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Commodore Disk User

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- **PROFESSIONAL MACHINE CODE MONITOR.** Full 64k monitor available at all times. Examine all memory, registers, IO, stack of any frozen program. Full range of commands, plus the luxuries that only a high capacity RAM/ROM system can offer: Assemble, disassemble, Hex/Ascii. Interpret in Ascii or screen codes. Fill, Hunt, Compare, Transfer memory. Number conversion, Register, Go. Load, Save, Verify (turbo, tape or disk). Two way scrolling of all screen displays. Output to printer (CBM or Centronics). Directory, error channel, 2 drive operation. Disk Monitor - read block, write block, assemble/disassemble drive memory etc. Hex calculator - add, subtract, multiply, divide. Unique set break/set freeze system. JSR Freeze. Full "floating" operation - corrupts no memory. Call Monitor from Basic or Freezer. Call Freezer from any point in your program.

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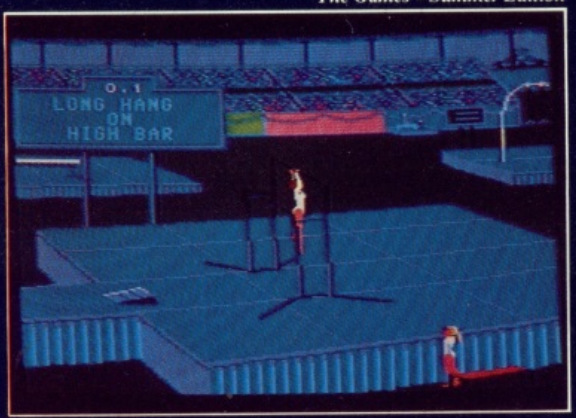
Commodore Disk User
Volume 2 Number 5
July/August 1989

IN THE MAGAZINE

ON THE DISK

The Games - Summer Edition



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Another two months have flown by since we last met. So hold onto your chips whilst I tell you something of what to expect in this issue.

This is definately a graphical time of year, therefore you will find plenty of visual appeal with this months disk. Become a T.V. reporter with *C64 NEWS DESK*. Design you own loading screens with the *HIRES DEMO KIT* whilst at the same time produce some scrolling borders with *BORDER SCROLL*. If that does not appeal, then create your own graphic environment with *VIDI-BASIC*. Designing screens are easier if you use the *FONT FACTORY 89* and to get your sprites moving there is *ANIMATOR*.

Some good news is that on the disk there is an update to the *TEXTED* program, first published Nov/Dec 88.

To round it off, for C128 users there is the comprehensive *TYPIT-128*. Enjoy the programs, they're yours.

Unfortunately a small amount of copy was missed from our **CDU PAINT** program presented in last months issue. The text related to using a printer with the program. As the program stands it supports *Epson* compatible printers only and **NOT** *Commodore* compatible printers. The author of the program, Tony Crowther, is working on a Commodore printer driver and we will present this as soon as we have received it. Appologies for any inconvenience caused.

How to copy CDU files

You are welcome to make as many of your own copies of Commodore Disk User programs as you want, as long as you do not pass them on to other people, or worse, even sell them for a profit.

For people who want to make legitimate copies, we have provided a simple machine-code file copier. To use it, simply select the item FILE COPIER from the main menu. The copier works with a single drive, is controlled by means of the function keys as follows:

F1: Copy file – the program will prompt you for a filename
F3: Resave the memory buffer – you may get an error on a save (perhaps you left the drive door open). Use this to try again.
F5: Disk commands – allows you to enter any regular C64 disk command
F7: Displays the directory
F2: Exits the program and returns you to Basic.

Disk instructions

We have done our best to make sure that Commodore Disk User will be compatible with all versions of the C64 and C128 computers

Getting the programs up and running should not present you with any difficulties, simply put your disk in the drive and enter the command:

LOAD "MENU",8,1

Once the disk menu has loaded you will be able to start any of the programs simply by pressing the letter that is to the left of the program you want.

C128 users please note that you should be in C64 mode when using the disk. You can enter C64 mode by either:

i) Holding down the Commodore key (bottom left of the keyboard) when turning the computer on or,

ii) After turning the computer on type GO64 and answer "Y" when prompted "ARE YOU SURE?".

IT is possible for some programs to alter the computer's memory so that you will not be able to LOAD programs from the menu correctly until you reset the machine. We therefore suggest that you turn your computer off and then on before loading each program.

Disk Failure

If for any reason the disk with your copy of Disk User will not work on your system then please carefully re-read the operating instructions in the magazine.

If you still experience problems then:

1) If you are a subscriber, return it to:
INFONET LTD
5 River Park Estate
Berkhampstead
Herts. HP4 1HL

2) If you bought it from a newsagents, return it to:
CDU Replacements
Direct Disk Supplies
Unit 19
Teddington Business Park
Station Road
Teddington
Middx TW11 9BQ
Telephone: 01 977-8777

Within eight weeks of publication date disks are replaced free.

After eight weeks a replacement disk can be supplied from DDS for a service charge of £1.00. Return the faulty disk with a cheque or Postal Order made out to DDS for £1.00 and clearly state the issue of CDU that you require. No documentation will be provided.

Please use appropriate packaging, cardboard stiffener at least, when returning a disk. Do not send back your magazine – only the disk please.

Back Issues

Back Issues of Commodore Disk User are available at £3.00 per issue, via:

Infonet Ltd.
5 River Park Estate,
Berkhamsted,
Herts,
HP4 1HL.

Magazines available are:

July/August 1988: Utilities – Disk Toolkit, Relocator, Orrery, Message Construction Kit. Games – Mind Games, 3D Breakout, Peggy 128

September/October 1988: Utilities – Fractal Frolics, Location Finder, Score Keeper, Co[illegible] Match, C128 Spreadsheet. Games – Scorpion, Escape, Starburst, Addit

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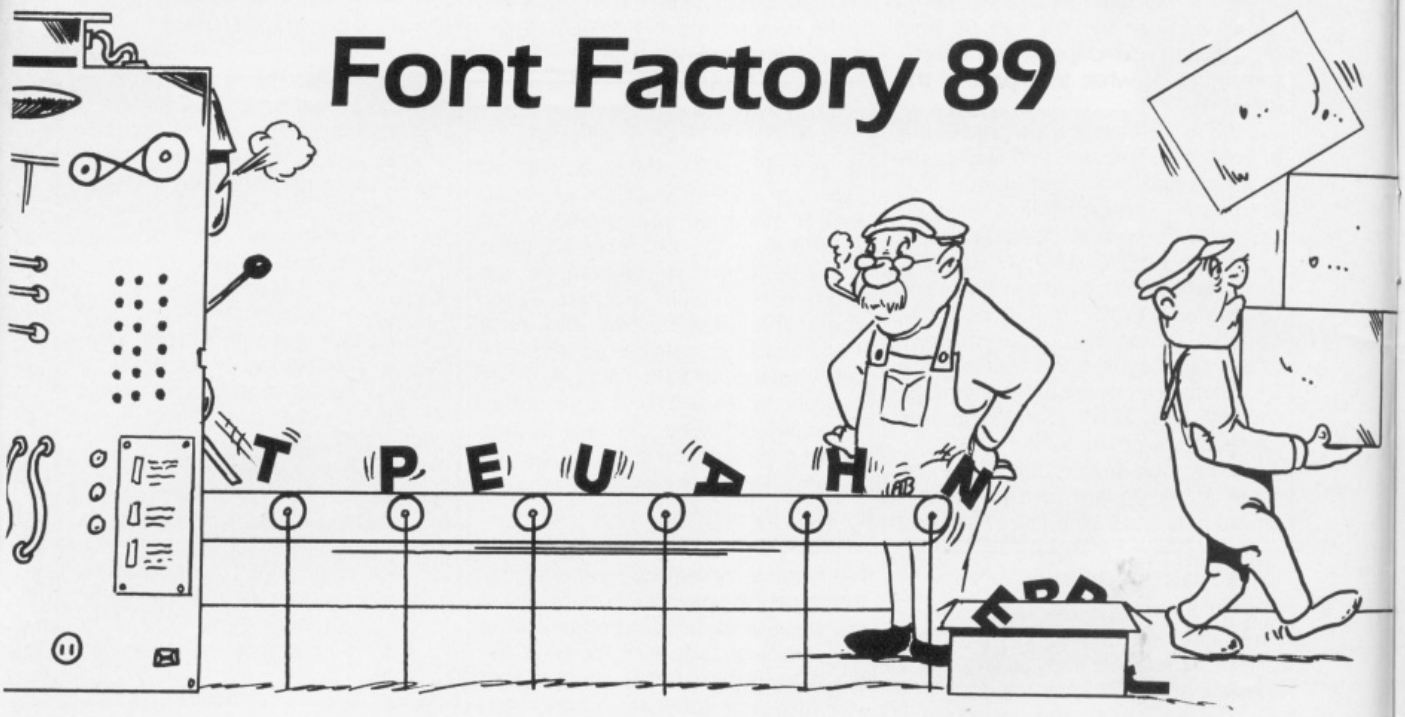
November/December 1988: Utilities – CDU FORTH, Texted, Extractor, Windows 64, ZMON 128. Games – Oblivion, Cribbage Master.

January/February 1989: Utilities – Easy Scroller, Data Maker, Border Sprite, Disk Turbo, Menu Maker 128. Games – Blastball, Microdot, Runaway, Colour Bind, Logic, Spots, Life.

March/April 1989: Utilities – CDU Paint, Devaid, 128 Graphics Primer. Games – Darts, Bazair, Araknifoe, Dominoes, Phantom.

Font Factory 89



Character designing on your Commodore made easy

By Craig Nottingham

Designing characters on the 64 is a major part of creating presentable programs or even demos. This useful utility will help you to design complicated characters with ease, instead of spending hours trying to design them with POKEs. The program includes such commands as ROTATE, INVERT, SCROLL and MIRROR. You have a selection of 20+ commands at your disposal. Plug a joystick into Port 2 and away you go.

As soon as you go into *Font Factory 89*, you must first of all answer the querry: 'Do you require Upper case or Lower case character set?'

To this prompt enter either 'U' or 'L'. One word of warning, once you have made your decision, you cannot swap between the two modes. The ROM characters will now be transferred down to RAM. The characters are stored at $3000 to $3FFF. A cursor will now flash at the home position of the 8*8 editing grid. There should also be the '@' sign in this grid. You are now ready to create your own characters.

The Commands

SPC/FIRE: Pixel on or off in the 8*8 editing grid.

C	: Copy ROM char to RAM position
+	: Move to next character in set
-	: Move to previous character
H	: View help screens
U	: Scroll current character up
D	: Scroll current character down
L	: Scroll current character left
R	: Scroll current character right
I	: Input from a device
O	: Output to a device
W	: Swap from 8*8 to 20*6 grid
RETURN	: Swap from 20*6 to 8*8 grid
X	: Exit program (Cold Start)
*	: Rotate current character through 360 degs in 90 degree steps
F1	: Invert current character
F3	: Clear current character
F5	: Move up a line in the character set
F7	: Move down a line in the character set
HOME	: Send cursor to home position on 8*8 grid
>	: Mirror current character left or right
<	: Mirror current character up or down
↑	: Clear 20*6 grid
=	: FILL 20*6 grid with current character
S	: Swap two character positions
£	Transfer a character to another position

Swapping and Transfering

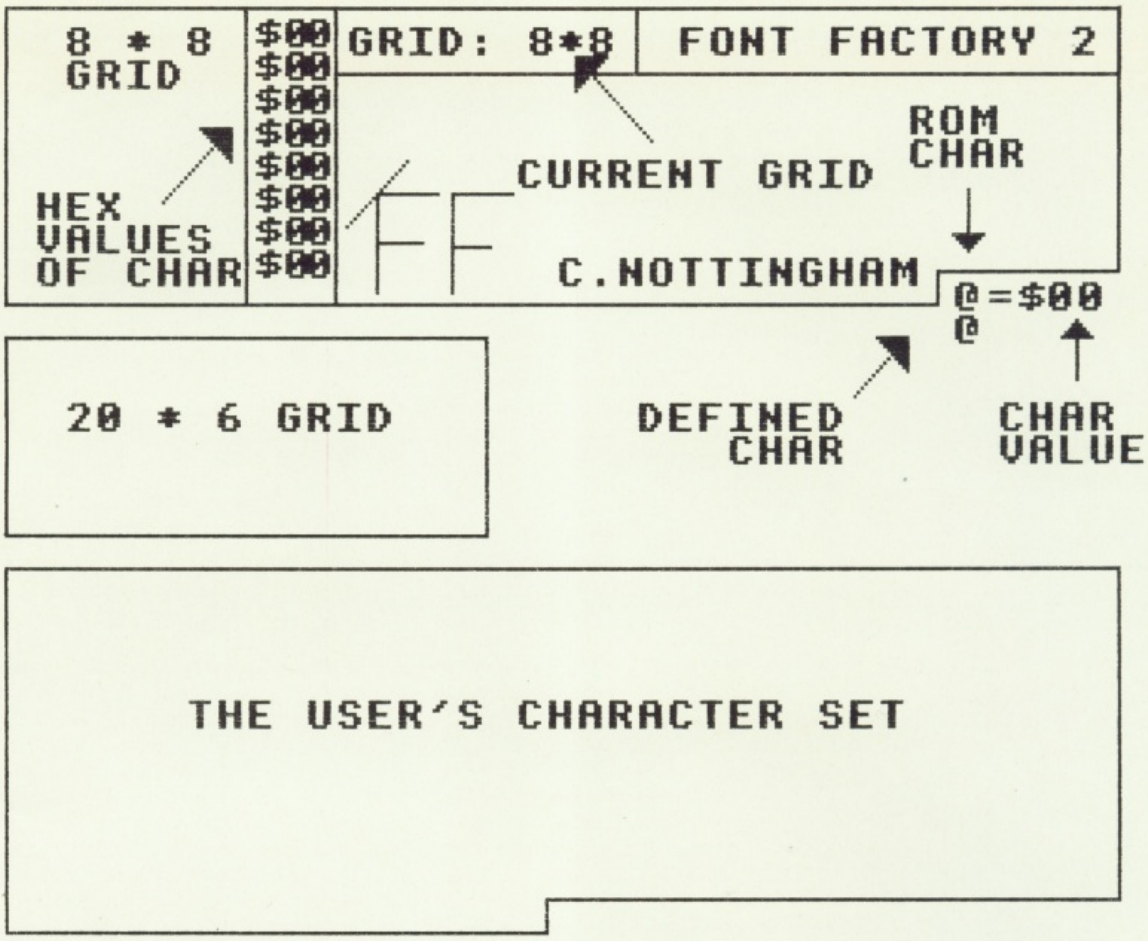
When using the SWAP and TRANSFER commands you must use them as follows:-

1) Move to the character you wish to transfer or swap.

2) Press the transfer or swap key. It will now display which mode you have selected.

3) Move to the other character you wish to swap or transfer to.

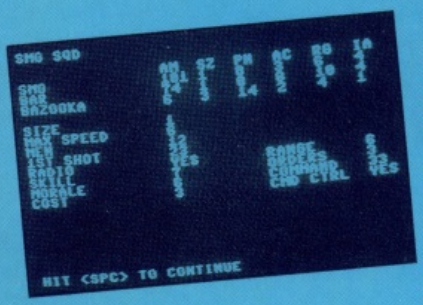
4) Press the same key as you pressed in step 2 to execute the command.



Reviews

TYPHOON STEEL AND OVERRUN

War game fans will be pleased to see the two latest releases from SSI, acknowledged masters of this genre. Both titles offer a selection of modern military campaigns.



Typhoon Steel is set in the Second World War and is the sequel to the popular *Panzer Strike*. Detail is considerable with each unit symbol representing either a single gun, tank or infantry squad. Each game represents a different mission that has to be achieved within a certain number of game turns. You can play either against a human or computer opponent for the tactical scenarios, or computer only on campaign level. Each side can be handicapped if there is a difference in skill between the players.

Three theatres of battle are covered: the Americans versus the Japanese in the Pacific, the British against the Japanese in Asia and the Americans versus the Germans in Europe. Included in the scenarios are Iwo Jima, Kakazu Ridge, Omaha Beach, Bocage Waltz, Peiper on Point, Kohimar and Kampar. In addition, you can design any other scenarios you care to think of using the included construction set. There is also a campaign game – you against the computer, in a choosing of its setting. You must decide what weapons to buy as you spend your resources. All that remains then is to win as many battles as possible before the war ends.

Every ground weapon that was actually used is represented – flamethrowers, mortars, tanks, pill boxes etc. The Japanese forces can even launch a Banzai attack – an all out assault with no prisoners to be taken on either side. Weapons apart though, the idea central to both these games is the establishment of a chain of command, i.e. working out who gives orders to whom.

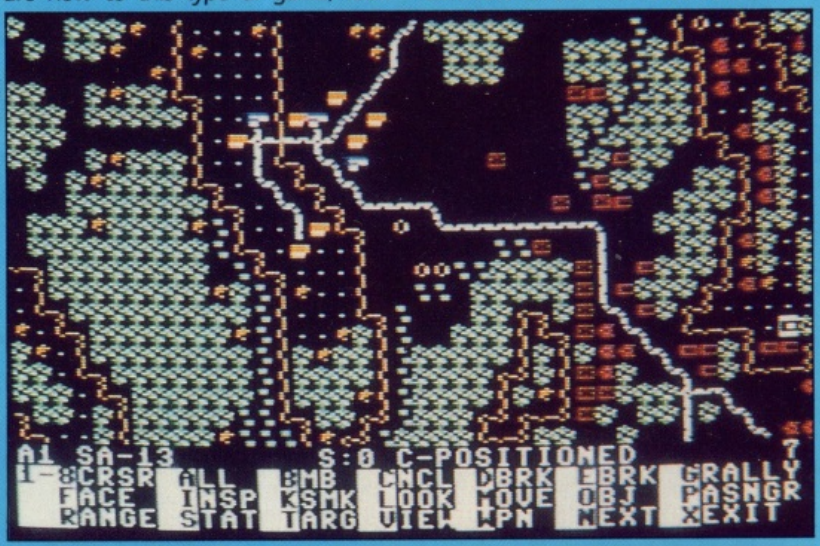
Overrun is set in the near future and uses an improved version of the game system menioned above! Europe and the Middle East are the settings for the eight scenarios – Nato versus the Eastern Bloc – although this effectivley comes down to America against the Soviet Union. In addition, you can recreate the Arab Israeli war of 1973.

Again, every known weapon has been included as well as some known to be in development and therefore still on the secret list! With both games, there is a briefing manual running to some 20 pages of all the different forces involved. Apart from that, there is a comprehensive rule book of another 40-50 pages to be inwardly digested.

