inmc news issue 4

I must say I am enormously impressed with the continuing standard of newsletters that your Committee is producing. I am sure you will agree that this fourth issue is yet again an advance. Many people have been good enough to write to me and mention their delight with the high quality of article and instruction that the previous three have contained. I think David Hunt and his colleagues deserve an enormous amount of praise.

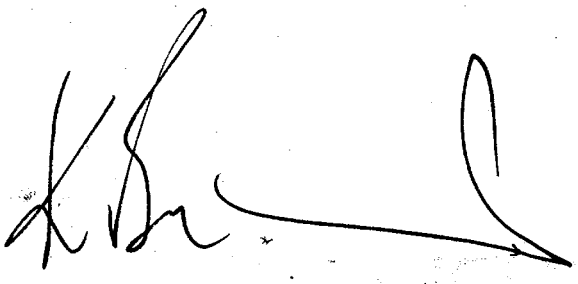
However, I would again, boringly, ask you all to search your desks and briefcases and minds and see if you cannot put pen to paper or printer to telex and send us something to include in the next one. As you will see, this fourth issue contains considerably more external product but it is still, to a great extent, produced by the few.

I am glad to say that many of the hobby clubs have now come forward with an INMC Committee Member and that we can soon produce an International Committee which represents the areas where Nascoms are dominating or just surviving. Obviously, as a Director of Nascom as well as the President of the INMC, I am delighted to find that most hobby clubs have more Nascom Users than any other single product and, in many cases, they are more than 50% of the club. I always tell people that this is because the dedicated members are highly intelligent and being highly intelligent they obviously bought Nascoms.

News from Nascom is that most of the products talked about by too many people for too long are, in fact, about to appear and as they will all tend to expand their systems the INMC should also expand with them and certainly the software library could become very interesting over the next year with large disc systems and with extensively programmable graphics.

Many people have been asking Nascom to make Nas-Sys available to the Nascom-1 Users. Although quite willing to do this, we are hesitant to suggest to somebody who has used a Nascom-1 successfully for many months that he should now change his monitor and start again. Perhaps you would drop us a brief note just mentioning whether you are for or against that. Please do not make it too long as we get hundreds of letters and just reading them takes a long time.

Finally, please note that the Nascom Marketing and Sales Department, and therefore the INMC Secretariat, is moving back to 92 Broad Street, Chesham, as from 5th October 1979, and that all correspondence, etc., should be sent there.



Kerr Borland
President INMC

"WE DEPLORE THE ABSENCE OF AN INDEX"

TIMES LITERARY SUPPLEMENT

ALSO TO BE FOUND LITTERED ABOUT THE PAGES OF THIS JOURNAL:

LITTLE KNOWN FACTS THAT NOBODY SEEMS TO CARE ABOUT-THE EDITOR HAS SCRAPED OUT HIS BRAIN AND KINDLY DONATED THE RESULT

THIS NEWSLETTER CONTAINS ONLY THE FINEST MATERIALS AND WORKPERSONSHIP. THE EDITOR HAS AT HIS DISPOSAL ADVANCED EQUIPMENT SUCH AS TINS OF SPRAY-GLUE AND TRENDY PENKNIVES. THE PUBLISHERS THEREFORE CONSIDER THAT ANY COMMENTS MADE UPON THE STRAIGHTNESS OF THE LAYOUT AND ACCURACY OF THE TYPING ARE SO MADE WITH MALICE AFORETHOUGHT, PROBABLY BY RIVAL PUBLISHERS; SUCH COMMENTS WILL THEREFORE BE FED WITHOUT FURTHER LET OR HINDRANCE TO THE OFFICE GOAT.

INMC4 IS NOT COLOUR-FAST AND SHOULD THEREFORE NOT BE WASHED WITH OTHER RAGS.

THIS ISSUE OF INMC NEWS IS GUARANTEED FREE FROM SMUT, SCANDAL, NAUGHTY WORDS, NAUGHTIER PICTURES, ANYTHING RELATED TO THE EDITOR'S WEEK IN COPENHAGEN, SWEARING ETC ETC; VERIFIED BY LONGFORD-WHITEHOUSE CYBERNETIC SMUT-SMASHER AND EROTICA ERASER (KINDLY LENT BY THE SCIENCE MUSEUM).

"WE DEPLORE COMPLAINTS"

THE EDITOR

EDITOR'S PAGE

I thought that it was about time to put finger to keyboard, to impart a little information, and to make a few observations.

The response to INMC3 was very encouraging and this issue covers fresh ground in devoting a large percentage of space to items received from INMC members. I hope that Doctor Dark's Diary will become a regular feature and that other contributors will come forward with series of articles to give the magazine the continuity which assists so much in creating a feeling of involvement amongst the readers.

Up until recently all mail addressed to "The Editor" has received a reply, even if this has only been in the form of a "plastic" standard acknowledgement form. As the volume of mail grows, continuing to do this unfortunately becomes both expensive and time consuming. In future, therefore, I would ask that if a specific reply be required then the writer should enclose a stamped self-addressed envelope - without this the contents of the letter will be noted and possibly put in the next magazine, the hardware library, or the software library but no reply will be sent.

The software library continues to grow and I hope that we will be able to announce the availability of a further batch of programs in the next newsletter. The INMC committee has been considering some way of rewarding contributors of programs and I am pleased to announce that it has decided to issue £5 vouchers that can be used to purchase programs in the library. These vouchers will be issued to the writer of any program that is made available in the INMC lists, and they will also be issued to the writers of those programs already on the list.

As you will see elsewhere in this issue, but I will still repeat it, the address for the INMC is changing. In future all letters should be addressed to:-

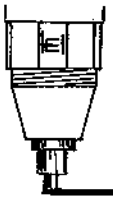
INMC
c/o Nascom Microcomputers Ltd.,
92 Broad Street,
CHESHAM,
Bucks, HP5 3ED

All correspondence concerning subscriptions, membership and orders from the library should be addressed to "The Secretary"; all technical queries, contributions to the magazine and items for the hardware or software libraries to "The Editor".

I trust that you will enjoy reading this issue and that you will find all of the items interesting, informative and inspirational! The INMC membership grows daily and I hope that shortly I will be receiving from you your comments, programs and articles so that the International Nascom Microcomputer Club can move further and further forward in becoming a true users club.

Happy Reading,

The Editor



letters to the editor

TREACLE DUCKS

Dear Sir,

Although I have been a keen radio constructor since a small boy and a Radio Amateur for a few years, I took to microprocessing like a duck to treacle. I don't know what I am doing half the time. However, that is a great improvement, as when I first received my Nascom 1, I didn't know what I was doing any of the time! (Incidentally, the hardware worked first time).

I must say that I am thoroughly enjoying myself although my garden has gone to pot and the house is falling down.

Much to my surprise and satisfaction I have managed to write 3 or 4 pretty respectable programs and when I can face the tedium of typing them out, I'll send something to the club. Many thanks for the newsletters. I have learned a great deal by taking the programs apart and making notes in a large book. An idea I strongly recommend to anyone who is lost in the wilderness. Compile a list of subroutines which could be useful. Write 'em, steal 'em, test 'em, file 'em.

When I finally emerge from this dark period, I hope to be able to contribute something more useful to the club. Meanwhile, please keep the newsletters coming. I lie in wait here, ready to pounce on the next one.

Finally, I wish I could figure out the interfacing to external equipment. For example, I would like to count incoming random pulses against a reference external clock, thereby having a constantly updated frequency displayed. I shall enjoy developing the software (getting confident now!) but can anyone help with suggestions for the interface?

Sincerely yours,

Ray Ridgwell
Gt Torrington

APPRECIATION - WE LOVE IT

Dear Sir,

Many thanks for INMC No 3, packed with the same invaluable tips and those eagerly awaited programmes .....what programmes!!

I've had a ball trying to land the lunar module into the deepest

of valleys.....I did it!!

Today I succeeded in getting all five 'chickens' across the road! I've been trying since INMC No 2.

The Othello programme was, in my opinion, absolutely first class and was far better than similar games being sold by software houses with a high price tag. For those wishing to play '2-player' Othello without the possible moves being indicated (a lot more fun I think) then change:-

ØD3Ø from 3D to 2E
ØE69 from 3D to 2E
ØE81 from 3D to 2E
Not forgetting of course ØF19 from C2 to C3

I would dearly love to comply with your request in sending lots and lots of programmes....but alas I am still struggling to acquire the 'knack'. I have most problems with that naughty monitor changing my nicely set-up registers each time it does a monitor routine....Oh! well, I'll keep trying and IF I eventually get a programme to run...you can have it!

Yours faithfully,

Les Carpenter
Watford

FROM A FRIEND

The Editor
INMC News

Can we expect four-letter words as well as good old fashioned swearing on the front page of the next INMC News? I hope not! It's such a bore.

SUPPORT YOUR INMC

Dear Sir,

I am amazed, totally amazed that out of the total membership of the INMC there is not one person who could come up with a solution to the puzzle in the last newsletter (issue 2). I managed to get the program working in about fifteen minutes from reading the puzzle and then decided not to send the modification in, as I thought it appeared so simple a problem that you would be swamped with answers!! I came to the right conclusion, as written in the latest newsletter (issue 3) but I got round the problem in a different way from your line of thought. This is the program complete with correcting instructions:-

```
AF       XOR  A
06 00    LD   B,0
3C       INC  A
27       DAA
37       SCF
3F       CCF
10 FA    DJNZ -4
E7       RST  20
```

It may not be the answer you expected, but it does work! The whole problem was that the carry flag kept setting and when the highest digit of the number in A is between 7 and F, the DAA instruction treats it as a NEGATIVE result of the last operation, and thus SUBTRACTS a value of 60 if the Half-Carry flag is reset, and if it is set, a value of 66 is subtracted (I hope that isn't too blurred).

Another thing which seemed a bit obvious, to me at least, was the name of program 32 in your list which even my neighbours' little girl guessed correctly as CHINESE CHEQUERS!! CARRE = 'SQUARE', CHINOISE = CHINESE.

I would like to say the standard of the latest newsletter was much better than the first two and I really enjoyed reading it. I do agree about the lack of participation of members in producing material for the newsletter, but I think this will soon change. One of the main reasons for the lack of "enthusiasm" must be the fear of making a complete fool of yourself; but if I am willing to take that risk, why can't they?

I would like to challenge every member of the INMC to write a letter, article or program for the newsletter and show their intellect, which up to now they seem to lack, if the puzzle is anything to go by! Let's hear about some of the uses that Nascoms are being put to apart from playing video-games and writing pages of notes for tape storage. I have developed a data logging system with mine over the last three months, and the finished system will become a saleable product for the company that I work for as Logic Design Engineer. If that puts you off, let me say that I have no qualifications whatsoever, and had to leave school before taking even my 'O' levels! I have had my Nascom 1 for just 9 months, and I knew very little about computers at the time I bought it. (I am 23).

