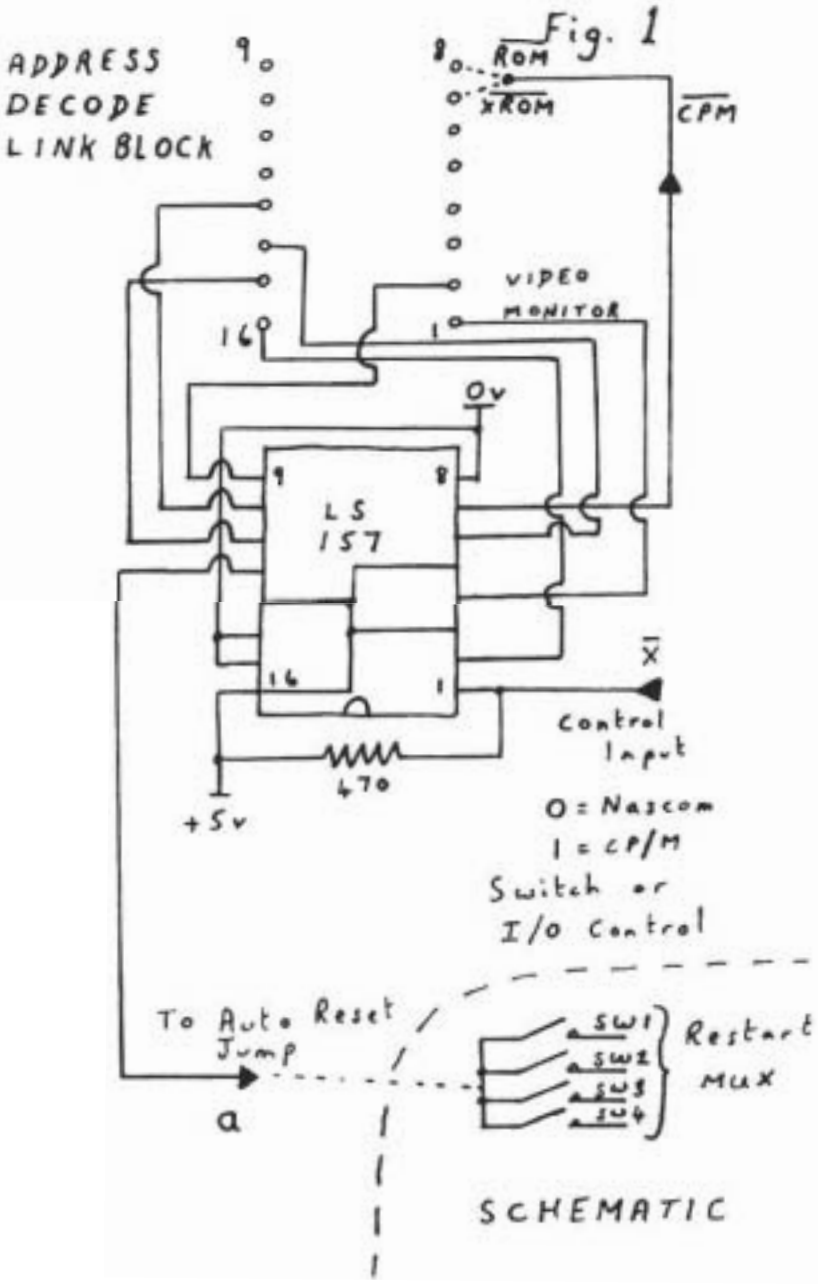
In 1 & 2 the Chip Enables are high when not selected, 4 is optional.

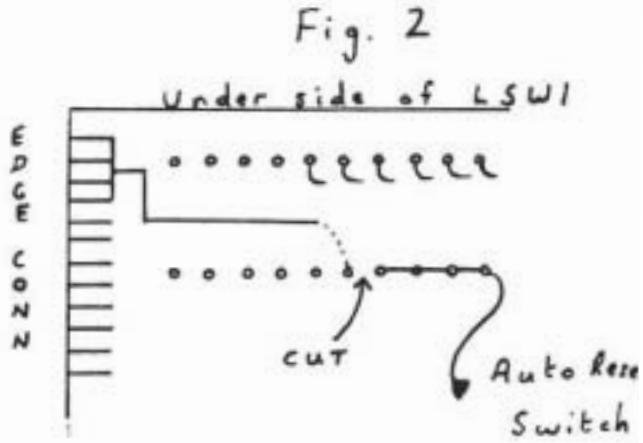
Fig. 2 shows the very simple track modifications to enable Reset address changing. It involves cutting two tracks (the one on the upper PCB side is superfluous anyway - being a ground track which is bypassed several times on other parts of the PCB). The other cut isolates the ground connection to the 4

address select switches. When held low (normal) they allow normal address selection to your preferred address. When high all address bits will be high, ie. F000H for CP/M.

Fig. 3 shows the schematic diagram (you can work out the physical layout yourselves) for the Auto Reset on switch over. The circuit provides a low pulse to the Reset line whenever the state of the control line changes. The length of the pulse has been made quite long to ensure that the normal Reset timing capacitor is fully discharged. If reset of your ports is not required then the reset can go direct to the CPU, Bus pin 14 which is much faster and therefore safer. (Funny arrangement that - the PIO's are not reset by the CPU reset line on power up, only when you press the reset switch!!).

Figs. 4, 5 & 6 show the various things that can be done with the BASIC ROM and Workspace RAM sockets to use up the spare locations. (I put my Workspace RAM in the BASIC socket and the CP/M ROM in the X ROM socket mainly for ease of changing the CP/M ROM later - it's more accessible (in my system) and it does not require mods to the socket or wiring direct to the ROM's pins.





