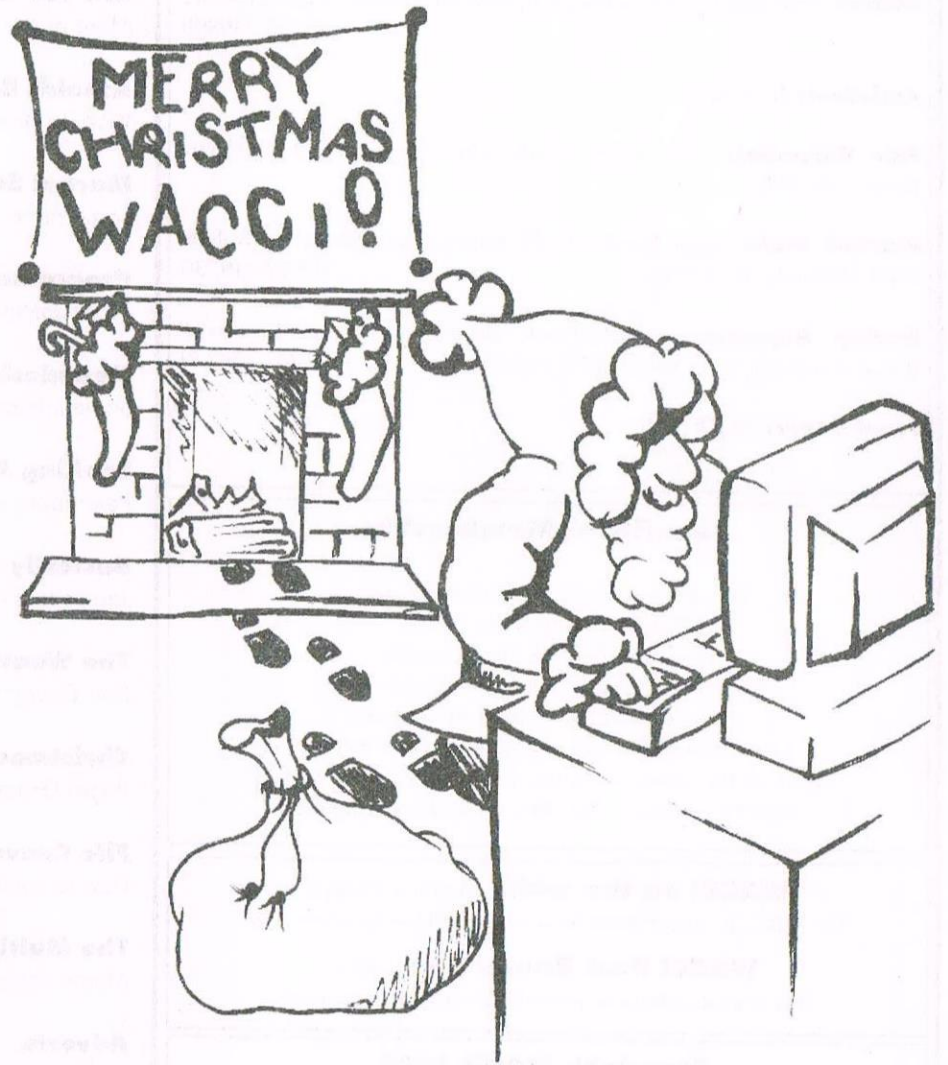


# WACC

**A Magazine For CPC Users  
And Members Support Club**

**Issue 126 £2.00**

**NOV/DEC 1998**



**Ho ho ho and  
a Merry Christmas**

## WACCI

a magazine for CPC user's and members support club

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### Benefits of Membership

- The best magazine for serious CPC users.
- Index covering issues 1-104.
- Telephone helpline (indispensible)
- Bargain buys/wanted list from Market Stall.
- Discount off goods from advertisers.
- List of PD discs, tapes, library books and services.
- Above all the advice, assistance and friendship from other WACCI members. Benefit List: by *Ernie Ruddick*

### WACCI on the web:

Matthew Phillips.  
The URL, is: <http://users.ox.ac.uk/~chri0264/wowwww.html>

### WACCI Post Room:

John Bowley  
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### Production Method

WACCI is created using Protext and Promerge on a CPC and transferred over to a PC using SANKO, MAKEBMP, PROCLIP, MULTICON, MODE 1-2 and lots of luck. The magazine is then printed on a Epson Stylus 200. WACCI is printed and collated by A 2 Z!

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# Thanx & Stuff

**Edited By:** John Bowley  
**Owned By:** The Club Members  
**Chairman:** Doug Webb

**Conceived and Founded By:** Jeff Walker  
**In:** October 1986

**Developed and Expanded by:** Steve Williams, Clive Bellaby, Paul Dwerryhouse and Philip DiRichleau.

**Copy date:** 15th January 1999  
**Membership:** 261



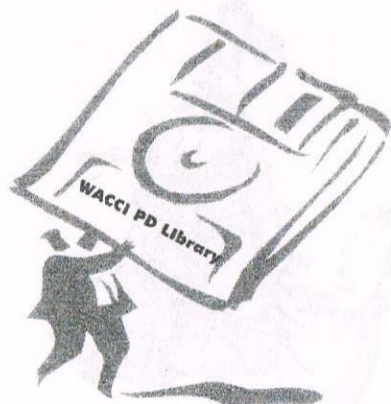
*Carol and I would like to wish you and your family a very very happy Christmas. Some good things are going to happen in the New Year and I don't mean WACCI being on time (although that would make a nice change). Happy Christmas and a very prosperous New Year to you all.*

## Special Offers

Since its nearly Christmas and I'm feeling in a generous mood (must be the Christmas spirit) The Alternative Firmware Guide is being reduce from £3.99 to £2.00 for December and January only and then it will go back to the original price. To order your copy send your cheque made payable to WACCI to Frank Frost his address is on the back page.

## PD Offer

If you buy two 3.5 discs at a £1.00 each then you can have another disc full of PD for nothing. Alternatively if you order two 3" discs at £2.50 each, you can have the third for free. Please send your orders to Dave



Stitson and his address is on page 30. But again please note: that these offers are for DEC and JAN 99 only.

## WACCI Closing?

Some of you may have heard a rumour that WACCI is about to close, but I can assure you that this is not the case. The reason this came about is because of the continuing lateness of each issue and it was thought that perhaps members don't want to have a magazine any longer, however since membership is strong I feel that WACCI can go on for a while yet and if/when the time sadly comes to the point of closure then you will all be given as much notice as possible.

## Membership Input

It is vital for the continuation of WACCI that members help their club by submitting articles, writing letters of help and advice to Fair Comment and by giving some ideas of what you would like to read about.

Richard Fairhurst and Angela Cook are still prepared to write articles for all of us to enjoy but they don't know what to write about, so your input is needed and needed NOW!

## Copy Date

You can't help noticing that WACCI is getting later and later and perhaps because of this members have the feeling that WACCI is about to close, although that this is not the case its just hard getting enough material together to produce a magazine on a monthly time scale. After many sleepless nights on what to do about the situation I thought of going bi-monthly but I've decided to go every six weeks instead (which is more or less what it is now).

So the next issue should be with you around the second week in January 1999, but please note this really depends on what input I get from you all. So please get writing and send me your articles and letters now. That's all the Christmas present I would like. No Carol this doesn't apply to you..

## Past WACCI's

After talking with Frank Neatherway it's been decided to close the Past WACCI's down with immediate effect since orders for them have been very scarce and plus the fact Frank needs the room in his loft.

## Things To Come

Starting in the new year a series by Sean McManus (author of the Basic Idea) which looks very interesting and hopefully Andy Price of Cheat Mode in AA will be showing us how to crack those games that we love to play. Christine Raisin starts a help guide for PC users giving basic tips on how to do things with your PC..

Some more hardware projects from Simon Matthews and a DIY Romboard from Stephen Potts. More programmers Patch (well done, an excellent series) from Matthew Phillips.

The continuing Basic tutorial by Paul Fairman (if anyone wants to learn basic I can honestly recommend this one to you and its on PD Disc 112.

Angie gives us some light relieve with 'Are You Games For A Game?'. And all the other regulars will be back next year.

## Convention 99

Two conventions are being thought about next year one I'm thinking of organising around June in sunny Peterborough and the other the annual meeting in September arranged by Angie Hardwick.

The location of the annual meeting is to be decided upon. Angie felt that Bescot Stadium let her down badly and so she is looking for another venue. You will be informed of the annual meeting venue early next year.

But what we want to know now is do you want a convention next year. It is pointless for Angie or myself to organise anything if you the members are not interested in coming regardless if we have a backer or not what we want is more members coming since this is the idea behind it in the first place.

So please let us know if you are interested. If we don't get any response then we must assume that you the members are not interested.

Send your letters to me at the usual address. I'll be looking forward to receiving them. *John.*



## New Phone Number

Carol and I have decided to go back to good old BT and our new phone number is: **01733 330890.**

## Special Thanx

This must surely go to all of those that have submitted articles and support over the year. To name but a few: Matthew Phillips, Simon Matthews, Angie Hardwick, Angela Cook, Peter Rogerson, Simon Lucas, Stuart Paterson, John Hudson, Paul Fairman, Jonty Jones, Richard Fairhurst, Frank Neatherway, Frank Frost, Doug Webb, Dave Sritson, Clive Bellaby, Jaquie Owen (managing the Market Stall at the convention), Christine Raisin, James Hoskisson, Peter Curgenvin and of course to my wife Carol (for all the support she has given me over the years without it I wouldn't be able to continue editing your magazine).

## Prize Compo

Since it is nearly Christmas I thought it would be a nice idea to have a simple competition and so here it is: What you have to do is tell me how many Santa's (see below) that you can find throughout the magazine and the prize is three months subscription or 3 PD Discs.



Please note that the size could be a lot smaller and don't forget to include this one. To enter please send your answers

to me on a postcard or letter and it's to be with me by the 7th January 1999 and that's all there is to it. *Have fun and good luck.*

## PD Reviews

Don't forget you can have free PD if you are going to do a review of the disc, what I would like is someone to do a disc review each month. Any takers? If so please get in touch with me.

## Articles

From now on if any member submits any article(s) I will give them in return a disc full of PD once it as been printed. So when sending in your articles please state what PD Disc that you would like. This also includes members who sends articles by e-mail. My e-mail address is on page 2 under the heading WACCI Post Room. Alternatively I will add one months free subscription it's your choice.

I'm sorry this offer only applies to articles received from the 15th December 1998 onwards.

## That's about it

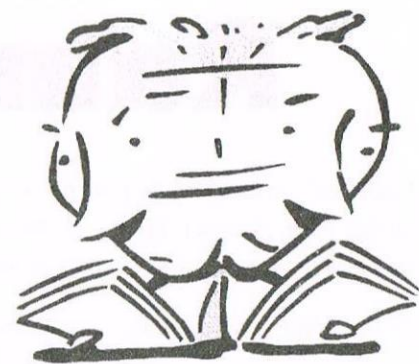
If you got any comments or you are not happy with the magazine in anyway please get in touch with me before contacting anyone else. It is very difficult to guess what you like or you don't like so let me know, your opinion is wanted. I try my best to give you a magazine that we all can be proud of.

Happy Christmas to you all from us all here at WACCI. Keep warm and be happy. *See you all next month.*



# Fair Comment

with John



**Please send all letters on disc (if possible) to:  
Frank Neatherway, 3 Glebe Close, Rayleigh, Essex. SS6 9HL**

## A Strange Computer



I have a puzzler for you all. Last Sunday a good friend saw a 664 on a Sunday Market and when he noticed the price tag (£2) bought it for me. I was, as you can imagine, more than grateful.

But all is not always what it seems to be. The legend AMSTRAD above the ESC key had been covered up with dark grey matching plastic, as had the inscription 64k COLOUR, which now bears the message DK\*TRONICS.

It had a non-standard 12-volt lead, so I opened it up in order to replace same with the right article from a defunct 6128, and I had the shock of my life. The circuit board is definitely not that of a 664, yet it is no bodged home-brewed concoction. The CPU is a Z80, but that's where any similarity between this computer and an ordinary 664 ends. There are no edge-connectors for peripherals and as far as I could see the only port of any description is the joystick one.

The volume control is missing and the line to the speaker (or where the speaker would be if it had one) is disconnected. The actual circuit is tailored to the 664 case and professionally manufactured to what looks to the uninitiated to be a high standard. When the thing is plugged in and sitched on the screen (and its full width is used) bears the legend "DK\*Tronics Ltd. 256K Z80 Computer V1.0" It then says that it is preparing to boot and invites me

to insert a disc. It seems to make a small amount of sense of a CP/M system disc, and the only disc that came with it evokes the response "Keyboard - Interrupt Test Routines" Oh, and the message at the top of the screen changes to inform us that the computer was designed by F Kups on 27/4/87.

It's clear that someone has gone to the trouble of manufacturing the guts of a computer around the 664 but that what I have is no more a 664 than I am. I wonder if anyone's come upon anything like this before? Maybe there's someone who can tell me what it does (no expansion port, no printer port, little apparent means of doing anything useful). My guess is it's a preliminary effort at creating something new and it came to nothing, but maybe there's a little software for it lurking in a hidden corner somewhere, and a member knows of it. Maybe Mr Kups reads WACCI and can put my mind at rest. It's a pity DK\*Tronics went to the wall, but maybe someone who worked for that noble firm can shed a little light on my darkness.