Let's put some 'guts' into the INMC before the other clubs start to call us the Ghost Club or other unprintable nicknames, because that is what we will become before very long, if the silence becomes any more deafening than it is!! The only people prepared to do anything for the club at the moment are the team <u>producing</u> the newsletter and you can't expect them to do ALL of the work for the club - that means <u>YOUR CLUB</u>. Be brave - DO SOMETHING!

Thankyou for being such a patient committee,

Yours sincerely

D V French
Brightlingsea

NON-NASCOM SOFTWARE

Dear Sir,

I've just received INMC News issue 3 and enjoyed every letter of the script. I hope that it continues (through its members submitting things).

However, I feel that your reply to Mr Griffith left out much information, e.g. you claim that no information on the compatability of the CCSOFT Level B Basic was available. RUBBISH you just have to ask them. Here are a few items which may be of interest to Mr Griffith and perhaps others.

Level B Basic - a 2K Tiny Basic complete with an Edit command as in Super Tiny Basic (NASCOM). It also has PEEK, POKE, IN, OUT, USR commands. Level B Basic can record in DUMP or WRITE format, depending on which monitor is present - it tests it itself. Level B Basic will also work with T1, T2, B-BUG, T4 and probably NAS-SYS?? (*It won't- Ed.*) It is available on cassette or on 2x2708 EPROM's.

There is also an 8K Basic for Nascom from XTAL Electronics, this runs with T1, T2, B-BUG, T4 (one modification needed) and perhaps NAS-SYS?? (*It won't- Ed.*) This is really only a 7½K interpreter. Available on cassette only. It has an Edit command. It has all the Nascom 8K commands except NULL, SCREEN, LINES, WIDTH, DEEK, DOKE, SET, RESET or CLS, these commands are extremely useful, but it's not all that bad if they're not available.

There are also 2 more Basic interpreters available, a 4K floating point version of Level B Basic from CCSOFT and a 4K integer Basic from MUSHROOM - contains most of the commands in NASCOM and XTAL 8K Basics.

There also is another version of a Z80 assembler available from V & T Electronics, it is similar to the ZEAP.

There are some software packages which I've not included viz CCSOFTS SUPER DEBUG, OCTAL LOADER, RELOCATOR. There are probably more which I've not heard of or I've forgotten about.

On the subject of Z80 software from magazines there's a lot about. In Dr Dobbs there's a few Z80 programmes but there's masses of 8080 stuff including a TINY PLOT interpreter etc. Incidentally, there's lots of CP/M type programmes coming up in Dr Dobbs at present.

The same can be said about your list of hardware, at present there has been masses of Nascom compatible hardware put on the market viz joysticks, graphics, calculator chips, music boxes, CUTS tape interfaces etc. etc.

I myself have built a light pen (circuit from BYTE) which plugs in to one of the available PIO parts. In short Mr Griffith there's lots of hardware and software around and some which are easily modified to work on the NASCOM.

Yours sincerely

Peter Crilly
Glasgow

An interesting letter from Alan Inleson, of 27, Cecil Avenue, Great Horton, Bradford, BD7 3BW, who signs himself as 'a true Nascomaniac'. These are some extracts. (Well it was a long letter, and the Editor has to earn his keep).

Connect the master RESET of the UART (pin 21) to port 0, say pin 14 of IC41. Then use this simple program to switch the UART on or off.

```
3E 20       LD A, #20
CD 53 00    CALL FLIP
```

Pressing RESET will always enable the UART.

A simple mod to 'LOLLYPOP LADY' (the mystery program in INMC 2 Newsletter) so that 'newline' restarts the program.

```
DE9  CD 50 0C

C50  CD 69 00
C53  FE 1F
C55  C0
C56  31 00 10
C59  00 00 00 00 00 00 00
```

Finally, he would like to know of anybody who has an 8 track paper tape reader they wish to sell, he says he can find the cash if the price is right.

EXPANDING your nascom

Here is an extract from R. A. Brassington, of Wimbledon SW19. Remember, we asked for moans in INMC News 2, well we dealt with one last time, here's another.

"My moan I feel may apply to other users. This is my first venture into micro-computers - at least in hardware terms, and I decided to get myself a system with about 16K words. Working only from magazine adverts, I tried to order the bits I thought I needed."

"Even after the arrival of most of the bits, I still have not had any guidance on expanding the system with Nascom products. I think it would be very useful to supply with each kit (we presume he means 'with each Nascom 1/2 kit.' Ed.) a brief description of the expansion units and assemblies. It would save others the frustration that I have had, to find that after ordering a Nascom memory card and buffer board, I am still lacking a mother board. Etc."

It's a good idea, putting a products list in Nascom Kits, we'll pass that one on to Nascom. However your real course would be to seek the advice of someone competent. Your local dealer is probably the best person. From personal experience, don't write, phone. I bet you didn't know that to answer the sort of questions that this letter raises would take a three page letter, and dictating and getting it typed really costs 'a bomb'. Most likely the dealer would simply bung a leaflet in the post and leave it at that.

No phone him! If you have thought of all the questions you want to ask, then if you have a pencil and paper ready, the phone call shouldn't last more than 10 minutes, even long distance that won't cost more than 50p, and you'll have the satisfaction of knowing that you got the answers to the questions you asked.

Anyway, we'll give a brief resume of what is required to expand a Nascom system. With Nascom 1, the 43 way buss connector on the back of the pcb is only capable of driving a pretty miniscule load, and so some sort of buss driver is required. All this is taken care of by the "Expansion Buffer Board", which also includes a clock generator, and the neccessary logic to pulse the RESET line so that data in dynamic RAMS is not lost. The Buffer Board also generates (or makes use of) the additional control signals required for NASBUS which are not provided by the Nascom 1 buss connector. Note that the Expansion Buffer Board is not required with Nascom 2 as all these 'works' are contained on board.

The Buffer Board has to drive a 'BUSS', which in the case of NASBUS is 78 ways. Nascom provide two cards (known as mother boards). These are really glorified Vero boards in a non-standard Vero size. The "Mini-Mother Board" is about 4" long, and will accomodate up to 4 cards on 1" centres. The "Mother Board" is about 12" long and will accomodate up to 12 cards. For a modest system, not to be fitted in the Nascom frame, the Mini-Mother Board should be adequate.

Connection is made to the mother board using 78 way 0.1" card edge connectors, which are supplied in the buffer and memory kits.

Memory cards are available for NASBUS in 8K, 16K and 32K versions. In all cases the pcb and control logic is the same. The boards are organised in two blocks, and option links selected for different types of RAM chip. Sockets are provided for 4 2708's, and 16 dynamic RAMS. The 8K RAM kit is supplied with 16 MK4028 (4K x 1) RAMS, the 16K with 8 MK4116 (16K x 1) and the 32K with 16 MK4116. As far as we know, these memory kits are not available without the RAM chips.

If desired, the whole assembley may be mounted in a 'standard 19"' card frame, supplied by Nascom, but a bit of 'DIY' is called for, as the whole thing is very flexible in terms of layout, and careful thought is required if the frame is going to accomodate disc drives (when they appear).

We believe the disc drives will be supplied in their own case (which seems a bit silly if you have a gaping hole in your 19" frame ready for them), which will incorporate an additional power supply, as the standard 3 amp unit will be severely pushed driving discs as well. The "Disc Control Card" will mount on the NASBUS in the same way as the other cards, and is capable of driving up to four disc drives.

The I/O card (when that appears) is again a standard NASBUS mounting card, but will be supplied with the control logic chips only. The I/O chips will not be supplied allowing you to populate the board in the fashion required.

In general terms, all the parts to fit an expanded Nascom together are supplied in the kits, although the frame kit is a bit short on nuts and bolts for fitting a large number of cards. Well nuts and bolts are easily found.

WHAT'S AVAILABLE? WHAT'S AVAILABLE? WHAT'S AVAILABLE?

Many of you have enquired what Nascom products are available as opposed to "coming shortly ..... next week .... next month ...."

Some snooping behind the scenes reveals the following items to be generally available ex-stock:-

Nascom 1	Nasbug T4
3A PSU	Tiny Basic
Vero Frame	Super Tiny Basic
Mini-motherboard	8K Basic Tape
Motherboard	Zeap on Tape
RAM board (8/16/32K)	Z80 Programming Guide
Buffer board	

Also certain other smaller items such as edge connectors, Vero DIP boards, 2708s etc. are available.

There are several other products "in the pipeline" and we believe one or two to be virtually ready. The only real way to check up on the current situation is to contact either Nascom themselves or your local distributor.

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (1)

Did you know that as most of the machine code dumps that appear in this news letter were printed using the 'T' command (having set the 'X' command to drive the printer), and as the 'T' command outputs a checksum at the end of each line (then backspaces over it on the screen); you could type machine code into your Nascom using the 'L' command. Hence the whole exercise becomes self checking. No more errors from mistyped code. Think about that for a while!

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (2)

Did you know that to speed up the Tiny Basic you should use the 'LET' (or faster still, the 'L.') command as a prefix to declaring the variables. Thus:

```
  20 A=1;B=2;C=3;D=4 ..... etc, becomes
  20 L.A=1,B=2,C=3,D=4 .....etc
```

Note that the semicolons become commas to further speed up the process.

SPECIAL OFFERS you can't risk sneezing at

DJM SERVICES

Cassettes - Quality blank C12 cassettes. 5 for £3.20, 10 for £5.30
50 for £23.90, 100 for £45.80

TDK HD-01 Head Demagnetiser - To ensure optimum performance and reliability from your cassette equipment - £11.75

Racal Head Cleaner - Chromium oxide type for low abrasives and efficient head cleaning - £0.40

Books:-

Computer Programs that work - £2.90
Introduction to Personal & Business Computing - £5.00
Microprocessors - from chips to systems - £7.50

All prices include 15% VAT (where applicable) and postage. INMC members can obtain 10% discount.

DJM is at 82 Hilden Park Road
Hildenborough
Kent TN11 9BN

Phone: 0732 832815 or 357721

Memory Chips

16 x 4027 memory chips, second-hand £20.00
Contact Marcus Parker-Rhodes on 01-263-1997 or write to:
60 Birnam Road, London N.4

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (3)

Did you know that line number arguments can be appended to the 'RESTORE' command in the 8K Basic. Thus:

```
20 DATA 20,20,37,196,20,53,30
30 DATA 20,21,44,44,196,37,77,60
.
etc
.
100 RESTORE 30: IF X=Y THEN RESTORE 20
etc
```

Note that in the above example the 'RESTORE' command restores to the second line of 'DATA', not the first as would be more usual. Further, the 'RESTORE' to the first line is made conditional upon X and Y. Interesting ain't it!

humble π does it again

I recently assembled the Sargon chess program to run on my Nascom. The response time of this program was rather long so I tried running the system at 4Mhz and found that it worked well at this clock rate. Tiny Basic would not run, because the EPROMs are not fast enough, but all the other programs that I tried worked perfectly, with the single exception of ZEAP which produced garbled lines when assembling long programs at 4 Mhz. I fitted a switch in place of the clock select link on the buffer board so that I could operate the system at either speed, and as a result made an amazing discovery - a program that would run at 4 Mhz but not at 2 Mhz.

