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## R E G ULAR S

## News

Codemasters on hamster frenzy, Emmanuelle pixelised, Bob says "no way buster!", and so much more . . .

## Neon Zone

John 'Pinball Maniac' Cook straps himself into a few racing games and comes out as smooth as ever.

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## Applications

 AdviceAgony Uncle David Foster returns to answer all your queries on hardware and software.

## Meltdown

A brand new games section arrives to sizzle your fancy.


## 55

Eprom Programming
Mind Blowing II - The sequel. Phil Craven strikes back with a follow-up to the articles in April's edition.

## Hairy Hackers

Cheats have never been so popular.

## Letters

Lance Davis sifts through the latest batch of readers views, and comes up with some interesting replies.

## COVER S TORY

## Blasteroids

Amstrad Computer User delivers the first exclusive review of the Asteroids rehash.

## PROGRAMMING

## 10 Liners

It's money time for a bunch of readers, who have sent in the 10 Liners this month.

##  <br> Type-It-Yourself <br> Thomas Betts tells how to dump variables all over the place. <br> 52

## $\mathbf{N c o r p u t e n k s e r}$ <br> S

## WHO SIGNED ROGER RABBIT?

THREE licenses are currently winding their way onto the Amstrad CPC, care of Activision. They are, one of the film, one children's cartoon, and one arcade machine andy should all reach the shelves in time for Easter.
Who Framed Roger Rabbit surely does not need any introduction. It is based on the incredibly popular Disney film released at the end of last year and already the main character, Roger Rabbit, has won the hearts of many people young and old. You must play the popular 'toon in his attempt to rescue his glamorous wife, and this is all done in three beautifully drawn sub-games.
The Real Ghostbusters is a children's cartoon that has certainly taken off since it's first showing. Already there has been multiple merchandising of it's name, and it has almost overtaken the original film in ranks of popularity. Activision are hoping that the computer game will follow suit (with their previous release based on the film, still selling at budget price).
It features twelve levels of ghost zapping fun, with an end-of-level meanie waiting at the end of each one. The Real Ghostbusters is based on the arcade machine by Data East (also responsible for Robocop and Dragon Ninja) and will


- Hubba, hubba, hubba
cost $£ 9.99$ on cassette, §14.99 on disk. Another arcade conversion planned for April is Timescanner, which will be released on the Electric Dreams subsidiary label. It is rather special in it's gameplay, because the original version emmulated a pinball machine. What this
has going for it, in preference to a normal pinball machine, is that each level promote a different screen layout, and thus makes it more varied in play. There is also a breakout type of bonus screen at the end of the game which makes all effort taken in playing worthwhile.

- Who maimed Roger Rabbit? Don't do it Bob!



## LONG TERM ACTION!

ACTION Computer Supplies are offering a 24 -month warranty for Star printers (including both 24 and $9-\mathrm{pin}$ ), of which the LC10 parallel printer is by far the most popular. It is an 80 -column IBM/Epson compatible machine, with bidirectional capabilities and a printing speed of 144 cps draft, 36 cps NLQ. Features include eight resident fonts and double and quad height characters. It also has a serial interface adapter and an auto sheet feeder.
If you have more money at your disposal it may be more worthwhile investing in the 24 -pin LC24-10, which is
also an 80-column parallel machine. It has eight resident fonts, like it's smaller brother, but extended features include a 7 KB buffer, friction and puch-feed tractor feed, and automatic cut-sheet feeder, and a 32 K memory expansion. The speed of printing is improved too, with draft operating at 170 cps , letter quality at 57 cps .

Action Computer Supplies, hail from Abercorn Commercial Centre, Manor Farm Road, Middx. Details can be obtained on (0800) 333333 , and it won't cost you a penny (according to Maureen Lipman!).


Gonna make you a star!


- Pixelised Porn?


## FRUITY FROLICS

TO rival the scandal of the various "Strip Poker" games comes Emmanuelle from Coktel Vision. It is a game based on the famous, nay infamous, book by Emmanuelle Arsan which caused a veritable ruckus, and may a soft porn movie, on it's release.
You play a doting young male who has fallen for the sex superstar, and must travel the length and breadth of Brazil in order to find her. Before you can do so you must commit many sins of the flesh woth various beauties. This is all done using a rather ingenious icon technique (you interact with the background) and it should boast some excellent graphics ( hmmm ?).
Emmanuelle should be released very shortly, and will cost $£ 9.95$ on cassette and £14.95 on disc.

IN the opinion of many users, the CPC is one of the best educational machines, mainly due to the enormous amount of software available. Another two programs that aim to educate the masses are Happy Breathing and Happy Fractions from The Micro Computer Limited. They both have attractive graphics and animation throughout and would please the eye, as well as the brain, of many CPC users, aged 12-16.
Happy Breathing deals with the trials and tribulations of the Respiratory System, and the components, functions and mechanism involved in breathing. Happy Fractions, on the other hand, is more mathematical and features all aspects of the subject.
Both programs are only available on disc at the minor sum of $£ 12.95$. All enquiries/orders should be directed to TMC, 9 St. James's Terrace, Nottingham, NG1 6FW. Tel: (0602) 483440.

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## ZAPPERS collection."

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Arkanoid - for the simple reason that it's simply gorgeous playing withit""
COMPUTER GAMES WEEK - "The take home message is simple. You want a great arcade game?"

## FLYING SHARK

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## ARKANOID REVENGE OF DOH * *

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## TARGET RENEGADE

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## PLATOON

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## A HAMSTER ATE MY ROCK STAR

ALTHOUGH there have been some peculiar titles for computer games in the past, surely "A Rock Star ate my Hamster" is the wackiest. It is the new game in a large array of releases from Codemasters, and also holds the
distinction of being its second full-price game.

It deals with the rough and ready world of the pop biz, and your quest as manager of a band to win those all elusive platinum singles. The way in which Rock Star is unique from any other simulation, is that as your band (chosen from a 50 caricatures of famous names) improve their dulcet tones, the racket emminating from your computer will become better. Although on a Spectrum we couldn't tell the difference.
Inside the box you will find two cassettes, one for the game and one for the data, and it will cost around $\$ 10$ (give or take a penny).


- What a sensible fellow David Darling is!


## BUDGET BONANZA!

THE Interceptor Group, under the Players budget label, has announced three new releases that all carry the §1.99 price tag.
Tomcat is a game that has experience mixed reviews on other formats and now it finds it's way to the CPC. The aim of the game can be summed up in one word, 'destruction'. Although the plot has been changed to protect the innocent, it truly is a shoot-em-up. Helicopters, gun boats, enemy tanks and ground installations are all featured as you fly your your $\mathrm{F}-14$ over treacherous ground.
If yo're a Cybernoid addict and you're looking for some cheap relief, Task Force is a game in a similar vein (although not


- Tomcat
officially so, of course). It is a flick screen shoot-em-up with hint of strategy (but only a hint), and the game will feature a stunning militaralistic soundtrack.
Fans of oriental games will be pleased with this last offering. Shanghai Warriors is an arcade style scroller with a plot larger than War and Peace. It all boils down to the fact that the only person stupid enough to attack the 'Snide Gantree' is a graduate of the 'Dragon Temple Karate Academy', i.e. you!

- Vroooom!

Anther two games on the release schedule are Grand Prix Simulator 2 and Street Gang Football, both of which are in the $£ 2.99$ budget market. Grand Prix Simulator 2 is the follow up to the successful Grand Prix Simulator, which caused more of a stir in the press over it's cover artwork, rather than its gameplay. It is a top down arcade game in the Super Sprint mould, and is a definite improvement over it's original.
Street Gang Football is the latest attempt to convert soccer to the homecomputer, and is another game that focuses on the more down-to-Earth (and violent) aspects of the sport. One interesting feature is that if you burst the football, you will have to continue playing with an old tin can (Ah, I remember the days!).

## MONKEY BUSINESS

THE computer game "Bob's Full House" has been suspended, due to complications in the licensing agreement. Unfortunately Domark, under its subsidiary label TV Games, has acquired only the rights to use the format of the TV show and not Bob Monkhouse's name or image.

No court action is being taken by Mr Monkhouse, and negotiations are currently underhand to release the game with his endorsement.

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## ARCADES <br> JOHN COOK ENTERS THE NEON ZONE

Hallo, I'm John Cook and I spend large amounts of my time putting ten pence pieces in machines and getting very excited about it - and hopefully over the next few months, you'll start getting excited about it too, as we start this new regular spot on video games.

There is no denying that coin operated arcade game influence the type of computer game that you can buy for the CPC. A quick glance at the Christmas charts would have shown that: Number One Operation Wolf,
recognise a few of the routines used in this. It's a driving game, yes - in a dune buggy, but it's also a racing game, with you driving against 12 other drivers at once on one of five sets of courses (each with five tracks). It's simple steering wheel, two gears and accelerator stuff but those graphics! Wow!

Huge sprites, loads of 'em - in fact the screen is just covered with them going really and astonishingly fast. The track is sometimes on the ground, with scenery whizzing past at a phenomenal rate but sometimes it's on this timber section of track that undulates like a roller coaster. What a view!
And with 32,000 colours to
choose from it
really is a visual treat. But to produce all those fabby effects has not been easy - or cheap. There's 1 Meg of code. 4.5 Meg of pre-shifted sprites. Three 16 Bit processors. Two 8 Bit. Plus a separate FM sound board, with samples, etc, the lot.

You could go down to your local machine distributor and ask him to sell you one, only it'd cost you around $£ 9,500$. Start saving now!
Another game that made its debut at last months ATBI show was something from Namco - a Formula One game/simulator called Winning

## Run.

The main thing about this beauty is that it is running the fastest, smoothest most impressive filled vector graphics in the world to date on an arcade game. It truly takes your breath away.
The whole of the top $3 / 4$ of the screen - filled vectors and no cheats. The view is an out of the cockpit one, so

Number Two - Robocop, Number Three - Afterburner, Number Four

## - Thunderblade.

Well, I can tell you a couple of games that might well be in with a shout next Christmas, already. The amazing Power Drift and the superb Winning Run.
First, Power Drift. This is a game that almost defies description, such is the astonishing speed and sheer exhilaration of playing the thing, particularly in the, "throw me and my breakfast around," version.

It's from Sega, and if you were a regular player of Outrun, you might
you can see the front of the car and the tyres. The tyres, instead of being made up of sprites are made up of tiny, tiny filled vectors. Double Wow! Especially when you realise that the refresh rate is something approaching a 20th of a second.

It plays like a dream too, in both easy-peasy mode ( 3 gears and not much realism) and simulation mode ( 5 gears and a lot), which is much more fun. You do a practice lap from the pits, and this determines where you are placed on the grid. The race itself lasts a scheduled 4 laps - but if you're particularly doddering, you'll run out of time before that happens.

The time you have taken on your practice lap determines your place on the grid in the race to follow.

When that starts, all hell breaks loose as the other computer controlled cars drive a fast and aggressive race. Going into the first corner you can almost believe you are actually there, with all the jostling for position and the roar of assorted engines howling in your ears.

The gameplay of Winning Run has been tuned to perfection. If you bump into another player, it's not a question of being blown to bits or spun off permanently (as would happen in real life). You simply go out of control and lose time, or hit barriers and lose even more time - time being a very important factor as it is this you are running out of. Completing a lap gives

you some extra time to play with but if you hang about, your timer will run down to zero and you'll be out of the race.

The best single player race game ever devised to date Winning Run is the kind of game the punters will be queuing up to play this summer.

Another racing game that is continuing to take the place by storm is Final Lap - being converted to home micros in the Uk by Domark.

Even though it is around nine months old, it is still packing the


Again, it's the gameplay - tuned to perfection, that makes the game so competitive. It has been programmed so that the car behind has a slightly higher top speed that the leader . . . and so can catch up after a crash or a spin out.
Also, if you are a very long way behind, the machine has the habit of removing intervening computer cars - to make it more likely that you'll catch up.

The result is, with two well matched players, head to head confrontation on the final corner of the final lap. What more could you ask of a game? Four player Final Lap? Well, assuming the arcade operator has two double units, you can have that too!

It'll certainly be interesting how the game converts down to the CPC let's hope whatever, there will be the option to play the game head to head, joining two machines together. We'll see.

That's it for this month - catch you next issue with news and some tips and hints on how to play some current games - and get on that all important Hi-Score Table.

What is the well to do person about town listening to these days? Forget your pokey little personal stereos, your Walkman's with radios and graphic equalizers, and even those truly gross ghetto blasters.

If you wanna be cool, if you want real street cred, if you want something that costs a lot of money, then you've got to enter the great US GOLD/Amstrad Computer User Sony
 competition.

Check it out funsters, a portable CD player of your very own, brought to you by those generous folks at US Gold, and your fave CPC magazine, ACU.

All you have to do is answer the following three questions, and send your answers, on a postcard, to Discman Competition, ACU, 3rd Floor, Greencoat House, Francis Street, London SW1P 1DG.
(1) What was the 1987 Christmas No. 1 computer game?
(a) Gauntlet
(b) Out Run
(c) Operation Wolf
(2) Where is US Gold based?
(a) Manchester
(b) Liverpool
(c) Birmingham
(B) What is the best selling LP of all time?
(a) Thriller
(b) Brothers in Arms
(c) Dark Side of the Moon

The closing date is May 31st, so get those entries in.

## Quality from the inside out.



The multi-font LC-10 is simple to operate, easy on the eye and comes complete with some features you won't find on many more expensive models.

The LC-10 is compatible with almost every computer's needs whatever the system. It can emulate most industry standards with ease, (there's even a Commodore version) a standard feature that we think should always be included. For connection over longer distances, there is even the option of a low-cost serial converter. And the range includes two models that also give you the option of first class seven colour printing.
21 Putting the LC-10 to work couldn't be simpler. At the mere touch of a button on the front control panel you can set your margins, choose from one of eight Near Letter Quality fonts and pitch sizes or simply put the paper feed into action. (No more inconvenient DIP switches to hamper you). And with the clip-in replace-
ment ribbons, we've made ink stained fingers a thing of the past.


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Labels $4.0^{\prime \prime} \times 1.5^{\prime \prime}$ (2 across)
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The established, powerful word processor for the Amstrad CPC 6128. TASWORD 6128 has been specifically developed to use 64K of memory as text space. This means a text file can be a massive 60,000 characters in length, enough room for over 10,000 words! Featuring all standard and many extra word processing facilities TASWORD 6128 incorporates sophisticated print options, on-screen hép, notepads, user definable keys allowing commonly used words, sentences or paragraphs to be typed with a single keypress and a powerful built-in data merge faciility. Extensive customisation facilities allow many of the facilities to be changed for personal requirements and saved into the program. By combining power with ease of use TASWORD 6128 is the complete word processor for the CPC 6128.

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This month we have a bit of a mixed bag of problems, largely due to the mail sent in to this column getting a bit fouled up with the change of address and problems getting it forwarded on to me. Hopefully this is all sorted out now and things will be back to normal next month. If you have written in and no reply has been published, then with a little luck it will be in next month's column.

I occasionally get letters from people saying that they don't think that an answer I have given is satisfactory in view of the fact that we are a part of Amstrad, so ought to know. ACU might be the Official Amstrad Magazine, but it is not a part of Amstrad Plc and I am not an employee of Amstrad, nor, as far as I know, are any of the other contributors. When I want information on something, I have to go out and get it the hard way, by ringing the software manufacture or asking around, so it isn't always possible to come up with a satisfactory answer.

## MINI OFFICE 2 COMMS MODULE

I still keep getting enquiries from people having trouble using the Mini Office 2 comms
 module, so it is perhaps worth repeating my earlier reply once more.

