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● LOGOTRON 1295 - WORDPROCESSOR, DATABASE AND SPREAD-SHEET REVIEWED ● DISK MENUS FOR PLUS/4 OWNERS ● KERNAL II - NEW OPERATING SYSTEM FOR THE C64

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1985



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Your Commodore incorporating Your 64 is a monthly magazine appearing on the first Friday of each month. Your design is published every second month within the pages of Your Commodore. Argus Specialist Publications Limited Editorial & Advertisement Office, Your Commodore, No 1 Golden Square, London W1R 9AB. Telephone: 01-477 0830 Telex: 604 2854.

Subscription rates upon application to Your Commodore Subscriptions Department, Inland Ltd, 5 River Park Estate, Deventham, Berks, HP4 1PL.

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Burning ambitions	●	●		
NOW Blow	●	●		
The Video Title Shop	●	●		
Bulletin Boards	●	●	●	●
Data Statements	●	●	●	●
Contributions	●	●	●	●
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• Back Page	●	●	●
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• Kernel II	●	●	
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VOLUME 4
NUMBER 2

ARGUS
PRESS
GROUP



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DATA STATEMENTS

Prepare for the Cold with U.S. Gold

Here I say it, but Christmas is not far away and U.S. Gold has come up with an impressive preview list once again.

Charlie Chaplin enables you to become a silent movie director and produce the world's greatest slapstick comedian in an epic production. Choose your script, get your props together and you're ready for ACTION. A score comprised of an adventure, and if you like it, you can go onto the next scene. The real test however is the audience reaction to the final version, which in the long run will govern your earnings - will better be good! Available on the C64.

Following the success of *Infiltrator*, *Antivator II - The Next Day* is now in the pipeline. *Antivator* embarks on three entirely new missions to save the world from the clutches of Mad Leader. The missions include neutralising a deadly nerve gas compound, destruction of the enemy's supply of classified neutron bombs and a final desperate confrontation with the Mad Leader himself.

Antivator II and *Charlie II* coming soon

Antivator II will be available on C64 priced at £4.99 (ret) and £9.99 (disk) or including *Infiltrator II* for £9.99 (ret) and £14.99 (disk).

For all you *Gamelet II* fans, prepare yourself for *Gamelet II*. Choose your original *Gamelet* character and come up against new creatures such as the fire-breathing dragon and the IT creature.

Fight your way through the complex mazes, keeping an eye out for man tiles and acid puddles! Do not despair, *Gamelet II* does have some new features to help you with your escape!

Gamelet II will be available for the C64.

Other releases being prepared for the Christmas period are *Hyper*,



Indiana Jones, *720°* and *Overrun*. It feels as if a good Christmas will be had by all!

Publisher:
U.S. Gold Ltd, One 2/3 Oxford Way,
Maiden, Southampton SO7 7AX, Tel 021-256 2088.

Budget Bonanza

Following the success of the Silver Budget range, Firebird are releasing a new budget label. Priced at £2.99, this range will be aimed at the user who is looking for a slightly more up-market product but which is still good value.

The blockpods are back in *Waher 2000* on the C64. Help the Blockpods across fragile areas of blocks - but beware, as the blocks can break or burn the Blockpods feet, and whatever you do - don't let them fall through the gaps!

Philo Music is a polyphonic sequencer which drives all the best features from the C64 SID processor. Access all waveforms, modulation features on the three (default) channels and the fourth channel will allow you to include digitised sounds.

Publisher:
*Firebird Software, First Floor, 64-67
New Oxford Street, London WC1A
1PN, Tel 01-579 6793.*

Black-It is the new budget range from Housens with games ranging from mind-busting puzzles to arm-watching shoot-em-ups. The games will sell for £2.99 with an overall theme of black and white, with great graphics.

Dragon's Crown will appeal to those seeking an intellectual challenge, and adventures such as *Eye Horde* and *Firestorm* for the middle of the road players. Last but not least, *Powerzone* and *Acroly* will appeal to all those who enjoy a good shoot-em-up!

The games will be available on the C64 and will be priced at £2.99 each.
Publisher:
*Mercury 2nd Floor, Princes Quay,
Aberdeen, Abingdon, Ocean City 10 8BT,
Tel 010 837978.*





Commodore have signed.

Shooting for the Top

Commodore UK Ltd's advertising strategy is underway with the cooperation of a few lads - the Chelsea Football team to be precise! Yes - for the next three years the team will sport the revamped shirts bearing the Commodore logo, which will also be displayed around the home ground perimeter boards.

The biggest deal in British football to date was finalised with the presentation of a cheque for £1,250,000 to the Chelsea Football club.

Commodore and Chelsea respectively are aiming for the top and both feel they can climb the ladder to

success together. There's more than the 'C's and their colours which bind them together. As well as the advertising, Commodore dealers will be able to take advantage to the limit through various promotional options.

Commodore have a history of sporting links following their German sponsorship of Bayern Munich and Dynamo Kiev and the backing of the first professional cycling team of Britain.

Teachline:

Commodore Andrew Markham (UK)
 Ltd: Commodore House, The
 Switzerland, Gardner Road,
 Maidenhed, Berks SL8 7LJ. Tel: 0423
 778084.

Join the Club

The only requirement for free membership to the Clubah Club is to own one of Clubah's products. All members can then keep up to date with regular news bulletins, special offers and product discounts. If you own a product simply write to the following address for an application form.

Teachline:

Clubah Marketing Ltd Norfolk
 House, Norfolk Road, Falmouth,
 Cornwall CT5 1AN. Tel: 0212 515121.