The program was suggested by the June issue of Creative Computing which published the value of pi to 8192 decimal places; no details were given of the method used, but I decided to try and write a program for Nascom to give at least as many places. I assembled the program with ZEAP and it appeared to work well, but I soon found that from the 160th decimal place the figures were wrong. I spent a long time over the next day or two looking for a software bug, with no success, and I was becoming obsessed by the problem when it suddenly started to give the correct answer. This was even worse, because I had not changed anything. It was quite a while before I realised that the clock rate was switched to 4 Mhz; returning to the standard rate caused the fault to reappear.

Further experiments showed that the result was only wrong when the program was in static RAM on the CPU board; in dynamic RAM it ran perfectly at either clock rate. I had just decided that there was some unexplained fault on the CPU board when I received issue 3 of INMC News, which suggested that noise could cause problems on early boards. "Bussing up" the ground and 5V rails improved the operation of the pi program - it now got the answer right up to the 450th place. As noise was apparently the cause of the problem I finally tried "bussing" the memory boards. I had not carried out this simple modification before because as far as I knew my system was free of "memory plague". This cleared up the problem entirely and as a bonus it has reduced the sensitivity of the system to external (mains) noise and improved the operation of ZEAP at 4 Mhz! Perhaps it would be worthwile modifying memory boards even if they don't suffer from the plague.

Presumably if I hadn't tried to run the system at 4 Mhz I would still be looking for the software bug!

J Haigh
Huddersfield

```
10    PRINT "8K BASIC PAGE"
```

Not too much about the 8K BASIC at this stage as there aren't many about yet, although with Nascom 2 just round the corner, there'll be plenty more soon.

Let's clear up some questions; the BASIC is compatible with both NAS-SYS and NASBUG T4 (it also works with T2, but you lose 'CSAVE'), and when you execute it, it's clever enough to sort out which monitor is in use. The main difference between the behaviour of the BASIC under NAS-SYS and NASBUG is the loss of the 'on screen' editing facilities under the latter. The 8K BASIC will finally be supplied in an 8K by 8 mask programmed ROM of the MK36000 series, and called "Nascom ROM Basic". Now this is a good choice of chip, as the legs are almost 2708 compatible. Where do the extra 3 address lines go, you ask? Well as the chip only needs a single +5 volt supply, two pins on the 2708 present themselves as obvious choices, and as you don't program ROMs, the program pin is the other. All this means that it shouldn't be difficult to adapt a Nascom series 1 memory card to take the ROM (at the expense of the EPROM sockets), and in theory, only three knife cuts and three wire links need to be added to the board to make it work. That's theory of course, we'll have to wait till we get our paws on one to prove it!

Now we have heard of one dealer who has a tape of the ROM (it seems that all dealers were supplied with EPROM versions of the ROM sometime ago) and is offering copy tapes with interim documentation at about £:45.00. What he says is that by paying now and taking the tape, you have paid for the ROM when it arrives, and of course have preference when his supplies of the ROM arrive. He also says he will charge or return any balances if the price of the ROM is different when it arrives.

This doesn't sound a bad idea for those who are that desparate for the BASIC, but of course there has to be a snag. The BASIC is designed to run in memory from #E000 to #FFFF and requires text space from #1000 onwards. This means that your memory has to be split into two halves, one at least of 8K contiguous memory, which in turn has to be located so that it will work from #E000 to #FFFF. That means you've got to invest in two 8K boards or have 32K of RAM on one board. Owners of 16K on one board (and from the sales thats the majority) don't get a look in.

So up gallop Nascom, to the rescue on their white charger, but like a lot of gallant forays of this nature it may be a mixed blessing. Nascom have re-assembled the BASIC to run from #1000 to #2FFF with text space starting at #3000, they call this "Nascom Tape Basic" ('CSAVE' works under T2 as well). The problem is that although the two BASICs are identical (in the way they work), tapes of programs generated using the 'CSAVE' command are not. The two versions of BASIC use different text space areas, and as 'CSAVE' calls 'Write' in NASBUG/NAS-SYS (or 'Dump' in T2) to output the data, then on 'CLOAD' the data will be reloaded to the wrong place (if at all) if not used with the same

combination of the BASIC and monitor as it was recorded. So what to do, your mate down the road has "Nascom ROM Basic" and you have "Nascom Tape Basic". First, don't give up, all hobbies ought to have a bit of frustration value built in otherwise you'll soon get bored. Go into 'X' mode in NASBUG T4/NAS-SYS (if you've got T2, sorry, you can't do it), then 'LIST' with the tape recorder going. Now all your mate does is to zap the tape in his recorder, switch on, and lo!, the BASIC thinks its got a super fast typist on the keyboard. Thats a bit simplified 'cos you'll have to output some nulls at the end of each line using the'NULL' command, and there's some snags there. Read the 'LITTLE KNOWN FACTS' spread about this newsletter.

Now for a couple of tips;

One feature missing on the 8K BASIC which is extremely useful on the (dare I mention it) Tandy TRS-80 Level II (which is a 12K extended BASIC by the way), is an 'INKEY$' command, it's a must for interactive keyboard games etc. What is does is scan the keyboard once, and if a key is down, return with its value. It doesn't wait for a key press like the 'INPUT' command. A simple bit of machine code fixes this.

```
For NASBUG T4
0C80  CD 69 00            CALL KBD       Scan the keyboard once.
0C83  38 04               JR C, PUTINB   If a char, go to PUTINB.
0C85  CB FF               SET 7, A       If no char, set bit 7,
0C87  18 02               JR RET         then go to RET.
0C89  47          PUTINB  LD B, A        Put the char in B,
0C8A  AF                  XOR A          then clear A.
0C8B  2A 0D E0    RET     LD HL, ABRET   Load HL with return address,
0C8E  E9                  JP (HL)        and jump to it.
```

It's a bit inconvenient to load that by hand, so lets turn it into BASIC and let it load itself.

```
10 REM   REAL TIME INPUT FOR NASBUG T4
20 DATA 27085,14336,-13564,6399,18178,10927,-8179,233
30 DOKE 4100,3200: FOR I9=3200 TO 3214 STEP 2
40 READ I8: DOKE I9,I8: NEXT

100 REM   TO USE
110 Z=USR(0): REM  IF Z<0 THEN NO KEY WAS PRESSED
120           REM  IF Z>0 THEN Z = THE ASCII  VALUE  RETURNED
```

For those lucky few with NAS-SYS, things are slightly different, and in consequence the routine is one byte shorter, thus:

```
For NAS-SYS 1
0C80  DF                  RST SCAL       Internal subroutine call
0C81  61                  DEFB #61       Table number for KBD
0C82  38 04               JR C, PUTINB        etc
```

Then as for the NASBUG routine

In BASIC it is similar to the above

```
10 REM   REAL TIME INPUT FOR NAS-SYS 1
20 DATA 25055,1080,-53,536,-20665,3370,-5664,0
30 DOKE 4100,3200: FOR I9=3200 TO 3214 STEP 2
40 READ I8: DOKE I9,I8: NEXT
```

The routine is used exactly as for NASBUG.

Just one more for NAS-SYS users, you will have noticed (and been annoyed by) the fact that you can't 'PRINT' on the top line of the screen. The is an unfortunate consequence of the cursor control of NAS-SYS. You get round it this way:

```
10 REM   PLACING TITLES ON LINE 16 USING NAS-SYS 1
20 Z$="TITLE": FOR Z=1 TO LEN(Z$)
30 POKE Z+Z1,ASC(MID$(Z$,Z,1)): NEXT
```

Note that Z1 is the start address on the top line
Min. value of Z1 = 3017
Max. value of Z1 = Z1+LEN(Z$) < 3065

So enough about the 8K BASIC for one session, it'll be a some time before many of you get round to using this bumpf, and by then you'll have used this newsletter for firelighters anyway. So don't forget our back issues service folks.

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (4)

Did you you know that if the TV sync. slips when displaying your Nascom, or that if you are lacking video drive to your monitor; that you could hang a 470R preset pot across the cathodes of D1 and D2 (a diode 'points' to the cathode by the way) and, having removed R8 and R9, feed the wiper of the pot to the modulator or monitor. Tweak for best sync versus best contrast.

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (5)

Did you know that if you fit the NMI generator described in INMC News 2, and make the leads too long, then spurious NMIs can be caused. Every time I turned the tape recorder off, so the damn thing would do multiple NMIs in the keyboard routine. Now you can't restart from an NMI in the keyboard routine!!! Sod's Law says that by having a multiple NMI you'll have screwed up something.

DOCTOR DARK'S DIARY

"It isn't in the book, so it doesn't exist"

Now that we all know that IX and IY will behave as if they were HL when asked nicely - but not always - (see issue 3 - Ed.) it must be time for the missing (and mysterious) CB instructions to see the light of day. Careful study of page 14 of the Hitch Hikers Guide to the Z-80 (alias the Mostek Micro-reference Manual) and meditation in a reverent posture has revealed all to me. The missing codes are CB 30, CB 31..... to CB 37. All the instructions on that page, with one exception, are in pairs; there should be a mnemonic SLL, but you won't find it. I think there were supposed to be eight instructions which shifted a register, or a byte pointed to by HL (and possibly IX and IY as well) one place left into the carry flag, feeding a zero in on the right of the register. Single step through this small program:-

```
0C50        06 8E       LD B, 8EH
  52        AF          XOR A
  53        CB 30       "SLL B"
```

You will find that bit 7 of register B has arrived in the carry flag as expected, but B is not the 1C it should be. A 1 has been fed in instead of the zero Zilog intended.

Having puzzled all that out for myself (honest!) the result gave me a feeling of deja-vu. Get out your copy of Personal Computer World (well, you should have bought it) Volume 1, Number 2, and turn to an item called "Four Easy Pieces". I knew it was there, somewhere, the joystick circuit on the same page works, too.

"The bit isn't displayed, so it doesn't matter"

If you have such a thing as a Nascom handy, execute this complex program:-

```
0C50        21 10 08    LD HL, 0810H
  53        36 7F       LD (HL),7FH
  55        76          HALT.
```

Now, replace the 7F with FF and run it again. Most of you got the same result both times, the others have been connecting things to the character generator socket. There are, you see, things available to the brave soul who wants graphics on his Nascom, called Bits and P.C.'s Add-on graphics boards. (We believe NM are up to something too - Ed.) These useful items produce another 128 characters, and make your Nascom even further ahead of those plastic boxes from across the Atlantic than it was. Trouble begins when you try to run a program that uses 00 and 7F to display the pieces for a game like Othello, for example. Mr Beal has written a fine program, but it uses FF, and on my screen it looks like Martian Hyper-Cricket (see my program, in INMC issue 476). Please folks, if you mean 7F then use 7F. Ta.

