May 1989 Volume 3. Final Issue.

Scorpio News

Scorpio Systems
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Contents

Editorial

I have, at the very end, realised that very few people read these Editorials! In the Editorial of the previous issue I said that there would be one more issue, and asked for re-subscriptions. Few came, and so a reminder was sent. *"What's this, only one more magazine?"*, *"Oh, it's resub time is it?"*, etc. were among the responses. So, my piece is later on this time! ●

Letters to the Editor

Bulletin Board

Sorry to see the end of *Scorpio News*, but I can understand the reasons. I still fantasise about an 80-BUS system with lots of RAM using paging, etc, to switch between word-processing, database, etc, instantly... I wonder where we would be if IBM had continued to ignore the micro??

For all those out there in reading land who have learnt a lot and been entertained by Scorpio's (and other contributors') efforts, you may be interested to know that I run a bulletin board called K-WOOD BBS on Great Tew (060883) 458. It runs 24 hours and accepts calls at V21, V22, V22bis and V23. I have a (not very active) area for 80-BUS and more CP/M files than most boards these days. so any reader with a modem is more than welcome to call in and leave messages, ask for help, give advice etc. There is also an area for Feline Fanciers as my wife and I breed Siamese cats. *[Ed's wife - I'm very interested in this info as I'm an FF too!]*

Just looked at INMC Issue 2 - we know what Dave Hunt is up to, what happened to the others on the original committee I wonder?? (What would MS-DOS have been by now if Richard Beal had worked for MicroSoft?)

Clive Waller, Banbury.

Disk Drives?

Does anyone know where I can get a working, (cheap) 5 1/2" DSQD half-height disk drive? Thanks.

David Saul, Chesham.

Retiring To My Nascom

I'm shortly retiring from full-time work and will have more time to spend on my dearly beloved NASCOM 2. I would be interested to hear from any others in a similar situation.

(Am also active with IBM, but don't talk about that!).

Stan Gent, Portsmouth

Various Interests - 1

I would like to be kept informed of add-ons for 80-BUS and systems software, particularly utilities and disk format conversion software. Is there an IBMCOPY for the 3.5" 720/730K format; is there a GENSYS config for the IBM 96tpi formats? Has anyone got documentation for the principle clone cards XT, AT and whatever - what will the empty sockets do?

I trade among Times 100 companies for micro applications in Central London with training in SSM, SSADM and James Martin methodologies; preferred applications are with Clipper/dBase.

Noel Hall t/a Nailsea Design Systems, Bristol.

Various Interests - 2

I am running a MAP-80 based system with hard disk and most size floppy drives - and also a Nascom 2. I'm interested in surplus hardware recovery, disk format translation and PD software.

Contact from similarly interested users or those with complementary software knowledge welcome. There can't be many of us about so don't let distance put you off.

John Manning, Winchester.

The End Of An Era.

I do not know how many readers of this final issue of *Scorpio News* there will be. Maybe some of you have, like me, been avid readers since Issue 1 of the INMC newsletter. With this last copy of *Scorpio News* an era comes to an end - the era of user support and information for what I feel was probably one of the best CP/M systems available.

In the early days I knew absolutely nothing about computing, and I found the newsletters invaluable in sorting out my Nascoms and later, Hybrids. I am afraid that I used to pester many of the authors but they were always very helpful and polite! Later I found that I had learnt enough to be able to contribute to the various newsletters, and I occasionally got letters and 'phone calls myself. I hope that my contributions helped a few people on the way. Some of the contacts made in this way resulted in good friendships, some of which are still continuing.

I still have my (mainly) Gemini based system, which is used for a number of jobs, but like most people, I have been tempted to stray to the MS-DOS scene, largely

due to the vast amount of software which is growing more sophisticated by the day. The increased speed of the newer systems is also attractive.

Another interest of mine is Amateur Radio, but due to lack of time, I have not been able to marry this to computing as much as I had hoped. Maybe I will be able to rectify this in future.

I am sure that some readers are still very interested in the 80- BUS systems. If I can be of any assistance with regard to any of the articles that I have written in the various mags over the last 4 or 5 years, I would be pleased to help where possible. I would particularly recommend anyone contemplating staying with CP/M to try to get the ZCPR3 operating system running, as it really does make operating a pleasure.

Best wishes to all. Clive Bowden G30CB, Truro.

Thanks

I'd like to say how much I (and many others, I suspect) have enjoyed the various versions of the NasBus/80-BUS magazines over the years - and how much I have benefitted from many of the articles - as well as the many friends and contacts I have made. I must own up to feelings of irritation when the magazines were late but on more sober reflection, so are many other newsletters and magazines produced on a part-time basis. Thanks very much.

ps: I'd be glad to hear from 80-BUS users with PCs - to swap software and horror stories. Best wishes.

Paddy Coker, Orpington.

Farewell

Very sad to hear that you are discontinuing the rag. Believe it or not, there are people out here who look forward to it flopping onto the doormat. By the way, what about all the business about including the PC series in the mag? As far as contributions and feedback is concerned you should know that '80-BUS' people have a long history of almost militant apathy. I don't suppose there's any chance of doing something on a more informal basis (as and when it's worthwhile)? ...No? Oh well, it was worth a try.

I am sure there is still a lot of loyal support out there, no matter how quiet it is: I know I am (loyal AND quiet), and feel sure that all existing subscribers would like to keep in touch with each other no matter how tenuously. Therefore, would you publish a contact list with the last issue so that we don't feel quite so cut off? *[Ed – have a look at the back pages!]*

Something I have been thinking about for a while is to put a newsletter 'on line' once my Nascom 2 becomes redundant (this will be quite soon now since seeing in the article about the new NE898 CPU card in the last issue). The BBS approach has the advantage that there would be no publishing costs / difficulties, however it may need to be a team effort. This is all still some way off as far as I am concerned as Herman is going through another BIOS re-write at the moment. This involves putting most of the code into another memory page so that I can fit in all the fancy bits without ending up with a silly size TPA (at the moment I'm down to less than 40K).

My main interest is in hardware development and system software - although I'll mess about with anything. By the way - is is my imagination or is there really no games software for the Pluto???

Oh well, that's about it. Again, may I say I'm sorry to see the newsletter disappear and thanks for at least having a go. BYEEE.

Phil Smeesters, London.

Farewell From Me Too

I'm sorry to hear that you will cease publication soon. I've been reading *Scorpio News* and its predecessors since the first INMC News - always very informative and worth the money.

My Nascom 1 unfortunately "died" late last year and I've not had the time to resurrect it yet but I still enjoy tinkering with it, so any news is worthwhile!

I am pleased to submit my name and address for contacts, etc (although I have no particular speciality). Best wishes.

Russ Heath, Croydon

Another Newsletter?

First may I thank you for your stalwart efforts on our behalf over the last 2 years and before! Whilst *Scorpio News* might be tardy on occasion it has always been welcome.

Hopefully, with your offer of one last issue sufficient folk will show an interest for the good work done in the past to bear fruit. As to messages, I am very interested in continuing with my Nascom - slowly growing into a soft-of-Galaxy. Thus, I would like to see something created to take the place of the News and would be happy to act as a clearing house for any other like-minded folk.

If no-one has any objection to the creation of a 'Roneoed' or Xeroxed news-sheet produced at minimum cost as is done by a number of Amateur Radio groups, I would be prepared to make up and circulate a first issue to those interested in keeping the ball rolling.

If successful such a 'publication' should not cost much more than £1 per issue - any perhaps even less, though postage is a growing charge in this area. Ideas please to me. And best wishes to Scorpio for the future.

Dick Railton, Dyfed.

A Yorkshire Group

In an attempt to keep some communications going, I am willing to extend our local informal group, here in Yorkshire, to anybody.

What is needed is a zero cost, one-to-one response. The way to achieve this is for any member to send me a disk with their contributions on (or empty disk) with return postage, I will when return it with a compilation of contributions.

A carrot for you is that if the disk has your system files on it, I can return it with ZCPR3 installed. Optionally, I will need a second disk for some of the support files.

Second carrot - do you have BIOS 3.# and fancy 1.4 Megs on an 8" disk that is as fast as the old Rodime winnies? Sadly, I will do this in my 'spare' time so return of post is not on, but I will try. Sincerely - Cliff Brownbridge, Selby.

Radio Amateurs

I'm still active with the dear old Nascom (have 3 of them!), using NAS-DOS. I'd like to hear from any other radio amateurs still enjoying this fine machine. Thanks to all who produced the INMC 80, 80-BUS News and *Scorpio News* magazines. Best wishes.

Geoff Bagley G3FHL, Malvern Wells

Help!

I have the Henry's Radio Utilities and would like to use UNSPOOL. However, I do not have the MAC assembler and wondered whether anyone could help out with a modified version of the source to suit Microsoft MACRO-80 assembler? I just cannot seem to find the time to sit down and sort it out myself as there always sseems to be too many other more important tasks to be done.

Finally, may I thank you for all your efforts in publishing this and earlier magazines, and may I wish you every success in the future.

R C Hill, AIRO, Hemel Hempstead.

Friendly Advice

Friendly advice on hardware or software, buying or selling used parts for your system? Then give me a ring on 0473 - 831353.

Ian Cullen, NETCOM Systems, Ipswich

Another Bulletin Board

Keep in touch through MBBS Wensleydale (0969 - 24089), V21, V23. 8am to midnight, 7 days. 80-BUS, PC and local tourist info.

Hair on End!