Beat the Brain

Ever dreamed of reconstructing your IQ - well, now is your chance in *IQ* - a recent release from Mind Games. The problems arise when you play the part of Professor Storm - the Geometric Genius, and suddenly you discover you haven't a single mathematical formula in your brain! Work your way around the maze and which that connect the memory bubbles containing the formula you need. Can you prevent the good professor from becoming a moron - there's only one way to find out! Available on the C64, priced at £9.95 (ret) and \$12.95 (disk).

Teachline:

Mind Games (ASP Software Group),
 Victor House, Leicester Place, London
 WC2C 3NA. Tel: 01-476 1666.

Software for HMV

A games software department is to be opened in HMV Music Stores aiming to hold the largest range of software in Oxford Street, London.

Andrew Tait, HMV's software expert comments, "we will be mass merchandising all new releases with discounts on selected new titles. As well as this our customers can look forward to great in-store promotions and competitions".

So, when you're browsing for your latest LP's at 30 Oxford Street, remember you can get your computer software there as well.

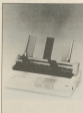
Teachline:

Lynn Frank Ltd, 4-10 Frederick
 Chase, Stamley Place, London W2
 3HD. Tel: 01-724 6777.

HMV sells software



DATA STATEMENTS



Brother 1724

The latest on the Hardware Front

Brother has recently acquired the rights to the Terminate! joystick from the Denmark based company SuperSoft. Brother will be covering the UK and Germany, and sales director, Mike Segras commented, 'we are looking to achieve very high sales on what is an excellent and very novel product. The Terminator costs £18.95.

In a bid to produce quality disks at low prices, Mydisk Ltd has produced a range, with prices starting at £7.99 for a box of thirteen. Managing Director Simon Kelly promises, 'if a customer can find branded disks of the same quality at a cheaper price, then Mydisk will refund the difference'. Each disk has a clipping level of 85% and comes with a 'one for one' guarantee, i.e., a faulty disk will immediately be replaced with two.

Brother has recently produced the 1724 - a letter quality dot matrix printer which will sell for £399. The 24 pin 1724 operates at 216 characters per second in draft and offers fast letter quality printing at 72 cps. The 1724 is compatible with Epson 8000, Diablo 630 and IBM Proprietary 81, and a dual interface, Commodore and RS232, is available. John Carter, Sales and Marketing Manager for Brother comments, 'the introduction of the 1724 exceeds our selection and supplements the 2624L in our 24 pin range'.

Tomlinson

Mydisk Ltd, Unit A, Ashwood Business Complex, St Johns Road, Plymouth, Devon, TW7 6AL. Tel: 01-947 4457.

Mydisk Ltd, Parly Hill, London Road, Bedford Road, Exeter EX1 2ED. Tel: 0145 851848.

Brother Computer Peripherals Division, James & Branson, Shipley Square, Glade Bridge, Andoverham, Manchester M14 5JD. Tel: 061-630 4517.

Strategy and Adventure

PSG have recently launched a new series of strategy games - with Classic Conflicts. Three of the titles are re-releases of the Classic PSG titles - Theatre Europe, Battle for Midway and Battle of Britain. Another title in the pipeline is Power Struggle which is a game of world domination.

Classic Conflicts is available on C64, and will be priced at £4.99 (c64 and disk).



Battle of Britain

ORL's follow-up to Cyborg is in the form of Mandrake. You are Cyborg and your mission is to retrieve the stolen blue prints and so they can be used for the good of mankind. This is a world of bandits, prostitutes, droids - a world of debauchery. However the longer you take to retrieve the blue prints the more Mandrakes are put into production and you must discover how these complex machines are de-activated and ultimately find your way through the complex labyrinth to the safe which holds the vital information.

Mandrake is available on the C64, and will retail at £9.95 (c64) and £14.95 (disk).



Grand Prix

Marble are putting the finishing touches on their racing game - Nigel Mansell's Grand Prix, and so all you budding drivers - be prepared. As the driver, you have access to the latest in car design and technology. Whether you simply want to blast around the track at excessive speeds with the turbo on maximum boost without a care in the world or whether you want to race a selection of the world's greatest circuits, this game is for those who enjoy the excitement of speed.

Nigel Mansell's Grand Prix will be available on the C64.

Arkose Armer is a recent release from MicroProse and is an action simulation with 12 desperate missions in three different regions of the world. Tactical thinking and lightning reactions will save the day. Arkose Armer will be available on C64/128, priced at £14.95 (c64) and £19.95 (disk).

A second MicroProse release comes in the form of Stealth Fighter - simulation of a radar cloaking jet fighter believed to be testing as part of the US Air Force arsenal.

Stealth Fighter will be available on C64/128, priced at £14.95 (c64) and £19.95 (disk).

TrackMania

PSG, 412, Greeny Newton Road, Caversham CV4 5DA. Tel: 0295 46554

ORL: ORL House, 9 Kings Road, Caversham Road, London E13 2AD. Tel: 07-533 2948.

Marble: Mariah House, 80a Terrace, Faversham, Kent, SA7 6EE. Tel: 0223 769655.

MicroProse: 2 Marlow Place, Farnham, Surrey GU10 2RH. Tel: 0688 34324.

Business Bargains

Is Logotron's trio of business programmes a portfolio for success?

By Eric Dagle

Logotron has steadily built up a solid reputation through producing software for the BBC micro. Even C64 owners may have heard about *SOB*, the game that took the BBC community by storm. Soon all C64 owners will have heard of Logotron when they enter the C64 market with their new 1285 business software range.