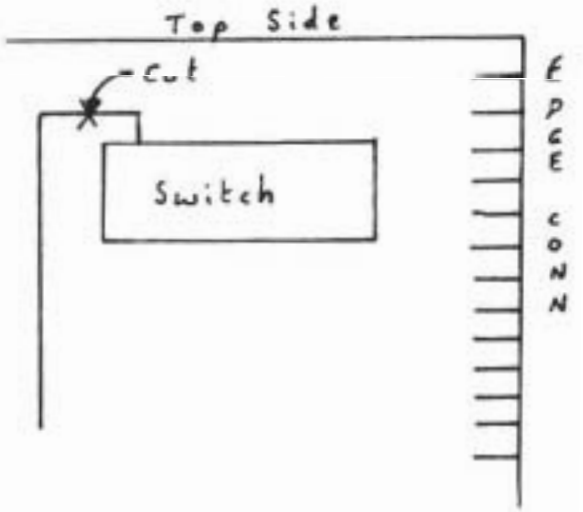


Fig. 3 Auto Reset

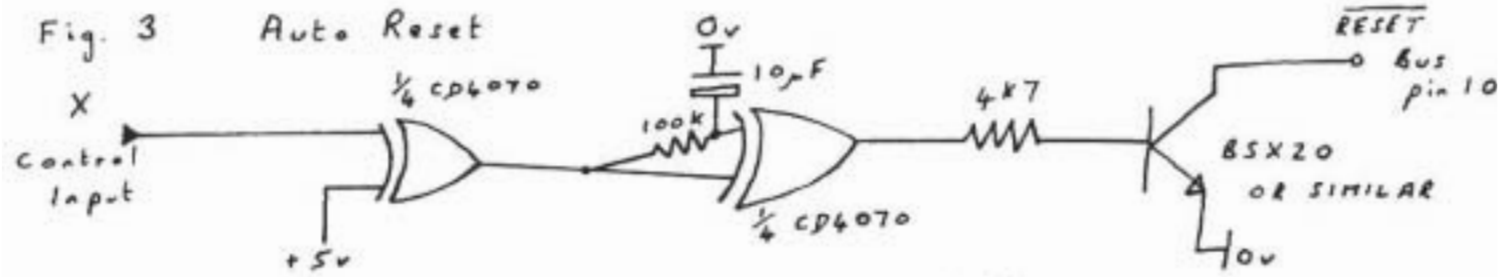
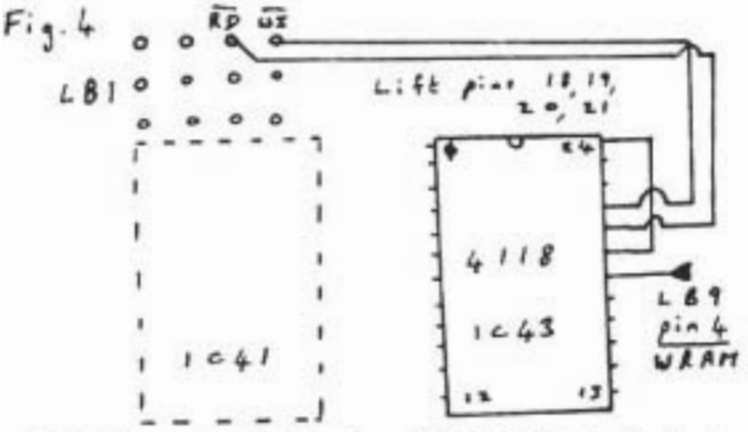


Fig. 4



Fitting 4118 into BASIC ROM Socket

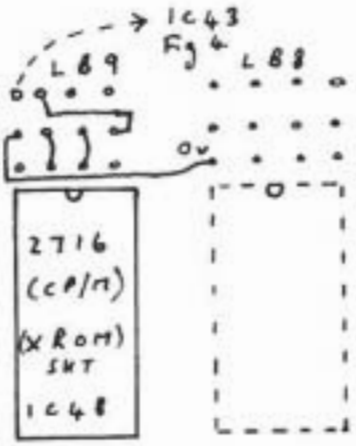
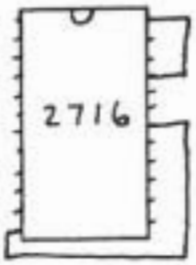


Fig. 5

Fitting 2716 into XROM Socket (for CP/M)

Fig. 6



Lift pins 21, 18 (V_{PP}, $\overline{CE2}$)

Fitting 2716 into BASIC ROM Socket (For CP/M)

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Facilities are provided for a second EPROM character generator which can be switched under program control. On board software has also been incorporated, providing full screen and keyboard handling together with a CPM boot, making the card extremely easy to use. During normal operation the screen is out of the Z80 memory map and is switched into the map only when video RAM access is required. Simply, the sequence of events is as follows. Page in the video card (at any 4k boundary selected under software control) Call onboard relocateable software and then page the card back out again. The result is a fast memory mapped screen that occupies no space in the memory map, enabling, for example, the implementation of a full 64K CP/M. Clearly this exciting new product can be used in many applications, for example it is possible to run a complete 64K CP/M computer with only two 8" by 8" cards by using the MAP VFC card and a Gemini 813 CPU card (and don't expect it to remain the only memory mapped CPU card for the 80 BUS).

As the project progressed it became apparent that there was plenty of space available and we are therefore able to offer the following optional extras. A KEYBOARD PORT for either 7 or 8 bit parallel ASCII keyboards with either positive or negative strobe has been incorporated on the card. Light pen facilities are available if required. For the Nascom owner a special VIDEO SWITCH can be fitted which would allow the user to select an alternate screen (eg original Nascom screen) under software control.

