

THE twentieth

WAGGI

May 1988 Vol 3 No 4

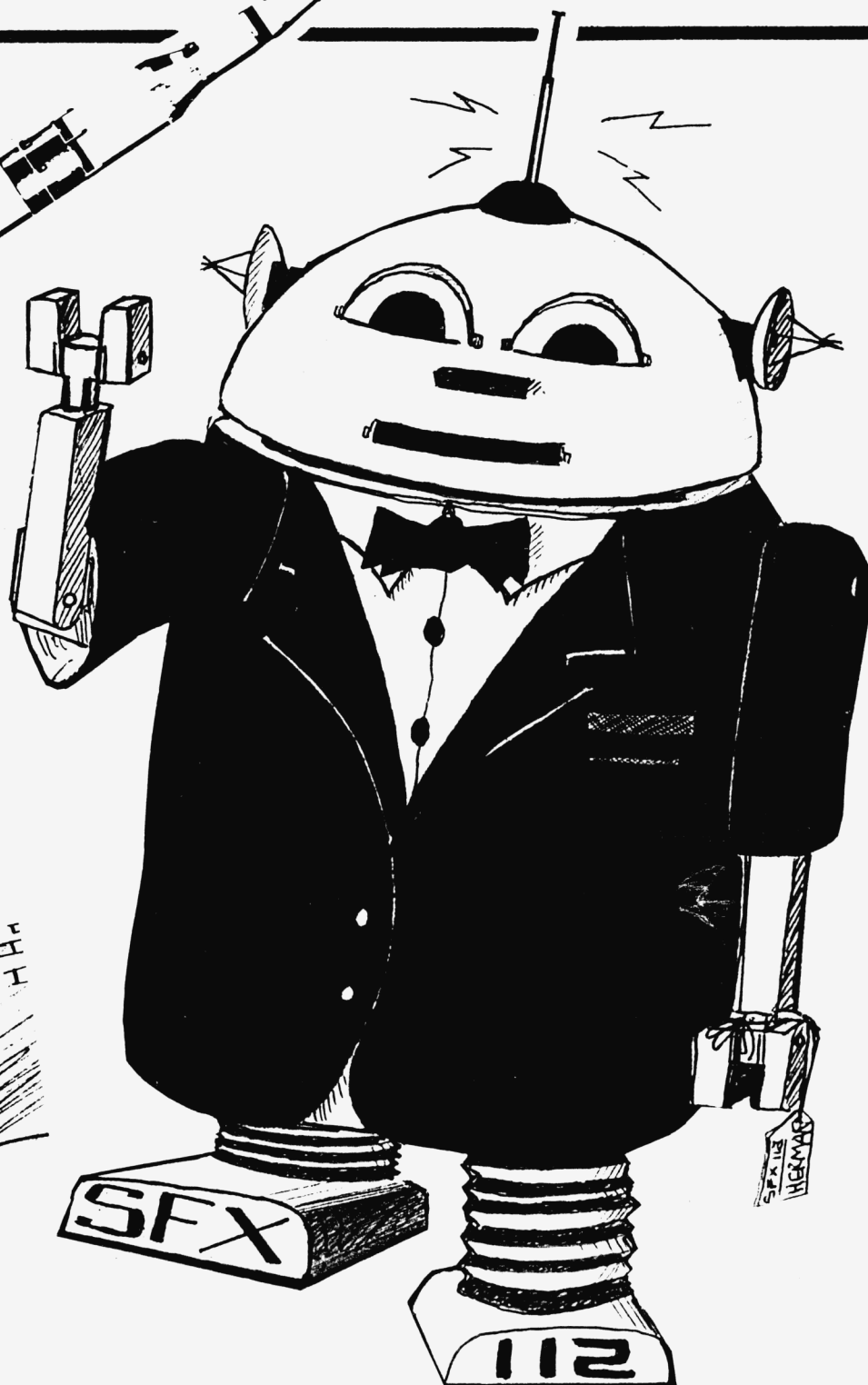
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WACCI Edited by STEVE WILLIAMS

PHONE (01) 898 1090

Conceived and Founded by

JEFF WALKER

REGULARS

THANK & STUFF	1
FAIR COMMENT	4
P-K4	8
WACCI ON-LINE	12
SIMPOT	20

PROGRAMMING

GOOD VIBRATIONS	18
ORIGIN OF THE CPCs	24

FEATURES

THE HARD STUFF	9
THE SYNTHOID	14
RAM'n'CHIPS	26

REVIEWS

BANKRAID	17
QUALITAS PLUS	22

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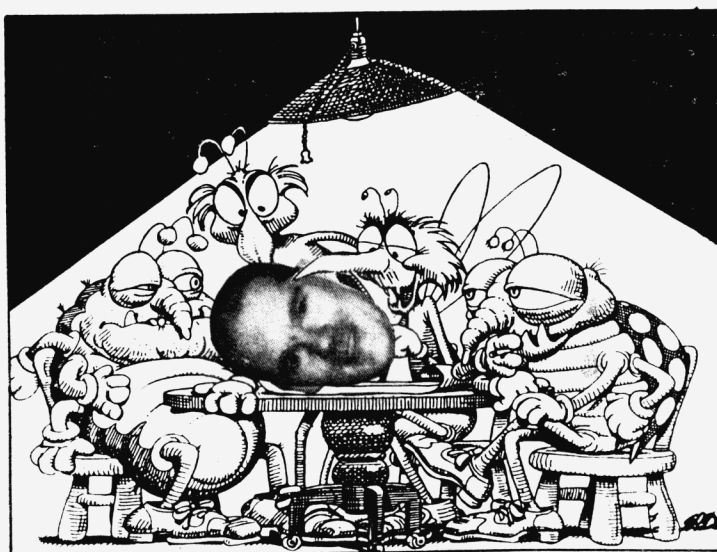
It is 4 am. in the morning. I am tired and I want to go to bed. I cant go though, the master copy of this issue has to be in Birmingham by tomorrow afternoon and this is the last item that has to go into it. My eyes are very sore and there is a little man inside my head trying to tap dance whilst wearing a large pair of hobnail boots. My mouth feels like the bottom of a birdcage and i ache in places too numerous to mention.

It's at times like this I get philisophical.

Why am I doing this? Where did last month go? Where did my packet of cigs go? Where did that thing I once knew as sleep go?

It's alright getting philisophical at this time of the morning. the only trouble is that I am in no fit state to come up with any

**PLEASE
MENTION
WACCI
WHEN
REPLYING
TO
ADVERTS**



answers. Right let's kick off with the news about the club this month. This issue's Thanx and Stuff reads a bit like Thanx and Apologies instead. But when you see how busy things have been around here lately, I am sure you will appreciate the reasons why.

THE MAY ISSUE

This month sees the start of a few new columns. First off is Phil Craven's (love his "News-Round") THE HARD STUFF, concerning the insides of your CPC. GOOD VIBRATIONS is hot on it's heels with advice on how to get the most out of your sound chip. Dave Tyake has sent the club an article on how to build a 16K CMOS RAM with a battery back-up, so dig the soldering iron out from the cupboard, turn to page 26

The Good Vibrations Fun Boy Three



and read Ram 'n' Chips. Apologies to those contributors that have sent articles that have not been published this month. It is down to lack of time and space (sounds like something from Dr. Who). Keep sending them in, they will get started as soon as I can manage it.

AMSTRAD SHOW

Yup, it's here again. The show will be held at Alexandra Palace from the 26th to the 28th of May. If you are going, drop me a line or give me a call on (01) 898-1090 and perhaps a few of us can arrange to meet up. Just in case you decide to go along at the last moment I'll be at the Amstrad Computer User stand, on the hour, every hour from 12 midday.

FSW UPDATE

Good news and bad news about The FSW Library. Good news is that this month we have received a large number of new proggies for inclusion in the Homegrown Section and some more for the Public Domain Library.

Bad news is that they won't be included on the order form until next month. Again this is down to the success of the club eating up most of my waking hours.

In the meantime, here are descriptions of just a few of the new titles you will be seeing next month.

Alastair "FSW" Scott has been trying to break the world record for "contributions to the WACCI FSW".

Poster is designed to be used in conjunction with Siren Software's Print Master. It allows you to use giant lettering in 20 styles.

Orriery lets you view a greatly speeded up solar system from a perspective somewhere halfway towards Alpha Centauri.

Contours does 16 colour plots in the style of Amsig, very pretty.

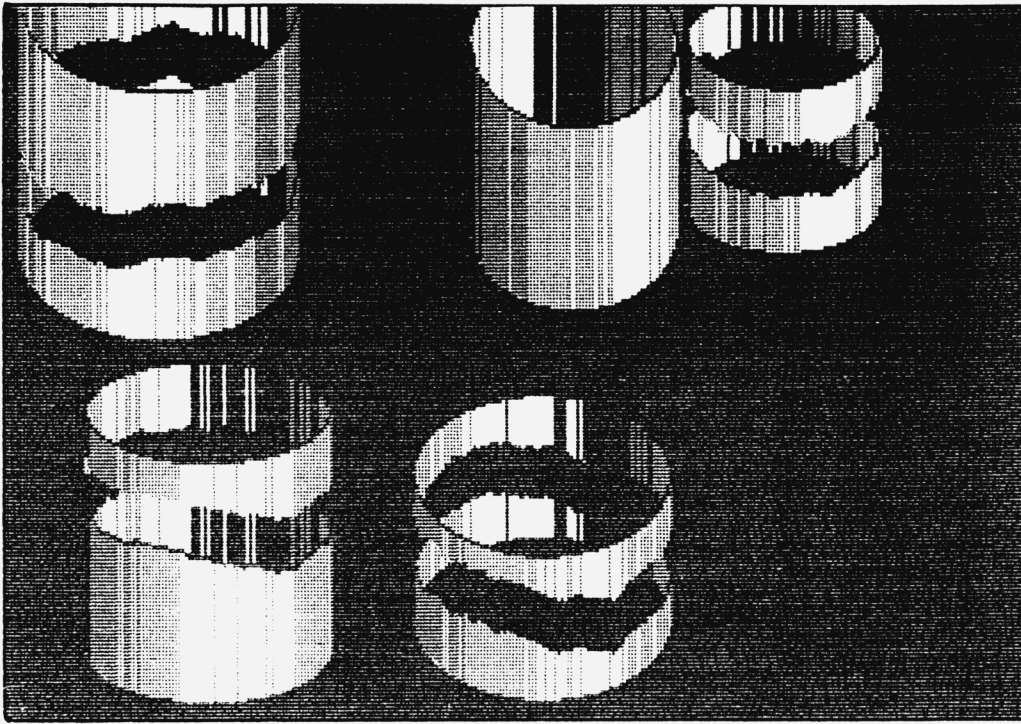
Dietmar Langenohl has chipped in on the PD department with a HEXtoBAS converter, written in HISOFT-C it makes DATA loaders from HEX files.

WOT, NO PLASTIC BOXES?

While we are on the subject of the FSW library. Members who have ordered software, on a new disc, may have noticed they are now being sent in plastic/paper cases and not the usual sturdy hinged plastic box. Don't shout at us, it's all down to Uncle Alan realising that he can save himself a few wonga by ceasing to supply them with the discs. Should we start a campaign to bring them back? Anyway in the meantime I suggest you send any angry letters direct to Amstrad.

WHAT A LITTLE PLEADER.

Yes another little plea from the heart concerning the Loose Homegrown and PD software that members can order. Now the service is there for you to use, but



I do think that sometimes some members are either not being very considerate when they order or downright greedy.

My spirits always flag a little when I open an envelope containing a one formatted disc and an order for 356K of assorted software. It is very fiddley trying to shoehorn software onto a disc so that there is OK left on either side and I have quite a few other demands on my time.

I will try my best to complete those type of order, but if it doesn't fit on easily I will just do the best I

can, return the disc and pocket the difference. A more sensible order size would be about 300K per disc. If people still insist on asking for the maximum they can get on a disc, I will have to slap a compulsory limit on the loose S/W per disc.

WOT, NO AUNTY JOHN?

No, not at least for this month. Don't ask me where he has gotten to this time. The rumours are rife. Jeff thinks he has gone off in search of his Koala bear, Squinty, and gotten lost himself. Alex says he's probably gone off to find his inner cosmic consciousness, yet again. I tend to think that he's found out about the existence of women, in which case it may be quite some time before we hear from him again.

SURVEY UPDATE

I'm sorry folks but the final report about the WACCI Reader Survey has missed the copydate deadline once again. This was partly due to a late influx of completed forms in response to the plea in the March's Thanx and Stuff and partly due to the club reorganisation.

WACCI HAS MOVED

Not only has the FSW library had to be

updated this month due to expansion but WACCI HQ has had to move to new offices for the same reason. So please note the new address and telephone number which is: 59 The Green, Twickenham, Middlesex, TW2 5TU and (01) 898 1090. Orders or letters sent to the old address are now suffering a two day delay while they are being re-routed, so it makes sense to use the new address.

AND FINALLY

The more astute amongst you may have already noticed a slight change in the Thanx and Stuff logo and a change in the usual credits.

Yup the pressure of paid writing work has finally put pay to Jeff "no-legs Walker" as WACCI's editor. He's had to give up the post (very reluctantly) because someone made him an offer he couldn't refuse. This could have meant the end of WACCI but, in order to keep the beastie going I took over running the club at Easter.

It has been non-stop slog ever since. I never realised how much work goes into keeping the show on the road, I certainly don't know how Jeff managed on his own for so long.

Jeff is still a contributing member of the club and you can read his article on ORIGINS on page 24 of this issue.

AND SO TO BED

Right that's about it for this month. I'm going to go and have a lie down and try to do my impersonation of someone sleeping. It never works.

Final apologies go to those of you who have ordered software and have experienced a slight delay in it's return. I'm sorry, once again it's the lack of time. Still I suppose that now I have finished this off I could get on and catch up with a few things...

Letters, labels, artwork, sorting out the filing cabinet etc etc.

Oh well, who needs sleep anyway.

W A C C I

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DYSLEXICS LIKE
HER ♀
DYSLEXICS LIKE
YOU
AND ENEVK WORIG
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FAIR COMMENT

FAIR COMMENT
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SLOTH CITY SOFTWARE

Please send me the enclosed Homegrown Software as underlined in orange felt tip as I'm too lazy to write it out on your order form. Please include it on one of your grossly overcharged Discs as I'm even too lazy to send you one of my £1.50 Amsoft CF2 (Alexandra Palace March 88) discs.

I'm only pretending to moan really, and I hope WACCI goes from strength to strength. Great mag, great humour and great software. What more could a CPC user ask for? Future releases from Infocom, that's what!

Sorry about that. The old blood pressure just took over for a moment, but I'm alright now, and so am I.

Bob Adams
Welwyn Garden City

HERE WE GO AGAIN

What an improvement in WACCI last month, so much less of the low grade moronic humour. When I want really high grade humour I go to the Dandy or an Asterix saga.

Technical pieces need simplifying and not padding out with facacious rubbish and this has been well achieved in the April issue.

Congratters to all, but especially Auntie John and Alex Aird.

John Matheson
Edinburgh

<<Stop crawling - Ed>>

A CODE IN DA NOSE

Despite (or is it because of) my letter a while back, I would be very foolish not to renew my subscription, and most unkind not to say that my comments only referred to the first issue I received. I have learnt quite a bit in a most in a most enjoyable way from the subsequent issues.

I wish especially to thank Alex Aird. Despite some efforts in the

past, my advance into machine code is hardly a nose length. I found that he has explained things about which I had previously been muddled. This has enabled me to write my first solo machine code program.

There is one point which I would be grateful for some enlightenment. What are the Homegrown Programs? I have two programs (Basic of course) which might be acceptable.