There are three packages in the set: a wordprocessor, a simple database and a spreadsheet. Nothing technically revolutionary except where cost is concerned.

Wordprocessing

Logotron Write (1285) is a sophisticated word processor with built-in spelling checker and mail merge facilities. It is simple to use, but there are one or two tasks which must be performed when you first use it.

The newly loaded program presents the user with a horizontal menu offering six categories: edit, options, print, storage, wrap and quit. Selecting any of the categories will open up a sub-menu window showing the full range of options.

It is best to select the wrap/leave first because, as the sub-menu reveals, you have the opportunity to insert up to seven codes which allow you to

access some of the special features your printer may possess. You can also select ASCII or non-ASCII (normal Commodore) output, the inclusion of extra linefeeds or a specific device number and secondary address.

Under the subheading of wrap storage, dual disk drive operation can be selected and a further heading allows the screen display colour to be changed. When all is as you would wish it to be, the fourth option allows you to save the parameters to disk to be automatically loaded each time you use the Writer.

Option opens up the possibilities of search and replace, preview and spelling check.

Search merely finds every occurrence of a specified word in the text. Search and replace not only finds the word but also replaces it with a new word of any length which you have selected.

Because the screen is only 40 characters wide and most printers work to an 80 column width, the preview option is essential. The formatted pages of your documents appear just as they will on the printer. This gives you time to make those small changes which always occur necessary before you commit your work to paper.

It's a good idea to check your documents for spelling mistakes before printing. This is a good option to have and surprising on such a low cost product. Unfortunately, this option has a weak point: the given dictionary is fixed, you can't add or subtract words to cater for your specific needs.

Since the spelling checker only checks the words which it knows, 'catalogue' spelled in the American way (without the 'ue') will remain undetected because the word is not included in the dictionary's 1000 word database. All this apart, the spelling checker does work, given this small limitation.

Storage allows disk access for loading and saving files, sending disk commands to erase old documents or to format a whole disk. The loading process is further simplified by the inclusion of a directory facility which lists all of the document files onto the screen. From the list you can load the file that you want by highlighting the required document name.

The next screen option is print which is not only for accessing the printer but is also for sending the current file to disk as an ASCII file. Here the special mail merge facility can be called, but more of that later.

Exit releases you from the menu as

that you can create a document and get merry (reset the computer to Basic).

Such are the facilities offered by this program that I've not yet mentioned the cut "n' paste or the special feature menu. Basically the cut "n' paste menu allows the user to move text around either replacing, replicating or creating selected blocks. Regularly used sections such as copyright notices or letter heads can even be merged in from disk.

Special features allow all of the special printer functions which have been defined previously. These can include underlining, boldface text, compressed text or expanded text. In addition right justification, headers and footers, page format, tab settings and centering can all be set. It is also possible to append files forming a chain of files should you be embarking on a novel or similarly long document.

The merge function works in conjunction with the Filer 1285 program. Fields may be selected from a file for insertion in documents. For example, if you are embarking upon an advertising campaign to several companies, a standard letter is created and merge marks included where each company's address will appear. At print time the file database disk is placed in the drive. Each time the letter is printed a new address is pulled in from the disk and printed wherever indicated.

The text memory boasts about 19K of space. In real terms this means 14,000 characters, or approximately 3,000 words, or just under 500 lines making this a valuable wordprocessor for any user.

The Database

Filer 1285 is a simple database which is both friendly and cheap. The hard part is inputting all of the data which you want to store.

Each Filer database occupies a single disk so the maximum number of records is limited by the simple equation of free disk memory divided by the number of bytes which each record is allocated. The lower the number of fields in a record, the greater the number of records per database.

In case I'm losing you at this point, let me explain in brief. A database is a catalogue of grouped information. Usually the groups are individual and company names which, like entries in an address book, contain various other details such as addresses, phone numbers etc.

In such a database a record would consist of all of the information referring to one particular company or individual. Fields are the individual entries which make up a record such as name, address, phone number etc.

One of the fields can be designated as the key field. This is the name under which the record will be entered and usually consists of the name of the company or the surname of an individual.

What is kept in a database is entirely up to the user when the record fields are defined. Filer 1285 has several field types to help in maximising the memory efficiency of the system. With only 250 bytes allowed per page, memory is at a premium. Using the full allowance of 25 characters per field, a disk will hold 288 records. Fields can fall into one of four types: keyfield, alphanumeric, numeric or date.

Once you've carefully entered all the records in your database, changes and deletions can be made or, first space permitting, further deletions can be made.

What you end up with is a very useful file which can be used in various ways. Files can be selected and saved according to criteria selected by your own needs. For example, if you want to separate out all of the people who live in the Leeds area, own a C84 and a car, you simply set these criteria and let the computer do the rest. If you then want to print out selected information from the database, such as name and address for labels, this can be achieved by generating a report sheet.

Within the limitations of ten fields, each holding 25 characters, quite a lot can be done but a lot of thought has to be applied first.

To maximise memory use you can use a coding system like binary for one of the fields. If someone complains with a particular criterion then a one is recorded, if not a zero is used. The result would be a number such as 1111 which could mean that the person in question is married, male, childless but car owning. To find other married car owners you could then specify a match to equal 1111. The question marks mean that any character will be accepted for sex and parenthood, but only a positive indicator for marital status and car ownership will be accepted.

If you just want a list of married people you can ask the computer to find a match for 1?. This means that the first figure has to be a one, but the other figures can be anything.