Until then I'll keep it in one piece, but before long I'll remove such delicacies as its disc drive. I wonder if the keyboard membrane is standard? I'll check that one out next time I find myself with a screwdriver in my hand and if it is then maybe I'll convert the whole thing back into a 664.. Anyway, cheers.

*Peter Rogerson*

<<Hiya Peter, It was very nice meeting you at the convention again.

Your computer did course a bit of a stir at the convention with Clive Bellaby, Rob Scott, Richard Fairhurst, Simon Matthews and more looking at it with amazement they even took it to bits a one stage and still they wasn't sure what it is. If memory serves me correctly I think it was decided that it is a prototype PCW.

I'm sure you would like to know if anyone else has got a similar machine and could give you more details about it. So if anyone can help Peter, we would love to hear from you. -John>>

Letters to Fair Comment seem to be getting very lean these days with only one letter from Peter and another letter from Stuart Paterson (which will be made into an article next month) it makes my job even harder than before to meet the copy dates. I'm sure a lot of you know of tips and information that would be of benefit to the membership so please write in and tell us all about it.

This page(s) are meant to be for the membership to have it's say and without it we don't know if you like the magazine or the services that you get from WACCI are to your liking so please help us to help you.



# RamRom

*It seems I made a big error in issue 124 I forgot to include the listing that should been in that issue please accept my sincere apologies especially to Simon Matthews. John*

; WACCI Rom Demonstration - (c) 1998 Ratz of STS

```

write "textrom.rom"
nolist
org &c000:limit &ffff
;-----
.header          defb 1,1,0,2          ; background, v1.02
.jump_table      defw name_table      ; point to name table
                jp initialise         ; list of routines
                jp help
                jp under
                jp bold
                jp italic
.name_table      defb "RATZ'S RO", "M"+128 ; names of routines
                defb "RHEL", "P"+128   ; bit 7 of last letter set
                defb "RUNDE", "R"+128
                defb "RBOI", "D"+128
                defb "RITALI", "C"+128
                defb 0                  ; end with zero byte
;-----
.initialise      ; *** this runs on power on / reset ***
                ; *** and grabs w/space (32 bytes) ***
                push de:push hl
                ld hl,init_text:call string ; print this text on startup
                pop hl:pop de
                and a:ld bc,32          ; grab 32 bytes workspace
                sbc hl,de:sef          ; from top of memory
                ret                    ; and return when initialised

.init_text defb 13,"Ratz's WACCI Rom v1.02".13,10,10,0
;-----
.help           ; *** prints a list of instructions ***
                ld hl,help_text:call string ; print commands
                ret                    ; back to basic

.help_text      defb 13,10,"Ratz's Rom instructions",10,10,13
                defb "|RHELP - display this screen",10,13
                defb "|RUNDER,tS - print underlined tS",10,13
                defb "|RBOLD,tS - print bold tS",10,13
                defb "|RITALIC,tS - print italic tS",10,10,13
                defb 7,0

.under ; *** Prints underlined text ***
                dec a:ret nz          ; return <>1 parameter
                call get_params       ; get len/adr of text
.under_loop     push de :ld a,(de)    ; get a letter
                call get_matrix      ; get letter matrix
                ld (iy+7),255        ; *** do underline ***
                call new_matrix      ; redefine/print letter
                pop de :inc de        ; move to next letter
                dec (iy+17):jr nz,under_loop
                ret                    ; return to basic

.bold          ; *** Prints bold text ***
                dec a:ret nz

```

*In the last of his RamRom series Ratz dabbles with the disk drive.*

Howdy! At the end of issue 124's article, I said we'd look at disk routines and suchlike; what I had in mind were programs that would allow you to access the disk sector by sector, track by track. Such "random access" of the disk forms the basis of powerful database techniques, and I'd like to be able to fully discuss these over a few articles.

Unfortunately, I'm pretty stuffed for time at the moment, so I'm going to wind up this series here and kick off again by about Christmas. In the meantime, you can content yourself with this month's program - a quick formatter.

Again, there's nothing earth-shattering about this routine; but it is convenient and much faster than using Parados, Maxidos or whatever to format your disks. The only limitation is that it only formats to the data standard (178k per side), but let's face it, no-one bothers with CP/M these days. Come to think of it, no-one bothered with it 10 years ago. Oops, sorry Clive!

As before, I'll assume that you already have the basic Rom program from the previous parts - this month's code just bolts on and in fact uses the text and number printing routines I've listed already. See, I told you they'd come in useful.

Ok, what do you need to do in order to format a disk? Basically, you need to lay down tracks and sectors and then fill them up with blank bytes (AMSDOS uses &e5). The nice people at Locomotive software have thoughtfully provided a routine in the AMSDOS rom which will perform such a task. All you need to do is pass a few values to the rom, and then relax as your disk is rapidly wiped.

At this point, you may have a small heart attack when you realise that you're formatting the wrong disk. But fear not! This formatter actually runs backwards ie. from track 40 to track 0, so if such a catastrophe were to happen, simply eject the disk or press escape and (hopefully) the disk will still have the directory track

```

    call get_params
.bold_loop  push de  :ld a,(de)
            call get_matrix
            push iy  :ld b,8                ; *** do bold ***
.bold_loop1 ld a,(iy+0):srl a                ; get byte, shift right
            or (iy+0) :ld (iy+0),a        ; overlay onto old byte
            inc iy  :djnz bold_loop1      ; repeat for all 8 bytes
            pop iy
            call new_matrix
            pop de  :inc de
            dec (iy+17):jr nz,bold_loop
            ret
.italic    ; *** Prints italic text ***
            dec a:ret nz
            call get_params
.ital_loop push de  :ld a,(de)            ; get a letter
            call get_matrix
            srl (iy+0) :srl (iy+1)        ; *** do italic ***
            srl (iy+2) :srl (iy+3)        ; shift top 4 rows right
call new_matrix
            pop de  :inc de
            dec (iy+17):jr nz,ital_loop
            ret
.get_params ; *** Get address/length of text ***
            ld l,(ix+0):ld h,(ix+1)      ; get string descriptor
            ld a,(hl) :or a              ; get length - is it 0?
            jr nz,skip                   ; no, so carry on
            pop hl:ret                   ; yes, so return to basic
.skip      ld (iy+17),a                  ; store length in w/space
            inc hl  :ld c,(hl)
            inc hl  :ld d,(hl)          ; get address of text
            ret
.get_matrix ; *** on entry, A=letter, IY points to w/space ***
            call &bba5                   ; get matrix adr into HL
            call &b906 :push af          ; turn on lower rom ...
            push iy  :pop de            ; set DE to workspace adr
            ldi:ldi:ldi:ldi             ; copy 8 bytes of matrix
            ldi:ldi:ldi:ldi             ; to workspace
            pop af  :call &b90c          ; ... restore lower rom
            ret
.new_matrix ; *** on entry, IY points to w/space ***
            push iy  :pop hl            ; set HL to workspace adr
            ld a,255 :call &bba8         ; define new character 255
            ld a,255 :call &bb5a        ; print it as well!
            ret
.string    ; *** print string routine - see WACCI 120 ***
            ld a,(hl) :or a              ; get letter, check if zero
            ret z                        ; return if end of string
            call &bb5a :inc hl          ; print, move to next letter
            jr string                    ; do it again!

; *** Quick Formatter, for RamRom project ***
; *** (c) September 1998 Ratz of STS ***

; *** Add to jump table...
            jp formatA
            jp formatB
; *** Add to name table...
            defb "RFORMAT", "A"+128
            defb "RFORMAT", "B"+128
; *** Change ld bc,32 to ld bc,64 in initialise routine
            and a :ld bc,64              ; grab 64 bytes workspace

```

(which lives in track 0) and so \*most\* files will still be intact and readable. If the disk in question contains a copy of Otto or suchlike, I realise that it will be hard to decide whether or not to press escape....

For each track you format, hl points to what is known as the "header information block", c holds the drive number and d the track number. You can then use RST 3 (far call) command to patch in the disc rom (7), run the routine and then restore things back to normal. The header information block consists of 4 bytes per sector: the first is the track number, the second is the head number (set to 0), the third is the sector number and the last byte holds the sector size (set to 2 = 512 bytes). The sector numbers for a data disc will run as follows:

&c1,&c6,&c2,&c7,&c3,&c8,&c4,&c9,  
&c5

The code should be pretty easy to follow. First a message is printed, asking if you want to continue; pressing any key other than "y" will return you to basic. Then all of the required registers are set up, and the header information block is copied into the workspace reserved by the rom.

The routine then enters the main loop (trk\_loop) - starting at track 40, the header information block in workspace is poked with the track number, the track is formatted, the track number is printed and the routine checks whether the escape key is pressed. After track 0 is formatted, the routine returns to basic. If any error occurs whilst formatting, the routine returns to basic also.

I've put in loads of comments and stuff, so it should be easy to see what's going on! Oops! Nearly forgot - use |RFORMATA to format drive A, |RFORMATB to format drive B. Ok, thats about it for now. I hope you've all found the last few articles interesting (some hope!) and you now know just how easy it is to write your own masterpiece programs in rom format. As usual, send any queries or whatever to

; \*\*\* Add to help text....

```
defb "|RFORMATA - data formats disk in A",10,13
defb "|RFORMATB - data formats disk in B",10,10,13
```

; \*\*\* Formatter routine....

```
.formata      ; *** formats DATA disk in drive A ***
               ld a,0:ld (iy+36),a          ; store drive number (0=A)
               ld hl,form1 :call string      ; print "Continue y/n"

.yes_no       call &bb03 :call &bb18         ; clear keyboard and wait...
               cp 89      :jr z,yes         ; test for "Y"
               cp 121     :jr z,yes         ; test for "y"
               ret          ; otherwise, back to basic

.yes          ld hl,form3 :call string      ; print "Formatting track"
               ld hl,h_info :push iy        ; copy header info block
               pop de      :ld bc,36       ; into first 36 bytes of
               ldir        ; workspace
               ld e,(iy+36) :ld d,40       ; e=drive no, d=track no.

.trk_loop     ld b,9          ; 9 sectors in header block
               push iy      :pop hl        ; point hl to workspace

.sec_loop     ld (hl),d      :inc hl        ; put track number into
               inc hl       :inc hl        ; each 4th byte in the
               inc hl       :djnz sec_loop ; header info block
               push iy      :pop hl        ; point hl to workspace
               rst 3        :dw form_trk   ; call AMSDOS format routine
               jp nc,error   ; exit if there's a problem
               ld a,66      :call &bb1e     ; test for escape
               jp nz,error   ; exit if escape pressed
               ld l,d       :ld h,0        ; hl holds track no
               push de      :call dp_10    ; print track no
               pop de       :ld a,8
               call &bb5a    :call &bb5a    ; reset cursor 2 spaces left
               dec d        :ld a,d       ; move down a track
               cp 255       :jr nz,trk_loop ; exit once track 0 is done
               ld hl,form4  :call string   ; print "Finished!"
               ret          ; back to basic

.formatb      ; *** formats DATA disk in drive B ***
               ld a,1       :ld (iy+36),a  ; store drive number (1=B)
               ld hl,form2  :call string   ; print "Continue y/n"
               jp yes_no    ; carry on...

.error        ld hl,form5  :call string   ; print "Error!"
               ret          ; back to basic

.h_info       defb 0,0,&c1,2
               defb 0,0,&c6,2
               defb 0,0,&c2,2          ; this is poked into the work-
               defb 0,0,&c7,2          ; space and the first byte of
               defb 0,0,&c3,2          ; each 4 byte group is poked
               defb 0,0,&c8,2          ; with the track number.
               defb 0,0,&c4,2
               defb 0,0,&c9,2
               defb 0,0,&c5,2

.form_trk     dw &c042,7          ; adr of AMSDOS routine, rom 7
.form1        defb "Format disk in A : hit [Y] to continue",13,10,0
.form2        defb "Format disk in B : hit [Y] to continue",13,10,0
.form3        defb "Formatting : track ",0
.form4        defb 13,10,"Formatting completed ok!",13,10,10,0
.form5        defb 13,10,"Formatting aborted!",7,13,10,10,0
```

myself or Johnny B (he'll hate me for putting that in.....) Back soon!

Ratz (0973) 718706  
s.j.matthews@mds.qmw.ac.uk

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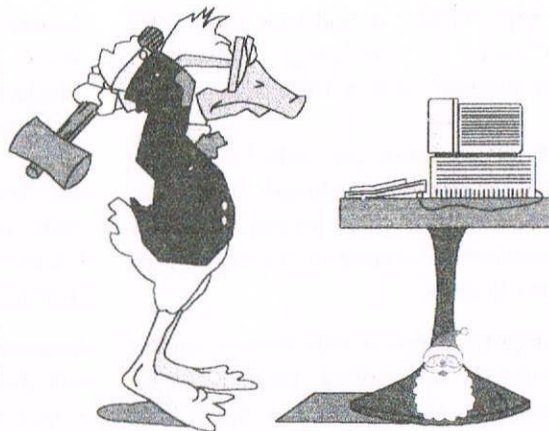
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# Are You Game For A Game?