P C Ashbury-Smith
London EC1

<<Thanks for the kind words, PC. The Wacci FSW Library consists of programs written and donated to the club by members.

By all means send in the products of your labours. We are always keen to have a look at new stuff and include it the club's library.

IN A TIGHT SQUEEZE

I purchased WACCI DISC-4 mainly to use the Biorhythm program. I followed the instructions in the Feb mag, using Filecopy and a System formatted disc, but without success.

I have got BIO.CQM and CHESS.CQM but when entering LOAD or RUN I get BIO NOT FOUND or CHESS NOT FOUND. Please explain what I am doing wrong.

T C Hockney
Baughurst

<<Hokay, you are going wrong on two counts. First off you haven't unsqueezed the files.

Once a file has been squeezed it appears on the directory with a ".CQM" extension instead of ".COM". To unsqueeze it you will need to use NewSweep.

First use Filecopy again to grab NSWP.COM and transfer it over to the system disc with BIO.CQM and CHESS.CQM on it. When you have done that type NSWP after the A> prompt and press Enter.

You'll see the credits roll up and then the first file in the directory. Press the Return key until BIO.CQM appears at the bottom of the list. Press T to tag the file. Press Q for the squeezing options. Press U to unsqueeze then type A or B according to whether you own a second drive. Press Return again and Robert is your father's brother.

Repeat this process until all your .CQM files are unsqueezed and then you can get on and play the games.

After the excitement of playing CP/M games has abated a little, go back and transfer the NSWP.DOC file across to your system disc. When you get the A> prompt enter TYPE NSWP.DOC and have a long hard read.

The second problem is that you are trying to run and load CP/M programs from Basic. Try entering CP/M and typing CHESS at the A> prompt. Um, don't forget to press Enter - Ed>>

SAME AGAIN PLEASE

As a newcomer to CP/M I was very pleased with my recent purchases from The FSW Library, in particular the disc utility (DU) and NewSweep allowed me a little insight into the mysteries of the operating system.

However, being a bear of very little brain I confess to being stumped by the programs which end in either DQC or CQM instead of the more understandable DOC or COM.

I realise that I must be missing a simple point but, lack the references and contacts to steer me down the right path. Can you help?

M K Farmer
Grantham

<<Do me a favour. See the previous letter - Ed>>

FOR WACCI PHONE 01-898 1090

VDE HELP

I have been experimenting with the VDE text editor and have discovered how to make the cursor keys work on my 6128 with CP/M Plus. As supplied, the program would report an Invalid Key error message when a cursor key was pressed. To get around this alter the entries in the KEYS6128.UDE file as follows:

Line 1 change ^K to ^E ;cursor up
Line 2 change ^L to ^D ;cursor right
Line 3 change ^J to ^X ;cursor down
Line 4 change ^H to ^S ;cursor left

All should now work correctly when the program is booted up with setkeys. If other readers have had this problem I hope this helps.

J Holbrow
Westbury

<<S'funny. The KEYS6128.VDE file works fine as it is on my computer. What a strange person you must be - Ed>>

BEAM ME UP SCOTTY

Regarding John Hawkins' problem, I am stumped! I noticed he has the same make of rom board as me, so the problem must be something to do with the way the speech rom is programmed as I have four extra roms and no problems with Romread.

Alternatively, he could cover the rom board with a box (tightly secured with screws and masking tape) to prevent the extra roms escaping, mistaking his 6128 for a Spectrum +3, and eating it.

I fully agree with you regarding the tape FSW furore: I would go further. In my opinion, anyone who tries to write programs with just a cassette drive for company is wasting their time. Looking back on the era when I had a humble Speccy, I'm amazed that I ever managed to do ANYTHING in the time I had left after waiting ages for programs to load from tape. <<All indignant letters please to Alastair Scott, 30 Talbot Street, Grangemouth, FK3 8HU - Ed>>

You will note that the disc I have enclosed is one of the cheap Taiwanese

imports. If you could publish the following paragraphs as a warning to your readers, I would be grateful:

If you see non-Amsoft CF2 discs for sale at less than £20 per box of ten, I would advise you not to buy them. I did, and almost regretted it. Of the ten discs I bought for £17.95, five were mechanically faulty, causing loud rattling in the disc drive, and refused to format.

The discs are easily recognisable. They come in silver cardboard boxes of five, have no plastic library cases and are black or tan plastic with an embossed pattern of concentric circles. The labels, which are white with orange printing, are supplied loose.

My advice is to only buy Maxell or Amsoft CF2 discs. They cost about 80p more per disc - but they will work.

A Scott
Grangemouth

<<Maxell? - Ed>>

LOAD OF J&N BULL

Mea culpa! Re. J&N Bull disc drives. I should have made it clear that I was using the 3.5 inch disc drive as the second drive. It does need a power supply but it does plug directly into the spare socket on the DDI-1 lead and functions normally. It could do with a longer lead though.

E.E.Meachen
Market Harborough

OKAY

Enclosed 12 quid, keep 'em coming.

C M Roland
Huddersfield

WIND OF CHANGE

Do you know anything about file transfer between PCWs and CPCs?

The secretary of a local kite flying club has a kite design program written in, presumably, Mallard Basic which he would like, if possible, to convert to CPC Basic.

Do PCW'S have the facility to save a Basic file on ASCII111, which could

then be loaded into a word processor for the appropriate changes to be made, and could this then be saved as an ASCII111 file to be loaded as a runnable program on a CPC?

Did you see the article in today's Daily Mail (7th April) Page 13? W.A.C.C. (pronounced whacky, and standing for Women Against Cervical Cancer). I hope the two groups don't get confused!

Steve Lee
Huntingdon

<<Hi, Steve. How did you get on on WACC's National Headache Day? Whoops. Think I'll rephrase that. Second thoughts, forget it.

Transferring files from the PCW to CPC: Locoscript has an option to convert a Locoscript file to an Ascii file. This converted file can be saved directly onto a CPC Data formatted disc in the PCW's Drive A. I think you get at this function through the "options" menu. Press a few function keys until you see the Convert option, and then follow the prompts.

After that it's just a question of making sure there are no norty Mallard keywords in the program before running it under Amsdos. If his program uses graphics, he may have a long conversion job on his hands - Ed>>

THE FORTH PROTOCOL

Forthv1.Asm, when assembled, gives a working program, but unfortunately lacks the text editor mentioned in the documentation.

I have had a bash at converting the program to use the Amstrad 3 inch disc by modifying a few EQU's deep in the bowels of Forthv1.Asm, namely:

SPT2 EQU 52 ;Sectors Per Trk drive B?
;Set to 9
TRKS2 EQU 77 ;No of Trks on Drive B?
;Set to 40
SPT1 EQU 26 ;Same as SPT2
TRKS1 EQU 77 ;Same as TRKS2
BPS EQU 128 ;Bytes Per Sector?
;Set to 512

I'm not entirely sure about these as I haven't been able to persuade Forth

to work successfully with these or the original values. I can put text onto disc but can't get it back as a screen. Possibly I haven't quite grasped the bits of Forth necessary to do this. I would be extremely grateful for any help on this.

Thanks for publishing my letter on VDE and JRT Pascal in WACCI, first time I ever appeared in print. Well CP/M Plus did eventually arrive and Pascal works perfectly so the idea of using CP/M 2.2 has gone straight out of the window!

Stuart Munro
Glasgow

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LOSS OF MEMORY

I read with interest the letter in WACCI 19 from John Thain of West Bromwich, particularly his question number 4.

I recently up-graded my 464 to 6128 with 6128 rom and DK'tronics 64K memory. I found that, although everything appeared in order, when I tried to reload any file previously saved, all I retrieved was rubbish.

This happened with Tasword 6128 and Mastercalc 128. When the shop I purchased Mastercalc from telephoned Campbell Software, they suggested that the DK'tronics expansion might be at fault although the initial ram test suggested everything was okay.

The shop very kindly let me borrow a brand new expansion and when this was connected up everything then worked perfectly. The problem was solved by replacing the memory expansion which the shop did free of charge.

I don't know whether John Thain has the same problem but he might try borrowing an expansion known to be working properly and see if it makes any difference.

Rob Jenkins
Bristol

THERE'S THE RUB

I have a 6128 and am having difficulty with keys sticking on the keyboard due to friction.

I have had it thoroughly cleaned twice at Amstrad dealers and the engineer says he can't do any more. I remove keys and de-dust [sic] them myself now, which helps, but not for long.

Have you or any WACCI readers got the answer?

Ron Armstrong
Glasgow

<<Ahem. What are you doing on your keyboard to cause all this friction?

Seriously though, I've had a little trouble with sticky keys, but a quick blow usually cures it. Um. Er.

Calling AJ ... Calling AJ ... you cured Jeff's disappearing letters, how about a cure for the Reverend Armstrong's friction - Ed>>

KEYWORD COPS

I am currently working on some programs which I intend to send in for the FSW section. Please advise as to which commands I should avoid to allow correct use on the 464/664 machines.

Clive Bellaby
Nottingham

<<Are you ready for this (takes deep breath)... In no particular order, avoid CLEAR INPUT, GRAPHICS PEN, GRAPHICS PAPER, CURSOR, COPYCHR\$, DEC\$, DERR, FRAME, MASK, FILL, ON BREAK CONT, and the final parameter in DRAW, DRAWR, PLOT, PLOTR, MOVE and MOVER - Ed>>

HO HUM

The main reason I purchased the 7 Public Domain discs as advertised in WACCI was to allow me to use many different computer languages.

I was rather annoyed to find that the discs were all squeezed. This meant that I needed to buy some other, blank, discs so as to use the compilers, and then I spent several days sorting out the programs and reading the unreadable documentation.

Then I tried to execute some of the programs and the results were not pleasing.

The problems I have encountered so far are: blah blah blah, blah blah blah, blah blah, blah...

I do hope you appreciate the situation I am in. I have spent £70 to find that some of the main programs in the PD offer do not appear to work.

Mark Press
Antrim, N.I.

<<Please excuse me here, but this guy is such a prat that he just has to be told. Mark, you're a prat.

Look, PD software is free. The money you paid is for the discs and the postage and the packing and the copying and my 3 month holiday in Benidorm. If you're not happy, return the discs in good condition and we will quite happily refund your money. See? We're not cowboys after all, are we - Ed>>

PLAY BY MAIL

I enjoyed reading through my back issues and decoding this alien and strange language you speak and write in the far northern corner of Europe (is it still Europe?).

I admired the braveness to fill large parts of the magazine with silly and weird stuff. It would be a step back to forfeit that feature. I was rather disappointed to see how serious Auntie John tried to explain his flexible I/O port. Don't let the humour go.

Some WACCI's back Auntie John was going to plan a play by mail for WACCI members. I am an enthusiastic pbm player and have written one on my CPC 6128. It is called ORK and, believe it or not, its main theme is the lives and deaths of ORKs. (Or are you spelling it ORC? Never mind, the folk I mean are the small ugly creatures that hobbits are not too fond of.)

The aim for the game is to become the Orc's High King called the High King of the Black Empire.

Involved in the game are magic (there are several spells to discover and to cast), enterprise (don't let

the economy of your Orc tribe slip down), diplomacy (better to talk to you enemies - the backstabbing hurts more then), faith to Khurrad the Snake God and his priests (Khurrad loves gold, gems and success) and of course military conquest.

The game is set in the year zero after the death of High King Kuon the Horrible. You are the young Chief of an Orc tribe. It is your task to become the heir of Kuon and to reign over your fellow tribe Chiefs.

The game is already tested so I don't think there are too many bugs in it. Do you think it's possible to run the game on a WACCI pbm?

There is one main problem. I am not very good at English and the whole game is written in German. If you think we could run ORK for WACCI I will make a rough translation, but I need somebody to smooth it over.

ORK as the WACCI pbm would be run on a non-profit-making basis, but I would like to have my costs covered. I propose a turn fee of 50p and a set-up fee of £1.50. This would include a thirty-two page rules leaflet. Payment should be made in advance. For example, £10 for setup and the first 17 turns. I don't expect a game to take longer than this. I propose a turn period of three weeks, but have nothing against a shorter or longer one.

Another point: I would like to contribute to the FSW and have written several programs but I can't send a SAE as we are a little short of Royal Stamps in this area. Would you be able to make an exception from the SAE rule in this case?

Thomas Naumann
Germany

<<A pbm is fine by me, let's see if anyone else is interested. But you must organise it between yourselves.

Forget the SAE, but an International Reply Coupon would be handy - Ed>>

UNASSEMBLER

Do you have any extra information on how to use Z8OASM.COM?

The problem is, it seems either to

crash or to do alarming things to the computer when I try to run it. So far I've tried it on two files; one is an RSX, the other is the ZX loader from ACU of a while ago.

I've followed the instructions. Either Z8OASM opens appropriate .HEX and .PRN files on disc and then crashes, producing the usual AMSTRAD sign-on display, or an audible oscillation is produced and a random screen display rolls upwards quite fast. Do I have a corrupt copy or is there something I don't know?

Bernard Kat
Newcastle

<<Um... Er... You are the first to have encountered this "bug". Is anybody else having problems with this program? - Ed>>

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KEEP IT SIMPLE

I entirely disagree with the sentiments expressed by Andrew Hatfield in his letter in the March issue. (Could he be related to Steve Glover by any chance?) My only plea is that you do not assume too great a knowledge of computery on the part of your readers.

Actually, I do have one other plea. BRING BACK THE COMPOS.

Derek Adams
London N20

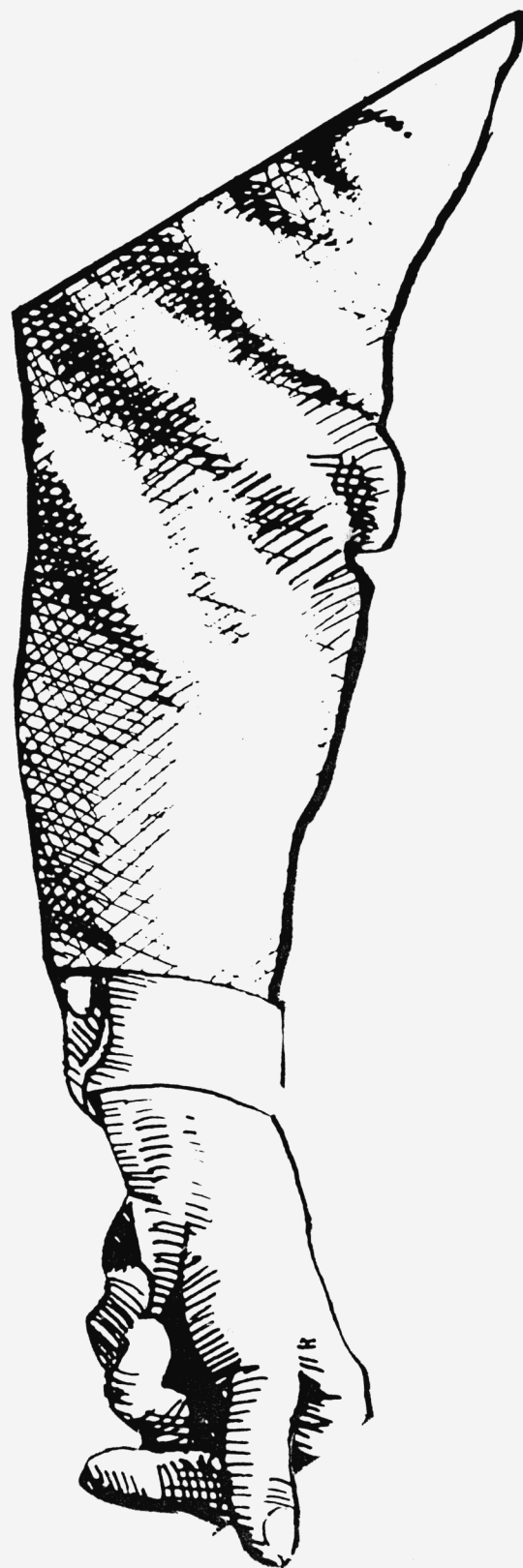
TAPE FSW

As I sympathise with Clive Blackmore and his motley crew of CPC464 owners, print my full address and if they send me one C15 tape, 17p copy charge and a 20p stamp in a Jiffy bag along with their address I will happily copy it onto a tape for them.