Using a master chart these codes can be converted into real terms and

Easy Working Planner		F2 HELP																										
WORK	PRINT	CHANGE	STORAGE																									
<table border="1"> <tr> <td>Income H1</td> <td>Jan</td> <td>\$1</td> </tr> <tr> <td>Income H2</td> <td></td> <td></td> </tr> <tr> <td>Misc. Income</td> <td></td> <td></td> </tr> <tr> <td colspan="3">*****</td> </tr> <tr> <td>Total Income</td> <td></td> <td>\$2</td> </tr> </table>		Income H1	Jan	\$1	Income H2			Misc. Income			*****			Total Income		\$2	<table border="1"> <tr> <td>DIRTY WORKSHEET</td> </tr> <tr> <td>LOAD WORKSHEET</td> </tr> <tr> <td>SAVE WORKSHEET</td> </tr> <tr> <td>LOAD DIR FILE</td> </tr> <tr> <td>SAVE DIR FILE</td> </tr> <tr> <td>DIRECTORY</td> </tr> <tr> <td>INSERT DATA</td> </tr> <tr> <td>EXPORT DATA</td> </tr> <tr> <td>CREATE FILES</td> </tr> <tr> <td>FORMAT DISK</td> </tr> </table>		DIRTY WORKSHEET	LOAD WORKSHEET	SAVE WORKSHEET	LOAD DIR FILE	SAVE DIR FILE	DIRECTORY	INSERT DATA	EXPORT DATA	CREATE FILES	FORMAT DISK
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Electric	\$100.00	\$100.00																										
Phone	\$50.00	\$50.00																										
Gasoline	\$20.00	\$20.00																										
Clothing	\$10.00	\$10.00																										
Car Loan	\$200.00	\$200.00																										
Food	\$100.00	\$100.00																										
Entertainment	\$100.00	\$100.00																										

you're not limited to mere ones and zeros. If someone has two cars why not record the fact with a figure two?

File 1295 may be a humble database but for many people it is powerful enough if used sensibly.

mathematical operators plus a few specially defined functions for dealing with groups of cells. Using these commands the sum, difference or average of a group of cells can be calculated, and the maximum and

Conclusion

Legation has three excellent products which were tailored to the British market from an American program created by Spinmaker Software. Planner 1295 is particularly comprehensive and writer 1285 is more than adequate for most people's needs. Even the weakest modems, Pilot, is powerful enough to be considered for small business uses. It is sure that a suite of programmes prove quite as satisfactory as this trio - perhaps they could become the Lotus 1-2-3 of the C64 world?

Footnote

Spinmaker: Horsham, West Sussex.
Database: Irvine, 12, 85, Park,
Surrey.
Legation: London Ltd, Daley Avenue,
Oxford Street, Cambridge CB2 3LL
Tel: 0223 329656.



The Spreadsheet

Planner 1295 is probably the most powerful spreadsheet available at this price range.

Starting with a fairly basic sheet of incoming and outgoing, the Planner will grow in complexity as your finances become more involved. Insertion and deletion of columns and rows is easily achieved, as is cutting and pasting whole sections for transplanting to another part of the sheet or across to another sheet completely.

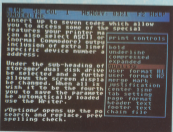
The advantage of these facilities is that detailed planning of the layout of your sheet is not essential. As long as you are sensible, you can meet your requirements, corrections can be made later.

The size of the sheet depends on the complexity of its contents. Columns can be set to any width from three characters up to a maximum of 33. Using a column width of 12, I can fit about 76% of numbers left when I created a 26x44 matrix!

Definition of cell contents is simplicity itself. If you want it to be text just type in the letters, if it is to be a fixed value, type it in; for a formula type an equals sign first. Calculations can be extremely complex using all

minimum values can be found. The range is staggering.

Finishing out the finished sheet has the usual limitations of paper width. If the spreadsheet is more than 88 characters wide, it is possible to select different areas of the sheet, print them out and then use sticky tape to reconstruct the full spread.



Kernal II

Add easy file handling and much more with this pull down menu system.

By Patrick Chable

The Commodore 64 may be a great computer but no one will deny that its file handling could be greatly improved. After all, if you need to get a directory on a normal C64 you have to erase the program that is currently in memory.

Kernal II will patch itself into the C64's operating system and provide you with a series of menus that will greatly improve the ease of which you can LOAD, SAVE and find details on programmes.

When the program is in use, an arrow is resident on the computer display. This arrow can be moved around the screen with a joystick in port 2. Across the top of the screen a strip is displayed giving the titles of the pull down menus available. These are, DISK, TAPE AND OPTIONS. To activate the menu you must position the pointer over the option and press the fire button. All of the commands available under that heading will appear. To select one, move the pointer to the command that you require and press fire.

All commands, having carried out their work, display an OK prompt. Just place the pointer on this, press

fire, and the machine will return to the program that was running before the command was executed.

As well as offering pull down menus the operation of a few keys is altered by the program. Pressing F1 stops the computer and F3 restores it. This allows you to stop a Basic listing or a directory listing. The RUN/STOP and RESTORE keys will not perform a warm reset as normal.

Below you will find a list of all of the functions available from the program.

Disk Menu

SAVE - this routine allows you to SAVE a program or a block of memory. The computer asks you for the file name. Type this in on the keyboard in the normal way, delete mistakes with the DEL key. KERNAL II will not allow you to enter a name with more than 16 characters. If you try to enter more the program will automatically jump to the next SAVE option. If you don't need a program name as long as 16 characters you can press RETURN once you have entered the desired number of letters.