I am sorry that *Scorpio News* is ceasing – there are too few of us hackers (and I use the word in its original sense) left. Byte has recently discontinued Steve Ciarcia, and is now edited entirely by what I consider to be cretins who wouldn't know which end of the soldering iron was hot!

Having seen the development of the 80-BUS system, and the (few) mistakes made, it is illuminating to consider the absolute mess IBM and their designers have made of the PC hardware. I have some friends involved in interrupt processing on PCs – the problems would make one's hair stand on end! Interrupts are not latched and so must be serviced within 5uS or less. An EGA scrolling can lock out interrupts for over 8uS (more on an AT), with consequent disaster! If interrupts are important, one can't beat the Z80 family!

I would be glad to meet with any 80-BUS fanatics visiting my area.

Rory O'Farrell, Blessington, Co. Wicklow.

Bye

Goodbye! Thanks for all the fish (and many years of interesting and useful information). Best wishes to you all for the future.

Martin Davies, Tewkesbury.

[Ed - obviously an HHGttG fan!] •

Doctor Dark's Diary - Episode 30

What can I say to cheer up the gloom that is all around us? Yet another magazine that has supported the Nascom and its offspring is going the way of all the others. I'd like to be able to say cheerful things like *"Don't worry, I'm going to start a new magazine, monthly, 132 pages, glossy..."*, but even if I knew how to go about such a thing, would my fans (Sid and Doris Bonkers) buy a copy each? I don't even know how many readers I had over the years...

I never thought when I wrote my first article all those years ago, pleased to death about a few undocumented Z80 opcodes I had found, that I would get to the 30th episode. In case anyone was wondering, I lifted the name Dr Dark from a Captain Beefheart record called *"Lick My Decals Off, Baby"*. It seemed like the thing to do at the time.

My Open University BA degree is now a reality. I started it because I never seemed to know enough theory to enable me to finish the grandiose programs I tried to write on my Nascom 1. It has been demanding, and has prevented me from doing as much programming as I would otherwise have managed, but it was well worth it. I'm carrying on to get the further two credits that will make it into an Honours degree, and unless I do something really dumb it will be a First Class Honours degree.

And does this qualification enable me to walk into a new job, do you suppose? Nope. I have been fairly selective this year, and have only applied for five so far. Not even an interview. There are several possible reasons for this, but the most likely is that people think 40 is too old. They want school leavers because they can be more easily cheated, I dare say. Then again, there can be no doubt that my left wing views will be recorded on the card files of the unpleasant Economic League. Remember, just because you are paranoid it doesn't mean they aren't persecuting you...

That was a bit of a whinge, I know, and I want to be more positive in this very terminal item. After all, I am writing this on a machine I built for myself, even if quite a few boards were ready made. And for an eleven year old home brew, it is mighty sophisticated, in its own way.

For a start, it is based on a bus system that gave a lot of firms the chance to get started, and most of them are still around. And it uses several processors in parallel. Lots of people are only just starting to see the sense in that idea. I have had a Z80 to process with, another to display mono screens, an NEC V20 to display colour screens and a floating point chip to make things hurry up for ages.

I know where everything is, and how to program it, and when it last broke down I fixed it myself. Not that it breaks down often, touch wood. I just touched the case, it's wooden. I hacked up some blockboard to make it. It isn't very pretty, but if I ever need something to stand on, it will do nicely. I am not the only person who believes in the 19 inch rack frame as a basis for civilisation, either, as you will see in a later paragraph.

Good though this system is, I am willing to sell it, either all at once or selected subsystems, because I want more bits for my Amiga. A while ago, I sent a list of the bits to every Nascom or Gemini user I had ever corresponded with. Nobody wrote back, so I assume the machine isn't going to sell. Mind you, I had a phone call from a man in France the last time I mentioned selling the Pluto board, but I suggested such a low price that he must have thought it was a trick, and he didn't buy it. Anyone who is interested in buying some or all of this device should contact me. The modem and Prestel software in particular, are real bargains, as is the Pluto board. Let's face it, you can't even get a mini palette board from Io Research any more. I have got the last one there was.

Talking of parallel processing, I spotted an interesting comment in the magazine "Parallelogram" the other day. The editor was musing on how increasingly large amounts of computer power are used these days just to operate the windows and icons that everyone except Dave Hunt likes so much. *"They are thinking only of how to sell the next generation of central processing units to users who don't actually need anything more powerful than the Z80 sitting in that old Nascom machine gathering dust on the shelf."* This is a valid comment, but where can I get shelves that strong? Seriously, I have been asked why I want more power on many occasions, and all I need to say is *"Have you ever waited 37 hours for a ray trace to finish?"*.

I have just been reading Issue 1 of the Gemini Transputer catalogue, and it makes great fantasy material, if you haven't yet won on the Pools. On the back is "The Gemini Story" with a picture of John Marshall holding two bare computer boards. There is a brief history of the firm, which says nothing about how you used to have to explain to Kerr Borland that a Nascom 1 wouldn't work at three quarter speed if two of the 2102s were not supplied. Neither does it mention the time I rang them up to say my Nascom 1 had finally arrived, only to be promised that it really was on the desk, and would honestly be posted that afternoon.

They are a different firm now. The boards John Marshall is holding in the picture are a Nascom 1 (you can't see, but I bet it says "imput" on it, making it the rare issue 1 all the collectors want) and a Gemini GM8202 "workstation" card. The GM8202 holds a T800 Transputer that is available in 17 to 35 MHz clock speeds, and from 1 to 64 Megabytes of 80 nanosecond RAM, plus a pipeline of up to eight more T800s. It is a slightly larger board than the Nascom, but not much. Of course it is bus based, and you can plug it into a nineteen inch rack frame with more boards of the same

awe inspiring type. Apparently, if you fill the rack frame, you have got more megaflops on hand than a Cray 1. Of course, you lose out on the comfy sofa around the Cray. It looks like a great machine, and I would be able to get my animations finished much faster, but I suspect that it isn't going to be in my price range. I will just have to write and ask if they supply bare boards, after all, it worked with Io Research...

Before I finish, I'd like to thank Paul for all his work, and putting up with me missing deadlines and using an obsolete disc format and forgetting to format my text and sometimes putting in libels for him to edit out and using far too many conjunctions in a sentence and using words his spelling checker is not cognate of. Not to mention putting prepositions at the end of sentences. And I am genuinely sorry I never had space for the anchovy wine recipe, it has such a lovely bouquet if you put enough garlic in.

If anyone else decides to start a new 80-BUS magazine, I will be interested in subscribing, and writing the occasional article. I am at 27 Laburnum Street, Taunton, Somerset, TA1 1LB. You can phone me if you want to offer me a job or buy chunks of Marvin, on 0823276768, but I can't debug hardware over the phone. Somebody tried to get me to, once... You can contact me on Prestel as well, but only after midnight as I don't pay the time charges. The mailbox number is 082376768. I'm not on Telecom Gold, because I spent all my money on computers and a house to keep them in. That's all folks!

end. •

DSP on 80-BUS

by R C Hill

I was rather sad to read in the October-December issue of *Scorpio News* that this is to be the final instalment of a magazine (or series of magazines) that has been my mentor for many years. I suppose that these things have to happen but perhaps we, the subscribers, should all have been more assiduous in providing the editor with material when the matter was in the balance - we were warned of the consequences if we didn't. In mitigation I can at least claim to have made one contribution in the past but I know that I could and should have done more and I apologize to all concerned.

However, the termination of the journal means that I have had to bring forward a report on a project that I intended to submit when the development was a bit further

advanced. The Company that I work for (AIRO) uses a small number of 80-BUS products as controllers for some rather specialized audio systems that we design and build for Concert Halls and similar buildings in this Country and overseas. We also use Gemini machines in a network for our in-house administrative functions, word processing etc.

For a current project for an overseas client we needed to incorporate an audio frequency oscillator with programmable frequency control to be used for installation and subsequent calibration of the system. We decided that this could best be achieved by building the oscillator into the control computer itself as this would provide us with the flexibility to use the host controller for a number of ancillary tasks and to reduce the amount of equipment that we will need to take on site with us for the installation work. We therefore commissioned the manufacture of an A/D and D/A board that would give us the required level of control in both the time and frequency domain.

The digital design and production of the board were entrusted to CAT Systems of St Albans who have considerable experience with DSP equipment while AIRO was responsible for the audio circuitry. The resulting "board" needed to operate quite quickly and to have some intelligence of its own and the designers chose to use the Texas Instruments TMS 320C25 digital signal processor chip running at 25 MHz and driving a 14 bit D/A convertor (DAC 1200KP- V) and complementary A/D device (TDA 1534). The design effectively provides a DSP co-processor board with a Z80 control interface. It is equipped with its own 64 k of 16 bit static RAM and EPROMS to contain software that can be transferred to RAM if required.

The Z80 control interface uses a PIO to drive essential control lines and a DMA to transfer commands, data and programs into the TMS memory space or to read information back. Although the DMA is a horrible device to program this approach does allow the Z80 and TMS processors to operate asynchronously.

The Z80 DMA is only a 16 bit device and to enable transfers to be made to and from the full 64 k x 16 bit TMS memory space and 512 k x 8 bit area allowed for in the 80-BUS specification, 4 bits of the PIO are used to latch the high order address lines when the DMA is bus master. This means that the full capabilities of the 80-BUS range of products are unaffected by this design. However, you do have to know what you are doing. We discovered the hard way that using a GM813 or GM811 combined with a 64 k dynamic RAM board works very nicely with the memory at Page 0, but if the GM811 is teamed with a static RAM card (GM 863) you may think you are using the default Page 0 whereas in fact you are using Page 7. This did take quite a time to sort out out as unfortunately at the time we did not have the circuit for the RAM card!