It should be stressed at this stage that these are not games for beginners but for experienced wargamers. If you are new to this type of game, look elsewhere otherwise you are likely to be put off for life. Graphics are well up to SSI's usual standards, that is to say functional and no more, but this

is one aspect of the game that real wargamers care little about.

Both these games are highly complex and it is difficult to think of any other details that could have been included. If you are a keen wargamer and these periods of history interest you, then I cannot imagine that you would have to buy another piece of software for some considerable time.



At a glance

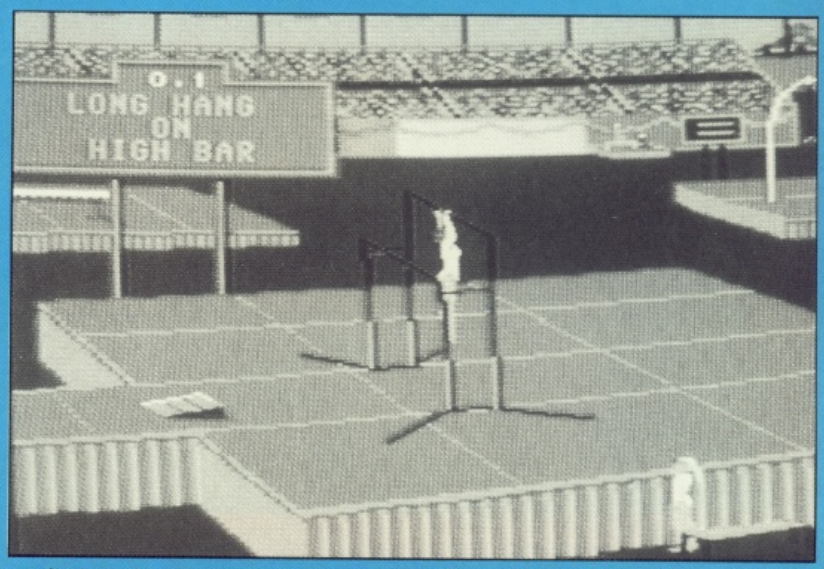
Title: Typhoon Steel and Overrun
Suppliers: SSI via US Gold, Units 2/3 Holford Way, Holford, Birmingham, B6 7AX, Tel: 021 356 3388
Price: Typhoon Steel – £24.99 (disk), Overrun – £24.99 (disk)
Graphics: Functional rather than pretty
Realism: Everything that you could possibly ask for
Playability: Both games highly complex
Addictiveness: Just what the doctor ordered but only if you like this sort of thing

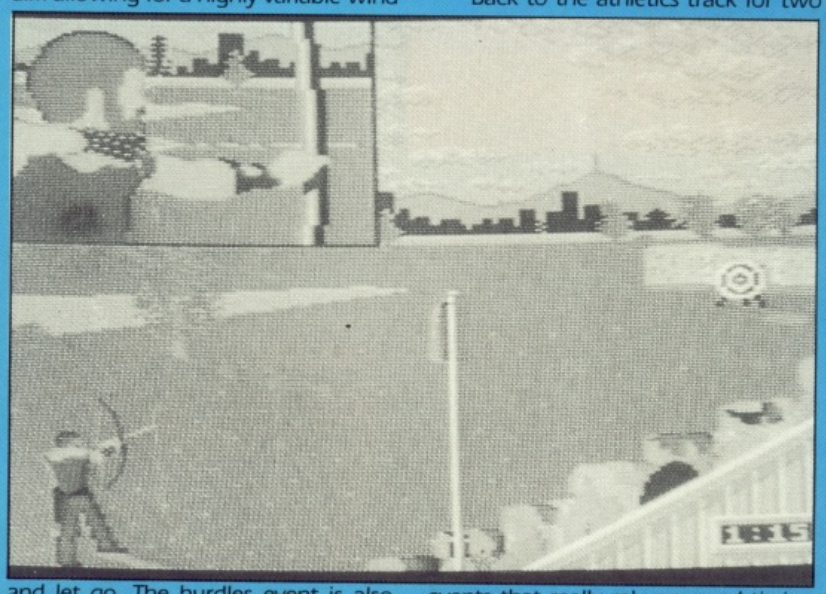
THE GAMES – SUMMER EDITION

Every time Epyx release another title in this series, I keep thinking that there can't be any events left for them to convert to the small screen. Time and time again though, they prove me wrong.

The theme for *The Games – Summer Edition* is the Olympics in Seoul, with the title sequence depicting a number of suitably Oriental snapshots. Up to eight players can compete in the eight different events, which range from the easy to master to those where it appears that it would actually be easier to do the real thing.

Archery is perhaps the simplest event. You get three shots in one and a half minutes. Decide how far you wish to pull the string of your bow, take aim allowing for a highly variable wind and let go. The hurdles event is also relatively straightforward – you just run and jump, being sure to time your take-off correctly.





Velodrome cycling always struck me as being a really stupid sport. Travel as slowly as possible for two laps and then pedal like hell for the third. I suppose that there are tactics involved, but why not just have a normal race?

Diving allows you to make a big splash, at least it does the way I try to do it. All your favourites are here – forwards and backwards, somersaults, pikes and tucks. The only thing I have not managed to duplicate yet is Greg Louganis hitting his head on the board.

Back to the athletics track for two events that really rely on good timing – throwing the hammer and the pole vault. Get the first one wrong and you'll probably demolish the protective net with your sixteen pound weapon (if you'll excuse the expression). The pole vault though offers many more ways to make a fool of yourself, ranging from complete failure to get off the ground to a highly successful jump – under the bar!

The final two events whisk you off to the gymnasium for the rings and the asymmetric bars. These are by far the most complex events, with some weird and wonderful charts showing exactly how to perform a lying hang pirouette straddle to high bar before receiving a penalty for a reverse splat fall off the low bar. You score marks for the complexity of your routine, as well as for how smoothly you change from one manoeuvre to the next. There are a whole range of penalties to reduce your score.

It's difficult to find fault with *The Games – Summer Edition*. Everything is well written, looks good and plays well. Having said that though, I can't help but feel that something is missing. Whereas I used to have lots of friends round to play the original *Summer* and *Winter Games*, the fun seems to have disappeared. Whether that is because my tastes have changed or the format is becoming stale, I am not too sure. All that I can suggest is that you try before you buy.

At a glance

Title: The Games – Summer Edition
Supplier: Epyx via US Gold
Price: £14.99 (disk), £9.99 (cass)
Graphics: Very good
Sound: Starting guns, bells and buzzers
Playability: Easy to start, difficult to master
Addictiveness: Not as much fun as I thought it should have been

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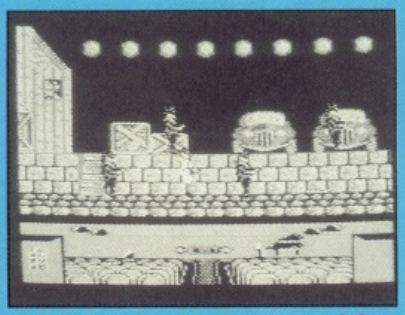
CHICAGO 30's

Chicago is under mob rule – the sort of mob that has ancestors in Italy and Sicily, and is led by one Scarface Al Capone. Prohibition is in full swing, and there's a lot of money to be made from illicit liquor.

As Detective Elliot, it's your job to see that the streets are safe for innocent people to walk down. You already have a good reputation in Chicago. The citizens see you as a one-man crime-busting squad, the gangsters respect your determination to bring them to justice.

Sadly, this game is no more than a simple shoot-em-up, and not a very good one at that. You have to cross



the city which is comprised of four different sections – the docks, the suburbs, the city and finally, the gangsters' warehouse. The streets are littered with a multitude of mobsters that must be wiped away with your trusty machine gun. They can appear behind windows, crawl out of sewers or just come running up the road behind you. Most of them just shoot back at you, but the occasional one lobs a grenade in your path – a strange weapon in that it remains lethal for several seconds.

As you progress through the game, you get to ride in a car, which offers you some protection from gunfire. It is, however, susceptible to grenades, but you can use the same tactics to destroy the enemy.

The graphics are very poor with chunky characters and not particularly inspiring backdrops. The scrolling looks so unreal it made me laugh out loud. Sound effects and music are not much better. There's no scoring at all – you either succeed in your quest or fail. All the action is presented as if on a cinema screen, with the number of lives you have left being represented by people dying in the audience.

Chicago 30's is unoriginal, poorly designed and lacks any addictive quality. Not recommended.

At a glance

Title: Chicago 30's
Supplier: US Gold
Price: £14.99 (disk), £9.99 (cass)
Graphics: blocky
Sound: Poor machine gun noises
Playability: Fairly easy
Addictiveness: About as much fun as going for a swim in concrete boots

The Real Ghostbusters

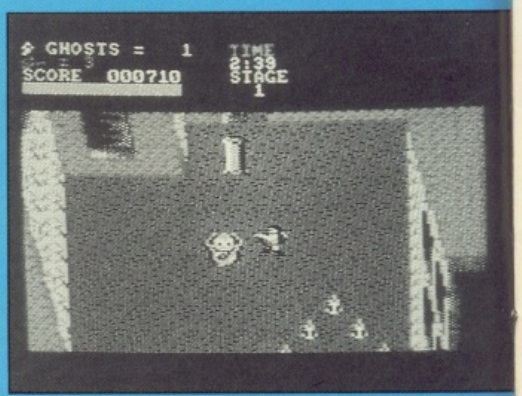
Yet another licensed product that doesn't really work. The original *Ghostbusters* appeared hot on the heels of the very successful feature film. It wasn't very good, but it was hyped to the heavens and so sold well. Now there's the TV series, and so I suppose it was a natural progression to base a game on that as well.

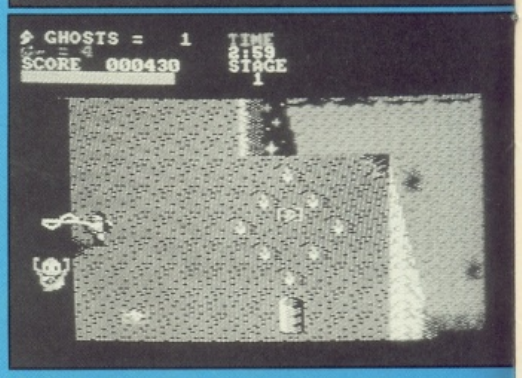
The idea of the game is simple. As one of the Ghostbusters, you enter a haunted house and must fight your way past a succession of spooks, spectres and shadows before a final encounter with the guardian of that particular level. Defeat him and he releases a key allowing access to the next of the ten levels.

There are two ways to kill the ghosts. You can shoot them, your gun having a limitless supply of ammunition, or you can trap their souls in your backpack using your proton beam weapon. The proton beam requires energy though and you can see the level falling off on an indicator at the top of the screen. The bonus for trapping the ghosts this way is in the form of extra points when you move up to the next level.

Shooting ghosts and sundry other items such as oil drums may reveal bonuses which can be picked up. Some are also protected by rising and falling spikes. These bonuses include increasing your rate of firepower, restoring some of your beam energy, providing yourself with an aura of temporary invulnerability and gaining the services of a slimer. This is a friendly little ghost that whizzes round your head absorbing bullets that are coming your way and killing off any creature that he touches.

There is nothing in this game to get excited about. Graphics are below average, sound above. The game itself is fairly tedious, and I cannot imagine anyone other than dedicated fans of the series gaining too much entertainment from it.





At a glance

Title: The Real Ghostbusters
Supplier: Actvision
Price: £14.99 (disk), £9.99 (cass)
Graphics: Lots of different monsters
Sound: A good rendition of that well known tune
Playability: Easy
Addictivenesss: Not so much undead as dead

Hires Demo Kit

Produce your own professional looking intro screens

By Neil Higgins

The *Hires Demo Kit* will allow you to display your own hi-resolution screen created with a graphic package or captured with a backup cartridge, complete with music and a scrolling message.

This is an excellent way for all you artists to show off your masterpieces, without the need for programming. Each demo can be saved out as a stand alone program, so you can send your creations to friends, or even to a software house to impress them with your artwork.

Screens can be loaded in from one of five graphics packages these being *Koalapad/Painter, Blazing Paddles, The Image System, Vidcom 64,* and *Doodle.* Before I give detailed instructions on using the kit, you might like to load my demo on the disk which gives you an idea of what the kit can do.

Using the kit

The kit is controlled via a main menu, where a selection can be made by using the cursor up and down keys, and pressing return. Any other menu that appears can be exited by selecting the bottom option:- 'exit menu', and any input required e.g. a filename can be aborted by pressing the run/stop key. Okay, I will now describe each part which makes up the kit.

LOAD HIRES SCREEN

On selection another menu will appear showing the names and screen mode of each graphic package from which you can load in your picture. The screen mode can either be multicolour hires (mult) or normal hires (norm) depending on which package you use. For example, if you use the Image System then both screen modes are available, so make sure you choose the correct one as in your original picture. The reason each package needs its own loading routine is because each one is originally saved out in a different format i.e. the colour data then the hires screen, or vice versa, and also because of the filename prefixes.

For example, a picture saved with Blazing Paddles has the characters PI. before the filename whereas a Doodle picture has the characters DD before your actural filename. These can be seen by listing a directory containing graphics screens. All this is taken care of by the Demo Kit, so after inserting your picture disk in the drive, only the files (i.e. pictures) saved with your chosen art package will be displayed.

If the name of the picture you wish to load is shown then press the 'Y' key, if not then press 'N' and the next file name will be displayed, if there are no more pictures on the disk, then you will receive the message 'No More Screens', so press any key to return to the menu. When a picture has been successfully loaded, it will be displayed. Do not worry about the colours at the moment, simply press any key to return to the main menu.

LOAD SCROLL TEXT

This option will let you retrieve the text entered with the next option. This is simply a safeguard so that your message can be reused at a later date without the need to re-type it all.

EDIT/VIEW SCROLL TEXT

Selecting this will take you to the text editor. Any message entered here will be scrolled in the bottom border when the demo is run. It works rather like a simplified wordprocessor. Text can be scrolled up or down on the screen. Certain keys provide separate operations on the text and they are:-

(f1) moves the cursor to line no.1
(f3) moves the cursor to line no.51
(f2) clears all the text area
(f4) clears text from the cursor onwards

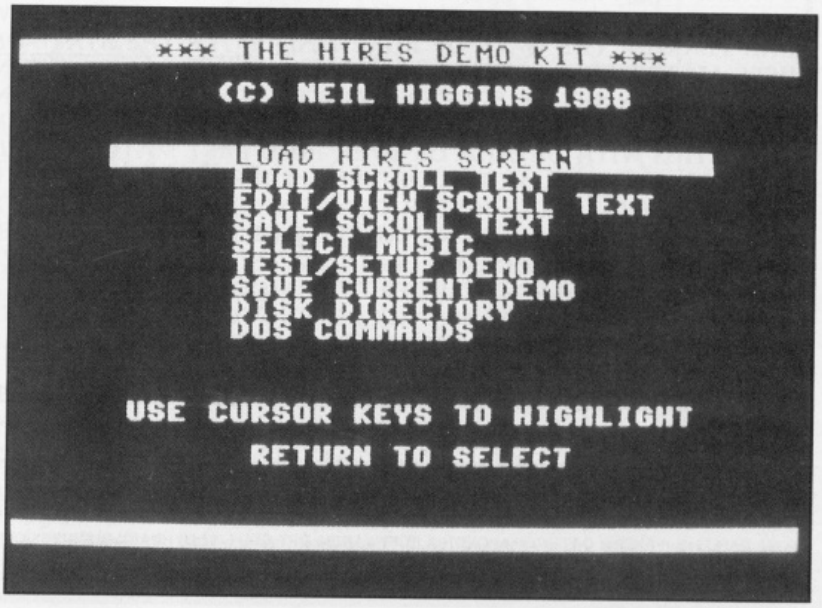
To move around the text use the cursor keys, the current line number is shown and up to 51 lines of text are allowed. This results in a maximum of 2040 characters which should be adequate for most messages. When you have entered your message you must press 'return' to place a marker at the end. The marker is a circle character, and this tells the scrolling routine where your message ends. Should you wish to alter your message at anytime then you must remember to continue from the previous end marker, so that your text will be correctly scrolled. If you do not wish to edit the text then press run/stop to exit. You should fine this a very easy to use system.

SAVE SCROLL TEXT

This saves to disk any text which has been entered using the previous option, simply enter the filename and press return.

SELECT MUSIC

This will bring up another menu with the names of each tune available as background music. To hear a tune simply select it. Any selection made will play a significant part in how much memory your demo will use. If you choose one of the top five tunes then your demo will take up 83 disk blocks, any other tune and the demo will use 79 disk blocks. To be safe, make sure



you have at least 84 blocks free on any disk you wish to save a demo.

TESTS/SETUP DEMO

After loading a picture, entering a message and selecting a tune, it's time to test the demo and setup the correct colours. Changes can be made by pressing the following keys:-

(S) = Screencolour ($D021)
(B) = Border colour ($D020)
(C) = Text colour
(+) = Speed up scroll
(-) = Slow down scroll
(Spacebar) = Exit to main menu

Note, the border colour only affects the left and right sides, this is because the "sprites in the border technique" is used to scroll your message.

SAVE CURRENT DEMO

This will save out the complete demo as displayed in the previous option. To re-load it outside the kit, use the normal command:- LOAD "filename",8. When running a demo, pressing the spacebar will stop the demo and return you to Basic. Note that the scroll speed can be changed by using left and right directions on a joystick in port 2.

DISK DIRECTORY

Will list the current disk's directory to the screen.

DOS COMMANDS

Sends a disk command e.g. S:PICTURE will scratch the file called PICTURE on the current disk. Consult your disk drive manual for further commands.

Notes

It might be interesting to know that the kit can be successfully used with a fastload cartridge active (I use Final Cart II) and this will considerably reduce loading and saving time. The demo supplied has been compacted using Tony Crowther's Cruncher which was in a previous issue of *CDU*. This reduced the file from 83 blocks to a mere 53 blocks, which leaves valuable disk space free for other use. If you do crunch a demo though, remember to give the start address which is $0843.

Memory used by DEMO

This is the memory used by each saved out demo after it has been 'Run'.

Usage	Address
Sprite Data	$0400
M/C Control	$0800
Hires Colour	$0C00
Scroll Text	$1000
(Multi Colour)	$1C00
Hires Screen Data	$2000
Music Data	$4000

Animator

Now Basic programmers can animate their sprite creations without difficulty.