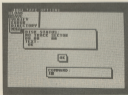
Once you have entered the program name a second pull down menu will be displayed. First you are asked whether the program is BASIC or ELSE. Move the arrow and press fire to select the desired option. BASIC means that the program to be SAVED is Basic and will be SAVED in the normal way.

If ELSE is selected then you are allowed to SAVE machine code. You are prompted for the start and end address of the code to be SAVED, in hex. These numbers must be four digits in length, i.e. 80 becomes 0080. This program could be SAVED with this option. The start address is 5800 and the end address is 9200.

LOAD - this works in the same way as SAVE. If ELSE is selected for the program type then you are just prompted for the address where you want the LOAD to start. N.B. Basic programmes are LOADED into the computer as though you had entered LOAD "name".S.I.

VERIFY - this will verify the specified program on disk.

ERROR - this command reads and displays the error status of the disk drive.



they are displayed on the screen.

The program will produce a template with screen function key labels but usually only eight are needed, which the program allows for. Any label can be left blank by just pressing (Return) when the label name is asked for. Do not use punctuation marks (commas, full-stops, etc.) and when some graphics characters are not printed properly on the 1320, consult the 1320 User's Manual for more information. The backarrow can be used, and I use it to denote that the function key command includes a RETURN. Confirmation of the label name is required to avoid wasting time and paper. The label descriptions are also displayed just before printing starts to reduce the risk of printing a wrong template.

"The template will remind the user of each function key definition and which key combination to press to obtain it."

Fitting the Template

The paper used in the 1320 is very thin and not satisfactory to use on its own as a key template. To remedy this it should be backed with a piece of stiff card. The surface of the template can be laminated with transparent film to protect the surface from dirt, fingerprints, etc.

Back the template, before it is trimmed to size by fixing it to a piece of card and prick the corners with the point of a pair of compasses or something similar as shown in Figure 1. Remove the template and mark the lines joining the holes in the card made with the compass point. Cut the card with a sharp knife in the shape of the template along the marked out lines. Check that the card fits on the keyboard and that there is sufficient clearance for it not to interfere with the operation of the keys. Trim the edges as necessary.

Cut the outside of the paper template and on the inside cut out four 1/16th of an inch inside the lines, making a diagonal cut into the corners.

Cut a rectangle of transparent film

of recommend Traseplast which is available from W.H. Smiths (about 1" wider and 1" longer than the template). Peel the backing off the film and lay the film sticky-side upwards on a flat surface. Carefully lay the paper template — print-side downwards — on the film. Cut the corners of the film as shown in Figure 1.

Position the cut-to-shape card

accurately over the paper template and fold the edges of the film over and press on to the back of the card. Next fold the film in the centre cut out. This will hold the paper template securely to the card.

Finally, fit the template to the keyboard and lay gently — no more rubbing on the grey matter!

See Listings on page 122

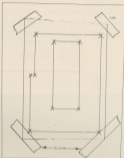


FIGURE 1: Fitting the template to the keyboard.

12001-00

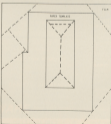
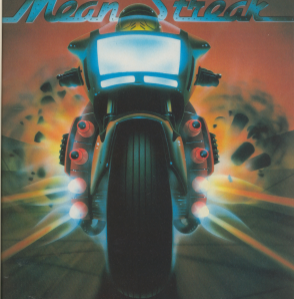


FIGURE 2: Fitting the transparent film onto the template.

12001-00

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Sci-Fi Games

Zip into the future with this selection of high-tech games from Electronic Arts.

By Tony Hetherington

Space, the final frontier. These are the games that can take you into the unknown as you fight, track, or explore your way across the galaxy. These games cover the whole spectrum of computer gaming from the coin-op constraints of Nemesis and Quantum, to the adventures of Solcom Division and the Hitchhiker's Guide and the strategy of stopping the Ogre as surviving in the Antisocial arena.

The Hitchhiker's Guide to the Galaxy was originally a radio series, then a TV series and a play, and several books and finally, thanks to Infocom, an adventure. The result is probably the best adventure you will ever play. It will certainly be the funnest as it combines the humor of Douglas Adams with the usual blend of fiendish difficulty but so obvious when you eventually solve them's Infocom

Explore New Frontiers

Infocom also feature a growing supply of Sci-Fi games for adventures needing to explore new frontiers. Starquest II is the sequel to the spatially puzzling Planetfall in which you're a droid scrambling through Mid-Class scenarios, when your space cruiser crashes only to get into deeper trouble. Starquest II continues the adventure.



Planet

logic problems.

Thus, though you suffer adventures, will have you excited as you try to find a way past the big blaster beast of Tinseltown in an improbability drive and try and get some sense out of Marvin the manic depressive robot and many other equally impossible tasks. The game is obviously based on the radio series, and associated books that has a new plot so don't be short cuts for those players who already know what their level is.



Planet

Leather Goddesses of Planet is an experience you won't forget as it's a game that you can play at three different levels ranging from tame through suggestive to lewd. Your mission is to stop the leather Goddesses fiendish plan to reduce the Earthmen to a state of sex slaves and to help you out you'll find a 3D comic to read and in the best 3D graphics to read and an intriguing search and sniff card! Some of the older games can still be found at incredibly low prices such as Starquest and the moral and wonderful Suspended which can you be suspended animation and your only way to explore and save an impending disaster is by controlling six very peculiar robots.



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Fantastic Graphics

On this side of the pond, only Level 9 have stemmed the Infocom tide with their own trilogy of futuristic adventures now marketed by Rainbird as Silicon Dreams. These adventures packed with illustrations and text descriptions to match, tell the tale of Kim Kimberly and his descendant who are caught up in the colonization of the Planet Eden.