Also, does anybody have an eight pin dot matrix printer they wish to sell?

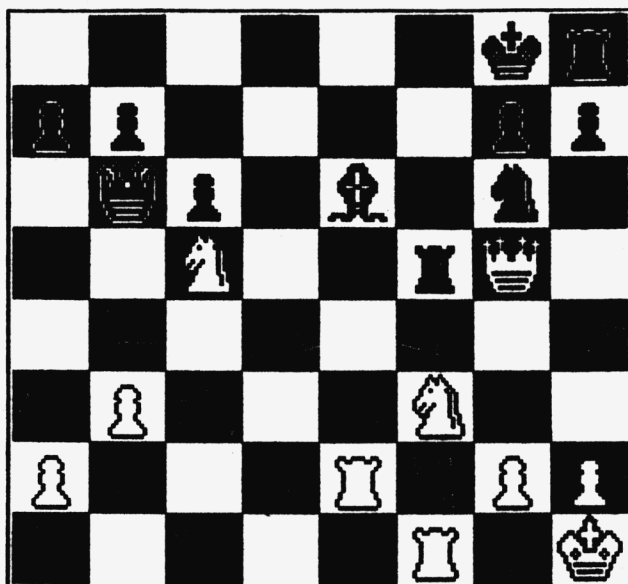
Chris Marlow
Formby

<<What a nice man - Ed>>



ord of
aged by
dled, so
afe never
. I've never

Alastair
Scott



8 WACCI MAY 1988

The hard stuff

PHIL CRAVEN GETS TO GRIPS WITH HIS CHIPS IN A NEW HARDWARE SERIES

The majority of computer users don't get involved in hardware and are often afraid to open up their machines for fear of damaging something. It's a pity really because they miss out on fascinating area of computing. It could even be argued that they miss the area of real computing. I'd better explain that before the letters start rolling in.

Computers don't 'understand' anything at all. Basic, Logo and even machine code doesn't mean anything to a computer. When you get right down to it, they are just a set of components which are wired together in a certain way so that certain basic tasks are performed. For example, if you connect a light bulb to the mains and switch on then the bulb will light up. It will always light up and, never do anything other than light up, when switched on. Power light, no power = no light. At the lowest level computers - machine code and below the micro programme within the microprocessor - all programmes are reduced to this same matter-of-fact power logic.

A	B	out
0	0	0
0	1	0
1	0	0
1	1	1

AND gate truth table
0 = low 1 = high

The AND gate works just as predictably as the light bulb. Only when all

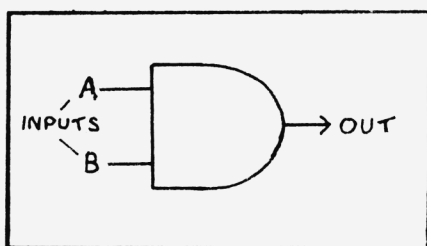


Figure 1.

inputs are high is the output high. If any input is low then the output is low - see truth table. Inside the microprocessor (MPU) programmes are reduced to this kind of electrical connection.

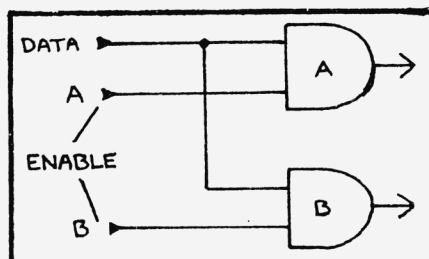


Figure 2. Input OR gate

Fig.2 demonstrates the routing of a stream of data using AND gates. The data line is connected to one input of each gate and an enable high line is connected to the other inputs - one to each gate. Only when the A Enable line is high will the data stream be passed through to the output of the A gate, otherwise the output will remain low. See the truth table again.

Not only is this logic at work inside the chips, but we can also use

it for our own purposes. A do-it-yourself romboard is quite a simple example. All that's needed is an understanding of computer logic which is what this series is about.

---0---

If understanding computers and the ability to design and make add-ons is not enough to get your grey matter studying then consider this. A few months ago I bought a job lot of computers and peripherals for £100. The price reflected the fact that it might have just been a pile of spares. By doing a few simple repairs I sold most of it for about £600 and keep the rest which included my 6128 with 2 green monitors. Just the other week I picked up a colour monitor, a 3" cased drive and an Einstein for £40 (the same working or not price) and immediately sold the drive for £50. I'm not boasting, but I do confess to purring a little. this sort of deal may not come up very often, if at all, but repairs to ones's own equipment is not so rare and they can be quite costly. Are you now convinced? I hope that I've persuaded you to take more than a passing interest in hardware and, as time goes on, perhaps we can have some good interaction with possible development of projects.

---0---

Before we get stuck in, a word of caution. CMOS chips can be damaged by static electricity when handled, so unless you know it is safe never handle chips by the pins. I've never

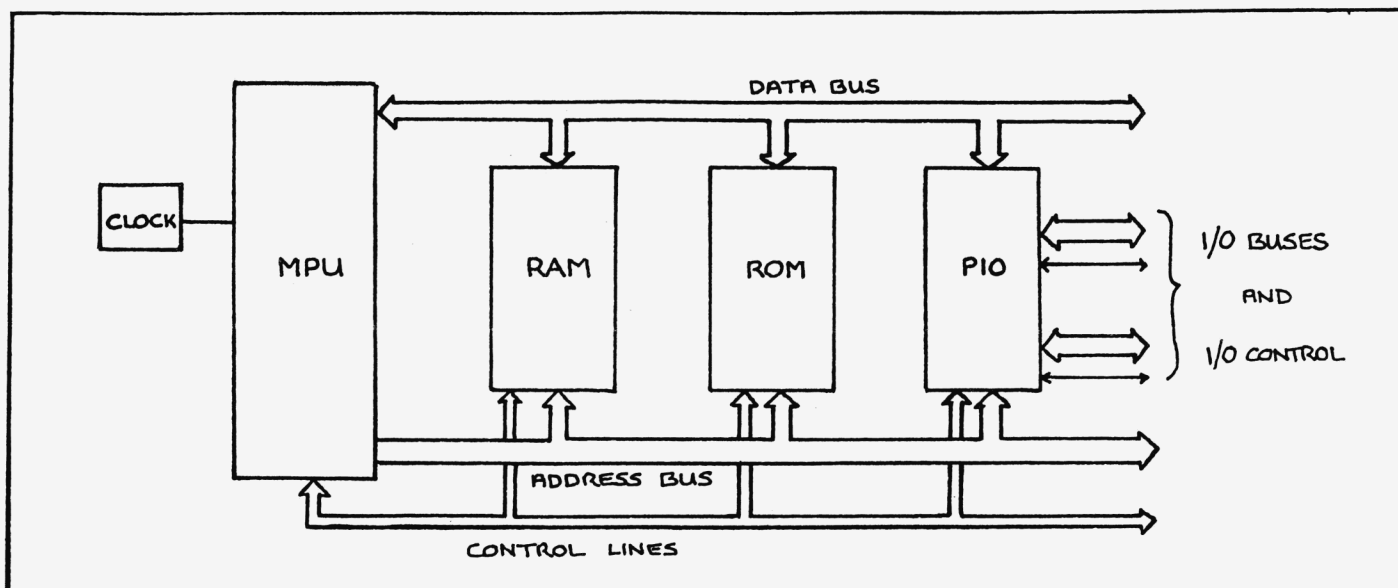


Figure 3.

Main components of a typical computer

zapped one and I'm not particularly careful but it is well worth the caution.

---0---

The main components of a computer are connected together by 3 buses (sets of wires) - the ADDRESS bus, the DATA bus and the CONTROL bus. The number of lines in each bus depends on the MPU used. The CPC has a Z80 MPU which has a 16 line address bus, an 8 line data bus and a quantity of control lines which we will get to later.

All these lines are brought out to the large edge connector at the rear of the machine where we can make use of them and internally they connect the MPU to the RAM, ROM, the PIO (parallel input/output device) and whatever else the system uses - the sound chip for example.

THE ADDRESS BUS is generated by the MPU and 16 of its pins are used to pass it out to the system. It is a omni-directional or one-way, which means that the MPU never receives an address on its pins. They are outputs only. Other chips have address pins as inputs and never outputs. The 16 lines are labelled A0 to A15. When the MPU

accesses the memory, the address of the particular byte are required is put on this bus as a set of 1s and 0s (highs and lows). The memory address &F847 would literally appear on the bus in 16 bit binary as:-

1 1 1 1 1 0 0 0 0 1 0 0 0 1 1 1
A15.....A0

These lines can be directly connected to memories and the CPC has A0 to A14 connected to the ROM, but for RAM use they are connected to other chips. The highest possible binary number using 16 digits is 1111111111111111 or 65535 decimal or &FFFF hex which amounts to 64K computer memory. It is the size of this address bus which limits the amount of 'in line' memory in a system.

Apart from a lengthy intro we have had a look at the the AND gate and the ADDRESS BUS. Next month we will look at other gates and the other buses, but to finish this month we can use these two together as a first step in hardware manipulation.

A little bit of thought will reveal that the output of E will be high only when all the inputs (A0 to A15) are high (or 1s). The address on the bus needed to produce this is &FFFF. Poking or peeking &FFFF will cause it to happen. The output can then be used

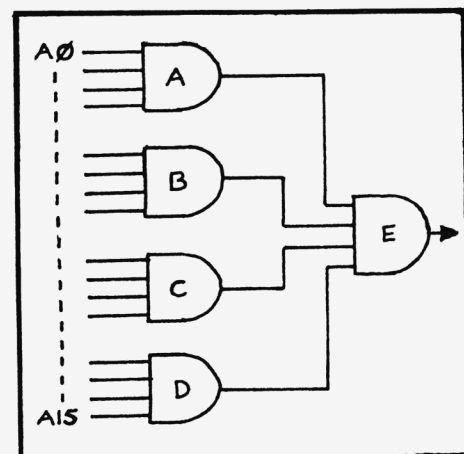
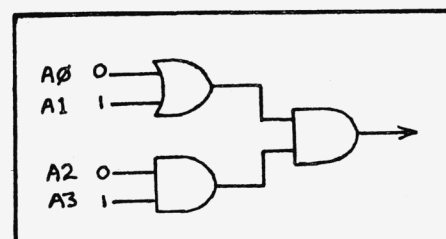


Figure 4.

Absolute decoding of &FFFF using AND gates.

for any purpose such as an Enable high line for a particular chip, or for switching something on and off outside the computer. Address and data decoding is a standard method used in computer systems and the CPC uses this technique for such things as ROM selection. If we do get onto a



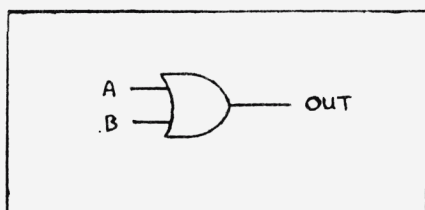


Figure 6 Two input AND gate

QUESTIONS

Using the OR gate truth table, will the output of fig.5 be high or low?

Which addressed (A0 to A3 only) will cause the output to be low?

If a 16 line address bus can address 64K memory, how much memory can a line bus address?

Answers next month.

A	B	out
0	0	out
0	1	1
1	0	1
1	1	1

OR gate truth table

romboard then this technique will be used.

That's it. Don't be silent if you don't understand something. Write, phone or MBX 219999114

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Masters of Midworld, Minimon, Chardes, Header Reader, Fruit Worm, Othello, Four in a Row, The World, Chat, Jigsaw-1, Eddy, Xox, Pontoon, Progdoc, Helping Hand, Bomber, Life, Lock'n'key, Tunnel Dive, Head, Memdata+, Keydef, Darts, Grid Warrior, Jigsaw-2, Star Chase, Ufo Escape.

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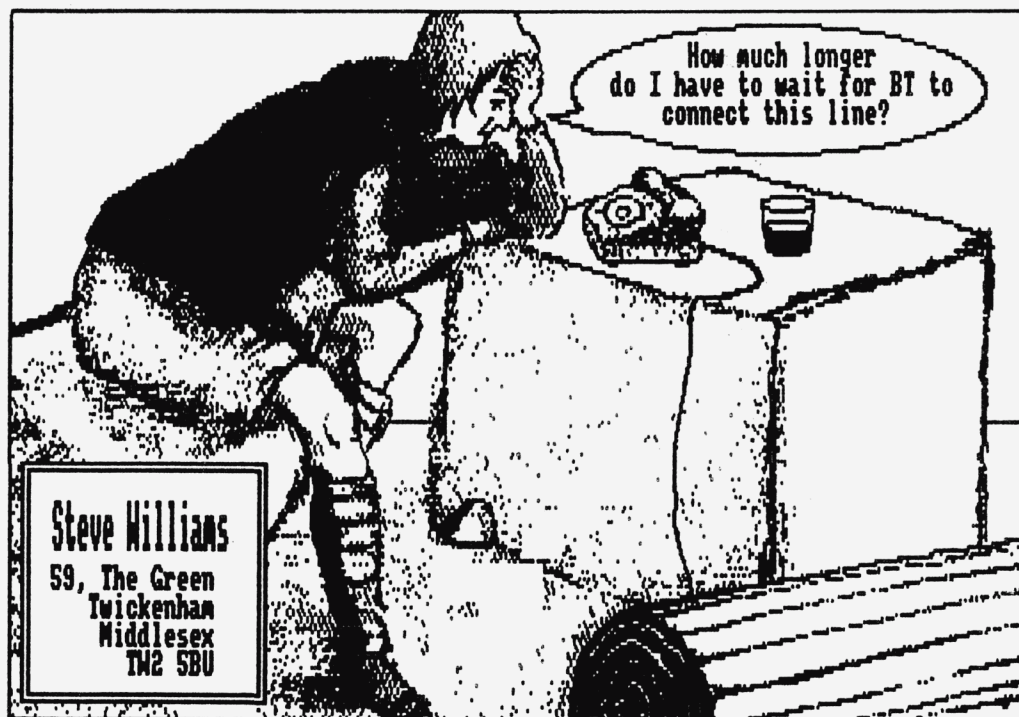
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AUNTIE JOHN'S CONCEPT DISC Price £6.50

Green's Strip Pontoon (128K), Dripzone Plus (128K), Englebert, Saucer Attack, Three Dimensional Maze, Beetlemania, Globe, Juggle.

EEF



No, I'm not going to do it this month. Nope, not even if you ask me nicely. I SAID NO. Pardon? OK then, Coooooooooooooooooooo I'm back! There that feels better already. I think it was Alfred Lord Tennyson that once said "Live your life like a football pitch, but not necessarily in that order". Marvellous. Truly great words.

Anyway enough of all this serious philosophy stuff, "what are we going to have a look at this month Steve?"

Well there's:-

- a) My new modem.
- b) A Bomb Thrower's Bulletin Board?
- c) A trip to the Gnome at Home's HQ.
- d) My nervous breakdown.