The Comms module makes uses of commands that are incorporated in the original Amstrad RS232 Interface software. It will therefore not work with any other RS232 interface. It is easy to tell whether you have the correct interface as the required Amstrad Interface was supplied with a separate power supply which had to be connected to it. This interface is no longer available, unfortunately (or maybe

## "MEX has a very good reputation"

fortunately, as the software that came with it wasn't really very good).
If you haven't got the right interface, then you will have to use some other software for comms work. Most of the Serial Interfaces were supplied with software which is adequate for most purposes, but MEX, Public Domain CP/M comms program has a very good reputation for use with normal Scrolling Terminal BBs and overlays and patches are available to make it work with most interfaces and modems. For use with Viewdata services such as Prestel, the Cage

Comms Rom takes a lot of beating. If you haven't got a rom on board, or can't replace the rom in your interface with it, then Axis is a good alternative which runs under $\mathrm{CP} / \mathrm{M}$.

## GRADUATE CP/M ROMS AND AMSDOS DISC ERROR MESSAGES

Peter Ceresole has written in to say that he has now got the Graduate CP/M roms and agrees with me that they make a world of difference to using CP/M on the CPC. He also makes the very valid point that they also make a lot of extra disk space available, as not only does it let you remove the EMS file from the disk, which frees about 25 K , but it mans that the disk can be formatted as a Data Format disk, rather than a CP/M disk, freeing another 10 K for data. With some programs and only a single drive, it will make a big difference to the amount of data that can be stored without having to swap disks repeatedly.
The only problem that he has with the Graduate Roms is that they speled his address incorrectly and the owner's name and address are embedded into the rom. The moral is that if you are ordering a set of roms,
make sure you print your name and address very clearly!
Peter also wants to know whether there is any way to trap the 'Disc Missing' error message you get if you try to change to drive $B$ : when there isn't a disc in the drive, so that he can replace it with his own message in a Protext loader program. He has asked a number of people and no-one has come up with an answer. As far as I now, the answer

SuperCalc is a relatively old program and dates back to the time when very few extra print styles were available on printers. One of the few things which is relatively standard and applies to most printers is that Condensed printing is set with the code ' 15 ' and reset with '18', so SuperCalc probably just sends these whenever it is instructed to with the Ctrl-O command.

SETLST requires a text file creating,
> "Major Walters wonders whether the CP/M SETKEYS command has anything to do with his problem"

is that you can't readily do so, either from Basic or machine code, unless you fancy rewriting the Disc Operating System! With a bit of luck some will prove me wrong.

## PRINT STYLES WITH SUPERCALC 2

Major Walters has written from Cyprus
about a problem he has with SuperCalc 2. The manual describes how to

## VISA

 insert codes into the spreadsheet to allow condensed printing instead of Pica, but has been unable to insert any other codes into a spreadsheet, whereas with Mini Office 2, he can embed whatever codes he wants.Major Walters wonders whether the CP/M SETKEYS command has anything to do with his problem and how SuperCalc knows about condensed printing.

I am sure that it is nothing to do with SETKEYS, but it may be that the SETLST command can be used to send the required codes to the printer before loading SuperCalc. This depends on two things. Firstly, Major Walters doesn't say exactly what he wants to do, but if all he wants is to select NLQ, Elite, or any of the printer commands that have a global effect on the document, it is possible to send the required codes to the printer before loading SuperCalc, by using SETLST. Secondly, SuperCalc may perform a complete printer reser before starting printing, in which case sending the codes beforehand with SETLST won't work as all the codes sent will be discarded. Unfortunately, I do not have a copy of SuperCalc 2 to hand so cannot try it out.
containing the sequence of codes needed by the printer. These are entered in a special form, with each code being preceded by a caret (The 'up arrow' symbol on the main keyboard). The codes may be expressed as names or numbers in Hex or decimal format.

If you want to send the sequence of codes 'ESC 77', which is the sequence to turn on the Elite typeface on an Epson, this may be entered as:-
${ }^{\hat{}} \mathrm{ESC}$ ' $\hat{\mathrm{M}}$ in code names and characters
or ' $27^{\prime} 777^{\prime}$ in Decimal
or ' $\& 18^{\prime 2} \& 4 \mathrm{D}$ ' in Hex
Once the file has been created, it should be saved on to the disc with a suitable name. If the file was called 'ELITE.LST', it could be called with the command 'SETLST ELITE.LST". The file called SETLST.COM must also be on the disc. If this works with Supercalc, the process could be automated by creating a Submit file to give the SETLST command, followed by the command to load SuperCalc.

## ATLAST DATABASE

Gavin Smythe, from Edinburgh, wants help with the AtLast database. He doesn't say whether it is the original AtLast, or the current
 AtLast Plus program, but in this case it doesn't really matter as the situation is much the same with both versions. Every time he comes to print anything out, he has to answer questions about whether it is to go to file, screen or the printer and whether each record should be on a new page etc. As he always uses the same report form and prints
on the same type of paper, he wants to know whether there is any means of configuring AtLast so that is always uses the same settings and saves him having to answer the questions every time.
Unfortunately this is not possible with either version of AtLast and it might not be desirable in any case. If the setting was for 66 lines for the printer and you decided to preview the data on screen, it would disappear off the top of the screen before you had a chance to pause the display.

## СРС TO PC

I have received several enquiries about whether Amstrad CPC programs can be used on the Amstrad PCs if the people concerned decide to upgrade to a PC and also whether data created with a program on the CPC will be usable with PC programs.

The answer to the first question is very simple. No. You can not run CPC programs on other machines, except in the case of some CP/M programs which may be used on other $\mathrm{CP} / \mathrm{M}$ computers and, in a few cases, under a $\mathrm{CP} / \mathrm{M}$ emulator on the PC. I wouldn't bother trying to run CP/M programs on the PC though as most of them run very slowly by the time the emulator has done all its work.

The second question, about whether data from a CPC program is usable on a PC is slightly easier to answer. In many cases, it is relatively straightforward, once you have managed to transfer the data onto the PC. Nearly all those companies that produces a

## "It is generally possible to export the data from the CPC as an ASCII file."

versions of a program for both machines have either made sure that the data formats are the same, or provide conversion programs to rearrange the data into a suitable form.

Even if there is no equivalent program on the PC, or a conversion utility is not provided, it is generally possible to export the data from the CPC program as an ASCII file and virtually all PC software has an ASCII import facility. The only time where there may be a problem is with those CPC programs that save their data in binary file format and do not have any ASCII file creation facilities.

## S.D.C. 60 Boston Road, London, W7 3TR

 Other branches at 309 Goldhawk Road, London W12 8EZ 18 Market Square, Leighton Buzzard, Beds.

# POWER TO PRINT 

Paul Gaunt reviews the Mannesman Tally MT-81

Many home computer users will, at some time, find a need for a printer. If you are not familiar with the common terms as used as printer jargon, you will find that purchasing your new peripheral can become a real nightmare. Serial and parallel interfaces, 130 cps in NLQ, nine pin dot matrix. What does it all mean? If you don't understand these terms - and there are many others - then your first step should be to get someone to explain it to you. Another good idea is to avoid asking a salesman. Many know as much as you, and will just try to sell you something you don't want.

## CHOICES

At the present time, there are many printers on the market, all offer outstanding value for money, or at least that's waht the manufacturer would have you believe. But as we all know, hype is a common problem with equipment of any kind and products rarely live up to the new owner's expectations.

Another problem

these also contributed to the low cost of the machine. These two absentees are the callibration of the bail arm and the facility to move the print head in relation to the platen - to change the density of the printing.

The actual print quality of the unit is quite reasonable for a 9 pin print head. Near letter quality is made up of two print runs, the first prints most of the characters, while the second completes them. Like most printers, the MT-81 offers Pica, elite, condensed and extended characters in both draft and near letter quality.

The front panel on the MT-81 looks quite harmless, although once you have read the manual, further functions unfold, and attempting to memorise them is a full time occupation. The panel itself consists of three touch pads for on/off line, line/form feed and near letter quality and four L.E.D. indications for power, online, NLQ and paper out. Some of these flash to indicate various options, but again, it's text book time if you want to learn what these mean.

## PARKING

By pressing the online and line/form feed buttons together, at exactly the same time a split second out and it won't work - you activate the reverse paper feed option to 'Park' the fan-fold paper. This allows the user to insert single sheet while still having the continuous paper loaded.

Pressing the online and NLQ buttons puts the printer into select mode. From here you can change the print style by continually pressing the NLQ key. Nine different functions are available from here, and range from changing the type style to resetting the printer and slashing zeros. It is here that you really need to refer to the manual to get the

output you require. I for one could not remember all none functions.

The MT-81 is a noisy beast. You certainly know when it's run out of paper, as it bleeps away quite happily. And just when you think it's finally stopped, it's off again. Pass the Nurofen please.


- The machine itself

BrunWord 6128 £25.00
A superb word processor is combined with a lightning speed spelling checker and a card filing programme, to give you a fast and versatile word processing package. Whether your requirement is writing a few letters or the composition of a complete novel, you will find no better assistant than BrunWord. It is written to be easy to use and yet has all the powerful features that you expect from a comprehensive word processor.
Simply type RUN "BRUNWORO" to load the word processor, the spelling checker and the 30,000 word dictionary. When the loading is complete, remove the BrunWord disc and put safely away. The disc drive is then completely free for your own data disc.
Remember that many word processors only work efficiently if you have a second disc drive. For example, the disc version of Protext needed the disc to be changed eight times to check the spelling of our test file, whereas BrunWord needed no disc in the drive.

BrunWord is supplied with a 40 page manual which has several detailed examples, starting with step by step instructions to produce and print a simple letter. But the very first step is to load the TUTOR file into BrunWord. This takes even the complete novice straight into word processing and demonstrates the powerful editing and formatting features of BrunWord. There are also examples of printer control, showing how to create headings, to underline or to emphasis, and five deliberate spelling errors for you to correct. The tutor takes about 20 minutes to run through and after that you will teel confident to type in your own text.

## BrunWord Features

*40, 80 or 128 column display *Touch typing speed over $200 \mathrm{words} / \mathrm{min}$ *True insert or overwrite *Justify/unjustify paragraph or whole text *Justified text has balanced appearance *instant word wrap *Block save, move, copy, insert and delete *Local editing with word delete/undelete *Adjustable margins and TABs *Column/Line/Page display with file name *True word count *Find and replace *Help menus *Memory filing system *Single character embedded printer commands (18 with 3 printer codes and 21 with 10 printer codes) *Page throw markers *Multiple copies *Odd/even page headers/footers with page numbers *Multi file printing (new page or continuous) *Print specified pages *Works with any printer *True display super/subscript numbers *User defined print characters *Load ASCII files from other word processors *Save ASCll files for other word processors *Files can be encrypted *Maximum file size about 9 pages of text.

## BrunSpell Features

*Memory resident with word processor *Checks 4,000 words $/ \mathrm{min} * 30,000$ word dictionary $*$ No American spellings *Add up to 5,000 of your own words *instant lookup *Helps to find correct spelling *Automatic correction.

## DataFile Features

*Alphabetical, numerical, date sorting on any tield *User defined headings $*$ Search routine *Data merging into BrunWord *Label printing.

# BrunlUord 

"BrunWord offers considerable flexibility . . . excellent spelling checker . . . very easy to use datafile* - CWTA<br>"BrunWord is a very competent programme" - AMTIX<br>"Real value for money . . . user friendly and fast" - Amstrad Action

## BrunWord Junior $£ 12.95$

This is a low cost version of BrunWord 6128 on 3 inch disc and includes the spelling checker with 30,000 word dictionary.

Type in a letter or a short essay, check it for spelling errors, save it to your disc and then print it out.
BrunWord Junior is for the CPC6128 and has all the features of BrunWord and BrunSpell but with two small changes. The text area has been reduced to hold just one page of text (about 600 words) and you cannot save words to the dictionary. It is supplied with a TUTOR file on the disc and an instruction manual.
You can upgrade later to the full BrunWord for just $£ 12.95$.

## Letters

We receive many letters each month. The following were all received in the three weeks before writing this advertisement.

I am extremely pleased with BrunWord 6128, and will certainly update my copy. May I congratulate you on making such an improvement to an already excellent programme.
Mr S (Gloucestershire)
I am writing to say how much I enjoy using the BrunWord disc. It is easy to use and as I am not a good speller the dictionary is most essential. I dislike writing letters but the disc makes it easy and much more exciting.
Clare (age 12 - Herefordshire)
I wish to upgrade (BrunWord) to Info-Script. May l congratulate you once again on a superb product, without which I would be lost.
Mr L (Nottingham)
have been using BrunWord for quite a while and like it very much. I have told my friends how good and user friendly it is. Also the speed and ease of commands. I enclose cheque for updating to Into-Script.
Mr G (Scotland)
Info-Script has got to be the best buy for Amstrad 6128 word processing. Keep up the good work.
Mr McQ (Leicester)

## Info-Script $£ 46.00$

Take the BrunWord disc, replace DataFile with a comprehensive relational database, integrate this into BrunWord and the result is Info-Script.

At its simplest Info-Script is no more complex than DataFile but with the attraction of direct access from the word processor, many new and enhanced facilities and the ability to store at least twice as much data. It is possible to have the database, the word processor, 1000 names and addresses and 6 pages of text all in the memory.

You are typing a letter in BrunWord and need an address. Place an address marker \&A where it is need. Go to Info-Script and search for the address, using say, the house name. Press $T$ for Transfer and you are back in BrunWord with the marker replaced by the address.

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Hello and welcome to Meltdown, the crucial games review section of ACU. We've got some pretty hot stuff for your joysticks this month, with the first, exclusive review of the CPC version of Blasteroids, and other goodies like Human Killing Machine and LED Storm.

We hope you like the redesigned games pages, and just in case you were wondering who these people are that do the reviewing, there now follows, the horrible truth.

Duncan: Duncan Evans, Editor of ACU. Fave games - WEC Le Mans, Robocop, Operation Wolf.

Rik: Richard Henderson, Assistant Editor. Fave games - Blasteroids, WEC Le Mans, Dragon Ninja.

Paul: Paul Gaunt, Contributor. Fave games - International Rugby, Robocop, WEC Le Mans.

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## 29 Incredible Shrinking Sphere

No, not Paul's brain (well maybe), but a strange new release from Activision which features a transmutable ball and bears just a tiny resemblance to something connected to Madness.

## 30 Command Performance

A compilation to be sure, but what a whopper. Mercenery is easily the pick of the bunch, and almost justifies the price tag alone.

## 30 LED Storm

Another coin-op conversion from US Gold. Drive along dangerous highways through burnt out cities, through post apocalypse countryside, through spaghetti junction, and live! Or not as the case will probably be.

## $\mathbf{3 2}$ Human Killing Machine

He's a one man killing machine, he's harder than Mike Tyson, he's got more enemies than Salmonella Rushdie, he's got a pair of boxing gloves on . . Er, yes, old Kwon runs across Europe and the Middle East and beats his opponent into a bloody pulp.

## 34 Blasteroids

Richie Henderson takes to the stars


## - Prepare for the deep space adventure of a dinner time

with Mirrorsoft's conversion of the Atari coin-op classic. You could certainly hear the screams in our office (as he got blown apart again).

## 36 SDI

It's Ronnie's loony tune dream land time again. Converted from the arcades you too can indulge in a rather politically unsound carnage spectacular.

## 36 Wanderer

And if anyone starts singing, "Oh I'm a wanderer, a wanderer ..." again I'll kill them. This offering from Elite requires the use of those curious items, the 3-D glasses (supplied free!).

## 38 Chicago 30's

Top of the world ma. Well probably not, Jimmy. Rather this Topo Soft game should have been the victim of some sort of prohibition.