The saga begins on the colonization ship in Snowball where you find trouble. In Return to Eden you must escape the arriving crew of the Snowball (I told you there was trouble) and find the robot city of Enoch only to find in the final part the Worm in Paradise that there is something desperately wrong with this robot servical city. The robots have taken over!



Quantum

Activision's Portal is described as a computer novel in which you return from a failed 100 year mission to find that all the people have gone. Who? Using Homer, a biological computer, that's growing weaker and weaker you must piece together the story before it's too late.

Activision also have the distinction of being the only company to produce two different games based on the same film novel - Aliens. The American company produced a multi-game version that follows the plot of the film with maps representing the scenes in the film where the druggie



Sentinel

lands on the planet, the rescue attempt to free the trapped marines, you hold off hordes of aliens as the team set their way out of the operations rooms, a mad scramble through the air ducts, a race against time to find and rescue new and the final duel with the Alien queen.

Meanwhile, Electric Dreams (part of Activision UK) has its own version that captures the atmosphere of the film but not the actual plot. Your mission is to guide your six marines through the rooms of the Alien infested complex. The action is tense and incredibly exciting.

Covering up a Bad Game?

In that accolade, the science fiction action is fairly more than left/right/try games in which an unbelievable variety of aliens are destroyed by players of countless games. In fact the science fiction label is stuck onto the strangest games usually to cover up a poor game or refresh and revitalize a re-sale of an old one. For example, *Archon* is an exceptional re-sale of the original *Breakout* but it's hardly science fiction. Two exceptions to this are *Quantum* and *Nemesis*.

Quantum is the world's equivalent of *Quart* by except that it's a side on scrolling game controlled by Electric Dreams in which the player selects one of the game's four characters to fight their way through the screen.

Nemesis (Rainbird) is one of the best coin-op conversions as well as being a top shoot-em-up which your ship and your chances of success get better as you blast the enemy and finally you have a high speed craft armed with lasers and missiles as well as two laser firing remotes.

Rainbird's *Starfighter* is one of the few games to make the transition from computer to arcade as more and more players grapple with the vector graphic cards, mainly *Space Invaders*, *Warlords* and flying *Starfighters* to a range the occupation of the planet *Nemesis*.

Although *Starfighter* has made the breakthrough it could have happened to any number of quality shoot-em-ups such as *Neugier's Mercenary*, *CRL's Tan Cuts* (the C64 disk version is incredible), *AtGames' Trap* and, of course, *Elite* (*Firebird*) and *Heaven's Ovidian*. *Elite* and *Ovidian* were games that rapidly set standards that other games had to beat (but also copied) and will always remain two of my favourite games.

Brain Power Wins

Pinbird has since followed up its direct success with the double act of *Choko* and *Sentinel*. *Sentinel* is an incredible game in which you must use your brains and your reactions to defeat the *Sentinel* over a staggering 10,000 battle grounds. The *Sentinel* stands on top of the highest peak in each of these lands and absorbs all excess energy. Your task is to teleport them about shell to robot shell until you can strike at the *Sentinel* while avoiding the *Sentinel*'s deadly draining stars.

In *Choko* you're just realised that mankind is trapped underground. The robots were supposed to let you out since the radiation levels had subsided. Now you have only one chance of escape as you've managed to regain control of a general purpose robot called *Choko*. If you use him well and don't make too many mistakes you may be able to recruit more robots to fight the robots. *Choko* is a little slow

compared to other games, but once you're into it you're hooked.

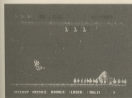
The hardest sci-fi game has got to be *Antiochus* (imported by US Gold's Psi-5 Trading Company). The game features some impressive graphics and an early game system. I can even cope with selecting a crew from the 30 galactic oddballs that you get to choose from but I always seem to get blown up and plundered by pirates on my first trading flight! Has anyone finished it?



Antiochus

Ogre is set to be the next computerised board game to follow *Antiochus* and will be a strategy science fiction wargame between two sides. One side must defend a command post with a force of tanks, infantry, howitzers and OGY's (Ogreoveralls), the other side has only one piece. That piece is the Ogre, a living cybernetic organism armed with massive guns, anti-personnel mines and missiles. If you can't wait for the computer version you may still be able to track down the original board game. If you find it, buy it!

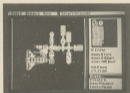
Antiochus (Origin Systems via Microprose) casts you into the strange role playing world of *Car Wars*. It's hard enough to survive in a world where you must build, armour and pile weapons onto custom cars that then either plug it out in arenas or battle on the open road. As you get the smell of petrol, smoke and blood in your nostrils you'll want to drive on until you're the best. Drive offensively, the life you save could be your own!



Electronic Arts, the latest US software house to setup shop in the UK, have just released *EOS* (Earth Orbit Station). Seven missions drive 1-6 players deeper and deeper into space as they compete to build bigger, better and more profitable space stations.

Depending on the scenarios which range from building a dry dock in Earth Orbit to a race to search for life you will have set number of turns or quarters to build out space stations or race to have the highest technology level. Whatever the mission your first priority is make as much money as you can to be able to fund the target projects.

Every space station needs a command centre and logistics module and then as many power plants, life modules and galleys to provide the people, power and support for any of the money making or research getting installations such as spaceports, chemical labs, weather or



communications satellites, forestry labs or space tags. As you make more and more money (hopefully) you can turn some of your modules from commerce to research and build up your tech level which may earn you victory points and allow you access to the more complex and profitable modules.