By Clive Horner

If you are writing programs or games in Basic, you will know how tedious animating sprites can be, and how much it slows your program down. 'Animator' allows you to simply and effectively animate sprites from within Basic.

Animation is achieved by flicking different sprites in turn. This is exactly what 'Animator' does. All you have to do is to set up a few parameters as described below:-

SYS49152,SN,SS,NA,RP

SN = **Sprite number**
SS = **Starting sprite**
NA = **Number of animations**
RP = **Repeat or not**

The sprite number is the sprite 0-7 which the parameter corresponds to.

The starting sprite is a number which points to where the first sprite data is stored in memory. So if, for example, you had stored your first sprites at location 12288. You would then use the formula 12288/64 = 192, which would be the number you put into the parameter.

The next parameter, number of animations, is the number of sprites you want to display in the animation. This number starts from the sprite in parameter number (starting sprite).

The speed parameter refers to the speed the sprite animates at. This can be in the range of 0 (fastest) up to 255 (slowest).

The last parameter determines if the sprite will repeat animation, or stop after one cycle of the animation sequence has been finished. This is useful for an explosion for instance, which only animates once. If you insert a '1' the animation is repeated. Insert a '0' for no-repeat.

Once all parameters have been set up, the sprite can be started by:- **SYS49845,SN.** To de-activate a sprite animation use:- **SYS50006,SN.**

If you have displayed the sprite on the screen then you will see it animate as you specified. Each of the eight sprites can have different animations, and are totaly separate from each other.

It must be remembered that the program does not set up the sprite so it is displayed on the screen, this must be done by yourself. Instructions on doing this can be found in your C64 user's manual.

Included on the disk is a short demonstration program showing the effects possible.

Border Message Scroller

Get that bottom border to do something useful for you

By Brian Storry

This routine utilises the technique demonstrated by Jason Finch in his "border sprites" program, (Jan/Feb 1989) of scrolling a message in the bottom border of the screen.

It is not merely a stand alone program, but allows the programmer full control. Call it during a program when it is needed, switch it off when it isn't, speed it up, slow it down, freeze it or change its colour, all from within Basic.

Machine code programmers will be pleased to note that not only zero page, but also the area $c000 to $cfff remain virgin. The Basic ceiling however, is reduced to 15872 ($3e00), and this is of course where the sprite data begins.

memory area used:-
$3E00 - $3FFF (15872) Sprite data area
$4000 - $43A9 (16384) Scroller
$43AA - onwards (17322) scrolling message area (depends on length of message)

Scrolling on the Disk

Border Scroll – This is the basic demonstration file. Once run it will load the machine code and show you the effects possible.

A. Code – is the machine code file for the scroll routine. (The basic demo uses this file in its execution.)

Using the routine

Load and run the Border Scroll from the menu or independantly

Using the routine from Basic (assuming mcode is in memory)

The first line of any program utilising SCROLLER must be:-
sys16384:clr

Thereafter, use the following commands available to you.

@n – where n = the scrolling speed (1 to 15)
%n where n = the colour of the scroll left pointing arrow (top left of keyboard) = switch scroll off
& – will stop the scroll at the end, without switching it off, but you must adjust the scroll speed (with@n) prior to scrolling another message, remember also to pad the end with spaces to scroll the last part of the message onto the screen.

A message must be at least 4 characters long (including spaces), to avoid syntax error.

If one of our new commands is used following the CBM basic ommand 'then', then a separating colon ':' must intervene eg. – if change scrolling speed to n then: n.

Examining the Listing

Load Border Scroll ,8 and list it. Dont run it.

Now let's work through it

10 sys16384:clr Must always be the first instruction in any program containing SCROLLER, variables will be lost if it is used later.
12 @ 3 sets the scrolling speed to 3 "Welcome etc", defines the scrolling message. (Quotes """ within the string are obtained by holding down the CBM key, and pressing 'i')
14-26 ordinary print instructions. The sub-routine at 100-104 asks you to "press space bar", waits until you have, and then returns.
28 Waits for SPACE BAR and then sets the scrolling speed to 0, with '@0', freezing the scroll.
32 Waits again and then resets the speed to 3 with ' 3'
36 Resets the colour of the letters to the value of 'j' with '%j'. Starting with black, it samples each colour in turn ending up with black again.
38 Line ends with (left arrow) switching the scroll off, and clears it.
40 @ 15 sets maximum speed, "sets new message", then '&' forces the scroll to stop at the end instead of wrapping around.
42 Checks for space bar, repeating the message until it is entered. (Jumping out of a loop is bad programming, but it keeps things simple, and we won't fill the stack with this demo.)
44 If the loop is left to expire, its back to 40 to scroll the messasge back to the same place.
46 Clears the old message, creates a new one, and sets the speed to 3.
52 Changes the speed slowly from 3 to 15 with '@j'.
58 Slows it down from 15 to 1 with ' j', and finally tells it to stop at the end with '&'.

Typit-128

Electronic typewriting facilities for your C128 and Commodore printer, including all the Commodore graphic characters on a dot matrix printer

By Peter Simonds

TYPIT-128 gives its users a range of typewriting and processing facilities to take advantage of the features provided by Commodore dot matrix and daisy wheel printers. All those graphic characters can be used on a dot matrix printer like the MPS801, and underlining and 'shadow' print on 164 character long lines are easy to access on Commodore's DPS1101 daisy wheel printer. TYPIT-128 can be used as a text and graphic character processor with immediate printing to paper at the end of each line, or it can be used to compose a whole piece of work before printing is started. When composing is complete, disk filing facilities store your work for use on another day, or to enable the merging of two pieces of work if you wish.

TYPIT-128 includes many *'Help Screens'* to remind you of the facilities that can be used, so if your copy of *Disk User* gets separated from the disk, you can still use the program. I have tried to make it as user friendly as possible, while at the same time making the best use of the screen to see your work in progress.

Using TYPIT-128

TYPIT-128 is configured for use with an 80 column colour monitor, a disk drive set to device number 8, and Commodore printers set to device number 4. The C128 uses the DLOAD "prog" command to load programs from the disk, so enter DLOAD "TYPIT-128" and RUN to get started. The title page will give you a choice of seeing the main menu of facilities, starting to type some new text, or loading a file of work already on disk. Start typing new text by pressing letter N. You must then enter the length of the line that is to be used. A length of 77 is the most useful for viewing your work, but any length from 2 up to 164 can be selected.

The typing grid for line 1 appears on the screen. The line is marked at every five characters to help with setting out your typing. Above the typing grid are the four control codes that set the typing mode you want at the start and end of the line. They also show the current mode if it is changed part way along the line. The four controls are changed using the function keys and changed back using the shift and function keys.

The control codes and the function keys are set out in similar order so F5 and F6 for example, turn underlining on or off. The codes are different in dot matrix mode to the codes in daisy wheel mode, so, in dot matrix mode, underlining is changed to reverse printing mode. Try pressing the function keys to see how they change the codes. Notice that the colour of the code changes to show it has changed from the default setting. Strange things will have happened on your typing grid as you experimented with some, not all, of the function keys. Only F3 and F4 change just the control codes. The other function keys also cause an 'embedded' control code to appear on the typing grid. This does not take the place of a character, so you will see that the typing grid is extended to accommodate the embedded code. When any embedded codes are deleted, the grid will be shortened as needed. The purpose of the embedded code is to show where a change of printing style starts or ends.

As your typing progresses, the typing grid is lost from sight. If you need to delete some text, the typing grid will re-appear.

When TYPIT-128 is run, it defaults into daisy wheel mode, with printing postponed until you wish to commit your composition to paper. You can change to dot matrix mode if you wish or to immediate printing mode if you want each line to be printed as it is composed. To do this you must be in typing, editing or menu mode as shown below.

KEYS	MODE AND PRINTER		SCREEN COLOUR
LOGO+1	Immediate	daisy wheel.	Background is light green
LOGO+2	Postponed	daisy wheel.	Background is dark cyan
LOGO+3	Immediate	dot matrix.	Background is dark blue
LOGO+4	Postponed	dot matrix.	Background is light grey

When you change printer type or printing mode, an audible warning indicates that it has happened. When you change printer type all future screen printing will be in the type appropriate to the printer. So text that is underlined will be shown as such, while reverse field printing on dot matrix printers will be shown reverse field on the screen. Double strike, shadow printing to give it its proper name, and double width printing for dot matrix work are shown in black instead of white on the screen.

So, choose printer type and mode when convenient; you can compose in any of the modes you wish. There is

a help screen if you need reminding at a later date.

Function keys F7 and F8 select upper and lower case character sets. This is of no significance for daisy wheel printers, but gives access to the full range of graphic and alpha-numeric characters on the keys when using a dot matrix printer. If the graphics are to be used in bit image mode, where no space is left between lines of printing on dot matrix printers, the F3 or F4 function key is used to turn on graphic mode, or to turn back to the text mode. This must be done on the line before when a change in spacing is required. So let's get started!

You are still on line one, aren't you! If it is full of experimental rubbish, press the ESC key. This will put you in the menu mode. Notice it is a single line that will give the option of a full page menu or you can press the appropriate key to continue into whichever mode you wish. Press key C to continue typing.

Now type a few words. Before the line is full, press the RETURN key. The text you wrote is now line one. If you were in the immediate printing mode, the text would be dumped onto the printer. The cursor will have disappeared. You must now press key C to continue typing line two, or you can go to menu mode by pressing key M. Any other key will cause a prompt to appear to help you. Press key C to start line two. Type a number of words until the line is nearly full. This time press the CLR/HOME key to terminate the line. Notice that the words on the screen will have been spaced out on the screen to fill the line. This is a right justifying facility. It can't work if the line is less than half full, if you ended your text with a space, or if more than five spaces would need to be added between words to make them fill up the line. If you used any embedded codes on the line, they will be left out when it is spaced out.

Continue with line three. Remember to use key C to get the typing grid. Fill this line with text. If the sound level on your monitor is turned up, you will hear end of line warnings that become more intrusive as you fill the line. The line will be terminated on filling the final space, and will be printed if in immediate printing mode. Now try a few more lines; terminate them by filling them, using RETURN, or by right justifying of text with CLR/HOME.

Now try looking at your lines of typing as they will be printed. Two viewing modes can be accessed from menu mode. Key R will give you a line by line review mode, while key V will give you a window view of your text. Use key M to exit both those modes back to menu mode. A help page exists for both the review and view modes.

Now let's try some mixed mode typing. Below are the keys that control printing codes.

KEYS	EMBEDDED CODE	DOT MATRIX	DAISY WHEEL
F1 or white	D	Double width	Shadow print
F2 or black	S	Single width	Single strike
F3 or cyan	-	Graphic mode on	-
F4 or red	-	Graphic mode off	-
F5 or purple	R	Reverse field on	Underline on
F6 or green	N	Reverse field off	Underline off
F7 or blue	U	Upper case on	Upper case on
F8 or yellow	L	Lower case on	Lower case on

The embedded codes are coloured, reverse field characters to make them easy to see in the midst of a line of text. Try typing 'This is underlined and **shadow text.**' Use F5 before 'underlined', F6 after it; use F1 before 'shadow', F2 after it; use F1 and F5 before 'text', F2 and F6 after it. Notice that shadow printed text is shown black and underlined text is underlined. If you use dot matrix mode, then reverse field printing is shown as such, while any double width characters are shown as black, single width characters. F7 and F8 keys are similarly used to mix upper and lower case characters on the same line. It is possible to mix all the printing modes in any combination on the same line. There is a help page for control codes should it be needed. To start underlining before the start of the first word, use a left arrow character instead of a space to initiate the underlining.

Editing Lines

It will not be long before you want to put right a typing error! If you have tried out the above experimentation, you surely noticed that the cursor keys do strange things in typing mode, and will do so in edit mode. Use the SPACE key and DELETE key to move one space at a time. The four cursor keys are programmed to move as shown below.

CRSR RIGHT Forward 10 or 1 spaces
CRSR LEFT Delete 10 or 1 characters
CRSR DOWN Forward 40, 10 or 1 spaces
CRSE UP Delete 40, 10 or 1 characters

The forward and delete cursor movements depend on there being enough line space in which to make movements. The lesser values are used if movement is restricted. Delete cursor movements are made one character at a time if embedded codes are on the line.

Edit mode displays your original text and a typing grid to re-enter the line. If you only wish to change the four print control codes to alter the start or end of line printing mode, these can be set without changing the text, but you must terminate editing in this way with the ESC key. All other key functions of typing mode apply to edit mode.

You can enter edit mode from menu mode by pressing key E, or directly from review or view modes by again using key E. From the review mode, you need not enter the number of the line to be edited if it is to be the last line reviewed.

If you have some empty lines between lines of text, the usual method to write on them is to use edit mode. An alternative method would be to compose them on the end of any previous work and then to copy them into the empty lines using the copying mode.

If you select a line to be edited and then decide not to change it, provided you have not changed the control codes, you can go to menu mode using the ESC key leavig the line unchanged. This is useful if you have entered the wrong edit line number!

Printing Your Work

TYPIT-128 provides a wide range of printing modes. Basic copy of composed text can be produced as you type, this is called the immediate mode, or you may wish to complete all the composition work ready for screen use before postponed printing of your

work. In postponed printing mode, there are extra facilities to print in any order the lines you wish, to print double spaced lines, and to print in newsprint column style. All of these features can be mixed to give a variety of presentation for your work. Column style printing of justified text is a very useful feature if you are writing articles in the style of Commodore magazines!

Enter printing mode using key P after you have entered menu mode. You will be given a choice of column or page printing. Page printing will start all the lines that you then select for printing at the left hand side of the page. Double spacing can then be selected before printing begins. Asking for the line numbers to be printed may be tedious, but it allows you to choose the order of paragraphs or even selecting sections from different files to compile new documents.

Column printing adds a whole new dimension to the printing mode. It can be used to move the left starting point of printing across the paper. This can be used in the production of newsprint style columns on the paper, or it can be used to set a left margin for all or part of the printout. To print with a margin of 10 spaces you will need to set a column width of 10 and then print in column 2. This pre-supposes that your set line length plus column width is less than the character width your printer is capable of printing. You can not have a margin of 20 spaces and a line length of more than 60 on an 80 column printer for example. If you give correct details in response to the prompts, the program will check and proceed only if what you ask it to do is possible. For newspaper style printing, you must plan three main details as below.

1. Compose your text in narrow columns to fit your layout.
2. Set the column width to the width of your text plus the width of the space that is to be between your printed columns.
3. Print the first part in column 1, then rewind the paper to exactly the same point that you started printing and then print the next part in column two.

The column numbers and width will depend on the printer that you use. To get neat edges to your columns, be sure to use the justification facility when composing the text. Winding back the paper may be inconvenient, but the end result will make it worth the effort. Experimenting with printing modes will be well worth the time spent on it, but it will be well worth the time saving any important work on a disk before you start. So, what about file saving, loading, merging and indexing with TYPIT-128? Read on!

Disk Files

Sooner or later you will want to save some typing you have done on a disk so that you can use it again. Producing and using some files is very easy with TYPIT-128. All of the disk modes are entered from menu mode with a single key press as shown below.

MENU MODE KEY	DISK FACILITY ENTERED
L (for load)	Load a disk file into TYPIT-128.
S (for save)	Save work in TYPIT-128 onto a new disk.
M (for merge)	Load disk file on the end of work in TYPIT-128.
I (for index)	Display an index of the files on the disk.

If you have entered load, save or merge mode, but decide not to continue with that mode, entering a file name of 'M' will put you back in menu mode. Also, if you have entered the same three modes and wish to check the file names on the disk, entering a file name of 'I' will display the files on the disk in the disk drive. You should always check, for instance, that you use a new file name when saving new work, as the use of an already used name will cause the new work to be recorded on top of the file with the same name! But, this does allow you to replace a file with an updated version. If you want to keep two versions of a piece of work, use two different file names. After all file activities, you are placed back in menu mode.

File names can be up to sixteen characters in length. When you load or merge files, a wild card file name system can be used to make life easier. If you enter a file name that does not exist, you will be given the disk index or directory, and asked to give a usable file name. When loading files, a prompt reminds you that loading a file erases any file already in TYPIT-128. All punctuation marks can be used when typing your work. This does present problems when saving and loading files, so TYPIT-128 has substitution and translation routines to allow commas and colons to be used. If you have used them, you must declare them when saving a file. Files will corrupt if you save commas or colons without declaring so before saving. The file handling routines are user friendly and have already looked after my own work for a long time.

Line Editing Modes

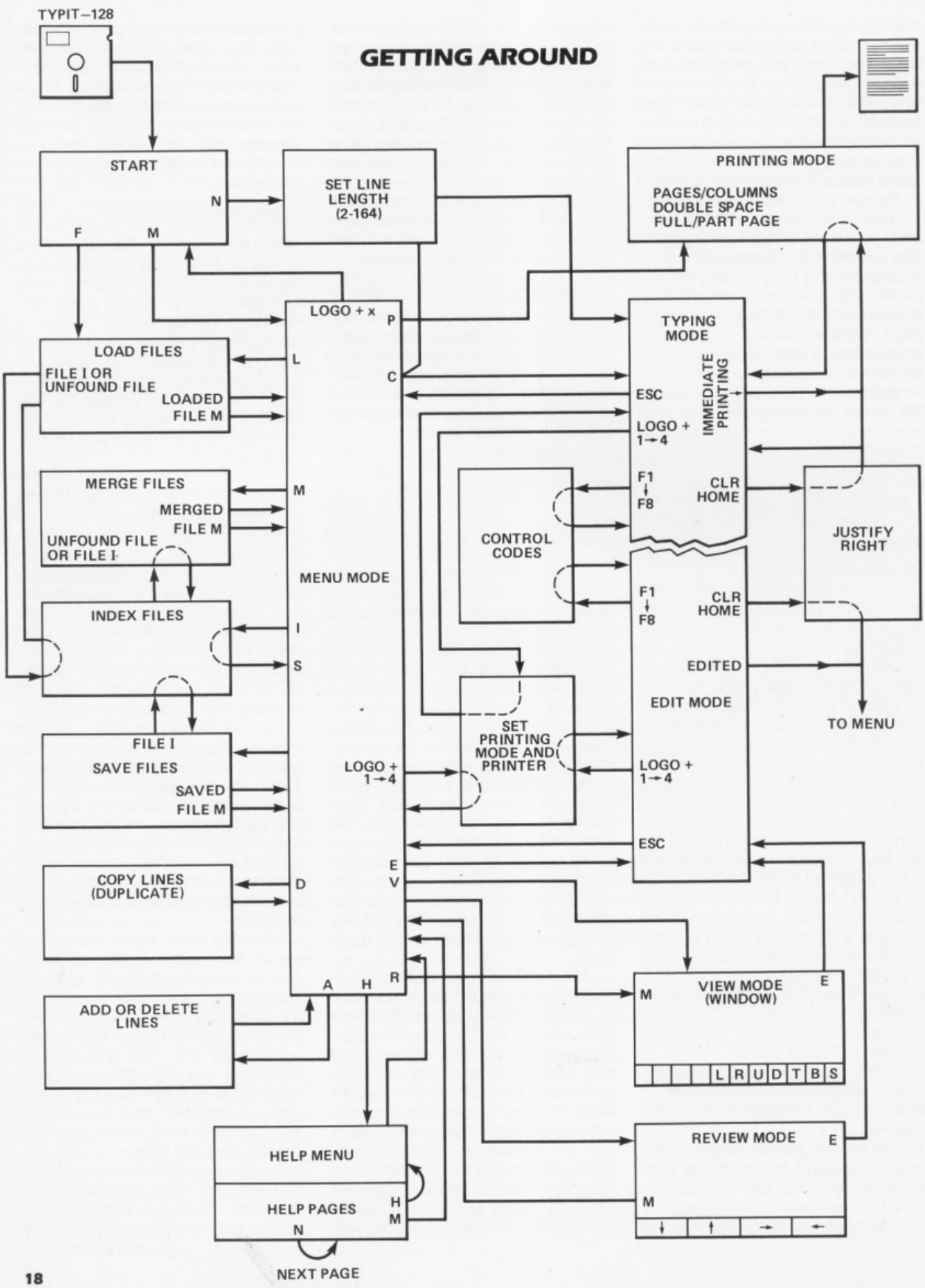
When you compose some work, there is often a wish to change it! To change the text on individual lines, the menu can direct you to editing mode. But, described below are the means of adding those extra lines that you may want, or the means of swapping two paragraphs around, copying some lines from one place to another, or just deleting an odd line or two that you wish you had not spent all that time on anyway!