"The program is listed in Z-80 assembly language"

The quotation comes from the advertising material for a program called SARGON, which is a very good chess program, probably. What they should have said was, "listed in A Z-80 assembly language". It is in fact in something called TDL assembly language, and would run instantly on a Wave-Mate Jupiter III, which is probably a plastic box we haven't had washed up on our shores yet. There are some amazing mnemonics, for example ANI or LIYD and what on earth is MOV BOARD(Y),E ? To be as fair as possible, I should say that they do give a list of the more normal equivalents, but the program is very long and will take me years at my present rate of translation. Anyone got a program that could do the job???

"One of you is dead right, the other is less right"

If the 8K Basic works best with NAS-SYS, then I would like to use NAS-SYS. K*** B****** (the one who swore on page zero!) please note. At present, I am using T2, with Darkbug in the spare ROM socket. Darkbug? That is another story entirely, and one I propose to tell next time.....

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (6)

Did you know that NASBUG T4 and NAS-SYS 1 are specifically designed to ignore nulls output to the CRT routine. Therefore any program which is designed to output nulls via SRLOUT, using the 'X' command will not be able to do so, as CRT is called as part of SRLOUT, before the character is sent to the output port, and (of course) CRT throws the nulls away.

So, what to do? Well the simplest way is to write a routine which will:

1) Push AF
2) Call SRLX
3) Pop AF
4) Jump to CRT in T4

4a) or do a return if you don't want to print on the screen

Don't set any 'X' command, but manually change $CRT to the start address of the routine (don't forget this must be a double byte change).

Using NAS-SYS, put DF 6F at 0C79 and activate the 'U' command.

Of course this need not only apply to printers, for instance, if you wanted to change a tape recorded for Nascom ROM Basic to run on Nascom Tape Basic, you would have to make a 'LIST' to tape and output about 20 nulls between each line (to allow the text buffer time to clear before the next line appears), and this is the only way to do it.

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (7)

Did you know that Nascom and CC Soft (level B) Tiny Basics are quite compatible. The only difference is that whereas the Nascom uses the pound (or hash) sign to mean 'not equal to', the CC Soft uses the <>.

SOFTWARE TIPS - SHUFFLING

Suppose you have a list of values which you want to arrange in a random order, such as shuffling a deck of cards. There are many possible ways to go about it, and some ways don't perform a truly random shuffle and others take a lot of programming or a long time to execute. Here are some examples:-

1. SORT METHOD

Attach a random number to each of the items to be shuffled. Then sort the random numbers into sequence with a sort program. Then take the original items in this order. This method works correctly, and could be useful if you have a random number generator, a sort program, and lots of memory to run it all in and store the random numbers. It is impractical for our purposes.

2. OBVIOUS REPLACEMENT SHUFFLE

For each item in the list, i, where there are n items (FOR I=1 to N) generate a random integer j in the range 1 to N and swop item i with item j. This method may seem to work but it is incorrect. Some orders are more likely than others. Never use this method.

3. CORRECT REPLACEMENT SHUFFLE

Here is a correct method!
For each item i in the list of a items, but only up to n-1 (FOR I=1 to N-1), to as follows :-

a) Generate a random integer j in the range i to n.
   J = I + INT (RND (1) * (N-I+1))

b) Swop value i with value j.

This method is very fast, is easy to program, works correctly, and runs quickly. It can be easily programmed in BASIC or in machine code.

```
LIST

100 REM ** DEMONSTRATION OF CORRECT SHUFFLE
110 DIM A(10): N=10
130 FOR R=1 TO 8
140 REM ** SET UP VALUES AND SHUFFLE THEM
150 FOR I=1 TO N: A(I)=I: NEXT
160 FOR I=1 TO N-1
170 J=I+INT(RND(1)*(N-I+1))
180 T9=A(I): A(I)=A(J): A(J)=T9
190 NEXT I
200 FOR I=1 TO N: PRINT A(I);: NEXT: PRINT
210 NEXT R
Ok
```

```
RUN
 10  8  2  1  9  3  7  6  5  4
 9  2  10  6  3  1  7  4  8  5
 1  9  7  4  6  5  8  3  10  2
 2  9  3  6  8  7  5  4  1  10
 5  2  6  7  10  9  3  1  4  8
 10  3  4  6  8  7  5  1  2  9
 9  6  7  1  5  8  2  10  3  4
 6  1  5  10  8  3  7  4  2  9
Ok
```

ADD-ON GRAPHICS REVIEW

Members of the INMC may be interested by the following information about an add-on graphics unit, which I have just purchased and connected to my Nascom.

1) Manufacturer BITS AND P.C.'s of 8 Church View, Crigglestone, Wakefield, WF4 3PF.

2) Cost £32.75 in kit form. (Built for £2.50 extra).

3) Quality The board is single sided, tinned, well made. Sockets are provided, and are by Texas. The DIL plug used doesn't melt when soldered to, which is both sensible and rare.

4) Delivery Eleven days from posting the order.

5) Documentation Building instructions are clear and concise, but the two sample programs are a little less legible.

6) What It Does It extends the number of characters to the full 256 possible, using a 2708 EPROM to store 64 extra characters, each of which can also be displayed in reverse video.

   The characters provided are a good selection, and can be used to fill complete blocks of screen - none of the annoying gaps between lines produced by the standard set. Another EPROM containing Chess piece characters is available for an extra £10.

To sum up, a very useful extra, although the price does seem slightly high.

Chris Blackmore
Ilminster

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (8)

Did you know that tapes recorded for the Nascom Tiny Basic can be made so that they can be transferred to the CC Soft (level B) Tiny Basic. All you do is go into 'X' mode in T4, then 'LIST' (having turned the tape recorder on). To load the program, simply replay the tape. Thats the theory anyway, I haven't actually tried it, so perhaps someone can tell me if it works. Oh, by the way, you might have to output a few nulls between each line, as glossed over in LITTLE KNOWN FACT (6).

CHRISTMAS (ALREADY?) COMPETITION

Dear Editor,

May I propose a Christmas competition for the next edition of the Newsletter?

The computer games I have seen (Hangman, Mastermind, Moon-Lander) involve a personal confrontation between a computer and a human being, whose intellectual capabilities are put to some kind of test.

With the festive season in mind, I should like to see a prize offered for a different kind of game - one that can be really enjoyed by a group of mildly intoxicated non-computer-people.

The game must therefore satisfy the following criteria:-

1. It must be original.
2. It must involve several participants.
3. The rules must be simple, and must be displayed by the program.
4. The result must not depend directly on the skill of the participants.
5. The screen display must be easy to understand from a distance.
6. Input must not involve much typing skill.
7. A typical game must not last longer than, say, give minutes.
8. The game must be suitable for family entertainment.
9. The program must run on a minimum Nascom 1.

As obvious candidate is some variation on the old game of Consequences ("aaa met bbb at ccc; he said to her'ddd'; she said to him 'eee'; and the consequence was fff.") However, this is literally vieux jeu, and I am sure that your members could come up with something more original which could contribute to the hilarity of Christmas parties throughout the country.

Yours sincerely,

T.P. Goldingham,
Maidenhead

This sounds like an excellent idea, so we'll do it! Closing date for entries is 12th November 1979. All entries become the property of the INMC and may be added to the software library. Entries should be addressed to:-

Nascom Mircocomputers Limited,
92 Broad Street,
CHESHAM,
Bucks. HP5 3ED

THE PRIZES

There will be three prizes given, each of them a voucher to be used against the purchase of Nascom Equipment.

1st Prize	-	£50 Voucher
2nd Prize	-	£30 Voucher
3rd Prize	-	£20 Voucher

There is no limit to the number of entries per person, but prizes will be limited to one per person.

We look forward to an entertaining evening judging the entries.

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (9)

Did you know that back issues of the INMC News are available from the INMC. Send 40p (for each issue) and an A4 size stamped addressed envelope for the attention of the delightful Beverly (who seems to do most of the INMC donkey work for us except typing this lot which seems to be a co-operative effort; Ta girls) Price to non-members £1.00

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (10)

Did you know that we have had a large number of hardware tips sent in? So we intend to set up a 'Hardware mods' library in parallel with the 'Software' library. We hope to publish details in the next news letter. Lots of interesting goodies there, although a lot are variations on the same themes.

NAS-SYS ONE : a brief Glimpse :

Unless you haven't been reading these marvellous bits of prose we have been writing over the last months, you can't have failed to notice that we have mentioned NAS-SYS 1 on occasion. NAS-SYS is of course the new monitor for Nascom 2. Now the Nascom 2 is almost with us (at the time of writing), and as Nascom have agreed (at least in principle) to release NAS-SYS on an unsuspecting public, we thought we ought to let you know what you are in for.

NAS-SYS is an entirely new monitor, and is not compatible with software written to run under the earlier NASBUG 'T' series monitors. However, NAS-SYS is compatible with Nascom 1 hardware.

So having plugged in our brand new NAS-SYS, and not having bothered to read the words that come with it (on the basis of "If everything else fails, try reading the instructions"), what do we find?

Well, the screen blanks as usual, but displays "NAS-SYS 1" on the top left of the screen with a cursor (which blinks on and off) at the start of the line below. There is no '>' sign as a prompt. The screen "scrolls" from the top downwards; when the cursor reaches the bottom line the display starts to scroll up.

NAS-SYS shows it's parentage as being "from B-BUG out of NASBUG T4", as many of the commands have identical or closely similar functions with many detail improvements; the following are identical or similar to NASBUG:

A xxxx yyyy	Arithmetic - in Hex
B xxxx	Breakpoint at x
C xxxx yyyy zzzz	Copy from x to y for z bytes
E xxxx	Execute at x
G xxxx yyyy zzzz	Generate a self-loading tape
I xxxx yyyy zzzz	Intelligent copy
K xx	Keyboard options select
L	Load (NASBUG tape or paper tape)
M xxxx	Memory examine/modify at x
N	Normal I/O resumed
O xx yy	Output y to port x
Q xx	Query (input from a port x)
R	Read a tape
S xxxx	Single step from x
T xxxx yyyy zzzz	Tabulate from x to y in increments of z
W xxxx yyyy	Write a tape from x to y-1
X xx	External serial mode select

The new commands are:

H	Half duplex terminal mode
J	Jump to #FFFA - cold start BASIC
U	User specified I/O options select

V	Verify a tape
Z	Jump to #FFFD - warm start BASIC

Well this not so different from NASBUG so what is so new?