Here we go friends my most favourite game to date of all time, guaranteed to keep you at it for hours and to keep going back. Chips Challenge by US Gold.

## Go bit buster!

Chip would do anything for Melinda the Mental Marvel. More than anything because he wanted to join Melinda's exclusive computer club the Bit-Busters. So you can imagine how Chip felt when Melinda sat down next to him in the school cafeteria and offered him membership - on one condition.

Take control of Chip as he does some heavy interfacing with a few interesting puzzles. Melinda will monitor your progress as you enter and work your way through 144 levels of challenging maze like paths and puzzle's. Once you accept the challenge, there is no escape. Monsters, traps and the ticking clock all conspire to delete you before a level is completed.

You must ram blocks of soil together to create bridges over water traps, or use them as buffers against cherry bombs. Invisible partitions will impede your progress. Coloured keys will open doors that lead to other keys that will open still more doors! To make through you must keep puzzle sequence stored in your memory.

Most levels have a specific number of chips that you must collect before you can progress to the next level.

Sometimes you must snatch those chips from under the very noses of deadly bugs that are just aching to take a byte out of you! Well Chip are you still up for the challenge? You can't get that Bit-Buster T-shirt out of your system can you? OK

Buddy, make tracks for level one of Chips Challenge.

## Getting Started

Amstrad Cassettes - Press the CTRL and Small Enter keys together. Press PLAY on the cassette recorder.

Amstrad CPC Disk - Type RUN'DISK and press ENTER. The game will now load and run automatically.

## CONTROLS:

Move Up	Q
Move Down	A
Move Left	O
Move Right	P
Restart Level	R
Exit Game	X
Music on/off	1
Effects on/off	2
Pause	H
Continue	Space

## Screen

The Chips Challenge game screen is divided into two windows, the Action window and the information window. All game action is displayed in the Action window. To the right of the Action window is the information window, in which the following information is displayed.

**Level** - shows the number of the level you are currently playing.

**Time** - gives the number of seconds remaining for you to solve the puzzle.

**Chips left** - shows the number of microchips left to be found. The

Inventory Box displays icons of all the items you have picked up and not yet used.

## Helpful Items

**Keys** - open doors. Pick them up to add them to your inventory. To use a key walk up to the door of the same colour as the key. Most keys will disappear from your inventory.

**Doors** - are opened by keys of the same colour. Once the coloured door is opened it stays open.

**Microchips** - enable you to pass each level's microchip socket. Most levels have a required number of chips you must collect before you can pass through the chip socket to the Exit Square.

**Exit Squares** - is flashing squares found on every level. Step on the exit square to proceed to the next level. Exit squares are usually blocked by chips.

**Dirt Blocks** - can be linked together to form bridges over water, pushed against a bomb to explode it harmlessly, or used as blocks against monsters, deadly lightning bolts and other moving obstacles. You can only move one block at a time. If you place a dirt block to make a bridge over water, you must stamp down the dirt to turn it into regular floor square. To do this step on the block after pushing it into the water.

**Note:** You may find things hidden under some blocks. Sometimes the things that you find are valuable, like

chips. However you may find that a block is covering something unpleasant such as a fire trap.

**Trip Buttons**- are linked to toggle blocks, clone machines and other obstacles. A trip button's colour matches the colour of the linked trap or obstacles.

Stepping onto a trip button square triggers the linked item. For example, moving over a green trip button square will open (or close) all linked green toggle blocks etc.

**Magnets**- neutralize the effect of force floor traps. With a magnet in the inventory, you can walk over a force floor normally.

**Fire Shields**- neutralize fire. With a fire shield in the inventory, you can walk through fire. **Water Shields**- allow you to walk on water.

**Cleats**-allow you to travel over ice traps without slipping.

**Note:** Magnets, fire shields, water shields and cleats stay in inventory. They do not disappear after they are used.

**Traps, Monsters and Obstacles.** Traps must be disarmed before you can pass through them. There are various sorts of traps. For example some hold you prisoner until your time runs out, while others destroy you as soon as you step on them.

You can disarm traps with strategic placement of dirt blocks.

**Force Floor Traps** - propel you with lightning speed from one area to another without allowing you to stop. Sometimes you can use this force to propel you to a desired location, however most of the time you will need to collect a magnet to neutralize the effect.

**Fire Traps**- are impassable bonfires laid out to block your progress. Use a fire shield to walk through fire traps.

**Water Traps**-can be crossed in two ways. Either build a bridge of dirt blocks or have a water shield in your inventory.

**Ice Traps**- are slippery obstacles that make you slide right past your goal. Cleats are required to be able to walk over ice traps.

**Monsters**-want to destroy you and will show no mercy. One touch from a monster and you'll cash in your chips.

**Tanks**-block the way through crucial paths in some levels. Tanks are always linked to trip buttons, so the way around them is to activate the correct trip button so they move out of your way.

**Thieves**-touching a thief wipes your inventory of all items. Make sure you use the tools you need to collect chips before trying to pass a thief.

**Teleport Squares**-move you to another location in the level. Some squares Teleport you in the direction you were facing when you step on them. Others Teleport you in random directions. Beware if you step on the only Teleport square that is accessible, you will be trapped.

**Toggle Blocks**-are outlined with broken coloured lines. These blocks can be solid or transparent. When the toggle block is solid you cannot pass through. These blocks are linked to trip buttons. When you activate a trip button, the toggle blocks linked to it will switch to the other state (solid or transparent).

**Microchip Sockets**- are special obstacles found on most levels. You must pass through a microchip socket to reach the Exit Square, but only after you have collected the required number of microchips for that level.

**Clone Machines**-discharge fireballs, dirt blocks and other items. Most clone machines are linked to trip buttons. If you wish to start/stop a clone machine, activate the linked trip

button. **Blue Blocks**- can be real walls or just an illusion. To figure out which a particular is try to pass through. If it is an illusion it will disappear.

### Strategy

Take notes and draw maps of difficult levels. Leave yourself an escape route whenever possible. Timing is crucial on some levels. Use Pause to give you time to think. If the obvious solution doesn't work, try a bizarre solution.

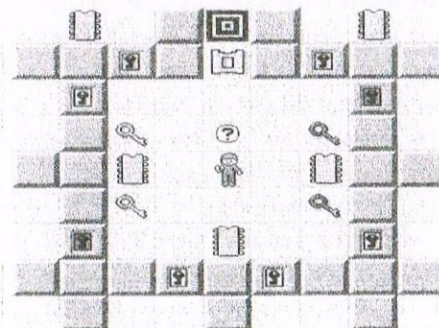
The bizarre will usually put you through. Monsters often move in predictable patterns. Many objects affect monsters the same way they affect you. If you get stuck in an impossible situation. Use the Restart Level key to resume the level.

### Scoring

You can earn points in two different ways. On each level a time bonus and level bonus points combine to give you your level score. During each play session your level scores are added together to give your total score. The number of level bonus points you earn depend on how many times you have to repeat the level before successfully completing it.

If you complete the level on the first try, you receive 500 points multiplied by the level number. Each time you die or have to restart the number of points you receive decreases by 20%.

The minimum level bonus is 500 points or 20% of the level number x 500 whichever is greater. You will receive 10 time bonus points for every second remaining on the timer when you complete a level. On levels that are not timed, the time bonus is always zero.



# Arnolds Basic

by Paul Fairman

## PRINT CHR\$(7)

The above command will produce a simple beep the same beep that occurs when pressing CLR, DEL or the cursor keys when the cursor cannot move. That is not the entire sound capabilities of the Amstrad, although this section doesn't go into huge detail of sound.

The command that actually produces a sound is the SOUND command and anybody who can guess why ought to apply to Menza the high-iq group. The parameters that follow are:

SOUND channel, note, duration,  
volume, volume envelope,  
note envelope, noise

As you can see the SOUND command has quite a few parameters, seven to be exact. So, the channel can be anything from 1 to 255 and is quite a complicated parameter and I know very little about it! CPC's have 3 channels to play sound numbered 1, 2 and 4. To play from channel 1 use channel one and so on. To play a note on more than one channel simply add the channels together. So playing both channels 2 and 4 do a:

SOUND 6, blah blah blah

But enough of that. The note is next and a full list of which is in the CPC manual on page 24 of chapter 7 in my 6128 one. SOUND 1,239 will play a middle C note for something like 0.2 seconds.

Notice that all the other junk has not been included, they are optional parameters.

The duration (how long the damn note goes on for) is done in 0.01 seconds by our little CPC, so specifying 100 as the duration will hold the note for 1 full second.

## Volume

Now here's one I fully understand. Between 0 and 15 it should be and surprise surprise (it's Cilla) it specifies the volume. Leaving this parameter out means the CPC will assume 12. You can't actually hear the value of 0, well I can't anyway.

And I am afraid that concludes our introduction into the sound of the CPC. I can assure you by listening to other peoples musical creations notably the music from Wec Le Mans and Hydrofool, the CPC is very much capable of incredibly brilliant sound effects etc. Don't let my basic knowledge of it put you off.

Try and understand the Amstrad manual because I can't and you may be able to create these weird and wonderful things called volume and tone envelopes and soon will be transferring Beethoven's Moonlight sonata onto your computer. The commands ENT and ENV are used in conjunction (that's is posh word for using together) with SOUND.

## Graphics

Using a graphics package is the easiest possible method of creating artistic masterpieces by far. Programming them in pixel by pixel, line by line is a pain, but I'm useless at art so I can't expect brilliant results. PLOT plots a tiny (well it depends) dot onto the screen.

The smaller the dot, the better the overall graphical result should be, and if you remember the actual size of dots if governed by the MODE that you are in. MODE 2 (80 column text) gives you high resolution graphics but only two colours can be used. MODE 1 giving 4 colours and is referred to a normal resolution (MODE 1 is when you turn to computer on), and

MODE 0 gives a good 16 colours from the palette but the graphics dot is quite big. The palette is the selection of colours that you have. They are listed on the disk drive of the CPC6128.

This is your palette, your choice of colours. Now irrespective of what MODE you are in, all 27 colours of the palette are still available. The restrictions come when you can only choose up to however many to have on the screen at the same time. It is like having 27 ink pots but only 4 (in MODE 1) pens. The INKs must be filled with the colours from the above chart.

Reset the computer to type in the following commands.

INK 2,16 would fill pen 2 with the ink 16 (pink). Now calling up PEN number 2 is done with a PEN 2. This colour of your writing is now pink. Owners of green monitors of course cannot see this change properly because green monitors have to use different shades of green.

INK 3,2 fills pen 3 with ink 2 (bright blue), use your computer programming skills to call up PEN 3 (hint) so you can have some nice blue writing. Now we have three colours on the screen. The introductory message when you reset the computer, pink (pen 2), and bright blue from pen 3.

Now pen 1 is the original writing of the Amstrad Consumer Electronics etc which is pastel yellow incidently. The other ink is INK 0 which alters the background when in paper 0 (see below).

Try INK 0, whatever colour you feel like. Now, alter INK 1 and go into PEN 1, you will find the writing at the top changes as well as the current

writing. This is because only 4 colours are available. Having said that using BORDER, the border around the screen where writing cannot be placed will change. BORDER 7 will change it purple and by now you will have found that I have putrid colour taste.

### FLASHER!

The border and the pens can be set to flash different colours by adding an extra parameter. INK 1,1,0 will set pen 1 to be flashing black and blue. Use SPEED INK no,no to alter the speed at which the inks flash. The same goes for BORDER.

Confusion is added to the situation with the PAPER command. Initially the paper is 0 and the pen 1, but setting the paper to something else will change the paper that the pen writes on. PAPER 2 sets the paper to INK 2 (pink if you have been following).

### EXERCISE 3

Create a program that sets 40 column text, and then demonstrates all papers and pens not to forget the border. Do not use something like:

```
10 PEN 1
20 PEN 2
30 PEN 3
```

This will take weeks and weeks and you will feel generally fed up at the end of it. No no no no. Use a nice and simple FOR NEXT loop.

To the PLOT command. Now this puts a dot onto the screen. Don't muddle up the cursor that you are used to write text with, with the graphics cursor. The graphics cursor is invisible which makes it rather hard to know where it is, so you'll have to keep track what you last command you issued.

There are two little things that will show you the position of the graphics cursor, XPOS and YPOS. XPOS returns the horizontal axis, and YPOS the vertical. Use PRINT XPOS,YPOS to print them

both in that order. You don't have a grid say 40 column by 25 (MODEs 1) for the graphics display but a 640 by 400 grid and on the grid you can plot little dots on there and draw things etc etc. So, using mathematics you should be able to work out that the centre of the screen is 320 across and 200 down, or up.

```
PLOT 320,200
```

places a little dot at the centre of the screen. The co-ordinates of the graphics cursor when you turn the CPC on are 0,0 by the way. PLOT 320,200,3 would place a dot in the same place BUT in a different pen as specified by the third parameter.

Just moving the graphics cursor is easily done with a quick MOVE x,y where x and y are the co-ordinates you want.

Using the DRAW statement, the computer will draw (never!) from the graphics cursor to the specified destination. A pen can be given as with the PLOT statement.

