inmc news issue 5

GRAND XMAS ISSUE

PRESIDENT'S CHRISTMAS MESSAGE

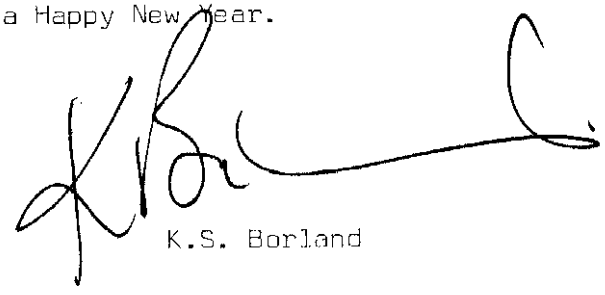
I am sure that you all feel as I do that a vote of thanks should be extended to David Hunt and his Committee for creating a sensible INMC giving increasing value for money throughout 1979. Also we must single out Paul Greenhalgh for the work he has done as Editor. In an organisation like the INMC, the Editor's task is not an enviable one and Paul has accepted the responsibility - the standard of the INMC News is in itself a tribute to the amount of work that he has put into the job.

To have managed this Bumper issue by Christmas was, I assure you, a marathon task and again it is an improvement on the last issue. No little thanks of course must go to yourselves. We are receiving material from all over Europe and instead of having difficulty in finding things to include, we are starting to have difficulty in choosing what to include from what we have been sent.

This is going to be another long Christmas and I hope many of you will receive, or buy yourselves, expansion for your Nascoms. Many of you will have new Nascom 2's and I look forward to receiving a bumper post in January with programmes written over the holiday period, which we can include in our first issue in 1980.

Nascom has many plans for 1980 and I think all of you next year will end up with expanded systems in various forms. The value of the INMC is becoming very apparent even within independant hobby clubs and I hope having started so well in 1979 that the INMC will become a major Z80 Users Group and Library.

Happy Christmas and a Happy New Year.



K.S. Borland

CHAIRMAN'S PAGE

It is now almost a year since I took on the task of Chairman of the INMC and during that time I have watched the INMC grow. The membership is impressive by almost any standards and stands now at about 2000. The members are from all walks of life, from accountants to hospital porters, from bus drivers to professional computer engineers. It is encouraging to see the spirit that exists between the members of the INMC.

There is almost a latent sense of conspiracy to try to catch Nascom out, be it with bits of hardware design, software, or whatever; none the less, this spirit also expresses an intense loyalty to what is after all a very good product. (No Nascom don't pay me).

I was playing with a shortwave set recently, and overheard a conversation between two CB'ers on 27 MHz. One, calling himself the 'Prowler' was vigorously defending his Nascom 1 against the various merits of a product that hails from the nether depths of Barnet. Nascoms are now on the legitimate SW bands churning out and decoding morse code (one program is going into the library), and there is a distinct group of licensed radio amateurs who use Nascoms for RTTY and God Knows what!

I have seen a Nascom being used as a 'patient monitor' in a hospital intensive care unit where the patient's heart beat and respiration is continuously checked, and it also keeps a log of drugs dispensed. In all, Nascoms are turning up in the most unlikely places.

Another sign that Nascom is here to stay, is that external manufacturers are now making a range of Nascom products available, both software and hardware; ranging from word processors, and maths packages to relay switched output boards and EPROM programmers etc. Nascom continue to support their own product of course, although personally, I wish they wouldn't shout about new products until they are available. As a dealer, I get a lot of aggro on that score.

To the newsletter, I hope you think that the quality has improved over the past year, and now that subs are becoming due, that you feel you have had good value for money. At first we virtually had to write every word, and in the process almost exhausted everything we had to say; but our appeals for material from members is beginning to bear fruit, and more and more 'external products' are appearing in the mag. Speaking on behalf of the committee, we would like to make the mags more frequent, but pressure of work (yes we do put in the odd day's work occasionally) doesn't really allow this. Splinter groups of the INMC are now getting organised, and local newsletters may be a thing of the future. The Merseyside group have published a superb Nascom program book, and we look forward to the next.

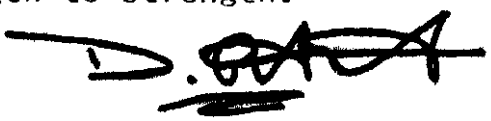
Now for a moan: we occasionally get letters demanding (and I do mean demanding) solutions to technical problems, now I must emphasize that INMC does not exist to solve all technical problems. If we know

the answers then we will reply, or if of general interest, publish; or if we don't we will pass the letter on to someone who may. Either way, to DEMAND replies to technical questions is not really on.

I would like to thank those on the committee, Kerr, Paul, Richard, and Howard (who resigned recently) for their support over the last year. To Derek for taking on the mammoth task of re-assembling the complete library (he recently sent us a bill for 10 typewriter ribbons). To all the girls at Nascom who type the mags, control the circulation and mailing lists, and Bev in particular who keeps the library in some semblance of order. And to all those members who have written articles for us. Finally to welcome Derek (the same one) and Eddie to the committee.

Who knows what the future will hold, one thing is pretty certain, NASCOM RULES OK, and with any sort of luck the INMC will go from strength to strength.

D. R. Hunt
Chairman



ABOUT THE INMC

For the new members here is a brief explanation of what the INMC is and how it works.

The INMC is run by a committee, the members of which live in or around London. The President of the committee is Kerr Borland, Nascom's infamous Sales Director; the Chairman is David Hunt, and the other members are Richard Beal, Derek Brough, Paul Greenhalgh and Eddie Pounce.

The committee meets every couple of weeks at each others homes, although any single meeting is generally a small subset of the whole - i.e. two or three! At these meetings various letters and articles are considered for inclusion in the newsletter, and other articles are written. Up to date most of the content of the newsletter has been generated by the committee but our pleas for material are being heard (by a few) and it is members articles that we want to print.

We also like to hear of any technical queries, either hardware or software, and if of general interest we will print them with a reply. We cannot, however, guarantee a personal reply as we do all have full time jobs, houses, cars, computers and in some cases even wives to keep us busy.

The final job of the committee is to sift through the programs that we receive and consider them for the software library. (Please note that the existing library is for Nasbug and B-Bug only, although we do hope to include Nas-Sys programs shortly). These programs are then available for a photocopying charge, to the INMC members.

This brings us on to the secretariat - viz Beverly. Bev deals with all memberships, requests for programs, magazine subscriptions etc. Unfortunately Bev has been off ill for several weeks and will not be back for some time yet. However, good fortune is with us, Val has kindly stepped in to help clear the backlog. So please bear with us while we get things straight, but don't let any upset stop you sending in those articles!

EDITOR'S PAGE

May we all wish you a Happy Christmas, although by the time you get this you'll all probably be unwrapping your Easter Eggs. We tried to make this a bumper issue, but because of the close deadline, we didn't quite make it, so we filled the mag. with programs (as usual). As far as the programs go, we've tried to include something for everyone (except NAS-SYS 1 machine code freaks, sorry about that, how about some progs. for the library?), so there's N1 minimum system, and N1 expanded system, Tiny Basic, Super Tiny Basic, and 8K Basic for N1 and N2.

In the last issue we anounced a Christmas Games competition, but due to the prolonged illness of a key member of staff (come back Bev) and printing delays, the mags didn't get posted till two days before the closing date, so the competition is still open, and we'll publish the winners in good time for next Christmas! Seriously though, the closing date is 3 weeks after you get this issue. Also, because of Bev's illness, the library has almost ground to a halt, so please bear with us if you have had difficulty extracting programs. We aren't saving your money for our next trip to the Bahamas.

Talking about the money: SUBS!!!!

In the early days, because it was all new, those who joined the INMC got away with paying a pound registation fee, and haven't been asked for anything since. More recent members have had to pay a fiver for the privilege (plus the registration fee). Now we have decided that all those who joined the INMC before the 31st January 1979 will have to pay up before the 31st January 1980, and all those who joined after January 1979 will be billed at the end of the month when their annual subscriptions become due (or something).

We will allow 21 days for cheques to reach us, then if we haven't seen the loot, names will be removed from the mailing list, and it will cost an extra quid to re-register.

The mailing list (for those who joined before January 1979) for issue 6 of this highly desirable rag will be made up from the list of subscriptions received (so the print run will be cheap anyway), so if you don't cough up, well sorry, but you won't ever find out who won the Great Christmas Competition. And we'll all know who the meanies are won't we.

So the message is 'cheque books to the fore' folks and send a fiver, payable to:

INMC
c/o Nascom Microcomputers,
92, Broad Street,
Chesham,
Bucks.
If you live in France special arrangements will be made for you to pay the money to the French Distibutor, so we will be letting you know what to do.

So having got the sordid business over...

WELCOME ALL NASCOM 2 OWNERS. We're afraid that there isn't much in this edition (except 'ELIZA') to interest you, but we won't forget you just because Nascom haven't given us our free issue N2's yet nudge, nudge (some chance!). We'll be publishing bits about N2's as they come along, and about 10 8K Basic progs will be in the library by the time you see this. Just in case you haven't already guessed, this is your magazine, and all contributions are gratefully received, if not necessarily printed. So keep it all coming.

Just in case you haven't noticed, parts of last months news letter, and bits of this have been prepared using the new Naspen text processor, then typed using a secondhand IBM terminal, it's not bad is it? Also, just in case you hadn't noticed, there is more than one Editor, that's why this rag suffers from a plethera of different styles. It is our plan to issue Naspen to all those concerned, that way all we need do is collect all the tapes together, then type them all on the IBM at one time.

Well this is the end of another late night editorial session. Time for bed, and dreams of the new super 'Inter-Galactic Bar Billiards' program, using real planets as balls (now I bet that will be an exhilarating experience for someone) and to wish all our readers Good Night, I mean Happy Christmas, and Happy Computing.

From us on the INMC Committee.

PLUG o PLUG o PLUG o PLUG o PLUG o PLU

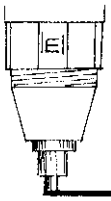
The Merseyside Nascom Users Group, some 150 strong, has put together a 64 page, A4 book entitled "Nascom Programs and Information". The main part of the book is dedicated to the programs, some 15 in all including:

3D noughts and crosses Othello Income Tax

Screenwriter Pico Pilot Crash Landing

Plus the complete listing for a 2K Tiny Basic.

The INMC is able to offer these to its members for £2-75 including postage and packing. Please note that the programs in this book are for use with Nasbug T1, T2, T4 and B-Bug but not Nas-Sys. For use with Nas-Sys the various monitor calls require changing, and other patching (e.g. changing all codes to ASCII) may be required.



letters to the editor

IT'S NOT EASY

Dear Sir,

Many thanks for the Newsletter and Library. I have just purchased and built a Nascom 1 with B. Bug, and managed to get it going.

Now, here is a point for you:- After reading the construction book, which is easy to understand, I build the machine, so far so good. Now read the program Manual, and what do we find, a book written by people who know what they are talking about, but I am afraid it does not mean a thing to me. After about 3 days of trying we manage to get the simple programs contained going, but not a clue as to what keys to press or whatever. (It seems to me that you are supposed to know things like that). So the next thing we do we join the INMC and get the newsletter, to try and find out some of these things. What do we find, a snow plough circuit, great build it, it works, great, put the mystery program in, great it works! What next? Read the rest of the newsletter great, now all we've got is a whole load of questions, like, what's a T2 or a T4 or a ZEAP etc., etc.

Now don't think I am getting at just the newsletter writers, they know what they mean, but people like me are only just beginning to "play" with Nascom and just don't know what things like the above are.

Don't forget we just go and buy a Nascom off the shelf from somewhere or other and all you get are the two books with it, and one of these just is not in "non-computer" mans words.

Hope you can see what I mean, I don't usually moan like this, you're doing a good job, but please oh please lets have as much paperwork as you like, on T4 etc., and add ons etc., and newsletters or program manuals that the man in the street can understand, or at least tell him to press this and that and so and so will happen.

It will really help a lot, and perhaps stop some of us going hairless.

Cheers and Beers,
G.M. Hewitt
Gt Yarmouth

We are trying our best to give you all the information we have. The problem is that Mr Hewitt is an expert in electronics, but a beginner at software. The best suggestion we have is that he takes the "Mystery Program" which he has working, and writes out the hexadecimal codes, converting them to source code and then work out how it works! I know it isn't easy, but once you have

finished, you will understand how to write your own programs. Also, get programs from the INMC library, and don't just put them in and run them, but read them carefully until you understand them.

THEY DON'T WORK - OR DO THEY?

Dear Sir,

After many hours of soldering,
Building up my Nascom one,
I waited for your newsletter,
Hoping for programs to run.
Eventually the postman called
With a letter just for me,
And I really was delighted,
With Mastermind and a mystery.
There I sat at the keyboard,
All day and half the night,
But mastermind prints MARKING ERROR,
And the lolly lady moves at the speed of light.

Well I wonder where the fault lies,
Is it you or is it me,
After which I reconsider -
There can't be bugs at the INMC.
So, I've put my pen to paper,
With a cry for help, to you,
Hoping you can solve my problem
Before I burn out my VDU.

Yours hopefully,
R A E Milton
Folkestone

We received a couple of letters saying that the programs don't work, but we received lots of letters saying that they do! We can only suggest that Mr Milton check his programs again. Also as explained in "Little known facts" in Issue 4, the L command can be a great help in entering long programs by hand.

If you have still not got the free programs running, then we suggest you read the letter below. All you need then do is tabulate the non-working program, compare the checksums that are now displayed against the listing, then correct any errors. Simple, isn't it!

THE SOLUTION

Dear Sir,

Here is a little program to cause the 'T' command to print out the check sum, for use with Nasbug monitors.

It is written in position independant code so to run it, first load it into a convenient part of the memory then execute at the first memory address.

```
     CALL    £3FC            ; CALL RETURN IN MONITOR        CD  FC  03
Y    LD      DE,X-Y          ; GET OFFSET                    11  0D  00
     LD      HL,(£FFE)       ; GET WHAT WAS ON STACK         2A  FE  0F
     ADD     HL,DE           ; CALCULATE ADDRESS OF X        19
     LD      (£CRT+1),HL     ; CHANGE CRT ENTRY ADDRESS      22  4B  0C
     JP      PARSE           ; GO TO PARSE                   C3  86  02
X    CP      BS              ; COMPARE WITH BACKSPACE        FE  1D
     RET     Z               ; GO AWAY BS                    C8
     JP      CRT             ; JUMP TO CRT                   C3  3B  01
```

To finish with this program do a reset.

Yours faithfully
D Tucker
Long Ditton

Thanks Mr Tucker we're sure this will be very useful in helping people load their Free Progs.

++++++++++++

We have received one letter that complains that all we talk about are Nascom products! Well this is true, as we can only speak about what we have got.

Please remember, we are a bunch of private individuals, whose pockets only stretch so far (and not as far as that if our wives are to be believed). So we can hardly talk about the latest 'Um Yukee' from Fred Bloggs & Co unless we buy one. We get a fair amount of co-operation from Nascom in terms of advance information about new products, but unless the independent manufacturers submit samples of products to Nascom (where we can lay our hands on them) or to ourselves, we are hardly in a position to review them. So our admitted ignorance of, say, the CC SOFT Basic is because none of us has a copy.