Firstly, as NAS-SYS was designed for use with Nascom 2, it handles a greater number of keys on the keyboard (a Nascom 2 has 57 keys I think), some of these keys are for the cursor control. But as NAS-SYS was designed on a Nascom 1 (as no-one had a fully working Nascom 2 at the time, about 28K of ZEAP source by the way), the cursor control keys had to be made to work using the Nascom 1 keyboard. With a Nascom 1 you use the control (@) key to obtain most of the new functions.

The most important feature covered by the new key functions are the cursor control keys. The cursor can be made to move non-destructively north, south, east and west, with additional keys to open or close a line. This allows comprehensive editing to take place on the screen. Now this feature would be pretty useless on its own, so, unlike NASBUG, where the line to be entered is always the bottom line, NAS-SYS enters what-ever line the cursor happens to be on at the time the 'new line' key is pressed. Hence editing an 8K BASIC program is a real dream, compared to using the BASIC under NASBUG.

Internally, well what can I say, ------ it's different! Nice old favourites like CHIN and CRT have disappeared (although not completely) to be replaced by single byte (RST) instructions, which in turn allow automatic use of the user defined input/output options (just in case the ones already provided don't quite do what you want). NAS-SYS also uses one RST instruction as the op-code for a two byte relative subroutine call, so you can write totally relocatable code if you have a mind to.

Now for the really clever bit. One RST instruction is used as the op-code for a two byte subroutine call to a table in NAS-SYS which contains the addresses of all the internal subroutines (the second byte being the number in the table). So goodies like TBCD3 and B2HEX are still there (and where they perform the same function as NASBUG, given the same label), so you simply use a two byte call to the routine instead of the usual 'CD' command followed by the address. Further, you can call commands from the table, for instance, if you want to write something to tape: load the registers with the neccessary 'from' and 'to' data, then simply call the Write routine using the ASCII equivalent of 'W' as the table number, in this case, #57.

All this has two advantages: the programs are shorter, but most important, if someone (loony) comes along with a "NAS-SYS 2", then, provided the routines do the same thing relative to their respective numbers in the table, the change of monitor is totally transparent to any program written for "NAS-SYS 1", and apart from the alterations (it must have been changed otherwise why bother) totally transparent to the programmer.

There's got to be some penalty to pay for all this

cleverness, and three or four not very serious snags go with it.

The monitor workspace needs more room; it goes from 0C00 to 0C7F which whilst not important on a Nascom 2 or expanded Nascom 1, it represents the loss of #30 precious bytes on a minimum system Nascom 1.

Now because NAS-SYS uses the internal subroutine table itself, and because using the table does some pretty intriguing 'ooh nasties' to the stack, it's most undesirable to have an interrupt occur whilst it's messing about with the stack, cos if an interrupt does occur, you could spend weeks trying to figure out where the program went on return from the interrupt. So one simple rule here; "if you are using interrupts disable 'em before going into any NAS-SYS routine", you can always re-enable on the return.

The CRT routines are slightly slower than NASBUG, but that shouldn't worry anyone except the $6,000,000 man. Who can read that fast Anyway?

RST #28, which works like it does in NASBUG, can't address the top line (line 16), so titles become a little more difficult. Use an LDIR copy instead.

Finally I would point out that with the delivery of Nascom 2 which has Basic and NAS-SYS, that the program library will become more complicated. Please make sure that any correspondence with the INMC about software states what configuration you are discussing.

STRINGS WITH NAS-SYS 1

Here's how to output a string to the top of the screen or anywhere else in memory, very efficiently. It is written for the 8k BASIC under NAS-SYS, but the same principle applies to NAS-SYS machine code programms.

I leave it up to you to work out how it works and how to use it. You need to study the NAS-SYS manual.

HINT: Run it, then look at location 0D00 onwards.

```
LIST

10 REM ** DEMONSTRATION TO SEND OUTPUT TO
20 REM ** MEMORY.
100 GOSUB10010
150 INPUT"ENTER VALUE";Z
200 HC=3018:GOSUB11010
300 PRINT"Square root of"Z"is"SQR(Z);"          "
800 GOSUB12010
900 GOTO150
10000 REM ** INITIALISE HEADING I/O
10010 DOKE3330,11*:DOKE3332,0:DOKE3334,3582
10020 DOKE3336,2088:DOKE3338,42:DOKE3340,30477
10030 DOKE3342,8739:DOKE3344,3528
10040 DOKE3346,-13897:RETURN
11000 REM ** SET I/O FOR HEADING
11010 UC=DEEK(3192):DOKE3192,3334:REM ROUTINE
11020 TC=DEEK(3187):DOKE3187,3330:REM TABLE
11030 DOKE3328,HC:RETURN
12000 REM ** RETURN TO PREVIOUS I/O
12010 DOKE3187,TC:DOKE3192,UC:RETURN
OK
```

A TALE OF WOE

In view of the cries for "articles" for INMC and my own lack of technical or programming abilities I thought I'd write of my experiences with my NASCOM 1.

But first a plea - nay, a command - to K.B. Give us this day our NAS-SYS for our NASCOM 1's. We want it desperately and if you cannot or will not supply it at a reasonable price we will pirate it. So you may as well be on the receiving end of the money. And why not a re-burn scheme for those of us who bought T4, e.g. we send you back the two T4 programs and (say) £10 and you re-program them to NAS-SYS.

But now for my tale of woe.

After much heart-searching and wife-beating and family allowance stealing I decided on a NASCOM 1, with the intention of building up from the basic system to one with Tiny Basic and 4K RAM. So I worked out the cost and plummeted for my NASCOM, with a little reserve for the power supply (which NASCOM were advertising but unable to supply). Having built most of the kit I then had to wait five weeks for the rest of the scarce chips to arrive. I plugged them in and turned on the power. But it did not work very well; certain characters were missing. Naturally everyone said it was my fault - such a complex project. I had to join INMC to find out it was a design fault; yes of course it was IC 18, and NASCOM knew all about it, but no mention at all in the construction manual.

Then my T2 blew up. OK, that may have been my fault, I was nearly ten feet close when it happened. So I had to replace it - an unplanned expense. At this moment I think it would be inappropriate to mention that superb piece of engineering design, the cassette interface in case you think I've lost faith in NASCOM.

I then bought LEVEL A BASIC from CCSOFT which plugs into the two eprom sockets, replacing the monitor. This is superb value and an excellent BASIC training product. I then succumbed to local and advertising pressures and bought T4. It was totally non-functional. I returned it to my local dealer who replaced it immediately - another argument in favour of your local (if expensive) dealer. This worked after a fashion, taking 40 minutes to warm up and then it was very erratic. This also was replaced and this one seems to work, but all the tape routines fail completely on odd occasions and the only cure is to switch the power off and then on again. All the voltages etc. have been checked with a DVM and scope and my T2 and Level A BASIC always work perfectly.

Now remember the 4K RAM I wanted? Well it was widely advertised, but never supplied by NASCOM. Now the minimum system expansion is 8K - stretching my budget again. And do you remember any mention of the need for a Buffer Board in early adverts? Even

in an article written by Kerr Borland for issue one of Personal Computer World there was no mention of it, though he did offer the 4K RAM board. Yes, you've guessed it, another £40 hole in my pocket. And unfortunately that's as far as I've got. The cash has run out, but not the enthusiasm - yet.

Would someone out there please write a simple article on learning to program the NASCOM in HEX for those of us who are having difficulty starting out and for whom the programming manual makes no sense at all?

By now you must be asking how much does he want for his NASCOM? But no, I've enjoyed every minute of the paperchase in building it and trying to expand, and I am enjoying, if struggling, my programming, and so the saga will continue, (funds and wife permitting).

In closing I've just one final thing to say, and that's to Kerr Borland. We, the NASCOM 1 users DEMAND NAS-SYS - NOW.

Les Pickstock
Wirral

LITTLE KNOWN FACTS THAT NO-ONE SEEMS TO CARE ABOUT (11)

Did you know that the 8K Basic can be persuaded to accept 'INPUT' strings with commas in them ? Try this:

```
      First set up the machine code input.
 10 DATA 25055,1080,-53,536,-20665,3370,-5664,0
 20 DATA 27085,14336,-13564,6399,18178,10927,-8179,233
 30 RESTORE 20:X1=31:X2=29
 40 IF PEEK(1)=0 THEN RESTORE 10:X1=13:X2=8
 50 DOKE 4100,3200:FOR I9=3200 TO 3214 STEP 2
 60 READ I8:DOKE I9,I8:NEXT

      Now go and get the string (including commas)
100 GOSUB 200
110 PRINT A$:GOTO100

      This subroutine replaces the normal 'INPUT' command
200 A$=""
210 A=USR(0):IF A<0 THEN 210
220 IF A=X2 AND A$="" THEN 210
230 PRINT CHR$(A);
240 IF A=X1 THEN RETURN
250 IF A=X2 THEN 270
260 A$=A$+CHR$(A):GOTO 210
270 A$=LEFT$(A$,LEN(A$)-1):GOTO 210
```

Two things here, firstly we have setup a machine code 'INKEY$' command, then using that, we continually add to A$ until a 'new line' is found in line 240. All keyboard characters will be accepted except 'new line', and 'back space' which are treated separately. Note that line 30 assumes that NASBUG is in use, whilst line 40 resets the pointers if NAS-SYS is present. See LITTLE KNOWN FACT (3) and the 8K Basic page for further details.

```
     CHASE
  BY HOWARD BIRKETT
>T C50 DC7
  0C50 31 FF 0F EF 1E 00 2A 18 EA
  0C58 0C 36 20 21 DA 0B 22 18 06
  0C60 0C EF 2A 2A 2A 20 20 43 68
  0C68 48 41 53 45 20 20 2A 2A 29
  0C70 2A 1F 20 20 20 20 20 20 85
  0C78 53 70 65 65 64 20 31 20 E6
  0C80 74 6F 20 39 20 3F 20 00 47
  0C88 CD 3E 00 FE 3A 30 F9 FE FE
  0C90 31 38 F5 CD 3B 01 D6 30 09
  0C98 32 C4 0D CD 3E 00 FE 1D CD
  0CA0 20 05 CD 3B 01 18 E1 FE D1
  0CA8 1F 20 F0 21 0B 08 36 20 6D
  0CB0 2B 36 2E 11 0C 08 01 2E 9F
  0CB8 00 ED B0 06 0E 11 4A 08 D8
  0CC0 C5 01 30 00 21 0A 08 ED E2
  0CC8 B0 21 10 00 19 EB C1 10 8A
  0CD0 EF 3A BF 0D 21 54 0A 77 C7
  0CD8 22 BC 0D 3A C3 0D 21 6E 68
  0CE0 09 77 22 C0 0D 3E 10 32 DB
  0CE8 BE 0D 3E 20 32 C2 0D 21 3F
  0CF0 F2 0B 0E 05 79 C6 30 77 F2
  0CF8 06 64 CD 35 00 10 FB 0D 88
  0D00 20 F2 36 20 FD 21 BC 0D 5C
  0D08 06 02 CD 3D 0D CD 7A 0D 88
  0D10 38 0C FD 23 FD 23 FD 23 C1
  0D18 FD 23 10 EE 18 E6 21 CC 2E
  0D20 0B 77 23 23 22 18 0C EF 2A
  0D28 4C 6F 73 74 2E 00 2A 18 47
  0D30 0C 36 20 CD 3E 00 FE 1F C7
  0D38 20 F9 C3 50 0C C5 D5 E5 FC
  0D40 3A C4 0D 47 3A C5 0D 4F FA
  0D48 C5 CD 69 00 30 22 DD 21 A0
  0D50 BE 0D 06 02 21 B4 0D 1E 30
  0D58 10 BE 20 05 DD 73 00 18 C0
  0D60 0F 23 CB 23 30 F3 DD 23 B0
  0D68 DD 23 DD 23 DD 23 10 E7 6C
  0D70 C1 0D 20 D4 10 CE E1 D1 CF
  0D78 C1 C9 D5 E5 FD 6E 00 FD 31
  0D80 66 01 FD 4E 02 11 40 00 92
  0D88 CB 61 28 03 B7 ED 52 CB AD
  0D90 69 28 01 19 CB 71 28 02 AE
  0D98 2B 2B CB 79 28 02 23 23 AF
  0DA0 FD 75 00 FD 74 01 7E FE 0D
  0DA8 2E FD 7E 03 37 20 02 B7 71
  0DB0 77 E1 D1 C9 57 5A 41 53 F4
  0DB8 50 2E 4C 3B 22 0A 20 00 16
  0DC0 9E 09 10 05 03 38 00 4A 0E

>  LEFT PLAYER KEYS  WASZ
   RIGHT PLAYER KEYS PL;.
   EXECUTE AT 0C50
```