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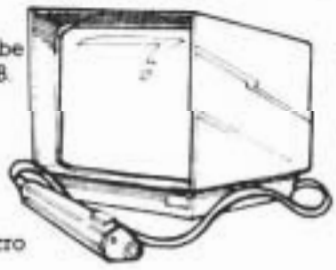

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Why Nasprint-80?

by D. Munday

To begin with, what is Nasprint-80 or, to give it the full title, Nascom Printer Drive and Formatting Package for the Epson MX80? Basically, it is an attempt to direct the printed outputs from all of the standard Nascom software, eg. NASDIS, ZEAP, etc, through a common printer drive routine, from which the text or listings etc can be printed and formatted into pages as required. The most important criterium being ease-of-use while giving it maximum flexibility. But, before giving a detailed description of what Nasprint-80 can do, it may be of interest to a number of people to know how the program began and was subsequently developed.

Like many people, I expect, who built their Nascom 2 and eventually got it working, there was a problem of what to do with it after the Martians had finally invaded Earth. I decided that it would be worthwhile to equip myself with a printer and, as it happened, an Olivetti TE 300 teleprinter came my way. With a small hardware addition to the printer, I was able to write a short program to drive the printer through the Nascom PIO and was quite delighted when some totally illegible garbage was printed, which, incidently, was different to the garbage that was typed in. Still, it was a start. In fact, that was the beginning of Nasprint-80, although I was unaware of it at the time.

The teleprinter drive routine was my first attempt at machine code programming although I had purchased a copy of ZEAP, NASDIS and DEBUG some time earlier with the intention of finding out what it was all about having grown tired of using BASIC. My only machine code experience prior to this was finding the bugs in a certain games program, O***llo, published by one of the national mags. So, armed with a couple of books and some articles on assembly language programming, I set about writing a program that would allow me to output listings and text from any of the standard software with the relevant output addresses being changed automatically.

Well, initially, progress was painfully slow with even the most simple tasks taking sometimes days to achive, only to give way to a better idea later on. A great deal of knowledge was gained from the assembly listings provided with the Nascom software, without which, I am sure you would not be reading this now. Unfortunately, the program's development stopped frequently because of problems with the teleprinter, it not doing as it was told. Eventually, after about 6 months, it gave way to an Epson MX80 as I ws spending all my time keeping the printer working, ultimately failing. However, by this time the program had developed to about 1K, half of that being tables and option menus, but the basic framework was formed.

Briefly, on executing the program, the user was presented

with an option table asking which piece of Nascom software was required to be printed, with the option of a second menu to select the various output options, ie. is a title required, page number, etc. Later, both option tables were included on the first screen. At this stage there was the option of using the keyboard as a conventional typewriter but this was removed as the Nas-sys 'H' command was almost identical.

With the arrival of the Epson I suddenly began to see things in a different light. I knew that this particular printer was selling very well in the U.K., therefore, quite a number of Nascom owners were likely to purchase one. Consequently, I thought my little program, along with some changes to suit the Epson, might make a good magazine article.

There followed a very intensive period of programming to try and get the best out of the Epson and so what was initially a relatively simple program soon began to grow into something rather more involved. Allied to the fact that it was also being directed towards other Nascom users, it also had to be very easy to use.

It wasn't until I reached the part of the program that dealt with Naspen that my problems began. The Epson printer had the potential for correspondance quality printing as well as many functions like changing the print size etc. Obviously, for my own benefit, I wanted to make the most of the printers capabilities. So, I began looking at the larger wordprocessor systems to find out what facilities they offered in the area of text formatting and soon discovered that printer control codes embedded in the text was the thing to do. By trapping each character output from Naspen, embedded control codes can be intercepted , executed and then the codes deleted from the printed text. There were several decisions to be made at this point about the form that the embedded code should take and how to seperate the codes from the text. I eventually settled on using <> brackets to enclose the code but also made allowance for this to be changed if required. The parameters to be passed on to Nasprint-80 from the text could be in decimal as the program already had a routine to convert decimal to binary which was used in the page format parameters table, eg page length. But, there was still the problem of how to control the printer.

The easiest way, from the users point of view, would be to have a series of commands that performed specific functions in the printer. Unfortunately, the 2K set aside for the program was filling up rapidly and there was not enough room for a table the size that would be required for the Epson. Also, printer codes used on the Epson may perform different functions on other printers. Because of these problems I opted to simply output the hex. value preceeded by the output command, eg. <o 1B 45>. This command will tell the Epson to start printing in emphasised characters. Great, I had basically everything that I needed, but what happens if, in typing in a control code, you miss the bracket from the end ? ...@!'*%'£! There was obviously a need for some form of error detection.

Here it would have been nice to be able to point to any error on the screen before the printer started printing. Unfortunately, this was not possible and the best solution I could arrive at was, having detected the error during printing, stop printing, print the Naspen line number where the error occurred along with an error code and then return control back to Naspen.

By this time, all of the allocated space had been used and considerable effort was put into reducing the code required to perform the various functions, not wishing to remove any options or abbreviate the option menus. This entailed optimizing any code that was duplicated and/or adjusting routines so this could be achieved, along with the removal of any redundant code. Finally, some nine months later, it all slipped neatly into a 2K EPROM along with the inevitable bug or two which were later sorted out, with more code compression required. The ZEAP source code ultimately stretched to 21K.

There followed several weeks of documentation writing. The only difficulty here was getting all the information onto paper in such a way that other people could read and understand it. However, by the time it was completed, it had grown too large for a normal magazine article as I had intended, so, I submitted it to Micro Power for evaluation, after which you can guess the rest. So, a small word of advice to any would be programmers. If you think you have a good idea, get down and do something about it. It may not develope into anything, but you can not tell unless you try.