Mathematics can be used on the CPC to draw pretty things onto the screen. Those mathematical geniuses who are aware of the COS and SIN functions can use them in a simple little program.

```
10 FOR j=1 to 360
20 PLOT 320+150* COS(a) ,
200+ 150*SIN(a)
30 NEXT
```

Type it and RUN it, and very slowly a circle will be plotted. By adding the line:

```
5 DEG
```

will set the CPC into DEG mode which will draw to circle a different way. Who needs a calculator when you have the Amstrad computer to do all those maths sums?

Well quite a few people who don't carry a computer around with them all day, but the computer is a very good calculator and such facilities

are often demanded in programming.

ABS - will convert a negative number to positive so a:

```
PRINT ABS(-123)
```

will throw up 123.

ATN - the number in brackets has the Arc-TaNgent calculated of it.

BINS - converts a number into binary format with the necessary amount of digits specified by the user

```
PRINT BIN$(500,10)
```

will give us 011110100 which is the binary equivalent of 500 with 10 digits. 16 is the maximum numbers of digits you can have.

CINT - rounds a number as long as it is from -32768 to 32768

```
PRINT CINT(4.6)
```

Will produce 5 because the .6 bit means round UP.

COS - calculates COSine like in our circle example.

CREAL - Converts a number to real.

DEG - goes into DEGRees mode like in the circle drawing program. The normal setting is RADians.

FIX - Rounds numbers DOWN

```
PRINT FIX(5.85875756) gives 5
```

HEXS - changes the number to hexadecimal which is base 16 unlike our usual base 10 (decimal).

```
PRINT HEX$(10,3)
```

gives 00A because A is the equivalent of 10 in hexadecimal and the optional 3 bit gives the answer with 3 digits as with BINS. INT - rounds numbers off to their INTeger value. See RND below. LOG - finds the LOGarithm of the number in

brackets. LOG10 - same as above but the number is returned to base ten. Both numbers in LOG and LOG10 must be greater than 0.

MAX - gives the MAXimum number out of those entered.

PRINT MAX(32,122,45,65,23) would give 122 which is the bigger number of those listed, separated by commas. You will often find in BASIC that the numbers are separated by commas and are in brackets like many of the examples used above.

MIN - opposite of above.

RAD - sets RADians which is normal but can be altered using the DEG command so switching back is useful.

RND - means RaNDom. Take a look at this:

```
a=INT(RND(1)*50)+1
```

The above calls up a "random" number and stores the result in the variable "a" which means the random number can be manipulated later on in a computer program. PRINT a will give us the value held in a.

The random number must be between 1 and 50 which comes from the \*50 bit and the INT is there to make sure a whole number is given.

I put random in inverted commas a while ago for a reason. No mathematical generated system such as the Amstrad can churn out true random numbers; it has a list of numbers in its memory and just calls the first number of the list.

Even if the first number is NOT between the range that the command asks for, certain modifications will be done to give you the random number.

The number you will be given is 14. The first number on the CPC's list of numbers is 13 but the +1 bit at the ends adds one to 13 to produce 14 simply guarantees that we will

not get 0 as our number. Reset the computer, ask for a random number as above. Note the number and reset the computer again. Ask for the random number exactly as you did before and you will notice similarities between the two. In fact, they are identical.

One good way to ensure that you get "more" random numbers the before is to type RANDOMIZE TIME. This is advised if you want to go into relatively random number generating programs, like a horse racing program which comes into an example later on. However, actually knowing what the random number will be could be of an advantage to you in such a computer program, as the bookmaker ...

SGN - We have number. Say 50, and it is stored in a variable called x. x is therefore a positive number. The SGN command finds the SiGN of the number, so PRINT SGN(x) will give us the sign of x, in SGN's little way:

0 is given if the answer is 0

-1 is returned if the answer is negative

1 is returned for answers that are positive

SIN - See COS and circle program.

SQR - Nice and simple. The square root of the number is given.

```
PRINT SQR(100) gives 10.
```

STRS - will convert to decimal. Numbers in BASIC have prefixes (things before them) to show what base they are: & is hexadecimal and &X is binary.

```
PRINT STRS(&X11111111) will convert that binary number into decimal.
```

TAN - finds the TANgent number in brackets. VAL - converts input from a string variable into a number.

```
10 REM Totally useless program on its own
```

```
20 CLS:PRINT"Please enter a number (1-4)"
30 a$=INKEY$:IF a$=""THEN
30
40 x=val(a$)
50 if x<1 or x>4 then 30
60 ON x GOSUB
100,200,300,400
```

The above programs accepts input from the INKEYS command and so the number is not held in a numeric variable to begin but a string variable and VAL makes x equal the number typed. Useless on its own, but for a menu system at the beginning of a program, it has a good use.

### Error Handling

The Amstrad CPC BASIC has a good error handling system that allows most errors to be "trapped". The reason why the telephone directory includes such a system is to make sure that the user does not get returned to BASIC for something like a disk missing from the drive. One of the first commands in the program is an ERROR GOTO one. This means that once the computer finds an error it jumps to the line specified. The error detection and interruption commands are listed below:

```
ON ERROR GOTO [line number]
ERROR [error number]
ERL
ERR
RESUME [line number]
RESUME NEXT
```

The first one has been dealt with. ERROR is a silly instruction that must be followed by a number. Below you will find a list of errors along with their respective error numbers. Typing ERROR 6 and pressing RETURN will result in a OVERFLOW being printed on the screen, this is the error message for code 6.

Now, when in a program and an error occurs you can type PRINT ERL and BASIC will tell you which line within the program the error has been detected; very useful for debugging programs. More about errors next month. Bye!

# Market



# Stall

Have you got anything to sale or are you looking for a piece of software or hardware if so then contact:

Angie Hardwick 23 Station Place, Bloxwich. WS3 2PH  
Tele: 01922 449730

*Well here we are in November I enjoyed last month's magazines very much. On the personal side of life I have some heartfelt thanks to friends in the club who helped me through a very rough time. To Doug & Doreen whose support and care soothed my troubled mind. To Chris & Christine who let me spend time at their home and made me so welcome. And to all those members who left me in peace and gave me the time and space to recover thank you all very much. Kelly is now settled with her new family and is very happy. Now back to business.*

**For Sale:** CTM 640 Colour Monitor, GT65 Mono Monitor, MPI Modulator, 2 Keyboards 64K 464 cassette drive, 2 joysticks, Amstrad User Guide Manual.

**Tapes as follows:** Welcome to Amsoft, Leisure genius, Waddintons Monopoly LG140, Cluedo LG150, Scrabble LG200, Trivial Pursuit Young Players Edition, Trivial Pursuit Genus Edition, Steve Davis Snooker 8912 Blue Ribbon, Grand Prix Sim, Jonah Barringtons Squash, Touchdown USA American Football, Leaderboard Par 3 Golf, Emlyn Hughes Arcade general Knowledge Quiz, Garry Linkers Superstar Soccer, Fun School 2, Roland on the Ropes, Roland in the Caves,

Oh Mummy, Sultans Maze, bridge It, The Galactic Plague, Timeone One, Animal Veg Mineral, Fruit Machine, Harrier Attack, Xanagrams, Easy-Amword, Starwars-Return of the Jedi, Strider 2 US Gold, Micro Maths, Short Circuit, Ghostbusters 2, Wargamers Series-Battle of Britain, Supreme Challenge inc, Elite, Starglider, Terris, Ace 2, The Sentinal, The Real Ghostbusters, Green Beret, Rambo 1<sup>st</sup> Blood Part 2, Schwarzenegger Predator, Indiana Jones & The Temple of Doom, Turbo Outrun, Rad Ramp Racer, The Curse of Sherwood, Jackle &

Wide, Classic Arcadia, Postman Pat, Genocide (The Mission), Magicland Dizzy, Treasure Island Dizzy - Fantasy World Dizzy, Yogi's Great Escape, Yogi Bear & friends in the Greed Monster, Amsoft Stockmarket.

**PLEASE CONTACT:** Susan Roberts, 15, Crome Road, Gt Barr, Birmingham B43 7NL TEL: 0121-605-2128 Offers.



**For Sale:** Wacci 69, 76, 94, 97, 98, 100, 101. CPC User 36, 44, 47, 49, 50. Plus loads of Amstrad Actions, Computing with the Amstrad and others. All at 50p each or less.

**PLEASE CONTACT:** Angela Cook Brympton Cottage, Brunswick Road, Worthing, Sussex. BN11 3NQ. Tel: 01903-206739.



**Wanted:** Has anyone got the negatives of photo's for the 1996/97 (2 and 3) from the Wacci Convention. I would love to borrow them so that I can then have a complete set. Also to remind you that a good home awaits here for any unwanted Amstrad items.

**PLEASE CONTACT:** Christine Raisin, 117 Tilbury Rise, Cinderhill, Nottingham NG8 6DE TEL: 0115-9133181.



**For Sale:** Hardware as follows: Colour Monitor for 464 £10.00. Colour Monitor for 664 / 6128 £10.00. Keyboards 464 and 6128 £9.00 for 464 £10.00 for 6128. Faulty upgraded 464 Keyboard £4.00 or free with 464. Two DDI-1 Disc Drives with CP/M Discs and Manuals £12.00 each or £21.00 for both.

Two Joysticks £1.50 each or free with computers. MP2 Power Supply (Faulty) £2.00. DMP1 Printer with manual £10.00.

**Software as follows:** Loads of tapes (send for list) 40p each or £3.50 for 10. Blank C15 Tapes 30p each or £2.50 for 10. Advanced Amword (word processor disc) £4.00. Protex (tape) £3.00.

Books, magazines and manuals as follows: Sensational Games for the Amstrad " 2.00. Using your Amstrad CPC464 £1.00. 100 Programs for the Amstrad £2.00. An introduction to programming the Amstrad CPC 464 & 664 £1.00. Manuals for

CPC464 and 6128 £3.00 each or free with computer. **Please note: All plus post & packing.**

**PLEASE CONTACT:** Simon Brunsdon, 7, The Greenway, Orpington, Kent BR5 2AY.



**For Sale:**

CTM 644 colour monitor £30.00. 6128 keyboard/drive £10.00 MP3 tv turner £20.00. Quickshot joystick £3.00. Multiface 2 £15.00. 3.5 external drive + sideswitch + psu £30.00. 71 3" discs 50p each.

**Utilities:** Mini Office 2 £5.00. AMX mouse + Stop Press £20.00. Maxam 2 (CPM) £3.00. MicroDesign & MicroDesign Plus £5.00. Firmware Guide £3.00. Laser Genius £3.00.

**Books:** 100 Programs for the Amstrad £2.00. CPM The Software Bus. CPM Plus Handbook For The CPC6128 /PCW8256 £2.00. Dynamic Games For The Amstrad £2.00. HiSoft DevPac (for use with DevPac - Amstrad Action £2.00. Programming The Z80 £10.00.

**Discs:** CPM Master Discs £2.00. Page Publisher £2.00 VDE word Processor & SPELL £2.00. Better Maths £1.00. Comms ZMP. TERM504B £1.00. Games Set And Match 2 £2.00. Tearaway (use with the Multiface) £3.00. F15 Strike Eagle £3.00. Dracula & Frankenstein £2.00. Galactic Conqueror, Maniacs Diary 1989, Overlander, Operation Wolf, Ocean Top 10 Games, Dale Thompsons Challenge and Indiana Jones at £1.00 each.

**Tapes:** All at 50p each. Milk Race, World Class Leaderboard, Ace/Ace2, Spellbound Sabrewolf, Harrier Attack, Paperboy, and Ghostbusters and Shard Of Inovar. Amstrad Action 71-117 with Covertapes £1.00 each. Amstrad Action 24-26, 30-31, 34-39, 42, 43 and 46 20p each. Computing With The Amstrad

vol3 8-12, Vol2 2-3 20p each. Amstrad Computer User DEC97, Apr, Mar, Nov 1998, Feb 1989 20p each.

**PLEASE CONTACT:** D. Limming  
Tele: 01733 342465



Wacci magazines 1992, 1993, 1994, 1995 all in Wacci binders.

Computing with the Amstrad 1986, 1987, 1988.

Amstrad Computer User 1986, 1987.

Amstrad Actions 1988, 1989, 1990, 1991, 1992, 1993 these magazines are all in WH Smith binders.

Books as follows: Practical Programming for the 464. Machine language for the beginner. Assemble language programming for the 464, 664, & 6128. Basic programming on the Amstrad. The Amstrad Disc companion. Amstrad communications. Introducing Amstrad CP/M language.

The working Amstrad. Micro guide for the Amstrad. Amstrad (2) Sound, graphics & data handling. Amstrad CP/M Plus. 100 Programs for the Amstrad 464, 664 & 6128. Mastering machine code on your Amstrad. Graphics programs & techniques on the Amstrad 464. 464 Ins and Outs of the Amstrad.

Programs as follows: Maxam. Disc Demon. Machine Code Tutor. Protex. Rembrant Icon Drawing Package. Maxam 1.5. A.D.A.M (Tape). Azimuth head alignment tape. Light Pen. Taspint 464 tape. Tascopy 464 tape.