The adding, deleting and copying of lines facilities are all accessed from the menu mode. The only thing you need to do before using these line processing modes, is to be sure of the line numbers where changes are to be made. You can very easily lose lines that you wished to keep. Let's deal with the easy one first, adding some extra lines. From menu mode select the adding or deleting lines mode using key A. Select the adding lines option by pressing key A. You then enter the number of lines to be added, the line number after which they are to be inserted, and the type of lines you wish to use. The latter simply allows a choice between normal speced text lines and the closed spaced, bit image modes lines that I call graphic lines, that could be used on a dot matrix printer. When lines have been added, a message line indicates the new page length of your work.

Deleting lines is even easier! Use key A from menu mode, select the deletion option with key D, enter the number and first line to be deleted, and it's done. This is not an erasing lines feature; lines are removed, not emptied.

Copying lines from one piece to another is very straightforward. They can be copied from anywhere in your work, to anywhere else in your work. This can be in front of line one, after the last line, well beyond the last line, or over the top of other composed lines. You will want to be a bit careful with the latter option. Text that was there, will be lost. To insert a block of lines

(continued on p.40)


TYPIT–128
GETTING AROUND
START
N
F
M
SET LINE LENGTH (2-164)
PRINTING MODE
PAGES/COLUMNS
DOUBLE SPACE
FULL/PART PAGE
LOGO + x
P
C
L
LOAD FILES
FILE I OR UNFOUND FILE
LOADED FILE M
TYPING MODE
ESC
IMMEDIATE PRINTING
LOGO + 1→4
F1 ↓ F8
CLR HOME
MERGE FILES
M
MERGED FILE M
UNFOUND FILE OR FILE I
CONTROL CODES
JUSTIFY RIGHT
MENU MODE
INDEX FILES
I
S
EDITED
EDIT MODE
TO MENU
SET PRINTING MODE AND PRINTER
FILE I
SAVE FILES
SAVED FILE M
LOGO + 1→4
ESC
E
V
COPY LINES (DUPLICATE)
D
A
H
R
VIEW MODE (WINDOW)
M
E
L R U D T B S
ADD OR DELETE LINES
HELP MENU
HELP PAGES
N
H
M
NEXT PAGE
REVIEW MODE
E
M

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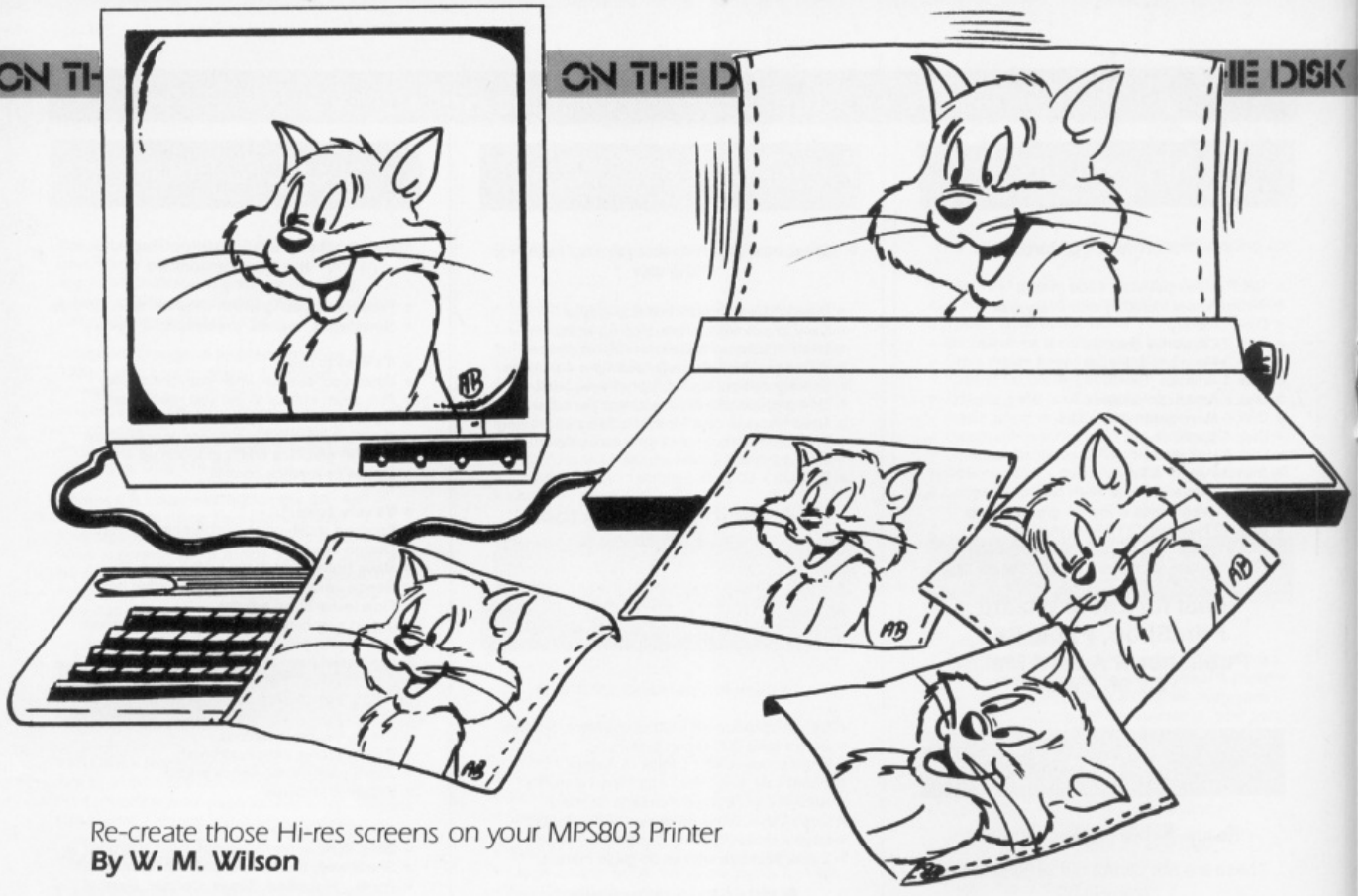


Re-create those Hi-res screens on your MPS803 Printer

By W. M. Wilson

Screen Copies Utility

Most art packages for the C64 offer plenty of scope as far as image design is concerned, but when it comes to presenting your masterpiece on paper the options are strictly limited. This program is my attempt to give you more choice over presentation and manages to squeeze six printing modes out of the humble MPS 803.

At present the program is configured to work with artwork produced using the Koala Pad software, though it should be relatively easy to convert to other formats. I will explain how to make the necessary changes later.

How The Program Works

The first task for the program after loading a file is to convert the picture into a simpler format. This takes the form of an array (160 by 200) in which each cell contains the colour information for one pixel. As there are 16 possible colours, one byte can hold information for two pixels and consequently 16000 bytes are needed to store the array. The advantages of this format will be obvious to anyone who has experienced the intricacies of C64 high resolution graphics at close quarters.

As the MPS 803 is a black and white printer the only way to represent the 16 colours generated by the C64 is by shades of grey. To do this the program assigns a pattern of dots to each of the colours, the greater the number of dots, the darker the shade. Obviously the size of the pattern matrix affects both the size and clarity of the printed image. With a matrix of 2 dots there are only 4 possible patterns (00, 01, 10, 11) and so it is impossible to give each colour a unique pattern. However, under favourable conditions, it can still give quite good results, hence its inclusion as Option 3.

Using the Program

Once loaded the program will present you with the menu offering the following options:

(1) DISPLAY
(2) REFLECT
(3) PRINT 2*1
(4) PRINT 3*2
(5) PRINT 2*4
(6) PRINT 2*5
(7) POSTER
(8) KNIT
(9) LOAD PICTURE
(0) SAVE PROGRAM

Pressing the keys 1 to 0 will select the corresponding option, which I will deal with in order.

Option 1 displays the picture currently in memory, keeping the image on screen until you press the space bar or CBM Key. This can form an important part of the strategy for converting the program to work with other art packages because it allows you to

check your progress visually.

Option 2 produces a mirror image of the screen, briefly showing the picture and after reflection.

As mentioned earlier **option 3** uses a pattern matrix of 2*1 dots and provides the smallest printed image available.
Image size = 135mm * 70mm (320 * 200)

Option 4 is essentially the same as Option 3 but uses a larger pattern matrix of 3*2 dots for each pixel.
Image size = 205mm * 140mm (480 * 200)

Option 5 sees a pattern matrix of 4*2 and prints the image sideways to overcome the printers limit of 480 dots across the page.
Image size = 230mm * 170mm (640 * 200)

Option 6 also prints the image sideways but uses a pattern matrix of 5*2.
Image size = 285mm * 170mm (800 * 200)

Option 7 uses a pattern matrix of two characters, or to be more precise one character printed twice. This means that only 40 pixels can be printed on one line and so a method of printing a part of the screen is needed. The method I chose uses four sprites to form the corners of a picture frame, which can then be positioned over the picture allowing you to see exactly what will be printed. To make the system more flexible you can also adjust the size of the frame, subject to the limits of 40 pixels horizontally and 100 pixels vertically.

The frame can be positioned manually, but if you need to be more accurate then you can enter coordinates instead. Whichever method you choose the result should be an image of the frame and a pointer superimposed on your artwork. The pointer can be controlled either by a joystick in Port 2 or by using the cursor keys. Pressing the spacebar or fire button with the pointer positioned over one of the corners should transfer control to that corner. As this method uses sprite collisions it can be unreliable and an alternative is to use the keys 1 to 4 as follows:

1: Top Left
2: Top Right
3. Bottom Left
4: Bottom Right

Control of the pointer is regained by pressing the spacebar or joystick fire button. When you are satisfied that the frame is positioned correctly move the pointer down until it is off screen and press the spacebar to begin printing. Note that the speed of sprite movements can be altered by changing the contents of memory location 43808. The default value is 6 and should be increased to slow movement down.

Option 8 is similar to Option 7 but uses a single character to represent each pixel. It can therefore manage 80 pixels on one line and takes four pages for a complete image compared with eight pages for Option 7. To make the pattern a little clearer and easier to follow, characters are assigned according to how much of each colour is present. This helps to ensure that the dominant colours are represented by the clearest graphics. Remember to reverse the image using Option 2 . If the pattern is for use with a knitting machine.

Option 9 *must* be used to load a picture file because this is where the colour array, used by the printing routines, is generated. When using a disk drive you must also remember to included in the filename any prefix or suffix used by your art software. In the case of pictures created using the Koala Pad you will need to enter '?PIC X' before the filename.

Option 0 is used to save the machine code and or pattern data. To make a complete backup you will need to save the Basic program.

Changing Patterns

Each of the printing modes has its own pattern data, subdivided into consecutive bytes for each colour. Note that as the same routine which prints Option 4 is used to print Option 3 the data is expected in the same 3 byte format , though in this case the third byte is ignored (see table).

The easiest way to design patterns for options 3, 4, 5, and 6 is to use binary. A dot is represented by setting a bit to 1 and a space is represented by a 0. Conversion to decimal completes the process, but remember to set unused bits to 0.

Option 7 and 8 allow user defined graphics or characters from the printers' own character set to be used for the pattern. A string of up to 8 codes is allocated for each pattern, these codes can be printer control codes or graphic data. If you are using the printers own characters the unused codes should be set to 0. To define your own pattern the first code should be 8 (switch graphic on) followed by six bytes of graphic data and ending with code 15 (switch graphic off). For further details refer to your printers' manual.

Use with other Art Software

On the C64 a multi colour high resolution screen consists of an 8K bit map, two 1K blocks for colour information and one byte for the background colour. SCUM-64 has a 28K data storeage area running from $2000 to $9000 and this must be used to store both the picture file and also the 16000 byte colour array generated by the program. A set of pointers in time honoured low/high byte format are used to tell the system where to find each of the data blocks. Conversion to another art package is therefore a simple matter of altering these pointers. If the manual supplied with your art software gives details of the file structure you are virtually home and dry, if not then a little guess work is involved. A method of force loading the picture file at $2000 is provided, for whenever the picture file normally loads outside of the data area, just set the variable SA = 0. This can also take a lot of the guess work out of determining the file structure when the manual doesn't offer any help.

If you now list the Basic program you will see that I have included details of the file structures for *Art Studio* and *Blazing Paddles* to supplement the default Koala Pad mode. To convert to one of these systems you will need only change the GOSUB command in line 30. The values given for Blazing Paddles and Art Studio have been gleaned from magazines and so can't be guaranteed but should at worst give you some idea of where to start. This programme is also compatible with CDU paint.

OPTION	DATA STORED	No. BYTES	BITS used
3: 2*1	$C480 - $C4AF	3 (2)	0
4: 3*2	$C4B0 - $C4DF	3	1-0
5: 2*4	$C4E0 - $C4FF	2	3-0
6: 2*5	$C500 - $C51F	2	4-0
7: POSTER	$C400 - $C47F	8	n/a
8: KNIT	$C380 - $C3FF	8	n/a

Vidibasic

A graphics extension of 50 commands to enhance the resident Basic

By Fergal Moane

You've probably all got some sort of Extended Basic to supplement the C64's ancient Basic 2. These extensions contain fairly standard toolkit commands, such as AUTO, RENUMBER etc. These commands may make the actual writing and debugging of a program easier, but do nothing to help you with the in-program workload.

Probably the most used command in the C64's vocabularly is POKE. All the features which make the C64 the best-selling home computer are accessed by POKE. I have always found that graphics have been hard to use effectively, requiring a host of POKEs to display anything.

Vidibasic is no ordinary Extended Basic, it is a complete graphics workstation which adds nearly 50 new keywords to C64 Basic. From the serious applications of multiple scrolling windows to arcade-speed movement of sprites, there is something for everyone, covering the three main modes of C64 graphics.

Points to Note

There are a number of points about the overall working of the operating system that need to be made:

1) All numbers can be entered in decimal, hexadecimal, or binary. This means that expressions, variables and commands can use any DEC, HEX or BIN number. All HEX numbers should of course be preceded by $ and all BIN By %.

e.g.
SYS $C000
PRINT $FF
POKE $D011, PEEK ($DO11) or %10110011

2) As commands are tokenised (i.e. assigned one byte values), they can be used in immediate or program mode. This advanced system means that no preceding character is necessary, and commands will take up less RAM. Note that programs with Vidibasic commands will not work without the system present, but normal programs will work in this environment.

3) Parameters in all commands are evaluated. This means that variables, expressions, DEC, HEX or BIN numbers can be used.

5) The area $**C000**-$D000 is only needed for Hi-res and interrupt commands. If these commands are not needed, this area can be used freely for your own machine code. Never call these commands if this area has been used.

e.g.

10 GET A$: IF A$ =”” THEN: GOTO 10

Memory Map

HEX AREA	COMMENT
0000-02A6	BASIC WORKSPACE
02A7-02CC	VIDIBASIC WORKSPACE
0300-033B	VECTORS
033C-03FF	CASSETTE BUFFER (FREE RAM FOR 3 SPRITES)
0400-07E7	SCREEN
07F8-07FF	SPRITE PROINTERS
0800-8FFF	BASIC RAM AREA (34K)
9000-9FFF	NEW COMMAND CODE
A000-BFFF	BASIC ROM SCREEN STORAGE WINDOW
C000-C35F	HI-RES COMMANDS/ FREE RAM
C35A-C53F	INTERRUPTS/FREE RAM
C540-C7FF	FREE RAM/10 SPRITES (21-31)
C800-CBFF	BUFFER AREA/FREE RAM
CC00-CFFF	HI-RES COLOUR/ FREE RAM
D000-DFFF	VIC + SID
E000-FFFF	KERNAL ROM/HI-RES SCREEN

6) There are a number of commands which use interrupts to assist Basic. These commands cannot be used at the same time; the last command will have priority. Take this into account especially when using sprite commands.

7) There is a prompt > displayed to let you know that Vidibasic is in residence. This prompt will be ignored in all commands, and should be transparent to the system. If this gets in your way, POKE770, 131: POKE771, 164 should get rid of it.

8) There is one peculiarity of Vidibasic. IF..THEN statements must have colons after the THEN and before the next command. This is optional in normal Basic, but is a must when using extensions

User's Guide

Sprite Commands

Overview

It is beyond the scope of these instructions to explain the concepts of sprite graphics. You will need a good reference guide for detailed explanations, suffice to say that to see any sprite, you will need the first four commands. Note that the cassette buffer is free for 3 sprites and $C380-$C7FF can hold 16 sprites. Remember to use the copy command to allow storage of sprites anywhere in memory, and to move them to a convenient area when needed.

Sprite Pointer
SYNTAX : SPRPTR, sprite, number, data block

This command sets the sprite pointer for a specified sprite to a data block. The data block number is obtained by dividing the start address by 64. This command compensates for any movement of screen position.