Finally, a brief description of what Nasprint-80 can do. It is a 2K, EPROM-based program which is normally located at B000H and which will operate at 2 or 4 MHz with either Nas-sys 1 or 3. It allows paginated or continous output from DEBUG, NAS-DIS, NASPEN, ZEAP and Nas-sys. With Naspen, however, up to nine different control codes may be embedded in the text to control the output format or the printer directly, during printing. Page lengths may be defined up to 255 lines with an optional title heading the page, and page number, at the foot of the page, from 0 to 999 beginning anywhere within that range. Both the title and page number may be placed in any position at the head and foot of the page respectively with the option of auto title centring if required. Page format changes, outside Naspen operation, are achieved by editing a default table before returning to the main program. All values used in the table are in decimal and default to standard fanfold paper (9.5" x 11"). Output to the printer is via the Nascom PIO and no additional interface is required.

Although throughout this article I have specifically referred to the Epson printer, other parallel printers may be used. Should your printer not be compatible with Nasprint-80 your own output routine can be incorporated and substituted by giving its address as a second argument at initialisation.

REVIEW OF NASPIC

by D.J. Plews

What is NASPIC ? - It is a 2K machine code utility program for the production of 'pages' of graphics for BASIC. The pages are produced with the help of NASPIC and then appended to the end of a current BASIC program. RUNning the program results in the 'page' being PRINTed.

What do you get ? - NASPIC on tape residing at 1000hex to 1800hex (it is fully relocatable so it's EPROMable!) or 2K of EPROM (again which may be plugged in anywhere) and a four page 'manual'.

What are the commands ? - There are fourteen commands in all. Taking them in alphabetical order :-

C - CHARACTER mode. The entire character set is displayed on line sixteen with a flashing non-destructive graphics cursor. This cursor may be used to scan along the 256 graphics characters by use of the keys <[> and <]> for left and right respectively. By using the normal cursor control keys the 'drawing' cursor may be positioned on the screen at the desired point and pressing the space bar will result in the chosen graphics character being printed there. By repeating this procedure it is possible to quickly build up a pretty picture of your own design. To return to normal mode i.e. MOVE, press <ENTER>.

CS - CLEAR SCREEN The screen may be cleared by <SHIFT/BACK-SPACE>. To prevent accidential erasure of the screen a <Y/N> prompt request occurs. If <Y> then after the screen is cleared the cursor returns to HOME and MOVE mode is entered.

D - DRAW mode. The flashing non-destructive 'drawing' cursor can be moved about the screen by using the normal cursor control keys. It will leave a white 'line' behind it. The resolution is 94 x 42. There is no wrap around over the edge of the screen.

E - EDIT mode. The start address of a previously 'compiled' NASPIC page in the BASIC program is requested which is then transfered to the screen for editing. If there is no page or it is of incorrect format the transfer still occurs but with spectular and fortunately non-fatal results. The cursor is sent to HOME and MOVE mode entered.

H - HOME. This moves the cursor to its home position i.e. bottom left hand corner of the screen. It also causes the program to enter MOVE mode and resets the LSP (last saved

point) to HOME.

J - JOIN. This joins the current cursor position to the LSP (last saved point) with a white 'line'. By 'line' I mean the shortest distance between the two points using the block pixel graphics. This usually resembles a 'staircase' ! The LSP is reset to the current cursor position. 'Line' drawing becomes quick and easy !

M - MOVE. The cursor may be positioned anywhere on the NASPIC page by use of the normal cursor control keys. The cursor is blinking and non-destructive. There is no wrap around. The NASPIC page is from line 1 to line 14 inclusive.

O - OPTIONS. This command sets the rates for cursor speed and repeat. The cursor speed may be from <1> (fast) (and it is), to <9> (slow). The repeat is enabled by <Y> or disabled by <N>. For the repeat with NAS SYS 1 you need the Bits and PCs Toolkit.

P - PROGRAM. This compiles the current NASPIC page to a BASIC program and appends it to the end of any existing BASIC program (it doesn't matter if there isn't one). As in <CS> there is a <Y/N> prompt before the procedure is carried out. When 'compilation' is completed the user is returned to BASIC. N.B. BASIC must have been cold started before NASPIC can used to produce the final product.

q - QUIT. This clears the screen and returns the user to NAS SYS. It's a bit of pity you don't have the option to chose between NAS SYS and BASIC.

R - RUBOUT. This is the opposite of draw i.e. it leaves a black 'line' behind it. However, any Character cell not containing pixel characters is blanked out. This means you can't draw black (and for that matter white) 'lines' through your graphics and text characters.

S - SAVE POINT. The current cursor position is set as the LSP and is of course for use with the JOIN and UNJOIN commands.

T - TEXT MODE. The keyboard is now enabled and text can be entered on the screen. The repeat key is disabled to prevent keyboard 'bounce'. The left and right cursors provide wrap around on the same line. The entire graphics set is again available to the user but of course to enter a graphics character you need to know the right combinations of keys to get them. Hence the the rather clever idea of the CHARACTER mode.

U - UNJOIN. This is the opposite of join i.e. it draws a black 'line' from the current cursor position to the LSP.

Running NASPIC

Like anything it takes a bit of getting used to, but once there it is really quite easy. There's no more tedious mucking about trying to remember how to get the 'funny-bent-thing-with-a-blob-on-the-end' out of the keyboard or having to print strings of CHR$(n). And it is FAST.

The BASIC program produced consists of 14 lines (line numbers in increments of ten) the format of each being :-

<line No.> PRINT"---- 47 chars ----"

NASCOM BASIC doesn't print the graphics characters when LISTed so what you see is 'garbage'. These lines cannot be edited in BASIC, even with the TOOLKIT as they are too long. However, it should be possible to edit such lines in BASIC if you have EBASIC by Level 9 Computing. When listing with this utility program the graphics characters are shown as they will be PRINTed and the EDIT command allows the EDITing of BASIC lines up to about 700 characters long ' Of course you can go back and EDIT them in NASPIC - probably much easier.

Disadvantages.