FREE PROGS

FOUR FREE PROGRAMS!

As a special bonus, here are four programs which are fun to have. We hope to include proper assembly listing of these programs in the software library soon, so that you will be able to see how they work.

You should find all the programs self explanatory, given the notes printed with them. The last column of numbers on the listings is a checksum, so don't type it in! (or see little known Fact No. 1).

The programs will run under NASBUG T2, B-BUG or NASBUG T4. We hope to reassemble them for NAS-SYS one day.

```
   RANDOM BUZZ-WORD LINKER
  BY RICHARD BEAL AND DAVID HUNT.
>TC50 F36
  0C50 EF 1E 00 21 CF 0B 22 18 9E
  0C58 0C EF 2A 2A 2A 20 52 41 90
  0C60 4E 44 4F 4D 49 5A 45 44 C6
  0C68 20 42 55 5A 5A 2D 57 4F B2
  0C70 52 44 20 4C 49 4E 4B 45 A5
  0C78 52 20 2A 2A 2A 1F 00 00 93
  0C80 00 00 00 00 00 00 00 00 8C
  0C88 21 00 0D 7E E5 21 CF 0C 21
  0C90 CD E0 0C 57 15 E1 28 08 D2
  0C98 23 7E B7 20 FB 15 18 F6 3A
  0CA0 23 7E B7 28 05 CD 4A 0C 54
  0CA8 18 F6 23 7E B7 28 07 23 6C
  0CB0 7E B7 20 FB 18 F4 23 7E B9
  0CB8 B7 20 D0 3E 1F CD 4A 0C EB
  0CC0 11 C0 00 CD D0 0C 18 C0 1E
  0CC8 00 00 00 00 00 00 00 3F 13
  0CD0 1B 7A B3 C8 CD 4D 0C D8 EA
  0CD8 CD 35 00 18 F3 00 00 00 F1
  0CE0 C5 47 ED 5F 86 38 01 3D 40
  0CE8 77 90 30 FD 80 3C C1 C9 6E
  0CF0 00 00 00 00 00 00 00 00 FC
  0CF8 00 00 00 00 00 00 00 00 04
  0D00 10 49 6E 74 65 67 72 61 E7
  0D08 74 65 64 20 00 54 6F 74 A9
  0D10 61 6C 20 00 53 79 73 74 BD
  0D18 65 6D 61 74 69 7A 65 64 78
  0D20 20 00 50 61 72 61 6C 6C A9
  0D28 65 6C 20 00 46 75 6E 63 B2
  0D30 74 69 6F 6E 61 6C 20 00 E4
  0D38 52 65 73 70 6F 6E 73 69 98
  0D40 76 65 20 00 4F 70 74 69 E4
  0D48 6F 6E 61 6C 20 00 53 79 EB
  0D50 6E 63 68 72 6F 6E 69 7A C8
  0D58 65 64 20 00 43 6F 6D 70 DD
  0D60 61 74 69 62 6C 65 20 00 FE
  0D68 42 61 6C 61 6E 63 65 64 7F
  0D70 20 00 43 72 69 74 69 63 F8
  0D78 61 6C 20 00 4D 69 6E 69 FF
  0D80 6D 69 7A 65 64 20 00 4D 13
  0D88 61 78 69 6D 61 6C 20 00 31
  0D90 4C 69 6D 69 74 65 64 20 85
  0D98 00 44 69 73 63 72 65 74 73
  0DA0 65 20 00 44 69 73 69 6E 29
  0DA8 74 65 67 72 61 74 65 64 05
  0DB0 20 00 00 10 6D 61 6E 61 8A
  0DB8 67 65 6D 65 6E 74 20 00 65
  0DC0 6F 72 67 61 6E 69 73 61 21
  0DC8 74 69 6F 6E 61 6C 20 00 7C
  0DD0 6D 6F 6E 69 74 6F 72 65 4A
  0DD8 64 20 00 72 65 63 69 70 7C
  0DE0 72 6F 63 61 6C 20 00 64 82
  0DE8 69 67 69 74 61 6C 20 00 8F
  0DF0 6C 6F 67 69 73 74 69 63 5B
  0DF8 61 6C 20 00 74 72 61 6E A7
  0E00 73 69 74 69 6F 6E 61 6C 71
  0E08 20 00 69 6E 63 72 65 6D B4
  0E10 65 6E 74 61 6C 20 00 74 C6
  0E18 68 69 72 64 2D 67 65 6E 34
  0E20 65 72 61 74 69 6F 6E 20 40
  0E28 00 70 6F 6C 69 63 79 20 E6
  0E30 00 69 6E 74 65 67 72 61 28
  0E38 6C 20 00 73 75 62 73 79 08
  0E40 73 74 65 6D 20 00 64 65 F0
  0E48 63 72 65 6D 65 6E 74 61 A5
  0E50 6C 20 00 63 6F 6E 73 74 11
  0E58 72 61 69 6E 65 64 20 00 F9
  0E60 74 65 73 74 65 64 20 00 17
  0E68 6D 6F 64 61 6C 20 00 00 A3
  0E70 10 6F 70 74 69 6F 6E 73 9A
  0E78 2E 00 66 6C 65 78 69 62 2E
  0E80 69 6C 69 74 79 2E 00 63 4A
  0E88 61 70 61 62 69 6C 69 74 DC
  0E90 79 2E 00 6D 6F 62 69 6C 5B
  0E98 69 74 79 2E 00 70 72 6F 78
  0EA0 67 72 61 6D 6D 61 62 69 EE
  0EA8 6C 69 74 79 2E 00 63 6F 78
  0EB0 6E 63 65 70 74 2E 00 74 7A
  0EB8 69 6D 65 2D 70 68 61 73 DA
  0EC0 65 2E 00 70 72 6F 6A 65 81
  0EC8 63 74 69 6F 6E 2E 00 68 89
  0ED0 61 72 64 77 61 72 65 2E F2
  0ED8 00 63 6F 6E 74 69 6E 67 D8
  0EE0 65 6E 63 79 2E 00 69 6E A2
  0EE8 74 65 72 66 61 63 65 2E FE
  0EF0 00 63 6F 6D 6D 75 6E 69 F6
  0EF8 63 61 74 69 6F 6E 2E 00 B2
  0F00 63 6F 6F 72 64 69 6E 61 5E
  0F08 74 69 6F 6E 2E 00 63 72 D4
  0F10 69 74 65 72 69 61 2E 00 CB
  0F18 63 6F 6E 66 69 67 75 72 84
  0F20 61 74 69 6F 6E 2E 00 65 DD
  0F28 6E 67 69 6E 65 65 72 69 88
  0F30 6E 67 2E 00 00 00 09 21 6C

EXECUTE AT 0C50
```

```
   LIFE   BY RICHARD BEAL
>T C58 FE8
 0C58 00 00 CD 8D 0C A0 A0 81 8B
 0C60 91 81 FF C9 CD 8D 0C A0 4C
 0C68 A0 A0 A1 81 81 91 81 92 FB
 0C70 90 91 82 92 82 82 A9 A0 FE
 0C78 80 FF C9 CD 6D 0C A0 A0 72
 0C80 A0 A0 92 92 92 92 A0 A0 54
 0C88 A0 A0 81 FF C9 EB E3 EB D6
 0C90 1A FE FF 20 05 13 EB E3 B9
 0C98 EB C9 CD 10 0D 13 18 F0 5D
 0CA0 1B 7A B3 C8 CD 4D 0C D8 BA
 0CA8 CD 35 00 18 F3 D5 56 D5 C1
 0CB0 36 5F 11 20 00 CD A0 0C FB
 0CB8 D1 72 38 08 11 20 00 CD 45
 0CC0 A0 0C 30 EA D1 C9 CD 8D 86
 0CC8 0C A2 81 81 A0 81 FF C9 6D
 0CD0 D5 23 0C 79 FE 31 38 33 F3
 0CD8 0E 01 11 D0 FF 19 2B D5 EB
 0CE0 2B 0D 20 27 0E 30 11 30 EA
 0CE8 00 19 1F D5 11 40 00 19 6A
 0CF0 04 7B FE 10 38 15 06 01 DA
 0CF8 11 40 FC 18 0D D5 11 C0 1C
 0D00 FF 19 05 20 06 06 0F 11 76
 0D08 C0 03 19 7E D1 CB 47 C9 1B
 0D10 CB 7F 28 02 36 7F CB 77 88
 0D18 28 02 36 20 CB 6F F5 C4 98
 0D20 D0 0C F1 CB 67 F5 C4 0F C4
 0D28 0C F1 CB 5F F5 C4 D0 0C F1
 0D30 F1 CB 57 F5 C4 DF 0C F1 E5
 0D38 CB 4F F5 C4 EB 0C F1 CB CB
 0D40 47 F5 C4 FD 0C F1 C9 00 10
 0D48 D6 30 28 08 21 10 00 39 F9
 0D50 C8 29 18 FB 21 01 00 C9 4C
 0D58 7E F5 CD 70 0D CD 70 0D 6C
 0D60 F1 77 23 10 F3 CB 41 C0 C7
 0D68 CB 49 C8 1B 3E 30 18 11 03
 0D70 AF ED 6F 20 08 CB 41 20 DC
 0D78 04 3E 20 18 04 CB C1 C6 55
 0D80 30 12 13 C9 00 00 00 00 AB
 0D88 E5 AF B8 28 05 C6 01 27 FC
 0D90 10 FB 77 06 01 CD 58 0D 58
 0D98 E1 C9 00 00 00 00 00 00 4F
 0DA0 D5 5F 7E 23 B7 28 07 BB 23
 0DA8 28 04 23 23 18 F4 5E 23 B4
 0DB0 56 EB D1 C9 00 00 00 00 98
 0DB8 54 05 00 59 01 00 55 09 D6
 0DC0 00 47 04 00 48 88 00 4A 32
 0DC8 08 00 42 06 00 4E 02 00 75
 0DD0 4D 0A 00 20 48 00 1E 60 1A
 0DD8 0F 2E 5E 0F 49 6A 0F 52 A3
 0DE0 81 00 4A 84 00 56 82 00 10
 0DE8 45 41 00 44 44 00 43 42 88
 0DF0 00 51 5A 0C 57 09 0E 41 63
 0DF8 C6 0C 53 64 0C 5A 7B 0C 7B
 0E00 58 5D 0F 2C 65 0F 00 5D CF
 0E08 0F CD 8D 0C A2 A0 A0 A0 0D
 0E10 A0 81 81 91 81 FF C9 00 9A
 0E18 7E FE 99 20 03 36 20 C9 7B
 0E20 FE 20 C8 36 7F C9 00 00 92
 0E28 CB 46 28 07 15 C8 15 C8 30
 0E30 36 99 C9 15 C0 36 2A C9 B4
 0E38 00 00 00 01 00 00 00 66 AD
 0E40 00 05 21 01 00 21 3C 0E E0
 0E48 06 09 36 00 23 10 FB C9 92
 0E50 01 01 01 21 0A 08 C9 00 5D
 0E58 CD D0 0C 79 FE 01 C0 CD 14
 0E60 EB 0C 78 FE 01 C0 F1 C9 56
 0E68 E5 C5 21 00 00 22 40 0E B1
 0E70 11 8F 0E D5 CD 50 0E CB F7
 0E78 46 28 0F 11 3B 0E C5 E5 07
 0E80 21 41 0E 06 02 CD AA 0E 8B
 0E88 E1 C1 CD 58 0E 18 E8 21 8C
 0E90 40 0E 11 EA 0B 01 02 02 F7
 0E98 CD 58 0D 21 3C 0E 11 DC 30
 0EA0 0B 01 00 04 CD 58 0D C1 B1
 0EA8 E1 C9 B7 1A 8E 27 77 1B 78
 0EB0 2B 10 F8 C9 E5 C5 21 42 C7
 0EB8 0E 11 F2 0B 0E 02 CD 88 47
 0EC0 0D 11 F8 0B C1 C5 41 0E C4
 0EC8 02 CD 88 0D C1 E1 C9 00 A5
 0ED0 3E 1E CD 4A 0C 3E 20 32 ED
 0ED8 8A 0B 32 FA 0B 21 CA 0B A8
 0EE0 22 18 0C EF 2A 2A 2A 20 C1
 0EE8 4C 49 46 45 20 2A 2A 2A B4
 0EF0 20 20 20 47 45 4E 20 20 78
 0EF8 20 20 20 20 20 20 20 20 06
 0F00 20 50 4F 50 20 20 20 20 9E
 0F08 20 20 52 20 20 20 20 20 49
 0F10 43 20 20 20 00 21 8A 0B 78
 0F18 22 18 0C CD 45 0E 21 DD 8B
 0F20 09 06 08 0E 14 CD 68 0E AB
 0F28 CD B4 0E CD AD 0C E5 FE 2F
 0F30 30 38 12 FE 3A 30 0E CD FC
 0F38 48 0D 22 43 0E E1 11 2B 2C
 0F40 0F D5 C3 79 0F 21 B8 0D 5B
 0F48 CD A0 0D E3 21 25 0F E3 F4
 0F50 D5 DD E1 AF BA 28 02 DD 62
 0F58 E9 7B C3 10 0D C9 F1 E7 4C
 0F60 21 D0 0E E3 C9 21 1B 0F 65
 0F68 E3 C9 E3 2E 03 C3 3A 0F 43
 0F70 C5 E5 11 3B 0E 21 3F 0E F1
 0F78 06 04 CD AA 0E CD 50 0E 41
 0F80 11 C4 0F D5 E5 16 04 CD 14
 0F88 D0 0C 28 01 15 CD EB 0C 75
 0F90 28 01 15 CD DF 0C 28 01 BE
 0F98 15 CD DF 0C 28 01 15 CD 7F
 0FA0 FD 0C 28 01 15 CD FD 0C CC
 0FA8 28 01 15 CD D0 0C 28 01 C7
 0FB0 15 CD D0 0C 28 01 15 CD 88
 0FB8 EB 0C E3 CD 28 0E E1 CD 52
 0FC0 5B 0E 18 C0 11 D0 0F D5 D5
 0FC8 CD 18 0E CD 58 0E 18 F8 0D
 0FD0 E1 C1 CD 68 0E ED 5B 43 4F
 0FD8 0E 7B FE 03 C8 CD A0 0C B2
 0FE0 D4 4D 0C D8 18 8A 00 00 96
.
>
```