Set Sprite Parameters
SYNTAX : SETSPR, sprite number
,type (0=hi-res 1=multicolour)
,colour
,Xexpansion (0=normal 1=expand)
,Yexpansion (0=normal 1=expand)
,priority (0=above data 1=behind data)
,multicolour 1
,multicolour 2

Sets the parameters for any sprites. Note that the two multicolours are not required for hi-res mode.

Sprite Position
SYNTAX : SPRPOS, sprite number, X,Y

Positions a sprite at coordinates X,Y. Note that the MSB of X is automatically taken care of, so x values range from 0 to 319.

Sprite On
SYNTAX : SPRON, sprite number,

ON/OFF (O=off 1=on)
Makes a sprite visible or invisible.

Sprite Fill
SYNTAX : SPRFILL, data block number, value
Fills a specified data block of 63 bytes with a value. Useful with 255 for a solid rectangle.

Sprite Erase
SYNTAX : SPREARASE, data block number
Erases a data block.

Sprite Reverse
SYNTAX : SPRREV, data block number
Reviews a data block by flipping pixels.

Sprite Invert
SYNTAX : SPRINV, data block number
Turns a data block upside down.

Randomise Sprite
SYNTAX : RANDOMISE, data block number
Sets a data block to random values. Useful for explosions.

Roll Sprite Left
SYNTAX : SPRLEFT, data block number, number of shifts
This moves the data to the left, making it reappear on the right, giving a roll effect. Try it to see what I mean.

Roll Right
SYNTAX : SPRRIGHT, data block number, number of shifts
Opposite of the above.

Copy Data Block
SYNTAX : COPYSPR, data block, start address, copy type
Copies 63 bytes from start address into the specified data block. The copy type is

0 – straight copy
1 – EOR's with existing data
2 – OR's with existing data
3 – AND's with existing data

Use to copy patterns from protected memory down to correct bank for displaying. This leaves maximum memory free for Basic.

Syntax/Sprite Collision
SYNTAX : SPRCOL, sprite number
Checks to see if a sprite has collided with another sprite and if so, location 2 will be non zero. Remember to read the collision again to clear it, or results will be unreliable.

Background Collision
SYNTAX : BACKCOL, sprite number
Same as above, but checks to see if a sprite has collided with any screen data and returns in location 3.

Animate
SYNTAX : ANIMATE, data block number
,start address
,number of frames
,delay 1
,delay 2
This displays a sequence of sprites from the start address in the specified data block. The number of frames obviously dictates the number of sprites after the start address to be displayed. The delay is the two numbers multiplied together, and regulates the delay between two animations. Experiment with fairly large numbers to find the best speed.

Move Sprite
SYNTAX : SPRMOVE, sprite number, direction, X velocity, Y velocity, no of moves
This is probably the most useful sprite command. It allows you to move 8 sprites simultaneously, independently of the Basic program. The sprites will complete their movement under interrupt, freeing up your Basic program for other tasks. The velocity and moves should be between 0 and 255, with 255 being the slowest speed. The directions are as below:

9	1	3
8	*	2
12	4	6

For reference, the number of moves remaining for sprites 0-7 are contained in locations 50488-50495.

Bordersprite
SYNTAX : BDRSPR
This allows displaying of sprites in the top and bottom borders, giving a full screen game. This professional effect exploits a VIC chip bug, and so may not be reliable. Also, the screen colours are constantly set to black under interrupt. This is to avoid weird colour effects created by the trick.

Hi-resolution Commands

Overview
Note that in hi-res mode, the screen is under the Kernal ROM therefore all graphics are taken from Bank 3. This should pose no problem, as the LORES command restores the screen and banks to their proper values. Note that for X,Y coordinates, the origin is the bottom left of the screen.

Hires Screen
SYNTAX: HIRES
Moves banks and goes into hi-res mode.

Lores Screen
SYNTAX : LORES
Restores banks and returns to the text screen.

Clear Hi-Res Screen
SYNTAX : CLEAR
Clears the 8K of RAM required for the screen.

Screen Colour
SYNTAX : HICOL, colour
Fills the screen with a specified colour.

Plot
SYNTAX : PLOT, X,Y
Plots the point X,Y.

Unplot
SYNTAX : UNPLOT, X,Y
Unplots the point X,Y.

Invert
SYNTAX : INVERT, X,Y
Flips the point X,Y.

Fill
SYNTAX : FILL, X,Y
Fills intelligently the area centred around X,Y.

Points Status
SYNTAX : POINT, X,Y
Checks to see if the point X,Y is set. PEEK (780) is nonzero if it is set.

Dump Screen
SYNTAX : DUMP, start address, type
Dumps a hi-res screen to the printer starting at start address. Type is 0 for a normal dump, or 1 for a 'negative' dump. It can also dump character sets if necessary. Note that as the Vidibasic screen is under the Kernal ROM, it will need to be copied into normal RAM for dumping.

Character Graphics Commands

Overview
Character redefinition and positioning

are the basis for all games. The Commodore is lucky to have sprites to take the work out of moving objects, but characters are essential for backgrounds. Even in the non-games environment, a business program can benefit from a redesigned character set.

Copy
SYNTAX : COPY, address

Copies the RAM character set RAM starting at address. It takes a fraction of the time that Basic needs. It is useful to have the ROM characters for basing your set around.

Char
SYNTAX : CHAR, character no, B1, B2, B3, B4, B5, B6, B7, B8

Defines the character given by its screen code number according to the bytes B1 to B8. Note that binary numbers can be used, so you can actually see what you are designing by looking at the bit patterns of the binary numbers.

Down Scroll
SYNTAX : DOWN

Scrolls the screen down one character position. Note that this is not a hardware smooth scroll. To be effective, after the scroll, print the new lines at the top of the screen.

Up Scroll
SYNTAX : UP

Scrolls the screen up.

Left Scroll
SYNTAX : LEFT

Scrolls the screen left with wraparound to the next line.

Right Scroll
SYNTAX : RIGHT

Scrolls the screen right with wraparound to the next line.

Print At
SYNTAX : AT,X,Y

Positions the cursor at X,Y for the next PRINT command. Saves the use of cumbersome control characters in PRINT statements. X=0-39 Y=0-24

Colour
SYNTAX : COLOUR, screen, background, cursor

Sets up the screen colours, avoiding POKE commands.

Reverse
SYNTAX : REVERSE, start address, no of reverses

Reverses a specified number of characters starting at address. This should be the screen location of the desired character. Useful for highlighting, and making messages noticeable by multiple reverses, giving a flashing effect.

Raster
SYNTAX: RASTER, first split, second split, colour 1, colour 2

Splits the screen in two at the raster lines specified, displaying both colours at once. This is useful for highlighting, or for special effects.

Vidibasic Command Summary

SPRPTR, sprite number, data block position
SETSPR, sprite number, type, colour, Xexpansion, Yexpansion, Priority, multicol1, multicol2
SPRPOS, sprite number, X,Y
SPRON, sprite number, flag
SPRFILL, data block, value
SPRERASE, data block
SPRREV, data block
RANDOMISE, data block
SPRINV, data block
SPRLEFT, data block, number of shifts
SPRRIGHT, data block, number of shifts
COPYSPR, data block, start address, copy type
SPRCOL, sprite number
BACKCOL, sprite number
ANIMATE, data block, start address, number of frames, delay1, delay2
SPRMOVE, sprite number, direction, X velocity, Y velocity, number of moves
BDRSPR

HIRES
LORS
CLEAR
HICOL, colour
PLOT, X,Y
UNPLOT, X,Y
INVERT, X,Y
POINT, X,Y,
DUMP, start address, type

COPY, address
CHAR, character no, b1, b2, b3, b4, b5, b6, b7, b8
AT X,Y
REVERSE, start address, number of reverses
COLOUR, screen, background, cursor
RASTER, first split, second split, colour1, colour2
ROFF

DOWN
UP
LEFT
RIGHT

WINDOW, corner location, columns, rows, colours
WUP, corner, columns, rows,colour
WDOWN, corner, columns, rows, colour
WLEFT, corner, columns, rows, colour
WRIGHT, corner, columns, rows, colour
WOFF

MEMTOP, address
MSAVE, start address, end address, "filename", device

$
%

Raster Off
SYNTAX : ROFF

Turns off the above effect, restoring screen colours and returning interrupts to normal.

Window Commands

Overview
These commands allow the creation of multiple overlapping scrolling windows, adding a professional look to any serious program. Text is restored as they are removed. Uses normal characters to draw the frame, and is so totally compatible with text mode. Note that there is little error checking, and out of range parameters may crash the program.

Window
SYNTAX : WINDOW, corner location, columns, rows, colour

This allows the creation of up to five on-screen windows. The corner location is the screen matrix location (e.g. 1024 for a window starting at the top left of the screen).

Remove Window
SYNTAX : WOFF

This removes any windows created in reverse order, restoring the contents of the screen under each window.

Scroll Window Up
SYNTAX : WUP, corner, columns, rows, colour

Allows the scrolling of text within the window specified, independently of the screen. This allows complex text windows or menus.

Scroll Window Down
SYNTAX : WDOWN, corner, columns, rows, colour

Scrolls window contents up.

Scroll Window Left
SYNTAX : WLEFT, corner, columns, rows, colour

Scrolls window contents left.

Scroll Window Right
SYNTAX : WRIGHT, corner, columns, rows, colour

Scrolls window contents right.

Memory Commands

Overview
This allows manipulation of memory, always a problem with graphics. Use with care, especially avoiding $9000-$A000.

Memory Top
SYNTAX : MEMTOP, address

Sets the top of the Basic area to address. Useful when protecting character sets or sprites from Basic.

Memory Save
SYNTAX : MSAVE, start address, end address, "filename", device

Saves the specified block of memory with the name "filename" to the device indicated. Useful for saving blocks of sprite data or machine code.

Points to Remember

A fairly hefty lot of instructions, but it is difficult to squeeze a manual into a few pages! Note that although no DOS commands have been provided, DOS 5.1 is compatible if hi-res is not needed. Feel free to fiddle around with the command names. There is a table of the commands just below $A000. To use Vidibasic in your own programs, check out the three SYS calls in the loader program. Don't forget to lower Basic to protect the code. The POKES to 770 and 771 that control the prompt in the loader can be modified to taste. That's it, but watch out for other extended Basics in the future.

KERNAL ROUTINES

Let the in-built routines do some of the harder tasks for you

By Paul Eves

When I first got into computers, I always felt a great sense of achievement whenever I had finished programming some routine or other. Indeed, even now, I still get that feeling, whether it's a simple routine or a complicated language extension.

In the beginning I stuck with Basic, partly because it was an easy language to get along with, and partly because machine code seemed beyond my capabilities. One day, whilst flicking through a KERNAL disassembly book with my mate Gary (late of Z..p), it dawned on me – here I was, trying to work out complicated coding routines to complete some task or other, when all the time the answer was staring me in the face. As the old slogan goes, 'Let the train take the strain'. That is, why not let the computer do the job for me? Thus began a new era in my programming efforts. So here are some of the machines inbuilt routines that you may find helpful.

As you know, there is a section of the Kernal that lies from $FF81 to $FFF5. This section contains the 39 JMP instructions that Commodore have designated as the Kernal routines. This table is intended to allow you to write programmes without having to worry about whether they'll run on later models.

So if this table is such a good thing, why would anyone not wish to use these absolute JMP instructions? One reason if that if the routine does an absolute JMP, as does $FFB1, you can't modify it in anyway. Also, if you wished to add additional features to a routine, either prior to calling it or after, some of the absolute JMPs could prove awkward.

Another possible reason could be that you wished to use a section of the Kernal that doesn't have an entry table – for example, using the screen editor routines from within your own programs, which are not available through jump vectors.

Here then, are a few routines you may find useful when used from within your own programs. The first section covers some of the indirect KERNAL routines that can be called. Because they're indirect, this means you can write your own routine, wedge it in to the RAM vector, and call it from the KERNAL JMP table.

The second section covers some useful Basic ROM and Kernal ROM routines. These routines are not documented as well as the KERNAL routines, other than the 'Complete ROM Disassembly' by Peter Gerard and Kevin Bergin, to whom I am indebted for this article.

THE ROUTINES

Name of routine : CHKIN
Purpose : Open a channel for input
Jump address : $FFC6
Vector address : $031E
Communication registers : X
Preparatory routines : OPEN
Errors returned : 3, 5, and 6
Use of the stack : 0
Registers affected : A,X

Before using routine, you must use the OPEN command unless using the keyboard as your device. When called, the X-register should contain the logical file number.

The default value at $031E is $F20E. If the logical file is present in the logical file table, the routine gets the device number and secondary address from the corresponding tables. If the file number is not in the table, the carry is set, 3 is placed into the accumulator and the error message 'FILE NOT OPEN' is displayed.

Location $99 holds the number of the current device. This will be 0 for keyboard, and 3 for screen. If the current device is tape, the routine also checks for a secondary address. This address must be $60, otherwise a 'NOT INPUT FILE' message is displayed and sets the accumulator to 6. If it is $60, then location $99 is set to 1.

If the device being used is a serial one, the input channel is opened by sending the TALK command to the device. If the secondary address held in $B9 is greater than $80, 'DEVICE NOT PRESENT' is displayed. The carry is set, and 5 is placed into the accumulator. Otherwise, the serial device number is placed into $99.

Name of routine : CHROUT
Purpose : Output single character
Jump address : $FFD2
Vector address : $0326
Communication registers : A
Preparation routines : OPEN, CHKOUT
Errors returned : See entry on READST
Use of the stack : 8
Registers affected : A
Function : To output data which has been placed in the accumulator Assumes that keyboard is channel unless OPEN and

Name of routine:: CHRIN
Purpose : Get character from the input channel
Jump address : $FFCF
Vector address : $0324
Communication registers : A
Preparation routines : OPEN,CHKIN
Errors returned : See entry on READST
use of the stack : 7
Registers affected : A,X
Function : To get single byte of data and store it in accumulator Assumes that keyboard is channel unless OPEN and CHKIN have been

Name of routine : CHKOUT
Purpose : Open a channel for output
Jump address : $FFC9
Vector address : $0320
Communication registers : X
Preparatory routines : OPEN
Errors returned : 0,3,5 and 7
Use of the stack : 4
Registers affected : A,X
Function : Output of data to a device. Unless screen is output dev, X-reg must

CHKIN have been used.

The OPEN and CHKOUT routines are not required beforehand, providing the output device is the screen. The accumulator should contain the byte to be output, in CBM ASCII format. If location $9A. (The output device number) contains 3, the screen, the ASCII code is displayed unless it is a control function. If it is a control function, the routine performs that function. Providing the ASCII code is a valid screen code, the code is displayed on the screen and the cursor is advanced one position.

If location $9A contains a number greater than 3 as a serial device, then the routine jumps to $EDDD to send the character to the open serial device(s).

used

If using the keyboard, the OPEN and CHKIN routines need not be called beforehand. If the current device for inpout is the tape, then return the next byte from the tape buffer, at the same time checking on the next byte for a vlue of 0. (E0F) If it is a 0, then set E0F status in $90. If the current value at $99 – input device number – indicates a serial device, the next byte is returned over the serial bus. If there are I/O errors however, the accumulator will hold the value $0D.

If the keyboard is the current device, each character typed is displayed on screen until an UNSHIFTED return is detected/except control characters. On exit from the routine, the accumulator holds the value of the byte recieved from the channel.

hold lfn.

On entry to the routine, the X-register should hold the logical file number. The default value at $0320 is $F250. If the logical file is present in the logical file table, the routine gets the device number and secondary address from the corresponding tables.

If the file number is not in the table, the carry is set, 3 is placed into the accumulator and error message 'FILE NOT OPEN' is displayed. 'NOT OUTPUT FILE' will be displayed if the keyboard is the current device. The carry is set and 7 is placed into the accumulator.

When the current device is tape, the secondary address is also checked – if it's not $61, a 'NOT OUTPUT FILE' message is displayed, carry is set and 7 is placed into the accumulator. If the secondary address is $61, then $9A is set to 1. If the device being used is a serial one, the output channel is opened by sending the LISTEN command to the device. If the secondary address that is held in $B9 is greater than $80, then 'DEVICE NOT PRESENT' is displayed. The carry is set, and 5 is placed into the accumulator. Otherwise, the serial device number is placed into $9A.

Name of routine : STOP
Purpose : Check if the stop key has been pressed
Jump address : $FFE1
Vector address : $0328
Communication registers : A
Preparatory routines : None
Errors returned : None
Use of the stack : 2
Registers affected : A,X
Function : Tests usage of stop key. If detected, the Z flag is set and all the channels are reset to their defaults

If you wished to check for the STOP key being pressed, you would call this routine. When the key is down, the Z status flag is set to a 1. This allows the user to test for this condition through their routine with a BEQ instruction. Location $91 holds the value of the keyboard scan for the STOP key column during the last IRQ or NMI interrupt.

Location $91 is stored in the accumulator. If it's not $7F or $FE then return from the routine, BNE to RTS (the accumulator will be holding the last value of $91). If the value is $7F or $FE, stop key pressed, then branch to the kernal routine at $FFCC, CLRCHN (reset I/O channels).

The following is a breakdown of the READST routine, mentioned in a couple of the routines above.

Name of routine : GETIN
Purpose : Get character from keyboard buffer queue
Jump address : $FFE4
Vector address : $032A
Communication registers : A
Preparatory routines : None
Errors returned : None
Use of the stack : 7
Registers affected : A (X,Y)
Function : To get single character from the keyboard buffer and to put it in the accumulator

When using the keyboard to retrieve characters, the keyboard buffer is scanned. If it contains characters, the first character is retrieved and its value placed into the accumulator. The remaining characters ae moved up in the buffer.

If the buffer doesn't contain any characters, the accumulator is set to 0. Normally you would use GETIN for keyboard operations. Remember, CHRIN does not retrieve anything until the RETURN key is pressed. If you wish to retrieve characters from either the screen, serial devices or tape, perform the same routines for GETIN that CHRIN does for these devices.

Name of routine : READST
Purpose : Read status
Jump address : $FFB7
Actual address : $FE07
Communication registers : A
Preparatory routines : None
Errors returned : None
Use of the stack : 2
Registers affected : A
Function : Places in the accumulator the current status of the I/O devices. Information is device status and error code Bits in the accumulator contain the information in the following table

BIT VAL	TAPE READS	SERIAL R/W	TAPE VERIFY ALSO LOAD
0	1	TIME OUT (WRITES)	
1	2	TIME OUT (READS)	
2	4 SHORT BLOCK		SHORT BLOCK
3	8 LONG BLOCK		LONG BLOCK
4	16 UNRECOVERABLE		MISMATCHES
5	32 CHECKSUM ERROR		CHECKSUM ERROR
6	64 END OF FILE E01		
7	128 END OF TAPE DEVICE END OF TAPE		NOT PRESENT

EXAMPLE OF CHRIN/ CHROUT

The following short example is a demonstration of the use of CHRIN and CHROUT. It utilises the CHKIN routine previously mentioned.