The advantages are clear, so what are the disadvantages and/or annoyances ? Well the lack of wrap around is certainly a nuisance and the lack of use of the normal line editing facilities of NAS SYS i.e. opening lines with <SHIFT/CURSOR RIGHT> etc. can be frustrating at first as it is usually second nature to NASCOM owners. But I forgive the writer of NASPIC (Peter West by the way) as it would certainly have complicated things for him. After all, there are only so many things you can cram into 2K. A few other annoyances are apparent as described above.

SUMMARY

Overall NASPIC is a well presented, easy to use and very useful graphics package as an adjunct to BASIC programming. However, there is no need to limit it's use to BASIC. It should be possible to extract the code out of a BASIC program for use with machine code programs, etc. It certainly comes a lot cheaper than some graphics packages for NASCOM BASIC being advertised at the present time.

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Computer Clubs.

The Birmingham Nascom User Group inform me that they meet on the last Thursday of every month (except December) at 8.00p.m. in the upstairs room at Davenports Social Club, Granville Street, Birmingham (behind the brewery, off Bath Row, near the Birmingham Accident Hospital). The club secretary is Martin Sidebotham who can be contacted at home on 021-744 3093 for further details.

The Merseyside Nascom User Group (or the Liverpool Club) meet on the first Wednesday of each month at the Liverpool pub not far from the Pier Head.

The Leeds Microcomputer User Group meet every other Thursday (next meeting is the 27th January) at 8/8a Regent Street, Chapel Allerton, Leeds 7 at about 7.00p.m. This is not a purely Nascom club but there is a strong Nascom membership.

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Answers

Further to the request to tie up the Nascom 1 and 2 ports, Mr. Marshall of Huddersfield has provided the following:-

PIO	Nascom 1	Nascom 2 Port A	Nascom 2 Port B
+5v	16	20	22
0v	9	16	18
data 0	1	13	10
data 1	2	15	8
data 2	3	17	6
data 3	4	19	4
data 4	5	21	2
data 5	6	23	1
data 6	7	25	3
data 7	8	24	5
STB	11	11	9
RDY	10	7	12

Many thanks and I hope that this will be of use for people converting projects from Nascom 1 to 2 and vice-versa.

Questions

Mr. Edgar of Renfrewshire has written to me asking for for help in interfacing an IBM Selectric Golfball printer to a Nascom 2 and also on where to get more information on the ACCULAB interface unit. If anyone can help on these I would be happy to publish it.

If anyone out there has a Pluto system and wants to get in touch with any other Pluto users, if you write to me I will pass the names onto a lonely Pluto user who wishes to meet others.

Now that there is an outlet for information via Nascom News we shall be using this in the future to notify you of new developments and to pass on information about existing products. Consequently NAS-DOS and MANOR owners should watch these pages for their future news of these products, rather than receiving their own special newsletters.

A number of items appear in this issue directed towards existing software owners. We are also bringing you news of changes in documentation, information on some hardware standards and more information on the AVC (Advanced Video Controller).

If you would like to suggest any topics for inclusion in these pages please drop us a line.

Mike Hessey
Technical Manager

1. Nascom documentation

We are making strenuous efforts to improve both the content and presentation of our manuals (no rude comments please!). As a result we will be introducing a set of 8 uniform A4 size ring binders (4 rings to stop the usual problem of the punched holes wearing and the pages becoming dog-eared). Each will cover a specific topic of hardware and/or software. Manuals for individual software packages will be supplied pre-punched ready for insertion in the appropriate volume (or in your own binders if you prefer). In the case of volume 1 (Nascom 3) and volume 6 (the AVC) which refer to a single product the binder will be supplied with the product. You will be able to buy these binders separately from your dealer, together with all the individual manuals, if you wish to update to the new standards.

The 8 volumes are as follows:

Volume 1	User Manual - Introduction to BASIC, NAS-SYS 3, Hardware Manual
Volume 2	Personal Data File - Space to file your technical literature, data sheets etc
Volume 3	Hardware Options - RAM-B, Power Supply, I/O Board etc
Volume 4	Operating Systems - Polysys 4, NAS-DOS, CP/M, CP/M terminal
Volume 5	System Software - Pascal , ZEAP, NAS-SEMBLER, NAS-DIS, DEBUG etc
Volume 6	Graphics Manual - AVC software and hardware

Volume 7 Applications Software for NAS-SYS and NAS-DOS - NAS-PEN, SPEX, NAS-CALC, MANOR etc

Volume 8 Applications software for CP/M - FINAS, FMS 80, Calcstar, Wordstar etc

Of these manuals the whole of volume 1 is completely new except for the NAS-SYS 3 manual, which is merely a reprint using a daisy-wheel printer. In almost all cases the manuals will be typed using a daisy wheel printer with a standard type face (prestige elite at 12 characters per inch, 70 characters per line). So far the MANOR and NAS-CALC manuals have also been reprinted in the standard format, and others will follow in due course. NAS-DOS will probably be the next to be tackled, and will involve re-writing some sections. Incidentally most of the manuals are now being prepared using the SPEX word processor. NAS-PEN will continue to be available and is a super word processor for its size, but for the NAS-DOS owner SPEX does have a number of advantages (see the next section!).

2. NAS-DOS - Pascal and SPEX

NAS-DOS is our own low cost disc operating system, and is compatible with all Our NAS-SYS software - ROM BASIC, NAS-PEN, ZEAP, NAS-DIS and Pascal. In addition we are adding new applications software to increase the versatility of the machine. All this software is priced very modestly, and therefore we think that for many users with a limited budget NAS-DOS is an attractive proposition compared with CP/M. At the moment we have already released NAS-CALC (a spread sheet program) and MANOR (a data base manager).