## 40 Colosseum

Hur, hur, that Ben's a bit of a go-er. Chariot racing on the CPC, whatever next?


## 40 Fast Food

It can't be, it really can't be. Oh no, it is. Pacman for the fast food generation, by those purveyors of the simplistic, the Olivier Twins. Oh and by the way lads, eating MacDonalds is ecologically unsound.

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As you clamber into your Fighter Sphere, you think just how stupid the Colonel-inChief had been to enter the training arena, after being chained to his desk for so long.

Totally out of practice, Matt Ridley, climbed into his Sphere and set the controls. Guiding the ball to the entrance he took a deep breath and


## Incredible Shrinking Sphere

advanced the fighter craft into the arena, so called the Death-Run.

Once inside his fear and lack of experience got the better of him, and whilst looking for the exit, he run into a group of Assassin Spheres. These hostile objects attacked the alien craft who had invaded their privacy and in their bombardment, managed to disable the colonel's sphere.
Silly old dodder, fancy thinking you actually survive in the Death-Run after

so long! Oh well, you had better get inside and rescue the silly old fool before the Assassin Spheres break through his shield and injure him.

Donning your helmet, you wave your good-byes to the already formed welcoming committee and advance
through the gate.
The game play is viewed in the great old style of corner-down 3D, and the play area scrolls, albeit jerkily, in the direction in which you are currently moving in.
The objective of the game is to progress through the four plates of the Death-Run in search of Matt Ridley's stranded craft, fight off the enemy and summon the automatic rescue shuttle to get the damn fool out and back to the safety of his desk. You should be highly commended for your gallant and brave endeavours, but get it right.
Each plate has a maze to be negotiated, and getting through some of the gaps is less than easy, especially if you are at your maximum size.
The Incredible Shrinking Sphere is made of a special molecular material which wnables it to change in size, mass, volume, and velocity. The pilot can achieve this by guiding his sphere over certain Tectonic Tiles. There are many of these tiles, each perform different functions, and you will need to manipulate your craft in various ways if you are to get anywhere near the colonel.
Various other hazards have been littered around the maze plates, the most common of these are the Ismo

Assassin Generators which throw out mutant spheres. It was a group of these which disabled your colonel. These nasty shapes are lethal to touch, unless you have been protected by a shield, in which case they burn up

upon brushing you. If you have no protection, your best bet is to take aim and blow the scum off the face of the plate.
The Incredible Shrinking Sphere is a very good game concept, although the game is let down slightly by the jerky scrolling. The graphics are, otherwise, good. The sound effects are enjoyable and the game is fun to play, even if it is pretty difficult. ISS certainly gets my vote.

## Paul

,'ve seen some compilations in my time, but this great big wodge from US Gold has to be one of the better ones. We're talking ten games for your dosh, and most of them are pretty good.
On offer then, is Xeno, Mercenary, Trantor, Hardball, 10th Frame, Bobsleigh, Leviathan, The Armageddon Man, Cholo, and Shackled.

In the truly fab, must have category are Mercenary and Trantor, with well worth having status going to Xeno, Hardball, and Bobsleigh. Quite good if you like that sort of thing are 10th Frame, Armageddon Man and Cholo, which leaves just two programs left. Shackled and Leviathan are dire so forget about them.

## Command Performance

1 imagine you all know about Mercenary so I shan't waffle overly. Suffice to say it's all about searching underground and flying overground in fast 3-D line graphics, while working out how to get off the planet that



0$h$ look, what a new and exciting concept, a driving game!!! But ah, this is no ordinary driving game, no siree, this is a vertical scroller, and as such comes

## LED STORM

into the box reserved for many games of the ilk, the Spyhunter box.
I'm sure you must all remember Spyhunter, it was an arcade game,

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| Overall: $73 \%$ |

which was of course converted, many moons ago, and it carried it's own cult following. LED Storm is a very similar game in the fact that you must race up a scrolling screen, avoiding hazards and other cars, to reach the end of a complex course. It is based on the highly successful Capcom coin-op, that thrilled many in the arcades a short while ago (l iust can't remember seeing it, that's all!), and believe it or not, LED stands for Lazer Enhanced Destruction (Not the other acronym taught to all in school).
There are nine levels of destruction to be mastered, before you can go make a cup of tea, and as always they


get progrssively harder. You start, behind the wheels of your XR3I Turbonutter. . . I'm sure you know the rest, at the edge of Capital City and away you must go, to traverse the highway, leap vast chasms and generally avoid all sorts of death inducing pitfalls.

To also deter you from your task, you have a fuel counter which spins away at a happy-golucky rate, whilst you trundle along. It also saps at an alarming speed when you crash, as another car takes time to come to you. You can avoid crashing with the help of ramped jumps, or better still, a quick stab of the fire button will do you just as well. Another bonus that these 'self-induced' jumps
have, is that you can use them to land on the top of enemies, and therefore eliminate them.
Other features include collectable 'tokens' which float around the screen waiting for you to acquire them. Once done so, you will find that your car is capable of a lot more than before, although unfortunately only for a short while. There are also some that can increase your score, which makes life all the more worthwhile, eh?

Graphically things are a bit bland, though the scrolling works quite well, and the sprites serve their purpose, if not being altogether well defined. On the sound front there is nothing to write home about, either, but I don't suppose there's anything offensive about occasional bleeps. Funnily enough, LED Storm is a fun game (। say funnily enough, because I was not a big fan of Spyhunter) and as such would prove a good buy for anyone who just wants a small amount of enjoyment to spice up their life.

## Rik



## Human

 Killing MachineKwon, the human gardening machine! I assume that Kwon is a gardener - according to the press blurb he goes cutting a swathe through Europe and into the Middle East. He must be a gardener! Aha, I've got it, the info says a bloody swathe - he must have run over his foot with the lawnmower then!

Since Kwon isn't armed with anything other than a pair of boxing gloves, and he only beats his opponents senseless, he might as well be a gardening machine rather than the killing machine of the title.

## Bloodbath

In case you hadn't immediately guessed from the screenshots, HKM is an unofficial sequel to Streetfighter, which was also a Capcom coin-op. It is obviously derived from Streetfighter because both games feature martial arts over a series of static backgrounds.

In the case of HKM, there are five locations, and two opponents to fight in each one (though not at the same times).

So off you go to the first locale, sunny Moscow, to face Igor (obviously a left over from a Rambo movie). Against a rather nice four colour backdrop, you can employ most of the standard martial arts manoeuvres,

## MELTDOWN

including a leap, tuck and drop kick. Very impressive! Each combatant has a number of lives for each fight, and an energy bar for each life, which naturally decreases as the blows start to regenerate. Gent in there and smash his face in.

## Violence

After dispensing with Igor there follows the first of the distasteful elements of HKM - dog beating. Shepski the dog is your next opponent.
Assuming you had the stomach to beat the poor mut senseless it's off to Amsterdam and two ladies of the night, Maria and Helga. Yep, it's hit a woman time. This is what you call pandering to the most base emotions.

Still with me? Good, off we go to Barcelona then, and Miguel the Torreador and his bull, Torus. I can only assume that Kwon is an England football supporter.
More encounters of the stereotype kind with Germans outside a




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## BLASTEROIDS

Picture this if you will, there is a game which allows you to control a spacecraft which must destroy and dodge various forms of asteroids. There is a game which requires some deft firing and the occasional thrust. There is a game that was very popular in the arcades, and if Asteroids sprang straight to your mind then only award yourself half a point, 'cause big brother's in town and he's twice as mean, nasty and enjoyable than his faded counterpart.
Blasteroids is finally upon us, although rather belatedly, and one can honestly say that it has been well and truly worth the wait. It is a conversion of the popular arcade machine which sought to do to Asteroids what Arkanoid did for Breakout, and if there was every a way to get me playing it again this is it!
Of course, there is the rehashed plot where instead of you being plunged into a universe you know nothing about, you have been placed on a mission. This mission is for one reason, although that reason is large, green and has many tentacles, and it's name is Mukor, but what's this ugly, repulsive monster got that other ugly, repulsive monsters haven't. Galaxies in his thrall, that's what.
To meet Mukor you must visit a warp, of which there are four, and clear several sectors within a galaxy (the harder warp/galaxy the more sectors must be cleared) and one they have been conquered you will have to defeat the enormous one by shooting all his tentacles off. It doesn't end there though, because you must then travel

to the next galaxy and do it all over again (it's a hard life in the suicide corps. and no mistake!).
Each sector is akin to a screen in Asteroids, but with slightly more hazards to worry about. For a start, there are several different types of asteroid of which some can be particularly nasty. There is the Popcorn type which expand when hit, until they are inactivated and stop, and the Seekers that fly toward you when hit and must take a few blows before destroyed, but the best of all are the Eggs (no Edwina Currie iokes here) which contain leeches. The leeches attach themselves to your craft and suck your energy. Deadly!
Another feature that has been added onto this new version is the

- Yuk, how ugly. Suppose I'd better shoot him then.


tokens that can be collected by your ship (all of them are useful in some way!). Examples of these are the Ripstar, when activated causes your ship to spin rapidly whilst emitting bullets, and Boosters, increases the thrust power of your ship, but these are only two out of eight. You have to collect them rather fast, though, because a rival ship will appear after a short while and nab them for itself. Another feature which more than enhances gameplay is the ability to 'transmute' your ship into three different styles (a la 'Transformers Robots in disguise' dum, dum, dum! Er, yeh. . .), and each one has different powers (one has more armour, one has more firepower and one has faster thrusters, simple eh?).

MELTDOWN

| I N F O |
| :--- |
| Price: £9.99 |
| Supplier: Mirrorsoft |
| M E L T D O W N |
| Grafix: 77\% |
| Sonix: $76 \%$ |
| Gameplay: $91 \%$ |
| Overall: $87 \%$ |

Although it may all sound run-of-the-mill stuff up to now, here is where the extra excitement is added to the fray in the form of two-player action, especially when both ships are vying for the same bonus tokens. Also the first player to disappear down the exit portal, which appears once a sector has been cleared, receives an enormous bonus, thus making it a race for points. Playing two player actions does have it's bonuses though, as you are bound to get further into the game, or are you? . .

Blasteroids is an excellent tool for ancient arcade hacks like me, I mean I remember when Asteroids came out, it caused minor poverty for many. The arcade game was brilliant and as a conversion goes, so is the homecomputer version. The graphics are unfortunately not as colourful as they could be, and the action is slightly slower than the main machine, but the gameplay has been reproduced perfectly, which makes it a amazingly playable game in it's own right. Mirrorsoft, under the label of Imageworks, has produced yet another in the ever increasing line of great arcade conversions on the CPC.

Rik

- How nice and scenic. Just right for mass annihilation!


0kay, so it's George Bush now, I can just about handle that, and he's taken over the Strategic Defense Initiative project, I can even handle that. But I cannot, and will not, accept that SDI on the Amstrad is the best that can be done.

Now I'm sure that everybody remembers the ancient arcade game Missile Command, where you hand a cursor to wave around the screen at which a stream of molten death would fly when the fire button was pressed. SDI takes that idea a few

steps further (although on this version, a few steps back would be more appropriate!), and seeks to reach the older hacks that Missile Command was worshipped by.

Now those of you out there that think Star Wars was a rather good movie featuring Mark Hamill and Harrison Ford would be right in that respect, but you're on a slightly different wavelength to me. Nope, star wars, as ex-president Reagan envisaged it, is the war to stop war, the war of the stars, the war that could be merchandised.


## - Hmm, nuclear armageddon. Should pe nice.

Activision has done a conversion of the popular Sega coin-op, based on the project for peace. It was fast, furious, and although not morally wholesome, fun to play. Unfortunately the CPC version is rather a let down, mainly because I was expecting far too
much, and as such would not make a particularly good buy.

The ways in which it is different from the older counterpart are pretty much obvious. For a start, it is a scrolling shoot-em-up, in preference to a static screen, and you can move your craft
command the tape recorder to replay the last minute events and hear the whole event in quadrophonic. "So we want you to get to the tenth planet of the galaxy now, and no stalling else we'll get some other guy to do it. Over. . . CRASH! EEEEEEEEEE."

As you run to the bridge, you realise that you have just passed the tenth planet and it's just simple change in direction and a space hop to land at the government's space centre.


You throw a few stitches, tap in a few coordinates and smack a large red flashing button. The ship shudders, stops, groans, flips over and hurls itself towards a large looming green planet. You pick you head off the ceiling and turn the ship upright again.
As you arrive you are brought before the supreme governor of the planets. He tells you of the evil overlord Vadd, and his army of war drones who has tried to take over the empire.

Your were the first choice of the empire, because of your expertise and

as well as the cursor. Various missiles, satellites and other assorted objects float past and you must blast them to oblivion. Bonus tokens can be collected which will increase your firepower or perform other beneficial functions, and on paper, it should make for an exciting game.
Unfortunately we can't always have our dreams come true, and bits of paper have often gone astray (well my Visa bills do anyway). The graphics can only be called disappointing to say the least, due to the fact that they

| I N F O |  |
| :--- | :--- |
| Price: <br> Supplier: <br> M E E Llite |  |
| T T D O W N |  |
| Grafix: | $66 \%$ |
| Sonix: | $40 \%$ |
| Gameplay: | $59 \%$ |
| Overall: $69 \%$ |  |


reputation for being a ruthless, bloody-minded, vicious git who would sell his own mother for the right price.
You must scoot around the galaxy collecting disrupter units and move them from planet to planet to earn some dosh. Once you have 8000 megs or more, you can precede unto
are in glorious monochrome (oooh, what a nice shade of blue, hmmmm!). I can take this if there is a reasonable escuse for making such, but the gameplay is just as bad, and the game is 50000 slow!
I did enjoy the arcade version, but I will have to admit that I will never load this version again out of personal choice. SDI on the Arnold will probably appeal to some people, but they're currently inhabiting various institutions.



Rik

the sectors of Vadd.
There are 10 planets, three black holes and 36 sectors of space to explore, or wander. In the space sectors, you will be attacked by enemy craft. So you had better do it to them before they do it to you, and fast.
The most notable thing about Wanderer is that is is one of the very few games that are in 3D, and by this I mean 3D red and blue cardboard
glasses. The effect is quite stunning, especially seeing as once you take'em off you see the two images, which merge into one once slipped on again.
The graphics are quite good although the sounds are pretty pokey. The gameplay lacks considerably but once you are into it, you will find it quite easy to fall asleep. Watch out for eye-strain though!

Paul

Living in Chicago nowadays is a veritable nightmare, with gangs roaming the streets and thugs lining the alleyways, but as bad as it is now, nothing can compare with the frightening days of Al Capone, prohibition, and the St. Valentines day massacre. There have been many films to illustrate the subject and the horror that went on, but there are very few computer games with that theme. US Gold has decided to rectify that fact with the aid of Spanish soffware house Toposoff, and quite a novel soffware title it is too.
You are the blue-eyed boy of the force, Elliot (I wonder where they got that name from? Well it wasn't from ET, that's for sure!), who has shouldered the responsibility of cleaning the streets of Chicago singlehandedly. The right way to do this (and who are you to alter the methods of law


## CHICAGO 30's

Price: £9.99
Supplier: US Gold

| M E L T D O W N |
| :--- |
| Grafix: $64 \%$ |
| Sonix: $35 \%$ |
| Gameplay: $52 \%$ |

Overall: 47\%


- Eat lead sucker
four lives. The sprite detection is completely useless, with bullets that seem to have seemingly passed beneath or above you, suddenly sucking a life away.