All that happens is this: When called, the routine waits for characters to be input from the keyboard, terminating with a RETURN. The DATA received is first stored after the routine. Next it is retrieved and printed to the screen again.

```
START STA $D018 : Determine char
                  set
LDY   $03
STY $D020
INY
STY $D021       : Set colours
INY
STY $0286       : Set text colour
LDX   $00

GETIT JSR $FFCF : Get char
STA HERE,X      : Store wherever
INX
CMP   $0D       : Is it return
BNE GETIT       : No, get another
LDA   $93
JSR $FFD2       : Clear screen
LDX   $00

AGAIN LAD HERE,X : Retrieve char
JSR $FFD2       : Output char
INX
CMP   $0D       : Is it end
BNE AGAIN       : No, get another
RTS

HERE .BYT       $00, $00, etc etc
```

This is a very simple demonstration, but it shows you what can be done.

ERROR CODES AND MEANINGS

The following lists are the error codes that may be returned on some of the above mentioned routines.

CODE	MEANING
0	Routine terminated by STOP key
1	Too many files
2	File already open
3	Not open file
4	File not found
5	Device not present
6	Not input file
7	Not output file
8	Missing filename
9	Illegal device number

BASIC AND KERNAL ROM ROUTINES

A3B8	Block memory move-checks for free space.
A3FB	Check for stack-space
A437	Output error messages.
A642	Perform basic NEW
A65E	Perform basic CLR
AB1E	Output string
AD9E	Evaluate an expression
B02E	String comparison
B256	Garbage collection-clear all unwanted strings
B853	Do subtraction
B86A	Do addition
BA28	Do multiplication
BB12	Do division
BD7E	Reitrieve Ascii digit
BDCD	Output positive number
BDDD	Transfer loating point-ascii
E37B	Warm restart
E544	Clear screen
E566	Home the cursor
E6B6	Advance cursor one position
E6ED	Retreat cursor one position
E8EA	Scroll the screen
EA87	Check keyboard

I hope that this little excursion into the KERNAL and basic ROM routines will help you in your programming. It's surprising what you can learn from simply reading through ROM disassemblys.

ON THE DISK ON THE DISK

Texted

Our popular wordprocessor gets an uplift

By Fergal Moane

Due to popular demand, our Wordprocessor from the Nov/ Dec issue of *CDU* gets another airing.

For the benefit of users old and new, the author has kindly supplied us with an enhanced version.

This program tidies up some of the loose ends that were present in the previous program.

Because of the popularity of the program we have decided to include it on this month's disk.

For details of the commands available please refer to the November/ December 1988 issue of CDU.

64 News Desk

Turn your 64 into a DTV machine and join the professionals.

By Mike Benn

In the past the wordprocessor advanced the speed and presentation of letters for home and business. Then came DTP (Desk Top Publishing) which allowed for one person to publish a professional style paper or news letter. Now there's another way of passing on the news to the world at large DTV (Desk Top Video).

Instead of presenting your news on paper DTV presents it on television. Television is the principal source of news for most people so why not use the best medium for news.

DTV will cut the cost of putting news on television, make newscasters redundant and eliminate the need for studios completely.

64 News Desk emulates a news and studio-based television program. As with a normal news presentation you have a newsreader, and, somewhere behind his left ear, a picture associated with the news item being read. BBC2 news also adds subtitles in some of their bulletins to assist the hard of hearing. 64 News Desk provides these three main features. The program allows for a choice of newsreaders who will read whatever you want them to in near perfect lipsync. The program will also allow you to include your graphics on demand. All you have to do is gather the news. The program is controlled from Basic and the newscasters will read any string you give them. News Desk is designed to work with most of the speech synthesizers that work with the CBM64.

Personalised graphics can be added via a sprite editor and displayed in the program.

The program also works independently of speech synthesizers and there's no reason why you can't use your own voice, perhaps videoing the result. You could use the newsreaders as presenters (they won't mind) and have them introduce a game or program you may have written.

Become a TV Director (or how to use this program)

News Desk is a machine code program controlled by SYS calls from Basic. Once you have loaded and run the program it's ready to run your own Basic program.

The SYS calls are as follows:-

SYS SA, SS, DE, S1$
SYS SA+, SC, TL/DF, TL/CL, TR/DF, TR/CL, BL/DF, BL/CL, BR/DF, BR/CL

SYS SA+6 RETURN TO BASIC

SS = SCREEN SELECT

This controls the choice screen selection. There are two presenters each with their own screen. A zero will present one screen a number greater than zero will present the second.

DE = DELAY

The delay controls the speed of the print out and lip movement. This is very important in order to produce a passable lipsync with your synthesizer. Certain words are spoken slower than others as are certain phrases.

The delay may need to be altered from string to string, and allows for the fine tuning which may be needed to improve the result. The larger the value of DE the slower the lips move.

S1$

This is where you add your string variable. A word of warning DO NOT INCLUDE STRINGS OF GREATER THAN 160 CHARACTERS because your string is printed on the bottom four lines of the screen as it is spoken and simple maths will show that the text will run off the screen. If you need a larger string, then start a new string variable.

When using a speech synth with the program always load each string into the synth's own buffer just before you have the newsreader speak it. Speech synthesizers usually require your strings to be written as pronounced, often with control codes to give an understandable result. If the program and the synth share the same strings the program will print out the string as found. The best technique is to use pairs of strings one for the synth and the other to be printed on the screen.

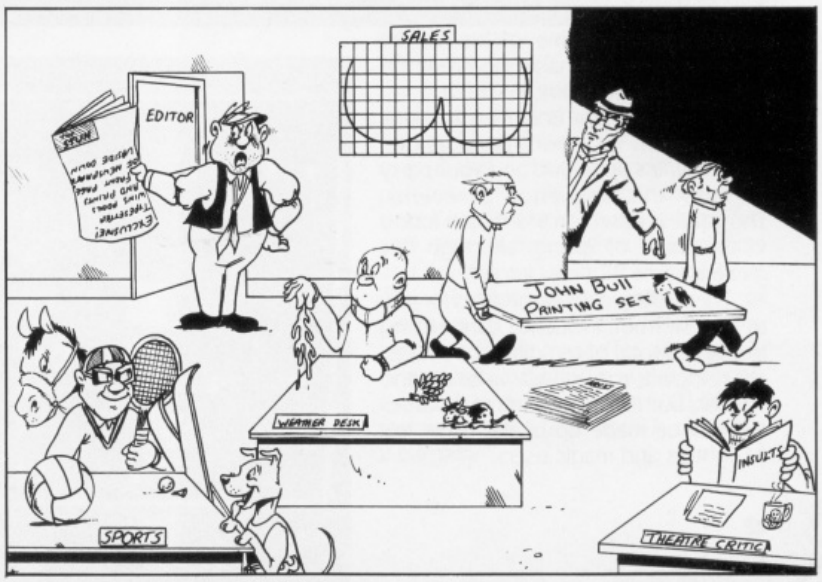
SC = SCREEN COLOUR

This variable controls the background colour of the inset screens.

TL = TOP LEFT
TR = TOP RIGHT
BL = BOTTOM LEFT
BR = BOTTOM RIGHT
DF = SPRITE DEFINITION
CL = SPRITE COLOUR

The above variables should be self explanatory as they go to control the background inset screens. The screens are created with a sprite editor and are in multicolour mode. This allows for you to add your own graphics or manipulate those already included in the program. If you do decide to add your own sprite designs, the minimum definition number you can use is 144, the maximum 192. Your program will become corrupted if you stray from those margins.

The Basic demo program should help you understand the manipulation of the inset screen.



Disk Dungeons

DEMON'S WINTER

With the recent proliferation in role-playing games, SSI has lost its early lead in this field, as games such as the *Ultima* series and *Bard's Tale* have appeared on the scene. Their latest title is *Demon's Winter*, and it's interesting to see how the authors have attempted to catch up with the opposition.

Your quest is initially uncertain, and it doesn't take many brain cells to work out that you will not be forever fighting off hordes of kobolds. Soon you start to pick up rumours about a demon called Malifon who has been trapped deep within a volcano. Even though he is physically imprisoned, he is still able to unleash some of his mental powers, and he managed to draw the world into a deep winter.

His minions are under instructions to free him as soon as possible. Naturally, it's up to you and your party to stop this sequence of events. The game is based on the terrain found in the Shard of Spring, although this game is some 32 times larger!

There are five different races for you to choose from, including dark elf and troll and a total of ten different classes. These include the unusual visionary and scholar, but I suspect that most parties will still be made up of the usual mix of fighters and magic users.

As each character is generated, so attributes are rolled for speed, strength, intellect, endurance and skill. You have a limited opportunity to improve any of these figures deemed to be too low. Speed determines how far you can move and attack in combat whereas your intellect dictates how many skills you can learn.

Skills are an integral part of the game. At the beginning, each character is allowed to learn two skills free of charge. Thereafter, you must find the appropriate college and pay in order to be trained. The skills fall into six main groups. Weapons skills are obviously vital for fighters, but there are other combat skills as well, such as studying tactics, fencing, berserking and kung

fu.

Most spells fall into the rune magic category, and you can learn from fire, metal, wind, ice and spirit runes, all of which contain a series of spells. The last mentioned is probably the most useful initially, as it contains all the healing spells. In addition, sorcerers can learn from illusion, summoning and possession chants.

Visionary skills allow you to 'see' things that would otherwise be hidden from you, such as what's in a room or whether a merchant is lying. Four types of Lore allow you to identify weapons, potions, items and monsters.

Finally, there are all the other skills loosely lumped together under miscellaneous. These include detecting and disarming traps, hunting and priesthood. This involves an element I have not previously come across in RPGs, whereupon each character with this skill chooses a deity that he will worship. He is then able to appeal to his god for help throughout the course of the game, with a basic 20 per cent chance of success. The different gods might be able to resurrect a fallen comrade, or grant you temporary super-strength or magical ability.

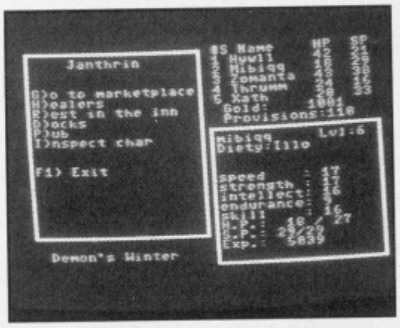
The game features a full range of terrains, although these appear to have minimal effect, save that of varying the type of monster met. You will certainly have to buy a boat at some stage to explore the many islands other than that on which you start.

As night falls, so your vision is restricted and eventually, you will need to set up camp. Here, you will be able to sleep and so regain some of your spent magical power and heal the odd wound. It matters not where you camp, you'll never be disturbed in the night.

Combat only occurs during the hours of daylight. Each character can move round the battle scene at will, or at least as far as his movement points allow. Every action – turning round, walking, attacking, dodging and spell-casting – uses up some of your points. If you're standing next to an opponent, you'll be able to get in several blows in the same combat round.

I felt that the magic system didn't quite work. For one thing, my wizards performed reasonably well in combat armed with only a dagger. Secondly, the system is very cumbersome to use. You must type the name of each spell to be used in full, decide how many spell points you want to use and then decide where to target it. Has nobody at SSI heard of menus, or could they not at least have abbreviated the spell names?

This feeling of user-unfriendliness pervades throughout the game. Presentation has never been one of SSI's strong points, and I can't help but feel that this is going to cost them a lot of sales over a period of time. The graphics are extremely crude, the alternative character set barely legible, even using a monitor, and the game is littered with spelling mistakes, something for which there is no excuse whatsoever and which suggests carelessness throughout the rest of the programming. The manual too could do with a re-write. C64 owners should not have to read the Apple section in order to find out how to get going. You will have to back up the disks using your own copying utility, something SSI do not bother to tell you.



This is a strange game. It contains a lot of ideas that are new and interesting, but the presentation puts you off straight away. For anyone bothered to persevere with *Demon's Winter*, there is actually a decent game waiting to get out but, oh boy, it's a struggle!

At a glance
Title: Demon's Winter
Supplier: SSI via US Gold
Price: £19.99 (disk)

TIME THIEF

It seems only a short while since I confidently predicted the demise of the text-only adventure and now to make me look a fool once again, one has arrived on my desk. The game is called *Time Thief*, produced by a company new to me called Big Sky Software, and it's currently only available through mail order.

The story is somewhat complex. Kedrigern, the arch wizard, has got a nice little racket going for himself. Realising that not too many people are willing to grow old gracefully, he has been selling holidays in a concern known as Time Share Travel through which the customers can trade in some of their later years in exchange for a dream holiday now.

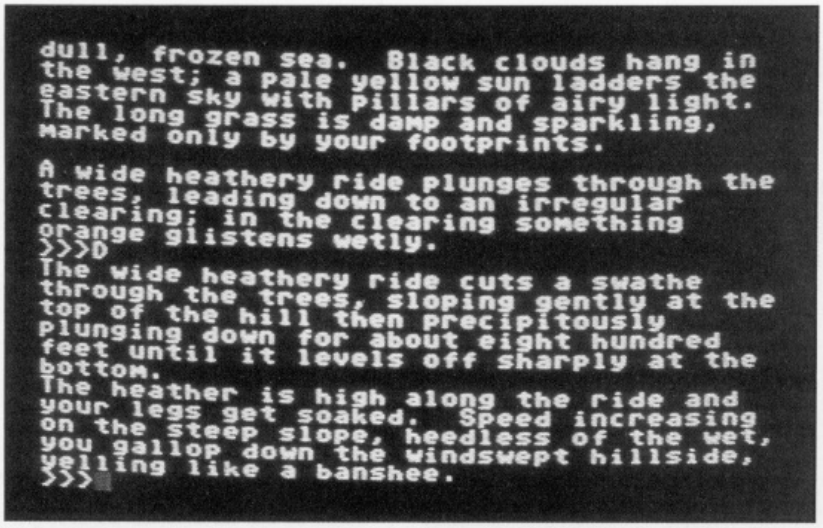
Unfortunately, due to a few minor problems with the space time continuum it is not possible to use up your own years in this fashion – you have to borrow somebody else's, and this involves some swapping and good will, all of which Kedrigern has managed successfully so far.

Some of the other wizards though have been getting a trifle upset with our 'hero' for the simple reason that he is keeping all the money for himself and refusing to grant franchises allowing them to profit also from the scheme. It is at this stage that things start to go wrong. People are returning from their holidays horribly aged or even dead.

Obviously, someone is deliberately sabotaging the system, but who? Kedrigern sends his faithful assistant Jocasta to investigate but she soon vanishes without trace and so it is up to you, Jocasta's twin, to see if you can sort out what is going on.

The game loads in two separate sections subtitled Shadows and Light and Ironhand. The text has been compressed by about 60% in order to avoid any further disk accessing during the game. There is plenty to read with quite a few of the location descriptions running to more than one screen full of prose. The parser is fairly simple but perfectly adequate and I didn't come across any problems with the vocabulary either. Other features include saving to RAM and an 'oops' command.

The descriptions are well written even if the author does seem to take particular pleasure in describing every tree! Couple that with a most imaginative story, some interesting problems and a nice line in humour and you have a game that should give a lot of pleasure to text fans. Certainly the graphics aren't missed at all. At only five pounds including p and p (UK only – add 60p for Europe and £1.00 for rest of world), *Time Thief* is definitely a bargain.



At a glance
Title: Time Thief
Supplier: Big Sky Brothers, 35 Old Evanton Road, Dingwall, Ross IV15 9RB
Price: £5.00

DUNGEONS AND DRAGONS POOL OF RADIANCE – the solution continued

The Wealthy area and Temple of Bane

Before going to this area, pay a visit to Bishop Braccio in Phaln where he will lend you the services of one of his own clerics to help clear these two areas.

In the wealthy area, free the goblins to get a clue but don't bother with the one from the orc jail. There is quite a bit of treasure hidden in the central areas. One of your characters should pick up a leather holy symbol as this will fool the blind orc who guards the entrance to the temple. Once in the temple, defile the alter, fight all the orcs that attack you and then search the temple carefully for treasure. There are three separate hordes stashed away here.

Kovel Mansion

This area is full of thieves and traps. Expect to get ambushed frequently. Always move round in search mode and, if you want your own thief to have a go at disarming the traps, make sure that he is wearing nothing heavier than leather armour.

When two thieves try to run away from you, follow them. When they split, go straight on. This will take you to a large party of thieves including the leader. In order to gain your reward from the town council, this area must be entirely cleared of thieves. There are two lots of information and one horde of loot to be found.

The Wilderness

Now is a good time to strike out into the wilderness. Avoid Sorcerers' Island for the time being– this is the area of the game that gave me most trouble. Start off in the Western Wilderness but head north and slightly west to find the Silver Dragon's Lair. Do not attack him but talk to him. He will give you information about an object that you will find in the Kobold's lair.

Strike out east until just north of the forest when you come across the Nomad's camp. Your instructions here are just to deal with the problem and you can do this in one of two ways. Either attack the nomads straight off or parlay with them and help them defend their camp against the kobolds. This latter option appears best.

Wait in your hut until you are summoned to a feast. Agree to help and then wait again until you are attacked. There are three waves of kobolds to deal with. After defeating the last of them, go with the chief to deal with the remaining kobolds in order to gain an extra reward. The nomads will now behave themselves so you can return to Phlan for your next commission.

The Kobold Caves

These are located in the eastern wilderness, on the east of the forest and north of the river. There are two entrances. The small one leads to the kobolds' cave, the large one to the wyvern's lair, although both complexes are linked. The small size of the caves will reduce your combat ability and also there are plenty of traps laid. The easiest way to explore the caves is to follow one wall ie treat the complex as a maze.

Several of the kobolds will help you. Give water to the crippled soldier to hear his story and follow the drunken one in order to meet the king. In the top left hand corner of the caves, Princess Fatima will join your cause. The main battle will be when you get to the throne room where three waves of kobolds, trolls and boars interspersed with flying rocks from catapults will assault you.

Battle past the king's guards to discover the truth about the king. Search the treasure room to find the efreeti bottle. Do not lie to him or he will attack you. He will, however, help you out when you fight the vampire in the graveyard.