WoliWoliWoli

TEMPTING FATE

Yes I certainly did that last month. All that kidding around about my CPC being on the verge of exploding was just asking for it. Instead of my computer departing though it was my modem that went to that great Modem House in the sky. Yes my poor little Prism 1000 finally decided it had suffered enough humiliation at my hands and turned it's little toes up and died. My faithful little companion for so long, with whom I shared so

many adventures, went to meet it's maker. SO I THREW THE BUGGER IN THE BIN AND GOT ANOTHER ONE!

Yeah, I bought a Pace Linnet. Wow, now I know what it's like to own a modem that works properly. Perhaps now I can get that Public Domain Comms disc finished for the FSW library.

WoliWoliWoli

BOMB THE BASE

Here we go then with a story that's been giving us all a bit of a giggle. It all started with a report on the front page of The Observer 3/4/88. Now ordinarily I don't read the Observer but a friend of mine passed it on to me and asked me for my comments on it. Before do that have a read of it yourselves:-

THE OBSERVER 3rd April 1988.

SCANDAL OF COMPUTER KIDS.

Violent and obscene information which includes includes instructions on how to make bombs, is being dispensed to young computer users in Britain because of a glaring gap in the policing of public communications systems.

Although British Telecom's Talkabout service was forced to close after

complaints that it was being abused as a teenage dating service, there is no effective legislation to control the use of computer bulletin boards which allow conversation over electronic screens linked by phone.

Inquiries by The Observer have revealed that the advance in information technology, eagerly seized by thousands of micro-computer buffs, is providing an invaluable communications medium for unscrupulous operators from paedophiles to political fanatics. There are estimated to be at least 300 non-commercial bulletin boards operating in the UK and up to 250,000 people with access to them through modem links. British Telecom admitted last week that the computer-based systems are "very difficult to control". The Office of Telecommunications said it is "concerned but not sure how to control it"

OK. There you have it. Do you see anything wrong with this report? NO? Well let me shift into my BEN ELTON mode (eg talking very loudly, waving my arms about and occasionally pushing my spectacles up with my middle finger), and let us look at it again.

Violent and obscene information

As usual, the Guardian gets it two years too late. The paedophile business was in the news ages ago because of several child abuse cases.

Look at the personal columns of Time Out, and the Contact magazine genres and adverts in newsagent windows, and the Bulletin Board issue pales into insignificance.

How many perverts buy computers? How many people become perverts after buying a computer?

Tuesday 5th April 88 at 00:39
PAEDOPHILES From Ice-3

((always a topical one that)) which includes includes instructions on how to make bombs ((even more topical)), is being dispensed to young ((why young?)) computer users in Britain because of a glaring gap ((if it's so glaring how come only the Observer spotted it?)) in the policing of public communications systems.

Although British Telecom's Talkabout service was forced to close after complaints that it was being abused as a teenage dating service ((ah that's why they used "young" in the previous paragraph)), there is no effective legislation to control the use of computer bulletin boards which allow conversation over electronic screens linked by phone.

Inquiries by The Observer have revealed that the advance in information technology, eagerly seized by thousands of micro-computer buffs ((EAGERLY? who are they trying to kid? They should try writing a monthly Comms column for a fanzine and see how many thousands flock to their doors)), is providing an invaluable communi-

maybe you could set up your own perverts board, but it's a damned expensive way of indulging your fetish))

There are estimated to be at least 300 non-commercial bulletin boards ((are they implying "commercial" = legitimate?)) somehow operating in the UK and up to 250,000 people with access to them through modem links. British Telecom admitted last week that the computer-based systems are "very difficult to control". The Office of Telecommunications said it is "concerned but not sure how to control it" ((they are not sure because until some sweaty little hack asked them, they didn't think it WAS a problem.

Once again then we have an example of how the National

-cations medium for unscrupulous operators from paedophiles to political fanatics. ((First off prove it! Where are their facts and figures? And secondly, Okay, if you have a couple of thou' to spare then

TELL 'EM ABOUT THE MEET

Okay, I'll get off my soapbox now and tell you about my little visit to the Gnome at Home Headquarters (should that be Headtoadstool?) For the uninitiated, the Gnome at Home is the second largest Bulletin Board in the UK (order some back-issues to find out the rest). Last month Zephyr, Jeff and I headed off towards Wood Green. Thanks to Jeff's powers of navigation, we arrived safely, four days later. Not a bad time for a ten mile hike. Anyway, the whole point of the exercise was to take my mighty Humpster CPC kit up to this humble centre of communications and zap some half decent CP/M PD sox into it's telesoftware section. So that's what we did, at 4800 baud rate no less! Deep Joy, if only you could do that over BT's rotten lines. Never mind,

So it was the Observer, was it? Never having read the Observer, I have better shut up about their computer reporting. My prejudice is against the Guardian only. Does the Observer HAVE a regular computer column? It is my impression that Fleet Street have spent loads of money on equipment, but zero on getting good computer journalists. The sort of rehashed junk they come up with even I could do better.

Tuesday 5th April 88 at 00:49
Dops From Ice-3

MERLIN

THE FRIENDLY WIZARD

I think the whole thing as published in the Observer is disgraceful. A load of Cock and Bull stories put about to sell as many papers as possible. Pure sensationalism from a group of misinformed people with no real idea of what goes on. The result of which is that we'll have the Government/BT investigating and making a nuisance of themselves when this action is almost certainly pointless and needless.

Tuesday 5th April 88 at 03:25
Comment From Merlin

the thing is that you can now get some CP/M s/w on-line. All you have to do is phone The Gnome on (01) 888 8894 (Viewdata 8,N,1) and go to WACCI on-line by keying *Can.0#. Select the telesoftware section from my main menu and have a go at downloading the bits I have put up for grabs.

The trouble is that unless you have already got a comms set-up you will have to "splish de dosh" on a modem, RS232 i/f, Viewdata sox, increased telephone bill etc etc, it works out to be £200+ . It's probably a lot cheaper just to order PD stuff from the club.

MY NERVOUS BREAKDOWN

I've run out of space this month so I can't tell you. I promise that I will do a four page spread on it. I can't promise when that'll be though.

newsworthy story, have taken a re-hashed "old story", mixed it with a recent one e.g. BeaTy's TALKABOUT, spiced it up with some innuendos of bomb making, dished it up with little or no evidence to support it and served it up to a gullible Joe Average.

THE SYNTHOID.



A PICTURE OF THE FUTURE, WRITTEN BY GLENN CAREY AND ILLUSTRATED BY LAWRENCE GIBSON

Herman, digit prefix SFX112, was born at the age of 24 - the standard age for such a model, although his intelligence far surpassed the average capacity under normal education.

The SFXs were a new addition to the range of Synthoids that came from the factory at the end of the Industrial Complex in Revolution Drive. And Herman was to be the first to be let loose on human society. Mr and Mrs Simmons had agreed to take the SFX112 into their house - albeit somewhat apprehensively.

Herman was bundled into the van and whisked off, a piece of left over black plastic covering his sensors. It was a bright, sunny day, typical of mid autumn at Rockland.

Mr Simmons was sitting out in the sun, reading a few notes he had made and adjusting some sort of technical equipment. His daughter, Magenta, watched as a van passed the "Rockland" sign before entering their driveway.

"Mr Simmons?" enquired the Driver.

"Er, yeah - who are you?" replied Jack Simmons.

"From the factory. Dropping off the new model. Sign the forms please."

Jack scribbled something illegible

on the bureaucratic form and handed it back to the Driver. He watched the van disappear into the distance before looking the SFX112 up and down.

Herman looked his four and twenty synthetic years in build, though the face showed nothing - there's not a lot to see in moulded white plastic. At least he looked smart in his dinner jacket.

"Hi," said Herman, trying to appear enthusiastic. A black piece of plastic fell off his sensors, and he could now see his new owner.

"Wha...? Oh. Hello there." Jack viewed Herman suspiciously. He hadn't expected the synthoid to be so ... so ... well, friendly really.

Interestingly enough Herman was viewing Jack even more suspiciously.



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Kilobyte). The CPM programs have been tested by WACCI on an Amstrad CPC6128 computer. Although the programs have been tested, they are supplied on an as-is basis. WACCI accepts no liability for faults or non-operation.

CPM-001: BINCALC 10K - On-screen calculator.
CPM-002: COMPARE 10K - Compares two files for differences.
CPM-003: LOOK 12K - Views and Edits ascii and binary files.
CPM-004: NDDT 11K - Improved version of DDT.
CPM-005: HSWP 37K - Disc and file management utility.
CPM-006: QK20 10K - Assigns character strings to keys.
CPM-007: RASMB 17K - Z80 reverse assembler.
CPM-008: UNERA 2K - Unerases erased files.
CPM-009: IIZI 22K - 8080 to Z80 to 8080 code translator.
CPM-010: ZMAC+ZLINK ... 40K - Z80 assembler and linker.
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CPM-014: Z8OASM 15K - Z80 assembler.
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CPM-016: ZDEBUG 31K - Non-symbolic Z80 debugging tool.
CPM-017: SMALL-C 157K - Floating-point version of the language.
CPM-018: SCI 59K - Small-C-Interpreter.
CPM-019: EBASIC 84K - Compiles a subset of Basic to m/code.
CPM-020: LISP 81K - The essence of a Lisp interpreter.
CPM-021: EPRO 37K - A version of the Prolog language.
CPM-022: CHEK 5K - Checks disc quality.
CPM-023: D 4K - Directory utility.
CPM-024: DISKDOC 11K - Disc doctor (not sure how it works).
CPM-025: DISPLAY 5K - Displays text files f/wards or b/wards.
CPM-026: ED.DOC 22K - Instruction file for ED.COM.
CPM-027: FORM3 3K - Allows CP/M+ owners to read PCW discs.
CPM-028: GREP 13K - Emulates the UNIX grep command.
CPM-029: LOOKAT 3K - Dumps files in ascii format.
CPM-030: RPIP 8K - Improved version of PIP.
CPM-031: SD 4K - Directory utility.
CPM-032: SETCOLOUR 12K - CP/M 2.2 easy colour-change command.
CPM-033: SORT 4K - Sorts the contents of text files.
CPM-034: VLIST 2K - Variable speed LIST.
CPM-035: WCOUNT 7K - Counts the words in text files.
CPM-036: LBRDISK 16K - A library utility.
CPM-037: DU 44K - Powerful disc sector editor.

CPM-038: NULU15 82K - Improved version of Library Utility (LU).
CPM-039: WRDCOUNT 26K - Another word-counter.
CPM-040: ADVENT 101K - Big text-only adventure.
CPM-041: TEAM-GEN 22K - Scoresheet generator.
CPM-042: USERFUNC 12K - A small library of Basic DEF FNs.
CPM-043: B10 14K - Biorhythm chart generator.
CPM-044: CAL 6K - Calendar generator.
CPM-045: CHESS 26K - CP/M 2.2 version of the board game.
CPM-046: GOLF 26K - A text-only swipe round the golf course.
CPM-047: MAZE 3K - Maze generator.
CPM-048: NEWPUZ 25K - Wordsearch generator.
CPM-049: OTHELLO 22K - Version of the board game.
CPM-050: UKM7 26K - Comms utility adapted from MODEM7.
CPM-051: INVENT 35K - Inventory database.
CPM-052: VDE 76K - Fast, powerful word processor.
CPM-053: SPELL 33K - Spelling checker with dictionary.
CPM-054: SCRIVENER ... 211K - Spreadsheet cum database cum Invoicer...
CPM-055: JRT PASCAL .. 208K - Floating-point, standard version.
CPM-056: JRT MANUAL .. 200K - Manual on disc for the above language.
CPM-057: COBOL 97K - NPS Micro-Cobol v2.1.
CPM-058: FORTH 54K - 16K version, can be enlarged easily.
CPM-059: STOIC 62K - A version of the language.
CPM-060: EXPERT86 52K - A very good expert system.
CPM-061: MEX 141K - Modem EXecutive comms utility.

CPM-997: MFT 3K - Easy one-drive Multi File Transfer.
CPM-998: CRUNCH/UNCR .. 13K - User-friendly file squeezer.
CPM-999: SIDEWAYS 34K - Prints spreadsheets sideways.

LOOSE HOMEGROWN SOFTWARE - Copying charge = 1p per K

To obtain loose HG software, fill in the FSW Library order form and send it with a CF2 disc or discs (356K maximum per disc) in a jiffy bag, plus the correct charge (min 50p), to WACCI HQ. The copying charge is 1p per K. (One pence per

Kilobyte). The AMS programs have been tested by WACCI on an Amstrad CPC6128 computer. Although the programs have been tested, they are supplied on an as-is basis. WACCI accepts no liability for faults or non-operation.

AMS-001: MASTERS OF MIDWORLD . 29K - Graphical adventure.	AMS-049: DRIPZONE 53K - Addictive machine-code game.
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AMS-006: OTHELLO 6K - Reversi simulation.	AMS-054: BASIC+ 13K - 45 new commands to Basic.
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AMS-010: JIGSAW-1 34K - Educational jigsaw.	AMS-058: SYNTH 3K - 3-channel keyboard sound.
AMS-011: EDDY 15K - Good text editor for all CPCs.	AMS-059: HOTRODS 6K - Race game.
AMS-012: XOX 3K - Two player noughts and crosses.	AMS-060: BREAKOUT 3K - Yawn.
AMS-013: PONTOON 37K - You against the computer.	AMS-061: DEPRO 2K - Load and list protected Basic.
AMS-014: PROGDOC 33K - Programmer's utility.	AMS-062: DIS 5K - Good Z80 disassembler.
AMS-015: HELPING HAND 5K - Decision aid.	AMS-063: PAIRS 4K - A version of Pelmanism.
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AMS-019: TUNNEL DIVE 4K - Freefall game.	AMS-067: LOGOPOLIS 15K - Version of Logo.
AMS-020: HEAD 3K - Tape or disc header reader RSX.	AMS-068: MATHS MAGIC 11K - For numerical freaks.
AMS-021: MEMDATA+ 3K - M/code into data statements.	AMS-069: BREAKER 3K - Dumps screens to disc.
AMS-022: KEYDEF 2K - Single keypress command typing.	AMS-070: DISC MENAGERIE 29K - Good disc utility.
AMS-023: CHAMPIONSHIP DARTS .. 12K - Bonk... Bonk... Bonk...	AMS-071: NOSEY 4K - Edit memory and banks, view roms.
AMS-024: GRID WARRIOR 4K - Another caterpillar/fly game.	AMS-072: SPRITES 6K - Mode 0 sprite designer.
AMS-025: JIGSAW-2 51K - Educational jigsaw.	AMS-073: SQUEEZER 4K - Squeezes ascii files.
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AMS-027: UFO ESCAPE 18K - Maze game.	AMS-075: ZENER CARDS 23K - ESP test.
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AMS-029: BEETLEMANIA 31K - Machine-code game.	AMS-077: ASTROSUITE 35K - Find out about space.
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AMS-036: STORY 12K - Zany prog that invents stories.	AMS-084: CALENDAR 7K - Calendar generator.
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AMS-043: EXPRINT 5K - Prints ascii chars > 127.	AMS-091: FONT 8K - 40-column text in Mode 0.
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AMS-045: NEATLIST 4K - Emulates the BBC's LISTO command.	AMS-093: GOMOKU 5K - Hybrid of Othello & Connect 4.
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AMS-047: SYMPHONY 4K - Kalaedoscope pattern generator.	AMS-095: OTHELLO 9K - Another version of Reversi.
AMS-048: AMSIG 173K - Mandlebrot Set Generator.	AMS-096: UDGRAB 6K - Grab user-defined graphics.