The graphics are rather well presented, although they could be described as a mite gaudy, in the form of a cinema screen, and the lives left for your character are displayed as viewers sitting down watching the action (as you die, they leave!). Chicago 30's would have been a
already stated) made up of
illegal alcohol warehouse, which is at the end of four rather difficult levels of play.
To stop you, there are literally hundreds of bad guys, just waiting to fill that puny body of yours full of lead (and they don't stab you with pencils, either!) They also throw petrol bombs and drive cars over your carcass (why else would they be called bad guys?). Another note is they they seem to stream from every point of the screen, and therefore death awaits in many directions.
There are four levels of play (as
the port, the city outskirts, the city, and finally the warehouseitselfand they all get progressively harder. Luckily you do have a Thompson machine gun with which you can mutilate any of those difficult enemies, and it is a good idea to constantly use it because the game is so hard.
The difficulty level is the game's major burden as it is far too hard to be playable. The amount of enemies that you have to wade through is terrible, especially seeing as you only start with

very good game if it had an error or two less, but those errors build up and make for an unenjoyable game and a pointless purchase.

## Rik

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Benurio has not had a particularly good time recently, but that is not to say that he hasn't lived life previously. In fact his story could be deemed a 'rags to riches' one, because although he was born the son of a modest merchant, he became the most admired of all the officers in the Roman Legions. But (it's time to get those hankies out!) Benurio had one minor flaw, his love for the pretty maiden Calia (get those sick bags out!).
c

oLO

## SEUM

 Nerio was another who loved sweetCalia, but alas his heart was to be filled with spite and jealousy because of Benurio, and using his position as chief of the Emperor's Praetorian Guard, he discredited the young officer and plunged him into the world of chariot racing.

Chariot racing is what Colosseum is all about, and mad, manic chariot racing at that. As Benurio you take the reigns of one of many chariots that line up for the race of their lives (deaths,


- Brake! Brake!
would be more appropriate!) and your main objective is to last four races in order to enter the Emperor's favour once more.
Each race consists of four laps of a rather dangerous course, and there are many hazards that await to eliminate you. Other racers also have the same ambition as you, to survive, and they can also prove more than a handful. The opponent's will always attack you when they can and this is another factor that makes the game a
mite difficult. They all carry different sorts or weaponry and whilst you are flying headlong around the course, avoiding obstacles, you must slug it out chopping and slicing them in order to obliterate the threat.
Colosseum uses some rather inventive ideas (in this market of many) and tries it's very hardest to bring those ideas across. Unfortunately it just doesn't make the grade. For a start

it is just far too difficult, as you do not actually see an obstacle coming, but die almost immediately. The graphics are very shaky to say the least, and although they are very colourful and


What sort of motorbikes do eggs dread? Scramblers! Ho, ho, ho, hem, sorry about that! As you may have guessed, that awful joke (or yolk as we may say!) was the lead in for the next game featuring that most infamous of all the salmonella threats, Dizzy. Fast Food, though, is very different from the other Dizzy games in the respect that it isn't an arcade adventure, nor does it offer
in depth puzzles. In fact all of these are thrown out of the window in the attempt to do something a lot more down to earth.
'Education' is a big word isn't it, and according to Codemasters it is also a very big seller and games that are more suited to kiddies are very profitable indeed. This latest one is a perfect example of what can be done, and is a sure winner to get the younger
members of the Amstrad using population to manoeuvre a joystick (thus eventually weening them onto the more violent games, no doubt!).

The idea and plot is very simple and leaves more to the imagination, which in a child (or reviewer) can be highly amusing. All you have to do is guide our little egg friend around the basic maze, whilst scoffing vast amounts of unhealthy comestibles. To stop this being a totally easy task, there are many factors that can get in the way, and even a few which can help.

## FAST FOOD

| N F O |
| :--- |
| Price: $£ 9.99$ <br> Supplier: Codemasters <br> M E L T D O W N <br> Grafix: $78 \%$ <br> Sonix: $67 \%$ <br> Gameplay: 75\%${ }^{\text {Gara }}$ |

Overall: 73\%

nice on the eyes, they move like a lego model on something illegal. The scrolling is another factor that would deter anybody from playing often.

One saving grace is the way that you scroll around corners, this is something I've not seen in a game before, but you can bet we'll see it
again. What is most sad though is that software companies still think they can take a half-baked piece of offal that they know wouldn't sell as a full price game, and sell it at a price that many kids would go for. I'm not happy!

## Rik

- There's gonna be an accident


| N F O |
| :--- |
| Price: $£ 2.99$ |
| Supplier: US Gold |
| M E L T D O W N |
| Grafix: $53 \%$ |
| Sonix: $51 \%$ |
| Gameplay: $49 \%$ |
| Overall: $51 \%$ |



Monsters are a feature which is added after the first few levels and they chase you in the style of the ghosts in Pacman, also the food starts to move on the harder screens and runs away from Dizy in a rather athletic fashion. There are icons to collect which appear on the screen at random and these can spread the action up, slow it down or do other beneficial


- You may be fast, but I'm faster, Splat!
things, and several other additions into the game all make it that more interesting for the slightly older player. Although this may sound far too simple for many people, parents should take note. Fast Food is a great game for youngsters because it is so mindbogglingly basic. The bright colourful graphics and plinky-plonk music makes the game very attractive to watch and hear, and the action gets progressively harder, going from a ridiculously stupid level to one that
proves too difficult even for the programmers.

One final note is that the more macho of readers who would prefer not to visit the lesser levels can start on any level up to 20 (out of 30 !) in order to avoid boring themselves. Also, at the paultry sum of two pounds and ninety nine shiny pennies, Fast Food will not break many shcools or families on the budget scale.

## Rik

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# ARCADE TENNIS <br> by David Hall 

Do you remember PoMg，a＇m not talking bodily odourl）the classic arcade game from the 70 ＇s？David＇10－LIner＇Hall has managed to fit a truly stunning version of said game into the oblilgatory 10 lines．

You must play a form of tennis by bouncing a flying ball past your opponent＇s bat．The first player to reach a score of nine points，wins．
It is for two players only and can be
played with two joysticks，or alternatively， ＇ROCKY＇can be controlled by＇$a$＇tor up to ＇z＇tor down，and＇ARME＇has the controls of＇［＇up．＇\＇down．
arcade tennis
＊＊＊＊＊＊＊＊＊＊＊＊＊


 ØF 1 E


CF9ACFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCFCF $458 A \emptyset 』 D 日 449898 C C C C ~$

$3 \varnothing$ DATA AF З2ロC62CD2C7721DロC222AB61CD4C76211EC322AAG1CD4C76CDEF75CD6ロ75CDCF75CDFG $75 C D 62763$ A0C $62 F E \emptyset D 28 F 0 C 906052 A A C 6111104 F C D 5176212 B C 3$
22AC6121010122AE613E0A32B06106052AAC6111FC4ECD51763E2FCD1EBE28F9C921303022419C21． $1705 C D 75 B E 3 E 06 C D 90 B E 3 A 419 C C D 5 A B B 2117$
40 DATA $10 C D 75 B E 3 E \square 9 C D 90 B B J A 429 C C 35 A B B 21419 C 0601347 E F E 3920 D 378320 C 5218 C D 21429 C \boxtimes 6$【21 EEDDD21AAG13E11CD1EBB20SF ЗE3ØCD1EBE20583E16CD1EBE
20353E31CD1EBB202E2AAAG106161858DD21A8613E4BCD1EBE20383E43CD1EBB20313E49CD1EBB2』 ØE ЗE47CD1E日B2ØØ72AAB6106161831DD66Ø1


 FED22805CD26BC180 $3 C D 29 B C 22 A C 613 A A F 61$
$6 \emptyset$ DATA FEØ220182AAC61CD29BC7EFEDØ28223AAF61EE0332AF61CD527718182AAC61ロGD5CD26BC 1ØFB7EFEØØ20E42AAC61CD26BC22AC612AAC6111FC4EØ6Ø5CDS1．
$763 A B \emptyset 61 F E \emptyset 1282 E F E 4 B C \emptyset 2 A A C 6123237 E F E \square \emptyset 2 \emptyset 17 C D 26 B C C D 26 B C C D 26 B C C D 26 B C 7 E F E \emptyset 020 \emptyset 6 C D B 7$ $75 C 360753 A A E 61 E E 0332 A E 6118462 A A C 612 B$
70 DATA $7 E F E \square 020 E D C D 26 E C C D 26 B C C D 26 B C C D 26 E C 7 E F E \emptyset 020 D C C D C B 75 C 360752195 E 611204 E C D 3 B$ 7721 DSE611204EDE1622日03ED6ロ81A77231310FA2AB0ЗECD26BC
 NT


 $250,10:$ INK 5,15 ：INK $14,26,15$ ：INK 15， 0,15
 OCATE 16，21：PRINT＂Arnie＂；LOCATE 8，22：PEN 3：PRINT＂
ArCaDe＂：LOCATE 8，24：PEN 5：FRINT＂TENNI5＂：PLDT $\varnothing, 88:$ DRAWR $\varnothing, 14,2:$ DRAWR 636，$\varnothing:$ DRAW R $\emptyset,-14,6:$ DRAWR $-636, \emptyset:$ PLOT $4,9 \emptyset, 1 \varnothing$
100 FOR $t=1$ ．TO 6：DRAWR 628，Ø：MOVER $-628,2:$ NEXT：FLOT $\emptyset, 380:$ DRAWR $0,14,2:$ DRAWR 636 ，$\because=$ DRAWF $\emptyset,-14,6:$ DRAWR -636 ， $0:$ FLOT $4,382,10:$ FOR $t=1$
TO 6：DRAWR 628，Ø：MOVER－628，2：NEXT：CALL उDDDD：LOCATE 4，9：PRINT＂PLAYER＂PEEK（2510
Q）＂WINS＂：FOR $t=1$ TO SDDO：NEXT：GOTO 90

It you have problems with Wordsearch puzzles，and cannot be bothered to take the time out to solve them by hand，David Hall returns with a short listing to solve them
automatically．
Firstly once the program has loaded． type in the number of characters across and down in the puzzie（e．g．20．17）．The
program will draw a grid which you must fill in the letters invoived．You will then have prompts to enter words，which will be tound for you，simple，huh？

```
10 MODE 1：INK 3，15，6：DIM i \((36,21):\) PRINT＂Greetings ！＂：PRINT＂I hope you＇re not g oing to type with＂：PRINT＂cold hands again（brrr）！＂： Ri（22）CHRe（1）；：FOR \(k=1\) TO d：FOR \(t=1\) TO a
```



``` （7）；：LOCATE \(t+2, k+2\) ：PRINT CHR \(⿻\)（ \((i(t, k)\) ）
30 NEXT：NEXT：PRINT CHR事（22）CHR \(⿻\)（ \(\because\) ）
```



``` ＂SEARCHING FOR＂wt：\(s=0: F O R ~ k=1\) TD \(d: F O R ~ t=1\) TO a：F
OR \(y=-1\) TO 1：FOR \(x=-1\) TO \(1: G O S U B\) 100：IF \(5=1\) THEN SØ ELSE NEXT：NEXT：NEXT：NEXT
50 GOSUB 9D：PRINT CHR（22）CHR（ 1 ）；：FOR \(k=1\) TO d：FOR \(t=1\) TO a：LOCATE \(t+2, k+2\)
s IF \(i(t, k)<97\) THEN PEN 3 ELSE PEN 2
```



```
IF \(i(t, k)<97\) THEN \(i(t, k)=i(t, k)+32\) 80 NEXT：NEXT：GOTO 40
90 CLS：PEN 2：PRINT＂＊＊＊WORDSEARCHER（V．1）By David Hall＊＊＊＂；：PLOT 30，368，1：FOR \(j=\emptyset\) TO \(d:\) DRAWR \(16 * a\) ，\(\emptyset:\) MOVER \(-16 * a,-16:\) NEXT：PLDT \(3 \emptyset\) ，
368：FOR \(j=\emptyset\) TO a：DRAWR \(0,-16 * d:\) MOVER \(16,16 * d\) ：NEXT ：RETURN
1 1ø \(q=t: f=k: F O R \quad z=1\) TO LEN \((w ⿻)=\operatorname{IF} i(q, f)\langle>A S C(M I D *(w *, z, 1)\) ）THEN RETURN ELSE：\(q=q\) \(+x: f=f+y:\) IF \(q<\emptyset\) OR \(f<\emptyset\) THEN RETURN ELSE NEXT： \(5=1: F O R\)
\(z=1\) TO LEN \((\omega ⿻=w): i(t, k)=i(t, k)-32: t=t+x: k=k+y:\) NEXT：RETURN
```

Another David Hall game continues to amaze us in the office with the versatility avallable wilthin 10 lines．

All you have to do is move your space ship left and right，in order to avold the oncoming debris．The most increatble thing
about this game is the multi－coloured sprite．Control is by Joystick only．

[^0]

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# HAIRY HACKER 

Welcome to the chaos, hackfans. Here we are in the Easter bunny season, running all over the garden, trying to find the Easter eggs. Mum and Dad hiding in the background saying "I'm sure the Easter Rabbit left three dozen eggs." To which the kiddies reply "Perhaps he snuffed it half way through, due to salmonella poisoning? '"

Meanwhile, back at the Hackery, no-one is dropping dead of food poisoning just this moment, in fact, not a lot is happening at all. This is fortunate, as I'm baby-sitting. We'll just pop another chocolate rabbit in the kiddies mouth, and get on with the column.

## Reading between the lines.

If I've got my timing right, which does happen occasionally, this is about April Fool's season too. Well, when typing in progettes, look for bits in the DATA line like: $41,70,72,69,6 c, 20,46,6 f, 6 f, 6 c$. That is what April Fool looks like in hex, and we've got no fooling about in this month's column.
The technique for spotting words in hex, is to search through the data for things in the range $40-80$ separated by 20 or $\mathrm{Od}, \mathrm{Oa}$. The manual has a hex to ASCII conversion table in it, so $48,61,70,70,79$, $20,68,75,6 e, 74,69,6 e, 67$.

## Haeyere's a poke

The first wee pokette we have for yur is a Nebulus disck poker, by a guy called Vincent D'Haeyere, from somewhere in Belgium. I dunno exactly where it came from: The bottom of the sheet is cryptically market "Try Vax". Still, if you're reading this Vincent, its yours:

```
`Nebulus Hack (disc
    'By Vincent D'Haeyere
    MEMORY 32768:MODE 0
    LOAD "Nebload.bin"
        DATA 21, ef, 85, 36,00, c9
        FOR i=1 TO 6:READ a$
        POKE & 30+(i-1),VAL('" &''+a$)
        sum=sum + (VAL("&''+aS)*1)
        IF sum<>2332 THEN 100
        POKE &8172,&CD:POKE
        &8173,&30
90 POKE &8174, O:CALL 33024
```

This month Vax encounters Salmonella, a multitude of Multidace hints, and lets you redesign the screens in Cybernoid.


100 PRINT "Error in DATA." :STOP
No instructions provided, but I'd recommend backing up your disc first, just in case, Then, load this routine, stick in Nebulus disc, and RUN.
Do you like the new-style listings by the way? Typesetters at the new regime has basically said "you do it, mate", so any complaints sent to me.OK?

## Trimming your Multiface

Stephen Trimmer, he of Helpline Services fame, has sent by the Royal Snail another wondrous cheat sheet for you lucky Multiface II owners (and let's hope there are many more to come). You can, of course, remember how to enter these, can't you? Wake up at the back, laddie! I mean you! Oh well, I guess I'll have to explain it again.

First you load the game with your Multiface II on the back. Either an original or a backed-up copy, it doesn't matter. Then hit THE BIG RED BUTTON, 'T' for toolkit, 'H' for hex, (SPACE) to clear the address, and then the poke numbers with a comma in it. Hit (RETURN), (ESC), and 'R'. Bingo.
For example, should the likes of you be hacking Renegade, type BIG RED BUTTON, 'T', 'H', (SPACE), '0A48A7', (RETURN), (ESC), 'R'. That should get you your infinite lives, if you want you can now back up the saved version. Here's the list:

## POKE GAME AND EFFECT

B6A6,C9
Monty on The Run has no collision detection.