A successful player will also have to play the markets and set as high a price as he thinks he can get for the goods created by his modules. Get this right and you can get ahead in the space race.

The game is played through a selection of menus between 2-4 players that can human-or computer opponents. It's easy to learn but can be tricky to play particularly when you're trying to judge how many life, power and galley points you need to install a new module.

Finalities

Title: *EOS*. **Supplier:** Electronic Arts, Largey Business Centre, 11-19 Norton Road, Largey, Av. Mough, Beds MK7 7JY. Tel: (8753) 4942. **Machine:** C64. **Price:** £78.95 (incl.). **Originality:** 5/10. **Playability:** 8/10. **Graphics:** 6/10. **Value:** 7/10.

Finally, over a year since its announcement we are still waiting for *Star Trek* - the game. Beyond's stand at last year's PCW show was built to look like the bridge of the Enterprise. I have played the Atari ST version (which is expected to be on down in the next few months) but all Beyond will say about the C64 version is 'it's being done'.

Contributions

So you own a Commodore? So you've written some programmes? So why haven't you sent them to us?

Your Commodore is always on the look out for new programmes, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in. How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send us to us. We don't expect everybody to be the next William Shakespeare, but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced i.e. there should be a blank line between each line of text. You should also leave a margin of about 11 characters around the text.

3) On the very first page you should put the following:

Name of the article
Machine that it is for
Any extras required - disk, printer etc.
Your name
Your address
Your telephone number

4) The top of every page should have the following information on it:
Abbreviation of the article title
Your name
The page number

For example, suppose you had submitted an article on Chat intercepts. You should put something like the following at the head of the page:

Intercepts/1 Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English. It does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word **MORE** if there are more pages to the article or **ENDS** if it is the last page.

8) If possible, enclose a listing of all programmes.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programmes should be included on either disk or tape. Make sure that you **SAVE** two copies of every program so that we have a better chance of loading them if problems occur.

11) Programmes under 10 lines can be included in the text. If your program is longer than this you must include a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a five line notice that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £30.00 and £80.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Prompt return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) If you use a wordprocessor then enclose a copy of your text on the disk and state clearly which wordprocessor you use.

20) Send your programmes/articles to:
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21) Your Commodore cannot accept any responsibility for items sent to the magazine.

The ICPUG Column

With the growing popularity of the Amiga, many ICPUG members are using their utilities for both the Amiga and the Commodore, which can lead to problems.

By Tim Arnot

Well, now that we've got the introductions out of the way, and the Commodore...oops, Commodore share report, we can get down to what this column is really all about. Namely, why hangtinkin'gura-maga (what?)

ICPUG's membership covers the whole spectrum of Commodore computers from the early KIM-1 through VICs, 64s, 128s and Amigas. In our bimonthly newsletter-column-journal, we try to reflect this wide range of interests. However, we can only print what our contributors write, and so this policy does not always work.

At a recent committee meeting, it was stated that 75% of enquiries we are receiving are from people who already have or are seriously considering buying an Amiga 500. This leads me to think that in maybe a year or two, the 64 and 128 will be reduced to the historical status of the PET and VIC. Indeed, the stated presence of 8-bit products at the recent PET show (as in a Amiga show?) would tend to confirm this.

Before that happens, there will be a transition period, where people are using both technologies. As they move

from 8 to 16 bits, they are likely to want to take their wordprocessors, spreadsheet and database files with them. This is the problem which I will expand upon this month.

Compatibility Problems

The first problem comes when you take your data disk out of the 1241 and insert it into the Amiga's internal disk slot - it won't fit. Commodore's engineers, normally very clever people, seem to have made the hole too small. Being resourceful people, they made the diskettes fit by reducing their size. Unfortunately the media now falls out, and the protective cover just disintegrates!

Thus, they produced a stronger, plastic jacket for this smaller disk, and for good measure, threw in a metal shutter to protect the surface from baby and the cat. The polished casing also stops people from flipping the disk, a deplorable practice anyway, as it can gouge my 1571 contacts! Then, to add insult to injury, they did away with that nice G.C.R. recording system that we're all used to, and started to use

some alien mush called M.F.M. Just because every other jack computer uses it, it is no reason for Commodore to start.

OK, so we're got to get our stored information from the 1241 onto a disk which is the wrong size, records in a foreign language and has a strange directory structure. We might also have to convert from PETSHELL or some code to ASCII, but given a small amount of programming expertise, that's not a real problem. Assuming we know that the 64 will read the 5.25" disk and the Amiga will write the 3.5" disk, all we have to do is make the 64 tell the Amiga what's on the disk. You could also go the other way if you wish.

For instance if you use an Amiga word processor and want to upload text onto a bulletin board using the Compucon system, the way to do this is best summed up in one word. Async. (ardon't) Yes, Async.

Async stands for ANYChronous communications, and is normally associated with sending and receiving data through the serial port. By this, I mean the RS232 port, not the Commodore serial bus, which is a

standardised form of the IEEE-488 parallel standard.

Guess what? Commodore failed to implement RS-232C properly on the 64 and 128. Plus/4 owners are lucky in that respect as they have true RS-232 right up to 19K baud. So some sort of interface is needed. Examples of these can be found by looking through adverts in this and other magazines. I personally recommend the interface made by Brain Boxes (049 85, 051-280-2500).

You will need to connect the RS-232 ports in a configuration known as a 'null modem' (Fig. 1). Basically this makes each computer think it is driving a modem and not another computer. Refer to the computer's technical manuals for the pinouts of the serial ports.