If you would like reviews of other products please write them. We will print them provided they are objective.

Last issue we had a look at the Bits and P.C.s graphics, this issue there is a review of the Comp S100 board. If you have any other non-Nascom add on, please send us your report - or a few free samples!!

STOP PRESS Comp S100 board did not meet printing deadline - see next issue.

CRASHING ROAD RACE

Dear Sirs,

John Waddell, author of "Burst-the-Balloon" has written to me and pointed out an error in my "Road-Race" listing in the INMC library.

At OCDE, I have written BO where I should have put OB! I'm very sorry for the inconvenience, but I hope you can change this, before sending out more copies?

May Babbage be with you,
Marcus Parker-Rhodes
London N4

SPECIAL OFFERS you can't risk sneezing at

We have received the ads below from other INMC readers. In publishing them neither Nascom nor the INMC endorses any of the items offered for sale

Nascom Users!

Ex Bank terminals. "IBM Golfball Printer plus Interface" Typewriter quality print at up to 15 cps. Colour shift, Underline, Tab and normal typewriter functions are all program selectable. £450.00 plus VAT - Write for details to:- DTN Wembley, 77 Montpelier Rise, Wembley, Middx. Tel. (out of working hours) 01 907 1767 or 01 904 7411

FOR SALE

1) Burrough 80 Column Card Reader (200 cards per minute). Trolley mounted. Technical manuals and circuits included. £80 ono
2) Friden Flexowriter electric typewriter with built in 7 hole paper tape punch and reader. All Solenoid controlled but will need interfacing. Circuit diagrams included. (Requires an 110 volt transformer). £50 ono
3) IBM Maintenance manual for Selectric I/O typewriter. Offers.

Contact: D Brough
43 Cranbrook Road
East Barnet
Herts

MUSHROOM BASIC

Mushroom are able to offer to INMC members a copy of the Mushroom 4K Integer Basic Interpreter at the reduced price of £10.50(normal price is £13.50). This includes cassette and manual - purchasers must state monitor used. In brief, it handles integer and string variables in scaler, one dimension or two dimension arrays as well as supporting nearly all the commands found on currently available 8K BASICS.

Contact: MUSHROOM
7 Bentinck Avenue,
Tollerton,
Nottingham

DOCTOR DARK'S DIARY-2

"Dedicated to the unknown op-code"

Since I last wrote, I have been sending poor Marvin (my paranoid Nascom) up the wall with non-existant instructions, in a search for anything beginning with ED that might be of some use or interest. I have discovered that ED 54 and ED 6B definitely do something, just what they do is at present still a mystery. If any of you want to experiment along these lines, the following subroutine should be useful. It may be located anywhere in the memory, and when called prints out the contents of AF, BC, DE, HL, IX and IY. Call if before and after your new op-code, then see if anything has changed.

```
F5  C5  E5  FD  E5  DD  E5  E5
D5  C5  F5  EF  1F  41  46  20
20  20  42  43  20  20  20  44
45  20  20  20  48  4C  20  20
20  49  58  20  20  20  49  59
1F  00  06  06  E1  7C  CD  44
02  7D  CD  44  02  CD  3C  02
10  F2  E1  C1  F1  C9
```

I am sure you won't need to be told that if you discover a new jump, you are going to be disappointed, because you'll never know what was in the registers after the instruction was executed! Equally obvious is the fact that if your new code does something that doesn't concern the CPU registers, it will look as though nothing has happened. Suggestions, anyone?

"There's always at least one better way"

Suppose you had a pair of Comp joysticks hooked up to your PIO, and you wanted to play some other game than the Fighter Pilot game that Comp provide. Just try to find out how to control those joysticks from their un-commented code listing. If you've never used the PIO for anything before, it can be a beast, until its little quirks are unravelled. The following extract from Darkbug (one reason why Marvin is paranoid is the presence of this utterly non-standard 2708 of mine) is my best effort so far. It saves all the registers it uses on the stack, and it puts the readings of the joysticks in RAM, which is handy. An added feature is the ability to control the scale of the results, by setting a delay constant in 0C56.

I've shown the addresses for this one, if you want to use it at some other address than 0400, wou will need to alter parts of it.

This is also the case if you don't want the results where I have put them.

```
0400    CD  07  04  CD  15  04  C9  F5
  08    C5  D5  E5  21  50  0C  11  00
  10    00  0E  06  18  0C  F5  C5  D5
  18    E5  21  53  0C  11  00  00  0E
  20    07  3E  FF  ED  79  3E  FC  ED
  28    79  3E  03  0D  0D  ED  79  3E
  30    00  ED  79  3E  03  ED  79  ED
  38    78  CB  5F  28  04  36  00  18
  40    02  36  FF  23  ED  78  CB  7F
  48    28  10  14  CB  77  28  01  1C
  50    3A  56  0C  47  F5  F1  10  FC
  58    18  EA  CB  77  20  F1  72  23
  60    73  E1  D1  C1  F1  C9
```

Calling 0400 reads both joysticks, to read only one, call either 0407 or 0415, depending on which socket the joystick is plugged into. The format of the results is;

0C50	Trigger A	00 normal, FF if trigger pressed.
0C51/2	Pot A/1, A/2	One byte for each pot in the joystick.
0C53	Trigger B	00 normal, FF if trigger pressed.
0C54/5	Pot B/1, B/2	One for each pot of other joystick.
0C56	RANGE SETTING	The value set in this byte controls the range of the results. For example, if 10 is used, each pot returns a number between 01 and 48, approximately. The smaller the number in 0C56 is, the larger the range of the results becomes.

"What else is there in this Darkbug"

Quite a lot, is the answer to that question, but a lot of it relates to the graphics board I mentioned in my earlier effort. There's the spiral screen wipe, for instance; or the automatic graph plotting routine. Pretty boring, really, isn't it? NO? In that case, here is one I use a lot, in games, and in "wall-paper" programs. It is relocatable, it is called SWAP, and it has the effect of replacing all of a given character on the screen with another. Just put the character you wish to remove in B and its replacement in C, then call this subroutine:

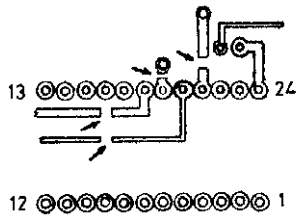
```
F5  D5  E5  21  0A  08  11  FA
0B  7E  B8  20  01  71  23  B7
ED  52  19  20  F4  E1  D1  F1
C9
```

Those of you with sharp eyes will have spotted that I have used something from INMC News No 2, without which the routine would have been a lot longer, to compare HL and DE. Finding that proved the value of the club to me, and I only hope this lot does as much for your programs as that did for mine!

BASIC CHIPS ON NASCOM 1's

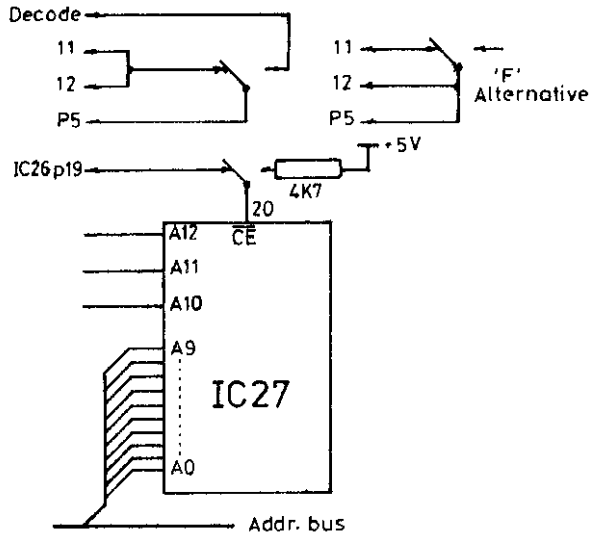
So there you are with your brand new (and expensive) MK36271 BASIC ROM, and wondering where to fit it. There don't seem to be any holes for it. When the memory board was designed it wasn't envisaged that anyone would want to fit an 8K ROM to it, so no holes were provided. Never mind, a little bit of surgery, and all will soon be working.

Take a careful look at fig. 1, and carefully cut the tracks as as shown. Then connect wire jumpers as follows:



1) IC26 pin 19 to IC27 pin 20.
2) IC24 pin 2 to IC27 pin 19.
3) IC24 pin 3 to IC27 pin 18.
4) IC25 pin 7 to IC27 pin 21.
5) Decode pads 11 and 12 together to pad P5.
6) Check it!
7) Plug the board back in the Nascom and try it. Lo! You should have BASIC.

Now this mod. means that you have lost the use of the other 3 sockets, so for those more adventurous souls, you can get them back again. The tracks to pins 19 and 21 were the +12 and -5 volt supplies to the EPROM sockets so these must be restored to make ICs 28, 29 and 30 operable. Two jumpers from the points where the tracks were cut to pins 19 and 21 on IC28 will restore the juice. But this will also put juice back on IC27, as these pins are linked on the top side of the pcb. Some deft knife work is required to cut these two tracks between ICs 27 and 28 sockets (and get it right 'cos you'll never repair a mistake!!!). Now the way we have mod'ed the chip select on the Basic ROM means that it will come on regardless, so a switch is called for to disable the ROM when not required. So make it a double pole switch, and use it for selecting the decaodes as well. Note that alternative arrangements are shown, for any other decode apart from 'E' and 'F', and decode for 'F'. Why? Well some idiot will want to run Big BASIC and Super Tiny BASIC on one board. Apart from that our version of Naspen is an early one, and runs from F8ØØ to FFFF. Naspen usually resides between B8ØØ and BFFF.



Can we make one thing quite clear, these mods have been tried and work, but the INMC can not take responsibility for any failures, or chewed up pcbs as a consequence of trying them. If you don't think you are capable of attempting these mods, DON'T TRY. Seek the help of someone competant, then you can blame him if he chews up half the tracks on the pcb.

STOP PRESS; 100 nF capacitor required across pins 24 and 12 of the BASIC ROM.

Hurray, The Nascom 2 Has Arrived.

by E. Pounce

There was great jubilation and excitement when my Nascom 2 arrived late one Friday night. I had been suffering from withdrawal symptoms for a couple of months since I sold my Nascom 1. Even my two and a half year old son was pleased, as he had been most disappointed when told that he could not play with the 'Lollypop Lady'.

Reading the documentation started there and then, but proved rather hard going, since my copy was rather poorly copied (you'd think that Nascom would clean their Xerox machine once in a while). There are also a number of pages which had been reduced so small that the printing was almost illegible. But worst of all there was no explanation of what the different sections were, or how to find them. It seems a shame that such a good product should be let down by the presentation of the documentation, which was all there if you could find it and read it. (We believe this has now been rectified, Ed.) One big improvement over the Nascom 1 is that there are references in the components lists to positions in a layout matrix, to show where the components are located on the pcb. This helped a lot since it took several minutes to find the location of some of the components when building my Nascom 1.

Construction of the main board (kits are currently supplied as a main board and a memory board) commenced after lunch on Saturday and took about 12 hours over the weekend to complete. Whilst soldering R17, I noticed what appeared to be a short between two parallel tracks. I don't think the tracks were touching, but just in case, these were 'tidied up' before continuing. One suggestion made was that this may have been caused by a speck of dust on the negative when the board was made.

To help keep the IC sockets tight against the board when soldering, I cut a piece of card 2" x 1", wrapped a piece of selotape round one end, inside out, and folded it in half, the selotape keeping it folded. This will stick to the sockets while the board is upside down, and keep the socket you are working on tight against the pcb. Another trick I learned when constructing my Nascom 1 was to leave the LEDs and transistors till last, less chance of them being damaged by turning the board over whilst soldering sockets etc.

After assembly , the VDU part was powered up as per the instructions (a bit brief) and the first problem was evident - in each character space, there appeared to be two, in fact the front half of each character twice. After a call to my 'friendly neighbourhood dealer' (at home, he wasn't pleased) the fault was cured by placing a 100pF capacitor between the LD pin and earth (pins 1 and 8) of IC65. The reason is that the signal on the LD pin leaves something to be desired, and the capacitor smoothes out the ripple.

Things were moving now until after inserting the CPU, monitor and workspace RAM.

NOTHING!!!

After much checking with a cheap multimeter, I discovered that the RESET line was low, ie: active. Tracing it back, it appeared that IC12a was misbehaving. In fact it was a dud. A replacement chip cleared the fault.

From here on everthing went smoothly. The memory board was built and connected to the buss. Everything else worked first time.

Other Points of Interest
========================

1) The graphics chip which the documentation says should be there seems to be an optional extra.

2) The Basic chip needs a wait state to run properly, Nascom don't say anything about that in their advertising. So what the ads mean is that although the Nascom 2 runs at 4 MHz, the Basic doesn't. (With the wait state, the BASIC averages 1.8 times the speed at 2 MHz without the wait state, Ed.)

3) The numbering of PL/2/3/4 appears to be as follows, and not what you would expect:

```
15 13 11  9  7  5  3  1
 .  .  .  .  .  .  .  .

 .  .  .  .  .  .  .  .
16 14 12 10  8  6  4  2
```

It follows the colours of the ribbon cables, but it doesn't say so.

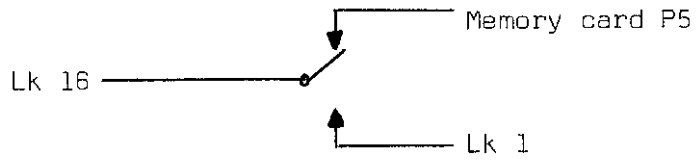
4) R43 is missing from the drawing in the base of TR3

5) My cassette interface would not work unless the variable resistor was adjusted such that the wiper gave 0 volts.

6) The Veroboard tends to buckle in the middle when the edge connectors are being soldered.

Now for a quick mod.

For those of you with Nascom 2 who want to run programs from Nascom 1, the NASBUG monitors may be fitted on the extension memory card in location 0 (& 1 for 2K monitors). Connect pin 16 of LSK1 to P5 on the memory card instead of pin 1 on LSK1. To give quick conversion, use a single pole double throw switch as follows:



To switch without ruining anything in memory, execute a 'HALT' instruction before changing monitors, and use 'RESET' to recover control.

Having had my moans, Nascom are to be congratulated, Nascom 2 is a superb machine, and another satisfied customer bites the dust.

Other bits of info for Nascom 2 from various sources

The video fault mentioned above seems to be fairly common, and really comes back to the oscillator. The output of the 74S04 (IC56) seems to be almost sinusoidal in shape, and this makes the first divider (IC49) a bit unhappy. IC49, in turn feeds IC71a which generates the LD signal for IC65, and any jitteriness of IC49 is transferred to IC65. The best cure is the 100pF capacitor as mentioned above, but a 5pF capacitor between pins 12 and 7 of IC56 helps to square up the clock a little. Severe clock jitter can cause some very weird timing problems giving rise to overall unreliability.