The audio circuitry allows a selection of one of four inputs and the A/D can be set to read the direct input, true RMS or Log RMS. The maximum input voltage is limited to about 8 volts peak to peak but there is also 50 dB of switchable input gain for lower level signals.

The D/A output is routed through a digital attenuator device which allows 88 dB of attenuation to be inserted in steps of 0.375 dB. Both A/D and D/A run at 40 kHz and therefore the available frequency range approaches 0-20 kHz but the software allows for effective sampling rates lower than this to be used. There is also an additional off-line digital attenuator which is directly controlled from the Z80 via the B side of the PIO.

I have referred to this as a "board" but it is in fact two boards mounted together to give an 8 x 8 inch sandwich. The card that plugs into the 80-BUS holds the TMS, memory, interface and an RS 232 port for direct access to the TMS for de-bugging. The daughter board carries the A/D and D/A devices, the audio circuitry and a set of DC to DC power supplies to generate the various voltages required for the analogue circuitry. The digital board is in fact self-contained and could be used by itself for fast processing of data if the audio circuitry is not required.

The software at present has been written with the specific project in mind and the facilities available in the on-board EPROM are:

- input sampling at variable rate
- waveform replay including a built-in sine wave output
- modulated waveform replay
- swept waveform replay
- white noise (equal energy in all frequencies)
- pink noise (white noise with 3 dB/octave roll off)
- saw tooth or ramp output
- operation as an audio delay line of up to about 1.25 seconds

In addition there is the facility to download any other program into the TMS and to execute it. We have only just taken delivery of the final boards and although we have had the opportunity to experiment with the prototype we have not really come to terms with what it is capable of. We have however already discovered that we have a very powerful tool at our disposal and we are looking forward to developing further applications for it.

If by any odd chance anyone out there is interested in further details of such an esoteric board or would just like to maintain contact with an 80-BUS and MultiNet user they are welcome to contact me. •

An Essay On The Deleterious Effects Of Too Much Computerism

or

Dave's Been Smoking Those Funny Cigarettes Again !

by Dave Hunt

It was small, black, rectangular and had sixteen legs, a bit like a large woodlouse I thought. It was only when it moved, looked up at me and spoke, that it struck me as being anything unusual.

"I'm the RAM, mate!", it said, quite well spoken I thought, although it didn't look much like a sheep to me. I made some remark to that affect.

"Dodo", it muttered, did I catch a tone of sarcasm, as it continued proudly, *"Strikes me as I'm cleverer than you. I've got 16,000 brain cells. More than you by the sound of it. Sheep indeed. I'm the brains of this outfit."*

I tried to think when I'd last had a conversation with a sixteen legged insect, and took to inspecting it more closely. It was then I noticed the boots. 16 of them, black, and each with laces and a neatly tied bow. Now what would it be doing with boots. No insect I'd ever come across had had boots!

"To catch the BUS with, what else ?", it muttered under its breath, *"And before you ask, yes, I can read thoughts."* There was an accusing stare from the thing, almost daring me to think on.

This was daft. I'm not in the habit of picking arguments with insects. *"Do you have a name ?"*, I asked.

"Of course, but we don't go by names, we've all got numbers. I'm 4116."

"Ah.", I thought, *"That should explain it."* 4116 rang bells somewhere. Hadn't I trodden on one a few days before and found it embedded in my shoe.

"No you didn't. That was 7432. Pity that, he was a bit dim, but useful all the same. We won't be the same without him."

"We ?", this is getting sillier, did that mean there's more of them somewhere. I could see nothing. It was dark all round, just a circle of light, and the insect on the floor. Parallel ridges ran across the floor into the darkness. Desperately I tried to think how I got into this situation.

"Sure, there's lots of us in the organisation. Do you want to meet a few us ?" There was a shuffling in the shadows all round. The sound of hundreds of small feet. An absurd thought occurred, if they all have sixteen legs and each leg has a boot on the end, there must be a lot of work for the cobblers around here.

"Cobblers to you to mate. Do you want to meet us or not ?"

"Ok, I suppose it can't do any harm. Do you all have names – numbers, I mean ?"

"Well, some of us have a few letters thrown in as well. Take this one for instance." The shuffling grew louder, and a larger insect came into the light. I counted, 40 legs in all, and again the little black boots. Why the boots ? *"He calls himself Z80."*, and then in a whisper, *"He thinks he's the boss round here. But he'd be no good without me and my mates. He's getting on a bit as well."*

"How do you do ?", the cultured Californian voice said, *"I'm Z80, I'm unique. I see you've been talking to my small friend here."* It looked down on 4116, and with a shuffling of the legs, several boots landed under 4116 and swiftly kicked him out of the light. *"Please excuse these underlings, I'd have been here to greet you myself had I not had an enemeye in progress at the time."*

"An enemy ?" I asked.

"No, an enemeye, you know, a fella's got to do what a fella's gotta do. No interrupting an enemeye, but then you should know that."

"I should ?" Again the feeling of 'deja vu'. Why should I know what an enemeye is. Somewhere in the back of my mind enemeye seemed to mean something – but what ?

"Never mind" said Z80, dismissing the subject, *"As you may be aware, I'm the organiser around here. I keep the others in order and tell them what to do. They all seem to think it's easy, but dolling out instructions at about 300,000 a second really puts a strain on one's silicon, if you know what I mean."*

"No I don't, where the hell am I ?"

"You really don't know ?" asked Z80, sounding pained with muted surprise, *"I would have thought it was all too obvious."*

"That's not helpful. And you might not have noticed, but I don't seem to be on the same scale as you. There's me up here and there's you down there at my feet." Feet again ! Perhaps I'm developing a feet fixation. *"Do you think you could explain in words of half a syllable or less. WHERE THE HELL AM I ?"*

"In Nascomland of course. We live here, and you arrived out of the blue as it were. And as to scale, you really should be more careful. I hear you did a severe damage to poor 7432. What had he done to hurt you ?"

"I'm sorry about 7432, I didn't know. I hope any damage I've done can be mended."

"Oh I dare say.", said Z80, *"I can't talk to my esseyeoe any more, but he was boring anyway, so I can't say I'm too upset about it. But you'd better keep it quiet, if some of the others get to hear of it, they won't be too pleased. Could get nasty."*

I looked about, still nothing but shuffling in the darkness, but the shuffling took on a new menace. Are feet menacing ? *"Tell me, Z80, where is Nascomland ?"*, I asked as politely as I could.

"Here." said Z80 glibly. *"We've been watching you for years. You entered our galaxy as a speck some time ago, and for a while we thought you'd miss us entirely, but here you are and you've landed. Don't you know where you came from ?"*

"I confess I don't know.", I said, *"I don't seem to remember anything before I arrived here, although some of the things I've seen and heard seem familiar. Can I ask you a question ?"*

"Seems to me you haven't stopped asking questions, but go ahead anyway."

This was going to be a major intellectual exercise, even before I asked, I knew it would upset him. *"I see you're well endowed with boots."* Why did I ask that, feet again. I didn't mean to say that.

"What of it."

This was bad. Why boots, if he's got legs, it follows he's got boots. There I go again – no stop, *"Tell me, how do you tie up all those boot laces ?"* Oh hell, this isn't going right, I've upset him, he's changing colour.

"I am shocked. Truly shocked." From the tone, I could see he was having difficulty keeping control. *"You come here uninvited. You tread on a valued friend and colleague. You – you behave like an imbecile – and – and now you insult my boots. What's wrong with you. Is all you think about is boots, why boots, what's wrong with my boots, there lovely boots. I'm not staying here to be insulted."* By now he was glowing a dull red. With a sudden scurrying movement, he shot off into the darkness.

Why had I asked that ? I knew, even before I asked, it would upset him, and now I'm alone. There was still the shuffling noises in the dark. A murmuring – but nothing in sight, just the parallel tracks going off into the darkness.

This was no good at all. The best way to find out where I was was to explore, and those parallel tracks looked interesting. I started to walk, taking care that I didn't tread on any of the insects, although none were in sight. Still the shuffling noises in the darkness, was I being followed. The tracks started to fan out, and there at the edge of the gloom was row upon row of the insects. They stood fast as I approached.

"I hear you've upset Z80.", said a voice from the row.

"Is that 4116 ?", I asked, desperately looking for a friend.

"No, we're 4116", a chorus of voices replied, *"Some of his brothers – but he told us all about you. Do you deny treading on 7432 ?"*

"Er – no, it was an accident", I replied sheepishly.

"H-rrumph", at least that's what it sounded like, in chorus. I felt I wasn't making a good impression here.

"Do you always all speak together ?" I asked, trying to change the subject.

"In groups of eight." the chorus replied, *"We don't take kindly to people who tread on our mates."*

There was a general movement, I saw the boots of the first row of insects, they all seemed to have little knives in the toecaps, like the nasties in a James Bond film. Who was James Bond ? 16 boots a piece, and 8 of them. Then the second row moved, each with boots and each boot with knives. And then the next row.... I thought of running, but knew they could out run me. I suppose I could hope they'd trip over their legs and stab themselves to death but knew they wouldn't. I felt this was the end. I waited for the rush. I guess I could deal with a few of them, but not all at once. You do silly things when faced with trouble. I tried to calculate 8 rows of insects, each row with 8 insects, and each row with 16 boots. It looked like death by a thousand cuts, well 1024 cuts anyway – close enough. And then it happened. A blinding flash $1024 - 2^{10}$ – a binary number. I knew where I was. And they flew at me. They aimed for the face. Hundreds of little pin pricks – none fatal, but each hurt.