MODIFICATION - OPTIONAL

```
>I E18 E38
 0E18 CB 7E 20 03 36 20 C9 36 E7
 0E20 7F C9 00 00 00 00 00 00 76
 0E28 CB 46 28 07 15 28 06 15 CE
 0E30 28 03 C9 15 C0 CB FE C9 99
```

EXECUTE AT 0ED0

THIS IS AN UNUSUAL VERSION OF THE GAME
BECAUSE THE UNIVERSE IS CLOSED.
(FOR EXAMPLE THE FOUR CORNERS ARE NEXT TO EACH OTHER)

MOST OF THE KEYS DO SOMETHING - TRY THEM ALL.

```
  CRASH  BY HOWARD BIRKETT
>TC68 FD8
 0C68 00 15 00 00 20 00 00 00 A9
 0C70 00 00 02 00 00 15 00 00 93
 0C78 00 25 00 00 10 00 00 00 B9
 0C80 00 00 00 00 01 00 00 00 8D
 0C88 1C 0A 31 00 10 3E 1E CD 24
 0C90 3B 01 21 D7 0B 22 18 0C 21
 0C98 EF 07 20 07 20 43 52 41 B7
 0CA0 53 48 20 4C 41 4E 44 49 CF
 0CA8 4E 47 20 07 20 07 00 2A C1
 0CB0 18 0C 36 20 21 CB 08 22 4C
 0CB8 18 0C EF 54 69 6D 65 20 86
 0CC0 28 73 29 20 2A 20 48 65 A7
 0CC8 69 67 68 74 20 28 6D 29 5E
 0CD0 20 2A 20 53 70 65 65 64 37
 0CD8 20 28 6D 2F 73 29 20 2A AE
 0CE0 20 46 75 65 6C 20 28 6B 4B
 0CE8 67 29 00 01 18 00 11 50 FE
 0CF0 0C 21 70 0C ED B0 01 04 47
 0CF8 00 11 68 0C 21 54 0C ED F7
 0D00 B0 21 0A 09 36 20 0E 00 55
 0D08 CD 18 0F 21 19 0A 22 18 87
 0D10 0C EF 3E 00 21 8A 0B 36 42
 0D18 20 CD 3E 00 FE 1F 28 12 A7
 0D20 00 00 00 00 FE 3A 30 F1 86
 0D28 FE 30 38 ED CD 3B 01 18 A9
 0D30 E8 00 2A 18 0C 22 88 0C 29
 0D38 2A 88 0C 36 20 11 1A 0A 8E
 0D40 CD 5A 02 3A 12 0C 2A 13 0B
 0D48 0C FE 03 30 23 7C FE 01 30
 0D50 30 1E 22 6C 0C C5 01 20 2B
 0D58 00 21 1A 0A 11 DA 09 ED 8B
 0D60 B0 06 20 36 20 2B 10 FB CF
 0D68 36 5F 22 88 0C C1 18 05 9E
 0D70 C3 CA 0F 00 00 11 58 0C 8E
 0D78 21 6C 0C CB E9 CD FE 0E AB
 0D80 CB 71 28 17 CD 89 0F CB 38
 0D88 E1 21 6C 0C 36 00 23 36 9E
 0D90 00 21 58 0C 06 04 36 00 62
 0D98 23 10 FB 11 54 0C 21 5C C1
 0DA0 0C CB A9 CD FE 0E 11 54 6B
 0DA8 0C 21 6C 0C CB E9 CD FE D9
 0DB0 0E CB 71 28 17 06 04 21 71
 0DB8 68 0C 36 00 23 10 FB 11 AE
 0DC0 68 0C 21 54 0C CD FE 0E 9B
 0DC8 CB D1 18 0F C5 01 04 00 62
 0DD0 21 54 0C 11 68 0C ED B0 80
```

EXECUTE AT 0C8A

ENTER BURN (0-99) THEN ENTER(NEW LINE)

PRESS SPACE FOR NEW GAME.