SPEX is a powerful word processor package intended for the disc user. It is loaded into RAM, and occupies about 12K. It is not intended as a replacement for NAS-PEN, which with its compact size and availability on EPROM is particularly suited to the cassette user (although as we have said already it can be used perfectly successfully with NAS-DOS). The particular advantages of SPEX are:

Integrated disc commands
Greatly extended editing functions, and NAS-SYS compatible use of the cursor
Improved (and variable within the text) width and margin inset facilities
Scrolling via the cursor (it never goes off-screen!)
Automatic paging
Elimination of the need to perform a formatting operation
Generally no need to hyphenate - and then have to change hyphenation if the text is changed

Unfortunately the editor asked for this contribution to be produced using NAS-PEN, so on this occassion I have had to go back to that package. However for ease of use most of the new manuals are prepared using SPEX.

Other people are now developing NAS-DOS extensions for

existing software. I would particularly like to mention Business and Leisure's PASCLDOS, which in conjunction with our existing Pascal provides many useful toolkit and disc access operations. Having used this recently I can vouch for its performance - a really well produced item. Documentation conforms to the present (but not necessarily future) A5 format of the Pascal manual - but I don't think much of the cartoon on the front cover! As that is the only criticism I can level at present I think it speaks for itself.

Incidentally it is definitely a more polished DOS extension than the one which we offer ourselves.

B and L have also produced some NAS-PEN extensions (by a different author). While these are quite effective and are well implemented I personally much prefer the entirely new SPEX package - B & L prefer their extensions, so perhaps you should wait for an unbiased review of both elsewhere in this magazine in the future!

As well as NAS-DOS we fully support the standard CP/M version 2.2, and we have available a number of extremely powerful software packages. More information on these another time.

Look out for more news on applications software in the future - remember that we will be producing more software for NAS-DOS and CP/M for use on our computers and disc drives.

3. MANOR

There is little to report on this occassion. I have received two reports of a problem with the CReate option of HINTON, although I have not yet been able to produce the reported fault (an NF error) myself. When this is located a revised copy of the MANOR disc will be issued to all registered owners. This will include a number of minor changes which increase the speed of operation. In particular a version for those of you using a short key field (typically 10 characters or less) will be provided, which can dramatically improve the time required to load the index file initially. A revised version of REBUILD is also planned which should be of considerable help to those with very large files who have the misfortune to corrupt their index file.

If you wish to use the suggested method of creating an empty file which forms the structure for a standard application (eg parts lists), and then copy this whenever you need to start a new file I would make one useful suggestion. It is much easier and quicker to copy an empty file structure using the NAS-DOS utility FILCPY than to use the CReate option of HINTON. The CReate facility is really intended for those cases where you wish to change the structure of the file.

A few users do not seem to have appreciated the use of the second disc - as specified when you answer the 'Data file disc number?' prompt. To enable you to create data files occupying

the whole of a disc (76 tracks of 16 sectors each) it is possible to specify the data file to be on a disc drive other than 0, so that this disc can be dedicated to the data. However, the index file for any application must ALWAYS be mounted in disc drive 0. In a similar vein I have seen some users loading MANOR and UTS from their original master disc and then changing the disc in drive 0 for their own data (and index) disc. It really makes it much easier to use the system if you copy at least MANOR and UTS (or even all the files) from your original master disc onto any disc you intend to use for MANOR. In this way the disc becomes self-contained, and you don't need to keep swapping discs. It is only if you want to create really big data files that you need to remove the programs from the disc in drive 0, and even that requirement is largely eliminated if you use a separate data disc and only keep the index(es) on the disc in drive 0.

Incidentally if you intend inexperienced users to use MANOR (or indeed any application program) you can make life easier for them by using the NAS-DOS 'User boot' facility. This allows a specified program to be initiated simply by typing]U and pressing the ENTER key. Refer to your NAS-DOS manual for more details of this very useful, but underutilised, feature. The one point you should remember with the user boot is that it is NOT copied from disc to disc when the COPYDD utility is used - you will need to use separate]R and]W commands to copy the user boot sector (track 0, sector 1).

One further hint if you manage to delete your index file (the one suffixed I rather than D), which would normally prevent you doing a REBUILD. All you need in the index file to permit rebuilding is the file format information. Therefore you could insert a new disc (DON'T use the old one) and use HINTON to specify the number of records, fields, field names and widths in the usual way. Then use FILCPY to copy the index file (NOT the data file) which is created onto the old disc. You will then be able to use REBUILD to recreate the remainder of the index data from the data file. This will only work if you specify the same number of fields and the correct field widths as in the original file. If you are really desperate and don't have a note of this information you could resort to the NAS-DOS R command to read in the start of the data file, and examine the data in memory to see what format you originally used. The normal disc directory shows you where the data file starts. There is of course no reason in normal operation why any of these steps should be necessary - but if you inadvertently delete the wrong file and have no back-up (VERY naughty) it is reassuring to know what solutions (apart from suicide) are available.

4. Nascom extended BASIC

The tape version of the extended BASIC has been available for a few months now, and seems to have been well accepted. We now have an identical CP/M version available. The NAS-DOS version has been rather delayed, but is now confidently(?!) expected in January.

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Since the release of the tape version of Nascom Enhanced BASIC a number of minor problems have come to light, both in the interpreter and the manual. These have now all been corrected, but if you have one of the earlier copies you should check whether the following bugs have been corrected. When you have made any necessary corrections you should save a new copy using the W1000 4200 command in NAS-SYS (remember you should not copy over your original in case you made a mistake making these changes!)

4.1 Keyboard operation

KBD and KBD$ only work for shifted characters.

Modify 1439 (was 38) to 20

Auto repeat works correctly with INCH, but not with KBD. This is due to the fast keyboard check that is used between statements. You can enable auto-repeat with KBD as follows:

Modify 3A4F (was E3) to FE

Note, however, that this slows down execution by about 10% and so should be used with care and certainly NOT as a permanent modification.