I'm awake now. I don't think I've ever fallen asleep whilst assembling a printed circuit board before. I must have nodded off and ended up face down on the solder side of the board. All those little legs. My face looks like it's just lost an argument with the blunt end of a hedgehog. There I go again – feet. Why feet ?. Can anyone tell me what happened ? •

The Last Card?

by Dennis Mclaren.

There are several reasons why so many of us want to hang onto our Nascoms/Galaxies/MAPs, but I can think of none better than the fact that the newer computers, though bigger and faster, are not fundamentally different from our old 8-bit micros.

What I mean is that IBMs, Amigas, STs - even Challengers are sequential von-Neumann type machines and I can learn nearly all I could ever wish to know about such machines from my Nascom 2/Gemini hybrid.

I also enjoy having a circuit diagram for every card in my system, good documentation (a horrid word that !) plus a 10 slot bus. Try to get any of those with an IBM.

Nevertheless, Parallel Processing is arriving on the scene and the chips that it requires are coming down in price. Large memory systems are starting to appear and software will always expand to fill them.

How can we tap into this new world using our existing heavy investment in 8-bit technology?

I don't think that using the serial port is the most effective way. Loading an n Mbyte program from my existing disk system to a diskless Transputer system at 19,200 bauds would not be tolerable for long, neither would having to pipe results back via the same bottleneck.

I believe that the design of a Nas/80-BUS plug-in Transputer development card would best enable us to hook in to the new technology in an interim way.

Such a card would have to earn its keep in the 8-bit world by pretending to be an 8 Mbyte Ram disk. As a transputer card, it would need to be able to address the full memory range of the Transputer - 4 Gbytes (Software always expands etc.) otherwise it wouldn't be future proof.

To be affordable, the card would have to work with only a little of its memory plugged in. The full amount of memory might not fit onto an 8 x 8 card, so an expansion bus might have to be provided, for example, for a piggy back memory board, or even for compact types of memory yet to be invented.

I wonder whether such a card would sell in large enough numbers? So many people have moved over to the IBM/Clone camp and any number of Transputer cards are available to them (including a good Gemini one).

It's the one card nobody makes for the Nas/80-BUS. It would be a fascinating challenge to the designer and would bring new life to our systems. It's the card I really want and I'm blowed if I'm going to buy an IBM to reach it. ●

A Free RAM-Disk

by J T Nestor

Well, not really free, but if you have a GM888 8088 board and RAM in excess of 64 Kbytes, then my program will enable you to use the memory above 0FFFF as a RAM-Disk. The principle of operation is very simple. The program runs and sets up alternative entry points to SELDRV, READ, WRITE and WBOOT. The code at these alternative entry points checks to see if the drive is "M", if so it calls the 8088 to move sectors of 128 bytes into the appropriate section of RAM. If not, execution is passed to the original code for these functions. It is an example of "Co-operating Code", as mentioned in the GM888 manual, from which the change-over code was borrowed. Please do not look too carefully at the 8088 code, this was my first attempt at writing 8088 pseudo assembler, and I now realise that improvements could be made. However, THIS WORKS.

A copy of the CCP and BDOS is stored in RAM, and this version is loaded when "^C" is typed, reducing the time taken to perform a warm boot and eliminating for ever the message "Wrong system on this disk".

After "GENSYS-ing" my system, I am told that the system ends at BIOS+0F0A (FF0A) and the new code is therefore assembled to reside there. If, because of a different disk system, your end is higher than that, it will be necessary to alter BIOSEND, up to a maximum of FF31. If BIOSEND is above that the the reservation of another page of workspace will be necessary. Please check the values between BIOSV3.2 (or BIOSV3.5) and ENDIF very carefully for your system. WBOOTUSE is the length of the original wboot code which reads in the CCP and BDOS from disk, DRIVE, SECTOR, TRACK and DMAADR are the stores accessed by the SELDRV, SETSEC, SETTRK and SETDMA commands respectively. DIRBUF is the directory buffer used by all the disk directories, and can be found by examining the SELDRV command. If anyone is unsure of the positions of these areas, or would like a copy of this program on disk, they are welcome to contact me via this magazine.

The CCP and BDOS live at 1000:0000 to 1000:15FF with the 8088 code at 1000:1FE6, the directory at 1000:2000 to 1000:2FFF, and the data areas contiguously up from there. It is thus possible to look at files in the RAM-disk using DDT86, but because the disk is "Standard" it can also be inspected and unerased by a disk doctor program such as DU.

I hope that the code, which is available by contacting me, is self explanatory and adequately commented. ●

The Final Traitorous Act

by Bert Martin

Bert Martin admits having become a PC proselyte, converting his NASCOM as well.

The Jonahs said that it would be too slow, but it had to be done, simply to prove that it was possible. The similarities between the Z80 and 8088 chips were too tempting to ignore, while the poor old machine had almost ceased to deserve any extended use, except that it had within it virtually all of the computational support for my Ph.D. in Ikonics. (For those who need to know, Ikonics is the multi-disciplinary study of how we perceive imagery, and therefore the key to how such imagery can be re-imposed upon the mind by the transmission or recording of two-channel 'information'.)

Having extended the machine to a single disk-drive CP/M machine, with the addition of 1Mbyte of memory (I couldn't afford the other Mbyte at the time), bandying words with my fellow readers led me to want the PC-conversion more than I wanted to retain NASCOM/GEMINI compatibility. Not being very good at machine-code (or any other form of language, for that matter, except swearing), it became necessary to carve large slices out of existing software, then tailor the patches into a working whole.

All sixteen 64K-blocks were therefore reorganised into one block which was devoted to the boot-up sequence, additional registers, 8088-like address segmentation and a table of redirectional 'hooks' to the essential functionality of MS-DOS, with the other fifteen blocks emulating the remainder of the PC-XT's standard layout, including even LIM/EMS emulation, just in case I should ever need that other Mbyte. It wasn't a true MS-DOS, but a rather inglorious 'hammer and nails' solution, which remains far too inelegant to want to demonstrate to anyone – but it works!

At a Norton rating of 0.9, it was rather slow compared to the subsequently acquired AMSTRAD PC1640 SD/ECD, as well as rather inconvenient, in possessing only one disk-drive compared with the latter's 3.5" and 5.25" floppies, and a 21Mbyte WD 'Filecard'. In the end it didn't last but was pensioned off to a local software house, as a disk-formatting and copying machine – a role which may take it several years into the future.

Despite possible groans from aficionados or even cries of "shame!", an improved version of the Z80-based PC-compatible could be prepared by those of a NASCOM/GEMINI background who are totally familiar with the excellent CP/M for the latter series of machines, on the assumption that their superior knowledge of DOS would enable them to optimise the application to a degree that is beyond my skills.

There remain vast quantities of CP/M machines among users; some exist in such numbers that they could support the developer's expenditure of time and money on such an application, at end-user prices that are affordable to private owners, provided that the writer was prepared to sell directly, and not through a commercial company which adds large overhead charges to the cost.

A sizeable target for such an exercise would be the AMSTRAD PCW range on which a conversion would not be excessively expensive, even if the owner has to fit a 3.5" drive, as well as buying the ZEDOS software. If anyone has the courage (or gall) to tackle the electronic and software problems, they could well become moderately affluent from servicing the needs of users who wish to acquire a home PC-compatible at half the price of even the poor AMSTRAD PC200; or even rich by extending the service to the rest of the world.

May I close by wishing 'Good Luck!' to my fellow travellers on MS-DOS' 'stony path' the way things are going, you'll need it! •

A Warning

by Andrew Mead

The Hitachi 64180 is NOT fully compatible with the Z80. At least one pair of instructions set the flags differently. These are RRD and RLD, which rotate the lower 4 bits of the accumulator with (HL). In the Z80 the flags are set according to the result in the accumulator, whereas the 64180 sets them on the result of (HL). NAS-SYS ZNUM routine uses this instruction and if transferred to a 64180 system needs an 'OR A' instruction to set the flags correctly.

My present system alternates between a Nascom 2 and a GM880 CPU card, with the Nascom running both NAS-SYS/POLYDOS and CP/M and the GM880 being CP/M only. A Winchester system always seemed too expensive, especially with a Xebec card, until I found one in the RS (Electromail) catalogue with SCSI interface built in. The GM829 floppy disk controller includes a SASI interface, but what is the difference. A read through the SCSI manual (from RS) suggested very little apart from an extended command set so I bought the Winchester. In the next issue

of the catalogue its price had fallen by over £100! SYS 19 was reassembled to include the Winchester split into two drives of 10M each and run. As usual nothing happened! A long read through the manual, combined with a study of the circuit for the GM829 finally showed that the SEL line needed to be active for up to 250ms before timing out, and RST needed a 25us pulse. Both these lines were being driven for the duration of one Z80 output cycle only. The first attempt to correct this added a latch which was set and then reset when RDY went active. However the code involved was not compatible with SIMON or any Gemini BIOS so the latch was replaced by a monostable (74LS123), triggered by SEL and reset by RDY. The Winchester then worked, set up in SYS as a Rodime 20M drive, although with BIOS 3.7 the Command Descriptor Block needs to be found and the last of the six bytes set to zero, otherwise an error code is produced.