The Gold Collection 11 tape. Word Perfect 464, 664 & 6128 tape. Taspell. Discbase CPC, Pyradev. Stockmarket. Locksmith Beebug Soft. Mini Office 11. Stop Press. The Advanced OCP Art Studio. Atlas

Plus. Machine Code Tutor. Tool Kit Beebug Soft. Office Master. RS232 (2). Multiface 2.

**Reasonable offers please:** to Tom Stephenson. 23, Devonshire Street. Stockton on Tees TS18 3QQ  
Tel: 01642-678300 evening not after 9.00pm.



Following is the extra advert for market stall as promised. FIVE nine pin printers all in good order.

Amstrad, Epson, OX1, Citizen 120 plus, Mannesmann Tally. £10.00 each of £40.00 for the lot all plus post and packing.

**PLEASE CONTACT:** Mr P. Phelps  
01708-477017.

**I wish all  
our  
members  
a very  
Happy  
Christmas**

**And a  
peaceful  
and  
prosperous  
New Year.**

**Love  
Angie**



# Programmers

# Patch

by Matthew Phillips

*The sun beat down on the wide desert plains of Mexico. Meanwhile, on the open seas of the Indian ocean the rain poured down on a ship laden with rice pudding. From the mizen-mast the sodden remains of a black flag hung limply. There was no sign of any crew on deck, but an eerie green light shone through a porthole. Inside the cabin sat the captain. He was an evil-looking man, with a crooked nose and crooked thoughts. "Yo, ho, ho," shouted Ambrose the evil pirate as he copied another disc.*

What we did not mention last month is that the Programmers' Patch disc (WACCI PD 98) now has a little utility in it called BSIDE. This is for those of you who have a 3.5" disc drive, but do not have a side switch.

If you are in this situation you will be well aware that with standard AMSDOS formats it is possible only to use one side of the disc, so if you want a disc copied from the WACCI library, you have to have the two sides copied onto two separate 3.5" discs.

Well, you used to have to do that! BSIDE copies the other side of a 3.5" disc to a disc in your A drive from where you can access it normally. Once you have a copy of BSIDE you will be able to order copies from the WACCI library on single 3.5" discs.

I do not know whether anyone is still in this situation, but if you are, it was written specially for you! BSIDE is of course saved on the A side of the Programmers' Patch disc...

## ARTIFICIAL IDIOCY

I hope you have all had fun with last month's program. I originally wrote it with a friend at sixth form, on an Acorn Archimedes computer

(excellent machine). The college had an Econet network connecting the BBC computers together, and I also wrote a chat program which meant any message you typed at your keyboard was displayed on the screen of anyone else who was using the chat program. We eventually took the obvious step of linking AI up to the chat program. It could then take part in the conversations that were going on, leading the ordinary users to wonder why there was a complete idiot contributing from one of the network stations!

## A GREMLIN IN THE WORKS

If you have used last month's version of AI extensively, you will have come across a problem to do with the limits we set to the size of the arrays. In line 20 we set the maximum number of words to 300, and the maximum number of links from one word to another to be 20. If we need more than 20 links from any particular word to another, the program will go wrong.

You are most likely to reach the limit of twenty links by using more than 20 different words to start a sentence (remember that the "word" w\$(0) is used to link to words that start a sentence). How can we deal with this problem? It is really a matter of balancing up how the data

is stored to make it as efficient as possible. On my machine there are just over 35,000 bytes free by the time we reach line 30 where the arrays are dimensioned.

If we just increase mlinks to forty instead of twenty, then for every word we store we would be taking up an additional forty bytes, because each integer variable takes two bytes to store. With mwords still set at 300, this would mean another 12,000 bytes, just to cope with a very small number of words which would need more than twenty links from them. We need a way of storing these extra links that doesn't increase the storage requirements of the other words too.

## A LINKED LIST OF LINKS

Figure 1 provides a solution. Load up AI and type in the lines listed. Some of them are new lines, while others replace existing lines. The solution is based on the idea of the "linked list". A linked list is an important type of data structure which is often used when programmers need to store an undetermined quantity of data.

The idea is that when you have filled up one data storage area, you use part of the storage to provide a



pointer to where the next block of data is located. In our case, instead of storing twenty links from word *n* in *lk(n,1)* to *lk(n,20)*, we use the first nineteen for links to words, and then use *lk(n,20)* to point to where the rest of the links can be found. We put a dummy word in the next free space in *w\$*, and use the link storage for that word to deal with the overflow from word *n*.

Subroutine 400 is the crucial one which searches through the existing links from word "pword" to see if "cword" is already among them. If not, cword is added to the links as a word that can follow pword. The new subroutine is listed in full in Figure 2.

In the old routine, line 410 looked through the links by looking at *lk(pword,x)*. This is great when all your links are stored together, but in our new arrangement, later links will not be stored under pword, but under the dummy word.

Thus in line 400 we set up a new variable, *y*, which will take us through the storage locations.

Initially it is set to pword, as before. Line 410 is much the same except that pword has been replaced by *y*. The big change is the new line 415. This tests whether *x* is pointing at the last link in the block. This is no longer used for an ordinary link, but points to the dummy word where the rest of the links are to be found. So if *x*=*mlinks*, we set *y* to be the position of the dummy word, which is pointed to by that link, and put *x* back to 1.

The rest of the loop works the same before, and by the time we exit at line 420, we will either have found a link to cword, in which case *j*>0, or we will need to add one. Variables *x* and *y* will still be pointing at the next free link, so line 430 is altered slightly from the previous version to change pword to *y* again, and the new link to cword is stored in *lk(y,x)*. Note that we still use pword at the start of line 430 to increase the count of the number of links from pword, which is stored in *lk(pword,0)*.

One further thing needs to be done, which is why line 435 is added. This

checks to see whether we have just used up the last-but-one space in the current block of links. If *x*=*mlinks*-1 then the next link will need to point to another dummy word for overflow storage. To do this we use the next free word position by increasing *nwords* by one. We then set *lk(y,mlinks)* to point to this new dummy word.

Do take a bit of time to get this idea straight. It is a bizarre concept at first, because not all of our words from 1 to *nwords* will be used for storing actual words: some will be dummy words used for storing extra links beyond the twenty allowed for one word.

Of course, as well as storing the links we need to be able to retrieve them when creating random sentences. Line 505 is added in order to adjust this routine. In line 500, *i* is set to a random number from 1 to the number of links from that word. If *i* is greater than *mlinks*-1, then the link will be stored under a dummy word, rather than the current word. In line 505 we move pword on to point at the dummy word, and decrease *i* by

### Figure 1: New lines to add to the AI program

```

400 j=lk(pword,0):x=1:y=pword
410 WHILE j>0 AND cword<>lk(y,x):j=j-1:x=x+1
415 IF x=mlinks THEN y=lk(y,x):x=1
430 lk(pword,0)=lk(pword,0)+1:lk(y,x)=cword
435 IF x=mlinks-1 THEN nwords=nwords+1:lk(y,mlinks)=nwords
505 WHILE i>=mlinks:i=1+i-mlinks:pword=lk(pword,mlinks):WEND
630 j=lk(i,0):y=i:x=1:WHILE j>0:j=j-1:INPUT#9,lk(y,x):x=x+1
635 IF x=mlinks THEN INPUT#9,lk(y,x):y=lk(y,x):x=1
636 WEND:NEXT
730 j=lk(i,0):y=i:x=1:WHILE j>0:j=j-1:WRITE#9,lk(y,x):x=x+1
735 IF x=mlinks THEN WRITE#9,lk(y,x):y=lk(y,x):x=1
736 WEND:NEXT

```

### Figure 2: The new subroutine at 400

```

400 j=lk(pword,0):x=1:y=pword
410 WHILE j>0 AND cword<>lk(y,x):j=j-1:x=x+1
415 IF x=mlinks THEN y=lk(y,x):x=1
420 WEND:IF j>0 THEN 440
430 lk(pword,0)=lk(pword,0)+1:lk(y,x)=cword
435 IF x=mlinks-1 THEN nwords=nwords+1:lk(y,mlinks)=nwords
440 RETURN

```

mlinks-1. This is done as many times as is needed to reach the dummy word where our random link is located. The rest of the alterations are to make loading and saving of vocabulary work correctly under the new system.

## OPTIMISATION

Now that we have overcome the limit imposed by mlinks, perhaps we ought to think about what an appropriate value for mlinks might be. We only set mlinks to 20 because it was a good high number that would take a while to reach. A smaller value might allow us to store the data more efficiently. We can work out the amount of space required per word depending on the value of mlinks. The word itself uses 3 bytes for the string descriptor block, plus as many bytes as the word is long. The space occupied by the array of links is two times mlinks+1, as each integer needs two bytes.

I had a look at a vocabulary I had saved to disc which had about two hundred words in it. The average length of a word was in fact as little as 5.1, and the average number of links from a word was only 2!

More importantly, 94% of the words had fewer than six links from them, and only two words had more than fifteen. Doing a rough calculation shows that setting mlinks to be 6 would mean that the storage required per word would be around 24 bytes on average. Contrast that with setting mlinks to 20, which requires at least fifty bytes per word. By reducing mlinks to 6 from 20 we can fit twice as many words in memory.

Certainly mwords could be set to something over a thousand. If you alter mlinks, then vocabulary saved to disc when mlinks was a different value will not load in correctly, so it is wise to choose a suitable value for mlinks and stick to that. I will be using 6 in future examples, but you can easily alter it to whatever you have selected.

This sort of calculation, optimising the method for storing your data, is often needed when programming machines with relatively little memory, like our Amstrads. It is also a good habit to get into when programming more powerful machines.

Sadly, most commercial programs for Windows PCs tend to compete on the features they provide, rather than the speed at which they run. Newer versions have more features, but often run more slowly than the previous version, and most of the power of the fast Pentium processors is wasted in running the sloppy code in the operating system and the increasingly bloated applications.

## BAG THE BUG

Anyway, enough of that, and back to our friendly Amstrads, trying to make conversation. If you are feeling really on the ball, have a go at this problem. While writing the article, I spotted a bug in the program, that can be cured by adding the following two commands to the end of line 435:

```
w$(nwords)="".lk(nwords,0)=0
```

Can you work out what the bug was, and give an example of how it might manifest itself? I'll give you a clue: it has something to do with loading old vocabulary.

The answer will be in next month's Programmers' Patch.

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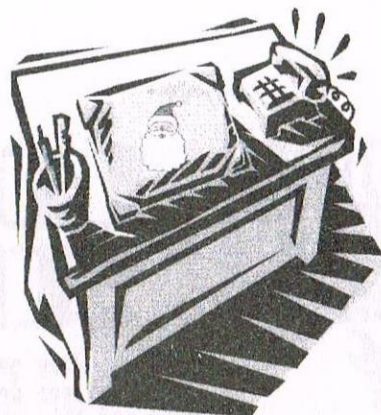
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# The News Desk

## with Angela (ITGA) Cook



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*After a break last issue Angela is raring to go again. At least that's what she said after a few drinks at the STS Computers shop opening, which you can read about from Carol another time.*

### A DROP IN THE OCEAN

Bob Wakelin is the artist who illustrated nearly all the covers for Ocean software between 1983 and 1994. His work includes the covers for Rainbow Islands, Match Day 1 and 2, Parallax, Head Over Heels, Parasol Stars, Chase H.Q., The New Zealand Story, Hyper Sports, Pang, Where Time Stood Still, Moon Alert, Operation Thunderbolt and Target Renegade.

Now he is selling the original one of a kind artwork for selected titles. Details (and about 30 box scans) can be found at:

<http://retrogamer.merseyworld.com/wakelin.htm>

### PC EMULATOR

There is a new version of Kevin Thacker's CPC/CPC+ emulator called "Arnold" available. It now runs at 200% speed on a P2-333, and 50% speed on a Cyrix 166. There is still a lot of room for optimisations, and it is still in pure C.

New features include: Zip support (using Infozip code), saving a snapshot of the screen as a BMP file so you can put pictures on a webpage, correct size screen and it will run in 16, 24 or 32 bit screen resolutions (only a couple of percent slower in the higher resolutions).

You can download it from: <http://www2.krisalis.co.uk/wwwkthk/arnold/index.html>

### FRENCH DEMON

Demoniak 6, a French disczine is now out. It is mostly in English, with about 42 articles. I don't know where you would get it from on disc (perhaps Peter Curgenvin will know), but you can download it from: <http://members.tripod.com/~arkos>

### CAN YOU C?

Peter Campbell and Brian Watson have added the CP/M version of the "C" compiler, which was originally published by Arnor Ltd some time ago, to the (currently rather short) list of programs which Brian will supply in future as shareware.

Up to now, the only other one has been the CP/M version of MAXAM; aka Maxam 2. Rather more interestingly, Brian is doing the same with the ex-Arnor print-enhancement program Protype.

From now on, both programs remain covered by copyright, but may be freely distributed for no more than the British equivalent of £5, to cover reasonable expenses of copying, this price to include the price of the disc/s or other media (if supplied) and postage and packing.