9BE3,C9
9CBC,00 Monty on The Run infinite lives.
1526,A7 Gryzor infinite lives.
0A48,A7 Renegade infinite lives.
042C,OA Combat School slow timer.
A0C7,C9 ZTB invulnerability.
A853,C9 Spindizzy infinite time.
61CF,C9 Ghost Hunters infinite macho energy.
4551,C9 Druid infinite energy. 5749,00 Antirad gives you gavity boots.
64F4,00 Antirad gives you pulsar beam.
5BBE, B7 Antirad invulnerability. A92B,C3 Wizball invulnerability for Wiz.
8925,01 Dizzy fast game.
751B,C9 Dizzy no collision detection.
1007,FF Renegade 255 lives (if you need more, God help you).
5308,C9 Gyroscope invulnerability.
1FIF,C3 Bomb Jack invulnerability.
19FD, 00 Bomb Jack infinite lives.
18E5,18 18 Bomb Jack II infinite lives.
AE3A, 18 Fly Spy no E.N.C.T. aborts.
AB2C, 18 Fly Spy can't die from bombs.
4A3F,00 Zynaps has no sprites.
6139,C9 Zynaps has increased rate of fire.
5F7E,FF Zynaps 255 lives.

## POKE GAME AND EFFECT

069D,00 Superpipeline 2, infinite
066C,00 Part 2 of above.
4DA3,00 Technicián Ted infinite lives.

Android 2 infinite lives. Mutant Monty infinite lives, needs next one.
A16A, 00
8438, XX
1DE0,00
3483,00
1Do8,00
297D,00
2A7D,00
914A, 00
917F,DO
A103,00
8C11,00 Devil's Crown fish sod off.
6616,00 Wriggler infinite lives.
81B8,00 Part 2 of above.
16C4,C9 Dynamite Dan infinite lives.
9CB3,00 Cauldron infinite lives.
A831,C9 Spindizzy infinite time.
5395,00 Pulsator infinite lives.
5396,00 Part 2 of above.
071A,00 Revolution infinite lives.
071E,00 Part 2 of above.
Interesting how Josh's bijou-pokette for
Spindizzy achieves a similar effect to Stephens, but by working its magik in a different place. Not possesing a kosher copy of Spindizzy or a Multiface II, I'II guess at there being maybe a coupld of versions. Either that or they're both doing the same thing different ways.

The Gauntlet pokette isn't for the blood-and-thunder one of late, but the rather nice defender clone that came out in the arly days of the 464. Ah, the nostalgia.
On the Devil's Crown poke, the fish are attracted to you until your oxygen supply is critical, and you begin to flounder. Sorry if this isn't the plaice for jokes like that. As the oxygen level doesn't drop )he poked it, remember?), the "Fish sod off" poke makes the fish, well, sod off. Hence his name for the poke.

## Revolution

The last thing not to panic about is the corruption thet okurs inn rEevoltion. It's mostly harmless, and anyway, the first duty of a revolutionary is to get away with it.

Josh has also popped a few posers. He wants to know why the words BUG OFF appeag in certain games with alarming frequency. Well, this is not a chant to the Great God Clitch, in a vain hope to appease him and keep the hell out of the code. No, it is in fact a subtle suggestion from DJL, who wrote Speedlock. It is the name of a small file loaded in near the beginning, and the letters "BUG OFF" are actually executed as code. What you might refer to as calling names?

Seeing as I'm about to take the ol' driving test, cars, for the use of, must figure
out how to do a "no collision detection" poke for the examiner. Now then, how can I con a Multiface II for review...
As it happens, Josh Ounstead of Fretherne-with-Saul (it's real!) in Gloucestershire has been doing much the same thing, but with slightly different games of course. Here's his list of Multiface pokes:

## POKE GAME AND EFFECT

0939,00 Joe Blade infinite strength.
105D, 00 Joe Blade infinite ammo.
7C5C, 21 Dan Dare (hooray!) infinite lives part 1 .
7C6B, 11 Dan Dare infinite lives part 2, goes with part one above.
02F3,00 Arkanoid infinite lives player 1.
0374,00 Arkanoid infinite lives player 2.
5166,00 Destructo infinite time.
3DAA, 00 Destructo indestructability (?!).
79DA,00 Light Force infinite lives.
6BAE, 00 Mission Jupiter Infinite lives on one player.
6BE2,00 Mission Jupiter Infinite lives on 2 player, player 1.
6CIE,00 Mission Jupiter Infinite lives on 2 player, player 2.
5F44,00 Mission Jupiter infinite fuel.
6154,00 Mission Jupiter infinite firepower.
2632,21 Impossible Mission infinite LIFTINIT passwords.
2634,00 Part 2 of above.

2659,21. 265B,00

Impossible Mission infinite SNOOZE passwords.

Josh says that it's not a good idea to leave Mission Jupiter running for too long in demo mode, because it can't die and the autopilot does some silly things with it. Given half a chance, it will fly through the side, and die after a few interesting ad-libbed landscapes.

Well done Josh. Hope you did well in the Mocks, and that sheet 2 is well on the way to completion.

Hold on, hold on, the next letter in the pile IS his part 2 sheet. It must have been put there recently, as it has fewer tea-mugs rings and muddy paw-prints on it. Oh hum, I'll print it now, shall l?.

## Deadlines

Josh also wants to know how to meet deadlines for the Hacker's column. This is a sore point of late (occasionally very late), and a subject of much anguish. To give you some idea of when you can expect to see your letters in print, it's now the 24th of February, and the deadline was two days ago. Life's a bitch and then you die, as Woody Allen says.

## Some eerie pokes.

Still, some things ain't so bad, and this next pokette from Naill Brady in Erie will redesign your Cybernoid level 1 screen to something a little bit more exciting. Try this is you have the patience (and a copy of Cybernoid):

## - Re-design that game!

1

## CYBERNOID-Tape LEVEL 1 REDESIGNED By Niall Brady, Eire

```
MODE 1
```

$x=\& 40$
READ $a \$$ :IF $a \$=$ "NCB" THEN 80
POKE $\times$,VAL ("\&"+a\$)
$x=x+1$ : GOTO 30
60 DATA 21,00, c0,11,1e, 42,01
70 DATA 52,06 , ed, bO, c3,00,02, NCB
80 MEMORY \& SFFF:LOAD"!Loader" , \& 4000
90
100 POKE \& 4133,0
110 POKE \&4134,0
120 POKE \& 4135,0
130 POKE \&4154,0
140 POKE \& $4153, \& 40$
150
160 DATA $7 E, 14,14,13,35,36,37,15 B$
170 DATA $34,37,35,36,34,37,37,178$
180 DATA $4 \mathrm{E}, 4 \mathrm{~F}, 7 \mathrm{D}, \mathrm{FF}, \mathrm{OD}, 00,52,278$
190 DATA $53,7 \mathrm{C}, \mathrm{FF}$, OF , OO, 7D, 14, 26E
200 DATA $14,49, F F, O C, 00,7 E, 02,1 E 8$


## HACKING

210 DATA 03,15,FF,OC,00,7D,03,1A3 220 DATA 04,15,FF,OC,00,7E,04,1A6 230 DATA 05,15,FF,0C,00,7D,03,1A5 240 DATA 04,15,FF,OB,00,F8,7E,299 250 DATA 02, 04, 4A, 14, 49, FF, 04, 1BO 260 DATA 46,EA, 48, 14, 14, 14, 14, 1C8 270 DATA 7E,02,03,04,05,12,FF,19D 280 DATA 05,14,13,01,02,03,04,036 290 DATA $00,00,00,00,00,00,00,000$ 300 DATA $00,00,00,00,00,00,00,000$ 310 DATA $00,00,00,00,00,00,00,000$ 320 DATA $00,00,00,00,00,00,00,000$ 330 DATA $00,00,00,00,34,35,36,09 F$ 340 DATA $34,37,37,12,14,14,14$, OFO 350 DATA $14,14,14,14,14,11, F F, 174$ 360 DATA 07,00,FF,08,47,15,FF,269 370 DATA OF,OO, 15,FF, OF, OO, 15, 147 380 DATA FF, OE, OO, E9, 15, FF, OB, 315 390 DATA $00,10,14,14,14,13,00,05 F$ 400 DATA FF,OA, OO, 12,14,14,14,157 410 DATA $11, F F, 0 C, 00,94,95,00,245$ 420 DATA $15, F F, 06,14,11, F F, 05,243$ 430 DATA $00,96,00,00,15,02,03,0 B 0$ 440 DATA 04,01,02,03, 15, FF, 04, 122 450 DATA $00, E E, 12,14,14,13,00,13 B$ 460 DATA $00,00,00,00,00,00,10,010$ 470 DATA FF,OF,14,15,FF,OB,00,241 480 DATA $30,31,00,00,15, F F, 0 B, 180$ 490 DATA $00,32,33,00,00,15, F F, 179$ 500 DATA OF, OO, 15, FF, OF , OO, 15, 147 510 DATA FF, OE, OO, EC, 15,FF, OF, 31C 520 DATA $00,15, E 9,22,22, F F, O C, 24 D$ 530 DATA $00,12,14,14,14,11,00,05 F$ 540 DATA $00,10, F F, 08,14,01,02,12 E$ 550 DATA 03,04,15,00,00,15,01,032 560 DATA 02,03,04,04,03,02,01,013 570 DATA $00,00,00,00,00,00,00,000$ 580 DATA $00,00,00, F F, O F, 14,14,136$ 590 DATA FF,OB, OO, 3C, OO, 3C, OO, 182 600 DATA 3C, FF, $07,00, F F, 04, F A, 33 F$ 610 DATA 3B,F1, $3 \mathrm{~B}, 00,3 \mathrm{D}, \mathrm{FF}, \mathrm{OB}, 2 \mathrm{AE}$ 620 DATA $00,3 D, 00,3 B, F 6, F F, O E, 27 B$ 630 DATA $00,3 \mathrm{D}, 00,3 \mathrm{C}, \mathrm{FF}, 0 \mathrm{O}, 00,183$ 640 DATA $3 \mathrm{C}, 00,00,00,3 B, F F, 0 B, 181$ 650 DATA $00,3 B, 00,3 C, 00,3 B, E E, 1 A O$ 660 DATA E9,E9,E9,E9,FF, 06,00, 4A9 670 DATA 3D,00,3D,00,3D,FF,10,1C6 680 DATA $14,01,02,03,04,05,01,024$ 690 DATA 02,03,04,05,04,03,02,017 700 DATA 01,02,03,00,00,00,43,049 710 DATA 6F,64,65,20,42,79,20,233 720 DATA $4 E, 69,61,6 C, 6 C, 20,42,252$ 730 DATA $72,61,64,79,20, A 4,20,294$ 740 DATA $38,38, F F, O A, 14,14,14,1 \mathrm{B5}$ 750 DATA $14,14,14,11,00,00,00,04 D$ 760 DATA 2B,2C, $00,2 \mathrm{~B}, 2 \mathrm{C}, \mathrm{FF}, 04,1 \mathrm{~B} 1$ 770 DATA $00,00,00,00,15, F F, 04,118$ 780 DATA $00,2 \mathrm{D}, 00,00,2 \mathrm{D}, \mathrm{FF}, 07,160$ 790 DATA $00,15, F F, O E, O 0,2 E, 15,165$

800 DATA FF,OA,OO,E9,OO,EA,2F, 3OB 810 DATA $2 \mathrm{E}, 15,00,00,00,00, F F, 142$ 820 DATA $05,00,2 E, 2 F, 2 E, 2 F, 2 E, O E D$ 830 DATA $2 \mathrm{~F}, 15,00,00,00,00, F F, 143$ 840 DATA $04,00,2 \mathrm{E}, 2 \mathrm{~F}, 2 \mathrm{E}, 2 \mathrm{~F}, 2 \mathrm{E}$, OEC 850 DATA $2 F, 2 E, 15,00,00,00,00,072$ 860 DATA $00,00,2 F, 2 E, 2 F, 2 E, 2 F$, OE9 870 DATA $2 \mathrm{E}, 2 \mathrm{~F}, 2 \mathrm{E}, 2 \mathrm{~F}, 15,14,14$, OF7 880 DATA $14,14, F F, 06,14,49,2 F, 1 B 9$ 890 DATA $2 \mathrm{E}, 48,14,4 \mathrm{~B}, 01,02,03$, ODB 900 DATA 04,01,02,03,01,01,02,00E 910 DATA $15,2 \mathrm{E}, 2 \mathrm{~F}, 15,01,02, \mathrm{FF}, 189$ 920 DATA AO,00,7D, 02,03,04,04,12A 930 DATA 03,03,04,01,02,02,01,010 940 DATA 02,01,01,02,7D,10,FF, 192 950 DATA OD,14,49,7E,15,FF,OD,209 960 DATA $00,15,7 \mathrm{D}, 15, \mathrm{FF}, 04,00,1 \mathrm{AA}$ 970 DATA F8, $10,14,14,11, \mathrm{FF}, 04,244$ 980 DATA $00,15,7 \mathrm{D}, 15, \mathrm{FF}, 04,00,1 \mathrm{AA}$ 990 DATA F9, $15,02,03,15, F F, 05,22 C$ 1000 DATA $00,7 \mathrm{E}, 15, \mathrm{FF}, 05,00,15,1 \mathrm{AC}$ 1010 DATA 01,02,15,FF,04,00,96,1B1 1020 DATA 7D, 15,FF,05,00,12,14,1BC 1030 DATA $14,13, F F, 04,00,15,7 E, 1 B D$ 1040 DATA 15,FF,OD,00,15,7E,15,1C9 1050 DATA FF,OD, OO, 15,7D, 12,14,1C4 1060 DATA $11,46,10$, FF $, 09,14,13,196$ 1070 DATA $00,00,00,00,00,02,01,003$ 1080 DATA 02,03,04,05,04,15,FF, 126 1090 DATA 05,00,37,35,36,48,3C,12B 1100 DATA OO,3C,F6,3C,00,12,14,194 1110 DATA $14,11, F F, 05,00,15,3 B, 179$ 1120 DATA F6,3D, 00, 3B, 00, FF, 09, 276 1130 DATA $00,15,3 \mathrm{D}, 00,00,00,3 \mathrm{D}, 08 \mathrm{~F}$ 1140 DATA FF,OA,OO,15,00,00,3C,15A 1150 DATA $00,00,00,10,14,14,13,04 \mathrm{~B}$ 1160 DATA FF,05,00,15,3C,00,3B, 190 1170 DATA $00,3 C, 00,15,01,02,82,0 D 6$ 1180 DATA FF, 05, 00, 15,3D,00,3D, 193 1190 DATA 00,3D,00,15,01,02,03,058 1200 DATA $82,80,81,0 E, O F, 15, F F, 2 B 4$ 1210 DATA 06,14,13,01,02,03,01,034 1220 DATA 02,03,04,05,15,04,01,028 1230 DATA 02,01,02,03,02,03,04,011 1240 DATA 02,03,02,03,04,01,15,024 1250 DATA FF,OF, 14, 13, 10, 14, 14,16D 1260 DATA $14,13, E F, E A, 12, F F, 07,318$ 1270 DATA $14,11,15, F F, O E, 00,15,15 C$ 1280 DATA $15, F F, O E, 00,15,15, F F, 24 B$ 1290 DATA OE,OO,15,15,FF,OE,OO,145 1300 DATA $15,15, \mathrm{FF}, \mathrm{OE}, 00,12,15,15 \mathrm{E}$ 1310 DATA FF,OF,OO,12,14,14,11,159 1320 DATA FF,OC,00,01,01,03,12,122 1330 DATA FF,OC,14,01,02,03,04,129 1340 DATA 04,03,02,01,03,04,05,016 1350 DATA 01,02,03,04,05,04,05,018 1360 DATA $14,01,02,03,04,05,01,024$ 1370 DATA 02,03,04,05,15,00,00,023 1380 DATA $00,15,01,01,02,03,04,020$