AMS-097: STYLE	2K - Analyses documents.	AMS-109: SOUNDFX	2K - Explode, Ping, Bang, Zap RSXs.
AMS-098: DISCMAP	3K - Maps sectors on any format disc.	AMS-110: PHARAOH	9K - Maze and beasties game.
AMS-099: TAPE RSXS	2K - Quick save and load screens.	AMS-111: SHIFTY	10K - Educational jigsaw type game.
AMS-100: VIEWFAX	12K - A Teletext type system.	AMS-112: DIAMOND MINER	8K - Underground hunt for jewels.
AMS-101: GO	10K - Ancient Chinese strategy game.	AMS-113: CRAZY MAZE	5K - Maze game.
AMS-102: DI-SYMM	2K - A colourful pattern generator.	AMS-114: PATHFINDER	8K - Confuzion type game.
AMS-103: AGE	4K - GEN type windows generator.	AMS-115: SPELLBOUND	17K - Educational spelling tug-of-war.
AMS-104: SNAKES	5K - A game (I think).	AMS-116: GRAPHIC MAGIC	9K - Mode 0 screen designer.
AMS-105: OZ	4K - Addictive peg-and-holes game.	AMS-117: JIGSAW-3	92K - Jigsaw game (includes 5 jigsaws).
AMS-106: FRACTAL	11K - CPC conversion of Macfractal.	AMS-118: WRITE IT RIGHT	12K - Educational word game.
AMS-107: TEE-OFF	12K - Golf game.	AMS-119: SHEEPDOG	5K - One man and his computerised dog.
AMS-108: PRIMES	2K - Calcuates prime numbers.		

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WACCI, 75 GREATFIELDS DRIVE, HILLINGDON, UXBRIDGE UB8 3QN

"So, you're the SFX112?" enquired Jack, reading from the Synthoid's circular body.

"Call me Herman. I hate serial numbers, don't you?"

Magenta, who had been quietly standing by all this time, smiled secretly to herself.

"Is this our new Robot?" asked Gran quite politely as she emerged from the house wearing a plastic mac and snow boots.

"Do you mind?" exasperated Herman in his plastic tones. "I am the most sophisticated Synthoid to come out of the factory," he said, bobbing around on his water tight suspension pads.

"Well I hope you can do the shopping," said Gran, and picked up her garishly coloured knitting before zooming off in her Ford XL14 towards the Bingo hall.

"Take no notice," apologised Jack, "she's getting old now, and perhaps a little..."

"Nutty?" interrupted Herman, so matter of factly that Jack knew they would get on, and Magenta broke her forced silence with a girlish giggle.

Jack Simmons was a scientist - an erratically moody scientist - working on OZLeR, the OZone Layer project. He knew that life on this planet was never going to be the same once the Ozone layer had gone, which was due to happen during the next five years.

Up until then the governments of the world shrugged the responsibility off, quoting industrial figures and saying that the pollution controls enforced earlier that century were quite sufficient. Jack hated politics - he hated the thought of having to wear another skin even more - but, most of all, Jack hated polite Synthoids. He smiled, Herman was OK by him.

Herman gave an erratic series of bleeps before waddling inside to meet his new owners...

oooOooo

It was a Saturday afternoon in the Simmons' household. Jack was finishing some office work at home, trying to find the right formula so that a new Ozone layer could be made. Herman

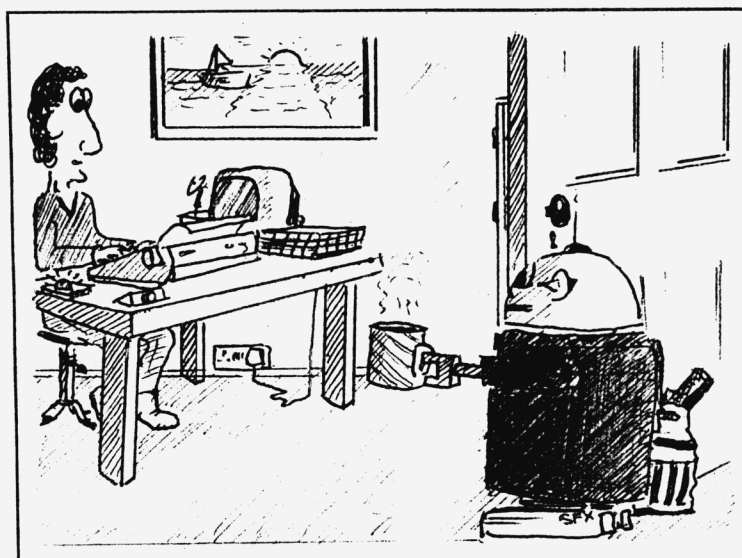
waddled into the study quite silently with a cup of coffee and a bag full of shopping.

"Hello", he said warmly under his synthetic breath.

"Oh, thanks Herman. You uh ..." Jack began.

"Two sugars?" said Herman.

Jack hardly had time to smile before a bright red light lit up on his desk. Herman checked with his sensors that nobody was near before pressing a button on the Phone Vision, or the PV as it was called.



A three-dimensional image suddenly materialised in the centre of the room, and a man behind a desk, who had his arms crossed, began to talk.

"Jack?" he asked.

"Yes, Mike."

"Jack," he repeated, in an earthy, desolate tone, "I've just received information to the effect that ... Jack, the deadline's now December."

There was silence.

"It's either that or we die in the New Year," There was desperation in Mike's voice.

"Ah, the Moon's such a lovely place," Herman couldn't help mumbling, his suspension making squelching sounds as he relaxed. "The new water there makes it so heavenly."

"You sound like the brochure," smiled Magenta, who had just walked into the room, picked up a brightly coloured piece of plastic from the

floor, and placed it very precisely into a slot on the wall.

A voice in stereo boomed around the room as Jack, Magenta and a goggle-eyed Herman looked at three-dimensional figures pottering about the Moon's surface.

"Welcome to the moon," the voice said calmly. "You will find your luxury home and tranquil surroundings here most satisfying. As scientists you will all ..."

There was a strange noise as Magenta fast-forwarded the message.

"... to pleasant and natural surroundings. Just think - no pollution, no cities, no noise, no ..."

The list went on and on.

"Sounds like a dream," Magenta said, taken in by the advertiser's claptrap.

"... And all just a few hours away from Earth. It could be your chance to start again," the message concluded.

The soft music rose to a crescendo then faded to silence as the colours of the hologram softly merged to a triumphant white.

Magenta and Herman began planning things...

oooOooo

The day the shuttle was due to take off was a hectic and busy one. Magenta helped Herman pack the Simmons' cases, and they both wheeled them down the driveway.

"All these memories," said Gran to

Jack, raising a tissue to her wrinkled eye. "I love this planet, and I'm going to stay! Besides," she said, raising her chin and being very British, "Things at this end need looking after too. I won't give in. How do you think we managed in the war against that Lybian donkey? I ..."

But Jack had gone.

The enemy, now as always, was man himself. Herman had often tut-tutted while pondering Human history. He had hardly predicted the Moon as the Simmons' next home. Mankind's instinct had always been to fight. But there was something strange about humans that Herman liked in a sort of synthetic way - it was their silly illogicality. They all seemed to be

and corny sense of humour?"

He patted the old robotron on his metallic head.

"Hello," said the robotron. "My name is Robert the robot. I will get you anything you desire," and promptly fell in to a mass of red metal.

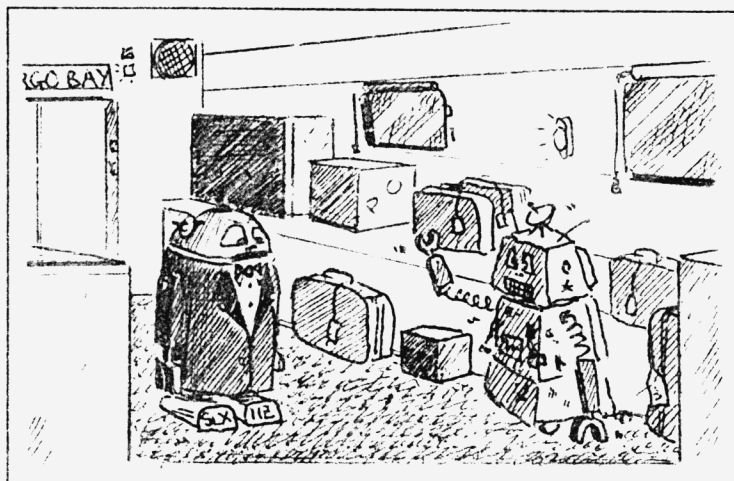
"Hello," it said again. "My name is Robert..."

Like a old fashioned record stuck in a groove, the thing repeated itself time and time again.

Back up above on the flight deck Magenta was getting restless.

"When are we going to take off?" she asked, not for the first time.

Before Jack could open his tired mouth a calm voice came over the speakers.



neurotic worriers. Their downright unpredictability was amusing to him.

Magenta always knew when Herman was thinking, a series of almost silent bleeps could just be heard. She stopped him before he got too depressed. Magenta thought Herman was becoming human.

Later, much later, the Simmons' looked out from the grounded shuttle. Herman waddled around restlessly in the cargo bay below.

"Ah, the humiliation," he thought, and sat by an old robotron.

"Hello," said Herman, trying to make polite conversation.

"Hello," the robotron replied in a false, canned voice. "My name is Robert..."

"... The robot?" Herman hazarded a guess. "Ah dear," he mused. "Why were scientists allowed this poetic licence

"We apologise for the flight delay," it said. "Until we have carried out necessary checks and repairs, here is some music."

Herman sighed and decided to go for a stroll - the company he was keeping was terrible. Besides, he wanted to take just one more look at the planet on which he was born.

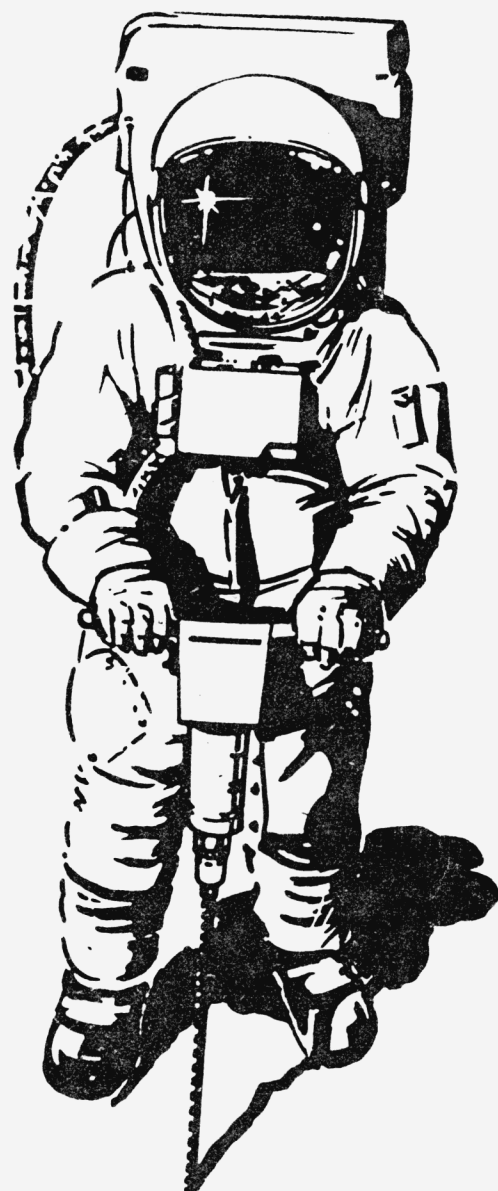
"We apologise for that short delay," the calm voiced announcer said. "The flight will now commence." And a minute later the shuttle was moving up past the clouds.

Magenta wept.

oooOooo

"This is the last one," the delivery man said to his colleague.

"Right then, let's get them back to the factory."

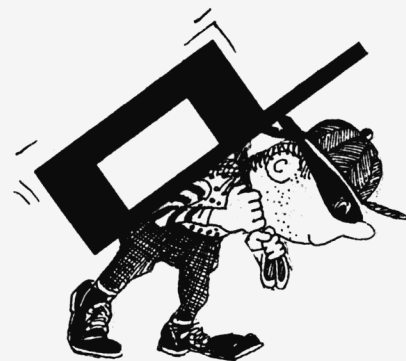


"You don't know what's wrong with them do you?" enquired the first delivery man flinching away from a deactivated Herman as they closed the van doors.

"Well," said the second delivery man very seriously, "they do say they were getting almost human."

They both paused for a while, staring at each others faces, then the second smiled broadly, pointed at the first, and roared with laughter. His colleague pretended to punch him, turning around and smiling.

Behind them, in the back of the van, Herman cried real tears while the delivery men laughed synthetically.



ALASTAIR "FSW" SCOTT REVIEWS A NEW DISC UTILITY

Many of you will have one of the little black boxes (such as *Multiface II*) that allow you to load a program, stop it running at the press of a button, and fiddle around with it. If you have a 6128 or 464 with 64K extra memory and disc drive and know some machine code but don't have the £40 plus to buy such a device, you will be delighted to hear that Neil Macdougall has come up with a software equivalent, Bankraid 3.

BR3 works by examining the machine code loader that loads most commercial

You can select several versions of BR3 from the main menu. Some are designed for specific loaders (eg *Speedlock*) and will automatically alter the loader: others you have to do yourself.

On loading, you are shown the screen picture which was present when control passed to BR3, and a list of options. These options are:

- S - Save the screen picture to disc.
- P - Save the entire program to disc.
- L - Load a program into memory.
- R - Jump to an address
- H - The Hacker menu.
- A - The Alter menu.

The Alter menu is the most powerful feature of BR3. This allows you to change the way the program works on reloading. You can change MODE and colours, the screen size, the registers, interrupt status, and various other parameters. So, if you don't like (for example) the colours a program uses, you can (theoretically) change them to whatever you wish.

IMPRESSIONS

The program is nicely presented, and is easy to use. There are quite a few clever touches: if you make mistakes while using the Alter menu, pressing N returns the colours and screen size to their default values. All addresses are entered in hex: other numbers (such as INK parameters) are entered

using the arrow keys and COPY, which prevents you from entering silly values. The disc handling is good: the disc formatting routine is extremely quick. A surprise (not mentioned in the instructions): typing !CPM (instead of RUN"DISC", which gets you to the main menu) loads BR3 and lets you play around with it without loading anything from tape.

ooo0ooo

The instructions, on six sides of A4 paper, are adequate, and give you enough technical information to get started.

An obvious problem is that BR3 will not work with all programs. There are quite a few loading systems that write out the Amstrad operating system and do other horrible things: they leave BR3 helpless. Also, you are restricted to examining tape based programs and saving them to disc: no other permutation is possible. There is no provision for two disc drives.

ooo0ooo

CONCLUSIONS

Not quite as good as Multiface II, but it costs seven times less! If you have a 6128 or expanded 464 and know a little machine code, BR3 is a must.

You can't order BR3 from any shop or mail-order company! It is a homegrown program, and will cost you £6 PLUS a blank CF2 disc. Write to:

Neil Macdougall, 130 Robin Way,
Chipping Sodbury, Bristol. BS17 6JS.

Autoraide Options

1. Autopatch.
2. Speedraid.
3. Keyraid.
4. Manual.
5. Install.
6. Cassys.
7. Tronicfer.
8. QUIT.

Autoraide (c)
1988 by N.W.M

software from tape and altering it so that when loading is completed, control jumps to BR3 instead of the program, and the 48K RAM and 16K display file is stored safely in the extra memory.

GOOD VIBRATIONS!

by Thomas J. Hardman

There are a wide range of ways to get sound from your Amstrad. To start I shall go through how to program simple pieces of music using Basic. All you need to know about music is how to read it in it's manuscript form, what the various abbreviations mean and how long notes last for. If you don't know these things, don't worry because there are many good books which take you through the simple steps.