Hopefully, this will minimise the chances of customers of PD librarians and "freelance copiers/distributors" getting ripped off for unreasonable charges, says Brian. Either may be distributed in any form usable by a CPC, and the C

compiler may additionally be distributed in any form usable by a PCW/PcW. At some stage when Brian has stopped playing 8BIT magazine editor, he will recompile both programs manuals as ASCII text files for free distribution/uploading etc. In the mean time if anyone wants a proper printed manual Brian has just had a few reprinted to sell on at £5; that's cost price, plus a bit for p&p. For any further clarification, please e-mail me at:

[protext@spheroid.demon.co.uk](mailto:protext@spheroid.demon.co.uk)

or write to: Harrowden, 39 High Street, Sutton-In-The-Isle, Ely, Cambridgeshire, CB6 2RA.

### WIBBLE IT

As you read this, issue four of Wibble should be available. As many of you know, it's a PC magazine for upgraders from 8bit computers such as the CPC, as well as those completely new to PCs. It has a letters page, educational programs and games reviews, articles about the internet and by far the most popular feature, step-by-step guides on how to perform all those actions that are a bit fiddley.

The magazine is £1 and currently quarterly, though changing to bi-monthly is on the cards soon. You can write to me at the above address for a free copy or find more details as well as an on-line issue at the website: [www.midnight.ndirect.co.uk](http://www.midnight.ndirect.co.uk)

**GOLDEN YEARS**

ARTWORK LAYOUT

MOBES

# LOOKING AT THE DART SCANNER

PETER ROGERSON  
CHARACTERS BY JONTY JONES

Many years ago a firm called Dart Electronics brought out a scanner for the CPC. It was a clever device as we shall see, and it performed creditably well. I've got my hands on one and this article is meant to do two things: one, to introduce the uninitiated to the world of CPC scanning and two, to use it and introduce you to a world created by fellow member Jonty Jones. Oh, the lives that some folk lead, especially if they're fortunate enough to live at the glorious Golden Years Retirement Home.... There should be a whole series of cartoons to follow during the months and years ahead. Or at least, that's the theory.

As Uncle Clive might tell you if he were pushed by the promise of an extra rubber at Dominoes, there's many a PC owner with a flat-bed scanner attached to his incredibly clever chunk of plastic. And that scanner, brothers and sisters of the WACCIHOOD, when used in conjunction with his PC and the right software, can reproduce images with incredible sharpness.

But what has the CPC got in order to compete with such technological excellence? Well, the answer isn't nothing and those who are relatively new to the CPC world might be surprised to read that. To my knowledge there are two solutions to the scanner problem. The first can be discounted because half-centimetre pixels just aren't on. And that first is a do-it-yourself project in a book entitled "Easy add-on Projects for the Amstrad and MSX Computers", published by Babani.

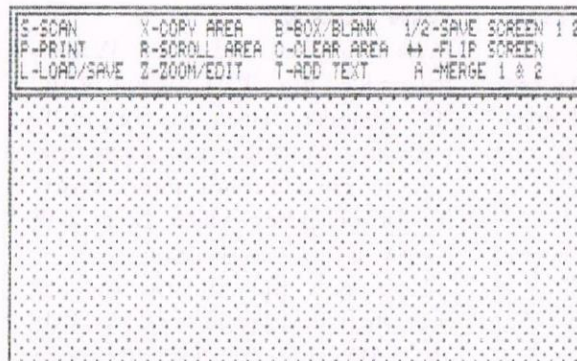
The second is the Dart Scanner which comes (or came - it isn't produced any more) with its own software on tape or disc.

The Dart Scanner is a small device that fits on the print-head of the DMP range of printers and scans pictures etc if they are fed like blank paper into the printer. And it actually works with varying results depending on the original. It likes black and white outline drawings, copes moderately with monochrome photographs and hates colour of any kind, often failing to distinguish between widely different colours. But then, the CPC, though capable of coloured output, is almost solely used to produce black-and-white pages when it's being used for DIP work.

There are several ways of dealing with scanning. An image can be scanned real-size or enlarged x2, x3 or x6. I like using x2 and then using MD+ to reduce its

size, because a large picture gains a degree of crispness when it's reduced. But a word of warning might not go amiss: mess around with increasing and reducing the size of your image too many times and the pixels will tend to become blocky and the final picture as clear as fog.

On loading the "Dartscan" program the screen is as follows:



Don't worry, the options clearly speak for themselves and all work with refreshing ease. Just select SCAN and you're off. There are a couple of on-screen prompts, how many screens (1 or 2 - use 2 if you're enlarging even a medium-sized picture), and enlargement. Oh - and you must tell it where on the original your image is by entering a quantity of spaces that precede its left-hand edge. Here a quantity between 0 and 66 suffices.

Then the thing begins working. There's the dimmest of lights on the scanner-head (it takes its power from the CPC's motherboard) and the head moves back and forth over the picture in the printer until it's done. There's an option to stop scanning and start again (essential as adjustments using the single control on the interface aren't changed retrospectively).

Modern scanners and their photograph-like images might produce infinitely better results,

but there's something fascinating about watching the Dart scanner at work. Words like "Heath Robinson" spring to mind....

Screens are saved using the SAVE option (press L for LOAD!). Then they can be imported into MicroDesign Plus or PowePage and manipulated until they fit your own particular bill.

Now for other things. What follows is in part the brain child of Jonty and is intended to be a comic interlude on a monthly basis in future issues of the mag. At the same time the little jokes and accompanying illustrations will be a constant reminder of what the good old CPC can do.

Golden Years home is a weird and wonderful retirement home run by a mish-mash of staff no real retirement home would ever recruit. So there goes its credibility to start with. Before I begin proper I'll just dole out the technical facts: text produced on Protex (what else?), pictures Dart-scanned from originals sent to me by Jonty, and the whole lot put together using MD+ and printed on a Citizen 1200 9-pin printer. So that said, here goes.

The building currently occupied by the Golden Years Residential Home for the Ancient was built during Victorian times as an asylum wherein such lunatics as unwed mothers, simpletons and other misfits were incarcerated. A fascinating range of disciplinary and restraining apparatus still exists in odd corners of the place, much to the satisfaction of its present staff and the perverse enjoyment of its patients.

The asylum was closed in the 1950s when social enlightenment began to replace blinkered pre-

judice, and it lay empty until well into the 1980s, when it was taken up as a warehouse by an unnamed electrical company that had just entered the computer market with a spiffing little 64k box of tricks.

The stay, though, was short-lived, and they withdrew in the early 1990s when it became quite clear that 8 was an inadequate number of bits for the years leading up to the Millenium. They left a few souvenirs behind, boxes piled in forgotten cubby-holes. It was then that the building was bought by the proprietor of Golden Years (of whom more later), and converted into the happy home for the geriatric and the senile that it is today. And as a consequence of the unwitting inheritance from previous owners, each room was equipped with a fascinating range of weird and wonderful Victorian instruments cleverly crafted out of leather and wrought iron, together with an abundance of elderly computers that came free with twelve ancient cassettes.



The chef was born Josh "Dogs-breath" Smith in 1952, only son of a petty pickpocket and a muck-spreader (she was the muck-spreader, which occupation did little for her natural bouquet). He learned his culinary skills whilst enjoying a

life of ease and leisure at Pentonville. Later, as a consequence of poisoning his by then infirm mother (the muck had got into her system and done its worst) he went into hiding and kept body and soul together by joining the black economy as junior cook's dogsbody at the Golden Years Retirement Home, where he was rapidly promoted to the position of Head Chef because he was one of the few survivors of an outbreak of Bubonic Plague that originated in the kitchens.



Dr Manson Testines had a considerably more advantageous background, being the son of a barrister and a call-girl. Manson, though, chose a different path

through life and became a dentist. Success was just round the corner when he was expelled from his profession subsequent to an unwelcome and unsavoury fixation with his nurse that got out of control. Bitter with shame, he sought employment at Golden Years, forging documents that claimed him to be an eminent Ear Nose and Throat man with a smattering of gynaecology. The fact that the occasional resident died following a course of his treatment was put down to the fact that old people do, unfortunately, occasionally pass away, and his skills were never questioned.

One of his nurses was Imogen Grimwolde. So sweet a nature, matching her name! She had enjoyed a full and explosive career as a weight-lifter and shot-putter and used the valuable lessons she'd learned during her years of heaving and chucking to equip herself for the tender and loving nursing of the elderly. But she didn't have everything her own way. For some inexplicable reason a few of her male patients looked at her through more than platonic eyes. Some even made crude advances to her, but these she managed to repluse after allowing herself a few moments in which to savour what was to her a unique and unexpected experience.



There were two males in the home who could keep her from a life of isolation, known less for their good looks than their dubious medical skills, which were non-existent. The Codpiece brothers, Luton and Dunstan, were twins, sons of a circus boxer and a ship's stoker. Mum was the boxer and dad only rarely visited the family home. The two boys grew up on a tough street where to survive at all was a triumph. They survived, and they survived well.

They had both been expelled from school as boys, for burning it down (twice - the Headmasters cat perished in the second conflagration, and he was not well pleased). It was a bad business and they were best out of it.

In adult life they became firemen, working all the hours God gave them, shift after shift after shift, and the pressure of work eventually got at them. They both went simultaneously insane, an ideal qualification for employment at Golden Years.

Mona Price was born in 1341, only daughter of a crazed shepherd and a manically depressed peasant girl called Annabel who had spent a childhood being thrashed because back then people didn't understand manic depression. In 1376 Mona was burnt at the stake as a witch. Her persecutors got the burning part wrong - burning people is always wrong - but the witch part right. She holed up in a cave and licked her wounds and, once healed, proceeded to spend the next several centuries selling lucky heather to the luckless. And so the years turned, and the twentieth century was nearing its end before she saw sense, bought a disused warehouse and converted it into an asylum for the elderly where, she told herself, she could torture humanity until the end of time if she so chose. So she promoted herself to Matron and the insanity began. But deep inside her weather-beaten, fire-scarred heart there was the gentlest breath of a wind called compassion. Or it might have been something more sinister. Who can tell?



There are others, of course, the patients, and a strange lot they are too. But space and pages and mundane things like that condemn us and we must wait for another time before we reveal their sinister secrets, one by wretched one.

And there you have it. The drawings don't look so bad, though you haven't seen the originals and therefore can't judge. I have and I can confirm that Mr Dart-Scanner's done his job, as have Protex and Microdesign. And the CPC, of course. Which is as it should be.

PETER ROGERSON.

# Basically Speaking

*Have you ever wondered how that wonderful program that flashes onto your screen, upon turning the computer on, actually works? Well, if you have, you can find out now!*

**WARNING** - This article requires some knowledge of the way the CPC's memory is utilised.

## The 'B' word

Yep, you guessed it this article is all about BASIC and what it does. The version of BASIC implemented on our CPCs was programmed by Locomotive and there are two versions, 1.0 and 1.1. There isn't much difference between the two except for V1.1 having a few more commands. Both versions work in exactly the same way when it comes down to what the commands do and how they work, though.

The part of the program that does all the work is the BASIC interpreter. This resides in a ROM and is automatically executed when the computer is switched on. It is a 32K ROM and is split into two blocks of 16K, one block is the actual BASIC interpreter, and the other block holds all the routines that the computer uses, called the firmware.

In direct command mode ie. when there isn't a program running, the interpreter executes each command as it comes across it, so it isn't stored anywhere in memory. When there is a program typed into memory it isn't executed straight away, so it needs to be stored somewhere.

## Where Did I Put that Damned Program?

The program, once it is typed in, is stored at memory address &170. If you type something in and then read a byte from this address, with a PRINT PEEK(&170) command, it will return a number, which happens to be the length of the first line of the

program. Each line of the program is compressed as it is entered so that the program doesn't take up too much space. This is achieved by replacing each command with a one byte 'token', eg. The PRINT command would be stored in memory as the byte &BF. The full list of all the commands can be found on page 72 of the Alternative Firmware Guide.

For the program to be executed later the interpreter needs two pieces of information for each line, the length of the line and the line number. These are both stored in four bytes before each line, with the length of the line being the first two bytes, and the line number being the next two bytes. They are both stored in LSB-MSB (Least Significant Byte-Most Significant Byte) form.

Due to AMSDOS using memory below HIMEM, but after the BASIC program area, the address of the last byte of the program needs to be known. This address and the address of the variables and strings area are stored in bytes from &AE68 to &AE6D (&AE85-&AE8A for the 464).

The address of the start of the variables area is held at address &AE68 (&AE85 for 464), the start of the arrays area is held at &AE6A (&AE87 for 464), and the address of the start of free space is &AE6C (&AE89 for the 464).

These three addresses are needed so that the strings won't overwrite the program in memory and so that AMSDOS doesn't overwrite any of the string or variables in its disc operations.

## The Complicated Bit

All seems pretty simple so far, huh? The hard part comes when storing things like strings and variables. To do this the interpreter employs a descriptor byte. This consists of any of the bytes from &02 to &04 or &0B to &0D. These say whether the following variable is a string, an integer, or a real variable, the byte &0D is used for any undefined variables ie. variables that haven't been declared in a DEFINT, DEFSTR, or DEFREAL statement or that don't have a '%', 'S', or '!' after them.

The variables are stored in the program as the descriptor byte, followed by two zero bytes, the name of the variable or string then follows. It is stored with bit seven of the last byte of the name high, eg. the variable ACC would be stored as the bytes &0D, &00, &00, &41, &43, &C3. The first byte is the descriptor byte which is &0D in this case because the variable is undefined. It is then followed by two bytes of &00 and then the ASCII codes for the letters ACC. Note that there is 128 added on to the value of the last letter to set bit seven high.