## HACKING

1390 DATA 01, 15,79,FF,07,78,79,286
1.400 DATA $11,01,48,14,14,14,13$, OA9

1410 DATA 00,00,30,31,FF,05,00,165
1420 DATA $15,02,15, F F, 06,00,32,163$ 1430 DATA $33, F F, 05,00,15,03,15,164$ 1440 DATA FF, OD, OO, 15, 14, 13,FF, 247 1450 DATA $08,00,00,00,00,00,00,008$ 1460 DATA $15,00, F F, 09,00,00,00,11 \mathrm{D}$ 1470 DATA $00,00,00,15,00, F F, 09,11 \mathrm{D}$ 1480 DATA 00,00,00,00,00,00,15,015 1490 DATA 00,FF, 09, 00, EE, 00, 00, 1F6 1500 DATA OO, OO, 15,FF, 05, 14, 11, 13E 1510 DATA FF, $04,00,20,20,20,20,183$ 1520 DATA 00, 15,01,02,03,04,05,024 1530 DATA $15,00,00,10, F F, 06,14,13 E$ 1540 DATA 4B,01,02,03,04,01,02,058 1550 DATA 03,01,02,03,15,00,00,01E 1560 DATA $15,01,02,01,02,10,14,03 F$ 1570 DATA $14,14,14,14,14,14,13,08 B$ 1580 DATA OO,OO, $12,14,49,48,14$, OCB 1590 DATA $13, F F, O C, 00,15,15, F F, 247$ 1600 DATA OE,OO,15,15,FF,OE,O0,145 1610 DATA $15,15, F F$, OE $, 00,15,15,161$ 1620 DATA FF, OC, OO, 27, 28, 15, 15, 184 1630 DATA FF, OC, $00,29,2 \mathrm{~A}, 15,15,188$ 1640 DATA FF,OB, OO, 10, 14, 14, 4B, 18D 1650 DATA $15, F F, 05,00, E D, E D, E D, 3 E O$ 1660 DATA $00,00,00,15,01,02,03,01 \mathrm{~B}$ 1670 DATA FF, AO, OO, 7D , 14, 14, 13, 257 1680 DATA OO, 12,FF,04,14,11,02,13C 1690 DATA 02,01,02,02,7D,FF,08,18B 1700 DATA $00,00,12, F F, 05,14,7 \mathrm{C}, 1 \mathrm{~A} 6$ 1710 DATA FF, OF, OO, 7D, FF, OF ,OO, 299 1720 DATA $7 \mathrm{E}, \mathrm{FF}$, OF, OO, 7C, FF, OF, 316 1730 DATA OO, TE, FF, OF ,OO, 7C, OO, 208 1740 DATA OO,OO,OO,27,28,00,27,076 1750 DATA 28,00,27,28,00,00,00,077 1760 DATA $7 E, 00, E 9,00, E B, 29,2 A, 2 A 5$ 1770 DATA OO, 29, 2A, EA, 29, 2A, 00, 190 1780 DATA EC, OO, 12,FF,OF, 14,00, 220 1790 DATA OO,00,00,00,00,00,00,000 1800 DATA 00,00,00,00,00,00,00,000 1810 DATA 00,00,00,00,00,01,02,003 1820 DATA 04,03,01,03,04,01,02,012 1830 DATA 03,04,05,01,02,03,04,016 1840 DATA FF, 10, $14,00,47,47, F F, 2 B 0$ 1850 DATA OA, OO, 30, 31, FF, OE, OO, 178 1860 DATA $32,33, F F, 10,00, F F, 10,283$ 1870 DATA OO,FF, $10,00, F F, 10,00,21 E$ 1880 DATA EC, OF, OE, OD, OE, OE, OF , 141 1890 DATA $80,81,82, O D, O E, O F, O D, 1 B A$ 1900 DATA OE, OF, OD,FF, $10,14,00,14 \mathrm{D}$ 1910 DATA OO,00,00,00,00,00,00,000 1920 DATA 00,00,00,00,00,00,00,000 1930 DATA OO,00,00,00,00,00,00,000 1940 DATA 00,00,00,00,00.00,00,000 1950 DATA OO,00,00,00,00,00,00,000 1960 DATA OO,00,00,00,00,00,00,000 1970 DATA OO,00,00,00,01,02,03,006

1980 DATA 04,04,01,02,03,04,03,015 1990 DATA 04,05,03,02,01,15,13,037 2000 DATA $4 E, 4 F, 00,3 C, F 1,3 C, F 2,2 F 8$ 2010 DATA $3 C, F F, 06,00,15,00,52,1$ A8 2020 DATA $53,00,3 B, 00,3 D, 00,3 B, 106$ 2030 DATA FF,06,00, 15,FF,04,00,21D 2040 DATA 3D,00,00,00,3D,FF,06,17F 2050 DATA OO, 15,FF, O6, OO, ЗC, OO, 156 2060 DATA OO,FF,O6,OO,FF,04,00,208 2070 DATA E9, ЗС, OO, ЗB, OO, ЗC,FF, 29B 2080 DATA 06,00,96,FF,04,00,3B, 1DA 2090 DATA OO, ЗB, OO, ЗB,FF,06,00,17B 2100 DATA 15,FF,O4,OO, 3D,OO, 3D, 192 2110 DATA OO, 3D,FF, 06,00,15,OF, 166 2120 DATA OD,OE,80,01,02,03,O4,OAS 2130 DATA $05,82, O F, O D, O E, O F, O E, O C E$ 2140 DATA $15, F F$, OF $, 14,13,01,04,14 F$ 2150 DATA 03,02,01,15,00,00,15,030 21 GO DATA 01,02,03,04,04,04,01,013 2170 DATA 02,48,14,14,14,4B,OO,OD1 2180 DATA OO, 4A, 14, 14, 14, 49, 03,OD2 2190 DATA O3, 02, 03, 15,FF,OA,00, 126 2200 DATA $15,02,02,02,01,13, F F, 12 E$ 2210 DATA OA, $00,15,01,01,03, F F, 123$ 2220 DATA O8,00,00,00,00,F9,15,116 2230 DATA 02,03,01,02,11,FF,09, 121 2240 DATA 00,00,15,01,02,03,04,01F 2250 DATA $15,00,46,46,00,00,46$, OE7 2260 DATA FF,04,00,15,01,02,03,11E 2270 DATA $04,15,00,4 C, 4 \mathrm{D}, \mathrm{EB}, 00,19 \mathrm{D}$ 2280 DATA 4C, 4D, $00,00, F C, 15,01,1 \mathrm{AB}$ 2290 DATA 02,03,04,4A,FF,OA,14,170 2300 DATA 4B,04,01,02,01,02,03,058 2310 DATA 04,01,02,04,04,01,02,012 2320 DATA 03,04,01,02,03,04,15,026 2330 DATA FF, OB, OO, 15,01,02,03, 125 2340 DATA 15,FF,OB,OO, 15, O1,O2, 137 2350 DATA O3, 15,FF, OB, OO, 12, 14, 148 2360 DATA $49,03,15, F F, O C, O 0, F D, 269$ 2370 DATA $15,01,15,00,00,85,83,133$ 2380 DATA $84,86, F F, 07,00,15,03,228$ 2390 DATA $15,00,00,8 B, 00,00,8 B, 12 \mathrm{~B}$ 2400 DATA FF, 07,00, 15,02, 15,00, 132 2410 DATA OO,92,00,00,92,00,00, 124 2420 DATA $46,46,00,00,00,15,01$, OA2 2430 DATA $15,00,00,92,00,00,92,139$ 2440 DATA OO, OO, 4C, 4D,FD, OO, OO, 196 2450 DATA $15,01,12, F F$, OD $, 14,13,15 B$ 2460 DATA 01,FF,10,04,00,00,00,114 $2470 a=\& C O O O: 1=160:$ WHILE $1<2410$ :GOSUB 2480:WEND:GOTO 2520
2480 cs $=0$ :FOR $x=1$ TO 7:READ $\vee \$$ $: v=$ VAL ("\&"+v\$): POKE $a, v$ 2490 cs $=c s+v: a=a+1:$ NEXT:READ $c \$$ : $c=$ VAL ("\&"+c\$)
2500 IF c<>cs THEN PRINT"Data error in line ", l:END
$2510 \quad 1=1+10:$ RETURN
2520 CALL \& 4000

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# TYPE IT YOURSELF 

Thomas Betts has problems with his variables, but soon finds out how to dump them.

If you are a very dedicated programmer, or just dedicated and very wealthy, then you will have all your BASIC programming aids on ROM. Or are you like many of us, relying on listings and give-away cassettes? I say, relying, but do you find your variables dump listings reliable?

Has this been your experience?

> You can't find a variable in a program you are working on.
> You save the program; change cassettes to load a variables dump; reload your program; and your machine then takes great delight in giving you unbelpful messages such as, Memory full, Overflow, Improper argument.

## Yes?

Or, If all seems to be well, the variables dump doesn't dump all the variables, and by way of compensation dumps some variables which aren't really there at all.

If that happens to you this TYPE-IT YOURSELF variables dump program is yours. Away with the wait for tape! Just type in a few lines and dump.

Instead of using the uncertain method of looking at the list of variables, which BASIC installs into memory when a program is run, this dump program looks through the BASIC program itself. Before we can look for the variables we shall need to know where, in memory, to find the lines of a BASIC program, and then to know how to recognize a variable name when we see one.

The CPC memory map gives \& 40 (64 in decimal) as the lowest address for use by BASIC. We shall start from there.

## Finding the Lines

Switch on the CPC and enter this BASIC program:-

10,
20,,
$30, \ldots$,
255 ,,",
258,
Yes! Nothing but line numbers and commas. Now enter the direct BASIC commands:-

## MODE 1:Zone 6:FOR $\mathrm{a}=64$ TO 405:PRINT PEEK(a),:NEXT

For this exercise you can ignore the first few numbers which are printed to the screen - actually they represent the direct BASIC command which you have just entered and ignore the rows of zeros which follow. When the screen stops scrolling, the bottom seven rows will be these:-

| 0 | 0 | 0 | 0 | 6 | 0 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 10 | 0 | 44 | 0 | 7 | 0 |
| 20 | 0 | 44 | 44 | 0 | 8 |
| 0 | 30 | 0 | 44 | 44 | 44 |
| 0 | 9 | 0 | 255 | 0 | 44 |
| 44 | 44 | 44 | 0 | 6 | 0 |
| 2 | 1 | 44 | 0 | 0 | 0 |

There are lots of 44 's about, 44 being the ASCII code for a comma. We can see a 10 , a 20,30 and 255 . We have found our program. The six in the top row is the first byte of the program and counting backwards from the bottom ( 405 ) gives us 368 as its address. Six is the length of the BASIC line as it now is in its stored form. The 10 on the next row is the line number; 44 represents one comma; and the sixth byte, starting at 6 , is a zero marking the end of a line. The following seven is the length of line 20 , and so on. Numbers greater than 255 need more than one byte ( 8 bits, or BInary digiTS) so two bytes are given to the line length, and two to the line number. It is the accepted practice that the low byte comes first; thus the number of the last line ofr short test program is given by the first two bytes on the bottom row (the third and fourth bytes of the line): $(2 * 1)+1 * 256)=258$.

## Recognizing a variable name

Enter this BASIC program:-
10 aaaa $=4$
$20 \mathrm{bbb}=5$
$30 \mathrm{x}=\mathrm{y}$
65430 memry $=368$
65440 length $=$ PEEK (memry)

+ PEEK (memry + 1)*256
65450 linumb $=\operatorname{PEEK}($ memry +2$)$
+ PEEK $($ memry +3$) * 256$
65460 IF linumb $=65430$ THEN
STOP


65470 PRINT:PRINT linumb, 65480 FOR addr $=$ memry +4 TO memry + length -1 65490 PRINT USING "****"; PEEK(addr); 65500 NEXT addr 65510 memry $=$ memry + length 65520 GOTO 65440

Enter: ZONE 2:MODE 2:RUN 65430
Notice that the use of PRINT USING has lined up the units digits of the numbers:-

```
10130097 97 97 225 239 18 0
20130098 98 22623919 0
30130024823913
```

I did think I would leave you to decipher this, but that might have provoked correspondence, and my wife already tells me that I need forty-eight hours in a day.

After 10, the three bytes 1300 are an indication that a variable name follows immediately. 97 is the ASCII for the lower case letter " a ". 225 is $97+128$. (BASIC adds 128 to the ASCII code of the last character of a variable name). 239 is the BASIC token for " $=$ " (equals). 18 is a "Tokenized" number 4. The following 0 indicates the end of the line. Line 20 follows the same rules. Line 30 has two variable names, each with one character. ASCII code for x is $120 ; \mathrm{y}$ is 121 .

## Enter RUN.

In line 10 the 1300 is now 1380 ; in line 20 the 1300 is now 13190 ; in line 30 the first 1300 is now 13280 .

The new numbers are an indication of the positions of the variables in the list of established variables. Notice that in line 30 , the second 1300 has not been changed: the variable has not been put on the list. This is a simple example of what I meant when I said that looking at the list of variables is an uncertain method to use.

Before we move on, amend the test program by entering:-

10 aaa $\%=4$
20 aaa! $=5$
30 aaa $\$=$ " 6 "
Enter: RUN 65430:-

1020099797225239180
204009797225239190
$303009797225239345434 \quad 0$
We can now be more specific and say that the indication given by 1300 is that a default variable follows. A default variable is a variable without a type-marker. Variables with a type-marker are indicated in the way shown. Notice that the variable name does not include the type-marker. (Type-markers are explained on page 4.6 of the CPC 464 User Instructions. The 6128 User Instructions refer to them on pages 3.14 and 3.15 but I cannot find explanations. Briefly, $\%$ is for integer; ! is for real; and $\$$ is for string). Default is real unless set otherwise by BASIC command, DEFINT or DEFSTR. Notice in line 30 that the character 6 is represented by its ASCII code, and not as a tokenized number, as are 4 and 5 in lines 10 and 20. ASCII code for inverted commas is 34.

## Finding variables

To find a variable (default type) we could use the line:-

IF PEEK (addr) $=13$ AND
$\operatorname{PEEK}(\operatorname{addr}+1)=0 \mathrm{AND}$
PEEK $(\mathrm{addr}+2)=0$
etc., but execution is very much faster if we use the two lines as under.

Delete 65470 and 65490 , and add:-

| 65492 | IF PEEK $(\mathrm{addr})<>13$ THEN |
| :--- | :--- |
|  | 65500 |
| 65494 | IF PEEK $(\mathrm{addr}+1)+$ |
|  | PEEK $(\mathrm{addr}+2)=0$ THEN |
|  | GOSUB 65522 |
| 65522 | ok $=1: \mathrm{n}=0$ :WHILE ok |
| 65526 | $\mathrm{v}=$ PEEK $(\mathrm{addr}+3+\mathrm{n})$ |
| 65530 | IF $\mathrm{v}<123$ THEN PRINT |
|  | CHR\$(v);ELSE PRINT |
| 65532 | $\mathrm{n}=\mathrm{n}+1$ |
| 65533 | WEND |
| 65535 | RETURN |

You would alter line 65492 if you wanted to dump variables of another type or types.