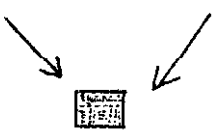
The memory supplied with N2's at present is our old friend Nascom Series 1 Memory card, which was the subject of a note about 'Memory Plague' in an earlier news letter. Well as an N2 may well ask it to run at 4 MHz without any wait states, a little more investigation was considered desirable. The buss signals from an N2 are a lot cleaner than an N1 which helps, but 'Plague' still raises its head from time to time. First, check that you have used the 74157s in the memory not the 74LS157s. Both types are used on an N2, and are easily mixed up. Secondly, gridding the +5 volt and ground rails is a good idea, there is a sheet in the N2 kit about that. Thirdly, change all the 33R resistors to 68R, and change the links between P8 and P9, P12 and P13 for 68R as well.

These mods alone cured a board that suffered from severe 'Plague' at 2 MHz on an N1. All the other mods (the Rs and Cs from the earlier note, etc), were removed. The board worked perfectly at 2 or 4 MHz on both an unmodified 'B' issue N1 (worst case) and an N2. So it seems that proper gridding of the board, and curing any tendency for the address and control lines of the 4116s to under-shoot (the 68R resistors) will cure 'Plague' on its own.

THIS SPACE TO LET

STOP PRESS — SCOOP

MASK PATTERN FOR 256K RAM CHIP REPRODUCED BELOW — ENTIRELY FREE AND AT NO COST.



XTAL BASIC UPDATE 1.3 - SEPTEMBER 1979

We have received the following release from Crystal, and reproduce it here for your information.

The following 'bugs' are the only ones so far found in XTAL BASIC:-

1. In all copies up to and including serial no 55.
   Caused errors in the use of scientific notation.

CORRECTION:-

>M2744	>M274E
A6 > A9	A5 > A8

2. In copies up to serial no 66.
   'WAIT' command does not work properly

CORRECTION

>M2267	>M226F
0A >08	C1 > 5F C1 F1 47

3. In copies up to serial no 88
   BASIC 'hangs' sometimes when a string space overflow occurs

CORRECTION

>M20C0
02 > 00

4. In copies up to serial no 106.
   Caused characters within quotes of ASCII value greater than 80H to appear as reserved words under 'EDIT' but OK under 'LIST'

CORRECTION

>M2B1B
F4 > F6

5. In copies up to serial no 150.
   Programs longer than about 5K found to contain corrupted lines deep within the program.

CORRECTION

>M13E8	>M1519
AF >CD 19 15	00 > AF BE 23 20 FC C9

6. In copies up to serial no 165.
   The numbers used in the CLEAR command cannot exceed 32767. This could cause problems if it is required to use small machine-code programs at the top of the memory space in systems with 32K or more RAM.

CORRECTION

>M1813	>M1827	>M12B1
C7 > B1 12	C7 > B1 12	00 > CD 7F 1B C3 D0 1

Now, to set TOPRAM to say, 8400H in a 32K system, you would type:

CLEAR 50, -31744 i.e, use negative numbers for locations greater than 7FFFH, as in the CALL and POKE commands.

7. Again up to serial no 165.
   Some users have expressed a preference to restrict the number of keys that interrupt a BASIC program. This modification will allow the program to stop if 'BS' is typed, and then any key will continue. If 'shift BS' is typed, either when running or when halted, the program will BREAK, as if a STOP command had been encountered.

>M168A	>M16F9
52 > F8 16 18 02	52 > 4D 0C FE 1D CC 3E 00 FE 1E 00 00 00 00.

All should now be well! Just save XTAL BASIC on another tape.

REVIEW OF EDITOR / ASSEMBLER PACKAGES FOR NASCOM COMPUTERS

Here is a chart showing a detailed comparison of all the Editor / Assemblers available for the Nascom. All three are capable of editing and assembling a program correctly, and they are all good and quite easy to use. ZEAP is available in two versions, ZEAP 1.1 for the old NASCOM monitors, T2 and T4, and the considerably improved ZEAP 2.0 which uses NAS-SYS. ZEN and V & T Packages are only available for T2/T4, but it is very likely that they will soon be modified to run under NAS-SYS as well. The ZEAP 2.0 tested was a pre-release version and there may well be modifications made before production commences. Our thanks to NASCOM, V & T Electronics, and Newbear for allowing us to sample the delights of the programs. We are not going to recommend that any one is best, because it depends on exactly what you want to do with it, and also on how much you can afford to spend. Here then is the detailed chart.

EDITOR / ASSEMBLER PACKAGES FOR NASCOM COMPUTERS

BASIC INFORMATION	ZEAP 1.1	ZEAP 2.0	ZEN	V & T
Available from:	NASCO	NASCO	NEWBEAR	V & T Electronics
Written by:	Sigma Software	Sigma Software	Avalon Software	V & T Electronics
Price:	£30	£30	£14.50	£11.50
Memory Size for the package:	3K	4K	4K	4K

EDITOR FEATURES	ZEAP 1.1	ZEAP 2.0	ZEN	V & T
To display a group of lines	Specify start and/or end line number. Pause facility	Specify start and/or end line numbers. Pause and lines per page features	Move pointer to start of group, then specify number of lines to display.	Specify start and end line numbers. Lines per page feature automatic.
To enter a line	Type in the line with the line number. Line numbers can be provided by the system.	Type in the line with the line number. NAS-SYS editing available for corrections. Line numbers can be provided by the system.	Move pointer to position to start, then enter the lines. The line number is provided by the system, always.	Add single line by specifying line number, or add a group of lines starting at a certain line. Line numbers are provided by the system.
To delete lines	A single line or a group can be deleted	A single line or a group can be deleted	A single line or a group can be deleted	A single line or a group can be deleted.
To edit a line already entered.	Editing mode allows full editing of a single line, including insertion /deletion.	NAS-SYS editing using cursor control keys allows very clear and easy editing including insertion/ deletion.	No editing possible. Line must be replaced by re-typing.	No editing possible. Line must be replaced by re-typing.
Compression of source code, to save valuable RAM	None	None	None	None
Search for character string	Yes, including continued search. Only from start of file. Only up to 6 characters.	Yes, including improved continued search. Only from start of file.	Yes, from any point, (but no editing - see above).	No
Remembering	Yes	Yes	Not needed because system supplies line numbers	Yes
GENERAL FEATURES				
Source code supplied	No	No	Yes, good listing but only partly commented.	No
Adaptability to other systems	No	Only by author	Yes, quite easy	No, but it includes an amazing ability to relocate itself to any address. All work areas can be put anywhere in memory.
Storage of source code on cassette	Yes, but better to use NASBUG Read/Write	Yes, but better to use NAS-SYS Read/Write	Yes, uses own routines. Can append files. This did not seem to work very reliably.	Yes, uses NASBUG routines.

ASSEMBLER FEATURES	ZEAP 1.1	ZEAP 2.0	ZEN	V & T
Does it work?	Yes	Yes	Yes	Yes
Error handling	All lines in error displayed	All lines in error displayed	Stops on first error	Displays all errors.
Pseudo-ops	Only some object code displayed for DEFB, DEFW, DEFM.	Better than ZEAP 1.1 but only first four bytes displayed.	Excellant, all codes displayed. Non-standard.	Standard Pseudo ops.
Hex numbers	Must have £ prefix	£ prefix or H suffix	H suffix, also Octal.	Hex is the default, decimal numbers have a decimal point.
Arithmetic operators	+ -	+ -	All four arithmetic plus OR, AND logical operators	+ -
Listing	VDU or printer	VDU or printer	VDU or printer	VDU only.
Symbol table	No	Yes, sorted and includes line number reference	Yes, sorted by first letter only.	No
Cross reference table	No	No	No	No
Object code destination.	Nowhere/memory/ memory displaced/ tape.	Nowhere/memory/ memory displaced/ tape.	Nowhere/memory/ memory displaced/ tape.	Memory, actual location only - but see above for relocating feature.
Speed	Rather slow - 10 mins to generate 2K	Pre-release copy as Zeap 1.1. Sigma working on speeding it up.	Fast - 4000 lines a minute claimed.	Fast.

RRRRR REPEAT KEYBOARD

In the past we have avoided publishing full assembly listings of programs, rather, we have put them in the software library, and commented on them when we publish the occasional library list. However, interest has suddenly swung round to the ability to add a repeat key facility to the Nascom, and we have received four programs which offer this feature.

Two programs by Dr. P. Curtiss offer full 'n-key' rollover, and have been assembled for both Nasbug and Nas-sys. Another (plagiarised by myself from those of Mr. Pounce and Dr. Curtiss) has been assembled at B000H and is intended to reside in EPROM for use with Nascom 2, which, by having its reset jump set to page 'B', automatically initialises the repeat key mode on reset. Unfortunately this is only directly applicable to Nascom 2, as hardware mods for the reset jump would be required for Nascom 1.

The program published here, whilst perhaps not the most elegant, is the shortest, and has been assembled for Nascom 1 using Nasbug or B-Bug, and is therefore the most immediately useful to the reader.

As some mystery surrounds the workings of the keyboard routines we publish Mr. Pounce's article and assembly listing in full.

KEYBOARD REPEATER by E. Pounce
==========

This routine is used to give a repeat facility when a key is held down on the keyboard. If a key is pressed and held down, with no other key being pressed, then a character will be received as usual (eg. from a call to CHIN); but after a set period of time, whilst waiting for the next character, the same character will appear to be received. This period of time is determined by the value loaded into the 'repeat rate counter' at line 280, zero is the longest time, 80H would be approx half that time (FFH would be the shortest possible). If the operator continues to hold the key down then the relevant character will appear to be received again and again, the time period being determined by the value loaded into the 'repeat rate counter' at line 660. C0H is used in the assembly to give a repeat speed of approx. one quarter of the initial delay time.

Fast operators should not be affected by this routine as there are only 23 extra bytes of code executed for each key depression compared with the 100 odd + the delay of 7.5mS in the KBD routine.

The routine is activated by modifying the reflective address from TIN (for T4 monitors) or KBD (for T2 and B-Bug monitors) located at address 0C4EH and 0C4FH to point to 0C5AH either as part of a program or via a modify command as follows:

```
M 0C4E
0C4E XX>5A 0C.
```

This command must be entered on one line as the first half of the address should not be changed without the second half.

Once this routine has been loaded and the reflective address changed the repeat is available to any program using CHIN. But take care not to corrupt any of the program otherwise no characters can be entered - even monitor commands - and a reset will be required to put the reflective address back to normal.

```
                0010 ;     ***  KEYBOARD REPEATER  ***
                0020 ;
                0030 ; By E. Pounce                      October 1979
                0040 ;
0069            0050 KBD    EQU  #0069 ; Keyboard routine
0C01            0060 KMAP   EQU  #0C01 ; Current key map
04F6            0070 SRLIN  EQU  #04F6 ; Serial input routine
                0080 ;                   for T4 monitors
                0090 ;
0C50            0100        ORG  #0C50 ; Origin of workspace
0001            0110 CHRSTR DEFS 1 ; Last valid character seen
0001            0120 RATE   DEFS 1 ; Repeat rate temporary store
0008            0130 KMAPC  DEFS 8 ; Copy of last 8 of KMAP
                0140 ;
0C5A CD6900     0150 RT0    CALL KBD ; Scan for new character
0C5D C5         0160        PUSH BC  ; Save status
0C5E D5         0170        PUSH DE
0C5F E5         0180        PUSH HL
0C60 11020C     0190        LD   DE, KMAP+1 ; Set up pointers
0C63 21500C     0200        LD   HL, CHRSTR ; Start of work area
0C66 010800     0210        LD   BC, 8      ; Length of KMAP used
                0220 ;          Note: last 8 bytes only used
0C69 300B       0230        JR   NC RT2     ; No character ?
                0240 ;
                0250 ; New character from KBD call
0C6B 77         0260        LD   (HL), A ; Store character
0C6C 23         0270        INC  HL
0C6D 70         0280        LD   (HL), B ; Zero repeat rate counter
0C6E 23         0290        INC  HL
0C6F EB         0300        EX   DE, HL  ; Set uo to copy KMAP
0C70 EDB0       0310        LDIR         ; Copy KMAP into KMAPC
                0320 ;
0C72 E1         0330 RT1    POP  HL ; Restore status
0C73 D1         0340        POP  DE
0C74 C1         0350        POP  BC
0C75 C9         0360        RET     ; Return from routine
                0370 ;
                0380 ; No character found from KBD call
0C76 7E         0390 RT2    LD   A, (HL) ; Is a character stored ?
0C77 B7         0400        OR   A
0C78 2810       0410        JR   Z RT5   ; No, jump to exit
                0420 ;
0C7A E5         0430        PUSH HL      ; Save the pointer
0C7B 23         0440        INC  HL      ; Point to counter store
0C7C EB         0450        EX   DE, HL  ; Set up to compare
0C7D 13         0460 RT3    INC  DE      ; Inc to next KMAPC byte
0C7E 1A         0470        LD   A, (DE) ; Compare KMAP with KMAPC
0C7F EDA1       0480        CPI
0C81 2005       0490        JR   NZ RT4  ; Not equal
0C83 E2900C     0500        JP   PO RT6  ; Equal: end of compare
```

```
0C86 18F5      0510          JR    RT3
               0520 ;
               0530 ; Map copies are different
0C88 E1        0540 RT4      POP   HL        ; Get char. store pointer
0C89 70        0550          LD    (HL), B ; Zero character store
0C8A E1        0560 RT5      POP   HL        ; General return point
0C8B D1        0570          POP   DE
0C8C C1        0580          POP   BC
0C8D C3F604    0590          JP    SRLIN     ; Change to RET if using T2
               0600 ;
               0610 ; Map copies are equal
0C90 E1        0620 RT6      POP   HL          ; Get char. store pointer
0C91 23        0630          INC   HL          ; Point to counter store
0C92 34        0640          INC   (HL)        ; Inc. counter store
0C93 20F5      0650          JR    NZ RT5      ; If not zero, exit
0C95 36C0      0660          LD    (HL), #C0   ; Reset repeat speed
0C97 2B        0670          DEC    HL
0C98 7E        0680          LD     A, (HL)    ; Recover stored char.
0C99 37        0690          SCF ; Set flag to simulate char. found
0C9A 18D6      0700          JR     RT1        ; Loop back to exit
               0710 ;
               0720 ;        END OF LISTING
```

All four repeat key programs will be put in the software library in due course.

ELIZA Continued from Page 37.

```
2550 DATA"I SEE, IS THAT ALL YOU HAVE TO SAY ?"
2560 DATA"I'M NOT SURE I UNDERSTAND YOU FULLY."
2570 DATA"COME COME, ELUCIDATE YOUR THOUGHTS."
2580 DATA"CAN YOU ELABORATE ON THAT ?"
2590 DATA"THAT IS QUITE INTERESTING."
2600 REM
2610 REM ** DATA FOR FINDING REPLIES
2620 REM
2630 DATA 1,3,4,2,6,4,6,4,10,4,14,3,17,3,20,2
2640 DATA 22,3,25,3,28,4,28,4,32,3,35,5,40,9
2650 DATA 40,9,40,9,40,9,40,9,40,9,49,2,51,4
2660 DATA 55,4,59,4,63,1,63,1,64,5,69,5,74,2
2670 DATA 76,4,80,3,83,7,90,3,93,6,99,7,106,6
2680 REM
2690 REM ** DATA FOR MACHINE CODE INPUT
2700 REM
2710 DATA 31711,1080,-53,536,-20665,3370
2720 DATA -5664,0
2730 REM
2740 DATA 27085,14336,-13564,6399,13178
2750 DATA 10927,-8179,233
Ok
```

DOCTOR DARK'S DIARY-3

EPISODE THE THIRD

This episode has been re-written about five times, due to rapid advances in the development of Marvin, and the influence of Doctor Dark's elderberry wine, (more powerful than a Z8000!) Doctor Dark strongly recommends the manufacture of wines in the computer room, as the carbon dioxide produced in the fermentation process is very good for putting out electrical fires.....