If you thought that was bad enough it gets worse! When dealing with numbers the interpreter uses five different descriptors. Three of the descriptors are for different types of numerical numbers and the other two are for binary and hexadecimal numbers.

The first descriptor, &19, is for integer numbers from 10 to 255 with the value of the number held in the byte after the descriptor. The second

one, &1A is for numbers from 256 to 32767 with the value in the next two bytes of the program in LSB-MSB form. The third one, &1F is for all numbers greater than 32767 or less than -32767, this includes floating point numbers. I will explain how these numbers are stored a little later.

Now, you may have noticed that I haven't told you what the descriptor for the numbers 0-9 is, the answer to this is that there isn't one! The numbers 0-9 are represented by the bytes &0E-&17 respectively. This is a clever trick that Locomotive employed, so that the most used numbers would only take up one byte, rather than two.

It all seems pretty straight forward, so far, but now we come to floating point numbers. These numbers are after the &1F descriptor and are held in five byte form in a very weird way! All of the bytes are used to store the number but the last two bytes are used as numbers as well as descriptors.

The number is stored backwards with the MSB being the fifth byte and the LSB being the first byte after the descriptor. The numbers are stored with each byte being 256 times bigger than the previous one and all of the bytes are added together to get the final number eg. if there are two bytes &01 and &01 then the second byte would stand for  $1 \times 256$  and the first byte would stand for  $1 \times 1$ , when added together they would give a result of 257 (this is a simplified version of how it works.)

The fifth byte of the string decides whether the number is between 0 and 1 or whether it is more than 1. If the fifth byte of the string is over &80 then the number will be 1 or over, if it is &80 or less then the number will be between zero and one. The number 1 is represented as &81 in this byte.

This byte doesn't operate in the same way as the other bytes. Every

time the byte is incremented it means the number the byte represents will increase by a multiple of 2 eg. &81 would be 1, &82 would be 2, &83 would be 4, &84 would be 8 etc. Every time the byte is decremented it decreases by a factor of a half eg. &80 would be 0.5, &7F would be 0.25, &7E would be 0.125, &7D would be 0.0625 etc. Each byte before this represents numbers 256 times smaller, so the accuracy that the number is stored as is determined by the size of the fifth byte.

The fourth byte is used to tell the interpreter if the number is a negative or positive number. It does this by setting bit seven high if the number is negative ie. every value over &7F in this byte would make the number negative. The byte is worth 256 times less than the fifth byte.

The three remaining bytes prior to the fourth and fifth bytes work on being 256 times smaller every time, with the smallest being the first byte and the largest being the third byte, with the fourth and fifth bytes being worth 256 and 65536 times more than the third byte, respectively. The fifth byte is 256 times bigger than the fourth byte so it would be  $256 \times 256 = 65536$  times bigger than the third byte.

So, if given five bytes we can now calculate the value of those five bytes, so lets give it a try! (Reach for that calculator now!). If there is five bytes of &FF,&FE,&00,&7F,&90 we would first calculate the value of the fifth byte, which is 32768 in this case (&80 is equal to 0.5, so if we multiply this by  $2^{16}$  we get 32768.)

The second byte is worth 256 times less than the first byte so every time it is incremented it will go up by  $32768/256$  which equals 128, when multiplied by &7F we get 16256. This is then added on to the value of the fifth byte so we get 49024, so far.

The third byte is 256 times less than the fourth byte so every one in

this byte is multiplied by  $128/256 = 0.5$ , which when multiplied by the value of this byte, &00, gives us zero. That one was easy, so our total is still 49204, since we have just added zero to it. The second byte is 256 times less, again, than the fourth byte so we get  $0.5/256 = 0.001953125$ . After multiplying this by &FE we get 0.49609375. Totalling this up we get 49024.49609...

Right, last byte, this is  $0.001953125/256$ . This is so small there is no point in working it out, as it doesn't really serve to illustrate the point that well. When this is then multiplied by &FF we get 0.001945495. Adding this to our total we get the final value of 49024.49804.

Not that complicated really! If you want to store a number, that you already know, as a five byte number, for example 65536, you have to do the logarithm to base 2 of this and add it to &81 (as &81 is equal to 1.) The rest of the numbers can then be calculated by subtracting the value for this from the total, and then dividing it by the value of the byte divided by 256.

### To Conclude

Well, I think that's just about all there is to know about how the BASIC interpreter stores the programs. If you are interested in how the BASIC programs are stored I advise you to buy the Alternative Firmware Guide because it has all of the BASIC 'tokens' listed in it.

This can be used to make complicated programs in BASIC that actually change themselves as they go along. This technique could be applied to those long machine code type-ins that check the data lines before the program is executed, so that the faulty line can be EDITed without leaving the program because as you may know the EDIT command doesn't work with a variable after it.

*James Hoskisson*

# The Weakest Link

*There is a saying that a chain is no stronger than its weakest link. This certainly applies in the case of floppy disks. We have all become so reliant on modern technology that we sometimes put all our faith in it and we commit our priceless work onto a fragile piece of plastic!*

When the quality of the disks is high, this is not generally too risky. However, with the 3" disks the plastic hub in the centre sometimes becomes detached from the membrane. Dropping the disk can dislodge it. So can leaving it in the drive for hours so that it gets too hot. The adhesive melts, allowing the hub to slip off centre. After use, always lay disks flat until they are cool before storing them upright in boxes.

Good quality 3" disks are now in short supply. The only criterion that I have found by experience to indicate the quality of a disk is the marking on the plastic. Those bearing a country of origin (usually JAPAN) or a serial number are usually better than those without. This applies to both 3" and 3 1/2" disks. Often a disk without these markings will not format properly at the outset.

Another problem becoming more common for AMSTRAID users with 3 1/2" drives is the use of the wrong type of disk. 3 1/2" disks come in two types - those with two holes in the plastic are intended for high density (1.44Mb) drives, whilst those with only one hole are meant for 720k drives, such as those on the PCW/PeW machines.

There is a common belief that these disks are actually of the same quality and that the manufacturers are "ripping off" users by charging twice the price for the high density variety. A special tool is even advertised that allows you to cut an extra hole in the 720k disks so that high density PC drives think these are really 1.44Mb

disks! Although you may get away with using the wrong type of disk for a while, problems will occur sooner or later. PCW/PeW users must only use the cheaper 720k type (often labelled 1Mb unformatted). The reason is that the high density disks are much more magnetically sensitive so that the information can be packed closer together without "blurring". The PCW/PeW 720k disk drives may "overload" the magnetic medium and the data will invariably become unreadable at some point.

## Oh No!

I was playing bridge the other evening and my partner was about to make "game". As she laid the penultimate card she let out a gasp or horror. She had played the wrong card. Result, one trick down. The sinking feeling she experienced will be familiar to anyone who has accidentally erased an important file.

Fortunately, LocoScript puts such files temporarily into "limbo", from which they can be recovered, but only if LocoScript has not needed to erase the limbo copy to make space either in the directory or on the disk for work subsequently carried out. This is one reason why CP/M files should not be stored on the same disk as LocoScript files. Any CP/M files stored in user groups 8 to 15 are regarded by LocoScript as limbo documents and may be erased without warning.

Erasing files in CP/M marks the file entry in the directory as "erased" by changing the user group to the hex value "E5" leaving the information on where on the disk the data are stored and the length of the file unchanged.

This feature is exploited by the various CP/M "UNERASE" programs, which simply change the "E5" back to user group 0. However, these don't always work properly. Files have directory entries called "extents" - one for each 16k or part of the file. If there are several erased copies of files with the same name then there is some ambiguity over which extents belong to which files.

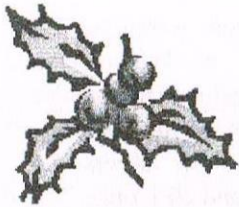
The bigger the file, the more possibilities and these utilities cannot tell which extents belong to which files. Murphy's Law dictates that the correct allocation won't be chosen!

These programs won't work at all with erased LocoScript files. This is because LocoScript for some reason erases all the information in the directory on where the data are stored on the disk. Recovery of such erased files is possible thorough the painstaking search through the available data blocks in the unused areas of the disk using a disk sector editor - just like doing a jigsaw puzzle.

One final piece of advice. If you erase a file accidentally, stop working on the disk immediately. This applies to CPCs, PCWs and PCs. Any attempt to work on the disk risks overwriting the data belonging to the file, making it totally unrecoverable. Of course, if you kept backup copies erasing a file wouldn't be a disaster anyway!

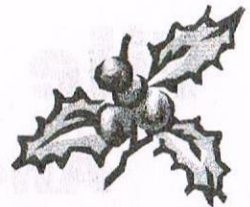
**Dave Smith**  
**Dave' Disc Doctor Service**  
**41 Tutsham Way**  
**Paddock Wood**  
**Kent, TN12 6UA**  
**01322 278045**





# Christmas Quiz

## with Roger Graves



Below are the second verses of a few popular Christmas carols. Just write the name of the carol you think it is next to the relevant verse.

The following events occurred on either Xmas Day or Boxing Day in one of the years listed. Match the year with the event and for a bonus point state if the event was on Boxing Day or Xmas Day. e.g: 1771, Xmas Day.

1. He came down to earth from heaven,  
Who is God and Lord of all,  
And His shelter was a stable,  
And His cradle was a stall:  
With the poor and mean and lowly  
Lived on earth our Saviour holy.
2. God of God,  
Light of Light,  
Lo! He abhors not the Virgin's womb;  
Very God,  
Begotten, not created:
3. They looked up and saw a star  
As it shone in the East, beyond them far;  
And to the earth it gave great light,  
And so it continued both day and night.
4. Christ, by highest heaven adored  
Christ, the everlasting Lord.  
Late in time behold Him come,  
Offspring of a virgin's womb !  
Veiled in flesh the Godhead see !  
Hail the Incarnate Deity !  
Pleased as Man with man to dwell,  
Jesus, our Emmanuel !
5. Born a king on Bethlehem plain,  
Gold I bring, to crown him again -  
King for ever, ceasing never,  
Over us all to reign:
6. O morning stars, together  
Proclaim the holy birth,  
And praises sing to God the King,  
And peace to men on earth;  
For Christ is born of Mary;  
And, gathered all above,  
While mortals sleep, the Angels keep  
Their watch of wondering love.

### YULETIDE EVENT YEAR XMAS / BOXING DAY

1. Kenny Everett, radio & TV comedian; born.
2. W.C. Fields, US film comedian; died.
3. Richard Widmark, US film actor; born.
4. The Mayflower arrived at Plymouth Rock, Massachusetts.
5. Mao Tse-tung, Chinese Communist leader; born.
6. William I (the Conqueror) was crowned in Westminster Abbey.
7. Anwar Sadat, Egyptian statesman; born.
8. Humphrey Bogart, US actor; born.
9. Harry Truman, 33rd president of the USA; died.
10. Fidel Castro landed in Cuba, starting a revolution against the Bastia regime.
11. HRH Princess Alexandra; born.
12. World's first feature film was shown in Melbourne, Australia.
13. Sir Isaac Newton, English mathematician and scientist; born.
14. Charles Pathe, French film pioneer who inaugurated newsreels; died.
15. First US regularly scheduled passenger train began on the South Carolina Railroad. (steam)
16. First Christmas tree in Britain was put up at Queen's Lodge, Windsor by Queen Charlotte.
17. Radium discovered by Pierre and Marie Currie.
18. King Stephen acceded to the throne of England
19. The Mont Cenis tunnel through the Alps was completed.
20. Emperor Hirohito acceded to the Japanese throne.
21. Charlie Chaplin, American film actor and director; died.
22. Stuart Hall, radio commentator and presenter; born.

### CHRISTMAS QUIZ - ANSWERS

- |                              |    |
|------------------------------|----|
| ONCE IN ROYAL DAVID'S CITY   | 1. |
| O COME ALL YE FAITHFUL       | 2. |
| THE FIRST NOEL               | 3. |
| HARK THE HERALD ANGELS SING  | 4. |
| WE THREE KINGS OF ORIENT ARE | 5. |
| O LITTLE TOWN OF BETHLEHEM   | 6. |

### LIST OF YEARS

1066	1899	1956
1135	1906	1957
1620	1914	1972
1642	1918	1977
1800	1926	
1830	1934	
1870	1936	
1893	1944	
1898	1946	

# File Conversion And WACCI PC by Christine Raisin



*I had reason to change some files from CPC Amsdos to MS-Dos here is how I did it. You do need a 3.5" drive attached to your CPC.*

Firstly you have to format your MS Dos disc's on the PC. Using Double Density Discs format them to 720MB. Log on My Computer, click on 3.5" disc drive from the File Menu, select Format, when the format windows goes up click OK.