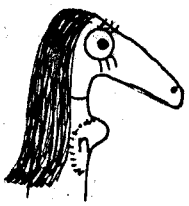
```
 0DD8 C1 CB 91 11 50 0C 21 54 E4
 0DE0 0C CD FE 0E CB 71 C2 38 0B
 0DE8 0E 11 60 0C 21 64 0C CB DC
 0DF0 A9 CD FE 0E CD 18 0F 2A 9D
 0DF8 88 0C 22 18 0C CB 99 1E 61
 0E00 04 06 CC CD 69 00 CB 59 3E
 0E08 20 19 30 17 FE 1F 20 04 D7
 0E10 CB D9 18 0F 00 00 00 00 E9
 0E18 FE 3A 30 07 FE 30 38 03 FE
 0E20 CD 3B 01 10 DE 1D 20 D9 3B
 0E28 2A 18 0C 22 88 0C CB 61 66
 0E30 C2 75 0D CB 59 C2 38 0D AD
 0E38 C3 75 0D 21 50 0C 06 04 12
 0E40 36 00 23 10 FB CD 18 0F A6
 0E48 21 CA 0A 22 18 0C EF 59 D9
 0E50 6F 75 27 72 65 20 64 6F 33
 0E58 77 6E 00 21 80 0E E5 21 00
 0E60 56 0C AF BE C2 A2 0F 28 DB
 0E68 BE C2 A2 0F 2B 7E FE 31 7F
 0E70 D2 8F 0E FE 06 D2 A0 0E 71
 0E78 FE 02 D2 C3 0E C3 E2 0E DC
 0E80 2A 18 0C 36 20 CD 3E 00 3D
 0E88 FE 20 20 F9 C3 8A 0C EF 15
 0E90 20 61 6E 64 20 76 65 72 5E
 0E98 79 20 64 65 61 64 00 C9 96
 0EA0 EF 2C 20 62 75 74 20 79 CD
 0EA8 6F 75 72 20 72 6F 63 6B 0B
 0EB0 65 74 20 69 73 20 61 20 34
 0EB8 77 72 69 74 65 2D 6F 66 F3
 0EC0 66 00 C9 EF 2E 20 41 20 9B
 0EC8 62 69 74 20 62 75 6D 70 E9
 0ED0 79 2C 20 62 75 74 20 79 87
 0ED8 6F 75 27 72 65 20 4F 4B 82
 0EE0 00 C9 EF 2E 20 4E 41 53 D6
 0EE8 41 20 77 6F 75 6C 64 20 A2
 0EF0 62 65 20 70 72 6F 75 64 0F
 0EF8 00 C9 00 00 00 00 CB B1 4B
 0F00 06 04 AF 1A CB 69 28 03 41
 0F08 9E 18 01 8E 27 12 23 13 CB
 0F10 10 F1 CB 7F C8 CB F1 C9 B7
 0F18 21 0A 09 06 30 36 20 23 0A
 0F20 10 FB 11 0D 09 21 62 0C F0
 0F28 CD 53 0F 11 18 09 21 52 0B
 0F30 0C CD 53 0F 11 26 09 21 DB
 0F38 6A 0C CD 53 0F 11 32 09 38
 0F40 21 5A 0C CD 53 0F 21 24 4A
 0F48 09 CB 51 20 03 36 0B C9 A9
 0F50 36 5E C9 ED 53 18 0C 06 26
 0F58 03 CB F9 7E CB 79 28 13 2B
 0F60 F5 E6 F0 20 0B F1 E6 0F 4B
 0F68 20 0E 05 20 12 04 18 08 00
 0F70 F1 CB B9 CD 44 02 18 08 27
 0F78 CD 4D 02 CB B9 18 01 04 44
 0F80 2B 10 D8 2A 18 0C 36 20 46
 0F88 C9 21 DA 09 22 18 0C EF 99
 0F90 4F 55 54 20 4F 46 20 46 B2
 0F98 55 45 4C 00 2A 18 0C 36 11
 0FA0 20 C9 EF 3B 20 74 68 65 23
 0FA8 79 20 6D 61 79 20 6E 61 86
 0FB0 6D 65 20 74 68 65 20 63 75
 0FB8 72 61 74 65 72 20 61 66 CC
 0FC0 74 65 72 20 79 6F 75 21 B8
 0FC8 00 C9 C5 21 3A 0A C3 61 EE
 0FD0 0D 00 00 00 00 00 00 00 EC
```

THE PERSECUTION OF THE INTELLECTUAL

saga two: HUBRIS

starring lawrence the long-haired weirdo

THE STORY SO FAR: LAWRENCE HAS TAKEN UP WITH BRILLIANT AND BEAUTIFUL PROGRAMMER HELOISE FORTRAN

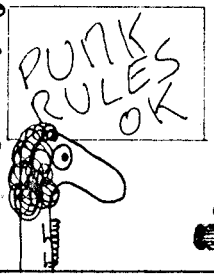


OBSERVED FROM A SAFE DISTANCE (THE WINE BAR) BY

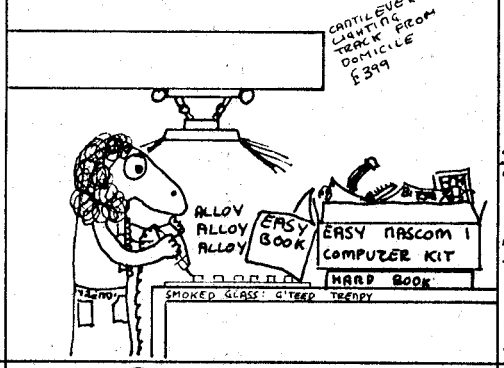
DOZY DAVE, WELL-KNOWN LOCAL TRENDY AND LECHER. HE HAS DESIGNS (GRAPHIC DESIGNS) UPON HELOISE'S REPUTATION

THINKS: IF I GET ME A COMPUTER I CAN CHAT UP HELOISE...

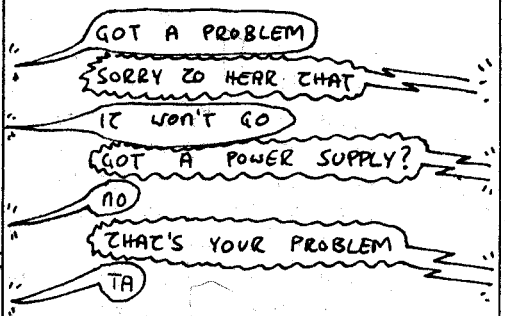
BETTER START READING COMPUTING OR INMC NEWS..



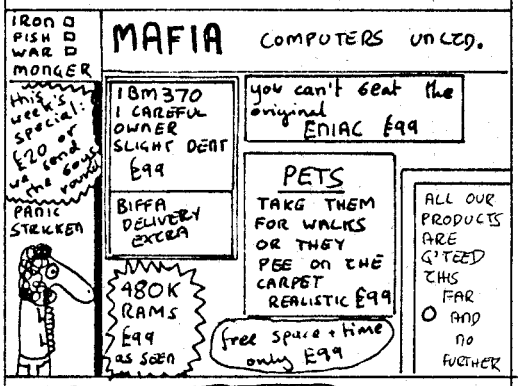
A QUICK CRUISE IN THE BMW LATER:

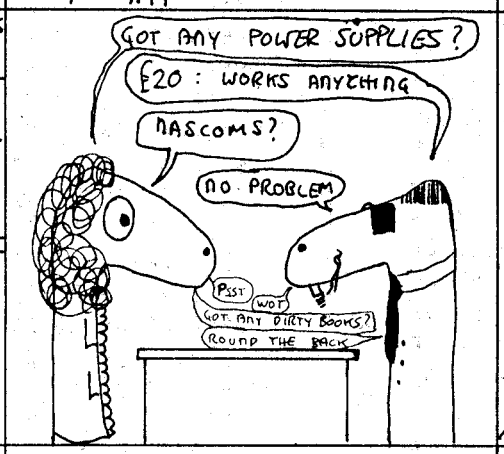


AFTER A WEEK'S WORK, IT DOES NOTHING; DAVE PHONES NASCOM ENGINEERING DEPT.

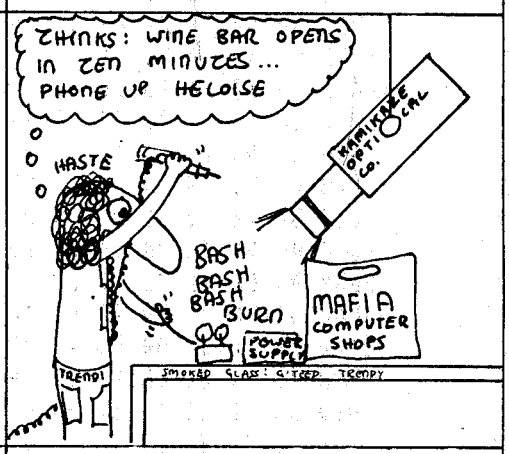


SLAMMING DOWN THE PHONE DAVE RUSHES OUT TO THE HANDIEST COMPUTER SHOP

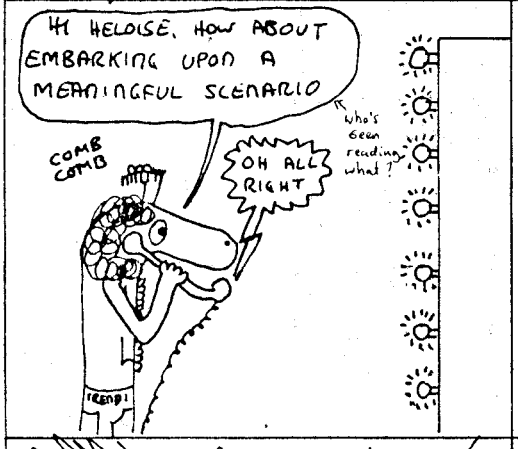




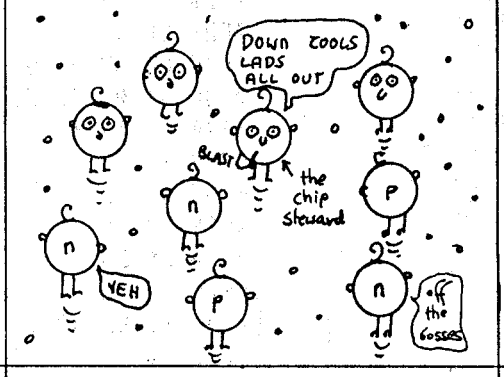
THINKS: WINE BAR OPENS IN TEN MINUTES... PHONE UP HELOISE



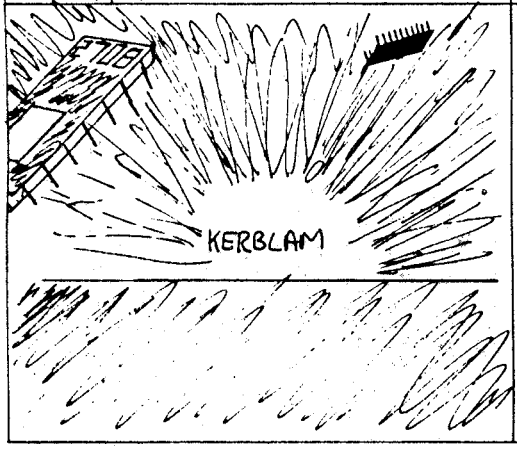
HI HELOISE, HOW ABOUT EMBARKING UPON A MEANINGFUL SCENARIO

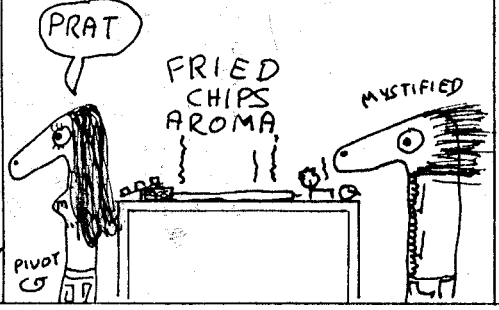


MEANWHILE, IN THE MYSTERIOUS INNARDS OF DAVE'S -5V REGULATOR:



AFTER A GALLON OF THE WINE BAR'S FINEST:





MORAL:

AS A COMPUTER FREAK LIKE LAWRENCE* not even YOU are immune to this sort of ruthless exploitation by the forces of nihilistic capitalism. ALWAYS make sure you get GENUINE parts for your hardware scenario, and embark upon ongoing caution cowboy-wise.

Don't miss next month's fork-bending episode!

* or dave if your luck's rough