The system also includes a GM833 512K RAM disk. This has been increased to 2M bytes by adding a link between all pin 1s and a further multiplexer (74LS157) to drive this line from A19 and A20. The 4164s have been replaced by 41256s.

A 3.5" disk drive, also from RS, has been added. Again, a quick read through the paperwork suggested no problems,but on trying to format a disk the drive stepped very erratically. Yet more research found that a 1.2ms delay was needed after a write operation before side change or track access. The drive code was modified to look for any track seek/step instruction and add this delay first. BIOS 3 already has a suitable delay built in for other reasons.

Following Paul's comments on WordStar 4 and how much better it was (WS5 is now out for PC's) than Version 3, I have now upgraded to this for use with the GM880 card. However many problems have come to light. Because CP/M has very limited memory available, compared to MS-DOS the programme is much more limited and during edit time does not know character widths for proportional spacing. This makes is very wasteful of space on the page, as most lines could include more words than they do. It also cannot correctly centre a proportional line, as it only adds spaces at the start of the line as if for monospacing. I have now worked out a long-winded routine to do this, making use of the printer's own centring ability, dot commands and custom print functions, QWER. The printer in use is a Facit 9401 typewriter with Centronics interface 'Compatible with Diablo 630'. However, it has several software bugs itself. It should be able to automatically justify between margins, but each line is short by the same number of units as there are spaces in the line (a space is ten units). In addition if set to auto back print it misses the last letter from every word – not much use!

If anyone wants advice and help on any of the mods and problems above, or can give help with WordStar 4 problems, please get in touch with me on Bristol (0272) 512719.

How about a Bristol area 80-BUS User Group? •

Developing Programs On Microcomputers Over The Years

by Richard Beal

Paul asked me to write an epitaph, as this is the end of an era of 8-bit computing. I thought it would be interesting to look back at the changes in ways of developing software on microcomputers, concentrating on the 80-BUS machines. I am sure some of you will have feelings of nostalgia when you read this!

The first program I wrote for my Nascom 1 (in 1978 I think) was written out in pencil on pieces of paper, with assembler mnemonics on the right which I had learned from the Z80 CPU manual. I then hand assembled the program, looking up each instruction in turn. Calculating the jumps was a painful process, particularly the backward relative ones. When the program was typed in (in hex) and executed, it crashed. I had no clues, and the next stage was to single step the program until the problem was found. Naturally the bug involved a missing instruction which meant that every jump had to be recalculated and typed in again. Still, the program worked in the end.

Once ZEAP was available, which provided a text editor and an assembler, things were much better. It was not possible for me to assemble a whole 2K of object code, and this time it was NAS-SYS that I was writing. This code was particularly hard and slow to debug, because I could only test it by putting it into EPROM, turning off the machine, plugging in the chips, and turning it on again. If it didn't work the only way to debug was by a minute examination of all the changes since the previous version.

The next great leap forward was floppy disks and CP/M. The MicroSoft M80 assembler was an excellent product, and WordStar was a fast text editor. In fact only recently has WordStar been made to run as fast on a PC as it used to under CP/M. I wrote another ROM based operating system, RP/M, using these tools.

I made several attempts to get away from Z80 assembler and wasted some effort on a language called PL/M. Then good C compilers were developed and I wrote a communications program called DIAL in a mixture of C and assembler.

Then the years passed and I had very little free time. I used IBM PCs and had a Compaq Plus followed by a Toshiba 3100 at home, but have written very few programs. Recently I tried out the latest MicroSoft products consisting of MicroSoft C 5.1, Codeview, Quick C, and MASM 5.1. These are a very professional set of tools

and another great step. I tried out Codeview on a C program which called an assembler subroutine. It was marvellous to be able to step through the program, setting watch variables and breakpoints and seeing the source code, both C and assembler, fly by on the screen.

Despite these advances I have happy memories of the old machines and when I moved house I put together a fully expanded non-disk Nascom 1 system and got it working before packing it away. I hope one day to find a museum worthy to exhibit it in full operation, with NAS-SYS, 8K BASIC, ZEAP, NAS-DIS and DEBUG all in ROM, with a massive 64K of RAM. Good luck. •

MAP-80 BIOS 5.02. Enhancements for CP/M Plus

by M Newson

Here are details of extensive modifications that I have done to the MAP CP/M + BIOS, and these are available from me with the kind permission of MAP-80. Ltd.

- All SETDEF parameters pre-definable on assembly,
- BIT or BINARY drive selection. (BINARY disables ASSIGNABLE feature.)
- All floppy drives may be set to default formats on assembly but are also re-assignable later by choice. (All except first logical floppy.)
- Physical Winnies greater than 32Mb handled – up to 512Mb.
- DSKSTRUC calculation speeded up – for those who rebuild regularly!
- SASI controller types S1410 or S1420 selectable at assembly.
- Countdown timeout added to Winnie initialisation while waiting for drive ready.
- Winnie error reporting in form TYPE, CODE, LOGADDR >X< CYLNO, HEADNO, SECNO
- "Retry [Y/N/^C] ?" added to floppy and Winnie, with proper UNLOG function.
- 'Wn' number added to signon display.
- 'Fn' display corrected for n>9.
- Screen centralisation Macros and message generation tidied.
- N2/VSOFT initial screen edit problem overcome.
- WFORMAT modified for multiple passes and retries to evaluate Winnie performance.

I also have a modification for the MAP 256K RAM card to convert it to 1 Mb capacity. For further details of information required to upgrade your system, please send a SAE to me. •

From The Horse's Mouth

by John Marshall, Managing Director – Gemini Computer Systems Ltd, Chesham

In the autumn of 1976, in the course of one of my regular visits to our buying office in northern California I was introduced to my first microcomputer, a PCB assembly measuring approximately 8" x 3", with the improbable name of Apple!

That evening I was "dragged" off to a lecture hall at Stanford University, adjacent to the mile long particle accelerator which is sometimes visible from the air as one approaches San Francisco's International Airport. The auditorium was filled to capacity with approximately 500 people anxiously awaiting the start of the evening's activities.

I cannot remember the name of the individual who hosted the meeting, but I do remember being completely taken aback by the proceedings. The attendees were one of the scruffiest bunch of individuals I have ever seen, but the average IQ must have been sufficient for all of them to have qualified for membership of Mensa!

The meeting consisted, in part, of an informal exchange of comment on the various microcomputers that were owned by the audience. Representatives or founding owners of the fledgeling manufacturers were present and were, on occasion, left in no doubt of the misgivings some users had of their equipment. It should be remembered that this event predated the time when systems were boxed, supplied with keyboards and screens. All you had for $2000 was a PCB with a processor, a serial I/O device and – if you were lucky – 1KByte of DRAM!!!

To be quite candid I was stunned! I found it difficult to understand how people could spend that sort of money out of their tax-paid pockets on a small PCB assembly stuffed with a handful of ICs. However, those were the days when a 6509 or 8080 CPU cost in excess of $500 and the Z80 was just about to arrive on the scene.

I tried to dismiss the evening's meeting from my mind, but somehow I felt that I had been privileged to have an insight into something that might just radically alter society within a few years.

On my flight home it occurred to me that there might be a market in the UK for something similar, albeit at a much more modest price. At that time one could purchase an SLR camera for about £200 and this seemed to be a reasonable target

resale price to aim for, since it was obvious that the male members of the population in this country were spending this sort of cash on their hobbies.

I had spent the early years of my working life building up an electronics component retail outlet which was specifically aimed at the hobby market (A Marshall & Son in Cricklewood – I was the son), and had also been extensively involved subsequently in the Practical TV project to build a colour TV receiver. It was obvious to me that I should look at the possibility of approaching the project with the idea of supplying a kit, both to save money and to appeal to the right type of person.

In the closing weeks of 1976 I attended a seminar at the Imperial College in London on microprocessors, and afterwards started talking to Phil Pitman, who was at that time working for Mostek (now part of the SGS Thomson group). Mostek had just signed a second source agreement with Zilog to manufacture the Z80 and were anxious to assist anyone who might want to use this device in their systems. Subsequently Phil put me in touch with Chris Shelton who acted as a consultant designer and who was, in the spring of 1977, asked to design Nascom 1.

We launched the system at the Wembley Conference Centre in November 1977. Prior to the launch we ran a series of articles on microcomputer design in Wireless World authored by Phil Pitman, who was technical marketing manager at Zilog, and these had aroused a great deal of interest. The switchboard at our office in Chesham was frequently clogged with callers requesting information and it became obvious that our initial booking of accommodation for 250 people at the launch was going to be hopelessly inadequate. Another hall was provided, but even this proved barely sufficient for the 700 people who arrived on the day. One of the attendees was Meyer Soloman, the first editor of Personal Computer World, who subsequently featured our system in the first issue of the magazine.

The seminar was a resounding success and many of the attendees gave us provisional orders for the system notwithstanding the fact that we could only show the prototype! Deliveries did not commence until the early part of 1978 and during the period to May 1980, we shipped a total of over 35,000 Nascom 1 and Nascom 2 systems, all in kit form. This may not seem a particularly large number when compared to the current market, but in those pre-IBM PC days, the numbers of systems sold were quite impressive.

By the middle of 1978 it had become obvious that I could not continue with my component-related activities and I sold off my interest to my partner, who still runs the operation today. We changed the name of the company to Nascom and tried to get to grips with the component procurement problems that were hampering production. Printed circuit board deliveries and quality were particularly problematical, difficulties which were only resolved in 1979 when we started to have the boards made in the USA. Then we were hit by the first great DRAM shortage

(these were 16K x 1!) created as a result of soaring demand from companies such as Sinclair, Acorn, Apple, Commodore and ourselves.