In this article we shall only look at the very simple facts about programming your computer to play to you. The only command you really need is SOUND.

To use SOUND you have to type some numbers in after it. Each number is separated by a comma. Type in:

```
SOUND 1,239,100,15
```

and press Return. You should hear Middle C played for two seconds.

If you did not, you must either have had the volume control turned down or have typed the line in incorrectly. If the latter, type the command in again.

Let's look at what each number after the SOUND command does. The first number is the Sound Channel - in this case 1, but there are three Sound Channels: 1,2 and 3.

The next number is the Tone of the sound, in this case Middle C. Every

musical note has a number associated with it. See Fig.2 for a table of all the musical notes and their numbers, two octaves above and below Middle C. If you want a more detailed table you will find one in your Amstrad CPC User Instructions.

The 3rd number along is the Duration of the note, or how long the note will hold for. A number of 50 would last for 1 second, a number of 100 would last for 2 seconds and a number of 25 would last for half a second, etc.

The 4th number is the Volume of the sound - a volume of 1 would be very quiet and a volume of 15 would be very loud.

There are three more possible numbers after the 4th one. They are Volume Envelope, Tone Envelope and Noise Period, but we will take a more

detailed look at these another time.

The best way to program the tune in Fig.1 into your computer is to use Basic. It's also a good idea to write the program on paper first so you don't get too mixed up. Here are the first three lines of the tune in Fig.1 notice the line numbers:

```
10 SOUND 1,127,25,15
20 SOUND 2,253,50,15
30 SOUND 3,319,50,15
```

As there is only one note playing at a time in the Treble Clef, all notes in that clef are given the Sound Channel 1.

In the Bass Clef there are two notes playing at the same time as a note

Fig.1



playing in the Treble Clef, so the notes in those clefs are given the Sound Channels 2 and 3. The top, or highest, note would be given Sound Channel 2 and the lower note in that clef would be given Channel 3.

Each crochet note lasts for one second, each minim lasts twice as long, and each quaver will last for half a second.

There is one volume change in the music - the one from F to MP - so when there is a volume of F it is given a number of 15 and when there is a volume of MP the volume number is 10.

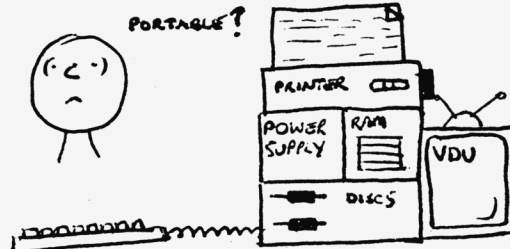
Now try programming the piece of music into your micro. If you type the line 200 as: 200 GOTO 10 the program will keep repeating itself until you press ESC once - if you press ESC twice the program will stop.

Remember to write the program down on paper first. I shall print the full program next issue then you can make sure you got it right.

Good luck with your programming.

Notes below middle C		Notes above Middle C	
B - 253	B - 506	B - 127	B - 63
A# - 268	A# - 536	A# - 134	A# - 67
A - 284	A - 568	A - 142	A - 71
G# - 301	G# - 602	G# - 151	G# - 75
G - 319	G - 638	G - 159	G - 80
F# - 338	F# - 676	F# - 169	F# - 84
F - 358	F - 716	F - 179	F - 89
E - 379	E - 758	E - 190	E - 95
D# - 402	D# - 804	D# - 201	D# - 100
D - 426	D - 851	D - 213	D - 106
C# - 451	C# - 902	C# - 225	C# - 113
C - 478	C - 956	C - 239	C - 119

Fig.2



```

10 ' Data format disc in Drive A
20 ' Mcode as published in WACCI September 1987
30 ' Copyright John Keneally, WACCI, and Alex Aird 1988
40 CLS:PRINT"Fast format program to data format discs"
50 PRINT"Type :DFORM to format a disc"
60 MEMORY &7FFF:addr=&8000:chk=0
70 FOR linenum=10000 TO 10260 STEP 10
80 FOR b=1 TO 8
90 READ byte$
100 byte=VAL("&"+byte$)
110 POKE addr,byte
120 addr=addr+1:chk=chk+byte
130 NEXT b
140 READ checksum
150 IF chk(<>)checksum THEN PRINT"Error line no.";linenum:END
160 chk=0:NEXT linenum
170 CALL &8000:NEW
10000 DATA 01,0d,80,21,09,80,c3,d1,716
10010 DATA bc,00,00,00,00,12,80,c3,529
10020 DATA 18,80,44,46,4f,52,cd,00,656
10030 DATA 21,a6,80,cd,c8,80,cd,06,1071
10040 DATA bb,fe,fc,c8,fe,20,20,f6,1457

```

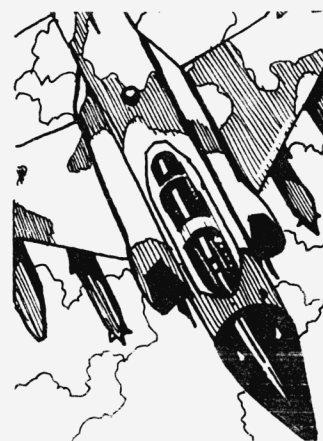
```

10050 DATA 21,a5,80,cd,d4,bc,ed,43,1235
10060 DATA a3,80,22,a1,80,dd,2a,40,941
10070 DATA be,dd,6e,00,dd,66,01,11,862
10080 DATA 0a,00,19,5e,23,56,21,0f,298
10090 DATA 00,19,21,7d,80,11,00,00,328
10100 DATA cd,6b,80,30,0e,16,01,cd,730
10110 DATA 6b,80,30,07,14,7a,fe,28,726
10120 DATA 20,f5,c9,32,7b,80,7a,32,951
10130 DATA 7c,80,c9,e5,01,04,00,3e,749
10140 DATA 09,72,09,3d,20,fb,e1,df,924
10150 DATA a1,80,c9,00,00,00,00,c1,683
10160 DATA 02,00,00,c6,02,00,00,c2,396
10170 DATA 02,00,00,c7,02,00,00,c3,398
10180 DATA 02,00,00,c8,02,00,00,c4,400
10190 DATA 02,00,00,c9,02,00,00,c5,402
10200 DATA 02,00,00,00,00,86,44,61,301
10210 DATA 74,61,20,46,6f,72,6d,61,746
10220 DATA 74,20,44,72,69,76,65,20,686
10230 DATA 41,20,2d,20,50,72,65,73,584
10240 DATA 73,20,53,70,61,63,65,a0,799
10250 DATA 7e,cb,7f,c0,cd,5a,bb,23,1165
10260 DATA 18,f6,00,00,00,00,00,00,270

```


D.I.Y. WARGAMES

KEN WALKER puts forward the idea of a "battle creator"



Towards the end of last year Rainbird released the Universal Military Simulator for the 16 bit machines which made it possible to create your own battle scenarios. According to the advertising blurb, you can re-enact some of the world's greatest military conflicts on a sophisticated 3D landscape. Great stuff! and an absolute godsend to the computer wargamer who is almost exclusively fed on a diet of World War II conflicts. About 50% of the entire Amstrad collection come from that period, with P.S.S. having released four out of a total of eight, being a typical example. It does therefore appear that there has been an undue commitment to one period of history, at the expense of others.

ooo0ooo

All this prompts me to believe that the industry is crying out for a 'battlefield creator' which could do for wargames what the GAC, Quill and PAW have undoubtedly done for adventures. My own favourite scenarios belong to English History - Civil War, Spanish Armada, 1066 and all that! I'm sure other wargamers have their personal favourites, so far not considered by companies like P.S.S.

ooo0ooo

In the meantime it is possible to dabble in a few battles of your own creation from what games are available if only in a limited way. I have previously referred to Redcoats (Lothlorian) as a game with 5 defined battles from the American War of Independence but also included is the facility to change the map and units to your own specifications and save to tape. Battles are restricted to 8 units with a maximum limit of 10,000 soldiers and values can be given to each unit's morale level. Four types of units are available for selection - Cavalry, Artillery, Riflemen and Muskets which allows for a wide range of battles from an earlier period of history, such as the English Civil War or as late as the Crimean Campaign. However the biggest drawback to defining your own battle in this game is in changing the map which only allows clear space, trees and walls - no rivers or hills are allowed.

That is a serious omission on any detailed battlefield, but what can you expect from an early wargame which was released in 1984?

ooo0ooo

More options are possible for the battlefield of your choice in The War Game. The single player has control of unit deployment which consists of six units of a thousand men each, three cavalry regiments of a thousand, three artillery batteries of two hundred and fifty and an engineering detachment of five hundred troops. There is no control of the enemy deployment (that is only available for the two player game) but you can choose the type of battlefield - one with river, forest, of plain with scattered farmhouses. The two player game provides an extra detachment of three foot regiments of one thousand troops for each side. Unlike Redcoats, there is no choice as to where these limited features will go and so an attempt to incorporate a degree of historical accuracy into a different conflict is not possible. I did review 'The War Game' in the September issue of WACCI when I described it as one of the best introductions to wargames. The computer opponent is certainly more sophisticated than Redcoats, giving a quick response to your moves - it often tries to outflank your manoeuvres whilst maintaining a central detachment to attack your H.Q. This forces the player to retain troops for defending H.Q. if your hope of victory is to be kept alive. Troop manoeuvres are also handled more realistically by the computer, as weaker units tend to become more defensive during the course of a battle. In Redcoats its not uncommon to see a kamikazi regiment of twenty men attack the artillery of five hundred - hardly the attitude you would expect of a worthy opponent.

ooo0ooo

So it would appear there are severe limitations to constructing your own battles on the Amstrad and few software houses seem inclined to improve the situation. Most games continue to provide set deployment at the start of each battle with no further options to rearrange the

troops if you wish to experiment. Johnny Reb II is a notable exception but that only applies to one side when playing the computer.

ooo0ooo

I realise that it may not be possible to provide a battle creator on a 3D landscape for the humble Amstrad but Lothlorian have managed to produce a worthy effort for the Spectrum (and BBC), called Confrontation.

The game consists of a master program (cost £7.95) which also includes one scenario as an example of twentieth century conventional warfare. Further sets of scenarios can be brought for £5.95 to cover most periods of history with a choice of weapons as well as troops and terrain.

The only drawback to the programme is that its only available for two players. Nevertheless it does prove that a wargame creator is feasible and would allow players the opportunity to widen the scope of historical conflicts. Adventures were once in a rut after the success of The Hobbit until the so called amateurs began to get other ideas with The Quill and GAC.

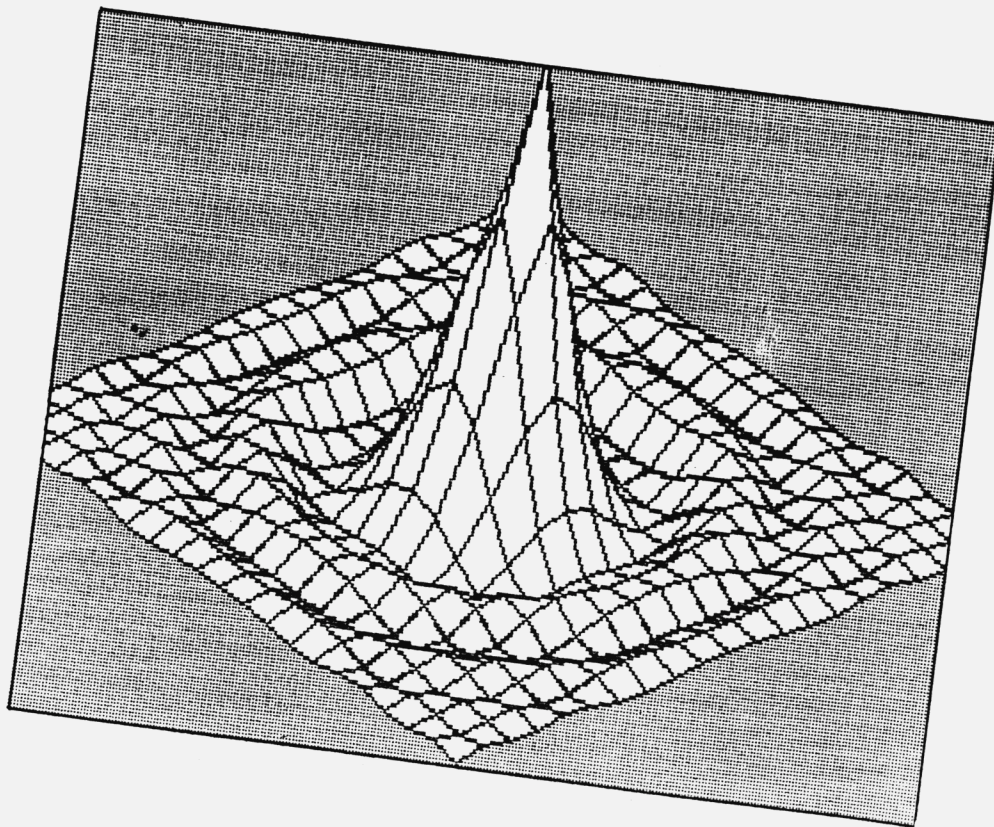
Don't you think it's about time us wargamers were given the same opportunity?

SIMSPOT
55 GREENBANK ROAD
DARLINGTON
CO. DURHAM
DL3 6EN

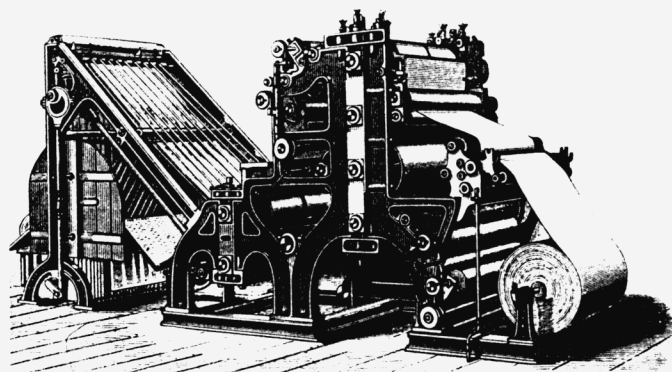
```

10 ' *****
20 ' *
30 ' * Hidden line removal graph *
40 ' *
50 ' * 6128 only cos of the FILL *
60 ' *
70 ' * J.Val88 *
80 ' *****
90 '
100 DEFINT a-j,l-z
110 MODE 1:BORDER 13:INK 0,13:DEG
120 INK 1,26:INK 2,9:INK 3,9
130 DIM g(21,21):kh=1.6
139 '
140 FOR x=0 TO 21:FOR y=0 TO 21
145 n=20-x:m=20-y
150 k=(x-11)^2+(y-11)^2:g(x,y)=(COS(k*8)
      /(0.01*(k+2))*3+40)*kh-54
160 NEXT:NEXT
169 '
170 FOR x=20 TO 1 STEP -1
180 FOR y=20 TO 1 STEP -1
190 xx=-x*16+y*16:yy=x*8+y*8
200 ORIGIN xx+320,yy-16
210 x(1)=-16:x(2)=0:x(3)=16:x(4)=0
220 y(1)=g(x+1,y):y(3)=g(x,y+1)
230 y(2)=8+g(x+1,y+1):y(4)=g(x,y)-8
240 GOSUB 270
250 NEXT:NEXT
259 '
260 GOTO 260
270 f=0:ax=0:ay=0:g=20:h=20
280 FOR a=1 TO 5:n=a:IF n=5 THEN n=1
290 IF f=0 THEN f=1:MOVE x(n),y(n),2 ELS
      E DRAW x(n),y(n):ax=ax+x(n):ay=ay+y(
      n)
300 NEXT:ay=ay/4:ax=ax/4
310 n=0:f1=0:MOVE ax,ay:ay1=ROUND(y(2)+y
      (4))/2:MOVE 0,ay1:FILL 0:FILL 1:FILL
      0:FILL 1
320 f=0:FOR a=1 TO 5:n=a:IF n=5 THEN n=1
330 IF f=0 THEN f=1:MOVE x(n),y(n),3 ELS
      E DRAW x(n),y(n)
340 NEXT:RETURN
387 '
388 ' Original equation
389 '
390 ' kh=1.6:k=(x-11)^2+(y-11)^2:g(x,y)=
      (COS(k*8)/(0.01*(k+2))*3+40)*kh-54
496 '
497 ' Replacements for line 150
498 ' (kh applies to line 130)
499 '
500 ' kh=36:g(x,y)=INT(SIN(x*13)*COS(y*1
      0.5)*2)*kh+40

```



Qualitas Plus



ALLASTAIR SCOTT TAKES A LOOK AT A PROGRAM TO ENHANCE YOUR PRINTER'S OUTPUT

You've probably seen adverts for the new 24-pin dot matrix printers. These beasts are expensive - two or three times the cost of a conventional 9-pin dot matrix printer - but have seven times as many pins available to print each letter. Hence the output is always of much higher quality than the older printers ... or is it?