The Lizardmen

Situated north east of the kobolds, there is not much to do here. The keep is ruined and there are several entrances to the catacombs below. Wander round kiling the guards before you explore the pools of water, otherwise it is dangerous to swim. Alternatively, if you have rescued the lizardmen from the Sorcerer's Isle, you can give the password to the chief who will then invite one of your part to fight a duel on his behalf. Win that and the chief will promise that his tribe will behave in future.

To be continued.

If you have any comments about anything to do with the Disk Dungeon column, please feel free to write in and air your opinions. We would love to hear from you.

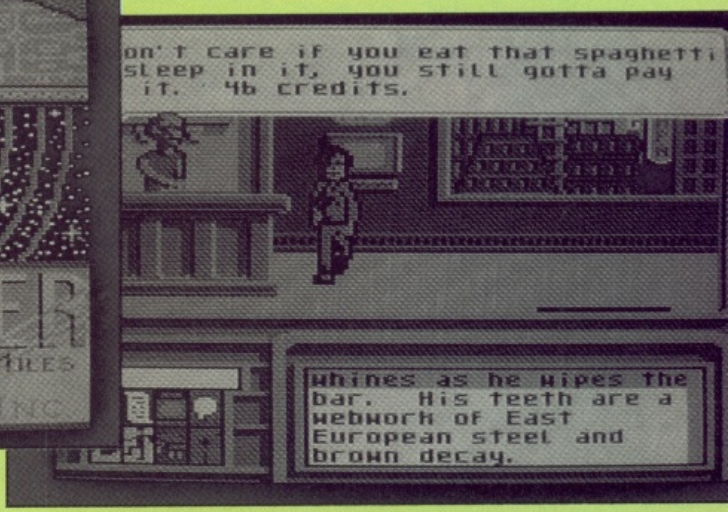
We are still looking for hints and tips for *Ultima V.* Send any solutions to me, Gordon Hamlett, at *Commodore Disk User* and I will try to organise a suitable reward for the best of them.

Neuromancer

William Gibson's seminal novel, *Neuromancer*, took the science fiction world by storm many years back. Blending futurism with fast-talking street action, huge helpings of bizarre electronics, and the odd dollop of designer chic, it set a field noted, paradoxically, for its conservativeness, on fire, and single-handedly created the category of Cyberpunk for itself and others of its genre.

Will the game create the same stir in software circles? The credits on the box certainly look impressive. Devo (remember them) have provided a sound-track, help and inspiration are credited to Timothy Leary (remember... well, probably not) and Interplay, the authors are a solid and well-established bunch.

At which point I usually sit down in front of the game and find that it totally fails to deliver. Not this time. *Neuromancer* is a generous witches' brew of a game, combining adventure with the ultimate promise of arcade action in a way I haven't seen before. You start the game as a 'cyberspace jockey' – the ultimate hacker – down on your luck in one of the seedier areas of Chiba City, which is not the most unseedy of towns. Using your skills, however, you can gain access to private and corporate databases and, well, rip them off. To do this you neeed equipment and money for communications time, so you need to hoard your meagre resources as best you can to start with. Of course, if you really start to go broke, you can sell various parts of your body for ready cash, but you wouldn't want to do that, would you?



Controlling the game is done by using a series of icons at the lower left. These enable you to walk, talk, access new software skills, and more. The main part of the screen shows the room you're in, plus any people present.

People can be found at certain locations in Chiba City, and these can adopt any shade of attitude, from helpful to utterly obstructive. Making deals with them is essential, but it's also helpful to question them carefully, for this game is above all, about the exchange of information.

Dialogue is a matter of multiple-choice. In a speech bubble above your character's head, you can flick through a number of options using the joystick. When you've chosen one, you either get a helpful answer, or not, in which case you're likely to start the same procedure again. It's all a bit reminiscent of Arnie's method of choosing dialogue options in *The Terminator*.

The vital thing is to keep upgrading the hardware and software available to you. Jockeys use something known as a 'cyberspace deck', not merely to hack into databases, but to create the visual analogy of a 3-D world in the machine – 'cyberspace'. Not all decks have this capability. In addition, you'll need at least Comlink 6.0 to get in at the Cyberspace level – you start the game with only Comlink 1.0 available.

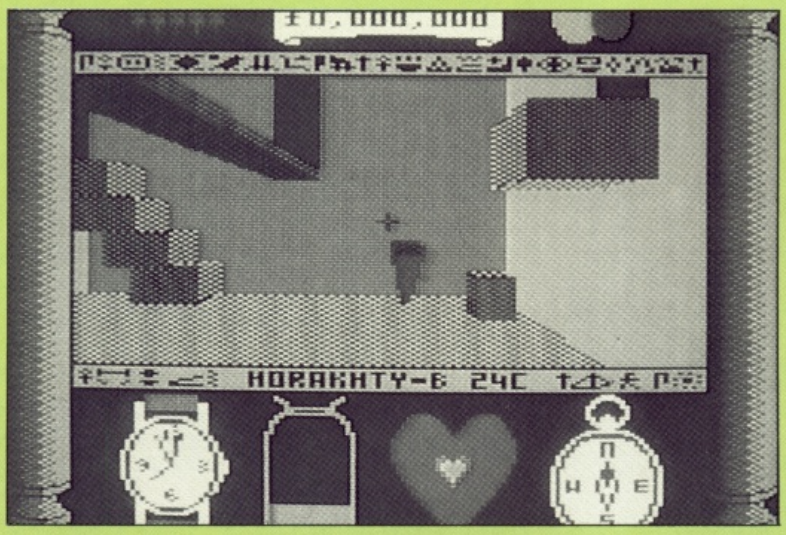
So there's a long run ahead before savouring the ultimate joys of Cyberspace. In the meantime, you can build up your stocks of specialist software, skill chips (these latter slot straight into your nervous system) and spondulicks.

I can't therefore tell you what Cyberspace is like, not having been that far, but from the shots I've seen, it employs a 3-D system very much along the lines of CRL's routines in *Tau Ceti*, that is sprite-based, as opposed to vector graphics.

Never mind though – the first part of *Neuromancer* is absorbing enough to keep you occupied. The number of gameplay options is vast, and the idea of holding out the carrot of cyberspace means that a lot of people will be playing this one for a long time. Highly recommended. **FF**

At a Glance

Title: Neuromancer
Supplier: Interplay/Electronic Arts, Langley Business Centre, 11-49 Station Rd, Langley, Berks SL3 7YN
Tel: (0753) 49442
Price: £16.95
Graphics: Horribly real
Sound: Devo are there, but a little hard to spot.
Gameplay: Smooth
Addictiveness: Stayed jacked in so long, I nearly flatlined.



Total Eclipse

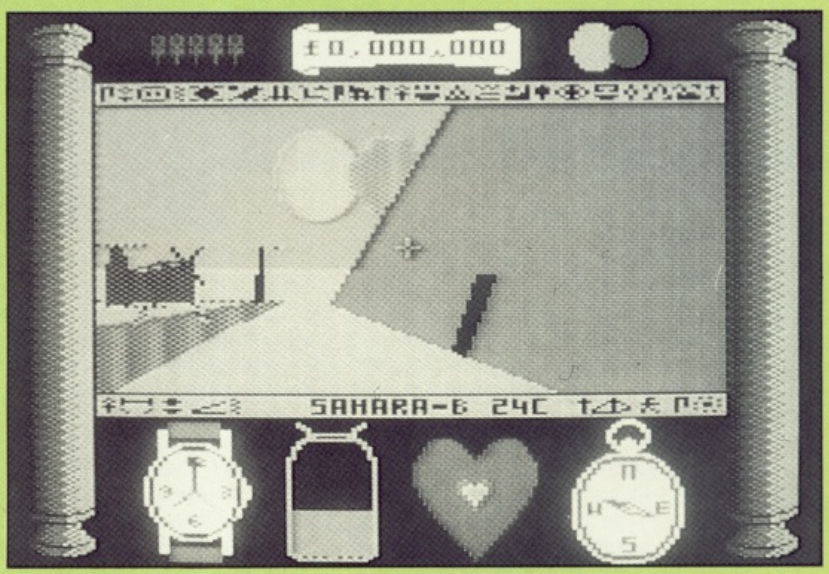
This is the successor to Incentive's last soft-solid game *Driller*. *Total Eclipse* uses the same modelling system, *Freescape*, but this time, instead of the space scenario, we are faced with a problem worthy of Indiana Jones. the time is the 26th October 1930, and the occurence of a total solar eclipse is about to bring about the total destruction of the world, due to the curse of Re, which specifies that if anything should block the sun's rays during daylight, the world will be destroyed. Pretty silly scenario, actually, considering the hundreds of total eclipses that have been visible from Egypt sine the time of the Pharaohs.

It's not relevant to the worthiness of this game, but I can't resist being a smart aleck and pointing out that although there was a total eclipse in October 1930, it took place between the 21st and 22nd and was invisible from Egypt. Yah boo!

After that, I'd better say very quickly that I liked this one. I felt very scathing about *Driller*, since I don't feel that the poor old C64 is up to Incentive's 3D ambitions. As a parenthesis, I feel this is borne out by looking at *Driller* on the Amiga, on which it makes a good and workable game.

Eclipse, though, has a much more adventure-gamey feel than *Driller* as such, the slowness of *Freescape* on an 8-bit machine is not so bothersome.

Nonetheless, the game is still very much a race against time. You have to collect objects from the rooms inside the pyramid, hoping that some of them will enable you to get to and destroy the shrine of Re, and save the world. All the time, however, the eclipse is moving towards totality, so you must keep an eye on the watch. On top of this, you only have a finite supply of water, and troughs must be found to fill your canteen, lest you expire of thirst.



Of course, it couldn't just be that simple. you also have to look out for your heart. Overexertion may cause your ticker to beat too fast, threatening a coronary. Not eating chip butties won't help - you have to take a rest when this happens, wasting valuable time.

The slowness of 8-bit *Freescape* is still a bit annoying, but when all's said and done, this game has a lot of atmosphere, right down to the Egyptian background music. Keep going, Incentive - you're getting there. **FF**

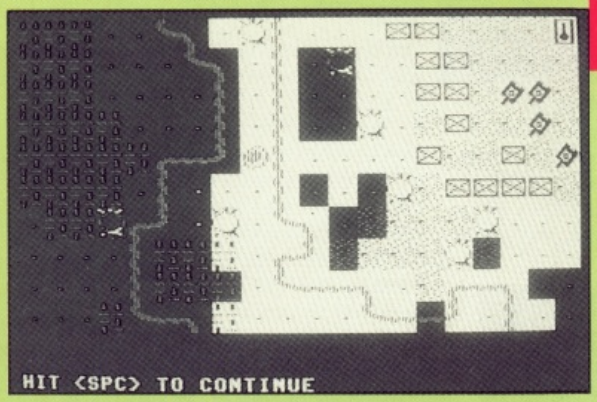
At a glance

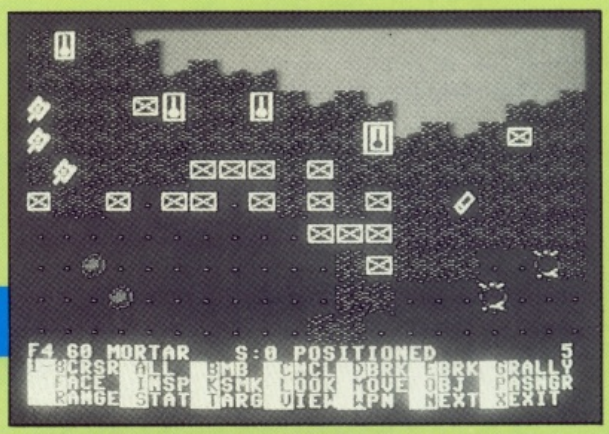
Title: Total Eclipse
Supplier: Incentive Software
Graphics: Looks great, but it's so slow.
Sound: Nice atmospheric music
Playability: Easy to get the hang of, but once again, speed is the problem.
Addictiveness: This one's got it

Typhoon of Steel

This is the successor to SSI's very worthy *Panzer Strike*, released early last year. *Panzer Strike* was a tactical Second World Wargame, and this is no different, but whereas the former game concentrated on armoured and mobile infantry battles in the Western desert, Europe and Russia, *Typhoon* goes east to cover the Pacific plus the fighting between Commonwealth and Japanese forces in Burma and Malaya. Europe is also included on this disk, however, with present scenarios covering the D-Day landings and the Battle of the Bulge.

Typhoon is a map-based wargame, with the rather Apple II-ish format that SSI has made its own. It comes on two double-sided disks. Three of these sides contain details of the Pacific, European and Asian games, while the fourth side contains additonal scenario details.





Although the graphics may look primitive, however, the programming is anything but. Unit details are specified right down to individual weapons and rounds of ammunition, and units have varying mobilities, levels of experience, fire control and more. Even more distinctive is the level of command and control involved in playing. A unit can only receive an order if it has a radio, or is in close range of its headquarters. This makes the game annoying at times, but adds an extra air of realism that makes up for a lot.

Adding to the fog of war, units have limited visibility too. They can only see a limited distance into forests, and cannot see over hills or through buildings. There is also a limit on visibility range depending on weather. This makes clever use of terrain and cover essential to winning.

Having said that, *Typhoon of Steel* suffers from the usual SSI shortcomings. The most important of these is the fact that the company still doesn't seem to realise that the C64 has a joystick port. I am all for providing key options for war game commands - experienced players prefer them - but when it comes to things like 'walking' around the map to check out the current tactical situation, you can't beat a joystick. Instead, SSI have a clumsy system of using the numeric keys to move the map cursor.

Although SSI games of this sort are clumsy to control, they do have some excellent aspects. One of the best ideas is the 'Campaign' game. the program sets up a series of battles for you during which you get to keep the same fighting command. Naturally your men (should they survive) increase their combat experience and get to upgrade to better equipment when this becomes available in the course of the war.

Equipment upgrades caused no problem in the armour-intensive theatres of *Panzer Strike*, but do cause a fair amount of hassle in this game. Transferring an American armoured unit from Europe, where it had to have the strength to come up against Tigers and Panthers, to the Pacific, just doesn't work if the unit is very powerful. Japanese tanks were probably the worst in the world, and the Pacific War was mostly a war of infantry. This unfortunately means that you have to start with less powerful units, or downgrade them before shipping the boys east. It's an asymmetry that makes a *Typhoon* campaign games a little less alluring than its predecessor's.

That aaprt, this is great value for money. Eight pre-defined scenarios, computer-generated campaign games, plus the ability to design your own set-ups right down to individual unit weaponry - it can't be bad. no one matches SSI for their tactical warfare simulations, although I feel it's fair to say that the Australian SSG has now outstripped them when it comes to grand strategy games. **FF**

At a Glance

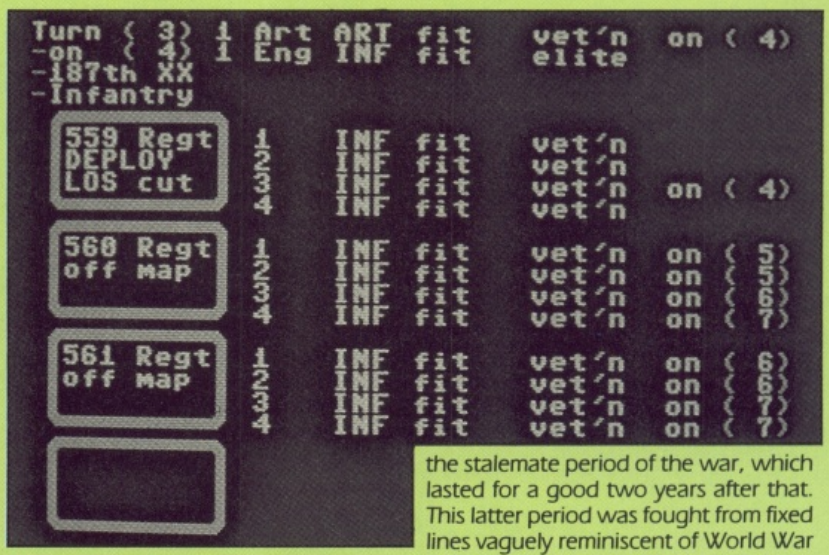
Title: Typhoon of Steel
Supplier: SSI/US Gold, Unit 2 and 3 Halford Way, Halford, Birmingham B6 7AX
Tel: 021-356 3388
Graphics: Look great on an Apple II, I guess...
Sound: Rat-tat-tat, bang!
Playability: Could do with some joystick control
Addictiveness: A very hard game to exhaust

McArthur's War

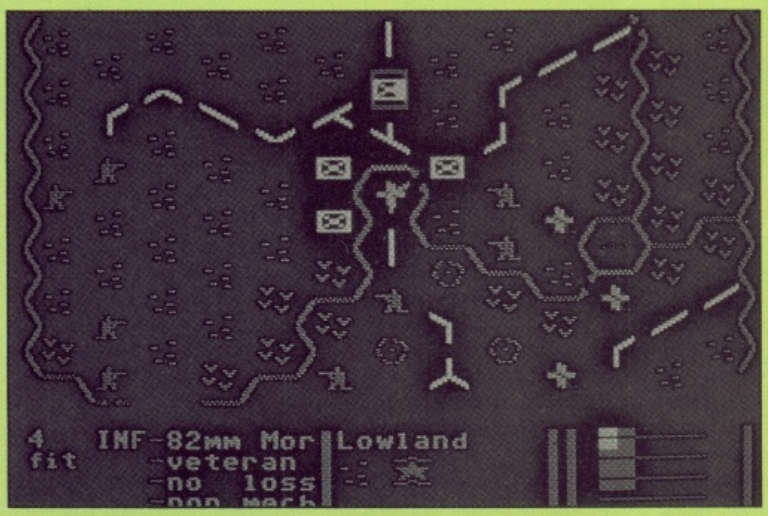
This year has seen a huge upsurge of interest in the 'Forgotten War'. A TV Series, a number of books, and now, the computer software – SSG has produced the first ever Korean War computer simulation.

Nobody's quite sure why Korea became so readily forgotten from the sixties onward. It wasn't a small conflict – possibly two million combatants lost their lives. It was dramatic – the armies of two great powers confronted each other on the battlefield for the first and only time in the post-war world. Finally, it was a war of movement, with enormous swings back and forth across the war-torn countryside.

In truth, Korea was largely overshadowed by Vietnam, to the point where a film like M*A*S*H, ostensibly about Korea, was really about Vietnam. Vietnam, however, has never lent itself to computer simulation. Apart from the final victory of the NVA, there were no large-scale setpiece battles – it just wasn't that kind of war.