These sort of problems put a great strain on the cash resources of the company and we were forced to find external funding. This finally materialised in the summer of 1979 in the form of a deal with Grovewood Securities who provided much needed cash on a very attractive basis. Unfortunately we fell into the classic trap of not asking for enough cash initially, and when we returned in January 1980 asking for more we were refused.

I felt at the time that this was a bad decision on Grovewoods' part and nothing that has happened subsequently has made me change my mind. It was also untypical of the far-sighted policies usually followed by John Danny, the Chairman of Grovewood. It was only a matter of months before the inevitable occurred, during which time I tried to drastically cut overheads in order to save the company. I also became embroiled in a particularly bloody boardroom battle which resulted in the dismissal of all of the directors of the company. Every avenue of refinance was explored, but without success, and on 27 May I was forced to ask Grovewood to appoint a Receiver, thus achieving the somewhat dubious claim of being the first microcomputer company to seek protection from its creditors by this means.

Grovewood appointed Messrs Cork Gully to manage the company's affairs and, much to their relief, I decided to quit within a month of the Receiver's arrival. Nascom stayed in receivership for nearly 2 years, apparently trading at a profit before being bought by Lucas and I have often considered that this fact alone vindicated my request for more finance.

Any contractual restriction on my activities were terminated when Cork Gully took over and I immediately established Gemini in Amersham, with a view to exploiting the demand for peripherals for Nascom systems. I was forced to use my house as collateral for a bank loan and was successful in persuading all but one of my old suppliers at Nascom to give me credit at Gemini notwithstanding the losses they had recently sustained.

We sub-contracted all of the design and manufacturing activities, paying only for results. Within 18 months we were ready to launch our own CPU boards and subsequently introduced the CP/M based Galaxy system at the 'Which' Computer Show in January 1982.

I watched the arrival of IBM with great trepidation and avoided chasing either the clone or add-on markets because of the cash problems that I could see developing. Gemini focused its activities on niche-type markets, thereby side-stepping any confrontation with the larger companies who had arrived on the scene. We produced our first 68000-based designs in 1985, whilst continuing to support our

existing Z80 based activities. In fact, the arrival of the Hitachi 64180 will ensure the continued production of our Z80 compatible systems for many years to come.

I left Nascom exactly 8 years after founding the company and am about to celebrate my ninth anniversary at Gemini – only this time I'm staying!

Gemini is one of the longest established companies in the micro business and this relative longevity enables us to now contemplate pursuing a programme of rapid expansion from a sound base.

In 1987 we began to work in close co-operation with Glasgow University with a view to developing and marketing a range of boards and systems based around the INMOS Transputer. This arrangement has now evolved into an exclusive agreement which will allow us to develop a wide range of Transputer-based products.

It is interesting to compare the Nascom 1 CPU board, designed in 1977, with the WorkStation card developed at Gemini 11 years later, which will become the main CPU unit for our new range of desktop Supercomputers:–

	NASCOM 1	GM8102
Processor(s):	One 8-bit Z80	Nine 32-bit T800s
CPU Speed:	2 MHz	25 MHz
Whetstones:	2.5K	40,000K
On-Board DRAM:	2 KBytes	64 MBytes

The above table shows quite clearly how far the industry has evolved in such a short time. The first transistor was developed in the Bell labs in 1946. Thirty years later in 1976 Zilog designed the Z80 consisting of 8,500 transistors. Ten years after that, INMOS manufactured the first prototype T800, a VLSI device which has more than 300,000 transistors in a single chip! In 1977 2 MHz clock speeds were state-of-the-art, whereas today, 25 MHz is becoming somewhat pedestrian. I remember the hassle we had trying to contain the system software within a 2708 1K EPROM and how generous we thought we were by including 32 1K DRAMs then, as opposed to the 64 1M x 8 devices on the GM8102!

Gemini transputer-based systems use building blocks of 8 transputers per card, and these can be built up into very large systems – we have just submitted a proposal for a machine with 384 T800 transputers and 1.636 Gigabytes of DRAM!

We also supply cards on IBM AT formats for more modest applications where people are trying to enhance the speed of their application by supplementing the host CPU with one or more Transputers.

It seems strange to me that so little time has elapsed between the start of the era at Nascom, with 2 MHz Z80s and 2K of system RAM, to Gemini's activities in parallel processing with multiple 25 MHz processors and tens, hundreds or even thousands of bytes of memory.

In the early days at Nascom, I concluded that we were about to witness the beginning of the second industrial revolution, but subsequent events have exceeded anything I imagined. The revolution sparked off by the ability to produce microprocessors so cheaply has permeated its way throughout our society and still appears to be gathering momentum. ●

All Good Things Come To An End

by Erling Andersen

All good things have to come to an end. I have enjoyed reading the 2 volumes of your excellent magazine, and as an owner of a Nascom 2 I have found much valuable information and good hints in your articles. Therefore, I am very sorry to hear that you find it impossible to continue the magazine.

But of course, one has to realise that our machines are getting older and the new PCs in plastic boxes are now taking over. A lot of new application programs are coming up that were never even thought of on our computers. Still, I don't think I will ever get the same relation to a computer as to my old Nascom, soldered together in the late evenings, and which worked the first time it was switched on. I also learned a lot about the inner workings of a computer and how to control it. Today, running UNIX and using lots of huge program libraries with not a single line of source code available, I think back to the NAS-SYS 3 with the complete commented listing. There were no problems that couldn't be solved by looking through the source code. Computers have grown up, but at a price – you don't get nearly as familiar with a "black box" with shelves of "User Guides" and a new version coming up every third month.

When I get tired I will go home to my Nascom, turn it on and listen to its non-existing fan. I will read volumes of INMC-80, 80-BUS NEWS and *Scorpio News*. And then maybe some day there will again be a small computer not supported by Big Blue that I can play around with.

Thank you for giving us a good time. ●

Lucas Hardware/Software - Points Arising

by Dennis McLaren

AVC and RAM mods

If you have an AVC in your system, you'll know that a "simple mod" has to be made to your RAM card before anything will work. You then find that /RAMDIS no longer works properly when any other card brings it low. The reason is that your simple mod has caused /RAMDIS to both read and write protect the RAM.

This is essential for the AVC, but contrary to the whole philosophy of /RAMDIS when used by EPROM cards etc.

Fortunately, the cure is simple. The idea is to restore /RAMDIS to its original read-disable role and to give the AVC its own /WRITEDIS line to the RAM card. Whenever the AVC wishes to read and write protect any RAM overlaid by the video planes, it will bring down /RAMDIS by way of a diode and /WRITEDIS via a separate lead to the RAM card. Any other card which brings down /RAMDIS will be prevented from bringing down /WRITEDIS by the diode.

This mod works for my Gemini 64K RAM card at 4MHz. It should work for other RAM cards but I don't know anything about those.

GM802 64K RAM card mod.

- Bend up pin 10 of IC 48 (74LS00) but don't connect it to anything for the moment (a low on this pin will write protect the card).

Nas AVC mod.

- Bend up pin 8 of IC 56 (7417) and solder a diode (I used a 1N4148) between pin 8 and TP 17 (/RAMDIS) immediately adjacent. Arrange for the cathode of the diode to be connected to pin 8 of the IC.
- Make up a length of hook-up wire long enough to reach from pin 8 of the IC on the AVC to pin 10 of the IC on the RAM card.
- Solder a soldercon to one end of the wire and solder the other end to the diode/pin 8 junction on the AVC.
- Plug the cards into your system and clip the soldercon end of the hook-up wire to pin 10 of the IC on the RAM card.

AVC and EPROM card should now co-exist peacefully.

Please note, I never bend IC pins or solder to them, it's just that it's easier to describe things that way. I use an intermediate DIL socket and bend/solder the pins on that.

Another mod.

When I first tried out my AVC, all I could get on the display was a green screen of less than full height. I had chosen to ignore the advice in the manual where you are told to connect the N2 video into the AVC as I wanted to use a twin screen set up.

After much probing, I discovered that TP 6 (EXT VIDEO) was floating at about 1.6 volts plus, so I tried grounding it and bingo! everything burst into life! The ground pin is not marked as such, but you'll find it immediately to the left of TP's 8, 7 & 5 (/SYNC OUT, EXT /SYNC & EXT SYNC).

Doctor Dark had a similar problem with his PLUTO. I checked the wiring between my AVC and my Microvitec Cub 653 after reading his comments, but could find no errors. Which of us is right? Are we both right?

The Lucas FDC.

I've had a good hard look at my Nas FDC and at its circuit diagram. I think that the designer of the card always intended it to be able to handle an 8" drive (as drive D) under software control via a spare latched port bit.

There are several strategically placed, innocent looking plated through holes in all the places where one might wish to tap into various tracks when modifying the card for an 8" drive. The holes are big enough to take small test pins and most seem to serve no other purpose. Has anyone done the mods? If so I would like to know how. I can be contacted on 0483 277500 between 8.00 p.m. and 10.45 p.m. most evenings.

Lucas Software.