At this stage I did some testing to see what speed of execution one might expect. It isn't as fast as MAXAM on tape which is incredible and needs to be seen to be believed, but it does work and my MAXAM, to quote the instructions, "does not work with BASIC variables because of the unusual way BASIC tokenizes its lines." On a program of 554 lines, with a size of over 22 K , and having 839 instances of variables, some string and some not type-marked, all the variables with their line numbers were listed faster than 4 per second. I added an integer type-marked variable at the end of the program, and it was found and listed on one minute and a half.

As a program, TIY does not pretend to be user friendly; it is a programmer's program. But at the cost of the losing of some of its type-it-now utility, we could allow two concessions to friendliness.

Firstly, although the program looks secure, it can happen that a chance succesion of bytes will break through and a strange character will be printed to the screen as a variable. I find that that annoys me. The following alteration will bar all characters except those which are allowed in a variable name: upper and lower case letters, figures and the full-stop.

Amend and/or add:-
65529 IF (v<123 AND
$v>64)$ OR ( $\mathrm{v}<58$ and
v $>47$ )OR $\mathrm{v}=46$ THEN
PRINT CHR\$(v)
$65530 \mathrm{u}=\mathrm{v}$-128:IF ( $\mathrm{u}<123$ AND
$u>_{64}{ }^{7946},<58$ AND
$u>47$ ) OR $u=46$ THEN
PRINT CHR\$(u):ok $=0$
Secondly, you may wish to select which variable name to dump. The following changes provide for that.

Make the alternative amendments:-
65522 ok $=1: \mathrm{n}=0: \mathrm{v} \$=\cdots$.
65530 IF $v<123$ THEN
$\mathrm{v} \$=\mathrm{v} \$+$ CHR $\$(\mathrm{v})$ ELSE
$\mathrm{v} \$=\mathrm{v} \$+\mathrm{CHR} \$(\mathrm{v}-128): \mathrm{ak}$ -
$=0$
65534 IF $\mathrm{t} \$=\cdots \cdot \mathrm{THEN}$ PRINT $\mathrm{v} \$$
ELSE IF v $\$=t$ THEN
PRINT v\$
When the program is running, press (ESC) twice and enter:-

$$
\mathrm{t} \$=\left\langle\text { "variable name" }^{\prime}\right\rangle \text { CONT }
$$

The following few paragraphs I have left to near the end because I would sooner forget them than commit them to print. But to omit them would be doing you a disservice.

When I was testing this dump program for its speed of execution, I also ran a court.

The sum of default variables and string variables (there were no others) was a lot less than the count of all variables. Investigation showed that some of the default variables were preceded by 1100 , not by 1300 . It is a simple matter to cope with this stranger, but it is rather disconcerting. Are there, one wonders, any other tokens signifying variables? Perhaps, upon reflection, we might have been intrigued by the gap in the list of tokens for variables, $2,3,4$, and then 13 , and might therefore have been less astonished when 11 showed itself. Meanwhile, until I know more, I shall catch all from greater than 1 (the token for colon, as I discovered after a mistype) to less than 14 (the token for number zero, as you can
calculate from your new knowledge of BASIC tokens for small numbers).

If I ever find one of those 48 -hour days which my wife says I need, I shall delve deeper in search of a solution. In the meantime, if there is anybody out there ......

I hope you have found more here than the variables dump program. If you have, then I am sure you will get a lot of fun delving deeper. Let me suggest, for a modest start, you have a look at the following. Switch on and enter:-
$\mathrm{a}=1: \mathrm{b}=\mathrm{l} \mathrm{c}=1:$ PRINT @a;@b;@c
The @(bey is next to the P-key. Switch off and on and enter:-

$$
\begin{aligned}
& \mathrm{a} \%=1: \mathrm{b} \%=1: \mathrm{c} \%=1: \text { PRINT } \\
& @ \mathrm{a} \% ; @ \mathrm{~b} \% ; \mathrm{c} \%
\end{aligned}
$$

Here below is TTY in a form which should dump all varieties of variables. Add it on to the end of the program to be dumped and RUN 65430. If you can remember 368,2 , and 13 , then you should be able to remeber (or re-think) the remainder. In this respect, I think that it is helpful having "the works" as a subroutine.

65430 memry $=368:$ DEFINT a. z:ZONE 2
65440 length $=$ PEEK $($ memry $)+$ PEEK (memry + 1)*256
65450 linumb! = PEEK (memry +2 )

+ PEEK (memry + 3)*256
65460 IF linumb $!=65430$ THEN PRINT"END":STOP
65480 FOR addr $=$ memry +4 TO memry + length -4
65492 IF PEEK (addr) $>13$ OR PEEK(addr)<2 THEN 65500
65494 IF PEEK $($ addr +1 ) + PEEK
$(\operatorname{addr}+2)=0$ THEN
GOSUB 65522
NEXT addr
memry $=$ memry + length
GOTO 65440
ok $=1: n=0$
PRINT linumb!, WHILE ok
$\mathrm{v}=\operatorname{PEEK}(\mathrm{addr}+3+\mathrm{n})$
65530 IF $\mathrm{v}<123$ THEN PRINT CHR $\$(\mathrm{v})$; ELSE PRINT CHR $\$(\mathrm{v}-128): \mathrm{ok}=0$
$65532 \mathrm{n}=\mathrm{n}+1$
65533 WEND
65535 RETURN
Have you noticed the small alteration in line 65480 ? It now has $\ldots$ length -4 , not -1 . Dumping is faster, and we do not ned, just here, to look at the last three bytes of the stored line, do we? In loops, especially, execution is very much faster using integers. But the upper limit for integers on the CPC is 32767 . So, as we have used DEFINT a-z, we must type-mark linumb!, or use lower line numbers in the TIY dump.


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## Phil Craven investigates

## EPROM PROGRAMMING

In the last issue we had a look at each of the eprom programmers made for the CPC and, now that we've had a few weeks to rush out and buy one, we are all no doubt poised with Arnold powered up, our programmers plugged in and our minds pregnant with anticipation (huh?) at filling our very first eprom with all our carefully prepared pieces of code. But just a minute. You can't go bunging loads of machine code into eproms any old how and expect them to work. Arnold has an excellent system for using extra roms, but that isn't it. On power up and resets, one of the first things that the computer does is look for external roms and it initialises any that are found. For this to happen certain, data must be in certain places within the eprom. It's all very simple but it needs to be accurate, so here we have a quick tutorial on what to put in, and where.

First, a short word for those readers who are not familiar with Arnold's expansion roms system. "Hi." OK then, we begin. Most external roms are accessed, when needed, via a bar
command (shift @) from the keyboard or program whilst at other times they are dormant. There are called Background roms and are recognised by the computer as their first byte is always \&01. Other types are Foreground ( $\& 00$ ), which replace Basic and take complete control of the computer, and Extension (\&02), which are accessed from within a Foreground rom. The most useful and therefore the most common type is the Background rom.

## GET IN THERE

If you have a disc drive with its rom, then you already have one such background type. Let us assume that we are designing a rom which needs its own private chunk of ram as a workspace, announces its presence on screen and also needs to react to a number of bar commands.

Every time the computer is powered up or reset the operating system will enter our rom at address \& C006. This address is set by the system and it must contain a jump instruction. In fact it is the first entry in the jumpblock, which we will examine later. The address to jump to must be in \&C007/8 and it must be the start address of our rom's initialising routine. e.g. \&C3 \&D000 $=$ jump to \&D000, although any suitable address within the rom would do. A return instruction at the end of the routine would hand control
back to the computer. At this point the Z80 registers, DE and HL, contain the addresses of the lowest and highest bytes of free ram respectively. To reserve some for our own use we must alter one or both of them before returning control to the computer. When we hand back, these registeres must contain the new addresses of free ram.

## WHO'S A PRETTY BOY THEN?

Now for the ego trip. We'll announce our rom's presence on the screen. Any machine code programmer worth his salt could go to town with the display but the more you put on the screen, the less rom you have left for actual programs. A one liner such as 'Auntie John - a rumour in his own time' is probably best. That done, a return instruction will hand back to the computer, having made sure that DE and HL are correct for it to complete its own initialising. We have done only two operations in our routine, but you can do a great deal more at this stage as installing firmware jumpblock intercepts, installing your own ran routines, etc.

## BAR COMMANDS

You will notice that I didn't mention the bar commands in the initialising stage. Preparations in the ram may need to be made for some of them at that time but mostly they will be either stand alone routines or they will modify the ram as theu are called. Having found our rom, the computer has placed it on the list of possible bar command receivers and each time such a command is issued, from keyboard or program, our rom will be included in the search for it.

The pathway to each bar command's rom routine is very exact and must be implemented precisely. Somewhere in the rom must be a table of all its bar command names and \& C004/5 must contain the start address of this table. Also a jumpblock must be included which starts at \&C006 with the initialising routine jump. These two relate to each other in that the first name table applies to the first jump in the jumpblock, the 2nd to the 2nd, and so on. Up to 16
characters can be used for each command name but bit 7 of the last character of each name must be set to 1 (add 128 decimal). They are stored in the table without gaps. The end of the table is marked by a nul ( 0 ) in the byte following the last name. Obviously a name cannot have 0 as its first character. The bar command IPROG would be stored in the table as:

## CHAR HEX DEC <br> P \& 50 80 <br> R \& 52 82 <br> O \& 4F 79 <br> G \& A7 199 ( $71+128$ )

The bar (shift @) is not stored with the name and only ASCII characters from 0 to 127 can be used. This raises an interesting point. We have seen that, since the initialising routine must have a name in the name table associated with its jump in the jumpblock, it would be accessible from the keyboard. This would usually be undesirable, so the inclusion of a space (ascii 32 ) in the name, which will not be accepted by Basic, will prevent any accidental re-initialisation.

## THE JUMPBLOCK

The jumpblock is a series of jump instructions and addresses, one for each command name, which must start at \&C006 with the initialisation jump. When a bar command is issued, the system searches the command name table for a match. If a match is found at, say the 4th entry in the table, then the system will go to the 4th entry in the jumpblock and jump to the address it finds there. No terminating byte is needed.

## VERSION

The second, third and fourth bytes of the rom (\&C001/1/2) are reserved for your own version numbers. If they contained 1, 2 and 3, for example, then our previous one line announcement would read 'Auntie John - a rumour in his own time 1.23', which, coincidentally, is a pretty accurate estimate of his mental age, in years.
That completes the parts of the rom

PROGRAMMING

which the system insists must be exact. Now you're on your own. What programs you put in, and where, is entirely up to you. You could even store a Basic program in an eprom along with a routine to download it when called by a bar command.

## TIPS

A return instruction at the end of any rom routine will get you back to the place from where you entered it. i.e. the keyboard or a Basic program.

Rom 'slots' or 'numbers' are taken care of by the romboard. You don't
need to include anything in your roms for this purpose.
The computer will search all possible bar command receivers for a name. These are all roms and RSXs and the first name it finds will be used, so take care not to duplicate any.
To erase an eprom without an eraser, find yourself a friendly hairdresser with an ultra violet sterilising unit. Half and hour in one of those will clear its memory.

I keep repeating this but it is worthwhile. Don't handle chips by the pins. Some of them can be killed off by static so err on the side of caution and touch no pins.

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# mopica <br> , <br> GOLD BUT STILL GLITTERING? 



Big boss Duncan Evans travels north to grimy Birmingham to talk to the people behind one of the country's largest software houses, US Gold.

What you see in the arcade at the beginning of the year, is invariably out on the computer by Christmas, and one of the leading companies involved in coin-op conversions is US Gold. Although conversions make up a fair portion of US Golds output equal importance is given to imported products from the US and from Europe. To accommodate this split in the origination of its product line, US Gold recently reshuffled itself internally into four specific departments, and it was with the heads of those departments that I spoke.
The man in charge of the coin-op

## - One a road to nowhere


conversions from Capcom is Andrew Chorzelski who stated intention is to make Capcom, "Something that the consumer aspires to purchase."

LED Storm started off the Capcom 1989 campaign, in late February, and Chorzelski declared, "With very few exceptions, it is looked on sa the title of the month, possibly the title of the year. That's the way it's been perceived already," Chorzelski asserted.

Personally I doubt that but there's also Last Duel (another car game) due for April/May, Forgotten Worlds in May/June, and around July there will be The Strider.

The Strider is based on a coin-op that hasn't even been released in the arcades yet, and will be programmed by development houses, Tiertex, but as Andrew admitted, "It's a title in name only at the moment."
The next two releases are bound to create a great deal of interest, being Black Tiger, due for August, and Ghouls and Ghosts for the last quarter. Ghouls being the sequel to Ghosts and Goblins. That one might be regarded as the CPC title of the year, and backs up a strong release schedule.
The Capcom Product Manager was quite enthusiastic. "I can't think of any other one brand other than Capcom that is releasing that sort of schedule as a label."

## EURO WARS

Alexa Czechowski is the Product Manager for European Licences and is primarily responsible for Rainbow Arts and Topo Soft's products.
Undoubtedly the most exciting product in Alexa's portfolio is Denaris, the scrolling shoot 'em up that Activision had removed from the market. Although only available on the C 64 and Amiga at present there is the possibility of another programming team, not Rainbow Arts, converting the game to the CPC. Lets hope someone does.
It is unlikely that any of the other Rainbow Arts games will be converted, but who knows, it you all write to Alexa at US Gold, Unit 2/3, Holford Way, Holford, Birmingham B6 7AX, then you may change their minds.
The first Topo Soft game has been

reviewed in this very issue, and (he said, turning the page to read the review), Chicago 30 's was not too well received. Other Topo Soft games will be available on the CPC, but lets hope they are better than the first one.

## JONES IS BACK

Susan Baker, US Licencees Product Manager, is primarily responsible for the marketing and sales of Lucasfilms, Epyx, Access, Accolade, plus others.
Until very recently Lucasfilms have been very quiet, I asked Susan what was going on.
"Ballblazer and Rescue on Fractalus were very good products, but that was a while ago. Zak MacKraken is the first of the new batch and the response to that product has just been fantastic."
But can you get Zak on the Amstrad I pressed. Reluctantly she admitted that you couldn't, nor the next one, Battlehawks 1942.
Zak and Battlehawks were both developed in States but the next title is being written here, which means you will be getting a CPC version (hooray). It's based on the last Indianna Jones film; Indianna Jones: The Last Crusade (obviously enough), starring Harrison Ford again.
Lucasfilms, in the States has its own product which will be an adventure, and released in the UK in August, one month after the film opens on June 15th.
The UK version is being developed by Tiertex and will be an action game, available in September. There will then be three other Lucasfilms titles between then and Xmas.
Just in case you were getting confused over the seemingly endless games variants, when The Games: Summer Edition is released in May

- Grimy Birmingham


- A small breeze?
seemed to include Intergalactic Developments, thanks to the nabbing of the rights to Universal Military Simulator 2.
Unfortunately for Bob, Intergalactic was made a better deal before contracts were exchanged and so UMS 2 has gone elsewhere.

Anyway, you can look forward to more AD\&D from SSI. The next product is Hillsfarm which is basically a training ground and brief adventure scenarios game, for individual characters from Pools of Radiance. Its primary function is to build up characters so that they will be read for higher level adventure in Curse of the Azure Bonds.
This is similar to Pools of Radiance, which US Gold is still undecided as to


- Watch out for the sequel, Ghouls and Ghosts!
then it will carry the suffix Summer
Games III. Susan pointed out that, "If there is any confusion in the eyes of the consumer then hopefully this will get round it."

Surprisingly, Epyx will be moving away from the sports scene sometime during 1989 into a completely different field. Alas Susan declined to comment on what it would be.
However, Access will have new product this year, with Heavy Metal scheduled for August.