4.2 ON ERR GOSUB

An error occurs after ON ERR GOSUB which results in a return to the monitor.

Modify 1652 (was C1) to: FE 90 20 18 2A 57 10 C1 C5 F5 7E B7 20 04 23 23 23 23 23 F1 E5 2A 51 10 E5 F5 33 C5

4.3 Tape system

Verify fails on data files of only one block length.

Modify 37DB (was 38) to 18 03

Tape loading and verification leaves the tape LED lit after an error has occurred.

Modify 3D53 (was CD) to 38 41
Modify 3D78 (was CD) to 38 41
Modify 4138 (was 00) to DF 5F C3 CD 15

4.4 RND function

The use of RND with a real argument of between 0 and 1, while of no particular use, causes the system to lock-up. In addition the use of negative numbers in the arguments (also of no particular use) returns a constant, rather than giving the error which it should.

Modify 2E01 (was 1B) to F7 24 7A B3 28 04 ED 53 1F 10 18 03

4.5 Formatting

The FMT command performs correctly except in the case FMT 15,n, where the correct number of figures is displayed, but the mantissa is rounded to one decimal place less than it should be. An example of this occurs in Chapter 4, where the result of doing:

```
FMT 15,2: PRINT 567.988
```

actually gives 5.70E+02, not 5.68E+02 as it should.

Modify 316B (was 03) to 04 E6 0F 3C C9 E5 E6 0F 3C 21 94 10 86 E1

4.6 EVAL

The use of the EVAL function on a NUL$ has a catastrophic effect.

Modify 24D6 (was 0B) to D5 ED B0 1B

4.7 Output devices

As stated both device 1 and device 2 may be used for a serial device. However, device 2 does not include the handshake facility of device 1 to allow for those applications where it is not required. A simple modification to the IO list would allow either the removal of the handshake from device 1 or the inclusion of it in device 2.

4.8 Manual

1. Our daisy wheel printer insists on treating the exponentiation symbol (up arrow) as a 3/4 - you may find instances in the manual where this has not been corrected.

2. In Chapter two the cursor movement keys should be indicated by the appropriate arrows in the single quotes.

3. In Chapter 3 page 19 the assignment LETAA=1+2*3/4 should of course assign the value 2.5, not 4.5, to AA.

4. The format of the IOLIST given in Chapter 4 in the first 50 copies of the manual is incorrect - the input and output devices are transposed. The list should read:

```
IOLIST DEFB  n    ; The number of devices used
       DEFW  OUT0   ; Output device 0
       DEFW  INP0   ; Input device 0
       DEFW  OUT1   ; Output device 1
       DEFW  INP1   ; Input device 1
.
.
       DEFW OUTn-1  ; Output device n-1
       DEFW INPn-1  ; Input device n-1
```

5. In Chapter 4 the example program given under the description of SEP should use the variable MNTH, not MONTH (MON is a reserved word).

6. In Chapter 4 the fourth example under FMT should show the result of PRINT 7895 as 7.89500E+03, and not as 7.895000E+03.

7. In Chapter 4 the parameters for the ZONE command are given in the wrong order. Zone can also be used as a function. The correct description is as follows:
ZONE <J1>,<J2> Sets the print zone (tab) width (<J2>), and the largest column for which printing to the next zone will stay on the same line (<J1>), known as the ZONE LIMIT. The default settings for these will vary accordingto the implementation, and are specified in the scratch-pad list in appendix B, as WIDTHT (zone limit) and ZWIDTH (zone width). The current values for these may be obtained at any time by using the ZONE as a function, ie PRINT ZONE(0) displays the zone limit, and PRINT ZONE(1) displays the width.

8. In appendix C, in the description of the routine LEN1, location TYPE should read NTYPE.

9. In appendix D the listing of the HOME command, the location marked 4263 should read 4262.

10. In appendix D the default pointers for the auxiliary tables are incorrect. They should read as follows:

```
3A80: 00 42   Start of auxiliary reserved word table
3A8A: 40 42   Start of auxiliary address table
```

If extra words are to be entered as temporary additions you should use the normal scratch pad locations as in appendix B. They will then be removed when you perform a cold start of the BASIC. If, however, the additions are to be permanent you should use the default locations given above. A cold start will then still allow you to use the tables.

5. Hardware connection standards

For the information of those of you not using Nascom 3's we enclose details of the external connector wiring arrangements which we use on the standard Nascom 3. In fact we had adopted these wiring conventions before Nascom 3 was introduced. If you use these conventions it will simplify moving periphrals between different Nascoms if you should ever need to do this.

The standards are described in Application Notes AN-0003 to AN-0005, which are reproduced below. Next time we will be printing AN-0006, which deals specifically with the connection of printers.

Nascom 2 and 3 cassette interface connections

The recommended connection used between the Nascom 2 and cassette recorder is via a 6-pin DIN connector. This allows use of either the high or low output to the recorder, and a connection for switching the recorder on and off by means of a 'Castle', or other, interface. The connections should be made as follows:

Nascom PL2 Con.	DIN Socket	Function	Colour
13	3	High output to cass.	Orange
14	4	Low output to cass.	Yellow
15	5	Ground	Green
16	6	Input from cass.	Blue
	1	Switching/Castle pin b	Black
	2	Switching/Castle pin a	White

This is the connector configuration fitted as standard to the Nascom 3.

Nascom 2 and 3 serial printer connections

Serial printers (and keyboard terminals) are connected to the Nascom 2 via the PL2 connector. External connection to the computer should use a 25-way D-type socket, which is connected to PL2 as follows:

PL2 Pin	D-type Pin	Function	Colour
3 *	3	Data received by Nascom	Orange
6 *	2	Data transmitted by Nascom	Blue
8 **	20	Printer handshake	Grey **
11	7	Signal GND	Brown

Pin 8 of PL2 should be connected to TP3 on the rear of the board for use as a 'handshake' line.