Qualitas Plus is hailed as "a really professional print enhancement system which you can use from within your word processor". What it does is intercept all data sent to the printer, and print characters in its own letter quality fonts.

On the 464, you can load three fonts into memory: together with the 2K of machine code that Qualitas uses, they take up a large chunk of memory (17K). With the 6128 or a RAMpack, you can load them into the extra memory, and no available memory is taken up at all, except when using Tasword 6128. You choose the fonts from a menu of five.

This is the DMP2000 Draft.

The Amstrad DMP2000 is very good value for money, that fact cannot be denied, but it is a teensy bit slow. Steve Williams April 1988

How do you use the fonts? Well, you define an unused printer control character to produce CHR\$(25), another to produce CHR\$(28), and a third to produce CHR\$(29).

Sending CHR\$(25) to the printer tells Qualitas to take over from the ROM printing routines and produce single-height characters: sending CHR\$(28) produces double-height characters: and CHR\$(29) reverts to the ROM printing routines.

This is Clarion.

The Amstrad DMP2000 is very good value for money, that fact cannot be denied, but it is a teensy bit slow. Steve Williams April 1988

With CHR\$(25) sent, the first font is selected by sending the NLQ control codes to the printer, the second by sending the italic control codes, and the third by sending the double-strike control codes.

Qualitas takes most other control codes that relate to print styles, and applies them to its own character set. So you can get condensed, emphasised, double-width, subscript, superscript and underlined printing using the Qualitas fonts! Most of these can be combined, so you can get (for example) double-width and double-height (i.e. quadruple sized) print! Any number of styles can be used in one line of text. Italic and proportional printing

needs special fonts, which can be loaded in at the start.

One minor problem: you must turn Qualitas off before sending any codes that do not affect the print style (e.g. margin and tab settings) and switch it on immediately afterwards, otherwise these codes will be ignored.

There are five fonts supplied: Classic Pica and Elite, Mercury, Piazza (an italic font) and Clarion (a proportional font). You can buy extra fonts: there are two packs, one containing 10 different styles and one containing the Clarion fonts for foreign languages and the Tasword second character set (Greek and Russian letters, fractions etc.), both in proportional and proportional-italic styles. Each pack costs £6.95.

The real surprise comes when you tell Qualitas to take over using CHR\$(25)CHR\$(x). x is a variable which depends on your word processor's margin settings and the width of the page: the Protext default is a 5-character left margin and a 70-character page width, so x = 75. With Tasword, always put x = 0 and Qualitas will do the needful.

This is Piazza.

The Amstrad DMP2000 is very good value for money, that fact cannot be denied, but it is a teensy bit slow. Steve Williams April 1988

Now, when you print out your masterpiece, each line will be micro-justified. This means that each word will have EXACTLY the same space between it - unlike conventional justification, which puts differing amounts of space between each word and can often make the line look lopsided (especially with Tasword). Most typeset books use this idea: as you can see from the example, the result is spectacular!

You can override the micro-justification by sending a value of x (say x = 127) which is longer than the line length (x = 75).

This is DMP200
NLQ. The Amstrad
DMP2000 is very
good value for
money, that fact
cannot be denied,
but it is a teensy
bit slow. Steve
Williams April 1988

The final formatting features are tabs and hard spaces. Sending a tab character to the printer switches off micro justification for the line, and ensures that columns of text are lined up. Hard spaces are not destroyed by formatting or justification: the normal Protex hard space is CONTROL-N, but (for some reason) Qualitas uses the \ character.

Setting Qualitas Plus up for your word processor is simple: a customisation program is provided, which is menu-driven and easy to follow. You can use it with all the Taswords, Protex, Mini Office 2 (only on the 6128), Masterfile III, and Basic. The last one is useful: you can produce immaculate listings using the standard LIST#8 command.

The printer requirements, are stringent, unfortunately. Firstly, your printer must support quadruple density graphics (ESC Z): Qualitas will work with double density (ESC L), but the results are not nearly as good. If your printer only supports

This is Mercury.
The Amstrad DMP2000 is
very good value for
money, that fact cannot
be denied, but it is a
teensy bit slow. Steve
Williams April 1988

single density (ESC K), you can't use Qualitas.

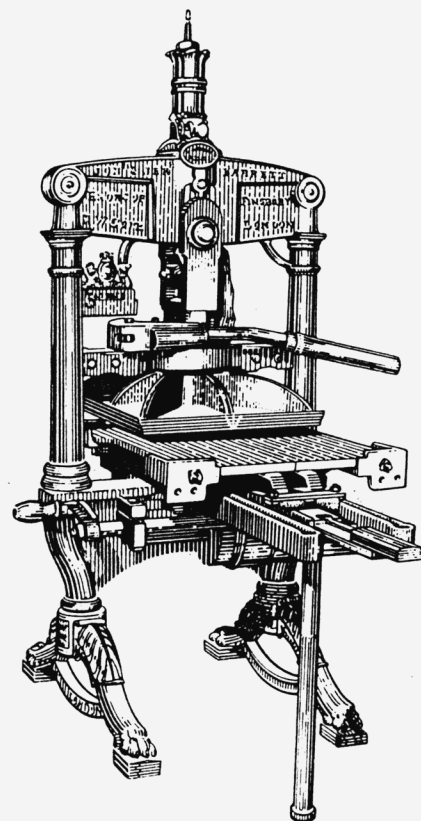
The second hurdle: your printer must be able to produce 1/144 or 1/216 inch line feeds (ESC 3 x). If it can't, Qualitas is again off limits. Moral - consult your printer manual before buying!

The CPCs only have a 7-bit printer port. This is was mistake by the designers, and has led to all sorts of problems. What it means is that only ASCII codes in the range 0 to 127 (&x01111111) can be sent to the printer. Those in the range 128 to 255 are ignored, which is unfortunate as many printers need them to access all their functions!

KDS Electronics sell an 8-bit printer port, which fits onto the original port and allows all ASCII codes in the range 0 to 255 to be sent. The port must be initialised with a short piece of machine code - if you forget, it'll behave just like the 7-bit port.

Qualitas has both 7 and 8-bit versions of each font. If you look closely at the 7-bit fonts, you will see that certain letters (e.g. g and y) have tails which do not descend below the line of print, and thus look a bit odd. With the 8-bit font, the tails do descend properly.

This is Elite.
The Amstrad DMP2000 is
very good value for
money, that fact cannot
be denied, but it is a
teensy bit slow. Steve
Williams April 1988



Seven Stars Publishing are crafty - they have acquired a stock of the KDS ports, and will sell you one for £19.55. If you really want first class print quality, it is recommended.

The last feature is a font designer. It allows you to alter the existing fonts, or create a new one from scratch. It is partly in machine code, and is very fast and easy to use.

THE VERDICT

I can't stand the DMP 2000's ugly NLQ print, and many other printers have the same problem. The definitive cure is Qualitas Plus. Provided your printer is compatible, it is one of the best buys you will ever make. It makes even the most humble printer's output look terrific.

The program is friendly, the manual is excellent (with loads of information) and the company is helpful - if you have any problems, send an SAE and they will do their best to help. They're pretty quick to process orders too - from Stirlingshire to Buckinghamshire and back only took 36 hours!

Origin of the CPCs

By Jeff.

STOP MONKEYING AROUND AT THE BACK, JEFF IS HERE TO SHOW YOU THE POINT AT WHICH ALL THE GRAPHICS COMMANDS BEGIN.

The text cursor is very familiar to us because we are used to seeing it represented on the screen as a square or rectangular blob.

To position this cursor we use the LOCATE keyword. The range of coordinates used with LOCATE differ with which mode you are in, but, whatever the mode, you will supply a column and a row as the position to display a character on the text screen. The top left position is 1,1 and the bottom right position, in mode 2, is 80,25.

We have another cursor, the graphics cursor, which is not so familiar because it is invisible to us. This cursor operates only within the graphics window, which on EMS (that's Early Morning Startup) exactly overlays the whole of the visible text screen.

This graphics window has a very different coordinate system to the text screen, and it is well worth taking the trouble to familiarise yourself with it.

Cursor at home

The "home" position of the graphics cursor is at point 0,0 within the graphics window. At EMS this puts it at the bottom left-hand corner of the screen.

We can adjust this position to suit by means of the ORIGIN keyword. The syntax is:

ORIGIN xpos,ypos

pixels across pixels up

The parameters xpos and ypos refer to pixel coordinates, as opposed to text coordinates. Unlike text coordinates, whatever mode you are in the graphics coordinate system remains the same. At EMS the bottom left of the window is 0,0 and the top right is 639,399.

To reposition the graphics origin to about the centre of the screen you would issue the command ORIGIN 320,200. That's 320 pixels across from the left, 200 pixels up from the bottom. This point has now become position 0,0.

The size of the graphics window hasn't changed, it still covers the whole of the screen. So what are the new coordinates of the bottom left-hand corner?

They've become negative, -320,-200. That's 320 pixels left from home, 200 pixels down from home.

A window in space

Just like a text window can be user defined, so can a graphics window. The difference is you can only have one graphics window.

Again, the keyword ORIGIN is used to alter the size and position of the graphics window, but we need to add four more parameters. That's six in all - enough to frighten off beginners, so take the next bit nice and easy. The syntax is:

ORIGIN xpos,ypos,left,right,top,bottom

The parameters xpos and ypos are the same as before. The parameters left, right, top and bottom describe the boundary sides of the new window. The easiest way to remember what these six parameters should be is to split them

into two groups.

The first group is xpos and ypos. These are the coordinates of where you want the origin to be within your new window. In most cases you will want it to be at 0,0 - the bottom left-hand corner. If you want the origin to be elsewhere in your window, then its coordinates will depend on the size of the graphics window you are defining.

The second group of parameters describe the graphics window in exactly the same way you would describe a text window. The only difference is that for a graphics window the numbers can be much larger.

The parameters for the default graphics window are 0,0,0,639,399,0. The first two - 0,0 - tell the system that we want the origin to be at the bottom left-hand corner, the next four - 0,639,399,0 - tell the system that we want the left-hand edge to be at 0, the right-hand edge to be at 639, the top edge at 399, and the bottom edge at 0.

In the shadows

Let's do a little programming. One of the easiest things we can do with ORIGIN is create a window with a little shadow. We simply define a window, clear it to black using CLG (the graphics window version of CLS), then define the window again, slightly offset from the first, and clear it to another colour. The technique is:

```
10 MODE 1:BORDER 13
20 INK 0,13:INK 1,0:INK 2,26
30 ORIGIN 0,0,100,539,349,50:CLG 1
40 ORIGIN 0,0,92,535,358,58:CLG 2
50 GOTO 50
```


Notice that CLG takes a parameter, the pen number of the colour we want the window to be. It's a bit like a PAPER x:CLS rolled into one.

It's important to remember that we haven't got two graphics windows here. The second ORIGIN command overwrites the first just as a WINDOW#1 would overwrite a previous WINDOW#1 if we were defining text windows. We only have one graphics window, which is a shame, but we have to live with it.

Another interesting thing you can do with ORIGIN is plant little DRAWings around the screen without having to change the coordinates in the DRAW commands. As an example we'll plant a few simple squares:

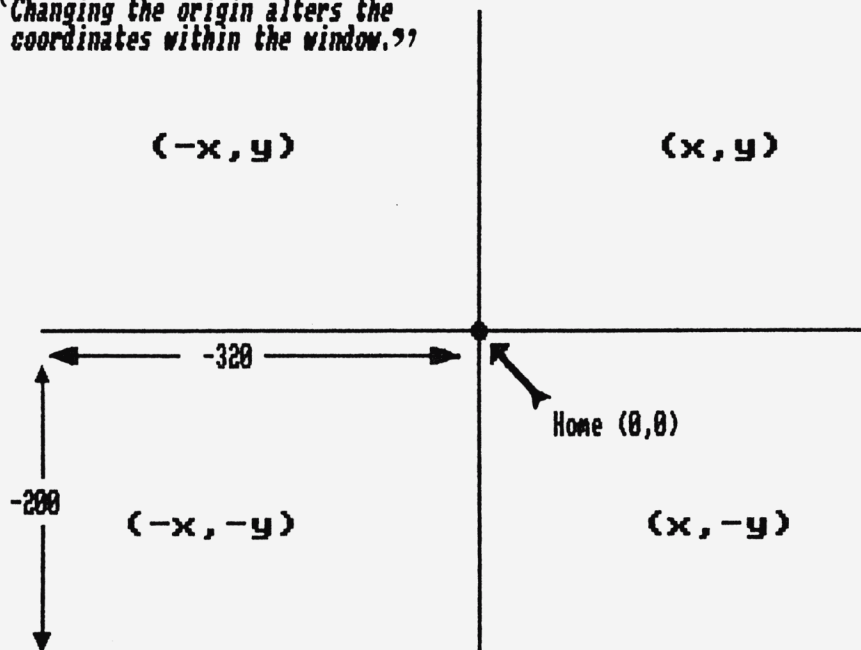
```
100 MODE 1
110 FOR loop=1 to 20
120 x=ROUND(RND*639)
130 y=ROUND(RND*399)
140 ORIGIN x,y
150 GOSUB 200
160 NEXT:END
199'
200 DRAW 100,0
210 DRAW 100,100
220 DRAW 0,100
230 DRAW 0,0
240 RETURN
```

Notice how quickly the 20 squares are drawn? The other way to do this would be to MOVE x,y in line 140, in which case the DRAW parameters would have to be recalculated for each square. This way we don't have to calculate anything so it all happens that much quicker.

As a variation on the above listing, try the following which is a very quick way to draw pixel-accurate filled boxes in Basic:

```
100 MODE 0
110 FOR loop=1 to 20
120 x=ROUND(RND*639)
130 y=ROUND(RND*399)
140 col=ROUND(RND*13)
150 ORIGIN 0,0,x,x-100,y,y-100
160 CLG col:NEXT:END
```

"Changing the origin alters the coordinates within the window."



Did you notice how some of the squares drawn by Listings II and III went off the edge of the screen? This isn't a bug, it is a feature that restricts the action of the graphics commands to the area of the graphics window.

It is easy to think we can draw off the screen by defining an enormous graphics window, but we can't. Although the CPC will let you define a graphics window that is far larger than the actual screen area, in practice it only remembers the bit it (and you) can see.