## DUNGEON MASTER

Bob Malin, European Product Manager for Wargames and RPG Division has had a hard time recently. His portfolio only incorporates SSI at present, but briefly,
release it or not on the CPC. Strange considering that Heroes of the Lance, the other AD\&D product is already out on the CPC.
Speaking of which, you can expect Heroes of the Lance 2, which features more detail and depth, sometime before Christmas.

## THAT'S ALL FOLKS

Although you're not likely to see too many CPC conversions of American and West German games, anything that is sourced in this country will include a CPC version, and if US Gold can deliver the goods to match up to its release schedule then 1989 looks like being a good year for both the Birmingham outfit and the end user.

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## Crawler

I'm not crawling, but your magazine is so great I'm proud to own an Amstrad. It's brilliant, thanks.

Brian Hillard,
Garndiffaith, Gwent.
PS. I've owned a 464 since 1984. I love 'em.
PPS. Please could you tell me if you prefer written letters or printouts.

ED: What a nice letter to start with.
PS. So do we.
PPS. It doesn't matter as long as we get the response.

## Complimentary note

While avidly reading the March ACU, I noticed in the letters that someone was giving away a free adventure.

Now I have seen some of these home brewed adventures, with most of them being pathetic, I thought that this will be a lemon. However, I am a pensioner and cannot afford $£ 15$ for a game, so I sent off for it straight away.
It cam by return post together with a full page of instructions and I was surprised. It has no spelling mistakes and no bugs as fas as I have got, it is also really very good. It has no pretty pictures, but then neither does an Infocom adventure.

This is the first time I have written to a computer magazine, but I felt I must show my appreciation for such a good effort and hope Mr. Bond can be persuaded to keep up the good work, which is of such benefit to us senior citizens, and school children, whohave to count every penny. I am very happy with my 464 . It is my hobby and I hope Mr. Sugar will keep it going for years yet.

## J. Pringle Manchester.

ED: For those who mised the March edition (where were you?), the adventure was offered by K.N.

Bond, of 17 Adel Park Gardens, Leeds LS16 8BN. And may we at ACU congratulate Mr. Bond for offering such a kind hearted service.


## Moan, moan, moan

I think ACU is turning into a heap of rubbish since the merger. You should have a separate adventure section and the old top 20 software chart (in preference to the top 10). The ratings should be changed to how CPC Computing had them (I think CPCC was the nest magazine ever) with separate percentages for addictiveness, presentation, playability and so forth. I think you are more like Computer and Video Games than a decent Amstrad CPC magazine, and I really hate the 'Which Game' section, it is almost identical to $\mathrm{C}+\mathrm{VG}$ 's. many other people think you are turning into "just another computer magazine" and several CPC users I know have stopped buying ACU altogether because of the changes, The only thing I really like, apart from the D.I.Y. hardware projects, is the front cover. I quite like Hacking and the Letters pages though.

James Clark,
Doncaster; South Yorkshire.

ED: You'll be pleased to note, James, that many of your pet hates have been changed, hopefully for the better.


## Crawler (part 2)

I would just like to say that I think your magazine is: BRILL, FAB, AMAZING, WONDERFUL, SUPER, WICKED, GREAT, UNPUTDOWNABLE, UNFORGETABLE, UN...FUNNY (oops!), CRAZY, ZANY, WHACKY, and above all, OZONE FREE! Phew! Now I've got that off my chest, I'd like to tell you why. Your games review section is the best around, with excellent scoring systems and all the family like comments (unlike other mags where every other word is $\mathrm{f} * * *$ ). The pokes section is totally wicked, and I want to adopt Vax. But best of all, your articles are brilliant, well written, and

very interesting. As I always say, a good article is like a pink banana, very rare! Anyway, Ijust think that ACU is the best mag around, and one of the cheapest. Keep it up!

Alex Martin,
Bracknell, Berkshire.
ED: So glad you liked the magazine, it seems a shame that we've changed it. I hope you like it even more now.


## Shome mishtake shurely

Congratulations! New Publisher - New Typesetter - New Printer - New Office, alas mistakes. I have recently received my copy of the April ACU from the Amstrad User Club and note the following gaffs.
a) The prize shown on the front cover does not match the prize shown on page 41.
b) Page 3 shoes under Features Stock Control, page 33, but this page contains previews of Driving Force and Under Seige. c) On page 30 Steve Gold looks at Micronet and Prestel but column three at the top shows the first years subscription as $\$ 69.95$. Do I consult my bank for the latest rate of exchange, of do I take it that you mean $£ 69.95$.
d) In the article on hardware, page 42 , you quote that Comet are selling the TV Tuner and Alarm Clock/Radio
as separate items, but where? On enquiring at my local branch I received a definite NO. If, perhaps, you could give your avid readers the stock numbers as supplied by Comet, this will assist their staff in tracing these items in the system. I could go on (no I hear you cry) but why? This is just teething problems isn't it? It is, isn't it?
D.R. Thompson, Felpham, West Sussex.

ED: You're right, when a magazine has moved publishers, there is bound to be a few problems. Now that the new staff have grabbed the bull by the horns, accuracy should not be a problem, and although 1 would sincerely love to pass the buck onto Mark Evans (the previous ed), Iadmit that some of the errors last issue were atrocious.


## Merge maladies

I am writing to you on a very important matter. When I heard that ACU and CPC Computing were to merge, I thought than an already excellent magazine would be better with CPCC, but to my disappointment it hasn't. In fact I fell that it has become boring, dull, do I need to go on.
I have not written to you soon as I though things would pick up, but no such luck. I am thinking of changing to another magazine unless my mind can be changed by the promise that some of the old ACU will return. I wait in hope until next month.

Gary Backhoume (A long reader), King's lynn, Norfolk.

ED: Welcome to a new era for ACU, I hope you like it better than the last one.


## A wee plugette

I am starting a small magazine for Amstrad CPC users. I would be grateful if you would print my name and address for anyone who would like information about it.
If anyone does, could they please send me an A4 size stamped adressed envelope, which I will send back with loads of info. Also if anybody knows about machine code, could they contact me. Lastly I would like to thank all the software companies that have replied to the letters I have sent to them.

John Mullen,
62 Lonsdale Street, Workington,

Cumbria,
CA14 2YD.

ED: No! There's no way we'll give away
your address.

## Doctor, doctor

Before I start, allow me to tell you about your fab mag. It's BRILL! Keep it up! Oh yes, what's a computer virus? What do I do is I've got one on my 6128 ? Speaking of viruses...

Doctor, doctor, I've just crossed the M5 motorway!
What did you get?
Run over!

ED: If you keep telling awful jokes like that, you deserve to catch a computer virus.

## LETTERS

## A word of warning

Firstly, I would like to say how disappointed I am with your magazine. I enjoyed having a selection of magazines to choose from but now, after two mergers, I don't have any choice left. Your latest format is not to my liking. 10 or more pages of games reviews is too much - even in a 74 page magazine. Many of the features I enjoyed in CPCC and AMTIX have disappeared along with the titles, and many of the features I enjoyed in ACU have been replaced by the less interesting items from the other two. I must admit that what is left is quite good, but there just isn't enough of it. Now to the reason for my letter. I have a young friend who had a run-in recently with a mail order company. He sent off to TRYBRIDGE SOFTWARE Ltd. for two games which they were advertising. There were Dragon Ninja and Black

Tiger. The ad was in the December ' 88 issue of ZZAP64. He still had not received his games, which he paid for by postal order, by January 4th. In the next issue my friend noticed that there had been a rider added to the ad to the effect that new games were subject to release dates being fulfilled. This had not been included in the pre-Christmas ad. I have also seen similar ads by this company in my own mags (including you), and these don't mention the possibility of delays either!
This is where I came in. Gary asked me to put a letter together - as it was over 28 days since he'd placed the order which I did. I enclose copies of my letter and their reply. As you can see, it's less than helpful, less than conciliatory and certainly not the kind of letter one would send to a 13 year old boy!
It amazes me that a company can claim to be able to supply a game months in advance of any hope of doing so without
the ASA breathing down their neck. It amazes me even more that magazines allow such adverts to appear in the first place, especially when you are often seen to be droning on about the way games companies are ripping off the public. Little mention seems to be made of the mail order companies who do a good job of this themselves. As yet my friend has received no money from them and they seem to have changed names and moved premises. Their new name in PREMIER MAIL ORDER and they have also moved to a new address - though still in Essex. I hope you will publish some of this letter as a warning to other unsuspecting dupes. Remind them to phone first to chek availabilty. Make sure they know the company well and that they don't part with money until they are sure they can get the goods.

Mike Lyons,
Manchester.



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    ：GOSUB 40：PEN 11：$x=5: y=5: n=14: m=14$ ：GOSUB 40：PEN $3: n=13: m=13$ ：GOSUB 4D：PEN 2：LOCAT E 14， 3
    20 PRINT＂SPACE＂：LOCATE 14，4：PRINT＂－．．．．．＂：LDCATE 14，5：PRINT＂STORM＂：LOCATE 16，10 ：PEN 13：PRINT＂By＂：PEN 11：LOCATE 14，14：PRINT＂Dave＂：
    LOCATE 15，15：PRINT＂Hal1＂：LOCATE 14，16：PRINT＂…．．．．＂：LDCATE 14，17：PRINT CHR金（34）
    ＂Hi．＂：LDCATE 14，18：PRINT＂Mary＂CHR事（34）
    30 FOR $t=1 \varnothing 0 \emptyset \emptyset$ TO 10337 ：READ a⿻三丨：POKE $t$ ，VAL（＂2．＂＋as）：NEXT：FOR $t=2000 \emptyset$ TO 20183：REA
    
    ：n＝1：PEN 1：GOSUB 40：LOCATE 12，22：FEN 7：PRINT＂SCORE－＂：CALL 1ロロロロ：LOCATE 3，13：PRI NT＂D E A D ！＂：FOR $g=1$ TO 5øDØ：NEXT：WEND
    40 LOCATE n，m：FRINT CHR事（150）；：FOR $t=1$ TO $x:$ PRINT CHR（154）；：NEXT：PRINT CHR 3 （156 ）：FOR $t=m+1$ TO $m+y$ ：LOCATE $n, t:$ PRINT CHR（149）SPACE事（
     EXT：PRINT CHRE（153）：RETURN
    50 DATA $21,9 F, E 6,22,40,9 C, C D, 5 D, 27,21,43,9 C, 6,7,36,30,23,10, F B, A F, 32,54,9 C, 32,42$ $, 9 C, 21,30,75,6,64,36, \emptyset, 23,10, F B, C D, 4 A, 28, C D, 45,27, C D$
    $, 84,27,3 A, 54,9 C, F E, D, C \varnothing, 18, F 2,3 E, 4 B, C D, 1 E, B B, 2 \emptyset, 27,3 E, 4 A, C D, 1 E, B E, C 8,2 A, 4 \sigma^{\circ}, 9 C, 2 B$ $, 7 E, F E, \emptyset, C D, 22,4 \square, 9 C, 11,20,4 E, E, 16, E 5,6,8$
    Sめ DATA $1 A, 77,23,13,1 \varnothing, F A, E 1, C D, 26, B C, D, 2 \emptyset, F \emptyset, C 9,2 A, 4 \varnothing, 9 C, 11,9, \emptyset, 19,7 E, F E, \emptyset, C \emptyset, 2$ $A, 40,9 \mathrm{C}, 23,18, D 6,3 A, 42,9 \mathrm{C}, 3 \mathrm{C}, 32,42,9 \mathrm{C}, \mathrm{FE}, \mathrm{A}, 20,35, \mathrm{AF}$,
    $32,42,9 \mathrm{C}, \mathrm{DD}, 21,30,75,6,1 \mathrm{E}, \mathrm{DD}, 7 \mathrm{E}, \mathrm{D}, \mathrm{FE}, \square, 28,9, \mathrm{DD}, 23, \mathrm{DD}, 23, \mathrm{DD}, 23,10, F 1, C 9,3 E, 1, \mathrm{DD}, 7$ $7, \emptyset, 21,54, \mathrm{CD}, \mathrm{ED}, 5 \mathrm{~F}, 47, \mathrm{AF}, \mathrm{BC}, \mathrm{FE}, 27,28, \mathrm{fa}$
    $7 \emptyset$ DATA $10, F 9,85,6 F, D D, 75,1, D D, 74,2, D D, 21,30,75,6,1 E, D D, 7 E, \square, F E, 0,28,5 D, 3 C, D D, 77$ $, ~ D, D D, 66,2, D D, 6 E, 1, C D, 26, B C, D D, 75,1, D D, 74,2, C 5,11, D D$
    $, 4 E, E, 4, E 5,6,2,1 A, 77,13,23,1 \emptyset, F A, E 1, C D, 26, B C, D, 2 \emptyset, F \emptyset, C 1,7 E, F E, \square, 2 \emptyset, 6,23,7 E, F E, \emptyset$, $28,28, D D, 7 E, \square, F E, B \emptyset, 30,6,3 E, 1,32,54,7 \mathrm{C}, \mathrm{C} 9$
    $8 \emptyset$ DATA DD $, 66,2, D D, 6 E, 1, E, 4,36,0,23,36,0,2 B, C D, 26, B C, D, 20, F 4, A F, D D, 77, \square, C D, 37,28$ ，$D D, 23, D D, 23, D D, 23,10,94, C 9,6,2,21,49,9 C, 7 E, 3 C, F E, 3 A$
    $, 20,5,36,30,2 B, 18, F 5,77,10, E F, 3 E, A, C D, 90, B E, 21,18, D, C D, 75, B E, 21,43,9 C, 6,7,7 E, C D$, $5 \mathrm{~A}, \mathrm{BB}, 23,10, F 9, C 9$
     $2 \emptyset, \emptyset, \emptyset, 1 \boxminus, 54, D, 1 E, 22,2 \emptyset, \emptyset, \varnothing, 10, A C, F, F, 39,2 \emptyset, \emptyset, \square, 1 \emptyset$,
    $A C, F, F, 39,20, \varnothing, \varnothing, 54, D, F, F, 1 E, 22, \square, \varnothing, 54, D, F, F, 1 E, 22, \varnothing, \varnothing, A C, F, 2 F, 1 F, F, 39, \emptyset, \varnothing, A C, F$, $F, F, F, 39, \emptyset, \emptyset, A C, F, F, F, F, 39, \emptyset, \varnothing, A C, 1 F$
    1 DØ DATA F，F， $2 F, 39, \emptyset, \varnothing, A C, F, F, F, F, 39, \emptyset, \emptyset, A C, F, F, F, F, 39, \emptyset, \emptyset, A C, F, 2 F, 1 F, F, 39, \emptyset, \emptyset, A$ $C, F, F, F, F, 39, \square, \square, S 4, D, F, F, 1 E, 22, \square, \square, 54, D, F, F, 1 E, 22, \emptyset$
    

[^1]:    1. COMPLEAT UTILITIES The famous NSWEEP disc manager, Superzap sector/file editor, Unerase, DISCKITA for manager, Superzap sector/file editor, Unerase, DISCKITA 2. TEXT PROCESSING UTILITIES Sideways prints text (eg 2. TEXT PROCESSING UTILITIES Sideways prints text
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    4 THE CPM 2.2 COLLECTION For 464 owners with just CPM 2.2 Includes NSWP, Sector Editor, Key Definer, Text Editor, Unerase, File Transfer, Grep, Easy Lister, Compare, Find,
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[^3]:    No camera or video source needed Simply feed your original into DMP2000/ 2160/3000/3160 printer (does not affect normal printing operations).

    - Compatible wth AMX Pagemaker and any light pen or mouse which works with standard screen format
    - For all CPC computers