Marvin now has a new monitor, Nasbug T4, and as a result, I have decided that Marvin doesn't really need Nas-Sys after all. I have now almost forgotten how boring it was waiting for the tape recorder all the time, and of course am much less likely to suffer Electricity Board repression now, thank goodness.

Richard Beal said in INMC News No 3, that programs written for T2 would run under T4. This is almost entirely true, but not if you try to run a program where the @ key has to be used during the program. No problem, use another key to solve that one. When all else had failed, I had a look at the instructions, where I found a diagram of the keyboard, with the @ key marked as the control key. What does it control, Richard? (Try it, or read the manual! - Ed).

Another addition to Marvin made recently is a 16K RAM board, naturally this means a buffer board and mother board too - then I fastened it all in a Vero-frame to stop it flapping in the breeze. The telly couldn't be put on the top, which is wide open, so I made a chipboard box and cured Marvin's agorophobia once and for all. Has anyone else noticed how difficult it is to solder chipboard?

Those of you who remember me mentioning Darkbug will be thinking T4 has put paid to that idea, perhaps. The answer is no, because the 16K RAM board just happens to have four sockets for 2708 EPROMs. Darkbug is going to be bigger and better than I had first intended, and will now be known as Darkbug 4K. Here is an extract, re-written for the RAM on the main board, so you can all use it!

```
0C60  C5  0E  7F  CD  6D  0C  0E  20  CD  6D  0C  C1  C9  F5  D5  E5
0C70  DD  E5  21  CA  0B  11  40  00  DD  21  2F  0F  06  30  71  23
0C80  CD  35  00  10  F9  21  F9  07  06  07  CD  9F  0C  10  FB  19
0C90  06  22  71  2B  CD  35  00  10  F9  DD  E1  E1  D1  F1  C9  C5
0CA0  DD  44  19  71  CD  35  00  10  F9  DD  25  DD  45  2B  71  CD
0CB0  35  00  10  F9  DD  2D  DD  44  ED  52  71  CD  35  00  10  F8
0CC0  DD  25  DD  45  23  71  CD  35  00  10  F9  DD  2D  C1  C9
```

A few things to note; the subroutine starts at 0C60; if you have a Bits & PC's graphics board, put E0 at 0C62. You can also load register C with the character of your choice and call 0C6D. Fun, isn't it? (It seems to impress non-computer owners, too). Keen users of disassemblers will find some very interesting instructions mixed in with the well-known ones.

I must have been typing E 0C50 NL for over a year now, and nobody told me that the E command will NL pick up three addresses, if they are there. If you type E 0C50 0C60 0C70 NL the program at 0C50 will be executed as normal, but all three NL addresses are in the scratchpad RAM, available for use by the program. The 0C60 would be at ARG 2 (0C0E/F) and 0C70 at ARG 3 (0C10/1). This would be useful if you had a program you wanted to run repeatedly, with varying parameters, and couldn't be bothered to put a proper keyboard input routine in, or hadn't enough memory to do so.

A NEW MAGAZINE WORTH TEN POUNDS!

The first edition of the Liverpool Software Gazette has arrived at Zilog Villas; it is produced by Microdigital, and is well worth investigation. For a start, they have included a listing of their own Nascom programming language, M5. This is normally sold for ten pounds, so you save nine pounds fifty on the first issue! There is also an article about running Sargon on a Nascom, which I expect will come in handy when I get around to translating all those funny TDL mnemonics. There was also a short article on the text oriented language, Pilot, which has given me an idea for what to write next to perplex poor Marvin. Obviously, a Nascom Pilot interpreter.... Yet another setback for the heap of half finished programs in my possession. (An example of this is the program suggested by Richard Beal, to test/convert programs intended for other machines; to tell the truth though, all I had done was draw a circle and write "start" in it....)

AN IDEA FOR A PROGRAM

The code that follows is used to draw a maze on the screen, the computer then has to try to solve the maze. The target is represented by a Θ and the creature that has to solve the maze by a symbol I can't type - 07H. You know the one I mean...Key U,D,L or R to draw the maze, E to erase parts you don't want, F to mark the finish, and then S to start. The next instruction will be at 0CB0, only you have to write it.

```
0C60  EF  1E  00  21  E0  09  11  40  00  01  C0  FF  CD  3E  00  FE
0C70  55  20  06  09  36  2B  C3  6C  0C  FE  44  20  06  19  36  2B
0C80  C3  6C  0C  FE  4C  20  06  2B  36  2B  C3  6C  0C  FE  52  20
0C90  06  23  36  2B  C3  6C  0C  FE  45  20  05  36  20  C3  6C  0C
0CA0  FE  46  20  05  36  0F  C3  6C  0C  FE  53  C2  6C  0C  36  07
0CB0  Your turn.....
```

If we are lucky INMC will make a competition of it. If I am unlucky I will have to judge it!

TRAILER FOR NEXT EPISODE

Will the Nascom 4 sack its designer? Can you run eight Z8000's off one crystal? Will Darkbug ever be finished? Is anyone reading this? When will the INMC library contain a Chess program?

FREE PROGS

On the next few pages are a selection of programs for virtually all combinations and permutations of Nascom equipment.

For minimum system Nascom 1 with Nasbug or B-Bug:

Go-Karting	by J Butcher
Fruit Machine	by Anon.
Hangman	by D Hunt

For expanded Nascom 1 with Nasbug or B-Bug:

Piranha	by J & E Long - adapted by N. Ray.

For expanded Nascom 1 with Tiny Basic:

Jackpot	by D Bullock

For expanded Nascom 1 with Super Tiny Basic:

Lord	by H Birkett

For Nascom 1 or 2 with 8K Basic:

Eliza	by J Shrager, adapted by D Hunt.