When it's done, the summary will tell you if there are any bad sectors When you have formatted all the discs you need ( I always do a few extra in Case Doscropy don't like some or can't read or write to them), you are ready to go on to the CPC. Run "Doscropy" go to copy at the screen choose AMSDOS TO MS DOS, press enter, follow screen prompts to put in the two discs. It will log in the Amsdos disc, you select the files by pressing the Space Bar or the Copy Key to tag the files, pressing the down arrow will take you to the next file. When all the files are tagged press Enter and away the computer will go and do the job for you. When finished I always log the MS Dos disc in by going to MS DOS to AMSDOS, just so as I know all has gone over. Then Press Esc and you can start the next disc.

I did 56 discs with no trouble. I was taking Protext files over to Word. Easy, yes this far, when they loaded into Word it puts bits of gobbledegook in the text, now taking that out is another matter.

Okay load your file into Word and follow these instructions and hopefully 90% of the gobbledegook will be removed. If you look at your screen you will see lots of little squares either in front of or behind

words, also some funny S's in front of some words, (this is what we are calling gobbledegook). Using your mouse button highlight the square behind a word. Press Control and X on your keyboard, the square disappears, go to your Edit menu and click on Replace, in the window that appears, make sure the cursor is in the find what window, press Control V on the keyboard, you should see the little square now in the window.

Leave the command replace with blank, click on replace all, and lo and behold all the squares are gone. You can repeat this procedure for the funny S's as well. This leaves you with just a few minor bits to clean out and a spell check and there you are all your files transferred over.

## WACCI PC

*Ok having twisted our Editor's arm here is the first in a new series, for all you dual users, what I hope is for you learn along with me, how to use our shiny new PC, and to get the best from it.*

### Creating A Shorcut

The first thing I learnt to do with my computer was to create shortcuts to my favorite programs, the reason you do this is to save the time and trouble of having to go into programs or Windows Explorer every time you want to use a favorite. So this is where we will start.

Now this really is down to basics, I'm trying to write this as I see it and I apologies to all you teckies right at the start because I'm not even going to try and use technical terms because

I'd probably get them wrong so I'll write is as I see it. When your computer has started up and you're into Windows Click on Start and go up to programs. Go across to Windows Explorer and click once.

Look down the column on the left called All Folders and find the file you want. Open the folder by clicking once.

Once you have clicked, on the right hand side of the screen you will see all the files for that program listed, this is called the list of contents.

You need to click on the application file, most of these have a little picture, but if it is a DOS application is shows up as a small window box with a tiny yellow icon inside. Right click on the picture icon or small window icon, which should bring you up a menu. If the menu doesn't happen you've got the wrong application or window file so try again, don't worry you can't do any damage. Once you've got the menu go down to create shortcut.

Left click once this will bring up a highlighted file called Shortcut to (name) If you want to put this shortcut onto your desktop. Click the minimise folder on the top right of the screen the one with the two boxes in, this should make your window explorer small so that you can see the desktop.

Click and hold down the left mouse button on the highlighted shortcut and drag the ghost over onto your desktop release the mouse button and the shortcut icon will appear. To use your shortcut double click



On it.

Well there you have it. Please feel *free* to send in letters with your comments and questions and if there's something you're trying to learn shout and I'll give it a go and then try to show you step by step.

# The Multiface

By Martin Beddall

## What Is It?

The Multiface was manufactured by Romantic Robot, the one for the CPC computer range being called the Multiface Two; a version was also made for the Plus range when they came out, or you can use the original model with an expansion port converter fitted between the Plus and the Multiface. The Multiface plugs into the expansion port and has a through port edge connector on it to allow other add ons to be fitted; it is approximately 4" \* 2.5" \* 3/4" in size and has two buttons on the top; a STOP and a RESET.

## What Can I Do With It?

The Multiface allows you to stop and restart programs whenever you wish and back them up to tape and disc as well as saving screens for say use in art programs. You can save your game just before you always get killed so that you do not have to restart from the beginning just reload your saved game.

Since the Multiface saves the computer's memory image, it will save any program whether from disc, tape or just typed in, after exiting from the Multiface the program continues as normal.

You can use the Multi toolkit which resides in the Multiface's own ROM chip to study and modify programs, find infinite lives and probably one of its best uses; POKE game cheats into memory to make you invincible etc...

It also contains 8K RAM to act as a buffer or allow you to load in the INSIDER which is a program to help you in Z80 programming, also

designed by Romantic Robot. The RESET button allows you to clear the first 64K of CPC RAM, instead of the [CONTROL/SHIFT/ESCAPE] routine which does not always work with some games as this routine is disabled within the game code, resulting in disc out, switch off and on - now you can just press the RESET button; much easier.

## Connecting Up

With computer switched off, connect the Multiface to the expansion port, making sure the connection is firm as wobbly connections can damage ROMs. If when switching on random rubbish appears on the screen, switch off and clean the connection, if problems still occur just have the Multiface connected without any other add ons.

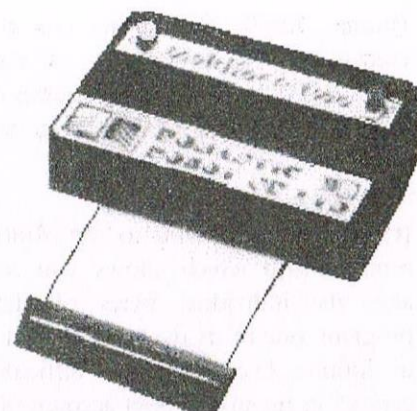
## Away We Go!

The Multiface has a software switch to prevent possible clashes with programs which makes it invisible or visible to them on loading. After CPC switch on or after using the reset button the Multiface is on, or visible. To switch it off just press the STOP button, a menu appears on screen, select **r** to return and the menu disappears.

Even though you have just switched off the Multiface it is still usable, it is just invisible - if you get my meaning!

Run the program that you wish to save/inspect and push the STOP button at the place you wish to halt the program, e.g. when the screen you wish to copy is on display. The following main menu then appears:

(r)eturn (s)ave (t)ool (j)ump (c)lear



## Main Menu

Select the appropriate function shown in inverse on the screen.

(r)eturn This returns to the program and continues running of it.

## SAVING A PROGRAM OR SCREEN.

As the Multiface saves the computers memory, the memory that does not have any program code probably contains rubbish, on the 6128 the extra 64K will be saved as well so if your program only uses the first 64K then your saved program will waste a lot of storage space. It is a good idea to clear the original RAM before loading a program, use the RESET button first. To clear the 2nd 64K select (c)lear before saving if you are sure the program does not use it.

On selecting (s)ave you can type in the filename (normal filename rules apply) without an extension and press [RETURN], the menu changes to:

ESC] (h)yper(t)ape (d)isc (s)creen (p)rogram

Select **p** for program or **s** for screen, you can back out by selecting [ESC]. Select **d** to save to disc making sure the disc has enough space which could be up to 128K if all the memory is used on the 6128.

If saving to tape you can select **t** for normal speed of 1000 baud or **h** for hypertape speed of 2000 baud, press **play** and **record** then any key on the computer as usual. When saving is complete the main menu is re-displayed.

(j)ump Briefly this allows you to execute code at any address in the CPCs ROM or RAM, and requires a good knowledge of machine code to use it.

(t)ool This takes you to the Multi toolkit menu which allows you to alter the individual bytes of the program, one of its uses is to POKE in infinite lives in those difficult games!, its menu and brief account of the operations is shown next:

|ESC| |RET|poke |SPC|addr (r)eg  
(h)ex (w)in (p)al (i)nfo (s)el

ESC returns you to the main menu.

RETURN allows you to see the contents of the address and type in a new number if you so wish.

SPACE allows you to enter a new address to have a look at.

(r)eg to point to the Z80 registers at the point you stopped the program.

(h)ex toggles between hexadecimal and decimal.

(w)indow to open a 56 byte window with full on screen editing press w again to finish editing.

(p)al to point to the colour pallette allowing you to edit the colours.

(i)nfo displays a series of bytes showing the status of the computer, you can find out the screen settings and some system variables.

(s)el the toolkit can only show 64K at a time so on the CPC6128 you can select which bank of memory to look at.

### Poking About

Since the main use will be, say to alter the lives byte so that you become invincible in your game here are the steps to take. First run your game, then push the STOP button and select the toolkit. Then press |SPACE| and type in the address number, once this is typed in the cursor jumps to the value of the address, type in the new number and press |RETURN|.

Finally press q to quit and r to return to the game.

**Reloading Your Saved Program** To reload make sure the Multiface is switched on and type RUN "filename". The saved program can only be run if the Multiface that saved it is connected to the computer this is to prevent software piracy, but there is now a program to allow you to reload Multifaced programs without a Multiface being present called MULTIFAC which is on PD Disc 68; the computer needs to have 128K of memory for this program to work.

**Reloading Your Saved Screen** To reload screens saved with the Multiface the following short program needs to be run:

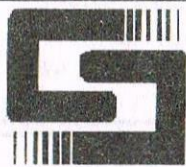
```
10 MEMORY 16384
20 LOAD "filename"
30 CALL 32768
40 WHILE INKEY$="" :WEND
50 MODE 1
```

To convert the Multiface screen image to Amsdos format so that you can use it in art programs (Advanced Art Studio), or your own BASIC programs etc... Then there is a program on PD disc 47 called MCONVERT.



**30 North Street, Leatherhead, Surrey, KT22 7AT**

<p><b>Tel: 01372 378608</b> <b>Fax: 01372 803999</b></p> <p><a href="http://www.stscomputers.co.uk">www.stscomputers.co.uk</a> <a href="mailto:info@stscomputers.co.uk">info@stscomputers.co.uk</a></p> <ul style="list-style-type: none"><li>• PC System builds with standard components, easy for upgrading</li><li>• Repairs/Upgrades on all types of PCs/ accessories</li><li>• Internet accounts from under £11 per month</li><li>• Data recovery and Networks</li><li>• Hardware/software conflicts a speciality</li><li>• All jobs carried out by experienced engineers</li><li>• Repairs fully guaranteed</li><li>• On-site service, free local delivery (within 10 miles of Leatherhead)</li></ul>	<table border="0" style="width: 100%;"><tr><td><b>Budget Buster</b></td><td style="text-align: right;"><b>£699.99</b></td></tr><tr><td colspan="2">Cyril MX300Mhz Processor, Aopen Mainboard, 32Mb RAM, 4.3Gb Hard Drive, x24 Speed CD-ROM, 16 Bit Sound Card, Midi Tower/Desktop ATX case, 14" SVGA Monitor.</td></tr><tr><td><b>Home Office</b></td><td style="text-align: right;"><b>£839.99</b></td></tr><tr><td colspan="2">Intel Celeron 300Mhz Processor, Aopen EX Mainboard, 64Mb RAM, 6.4Gb Hard Drive, x24 Speed CD-ROM, 16 Bit Sound Card, Midi Tower/Desktop ATX case, 15" SVGA Monitor.</td></tr><tr><td><b>Ultimate Office</b></td><td style="text-align: right;"><b>£1799.00</b></td></tr><tr><td colspan="2">Intel Pentium 2 400Mhz CPU, Aopen BX Mainboard with 100Mhz Bus, 128Mb SDRAM, 8mb Matrox VGA card, 8 Gb Hard Drive, x32 CD-ROM, AWE 64 Value Wavetable Soundcard, Midi Tower/Desktop Case, 17" Monitor.</td></tr><tr><td><b>Games Demon</b></td><td style="text-align: right;"><b>£1899.00</b></td></tr><tr><td colspan="2">Intel Pentium 2 400Mhz CPU, Aopen BX Mainboard with 100Mhz Bus, 128Mb 100Mhz SDRAM, 12Mb Voodoo 2 Accelerator Card, 8mb Matrox G200 VGA card, 8Gb Hard Drive, x32 CD-ROM, AWE 64 Value Wavetable Soundcard, Midi Tower/Desktop Case, 17" Monitor.</td></tr></table>	<b>Budget Buster</b>	<b>£699.99</b>	Cyril MX300Mhz Processor, Aopen Mainboard, 32Mb RAM, 4.3Gb Hard Drive, x24 Speed CD-ROM, 16 Bit Sound Card, Midi Tower/Desktop ATX case, 14" SVGA Monitor.		<b>Home Office</b>	<b>£839.99</b>	Intel Celeron 300Mhz Processor, Aopen EX Mainboard, 64Mb RAM, 6.4Gb Hard Drive, x24 Speed CD-ROM, 16 Bit Sound Card, Midi Tower/Desktop ATX case, 15" SVGA Monitor.		<b>Ultimate Office</b>	<b>£1799.00</b>	Intel Pentium 2 400Mhz CPU, Aopen BX Mainboard with 100Mhz Bus, 128Mb SDRAM, 8mb Matrox VGA card, 8 Gb Hard Drive, x32 CD-ROM, AWE 64 Value Wavetable Soundcard, Midi Tower/Desktop Case, 17" Monitor.		<b>Games Demon</b>	<b>£1899.00</b>	Intel Pentium 2 400Mhz CPU, Aopen BX Mainboard with 100Mhz Bus, 128Mb 100Mhz SDRAM, 12Mb Voodoo 2 Accelerator Card, 8mb Matrox G200 VGA card, 8Gb Hard Drive, x32 CD-ROM, AWE 64 Value Wavetable Soundcard, Midi Tower/Desktop Case, 17" Monitor.	
<b>Budget Buster</b>	<b>£699.99</b>																
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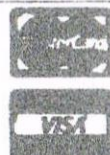
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