** The printer handshake at this pin is only at TTL (5 volt) level. Since many printers use a 12 volt handshake connect the grey wire from pin 8 to a diode (eg 1N4001), the other end of which is connected to another diode and a 1K resistor. The other end of the second diode is connected to pin 7 of the D-type, and the other end of the resistor is connected to pin 20 of the D-type. The cathodes of the diodes (usually marked with a bar) are connected together. This is the connector configuration fitted as standard on Nascom 3.

* These connections are suitable for the normal printers operating on RS232 and V24 signal levels, ie +12V and -12V. For printers using 20mA current loop the input to the computer should be connected to PL2 pin 9 instead of 3, and the 20mA output to PL2 pin 12 instead of 6.

Please refer also to the data sheet 'Use of printers with Nascom 2 and 3' (Application Note AN-006).

Nascom 2 and 3 parallel port connections

The recommended connection between the Nascom 3 parallel PIO port, PL4, and an external connector is by means of a Scotchflex cable, using a 25-way 'D-type' socket for the external connection. The D-type should also be of Scotchflex type, the

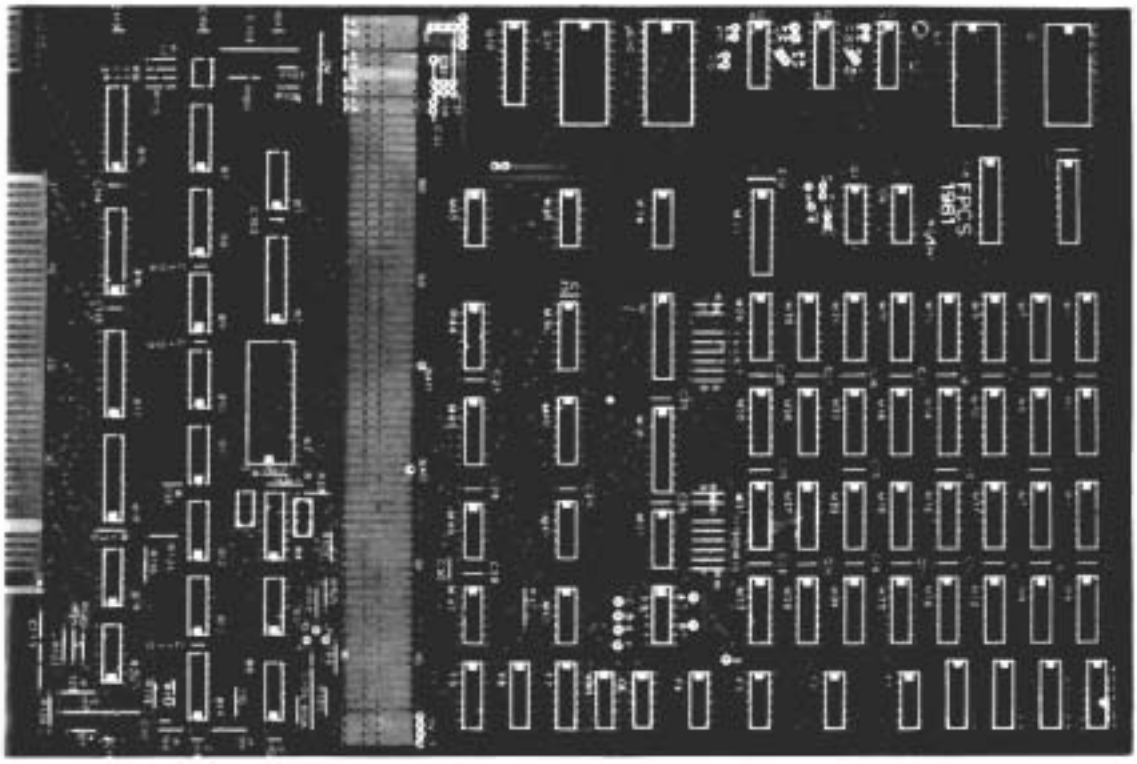
cable being connected so that pin 1 of PL4 is connected to pin 1 of the D-type. The 26th cable, from PL4 pin 26 is not connected, since it carries no signal from PL4. This is the cable/connector combination fitted as standard on the Nascom 3.

This leads to a rather arbitrary arrangement of the port lines at the D-type, but does mean that add-ons designed to connect direct to PL4 can still be easily connected merely by fitting a Scotchflex D-type plug in place of the header plug. The resultant allocation of pins is as follows, colours refering to multicolour Scotchflex cable (where grey cable is used the marked line should be connected to pin 1):

PL4 Pin	D-Type Socket	PIO Function	Colour	Parallel Printer
1	1	B5	Brown	7
2	14	B4	Red	6
3	2	B6	Orange	8
4	15	B3	Yellow	5
5	3	B7	Green	9
6	6	B2	Blue	4
7	4	ARDY	Violet	
8	17	B1	Grey	3
9	5	BSTB	White	
10	18	B0	Black	2
11	6	ASTB	Brown	
12	19	BRDY	Red	
13	7	A0	Orange	11
14	20	No con.	Yellow	
15	8	A1	Green	1
16	21	GND	Blue	14
17	9	A2	Violet	
18	22	GND	Grey	
19	10	A3	White	
20	23	+5V	Black	
21	11	A4	Brown	
22	24	+5V	Red	
23	12	A5	Orange	
24	25	A7	Yellow	
25	13	A6	Green	
26		No con.	Blue	

6. The Advanced Video Controller (AVC)

Next issue we hope to include, space permitting, the first part of an article on the AVC by Peter Horton, who designed the card and wrote most of the support software. We will continue this article next month. In a future issue we will be describing how to make use of animation with the AVC.



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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:-

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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
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