Happy Computing!

```
> GO-KARTING BY J BUTCHER
>T C50 F98
  0C50 00 00 00 00 00 00 00 00 5C
  0C58 00 00 00 00 00 00 00 00 64
  0C60 31 FF 0F 3E 1E CD 3B 01 10
  0C68 21 8A 03 36 20 21 CD 0B 76
  0C70 22 18 0C EF 09 09 47 4F 59
  0C78 2D 4B 41 52 54 49 4E 47 C1
  0C80 09 09 20 20 54 49 4D 45 0D
  0C88 3A 2D 20 20 20 20 50 45 10
  0C90 4E 41 4C 54 59 3A 2D 00 8B
  0C98 2A 18 0C 36 20 3E 10 21 B7
  0CA0 0A 03 06 30 77 23 10 FC 9A
  0CA8 21 8A 0B 06 30 77 23 10 4A
  0CB0 FC 11 40 00 01 00 0D 21 38
  0CB8 4A 03 77 19 10 FC 01 00 B3
  0CC0 0D 21 79 03 77 19 10 FC 17
  0CC8 3E 16 06 09 21 E9 0C 5E AB
  0CD0 23 56 23 12 13 13 12 10 D2
  0CD8 F6 3E 17 11 40 00 21 E3 84
  0CE0 0A 77 19 77 19 77 C3 69 B9
  0CE8 0F B2 0A EE 09 F2 03 A4 54
  0CF0 09 D5 08 0E 09 CC 0A 9E 6D
  0CF8 0A 93 09 B2 0A 00 00 00 6B
  0D00 00 00 00 ED 0C 99 09 00 A8
  0D08 FE 0A 20 2A F5 D5 E5 3A 50
  0D10 07 0D B7 20 1A 3C 32 07 97
  0D18 0D 2A 03 0D 5E 23 56 23 66
  0D20 22 03 0D 13 ED 53 05 0D C4
  0D28 5E 23 56 EB 23 36 0A E1 3B
  0D30 D1 F1 7C FE 00 C9 F5 E5 1C
  0D38 3A 07 0D B7 28 09 AF 32 5C
  0D40 07 0D 2A 05 0D 36 20 E1 D4
  0D48 F1 18 E7 F5 E5 2A 05 0D 5B
  0D50 7C FE 09 20 0A 7D FE 99 1E
  0D58 20 05 00 00 C3 7C 0F E1 B9
  0D60 F1 C9 00 00 00 21 0B 0B 5E
  0D68 11 00 00 36 2A 06 78 CD 31
  0D70 69 00 FE 4A 20 04 14 C3 29
  0D78 90 0D FE 47 20 04 15 C3 63
  0D80 90 0D FE 59 20 04 1C C3 84
  0D88 90 0D FE 4E C2 90 0D 1D FA
  0D90 CD 35 00 10 DA C5 D5 E5 08
  0D98 EB 00 7C FE 00 28 0D FA 39
  0DA0 A8 0D CD EB 0D 25 18 04 68
  0DA8 CD FA 0D 24 7D FE 00 28 50
  0DB0 0D FA BA 0D 2D CD 0B 0E 9E
  0DB8 18 04 CD 20 0E 2C 3A 50 92
  0DC0 0C FE 16 CC 33 0E FE 17 0F
  0DC8 CC 4B 0D FE 10 CC C8 0E A9
  0DD0 CD 03 0D 28 03 C3 3A 0D 54
  0DD8 7D FE 00 28 03 C3 3A 0D F5
  0DE0 E1 EB D1 C1 CD F0 0E C3 D9
  0DE8 6B 0D 00 EB D5 11 50 0C 9A
  0DF0 1A 77 23 7E 32 50 0C D1 8E
  0DF8 EB C9 EB D5 11 50 0C 1A 00
  0E00 77 2B 7E 32 50 0C D1 EB 78
  0E08 C9 00 00 EB D5 11 50 0C 0C
  0E10 1A 77 11 40 00 ED 52 7E BD
  0E18 32 50 0C D1 EB C9 00 00 39
  0E20 EB D5 11 50 0C 1A 77 11 FD
  0E28 40 00 19 7E 32 50 0C D1 6C
  0E30 EB C9 00 F5 D5 E5 11 54 06
  0E38 0C 21 56 0C CD 10 0F 11 D2
  0E40 F0 0B 21 55 0C CD 20 0F C7
  0E48 E1 D1 F1 C9 D5 E5 3A 58 0E
  0E50 0C FE 00 28 04 FE 03 28 BD
  0E58 23 F5 21 F4 0B 22 18 0C E4
  0E60 EF 4C 41 50 3A 2D 00 2A CB
  0E68 18 0C 36 20 F1 3C 21 58 96
  0E70 0C 77 11 F9 0B CD 20 0F 12
  0E78 C3 60 0F 00 E1 21 50 0C 16
  0E80 06 0A 36 00 23 10 FB 21 23
  0E88 DA 09 22 18 0C EF 50 72 70
  0E90 65 73 73 20 22 2F 22 20 9C
  0E98 6B 65 79 2C 00 2A 18 0C 69
  0EA0 36 20 21 5A 0A 22 18 0C CF
  0EA8 EF 74 6F 20 70 6C 61 79 5E
  0EB0 20 61 67 61 69 6E 2E 00 0C
  0EB8 2A 18 0C 36 20 CD 3E 00 75
  0EC0 FE 2F 20 F9 C3 60 0C 00 43
  0EC8 D5 E5 21 5A 09 22 18 0C 5A
  0ED0 EF 59 4F 55 20 48 41 56 C9
  0ED8 45 20 43 52 41 53 48 45 01
  0EE0 44 21 00 2A 18 0C 36 20 F7
  0EE8 C3 7C 0E 00 00 00 00 00 43
  0EF0 C5 D5 E5 11 52 0C 21 56 63
  0EF8 0C CD 10 0F 11 E3 0B 21 1E
  0F00 53 0C CD 20 0F E1 D1 C1 DD
  0F08 C9 00 00 00 00 00 00 00 E0
  0F10 06 02 AF 1A BE 27 12 23 DA
  0F18 13 10 F8 C9 00 00 00 00 0B
  0F20 ED 53 18 0C 06 02 CB F9 5F
  0F28 7E CB 79 28 13 F5 E6 F0 FF
  0F30 20 0B F1 E6 0F 20 0E 05 83
  0F38 20 12 04 18 08 F1 CB B9 12
  0F40 CD 44 02 18 08 CD 4D 02 9E
  0F48 CB B9 18 01 04 2B 10 D8 0B
  0F50 2A 18 0C 36 20 C9 00 00 CC
  0F58 00 00 00 00 00 00 00 00 67
  0F60 21 56 0C 3E 01 77 E1 D1 5A
  0F68 C9 21 99 09 22 05 0D 21 58
  0F70 07 0D 36 00 21 B3 0A 36 DD
  0F78 0A C3 65 0D 21 E9 0C 22 FE
  0F80 03 0D E1 F1 C3 4C 0E 00 8E
  0F88 00 00 4E 00 50 45 4E 43 0B
  0F90 49 4C 00 48 41 50 50 59 B6

> CONTROL KEYS: Y G J N
> EXECUTE AT C60
> SPACE FROM C50 TO C60 MUST
> INITIALLY BE 'NOPS'.
```

```
> FRUIT MACHINE BY ANON.
>
>T C50 FEF
  0C50 F5 C5 D5 E5 3E FF BE CA 95
  0C58 67 0C 5E 23 56 23 06 00 D7
  0C60 4E 23 ED B0 C3 56 0C E1 80
  0C68 D1 C1 F1 C9 00 00 00 00 C0
  0C70 00 15 22 00 A4 0E 1F 0B 8F
  0C78 05 20 20 20 20 20 5F 0B 93
  0C80 05 20 20 20 20 20 FF 00 30
  0C88 52 78 0E C6 0C D8 0C 06 28
  0C90 EA 0C 3A 0E 00 00 00 0F 39
  0C98 04 06 07 0F 1A 06 00 1A FE
  0CA0 0F 04 0F 06 0F 0F 07 06 FF
  0CA8 00 18 1A 18 04 13 1A 18 4C
  0CB0 06 18 00 04 18 06 0F 1A 25
  0CB8 18 04 2A 00 06 0F 00 06 25
  0CC0 07 18 04 1A 2A 06 CE 0A 11
  0CC8 0D 53 50 41 43 45 20 54 C1
  0CD0 4F 20 53 50 49 4E FF 00 84
  0CD8 CE 0A 0D 20 20 20 20 20 69
  0CE0 20 20 20 20 20 20 20 20 EC
  0CE8 FF 00 1F 0B 05 20 20 20 32
  0CF0 20 20 5F 0B 05 20 20 20 0B
  0CF8 20 20 FF 00 00 00 00 00 43
  0D00 EF 1E 00 2A 74 0C CD 50 E1
  0D08 0C 21 79 0C 11 7A 0C 3E 9C
  0D10 20 77 01 04 00 ED B0 11 67
  0D18 85 0C 0E 05 ED B8 CD 32 6D
  0D20 0D FE 1E CA 86 02 CD 90 05
  0D28 0D CD F4 0D CD 34 0E C3 E2
  0D30 09 0D AF 32 73 0C 2A 92 6F
  0D38 0C CD 50 0C 3A 88 0C 47 8F
  0D40 CB 40 28 06 2A 89 0C CD 12
  0D48 50 0C 2A 8B 0C CD 50 0C 9B
  0D50 CD 69 00 30 FB 2A 8D 0C 81
  0D58 CD 50 0C FE 20 C8 FE 1E 90
  0D60 C8 CB 40 28 E5 11 73 0C DD
  0D68 21 DF 08 FE 41 20 06 36 18
  0D70 0B EB CB C6 EB 23 23 FE 33
  0D78 42 20 06 36 0B EB CB CE B2
  0D80 EB 23 23 FE 43 20 05 36 5A
  0D88 0B EB CB D6 C3 4A 0D 00 46
  0D90 ED 5F 11 88 0C 12 00 00 A0
  0D98 21 73 0C 3E 7F CD B2 0D 8E
  0DA0 1A CD B2 0D CB C6 1A CD CB
  0DA8 B2 0D CB CE 1A CD B2 0D B3
  0DB0 C9 00 F5 C5 D5 E5 47 4E 8F
  0DB8 DD 21 96 0C 21 70 0C 11 13
  0DC0 9F 09 CD DC 0D CD DC 0D E1
  0DC8 CD DC 0D 3E 06 32 8F 0C 9C
  0DD0 CD 6C 0E E1 E5 10 E0 E1 BB
  0DD8 D1 C1 F1 C9 CB 41 20 05 62
  0DE0 ED 67 3C ED 6F 7E 32 EB 74
  0DE8 0D DD 7E 22 12 23 13 13 DA
  0DF0 CB 09 C9 00 3E 07 CD 54 00
  0DF8 0E FE 24 20 07 21 81 0C 0A
  0E00 CD 62 0E C9 3E 00 CD 54 73
  0E08 0E FE 24 C8 3E 04 CD 54 71
  0E10 0E FE 24 C8 3E 1A CD 54 8F
  0E18 0E FE 24 C8 3E 06 06 03 6B
  0E20 21 9F 09 11 7A 0C BE 20 6C
  0E28 05 EB 36 24 23 EB 23 23 D4
  0E30 10 F4 C9 00 06 0A 3E 3F 98
  0E38 32 8F 0C 21 76 0C ED 5B FE
  0E40 90 0C CD 50 0C CD 6C 0E 5A
  0E48 EB CD 50 0C CD 6C 0E EB 9C
  0E50 10 F0 C9 00 06 03 21 9F F0
  0E58 09 BE C0 23 23 10 FA 21 5E
  0E60 79 0C 06 05 3E 24 77 23 FA
  0E68 10 FC C9 00 C5 ED 4B 8E D6
  0E70 0C 0D 20 FD 10 FB C1 C9 49
  0E78 5F 08 05 48 4F 4C 44 53 6C
  0E80 9F 08 05 41 20 42 20 43 40
  0E88 FF 00 5F 08 05 20 20 20 61
  0E90 20 20 9F 08 05 20 20 20 EA
  0E98 20 20 DF 08 05 20 20 20 32
  0EA0 20 20 FF 00 D9 0B 12 46 29
  0EA8 52 55 49 54 20 4D 41 43 EB
  0EB0 48 49 4E 45 20 47 41 4D D7
  0EB8 45 50 08 07 4A 41 43 4B 83
  0EC0 50 4F 54 6A 08 0B 31 30 9F
  0EC8 20 50 45 52 20 53 50 49 E9
  0ED0 4E 8F 08 09 50 41 59 53 09
  0ED8 20 20 31 30 30 AA 08 0B 74
  0EE0 52 41 4E 44 4F 4D 20 48 17
  0EE8 4F 4C 44 D1 09 05 07 20 DA
  0EF0 07 20 07 5D 09 09 FF FF 99
  0EF8 FF FF FF FF FF FF FF 2A 29
  0F00 09 0C 44 49 53 50 4C 41 E1
  0F08 59 20 50 41 59 53 50 09 26
  0F10 07 33 20 41 4C 49 4B 45 DF
  0F18 6B 09 0A 2D 20 2D 20 06 45
  0F20 20 20 20 31 30 90 09 07 90
  0F28 50 41 59 53 20 35 30 9D 96
  0F30 09 09 FF FF FF FF FF FF 4B
  0F38 FF FF FF AB 09 0A 2D 20 4F
  0F40 06 20 06 20 20 20 32 30 3D
  0F48 D1 09 05 00 20 00 20 00 76
  0F50 EB 09 0A 06 20 06 20 06 AF
  0F58 20 20 20 33 30 11 0A 05 4A
  0F60 04 20 04 20 04 DD 09 09 AA
  0F68 FF FF FF FF FF FF FF FF 6F
  0F70 FF 51 0A 05 1A 20 1A 20 52
  0F78 1A 61 0A 01 FF 6B 0A 0A 3B
  0F80 06 20 06 20 2D 20 20 20 68
  0F88 32 30 A0 0A 03 FF FF FF A3
  0F90 AB 0A 0A 06 20 2D 20 2D FE
  0F98 20 20 20 31 30 DF 0A 05 56
  0FA0 FF FF FF FF FF EB 0A 0A A9
  0FA8 2D 20 06 20 2D 20 20 20 B7
  0FB0 31 30 2B 0A 0A 06 20 2D B2
  0FB8 20 06 20 20 20 32 30 FF AE
  0FC0 FF FF FF FF FF FF FF FF C7
  0FC8 FF FF FF FF FF FF FF FF CF
  0FD0 FF FF FF FF FF FF FF FF D7
  0FD8 FF FF FF FF FF FF FF FF DF
  0FE0 FF FF FF FF FF FF FF FF E7
  0FE8 FF FF 00 04 80 00 07 0C 8C
>
> EXECUTE AT D00
> FOR USE WITH T2 AND T4 MONITORS
```

```
 HANGMAN BY D. HUNT
> VOCABULARY FOR A 6 YEAR OLD
>TC66 FDA
  0C66 48 41 4E 47 4D 41 4E 00 6C
  0C6E 00 00 CD 6F 0D 21 D6 09 C3
  0C76 22 18 0C CD 94 0D 31 FF 66
  0C7E 0F 06 07 21 50 0C 36 20 79
  0C86 23 10 FB 06 0F 21 57 0C 59
  0C8E 36 00 23 10 FB DD 21 66 62
  0C96 0C FD 21 50 0C CD B0 0D B2
  0C9E CD 69 00 30 F8 4E AF B9 BE
  0CA6 2B 20 FA 23 23 11 5F 0C B9
  0CAE 06 30 A9 7E B9 28 06 12 10
  0CB6 13 04 23 18 F5 CD 6F 0D 52
  0CBE 21 8A 0B 22 18 0C CD CE 61
  0CC6 0D 21 9B 0B 78 77 CD 40 A2
  0CCE 02 CD 40 02 78 D6 30 32 9B
  0CD6 F5 0D 32 5C 0D CD FF 0D 58
  0CDE CD F1 0D CD 69 00 30 FB 16
  0CE6 2A 18 0C 23 23 77 CD 11 DB
  0CEE 0E 3A 57 0C FE FF 20 0F D1
  0CF6 CD 37 0E CD 40 02 CD 4E 3E
  0CFE 0E 20 02 28 11 18 D6 CD 2E
  0D06 60 0E CD 40 02 DD 7E 00 EB
  0D0E FE 00 28 21 18 C7 CD 40 4E
  0D16 02 EF 59 6F 75 20 77 69 51
  0D1E 6E 2E 20 00 CD 3E 0D CD 1C
  0D26 94 0D 00 00 00 00 00 00 D4
  0D2E 00 00 C3 7C 0C CD 40 02 95
  0D36 EF 42 61 64 20 6C 75 63 9D
  0D3E 6B 2C 20 74 68 65 20 77 DA
  0D46 6F 72 64 20 77 61 73 00 03
  0D4E CD 3E 0D 06 06 21 5F 0C 5B
  0D56 CB BE 23 10 FB 06 03 21 44
  0D5E A1 0B 11 5F 0C 1A 77 13 37
  0D66 23 23 10 F9 CD 40 02 18 E9
  0D6E B6 3E 1E CD 3B 01 CD 3E F1
  0D76 0D 21 DA 0B 22 18 0C EF CB
  0D7E 09 20 09 20 48 41 4E 47 FB
  0D86 4D 41 4E 20 0D 20 0D 00 C9
  0D8E 2A 18 0C 36 20 C9 EF 50 47
  0D96 72 65 73 73 20 61 6E 79 C8
  0D9E 20 6B 65 79 20 74 6F 20 37
  0DA6 70 6C 61 79 2E 00 CD 3E F2
  0DAE 0D C9 21 6D 0F 11 D0 0F 1E
  0DB6 ED 52 20 05 21 7B 0E 28 F9
  0DBE 0A 2A B1 0D AF BE 28 03 55
  0DC6 23 18 FA 23 22 B1 0D C9 D4
  0DCE EF 4F 4B 2E 20 54 68 65 D3
  0DD6 20 77 6F 72 64 20 68 61 A8
  0DDE 73 20 20 20 6C 65 74 74 77
  0DE6 65 72 73 2E 00 00 00 CD 38
  0DEE 3E 0D C9 21 9C 0B 06 03 30
  0DF6 36 5F 23 36 20 23 10 F8 3C
  0DFE C9 EF 59 6F 75 72 20 67 F9
  0E06 75 65 73 73 20 3F 00 CD 00
  0E0E 3E 0D C9 F5 3E 00 32 57 3C
  0E16 0C F1 06 06 21 5F 0C 11 CA
  0E1E 58 0C BE 28 05 23 13 10 C1
  0E26 F9 C9 F5 3E FF 32 57 0C BD
  0E2E F1 12 C6 30 77 D6 30 18 6A
  0E36 EC 21 58 0C 06 06 11 9C 6E
  0E3E 0B AF BE 20 06 23 13 13 33
  0E46 10 F8 C9 7E 12 AF 18 F5 71
  0E4E 21 58 0C 11 5F 0C AF BE CA
  0E56 28 04 23 13 18 F9 62 6B A4
  0E5E BE C9 DD 7E 00 FD 77 00 C2
  0E66 DD 23 FD 23 21 AA 0B 06 70
  0E6E 07 11 50 0C 1A 77 23 23 C7
  0E76 13 10 F9 C9 00 43 41 54 41
  0E7E 00 44 4F 47 00 48 41 54 43
  0E86 00 42 41 54 00 41 4E 44 3E
  0E8E 00 48 4F 54 00 4D 4F 55 78
  0E96 53 45 00 41 50 50 4C 45 AE
  0E9E 00 47 52 45 45 4E 00 4D 6A
  0EA6 41 54 00 4C 4F 56 45 00 7F
  0EAE 4F 52 41 4E 47 45 00 4C C4
  0EB6 45 54 54 45 52 00 53 45 E0
  0EBE 43 52 45 54 00 54 48 41 D7
  0EC6 4E 4B 00 47 52 41 50 45 DC
  0ECE 00 41 52 45 00 4E 55 54 AB
  0ED6 00 52 41 42 42 49 54 00 98
  0EDE 54 4F 50 00 56 41 4E 00 C4
  0EE6 46 49 53 48 00 42 4C 4F FB
  0EEE 43 4B 00 54 4F 59 00 42 C8
  0EF6 41 44 00 47 4F 4F 44 00 B2
  0EFE 54 41 50 00 54 48 41 54 22
  0F06 00 54 48 45 4E 00 53 48 DF
  0F0E 4F 50 00 43 55 54 00 43 EB
  0F16 41 53 45 00 42 49 47 00 D0
  0F1E 53 4D 41 4C 4C 00 42 55 3D
  0F26 59 00 42 4F 58 00 51 55 1D
  0F2E 45 45 4E 00 52 41 49 4E 3F
  0F36 00 4F 4E 45 00 54 57 4F 21
  0F3E 00 54 48 52 45 45 00 46 0B
  0F46 4F 55 52 00 53 54 52 49 8D
  0F4E 4E 47 00 53 57 49 4E 47 7A
  0F56 00 48 4F 57 00 50 41 59 3D
  0F5E 00 47 4F 00 4F 55 54 00 FB
  0F66 46 55 4E 00 4F 4E 00 4C 47
  0F6E 4F 54 00 53 49 54 00 54 64
  0F76 41 4C 4B 00 4C 49 46 54 8C
  0F7E 00 48 45 4C 50 00 4E 4F 53
  0F86 54 00 50 45 4E 00 50 45 61
  0F8E 4E 43 49 4C 00 48 41 50 9C
  0F96 50 59 00 4C 4F 53 54 00 90
  0F9E 4C 4F 4E 47 00 4C 49 54 C6
  0FA6 54 4C 45 00 54 45 45 54 CC
  0FAE 48 00 54 4F 4F 4B 00 4F 91
  0FB6 57 4E 00 53 45 45 00 57 9E
  0FBE 41 4C 4C 00 4E 41 49 4C CA
  0FC6 00 4E 4F 00 4D 4F 4E 45 A1
  0FCE 59 00 53 49 4C 56 45 52 0B
  0FD6 00 00 00 00 C3 6A 0E 00 20

> EXECUTE AT C70
```

PIRANHA BY J & E LONG.