Lucas CP/M does NOT require the AVC. It works perfectly well via the N2's 48 x 16 display. It has screen editing (of the "unfixed" variety) and there's a feature which enables you to send control codes to the printer directly from the keyboard. Also supplied are two Resident System Utilities: AVCTXT and AVCTXTS. The first is required when using graphics and it occupies 4.5K of RAM. AVCTXTS is a "switched" version which handles text only. The main feature of AVCTXTS is that its main and alternate set of characters are stored not in EPROM (as mooted by David Parkinson in a previous issue) but in the video margins (up to 4K per colour is available). Consequently it only occupies 2K of RAM. You need the AVC to use the RSU's.

As with the 48 x 16 CP/M, control codes can be sent direct to the printer. In addition, control codes can be sent direct to the screen.

Please note: Software such as Wordstar and Supercalc expect an 80 x 25 line display; to fix them to work with a 48 x 16 screen would require patches both to them and to MOVCPM.

Lotti2 is a remarkable electronic drawing board which is very simple to use. It's given me what I've always wanted - a drawing board in my own home which does not require a huge chest of drawers in which to keep the drawings. (It doesn't require a pongy print machine either.) Now I can plan the garden, draw the new outbuilding, do PCB layouts (no auto routeing or track separation checking, but very welcome nonetheless) and draw the mechanical engineering drawings which are my trade. The whole thing is menu driven and software drivers are provided for a bit pad, 3 types of matrix printer and 5 types of plotter. It can be controlled using just the N2 keyboard. For me, it's the bargain of the decade. You need an AVC to use it and it needs 48K for the Nasdos 2 version and 64K for the CP/M version.

Lucas officially abandoned their computing business in September of last year. However, they still retain the rights to all their hard/software. The last I heard was that they were intending to transfer those rights together with the repair contracts to another company. I shall be writing to them shortly, thanking them for what they have done over the years and asking them to press on with the transferral of rights so that software will again be available to the 10,000 plus of us out here. Ring me if you want a progress report. ●

For Sale & Wanted

For Sale – a MARVIN system at bargain prices. (Somebody somewhere must want some of this gear!) Anyone interested should contact Chris Blackmore, Taunton.

For Sale – 10A PSU, 19" VERO frame with 7-slot Backplane – £40. VRT Superdeck with software – £30. GM802 RAM B – £20. 3A PSU – £15. GP80A Printer – £50. ROM Graphics Board for Nascom 1 (econographics) – £5. Nascom 1 Buffer Board – £10. Infocom's Enchanter – £5. **Wanted** – ROM to drive Pluto (768 x 576) and Palette. Phone Mike Parker (0865) 725495

For Sale – GM803 EPROM, GM837 Colour, GM862 256K RAM, GM870 MODEM, GM812 IVC, GM816 I/O. All with documentation and software where relevant. All offers considered. Phone C Bowden for details (0209) 860480.

For Sale – Lots of 80-BUS boards, cheap 64K RAM and other goodies at bargain prices. Detailed list available. Write or phone P D Coker, Orpington, (0689) 58510

Wanted – Information to set up Compiler language based subroutines for Nascom AVC Graphics board, as GBASIC is too slow. Jack Arnett, RNTNE, London.

For Sale – Nascom 2 48K complete; spare 48K RAM; MAP 256K RAM; Nascom I/O board; GM833 512K RAM-disk board; GM811 Z80 CPU; GM812 IVC; GM802 64K RAM; Pluto V2.0; GM829 FDC/SASI; GM803 NasBus EPROM/ROM card; GM813 CPU card; GM809 FDC; 8-slot Motherboard; 6 Amp small PSU; Keyboards, etc. Please phone (0602) 846116 with offers. G E Gillard, Nottingham. •

Contacts

The following people have asked to remain in contact with others, and have given the following details as to their interests. Their full addresses are given later.

GEMINI / NASCOM / MAP-80

Michael Parker	Writing/modifying systems software for CP/M 2.2 and CP/M +, running on a Nascom 2 with MAP-80 cards. (See my article.)
Geoff Higgs	My system comprises a Nascom 2, GM809 Iss 2 FDC, 2-off RAM A, GM812 Iss 2 IVC, Wintec WT 625 (Teletext) Colour Card, pair of 40/80 5.25" drives, NAS-SYS 3, POLYDOS (modified to work 35/40/80 track. When the house is rebuilt I have all the bits (SIMON, etc) to make the beast run CP/M.
J T Nestor	Anything further which may be written about Gemini or Nascom. Please let me know.
J N Coleman	Please contact me on any developments of advanced 80- BUS hardware and CP/M software.
P G Lee	I run a Nascom 2 and a Gemini system and am interested in go-faster Z80 variants (Z280, etc). Also graphics and interface cards.
Nigel Duffin	Please let me know about any 80-BUS boards, add-ons, software, etc.
Cliff Wernham	I am generally interested in NASDOS, Lucas, Gemini CP/M
Brian Hayward	My special interest is in Gemini/Nascom hardware

Neil Stuttard	I'm interested in Nascom CP/M and Pluto system uses.
R S Large	Anything on Z80 and Nascom, please.
B Cuddeford	As a Nascom user, I'm interested in anything.
J Boraston	I would be interested in hearing from anyone using the AVC.
Brian Judd	I am interested in buying suitably priced second-hand boards.

ZCPR3

Malcolm Bay	Interested in ZCPR3.
J N Coleman	Please contact me on any developments of advanced software.

OTHERS

D F McLaren	My special interest is software for the AVC (Prestel and GSX). Any comments?
Brian Hayward	I am interested in IBM-type hardware
L C Waring	My particular interests are Operating Systems (other than CP/M); TDL assembly language programming; amateur radio applications such as morse and teleprinter; Forth and real time programming.
John Parrott	Broughton Designs has now been hatched with the intention of doing one-off hardware and software designs and also oddball problem solving (at a price) on a no-solution no-fee basis. ●

Dave's Farewell

by David Hunt

A pity really, still, good things don't last forever. Paul has suggested that this piece ought to reminisce a bit, you know, funny anecdotes from the past and all that. Well reminiscence is a peculiar thing (see the other piece from me if Paul's included it) I can't think of a thing. I dare say they'll come to me later.

What strikes me now is the changes and effects that Nascom and Gemini have made in my life. And all the interesting people, many of them now good friends, who I have met over the last 10 years. All because John Marshall had this idea of producing a microcomputer kit which anyone with a bit of electronic knowledge could build. Also, and unusually, everyone was equal, starting from the same point, knowing virtually nothing about the subject. All right some of us grasped the concepts a bit quicker than others, and some fell by the wayside, unable to make the mental leap which allows the pursuit of anything new. But in the main it has been a friendly and intense period of learning. You're never too old to learn something new.

There are many people I ought to thank, they'll know who they are. Those who pointed me in the right direction in the very beginning. Those who offered advice and tips over a period of time. Thank you one and all. In my turn, I have tried to help others a little, either by my dubious writings in this and other magazines or by trying to answer letters on specific points or by meetings at computer clubs, et al.

As far as changes go, many of the people I have met (and myself included) now have new careers in the challenging area of computing and microelectronics, all because they tried to build and drive a humble Nascom. John Marshall has a lot to answer for (most of it complimentary), although I doubt that he foresaw the changes that his kit would bring about in a small segment of the U.K. This magazine, with its various names over the time, has been useful, so I should thank the organisers of these. Most of the people I have met in the field and who have been most helpful have been readers and contributors at various times. It's only now, when this is the last issue that I feel a little regret, as there's many of you out there that I have not met, and will lose contact with, no matter how indirect.

Enough introspection, Paul's idea was to bow out with a laugh, rather than a sob.

During the last ten years I have been able to formulate and prove many new laws of nature. Extensions to Murphy's Laws if you like. Most are obvious and owe their origins to the Great Murphy himself, others are more obscure, but none-the-less valid.

Reciprocal Qualification

Take for instance Dave's Law of Reciprocal Qualification. This states that the better qualified a man is (and the louder he shouts about it) the more likely he is to make a complete jackass of himself when dealing with matters outside his own field.

This is exemplified by a Nascom 2 we had for repair once, returned by a person who had a prestigious title before his name and more letters behind his name than in it (think about that). All this qualification to learned Institutes pointed to a highly successful career in theoretical physics. Now he was complaining bitterly that his Nascom would not work, despite perfect construction and having followed the instructions to the letter. We had to agree the quality of construction was unusually high. Perfect soldered joints, leads on resistors perfectly shaped before insertion into the pcb and all that. In fact a thoroughly good assembly job. There was only one thing wrong, it had been assembled 100% on the wrong side of the pcb.

Pointless Qualification

Every law also has a corollary, which more often than not tends to negate it. Take for instance, the converse of the above, Dave's Law of Pointless Qualification. This states that it doesn't matter how good you are at it, bureaucracy likes letters behind a name.

Many of you will be aware I am a night school teacher, teaching an unrelated subject at a Technical College. Three or four years back they found themselves without a night school lecturer in microcomputer studies. Now the particular course consisted of teaching how to build and program a minimal Z80 system. So the Computer Department, thoroughly aware of my connections and knowledge in the subject, asked me. I admit I was hesitant about it, the teaching side that is, I didn't doubt my ability. I think as it was going to be a stand-in for one year, what bugged me was the amount of preparation I'd have to do, with no following years where I could teach with virtually no preparation. A lot of effort for just one year's work. However, the Computer Department was enthusiastic and it was argued that if I made a go of it, I might get the class the following year, and so on.