So SSG have been able to do a very convincing job. Computers are always best at simulating wars of movement, and these also make the most the most exciting games. SSG has taken eight set-piece encounters, from the initial invasion of the South to the stand of the British 29th Brigade at Imjin which broke the back of the Chinese 63rd Army, although at great cost to the defenders. Wisely, they have ignored the stalemate period of the war, which lasted for a good two years after that. This latter period was fought from fixed lines vaguely reminiscent of World War I, and, although bloody enough, resulted in no decisive encounters.



Korea, on the other hand, was quite different. Much of the terrain is barren and mountainous, not lending itself to guerilla warfare, as in Vietnam. Also, although Korea foreshadowed Vietnam, in that the massed technology and firepower of the US and Allies confronted the Chinese and North Koreans largely dependent on their large resources of manpower, the disparity was never as great as in the later conflict. The initial push into the South was by long columns of North Korean T34 tanks – the South had no tanks at all at the start.

For the purposes of Korea, SSG have employed their modern warfare system. Combat is as ever in phases, movement followed by combat. Supply, however, has become important, and a unit's fighting strength can be sapped by being enveloped by the enemy.

The usual SSG strengths are here – an accent on command and control, so that you cannot guarantee that orders will get through, plus their excellent authoring systems, Warplan and Warpaint. Using these, you can modify each of the battles to your own liking, and the well-designed manual suggests scenario variants that you can set up based on plausible, but different, historical assumptions.

As usual, a high quality colour map of the battlegrounds is also included, together with some useful crib cards for those who may get lost in the web of control menus.

MacArthur's War is a thoroughly professional product, marred by nothing. What can anyone say to eight wargames on one disk, first-class documentation, plus a powerful authoring system thrown in for free. A must for your computer wargame collection. **FF**

Title: MacArthur's War – Battles for Korea
Supplier: SSG/Langley Business Centre, 11-49 Station Road, Langley, Berks SL3 7YN.
Tel: (0753) 49442
Price: £18.95
Graphics: Real hexes — SSI, eat your heart out!
Sound: Beeps etc.
Gameplay: Takes a little mastering, but there are a lot of options.
Addictiveness: Set aside a month or two

Deciphering Code

The 6510+ Assembler has many advanced features but first you need to know how to use it

By Eric Doyle

It's funny how things can change between one issue and the next. There was I, wondering how to make hexadecimal simple and toying with the possibility of writing my own monitor or assembler, when, suddenly, there it was on the schedule – the 6510+ Assembler. "This needs supporting," I thought. So here is a start to programming in assembler.

What Is It?

An assembler is a language which makes writing code almost as easy as writing in Basic. It is a simple language to master but the commands are not so easily understood as those in Basic.

Assembler codes are mnemonics which give a clue to the meaning of the command. The most common is LDA (LoaD the Accumulator).

The accumulator is a special 8-bit memory location inside the 6510 chip which is the only place within the computer where true mathematical operations can be performed. It may be one of several registers in the 6510 but all of the other others can merely increment or decrement their contents. In other words, the A register is the business centre at the heart of the microprocessor.

Loading a value means that something can then be done with it, even if it is just to move the value back out into another memory location. For example, to poke an asterisk to the top, left-hand corner of the screen, it must have its screen poke value loaded into the accumulator and then stored in location 1024, the first screen location:

```
LDA # 42
STA 1024
RTS
```

The hash sign in the first command means that the accumulator is loaded with the value 42, the screenpoke for an asterisk. If the hash was omitted, it would be the contents of memory location 42 which would be loaded in.

This value is then copied to screen location 1024 using a STA (STore the Accumulator) command. Notice the lack of a hash sign, therefore it is a memory address. Finally, RTS (ReTurn from Subroutine) hands back control to Basic.

To convert this in 6510+ Assembler language, the mnemonics would be set against line numbers and an extra command would have to be added.

```
10 *=49152
20 LDA # 42
30 STA 1024
40 RTS
```

Line 10 tells the assembler where to place the program in memory. Locations between 49152 and 53247 are always good places to position code for testing.

Once written, the source code can be stored using a normal SAVE command.

Next the word ASSEMBLE is typed in and, on pressing RETURN, the screen indicates when all three passes of the assembler have been made and then prints the start and end addresses of the actual code, in hexadecimal. Don't worry if you don't understand hex, simply note down the values as written to the screen, $C000 and $C006.

The program can now be saved via the monitor. It is initialised with the MONITOR command and this displays the current register values. The monitor command for saving the program that has just been assembled into code is:

```
.S"SCREEN POKE", 08, C000, C006
```

As can be seen, the save command and program name is followed by the device number and then the two values which were given on completion of the assembly.

After saving comes the testing. Clear the screen and, with the cursor in the HOME position, enter SYS 49152. An asterisk should appear in place of the first 'S' of SYS.

Using the Registers

In addition to the accumulator, the other 'active' registers are called X and Y. These are almost as flexible as the A register but have no commands for arithmetic operations other than DEY (DEX) or INY (INX) to increase or decrease a register by one.

X and Y are useful because they can be used to index the A register:

```
STA 1024,X
```

This would poke the current value in A into a location derived from 1024 plus the contents of the X register:

```
10 *=49152
20 LDA # 42
30 LDX # 40
40 STA 1024,X
50 RTS
```

This program would poke the asterisk into location 1064 (1024 + X) but this is only a small role that X or Y can play. By continually increasing the indexing register, a series of asterisks can be placed into position:

```
LDA # 42
LDY # 0
STA 1024,Y
INY
```

At this point the program hits a problem, how do we get back to STA with the new value in Y? In Basic, a similar situation would be called a loop which would use the keyword NEXT to increase the value. In code there is no such convenience.

Instead, the last operation performed can be tested by specific branch commands. These tests relate to the last register's relationship to zero:

```
BEQ (Branch if EQual)
BNE (Branch Not Equal)
```

There are several more branch commands but these are the only two that concern us for the moment.

Before deciding which of these commands is the most suitable, it is necessary to consider the method that the assembler uses to signify which line of the listing the branch loops back to.

Design Labels

In Basic, a GOTO would need a line number for it to work at all. When renumbering a program, all of the GOTO jumps have to be changed which makes the program unnecessarily complicated. 6510+ uses a method, called labelling, which has proved to be far better and has been employed in assemblers and certain advanced Basic's for many years.

The line to which the branch is to be made has a label attached to it and the branch refers to the label rather than the line number:

```
10 LDA # 42
20 LDY # 0
30 SCREENLOOP STA 1024,Y
40 INY
50 BNE SCREENLOOP
60 RTS
```

The advantage is that a renumber may change the line number but the label will stay in the same relative position.

When the Y register is increased, the computer checks to see if the value has gone beyond 255 (or reached zero again, to put it another way). If this is not the case, the program jumps back to the corresponding label but the program finally stops when Y eventually reaches zero.

The effect is to produce 256 asterisks on the screen but what if you only want a single row?

Limiting Loops

The A, X or Y register can always be checked by the CMP, CPX or CPY commands. If, for example, it was desirable only to have a single row of asterisks then the program could be changed by adding:

```
45 CPY # 40
```

When Y reaches this value the BNE will detect the fact and asterisk production will cease.

Try playing around with the values to see what effects you can create. Be careful to save everything that you write before using it because a wrong move with a coded program can be fatal. If you've never seen a computer crash before, you probably soon will!

TYPIT-128 (continued from p.18)

from one place into another, you will need to add the blank lines at the place required and then copy the block to the new space. If you are moving a block rather than copying it, you will then need to delete the lines that have been copied. This all sounds tedious, but it makes it easy to perform copy, insert and block move alterations, relatively safely. Save new work on a disk before you start any 'cut and paste' selected individually, or they can be scanned in turn using key N at the end of each page. I have put as much detail as possible, without making them too cumbersome to be of real help.

A good introduction to TYPIT-128 would be to making your own help pages on disk files that could be merged with your work and then deleted when you know how to move on with confidence.

TYPIT-128 is a complex program composed in BASIC and runs slowly in some modes. I am sending the BASIC and SUPERSOFT BLITZ-128 compiled versions to the editor. Compiled TYPIT-128 runs very much faster, but takes up more space on the disk. If you get the slower BASIC version, you've got a well structure program to look at, but invest in a BLITZ-128 if you don't have one. We've provided a flow chart to guide you through TYPIT-128.
tricks, just in case it turns out wrong. I'm sure that you will enjoy using these facilities. One small point to remember. If you create blank lines in the middle of your work, they can be written on using the edit or copy mode.

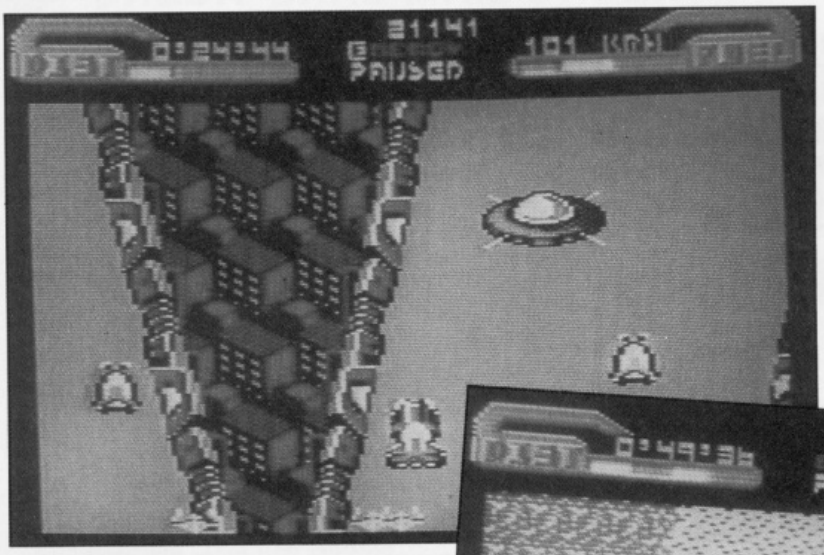
On the Screen

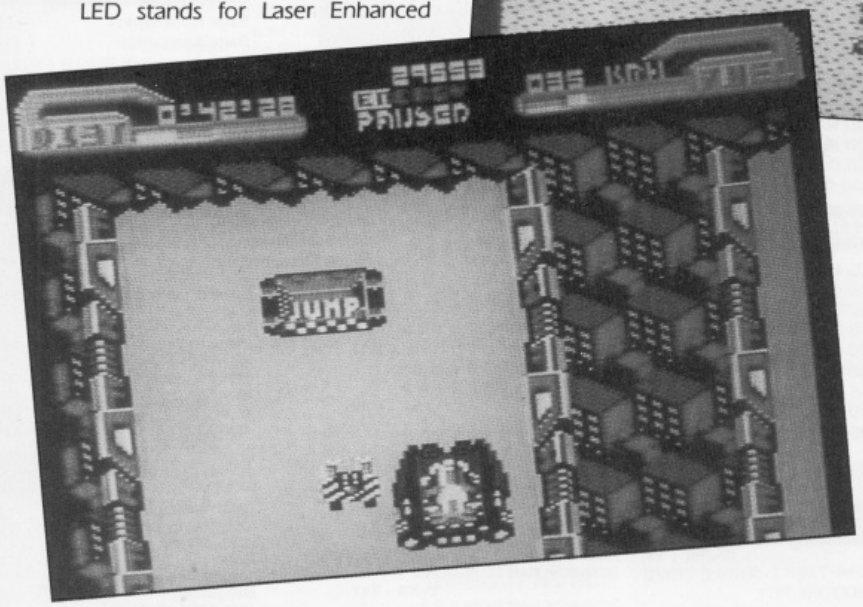
Before printing your work, you may wish to check it on the screen. TYPIT-128 has two modes to help you. Both are entered from menu mode, Review mode with key R and Vide mode with key V. Review mode displays the full line, wrapped around if it is longer than 80 characters, together with printer control codes for the start and end of the line. The lines are displayed one at a time using the cursor keys, starting with line one. The cursor up and down keys will display the next or previous line, and the cursor left and right keys jump ten lines at a time to move faster towards a chosen line. Key M returns you to menu mode, but key E can take you direc to editing mode. If you do not enter a line number to be edited, the last line that was reviewed will be presented for editing.

View mode views your work by displaying a 77 column, 24 row window of your work. The window can be moved around your work, so that you can see how it will appear before you print it. The cursor keys move the window in small increments, and the window can be moved U(p), D(own,), L(eft), R(ight) T(op), B(ottom) and S(ide) in larger steps with the appropriate key. To move into the menu or edit mode, you can use key M or E. Both view and review modes show features such as underlining, reverse field, double strike (shadow) and double width printing appropriate to the printer type chosen.

Help Pages

There are some help pages to help you when you lose your magazine and can't remember how to use TYPIT-128. A help screen menu is entered by pressing key H in menu mode.





LED Storm

The trouble with most racing games is that they concentrate too much on the technical aspect of the sport at the expense of the fun. Change gear... now! Take this corner at exactly 3800 revs then accelerate away etc etc. Not so with LED Storm from Capcom, a conversion from the arcade original.

LED stands for Laser Enhanced Destruction for reasons that entirely escape me as there are no lasers within the game but still, what's in a name. The game follows a familiar format. Complete a section of the course and you get to try your luck in the next of the nine stages. Run out of energy prematurely and it is game over time.

Where LED Storm departs somewhat from the usual run of the mill car racing game is in the nature of the hazards that you have to face. Can you imagine Murray Walker commentating on Nigel Mansell trying to shake off a particularly bad attack of manic frogs?

Then there are the lorries carrying TNT to be avoided, mines parachuting down, and computer controlled cars hell bent on your destruction.

Just when you think that you have got the hang of all this, the road disappears. Not disappears as in fading out into desert or similar but disappears as in you have to drive over a bridge that has long since collapsed. Carefully timed jumps off ramps are necessary here and bouncing your car is also an effective way of squashing the opposition.

All this driving requires careful management of your fuel resources and you have to leap up to collect floating energy capsules dropped from friendly passing flying saucers or run over gasoline containers lying in the road. You can also render yourself temporarily invulnerable and collect bonus points this way.

Extremely silly it may be but LED Storm is also highly addictive. If nothing else, it's great practice for the next time you're trying to get to grips with the M25.

At a glance

Title: LED Storm
Supplier: Capcom/US Gold
Price: £14.99
Graphics: A bit fuzzy but some excellent scrolling
Sound: Very good
Playability: Just one more go
Addictiveness: First class

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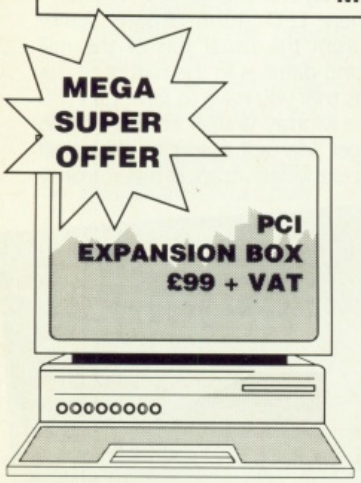

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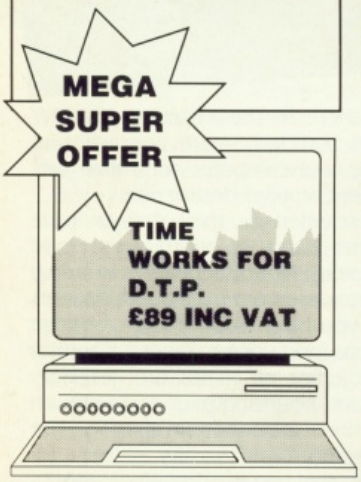

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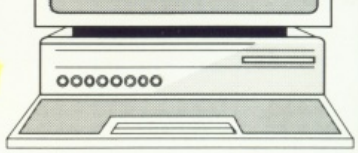

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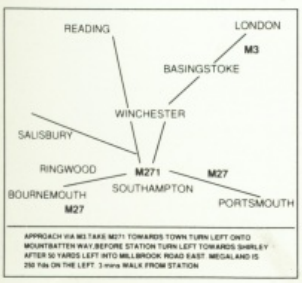

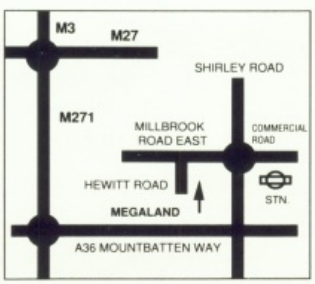

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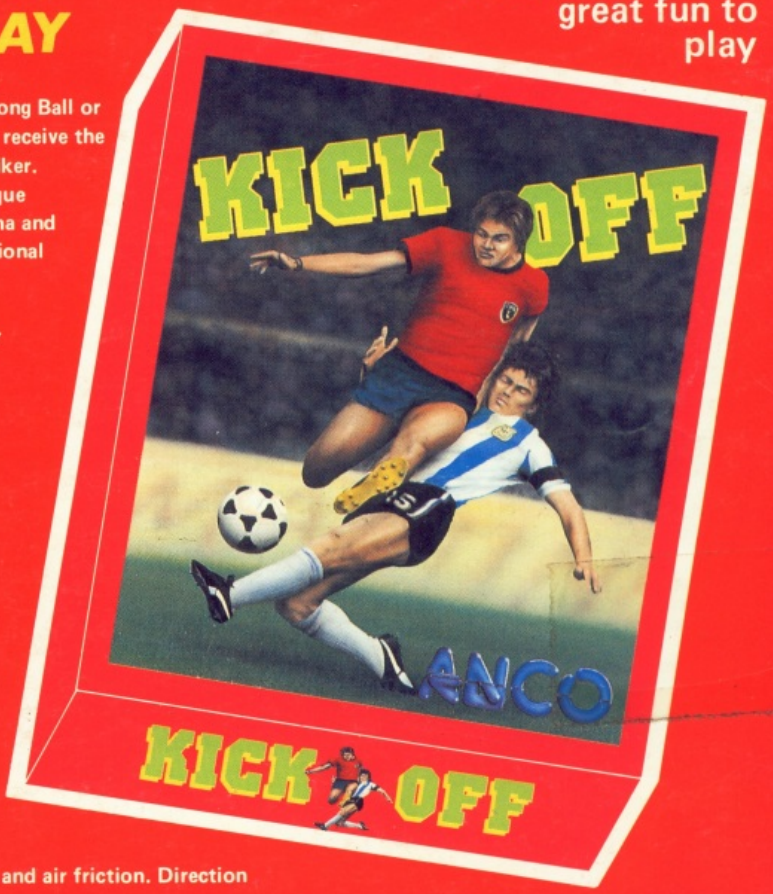

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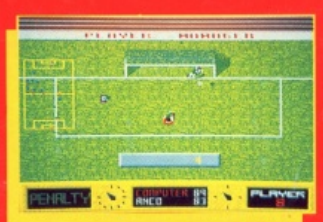
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