YOU HAVE FALLEN INTO THE AMAZON. DURING PHASE 0 THE PIRANHAS CAN'T SENSE YOU, BUT THEY GET CLEVERER. YOU GET BONUS POINTS EACH TIME YOU SWIM FROM SIDE TO SIDE.
S RETURNS THE GAME TO START
P WILL CHANGE THE PHASE
" WILL RETURN TO NASBUG
! ALLOWS CHANGING COMMANDS
A AUTO PILOT WHEN OVER 1000
CONTROL KEYS ARE AS FOR ROBOTS, ALL KEYS CENTERED ABOUT H, MAY CHANGED WITH THE ! COMMAND.

```
T 1000 1660
  1000 00 31 00 10 CD AC 14 21 FF
  1008 59 16 23 7E FE 4F 28 0C A9
  1010 E5 CD 89 10 3A 73 15 B7 E4
  1018 F4 7C 12 E1 CD EC 11 CD 22
  1020 0B 11 CD 19 11 21 59 16 D3
  1028 06 16 C5 E5 CD 42 13 E1 01
  1030 CD 27 15 C1 10 F4 18 CF F5
  1038 21 CF 0B 4F 11 68 15 06 36
  1040 0A 1A F6 00 77 13 23 10 27
  1048 F8 79 C6 30 32 D5 0B D6 A7
  1050 30 07 07 07 50 5F 2A 7E FC
  1058 15 19 11 76 15 06 08 7E BE
  1060 12 23 13 10 FA AF 32 51 F4
  1068 15 C9 3A 75 15 FE 09 C8 E9
  1070 3C 32 75 15 C3 33 10 E1 64
  1078 CD 11 12 FE 30 D8 FE 3A B6
  1080 D0 D6 30 32 75 15 C3 33 1D
  1088 10 3A 75 15 3C 47 21 EE FE
  1090 0B CD C6 10 10 FB 21 5D D7
  1098 16 56 23 5E CD 9A 13 3A 49
  10A0 74 15 BA 20 19 FE 01 20 4B
  10A8 04 3E 2E 18 02 3E 01 32 B3
  10B0 74 15 3A 7D 15 47 21 EE 6B
  10B8 0B CD D4 10 10 F8 3A 51 17
  10C0 15 FE 14 C0 18 A4 3A E9 96
  10C8 10 3C 32 E9 10 FE 20 C0 2D
  10D0 AF 32 E9 10 7E FE 20 20 76
  10D8 03 36 31 C9 FE 39 C2 E6 FA
  10E0 10 36 30 2B 18 EE 3C 77 4A
  10E8 C9 19 7E FE 20 28 16 FE B2
  10F0 30 20 05 36 39 2B 18 F2 F9
  10F8 3D 77 FE 30 C0 2B 3E 20 33
  1100 BE C0 23 77 C9 3E FF 32 61
  1108 73 15 C9 21 50 15 34 C0 E4
  1110 23 34 C0 23 34 C0 23 34 A6
  1118 C9 3A 76 15 CD B6 11 FE 49
  1120 01 C0 3E 04 CD B6 11 A7 6F
  1128 C0 CD 7D 14 78 B7 C8 36 84
  1130 01 23 3E 64 CD B6 11 47 E2
  1138 3A 7B 15 B8 30 04 36 41 76
  1140 18 02 36 49 23 3A 79 15 D5
  1148 CD B6 11 47 3A 78 15 90 7B
  1150 77 2B 2B 77 CD 2A 15 E5 96
  1158 3A 77 15 CD B6 11 FE 03 C4
  1160 28 2D FE 02 28 1D FE 01 0A
  1168 28 0C 06 C0 3E 2E 21 4A 4A
  1170 0B 11 01 00 18 23 06 40 1F
  1178 3E 2E 21 4A 08 11 01 00 7A
  1180 C3 99 11 06 FF 3E 0D 21 6F
  1188 38 08 11 40 00 18 0A 06 52
  1190 01 3E 0D 21 0B 08 11 40 72
  1198 00 CD B6 11 3C 19 3D 20 EF
  11A0 FC EB E1 1A FE 20 28 05 DE
  11A8 2B 2B 36 4F C9 70 23 72 62
  11B0 23 73 3E 2A 12 C9 C5 E5 44
  11B8 47 2A 4E 15 0E 08 7C 0F 3E
  11C0 AC 0F 0F AC 0F AD 0F 0F 21
  11C8 0F EE 01 E6 01 29 85 6F DB
  11D0 0D 20 EB 22 4E 15 7C 85 7F
  11D8 67 78 6F 80 B8 30 FB 7C 16
  11E0 BD 30 D6 B8 38 03 90 18 4F
  11E8 FA E1 C1 C9 CD 69 00 D0 64
  11F0 2B 36 01 CD 2A 15 E5 21 75
  11F8 1E 16 06 1C BE 28 05 23 6D
  1200 10 FA E1 C9 3E 1C 90 E6 96
  1208 FE 26 16 6F 5E 23 56 EB 85
  1210 E9 C3 3E 00 3E C0 18 1A 3C
  1218 3E 01 18 16 3E 40 18 12 3F
  1220 3E FF 18 0E 3E BF 18 0A B4
  1228 3E C1 18 06 3E 41 18 02 F0
  1230 3E 3F E1 BE 28 05 77 2B 2D
  1238 36 17 C9 2B 36 07 C9 E1 72
  1240 36 00 C9 E1 3A 73 15 3F 23
  1248 32 73 15 C9 01 22 16 11 27
  1250 3B 16 21 0A 08 1A 13 FE 11
  1258 FF CA 00 10 F6 00 77 23 D3
  1260 FE 2D 20 F1 CD 6C 12 36 2F
  1268 20 23 18 E9 CD 11 12 FE AC
  1270 21 CA 00 10 02 03 03 F6 7B
  1278 00 77 23 C9 21 59 16 7E FB
  1280 FE 01 C0 3A EB 0B FE 20 9F
  1288 C8 21 EE 0B CD EA 10 21 64
  1290 5D 16 46 23 4E CD F3 12 3E
  1298 57 2B 2B 7E B7 20 0C 3A F2
  12A0 74 15 FE 01 3E FF 28 02 A1
  12A8 3E 01 77 CD 32 13 5F 07 E8
  12B0 83 5F 0F B3 5F A2 B7 C8 E6
  12B8 06 07 3A C3 12 EE 08 32 0E
  12C0 C3 12 7B 07 5F A2 B7 28 09
  12C8 15 10 F7 7B 07 07 A3 5F 81
  12D0 06 08 7B 0F 5F A2 B7 28 59
  12D8 0B 10 F7 36 00 C9 7B 07 7D
  12E0 5F 0F 0F A3 CD 2C 13 77 95
  12E8 06 07 21 ED 0B CD EA 10 E7
  12F0 10 F8 C9 E5 21 35 15 AF D2
  12F8 32 4D 15 3E 08 32 4C 15 77
  1300 7E B7 5F 16 00 F2 0A 13 CC
  1308 16 FF EB 09 7E EB 23 FE AE
  1310 20 28 0C FE 25 28 08 56 20
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1318 3A 4D 15 82 32 4D 15 23 00
1320 23 3A 4C 15 3D 20 D6 3A 5E
1328 4D 15 E1 C9 E5 21 34 15 96
1330 13 04 E5 21 35 15 BE 28 95
1338 05 CD 2A 15 18 F8 23 7E 0D
1340 E1 C9 35 C0 3E 01 CD B6 B4
1348 11 A7 C0 23 7E FE 4F C8 89
1350 FE 58 CA 6F 14 E5 FE 49 32
1358 CC B2 13 E1 23 7E 2B 2B D4
1360 77 CD 2A 15 16 00 5E 7B E5
1368 B7 C8 B7 F2 70 13 16 FF 3B
1370 23 46 23 4E 0A FE 20 20 A5
1378 06 CD 2F 15 36 4F C9 E5 D5
1380 60 69 19 EB E1 1A FE 25 7E
1388 CA 03 14 FE 20 C2 15 14 35
1390 2B 72 23 73 0A 12 3E 20 50
1398 02 C9 C5 21 F6 F7 19 11 73
13A0 C0 FF 06 10 19 05 7C B7 D9
13A8 F2 A4 13 58 7D C6 40 57 96
13B0 C1 C9 3E 64 CD B6 11 47 CA
13B8 3A 7C 15 B8 D8 CD 2A 15 32
13C0 E5 56 23 5E CD 9A 13 42 4B
13C8 4B 3A 5D 16 57 3A 5E 16 D8
13D0 5F CD 9A 13 78 92 57 F2 0F
13D8 DB 13 2F 47 79 93 5F B7 71
13E0 F2 E4 13 2F B8 38 0D 7B 83
13E8 B7 FA F0 13 3E 40 19 0F 54
13F0 3E C0 13 08 7A B7 F2 FD 44
13F8 13 3E 01 18 02 3E FF E1 95
1400 2B 77 C9 CD 2F 15 7E FE 0C
1408 50 28 05 2B CD 70 14 C9 DE
1410 AF 23 23 77 C9 CD 2E 15 69
1418 CD 70 14 CD 91 14 CD 70 2C
1420 14 21 01 00 09 CD 3E 14 92
1428 21 FF FF 09 CD 3E 14 21 A4
1430 40 00 09 CD 3E 14 21 C0 3D
1438 FF 09 CD 3E 14 C9 7E FE B8
1440 20 CA 55 14 FE 25 C8 FE 90
1448 2B C8 E5 C5 EB CD 91 14 56
1450 CD 70 14 C1 E1 EB C5 CD D4
1458 7D 14 C1 7C B7 C8 3A 7A 6D
1460 15 77 23 36 58 CD 2A 15 BD
1468 72 23 73 3E 2B 12 C9 2B F3
1470 23 36 4F CD 2A 15 46 23 A1
1478 4E 3E 20 02 C9 21 60 16 9A
1480 06 15 7E FE 4F 28 08 CD 77
1488 27 15 10 F6 21 01 00 2B 2B
1490 C9 21 59 16 06 16 CD 29 0F
1498 15 7E 23 BA 20 07 7E BB 7C
14A0 20 03 C3 2E 15 23 10 EE FE
14A8 21 00 00 C9 21 0A 08 06 DF
14B0 10 0E 40 36 20 23 0D 20 C8
14B8 FA 10 F6 21 0A 08 11 3A 9A
14C0 0B 06 30 3E 25 77 12 23 24
14C8 13 10 FA 06 0E 21 4A 08 80
14D0 77 0E 2F 23 0D C2 D3 14 71
14D8 77 0E 11 23 0D C2 DB 14 63
14E0 05 C2 D0 14 21 59 16 36 65
14E8 17 23 36 50 23 36 17 23 4F
14F0 36 00 23 01 E2 09 70 23 DC
14F8 71 3E 07 02 16 15 23 23 35
1500 36 4F CD 29 15 15 20 F6 D0
1508 21 E1 0B 06 14 11 54 15 BE
1510 1A F6 00 77 13 23 10 F9 EA
1518 3E FF 32 73 15 AF 32 75 7A
1520 15 CD 38 10 C3 78 10 23 CD
1528 23 23 23 23 23 C9 2B 2B 0B
1530 2B 2B 2B C9 01 C0 01 02 53
1538 C1 02 04 01 04 08 41 08 6A
1540 10 40 10 20 3F 20 40 FF 73
1548 40 30 BF 80 08 00 AD F4 05
1550 F9 08 00 00 53 43 4F 52 9D
1558 45 20 20 20 20 20 20 20 92
1560 30 30 20 20 20 20 20 20 95
1568 50 48 41 53 45 20 20 20 4E
1570 20 20 20 FF 2E 00 40 01 53
1578 02 60 30 0A 01 32 31 15 F2
1580 16 40 01 02 60 30 0A 01 89
1588 32 3D 01 26 5C 30 14 04 D7
1590 4B 3A 01 24 58 2C 1E 07 F8
1598 64 37 01 22 54 2C 28 0A 1D
15A0 7D 34 02 20 50 28 32 0D 3F
15A8 96 31 02 1E 4C 28 3C 10 64
15B0 AF 2E 02 1C 48 24 46 13 35
15B8 C8 2B 02 1A 44 24 50 16 AA
15C0 E1 28 04 18 40 20 5A 19 CD
15C8 FA 25 04 16 44 20 64 1C FA
15D0 FF 00 00 00 00 00 00 00 E4
15D8 00 00 00 00 00 00 00 00 ED
15E0 00 00 00 00 00 00 00 00 F5
15E8 00 00 00 00 00 00 00 00 FD
15F0 00 00 00 00 00 00 00 00 05
15F8 00 00 00 00 00 00 00 00 0D
1600 36 02 4C 12 00 10 14 12 32
1608 1C 12 20 12 18 12 24 12 DE
1610 28 12 30 12 2C 12 3F 12 31
1618 77 10 43 12 02 12 FF 22 3F
1620 21 21 53 0D 59 38 4E 32 E9
1628 47 34 4A 36 54 37 55 39 52
1630 42 31 4D 33 48 35 50 2E 34
1638 41 30 FF 47 4F 2D 55 2D 03
1640 44 2D 4C 2D 52 2D 55 4C 60
1648 2D 55 52 2D 4C 4C 2D 4C 70
1650 52 2D 48 2D 50 2D 41 2D 45
1658 FF 2F 4F 17 00 09 E2 8D 7A
```

```
> EXECUTE AT 1000
```

```
LIST
  25 P.$↑
  26 P. "       ♦♦♦♦♦♦♦♦♦♦ JACKPOT ♦♦♦♦♦♦♦♦♦♦"
  27 P.;P.;P.;P.;P.;P.;P.
  30 P."  PLEASE ENTER THE AMOUNT OF MONEY THAT"
  35 P.
  40 INPUT"  YOU WISH TO PLAY WITH MAX.(2000)"Z
  41 P.
  42 IFZ>2000 P.;P.;P.;GOTO 30
  60 IF Z<0 GOTO 80
  70 GOTO 90
  80 P."       PLEASE ENTER A POSITIVE NUMBER!"
  85 FOR I=1 TO 1000;NEXT I;GOTO 27
  90 P.
  99 Y=0,N=1
 100 INPUT"  DO YOU WANT INSTRUCTIONS?(Y-N)"A
 101 IF A=1 GOTO 370
 102 P.$↑
 140 P."      BANDIT! A SIMULATED SLOT MACHINE"
 150 P."    PLAY UNTIL YOU OR THE BANK ARE BUST!"
 160 P."    WINNING COMBINATIONS ARE AS FOLLOWS:-"
 161 FOR I=1 TO 3000 ;NEXT I;P.$↑
 180 P."      CHERRY CHERRY ANY      PAYS 2:1
 190 P."      CHERRY BAR    ANY      PAYS 2:1
 200 P."      CHERRY CHERRY BAR      PAYS 4:1
 210 P."      CHERRY CHERRY CHERRY   PAYS 4:1
 220 P."      ORANGE ORANGE ORANGE   PAYS 8:1
 230 P."      LEMON  LEMON  LEMON    PAYS 16:1
 240 P."      GRAPE  GRAPE  GRAPE    PAYS 32:1
 250 P."      MELON  MELON  MELON    PAYS 64:1
 260 P."      PLUM   PLUM   PLUM     PAYS 128:1
 270 P."      APPLE  APPLE  APPLE    PAYS 256:1
 280 P."      BAR    BAR    BAR      SUPRISE!
 290 P."      BELL   BELL   BELL   TAKES IT ALL!
 291 P.
 292 INPUT "      PRESS ANY KEY TO CONTINUE"X
 293 P.$↑
 305 P."          ♦♦♦ SOME FURTHER ADVICE!♦♦♦
 306 P.;P.
 310 P."   (1) A -BAR- IS WILD!"
 320 P."   (2) YOUR STAKE WILL BE REDUCED BY 2♦ THE          BET FOR EACH -OOPS-!"
 325 P."   (3) A BELL ANYWHERE PAYS 10♦ THE BET!"
 330 P.;P."   IF YOU WANT TO STOP THE GAME"
 340 P."  PRESS 0,0 WHEN YOUR BETS ARE CALLED"
 361 P.
 365 INPUT "  PRESS ANY KEY TO CONTINUE"X
 366 P.$↑
 370 P.$↑
 371 LET B=(Z♦3)/2;LET P=Z
 380 C=0;D=0
 390 IFD<C GOTO 510
 400 IF B<=0 GOTO 1480
 410 GOTO 480
 420 INPUT "       HOW MANY GOES DO YOU WANT?"C," AND HOW MUCH PER BET
"E
 430 P.$↑
 440 IF (C=0)♦(E=0) GOTO 1670
 450 IF E<=0 GOTO 420
 460 D=0
 470 GOTO 510
 480 P.;P."       THE BANDIT HAS",#5,B,,"YOU HAVE",#5,P
 490 P.
```

```
500 GOTO 420
510 P=P-E;B=B+E
520 D=D+1
530 GOSUB 740
540 F=@(2)
550 GOSUB 740
560 G=@(2)
570 GOSUB 740
580 H=@(2)
590 IF F#9 GOTO 600
595 F=G
600 IF G#9 GOTO 610
605 G=F
610 IF H#9 GOTO 620
615 H=G
620 IF (F*G)#B GOTO 640
630 G=H;F=G
640 IF F=G GOTO 660
650 GOTO 1180
660 IF G=H GOTO 720
665 IF F=2 GOTO 680
670 GOTO 1180
680 IF H=1 GOTO 1180
690 B=B-(2*E);P=P+(2*E)
700 P."  WIN",,#3,2*E
710 GOTO 390
720 IF F=1 GOTO 1180
730 GOTO 1370
740 @(2)=0
750 @(1)=RND(10000)
760 IF @(1)>8800 GOTO 750
770 IF@(1)>8700 GOTO 870
780 IF@(1)>8500 GOTO 880
790 IF@(1)>8100 GOTO 890
800 IF@(1)>7500 GOTO 900
810 IF@(1)>6700 GOTO 910
820 IF@(1)>5700 GOTO 920
830 IF@(1)>4500 GOTO 930
840 IF@(1)>3100 GOTO 940
850 IF@(1)>100 GOTO 950
860 GOTO 960
870 @(2)=@(2)+1
880 @(2)=@(2)+1
890 @(2)=@(2)+1
900 @(2)=@(2)+1
910 @(2)=@(2)+1
920 @(2)=@(2)+1
930 @(2)=@(2)+1
940 @(2)=@(2)+1
950 @(2)=@(2)+1
960 @(2)=@(2)+1
970 IF@(2)<10 GOTO 990
980 P."   BELL  ",;RET.
990 IF@(2)<9 GOTO 1010
1000 P."   BAR   ",;RET.
1010 IF@(2)<8 GOTO 1030
1020 P."   APPLE ",;RET.
1030 IF@(2)<7 GOTO 1050
1040 P."   PLUM  ",;RET.
1050 IF@(2)<6 GOTO 1070
1060 P."   MELON ",;RET.
1070 IF@(2)<5 GOTO 1090
1080 P."   GRAPE ",;RET.
1090 IF@(2)<4 GOTO 1110
1100 P."   LEMON ",;RET.
1110 IF@(2)<3 GOTO 1130
1120 P."   ORANGE",;RET.
1130 IF@(2)<2 GOTO 1150
1140 P."   CHERRY",;RET.
1150 IF @(2)>=1 GOTO 1160
1160 P."   OOPS! ",
1170 RET.
1180 J=0
1190 IF F=10 GOTO 1260
1191 IF G=10 GOTO 1260
1192 IF H=10 GOTO 1260
1200 IF F>1 GOTO 1210
1201 J=J+1
1210 IF G>1 GOTO 1220
1211 J=J+1
1220 IF H>1 GOTO 1230
1221 J=J+1
1230 IF J>0 GOTO 1290
1240 P.
1250 GOTO 1580
1260 P."  WIN ",,#3,10*E
1270 B=B-(10*E);P=P+(10*E)
1280 GOTO 1580
1290 IF J>1 GOTO 1320
1300 B=B+(2*E);P=P-(2*E)
1310 P."  LOSE",,#2,2*E;GOTO 1580
1320 IF J>2 GOTO 1350
1330 B=B+(4*E);P=P-(4*E)
1340 P."  LOSE",,#2,4*E;GOTO 1580
1350 B=B+(8*E);P=P-(8*E)
1360 P."  LOSE",,#3,8*E;GOTO 1580
1370 @(4)=2
1380 FOR @(3)=2 TO 10
1390 @(4)=@(4)*2
1400 IF F=@(3) GOTO 1420
1410 NEXT @(3)
1420 IF F=10 GOTO 1460
1425 IF F=9 GOTO 1530
1430 B=B-(@(4)*E);P=P+(@(4)*E)
1440 P."  WIN",,#3,@(4)*E
1450 GOTO 1580
1460 P=P*2
1470 B=0
1480 P.
1490 F.I=1 TO 815;P.#1,"*",;N.I
1495 P.;P."          ***** JACKPOT ***** "
1500 P.;P.;P.;P."  YOU BROKE THE BANK,YOU NOW HAVE",P
1510 P.,,,,,"    PLEASE LEAVE QUIETLY!"
1520 GOTO 1630
1530 R=(Z*2)
1540 P=P+R;B=B-R
1550 P."  ITS BONUS TIME !        *****  YOU WIN",#4,R," POUNDS  *****"
1560 P.
1580 IF B<=0 GOTO 1490
1590 IF P<=0 GOTO 1620
1600 GOTO 390
1610 P.
1620 P."     YOU ARE BUST!- NO CREDIT ALLOWED!"
1630 P.
1635 Y=0,N=1
1640 INPUT "  DO YOU WANT TO PLAY AGAIN  Y, OR N"T
1650 IF T=1 STOP
1660 GOTO 25
1670 S.
OK
```