So, if you defined a graphics window with ORIGIN 0,0,0,32767,32767,0 and then tried to PLOT 32767,32767, your computer would not complain. It would simply laugh up its sleeve and pretend to do what you ask. In actual fact it has done nothing. The moral of this story is, there's not much point in defining a graphics window that stretches past the visible boundaries of the monitor. Or is there?

All change

The 464 has no GRAPHICS PAPER command. Here lies the only reason I can find for defining a graphics window off the screen.

The action of GLG x is to clear the graphics window to graphics paper x.

It is the only in Basic to change the graphics paper on a 464. So you would issue an ORIGIN 0,0,999,1000,1000,999: CLG 3 to change the current graphics paper to the colour in pen 3. Then you would reset your graphics window to whatever it was before, probably ORIGIN 0,0,0,639,399,0, the default setting.

Similarly, the 464 has no GRAPHICS PEN command, so the only way to change the colour of the graphics pen from Basic on a 464 is to PLOT a point or DRAW a line in that colour first. So as to not spoil the screen display, we would use a command such as PLOT 999,999,3 to change the graphics pen to the colour in pen 3 then MOVE back to wherever we were before we decided to change the pen colour.

This a highly unsuitable state of affairs and I would recommend 464 owners who wish to mess about with graphics to acquire a toolbox that has the commands GRAPHICS PEN and GRAPHICS PAPER in it.

ooo0ooo

Well, that's ORIGIN for you. I'd have like to have talked a bit more about PLOT and DRAW, and particularly their relatives PLOTX and DRAWX, but space and time dictates all. Perhaps another month. Tarra.

RAM in Chips



A few weeks ago I finished building a circuit into the lid of my Panda Electronics ROM box. It is basically 16K of CMOS RAM with battery back-up. Apart from 7 connections made directly to the expansion connector of the ROM box, it plugs into a spare ROM socket via a 28-way DIL plug and ribbon cable. In normal use it appears as a background ROM, assuming of course that it has been loaded and initialised correctly. It can be written to either directly from disc or an assembler such as MAXAM.

I have been using this now for three weeks, without any problems at all, developing a utility ROM for myself. It is certainly much easier than erasing and re-blowing an EPROM when adding to, or changing the contents.

The circuit diagram is my own design and no part of it incorporates any part of the Panda Electronics circuit.

--><--

BRIEF DESCRIPTION

The circuit is built on a small board mounted in the lid of the Panda electronics ROM box. It is connected to the ROM box via a 28-way ribbon cable and DIL header which is plugged into a spare ROM socket. There are 7 additional connections made directly to the expansion connector of the ROM box or other suitable points.

IC1 and IC2 are two 6264 LP 150 CMOS RAMs. Although they are two separate IC's, they appear to the computer as one 16K block, each IC being selected

by IC3/IC4 and A13 depending on which mode is being used.

IC3 and IC4 are both 74LS138, (3 to 8 line decoders). IC3 switches between the two RAMs when in read mode (i.e. being used as a ROM), the enable and read signals being provided on pins 22 and 20 of the DIL header plugged into the ROM box. Pin 22 is the ROM page is the select signal for that particular ROM socket and pin 20 is the ROMEN signal provided by the computer. (Other ROM boxes may differ.) IC4 is used to position the RAM in the address range &4000 to &7FFF, A13 switching between the two, when in the write mode.

IC6 and IC7 loosely decode port address &F9F7 which is used for enabling the write mode by toggling the two D-type flip-flops (IC5-74LS74). The LED lights to show that this mode is active.

S1 is a write protect switch which disables the WE input of the RAMs and resets IC5 when in the off position. TR1 provides the CE1 signal to the two RAMs (high) when the computer is switched on and puts them into the powered down mode when the computer is off. TR2 provides the WE signal via buffer IC8a when S1 is switched on.

The BSY-21 diode is a SCHOTTKY power diode which has a low forward voltage drop and is used to isolate the +VRAM supply when the computer is off. Although the +VRAM supply is only 4.7V, it is within the operating range of the 6264 RAMs (4.5V - 5.5V). This diode is obtainable from ELECTROVALUE.

If a problem does occur due to +VRAM being too low, the only alternative is to derive it from a separate 5.6V supply with an ordinary silicon diode for isolation. I have used the BSY-21 for this purpose before without any problems.

NOTES ON USE

In use the RAM appears as ROM in the address range &C000 to &FFFF, assuming of course that it has been correctly loaded and initialised. To write to the RAM, S1 must first be put in the ON position, then two successive OUT commands issued on port &F9F7 to place the RAM in the address range &4000 to &7FFF and enable them. Any program or commands which write to this address range now will also write into the CMOS RAM.

In Basic:-

```
10 hm=HIMEM:MEMORY &3FFF
20 OUT &F9F7,0:OUT &F9F7,0
   :REM enable RAM at address
   :&4000 to &7FFF
30 LOAD "PROG.BIN",&4000
   :REM binary file contains
   :ROM program
40 OUT &F9F7,0:OUT &F9F7,0
   :REM disable Ram and
   :restore to &C000
50 MEMORY hm:END
   :REM remember to switch
   :write protect off.
```

When in write mode, the CPC's normal RAM in the address range &4000 to &7FFF is not disabled, so whatever is written will also go into the CPC's RAM. This is not necessarily a disadvantage, since a block comparison can be made after the CMOS RAM has been restored to its ROM address range. The CMOS RAM cannot be read from when in low memory, only written to, so no conflict occurs between it and the CPC's RAM.

IMPORTANT POINTS.

There should be no connection between pins 20, 26, 27 and 28 of the CMOS RAM and the same pins of the DIL header, since these signals are provided separately by the circuit. For safety, S1 should be put in the OFF position when loading is completed to prevent any spurious writes from occurring during switching on/off of the computer. A good tip is to solder the battery last - it can discharge very rapidly if accidentally shorted out.

FOOTNOTE.

The choice of transistors is not critical. Any small signal general purpose or switching types with a gain >50 and an ft of 200-300 Mhz should do, I just happened to have these. I tried originally to put the RAM in a spare RAM page for writing to,

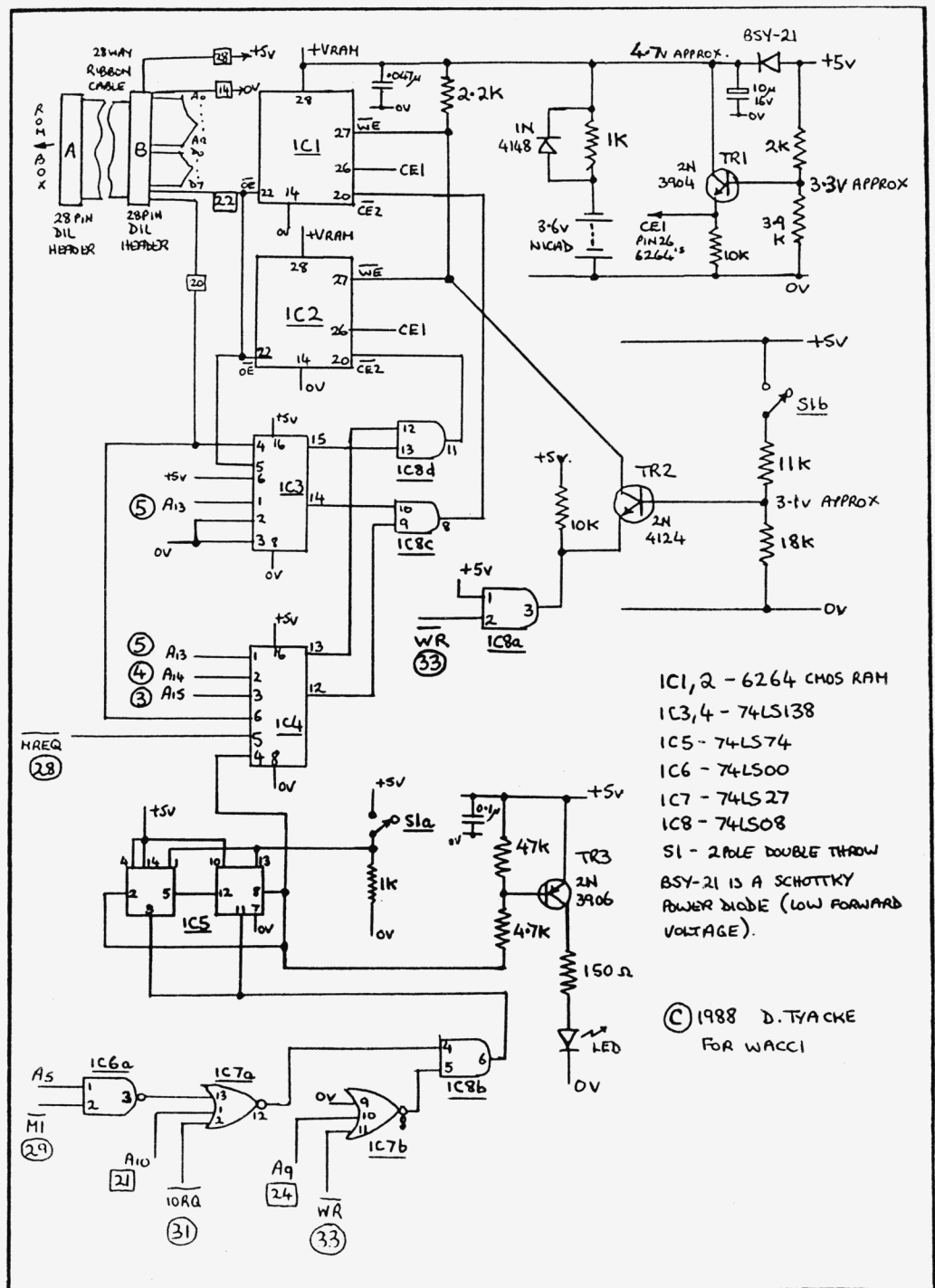
disabling the internal RAM via RAMDIS on the expansion port, but the screen RAM got a touch of the St.Vitus Dance. I guess I must have been doing it wrong.

I daresay there is a better way of doing this, but then, like Frank Sinatra I did it my way <<Groan -Ed.>>

--><--

Ensure that pins 28,27,26 and 20 of the 6264's are NOT connected to DIL header 'B'.

Circled numbers are CPC expansion port numbers. Squared numbers are DIL header 'B'



CAMEL COMMENT

WHO SAID THE CPC WAS
DEAD? WE DON'T THINK
SO, OTHERWISE WE
WOULDN'T BE PUTTING
SO MUCH EFFORT INTO
NEW SOFTWARE

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WORD PROCESSING

PROTEXT

Protext is without doubt the most sophisticated word processor you'll find on any home micro. Its ease of use and advanced range of features are normally only found in business systems costing many times more. Widely praised throughout the Amstrad press, Protext is rightly acclaimed as the No.1 word processor for Amstrad CPC owners.

- * Super fast * Works with any printer * Flexible find and replace *
 - * Layout stored with text; normal & decimal tabs, left & right margins *
 - * Word count * Versatile print options; incl. headers/footers, page nos. *
- "Extremely powerful editing features ... superb search and replace" AA*
"I can't emphasise how good it is" PCW

WACCI PRICES: Rom £31 Disc £21 Cass £15

PROSPELL

Typing and spelling errors are simple to make and frustrating to miss. But by using Prospell, you can produce documents that are error-free. Prospell is an automatic spelling checker that points out any odd words or dubious spellings.

- * checks Protext text in memory *
 - * checks file on disc from Protext/Tasword/Amword/NewWord/WordStar *
 - * over 33000 words * room for thousands more * up to 2000 words/min *
 - * find words and anagrams - great for crosswords *
- "Fast, efficient, easy to use" YC*

WACCI PRICES: Rom £27.25 Disc £19.50

PROMERGE

More than just simple mail merging for multiple standard letters!

- * integrates perfectly with Protext * read data from keyboard or file *
- * conditional printing to create personalised letters *
- * use the built in maths functions to produce invoices etc *
- * microspacing - to even out the spaces between words * typewriter mode *
- * link files together at print time * Reformat while printing *

WACCI PRICES: Disc £19.50

PROMERGE PLUS

All the features of Promerge, plus:

- * Edit two separate files in memory at once; copy blocks between them *
 - * Background printing - allows you to print and edit at the same time *
 - * Box mode - cut and paste any rectangle to create newspaper columns *
- "You'll have a set-up that can thrash any 8-bit word processor for speed...and even some 16-bit programs for power" PCW*

WACCI PRICES: Rom £27.25

UTOPIA

50 new commands available without having to load a program, including:

- * Text screen dump * Graphics screen dump to Epson compatible printer *
- * disc utilities - disc format and copy, copy files, sector editor *
- * useful function keys automatically set up; easily define your own *
- * BASIC programming utilities * ROM management commands *

"UTOPIA is by far the best utilities rom...it's worth buying a rom board just to plug it in" AMSCLUB

"Utopia seems to be in a class of its own" AMTIX

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ROMBO

All rom software requires a rom expansion system. Its benefits include zero loading time and maximum memory available for text, data, programs etc. Remember; Utopia and the extra commands of Promerge Plus are not available on disc. Fits CPC464/664,6128.

WACCI PRICES: 8 socket rom box £27

CPC 464/664,6128

MAXAM

The classic Assembler/Monitor/Editor for developing Z80 machine code.

- * Plain English error messages * Disassembler * Memory editor *
- * Menu driven full screen editor * load/merge/save/print/find/replace *
- * Mix BASIC and machine code * or assemble directly from editor *
- * Use the editor to edit BASIC programs saved in ASCII *

"This piece of software should be held up as an example of what can be done by programmers who care ... buy one now!" E & C

WACCI PRICES: Rom £31 Disc £21 Cass £15

BCPL

Flexible, fast, general purpose programming language.

Comprehensive I/O libraries including graphics and sound.

Example source files supplied, including a space invaders game, full screen editor and all the libraries. 60 page manual covers the language and gives details of the libraries.

"Designed for humans, not computers" CWTA

WACCI PRICES: Disc £19.50 Rom £23.95

MODEL UNIVERSE

Create and print your own designs in three dimensions. Zoom into your object, rotate it through 360 degrees or view from any angle or perspective

"An ideal introduction to the world of 3D graphics" CWTA

WACCI PRICES: Disc £15 Cass £12

C (6128,CP/M+)

Integrated C programming system. Full implementation of K&R standard.

- * Floating point * 32 and 16 bit arithmetic * Optimising compiler *
- * Linker * I/O and maths libraries * Conditional compilation * Macros *
- * Editor is program mode of Protext *

"In typical Amstrad fashion, they've taken their time and got it right" AU

WACCI PRICES: Disc £39

MAXAM II (6128,CP/M+)

Enhanced version of Maxam for CP/M+. Extras include:

- * Single stepping * conditional breakpoints * symbolic debugger *
- * Editor is program mode of Protext * Macro assembler *

"Now the best gets even better" CWTA CPC

"Maxam II - others nil" AU

WACCI PRICES: Disc £39

POCKET PROTEXT (6128,CP/M+)

An enhanced version of CPC Protext running under CP/M+ with:

- * unlimited file size * foreign languages, accents on any letter *
- * microspacing to give equal spacing between words * two file editing *
- * proportional printing with right justification * disc utilities *

"Deserves to be the system by which all other WPs are judged" YC

WACCI PRICES: Disc £23.25

PROTEXT (6128,CP/M+)

Combines all the features of Pocket Protext, Promerge Plus and Prospell into one program. German program and dictionary also available (Prowort).

Protext is also available for IBM PC compatibles including Amstrad PC1512/PC1640 at the same price.

"Protext is just so fast and versatile once you have used it - it is like putting Nigel Mansell against a C5" PYATW

WACCI PRICES: Disc £47

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