Anyway I reluctantly agreed, until that is, I had an interview with the twits who run the place. 'What paper qualifications did I have for the job.' Simple answer to that, 'None.' (They already knew my electronics qualifications, it was microcomputers they were worrying about.) 'Why not ?', they asked. 'Easy.', I replied, 'When I learnt all this stuff, you didn't run courses on the subject, so I couldn't come here, or anywhere else for that matter, to get qualified in the subject.' 'Oh', they said, 'We'll have to think about that.' As far as I know, they're still thinking. In the meantime, they no longer teach that particular class.

All Perversities

Now we all know the Law of All Perversities will contrive to make the most obvious obscure, take the instance of the Gemini with the faulty drive.

This was a GM903 (if I remember my Gemini model numbers correctly) a single floppy drive and a 5Mbyte Winnie. It came in with a dodgy disk drive, one of the Micropolis ones I think, they never were too reliable. Anyway, it's a job of a few moments to replace the drive, and the Gemini was placed on the bench and the drive swapped. Because the keyboard and monitor were on the other bench, and the bench, as benches will, was cluttered up, having replaced the drive, the Gemini was moved to the other bench to test it. No joy, it wouldn't boot from the floppy disk.

So back on the first bench, and the drive controller card was swapped. Back to the bench with the monitor and keyboard, and it still wouldn't go. This process went on, the CPU card, the video card, the power supply – until the only thing left to swap was the case. Now cases don't usually affect the operation of the machine, so we stopped to think – what had we missed ? In the end we fired it up without the keyboard and monitor on the work bench. It fired up beautifully – Oh heck ! Well I reckon you've spotted it. EM radiation from the monitor was being picked up by the disk drive, and all it would do was error all the time. Moral: put the lid on a Gemini before you try to run it near the monitor !

Diminishing Returns of Work

This exercise took two of us most of an afternoon, which neatly brings me to the next Law. Dave's Law of Diminishing Returns of Work, which states quite simply that the equivalent effort visible from a group of individuals is approximately equal to the the square root of the number of individuals employed. This may be summed up by the equation $E = \sqrt{I}$, where E is the equivalent visible effort, and I is the number of individuals. This of course gives the lie to the old school maths questions such as, 'If it takes one man two hours to dig a hole 2 metres square and 1 metre deep, how long does it take the two men to dig a hole twice the size ?'. In this case the answer will be 2.828 hours and not as every school kid knows, 2 hours. Eat your heart out Kenneth Baker, try stuffing that in your National Curriculum. Whilst on about silly questions, 'How may software writers does it take to change a light bulb ?'. Just to keep you guessing, the answer is at the end of the article.

Signetics WOM

Some years ago, BN, that is Before Nascom, I was the recipient of a pile of Signetics data sheets. When I riffled through them the first time, I saw nothing extraordinary about any of them. But on closer examination, my eye was drawn to the Signetics Write Only Memory chip. It looked odd, but the significance still didn't sink in. Then

it dawned. What earthly use was a memory that you could write to but not read from. So I read on. It was quite an amusing spoof, and its uses included 'Post Mortem Memory (Missile Systems)' and a 'Terminal Bit Bucket'. It even included various performance graphs, including a plot of the 'number of pins remaining' against the 'number of socket insertions'. When you've repaired as many Nascoms as I have, you realise that the guys who drew up that particular data sheet knew their stuff. You'd be surprised how many 36 legged Z80's there were at the time.

Great British Post Office

Murphy isn't the only one to have Laws to himself. As we all know, the Great British Post Office is a Law unto itself. There was the occasion where a Nascom 2 was returned for repair by post. There was no trace of damage to the box, the packing was entirely adequate and yet the pcb was neatly snapped in half. Now I don't know if you've ever tried to snap a piece of glass fibre printed circuit board the size of a Nascom board, it ain't easy, or rather, it's damn near impossible (at least to do it neatly). Now the Post Office had their own theories about what happened, and to honest, so did I. None-the-less, if it wasn't an immutable working of one of the Great Post Office Laws, it only shows the heights of frustration owning a Nascom could endow.

Defeatist Advertising

Dave's Law of Defeatist Advertising goes to prove that no matter what you say in the ads, someone or something will prove you wrong. A nice example of this occurred just after disk head cleaning kits became fashionable (and expensive). Now I've always wondered about the efficacy of disk head cleaners. The structure of the disks themselves leads to self cleaning and the design of the heads ensures that there are no head gaps to get clogged. Still, this doesn't stop the entrepreneurial types trying to flog us something we don't need.

Almost immediately after a flood of free sample of disk head cleaners, a Gemini came in for service. Nothing particularly wrong with it, but the owners though it needed as 10,000 mile service anyway. Who are we to refuse money. Well we opened it up and found the whole works covered with about a 3mm thick layer of cement dust. It was everywhere, and apart from disclosing interesting patterns, indicating the air flow through the machine, it left us with the job of getting rid of it. Close examination of the drives indicated they were in as mucky a state as the rest of it, except the heads, they were pristine clean. So much for head cleaners. We found out subsequently that the machine lived in a small shack in the bottom of a cement works where it kept tally of the number of lorry loads of cement which came and went.

Inverse Requirements

Something not strictly Gemini related is the more recent Dave's Law of Inverse Requirements. Now a few years ago I got involved in the design of a database system for document retrieval using microfilm, the earlier examples of which were written for the Gemini, but it soon became apparent that business customers were far more happy with IBM type computers, but that's beside the point. Anyway, we rapidly decided that five fields would be manageable and entirely adequate, whilst more wouldn't, apart from that, the required information would be on the microfilm, and the database was simply a tool to allow access to it. We also soon found out that the bigger the company the more fields they wanted. That figures, as always, some bright sparks in the company decided that management information could be accumulated in the databases, thus defeating the aim of the system in the first place as the management info was on the film.

This is where the Law comes into play. It states that the larger the customer, the more fields that say they require, but in practice, the fewer fields they ultimately use. BAA wanted 13 fields – they insisted, and grumbled loudly when we asked, 'What for ?'. They finally agreed to give it a go with the 5 fields supplied, with the rider that they would expect the number of fields to be expanded or they could sling it back and get their money back. You guessed it, the database is still growing after 3 years at 15,000 entries a month, using one field of 12 characters. Several other customers have exhibited the same behaviour. Strange isn't it ?

I read an article once about the Great Murphy and how his Laws affect instrumentation engineers. The only one I remember was one about having dismantled and re-assembled a instrument, there would always be one nut and bolt left over. Any one who's taken a car engine apart will know the feeling and will be lucky if it's only one nut and bolt. None the less, the corollary was that having taken the instrument apart again to fit the missing nut and bolt, it will be discovered that nothing was missing in the first place, and that the nut and bolt came from one of the several instruments which was serviced yesterday. Oh I know, having dismantled and re-assembled many disk drives in my time – the number of times that particular Law has held true.

A couple of pages worth. Paul said don't make it too long or he'd cut it, so I'd better stop here with one passing thought. Today is Sunday, and this afternoon I have done something nasty to my back. Having very painfully sat down at the computer, I now can't get out of the chair. My brother says it's good for a couple of weeks off work, and I guess the doctor will say the same tomorrow. But I'm on holiday next week. That's Murphy for you, why can't I be sick in the firm's time ?

Oh yes, the answer to the question of the day, simple – it can't be done, it's a hardware problem !! ●

Names and Addresses

The following people have all asked to have their names and addresses published so that they may maintain contact with others with similar interests.

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A POME

So
Farewell then,
Scorpio News.

You were a
Really Interesting
Magazine.

Keith's Mum says
She could never
Understand
A word of it.

E J Thribb
(age Z80).

Editor's Farewell

It now falls to me to close down, shut up shop, and go home. Dave Hunt has kindly done "the funny bit", and so I can do "the sad bit" – well, it's a bit sad to me anyway.

Do you realise that I have been producing *Scorpio News* and its predecessors for well over ten years now? Little did I realise, when I said to Kerr Borland *"Can I help with the INMC?"* back in 1978, just how much I was letting myself in for. I even tried to resign twice, and comments to this effect were published, but I let myself get talked out of it. A bit like Frank Sinatra I suppose – *"And now, the end is near, and so I take the final curtain"* as he would say time and time again, but always coming back for more. There are differences between Frank and I though, after all he's getting on a bit and has got stacks of money. I'm considerably younger, and although I haven't got quite as much loot as he has, I bet he hasn't got £10 worth of Premium Bonds! And I don't think that I'll have yet another return performance to produce another 80-BUS related magazine.

So, what remains for me to do? Well, there are lots of thanks to be said. I'll name some names, although of course the trouble with that is the chance of upsetting someone by not mentioning them – sorry. Well, Kerr Borland employed me at Nascom, and so must take the credit (or blame) for me ever getting involved in this, and John Marshall maintained that employment for over 8 years, until I decided that the grass must be greener elsewhere.

Dave Hunt deserves a very special mention for the many, many hours that he has put in over the years. Then David Parkinson, Richard Beal, Paddy Coker, Clive Bowden, Rory O'Farrell and good old Doctor Dark, alias Chris Blackmore, for the large number of items that they have each submitted. Next, of course, there are the authors of many individual letters and articles which have kept the magazines going over the years. And I won't get away without a special mention for my wife, Viv, who has had to put up with the amount of time that I have been engrossed in magazine preparation, the draft copies scattered all over the lounge floor, and who has helped with the typing and in the "stuffing", addressing and stamping that gets the things on their way. To all of these people, who have had little reward other than seeing their names in print, many, many thanks.

But, of course, there would have been no point to any of it if there hadn't been you, the reader! You have made it all possible, and deserve the most special message. Thanks Bert. ●