LORD

By H Birkett

```
LIST
  10 P.$↑
  20 M=20464,L=16
  30 P."What is your name ?";;MCI
  40 P.$↑;M=M+15
  50 MCL;IFK=32M=M-2,L=L-1;G.50
  60 IFL=0G.10
  70 M=20464
  80 P."Lord ";;MCP;P." .... Your Estate awaits."
  90 P.;P."To quit, sell all your land."
 100 P.
 110 L.P=25,Y=5,D=0,S=700,R=50,H=3,T=750,A=250,J=1,N=100
 120 P."Lord ";;MCP;P.", last year"
 122 P.#1,D," serfs starved and ",Y," came to the Estate."
 124 IFJ>0G.140
 130 P=P/2;P."The plague killed half the serfs !!"
 140 P."You now have ",#1,P," serfs."
 141 IF(P<10)+(P=Y)G.143
 142 G.145
 143 P.;P."                    ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆";P.;P."What was left of the serfs hav
 moved on (after cutting your throat)";G.500
 145 P.#1,"Harvest was ",T," bushels at ",H," bushels per acre.";P.#1,"Rats rui
ed ",R," bushels, leaving ",S," in store."
 150 P.;P."The Estate owns ",#1,A," acres, and land is worth"
 152 V=17+R.(6)-1;P.#1,V," bushels per acre."
 155 IN."How much land will you buy ?"I;IFI<0G.155
 157 IFI=0G.190
 160 J=I◆V;IFJ<=SG.180
 170 GOS.1000;G.155
 180 S=S-J,A=A+I
 185 G.240
 190 IN."How many acres will you sell ?"I;IFI<0G.190
 195 IFI=0G.240
 200 IFI<AG.230
 210 IFI=AG.500
 220 GOS.1000;G.190
 230 A=A-I,S=S+V◆I
 240 P.;P."Lord ";;MCP;P.", how many bushels"
 242 IN."shall we distribute as food ?"I;IFI<0G.240
 244 IFI<=SG.260
 250 GOS.1000;G.240
 260 S=S-I,D=P-I/20,Y=0;IFD>=0G.280
 270 Y=-D/2,D=0
 280 IN."How many acres shall we plant ?"I;IFI<0G.280
 285 IFI>AG.300
 290 J=I/2;IFJ<=SG.310
 300 GOS.1000;G.280
 310 IFI>10◆PG.300
 320 S=S-J
 330 H=R.(5),T=H◆I,R=R.((T+S)/14+1)
 340 S=S-R+T,J=R.(10)-1,Y=Y+((5-H)◆S)/600+1
 350 IFY<=50G.360
 355 Y=50
 360 P=P+Y-D;P.;P."                    ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆";P.;G.120
 499 S.
 500 P.;IN."Do you want to try again (Y or N) ?"I
 505 P.
 510 IFI=YP.$↑;G.70
 520 IFI=NP."You were no good in any case.";G.540
 530 G.500
 540 P.;IN."Anybody else want to try (Y or N) ?"I
 550 IFI=NS.
 560 IFI=YG.10
 570 G.540
1000 P.;P."Lord ";;MCP;P.", think again - you have"
1010 P.#1,P," serfs, ",A," acres, and ",S," bushels.";P.;R.
OK
```

```
10 REM          ***  ELIZA  ***
20 REM
30 REM FROM THE PROGRAM BY THE SAME NAME BY
40 REM JEFF SHRAGER, PUBLISHED BY CREATIVE
50 REM COMPUTING. ADAPTED FOR NASCOM 1/2 BY
60 REM D. R. HUNT                  OCTOBER 1979
70 REM
80 REM REQUIRES APPROX. 16K RAM SPACE.
90 REM SUITABLE FOR NASBUG T4 AND NAS-SYS.
100 REM
110 REM ** INITIALZATION
120 REM
130 CLEAR 1500:DIM S(36),R(36),N(36)
140 REM
150 REM ** SET UP MACHINE CODE INPUT.
160 REM
170 RESTORE 2740:X1=31:X2=29
180 IF PEEK(1)=0 THEN RESTORE 2710:X1=13:X2=8
190 DOKE 4100,3200:FOR I9=3200 TO 3214 STEP 2
200 READ I8:DOKE I9,I8:NEXT
210 REM
220 REM ** CHANGE A FOR USE WITH A PRINTER
230 REM
240 A=47
250 WIDTH A:N1=36:N2=14:N3=112
260 RESTORE 2630
270 FOR X=1 TO N1:READ S(X),L:R(X)=S(X)
280 N(X)=S(X)+L-1:NEXT
290 CLS:PRINT"HELLO, I'M A NASCOM SPECIALLY TRAINED IN"
300 PRINT"PSYCHOANALYSIS. PLEASE TELL ME YOUR PROBLEMS."
310 REM
320 REM ** USER INPUT SECTION.
330 REM
340 PRINT:I$=" ":B1=0
350 B=USR(0):IF B<0 THEN 350
360 IF B=X2 AND I$=" " THEN 350
370 IF B1=175 AND B<>X2 AND B<>X1 THEN 350
380 PRINT CHR$(B);:IF B=X1 THEN 430
390 IF B=X2 THEN 420
400 IF B>92 THEN B=B-32
410 I$=I$+CHR$(B):B1=B1+1:GOTO 350
420 I$=LEFT$(I$,LEN(I$)-1):B1=B1-1:GOTO 350
430 I$=I$+" ":IF PEEK(1)<>0 THEN PRINT
440 REM
450 REM STRIP OUT SURPLUS PUNCTUATION.
460 REM
470 FOR L=1 TO LEN(I$)
480 IFMID$(I$,L,1)="'"THENI$=LEFT$(I$,L-1)+RIGHT$(I$,LEN(I$)-L):GOTO 480
490 IFMID$(I$,L,1)=","THENI$=LEFT$(I$,L-1)+RIGHT$(I$,LEN(I$)-L):GOTO 490
500 IFMID$(I$,L,1)="."THENI$=LEFT$(I$,L-1)+RIGHT$(I$,LEN(I$)-L):GOTO 500
510 IFMID$(I$,L,1)="?"THENI$=LEFT$(I$,L-1)+RIGHT$(I$,LEN(I$)-L):GOTO 510
520 IFL+4<=LEN(I$)THENIFMID$(I$,L,5)="SHUT "THENPRINT"SHUT UP ....":END
530 NEXT
540 IF I$=P$ THEN PRINT"PLEASE DON'T REPEAT YOURSELF!":GOTO 310
550 REM
560 REM ** FIND KEY WORD IN I$
570 REM
580 RESTORE
590 S=0:FOR K=1 TO N1
```

```
600 READ K$:IF S>0 THEN 640
610 FOR L=1 TO LEN(I$)-LEN(K$)+1
620 IF MID$(I$,L,LEN(K$))=K$ THEN S=K:T=L:F$=K$
630 NEXT L
640 NEXT K
650 IF S>0 THEN K=S:L=T:GOTO 680
660 K=36:GOTO 910: REM No keywords
670 REM
680 REM ** Take right part of string and
690 REM    conjugate it, using list of strings
700 REM    to be swapped.
710 REM
720 RESTORE 1410
730 C$=" "+RIGHT$(I$,LEN(I$)-LEN(F$)-L+1)+" "
740 FOR X=1 TO N2/2:READ S$,R$
750 FOR L=1 TO LEN(C$)
760 IF L+LEN(S$)>LEN(C$) THEN 800
770 IF MID$(C$,L,LEN(S$))<>S$ THEN 800
780 C$=LEFT$(C$,L-1)+R$+RIGHT$(C$,LEN(C$)-L-LEN(S$)+1)
790 L=L+LEN(R$):GOTO 830
800 IF L+LEN(R$)>LEN(C$) THEN 830
810 IF MID$(C$,L,LEN(R$))<>R$ THEN 830
820 C$=LEFT$(C$,L-1)+S$+RIGHT$(C$,LEN(C$)-L-LEN(R$)+1)
830 NEXT L
840 NEXT X
850 IF MID$(C$,2,1)=" "THENC$=RIGHT$(C$,LEN(C$)-1)
860 FOR L=1 TO LEN(C$)
870 IF MID$(C$,L,1)<> "!" THEN 890
880 C$=LEFT$(C$,L-1)+RIGHT$(C$,LEN(C$)-L):GOTO 870
890 NEXT L
900 REM
910 REM ** Now using keyword number (K),
920 REM    get the reply.
930 REM
940 RESTORE 1480
950 FOR X=1 TO R(K):READ F$:NEXT
960 R(K)=R(K)+1:IF R(K)>N(K) THEN R(K)=S(K)
970 REM
980 REM ** Convert output string to lower case.
990 REM
1000 IF RIGHT$(F$,1)<>"*" THEN Z$=F$:GOTO 1020
1010 Z$=LEFT$(F$,LEN(F$)-1)+C$
1020 Z1$="":FOR L=1 TO LEN(Z$)
1030 Z=ASC(MID$(Z$,L,1)):IF L=1 THEN 1070
1040 IF MID$(Z$,L,3)<>" I " THEN 1060
1050 Z1$=Z1$+" I ":L=L+2:GOTO 1080
1060 IF Z>=65 THEN Z=Z+32
1070 Z1$=Z1$+CHR$(Z)
1080 NEXT
1090 Z2$=RIGHT$(Z$,1)
1100 IF Z2$="."OR Z2$="?"OR Z2$="!"THEN 1170
1110 FOR L=LEN(Z1$) TO 1 STEP -1
1120 IF MID$(Z1$,L,1)=" " THEN NEXT
1130 Z1$=LEFT$(Z1$,L)+" ?"
1140 REM
1150 REM ** Justify to width held in A
1160 REM
1170 IF LEN(Z1$)<A THEN PRINT Z1$:GOTO 1230
1180 Z$=LEFT$(Z1$,A):FOR J=LEN(Z$) TO 1 STEP-1
1190 IF MID$(Z$,J,1)=" " THEN 1210
1200 NEXT
1210 Z$=LEFT$(Z$,J):PRINT Z$
1220 Z1$=RIGHT$(Z1$,LEN(Z1$)-J):GOTO 1170
1230 P$=I$:GOTO 310
```

```
1240 REM
1250 REM ** PROGRAM DATA FOLLOWS
1260 REM
1270 REM ** KEYWORDS
1280 REM
1290 DATA "CAN YOU","CAN I","YOU ARE","YOURE"
1300 DATA "I DONT","I FEEL","WHY DONT YOU"
1310 DATA "WHY CANT I","ARE YOU","I CANT"
1320 DATA "I AM","IM ","YOU ","I WANT","WHAT"
1330 DATA "HOW","WHO","WHERE","WHEN","WHY"
1340 DATA "NAME","CAUSE","SORRY","DREAM"
1350 DATA "HELLO","HI ","MAYBE"," NO","YOUR"
1360 DATA "ALWAYS","THINK","ALIKE","YES"
1370 DATA "FRIEND","COMPUTER","NOKEYFOUND"
1380 REM
1390 REM ** STRING DATA FOR CONJUCATIONS
1400 REM
1410 DATA " ARE "," AM ","WERE ","WAS "
1420 DATA " YOU "," I ","YOUR ","MY "," IVE "
1430 DATA " YOUVE "," IM "," YOURE "," ME "
1440 DATA " !YOU "
1450 REM
1460 REM ** REPLIES
1470 REM
1480 DATA "DON'T YOU BELIEVE THAT I CAN*"
1490 DATA"PERHAPS YOU WOULD LIKE TO BE ABLE TO*"
1500 DATA"YOU WANT ME TO BE ABLE TO*"
1510 DATA"PERHAPS YOU DON'T WANT TO*"
1520 DATA"DO YOU WANT TO BE ABLE TO*"
1530 DATA"WHAT MAKES YOU THINK I AM*"
1540 DATA"DOES IT PLEASE YOU TO THINK I AM*"
1550 DATA"PERHAPS YOU WOULD LIKE TO BE"
1560 DATA"DO YOU SOMETIMES WISH YOU WERE*"
1570 DATA"DON'T YOU REALLY*"
1580 DATA"WHY DON'T YOU*"
1590 DATA"DO YOU WISH TO BE ABLE TO*"
1600 DATA"DOES THAT TROUBLE YOU ?"
1610 DATA"TELL ME MORE ABOUT SUCH FEELINGS."
1620 DATA"DO YOU OFTEN FEEL*"
1630 DATA"DO YOU ENJOY FEELING*"
1640 DATA"DO YOU REALLY BELIEVE I DON'T*"
1650 DATA"PERHAPS IN GOOD TIME I WILL*"
1660 DATA"DO YOU WANT ME TO*"
1670 DATA"DO YOU THINK YOU SHOULD BE ABLE TO*"
1680 DATA"WHY CAN'T YOU*"
1690 DATA"WHY ARE YOU INTERESTED IN WHETHER OR NOT I AM*"
1700 DATA"WOULD YOU PREFER IF I WERE NOT*"
1710 DATA"PERHAPS IN YOUR FANTASIES I AM*"
1720 DATA"HOW DO YOU KNOW YOU CAN'T*"
1730 DATA"HAVE YOU TRIED ?"
1740 DATA"PERHAPS YOU CAN NOW*"
1750 DATA"DID YOU COME TO ME BECAUSE YOU ARE*"
1760 DATA"HOW LONG HAVE YOU BEEN*"
1770 DATA"DO YOU BELIEVE IT IS NORMAL TO BE*"
1780 DATA"DO YOU ENJOY BEING*"
1790 DATA"WE WERE DISCUSSING YOU .. NOT ME."
1800 DATA"OH, I*"
1810 DATA"YOU'RE NOT REALLY TALKING ABOUT ME, ARE YOU ?"
1820 DATA"WHAT WOULD IT MEAN TO YOU IF I GOT*"
1830 DATA"WHY DO YOU WANT*"
1840 DATA"SUPPOSE YOU SOON GOT*"
1850 DATA"WHAT IF YOU NEVER GOT*"
1860 DATA"I SOMETIMES ALSO WANT*"
1870 DATA"WHY DO YOU ASK ?"
1880 DATA"DOES THAT QUESTION INTEREST YOU ?"
1890 DATA"WHAT ANSWER WOULD PLEASE YOU THE MOST ?"
```

```
1900 DATA"WHAT DO YOU THINK ?"
1910 DATA"ARE SUCH QUESTIONS ON YOUR MIND OFTEN ?"
1920 DATA"WHAT IS IT THAT YOU REALLY WANT TO KNOW ?"
1930 DATA"HAVE YOU ASKED ANYONE ELSE ?"
1940 DATA"HAVE YOU ASKED SUCH QUESTIONS BEFORE ?"
1950 DATA"WHAT ELSE COMES TO MIND WHEN YOU ASK THAT ?"
1960 DATA"NAMES DON'T INTEREST ME."
1970 DATA"I DON'T CARE ABOUT NAMES .. PLEASE GO ON."
1980 DATA"IS THAT THE REAL REASON ?"
1990 DATA"DON'T ANY OTHER REASONS COME TO MIND ?"
2000 DATA"DOES THAT REASON EXPLAIN ANTHING ELSE ?"
2010 DATA"WHAT OTHER REASONS MIGHT THERE BE ?"
2020 DATA"PLEASE DON'T APOLOGISE !"
2030 DATA"APOLOGIES ARE NOT NECCESSARY.'
2040 DATA"WHAT FEELINGS DO YOU HAVE WHEN YOU APOLOGISE ?"
2050 DATA"DON'T BE SO SENSITIVE !"
2060 DATA"WHAT DOES THAT DREAM SUGGEST TO YOU ?"
2070 DATA"DO YOU DREAM OFTEN ?"
2080 DATA"WHAT PERSONS APPEAR IN YOUR DREAMS ?"
2090 DATA"ARE YOU DISTURBED BY YOUR DREAMS ?"
2100 DATA"HOW DO YOU DO .. PLEASE STATE YOUR PROBLEM."
2110 DATA"YOU DON'T SEEM QUITE CERTAIN."
2120 DATA"WHY THE UNCERTAIN TONE ?"
2130 DATA"CAN'T YOU BE MORE POSITIVE ?"
2140 DATA"YOU AREN'T SURE ?"
2150 DATA"DON'T YOU KNOW ?"
2160 DATA"ARE YOU SAYING NO JUST TO BE NEGATIVE ?"
2170 DATA"YOU ARE BEING A BIT NEGATIVE."
2180 DATA"WHY NOT ?"
2190 DATA"ARE YOU SURE ?"
2200 DATA"WHY NO ?"
2210 DATA"WHY ARE YOU CONCERNED ABOUT MY◆"
2220 DATA"WHAT ABOUT YOUR◆"
2230 DATA"CAN YOU THINK OF A SPECIFIC EXAMPLE ?"
2240 DATA"WHEN ?"
2250 DATA"WHAT ARE YOU THINKING OF ?"
2260 DATA"REALLY, ALWAYS ?
2270 DATA"DO YOU REALLY THINK SO ?"
2280 DATA"BUT YOU ARE NOT SURE YOU◆"
2290 DATA"DO YOU DOUBT YOU◆"
2300 DATA"IN WHAT WAY ?"
2310 DATA"WHAT RESEMBLANCE DO YOU SEE ?"
2320 DATA"WHAT DOES THE SIMILARITY SUGGEST TO YOU ?"
2330 DATA"WHAT OTHER CONNECTIONS DO YOU SEE ?"
2340 DATA"COULD THERE REALLY BE SOME CONNECTION ?"
2350 DATA"HOW ?"
2360 DATA"YOU SEEM QUITE POSITIVE."
2370 DATA"ARE YOU SURE ?"
2380 DATA"I SEE, TELL ME MORE."
2390 DATA"I UNDERSTAND."
2400 DATA"WHY DO YOU BRING UP THE TOPIC OF FRIENDS ?"
2410 DATA"DO YOUR FRIENDS WORRY YOU ?"
2420 DATA"DO YOUR FRIEND PICK ON YOU ?"
2430 DATA"ARE YOU SURE YOU HAVE ANY FRIENDS ?"
2440 DATA"DO YOU IMPOSE ON YOUR FRIENDS ?"
2450 DATA"PERHAPS YOUR LOVE FOR YOUR FRIENDS WORRIES YOU ?"
2460 DATA"DO COMPUTERS WORRY YOU ?"
2470 DATA"ARE YOU TALKING ABOUT ME IN PARTICULAR ?"
2480 DATA"ARE YOU FRIGHTENED BY MACHINES ?"
2490 DATA"WHY DO YOU MENTION COMPUTERS ?"
2500 DATA"WHAT DO YOU THINK MACHINES HAVE TO DO WITH YOUR PROBLEM ?"
2510 DATA"DON'T YOU THINK COMPUTERS CAN HELP PEOPLE ?"
2520 DATA"WHAT IS IT ABOUT MACHINES THAT WORRIES YOU ?"
2530 DATA"DON'T YOU HAVE ANY INTERESTING PSYCHOLOGICAL PROBLEMS ?"
2540 DATA"WHAT DOES THAT SUGGEST TO YOU ?"
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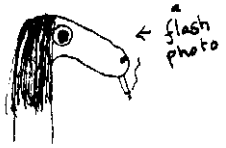
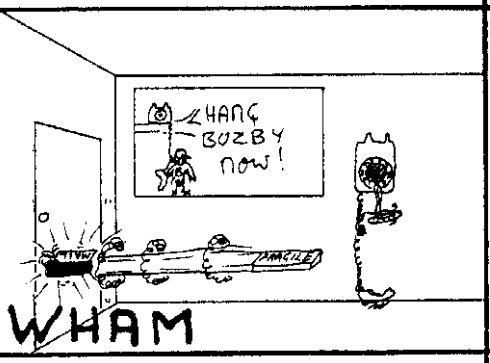
THE PERSECUTION OF THE INTELLECTUAL

SAGA THREE: hell hath no fury

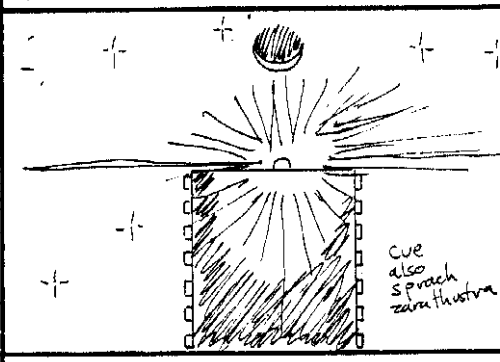


starring lawrence the long-haired weirdo

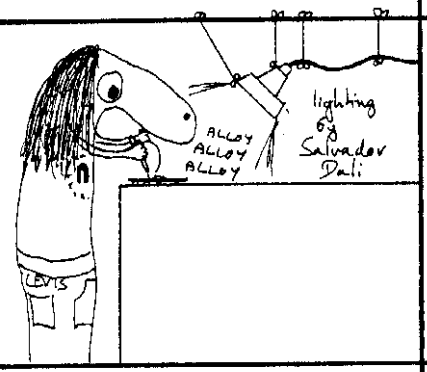
ONE MORNING A PARCEL IS DELIVERED BY THE FRIENDLY GPO.



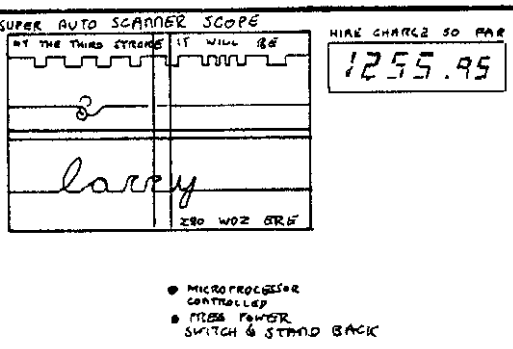
IT IS A FREE SAMPLE OF A REMARKABLE ONE-CHIP SPEECH SYNTHESISER



WHICH LAWRENCE RAPIDLY ASSEMBLES



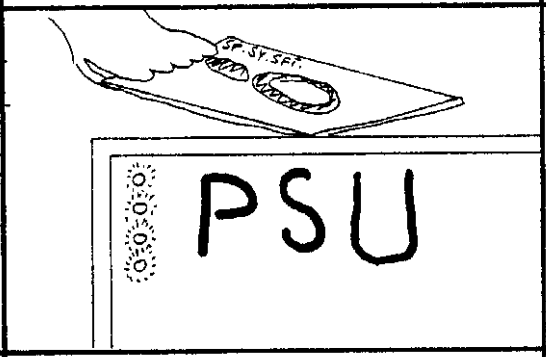
IT CHECKS OUT



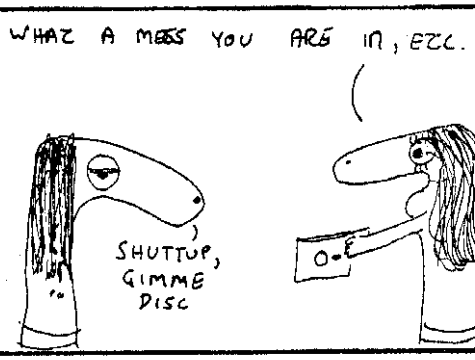
SO

THREE WEEKS LATER:

HELOISE PUTS DOWN THE DISC AND THEY BOTH GO OUT.

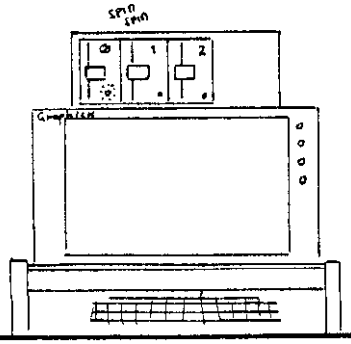


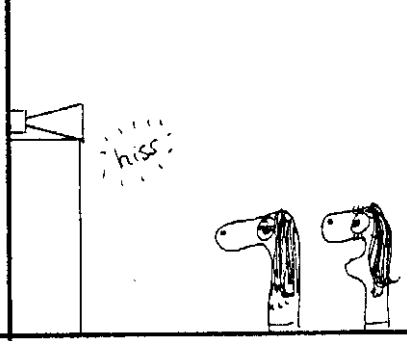
LATER

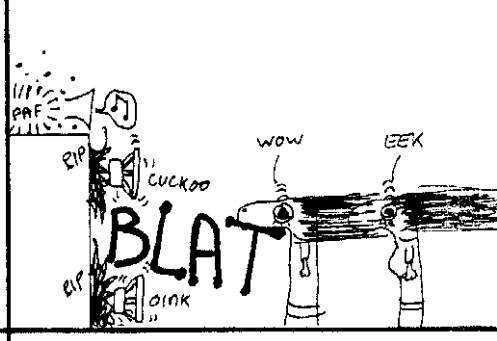


THEY RUN THE SOFTWARE INTO LAWRENCE'S NASCOM, NOW CONNECTED TO HIS HI-FI.

RESULTS ARE NOT AS EXPECTED







INVESTIGATION

REVEALS THE CAUSE.

Discs and tapes are designed by their fiendish manufacturers to be sensitive to the smallest of magnetic fields, like that of the glorious NM power supply; try not to play into the reactionaries' hands by leaving tapes, discs etc where evil magnetic fields can thus defile weeks' work.