Rather than writing your own software for transferring the files from one machine to the other, there is a public domain file transfer program available which makes it relatively easy.

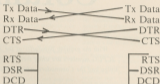
This is called 'Kermit', and is

available for virtually every personal computer under the sun. We certainly have it in all the ICPCUG libraries. Before you ask, yes it was named after

a small and lovable green frog!

So, connect the cables, boot up the software, transfer the files and life will be easy. Or will it? 70

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Games Reviews

Need some advice on the new releases? Then cast your eye over the latest batch of games.



Pegaseus

You've flown a plane, taken a helicopter gunship for a spin, dived to the depths in a submarine and gone on patrol in a destroyer. Now here's your chance to fly across the waves in a hydrofoil.

This isn't going to be a joyride as you're at the controls of the PHM Pegaseus. It's one of the heavily armed patrol boats like those on service with the NATO allies USA, Italy, and Israel and it's your job to complete one of the eight assigned missions. These range from target practice (although even these shoot back) to the highly topical but almost impossible job of escorting a supply ship from Kuwait, through the Persian gulf to the safety of the open sea! The only trouble is that the Gulf has become a war zone and ships are being attacked indiscriminately.

To carry out your mission you'll have to master the controls and weaponry of the Pegaseus so you can react to any threat quickly and decisively. And at the same time, control the overall strategy of the mission as well as two search helicopters and the supply ships from a separate map screen.

The map screen is used to plot your course and speed as well as those for the helicopter and supply ship. Then you sit back and wait for the action. You don't have to wait long as enemy ships will soon be picked out by hydrofoil and helicopter radar screens. As soon as you see a blip you toggle manual controls and the instrument screen that shows fuel, speed, compass, radar and weapons gauges as well as a HD view ahead and above that in an enlarged binocular view of any locked on target. When the target is in range you can either take it out from a distance with a guided missile or try out your shoot skills with the 76mm water cooled naval gun. Either way you haven't got much time as other ships will soon be in the area.

Pegaseus lacks some of the detail of other simulations such as Gunship and Silent Service, however it does compensate for that in action. Another merit for your collection of combat simulations.

T.H.

Filename: Pegaseus, **Supplier:** Electronic Arts, Langley Business Centre, 11-19 Sutton Road, W. Slough, Berks SL5 7TB. **Ref:** (0514) 0614, **Machine:** C64.

Originality: 7/10. **Playability:** 8/10. **Graphics:** 8/10. **Value:** 7/10.

Black Magic

In a time of hapless warlocks and evil wizards, many moons before the civilized man came to be, class was a word not known and hence was judged by magical status. As you can imagine, it wasn't very nice being a normal person, being turned into a one eye'd dancing polar bear, for the wizard's amusement, and then left to dance around the village, only to be caught by the local fat coast rasher - not very funny.

Anyway on with the real plot. You are, as it were, a normal person - a resident in the once peaceful village of Marigold.



The once lush green fields are now misty swamps where the bodies of Zargrim's 111 former victims lie in a minute's visit are damaged. The towns are deserted and only the demons occupy the once happy homesteads.

This makes you very sad and angry (how good! The last straw comes when Zargrim, the evil warlock of great power, kills your magic tutor, who taught you all that he knew. (Which wasn't very much as Zargrim had nicked all the magic books). So filled with anger you set off to kill the mighty Zargrim, but as you pack your rucksack you discover an old dusty parchment that tells the story of a wise old man called Anaker who was deflated by Zargrim and then had his six eyes nicked (yes, six) and placed randomly around the land so he could watch in vain as the land decayed and crumbled.

You decide to find Anaker's six eyes and play them back in the sockets (Anaker, by the way, has been turned into a statue, hidden away in the wilderness by Zargrim).

Well, what's the game like? Very good indeed, I haven't stopped playing it yet. Okay, the graphics are a little dodgy and sometimes dull, but the game is hell, with nice spot effects and a huge playing area. This type of game is rare to see as I'm sure of an awfully frank report, but I just hope that US Gold make a follow-up to it, and then a follow-up to that. Well, stop being your own mate and get this game, you won't be sorry.

S.B.

Distributor: EMI Music **Supplier:** US Gold (over 2,000,000) 800 W. 14th St., Irving, New York 10314 **Tel:** 021-336-2000 **Machine:** C&A **Price:** £8.99 (C&A £14.99) (D&D). **Originality:** 5/10 **Playability:** 9/10 **Graphics:** 2/10 **Value:** 6/10

Contaminations

Most of you kids out there must have seen that new American cartoon, The Contaminations: those space-age super heroes who fly high above the earth observing life on earth. And whenever something bad happens they beam down to our humble planet and zap the bad guys.

Well, it had to happen sooner or later didn't it - the cartoon of the tops of the game and so on. The idea behind

the game is this, the evil Doc Terror plans to get his dirty hands on a deadly nerve gas, which is hidden in the centre of a high security complex, throughout the complex there are masses of doors which are all locked, and all need a special key to open it.

You and your contarian pals have to get into the complex's heart, locate the nerve gas and keep it safe from the Doc, search his way, doesn't it? Well I've seen the map for the level and it's huge, and one thing's for sure - it'll keep you busy for a long time.

At the start of the game you can choose one of the following characters - Jake, Ace and Max. Each have different skills, such as skills in the air, land and sea. You start off as a droid and must choose which skill you want.

Through-out the game there are patches of sea, air and land, in the middle of which are keys. So, if you are in sea mode and need a key that is surrounded by air (!) then you will have to go all the way back to the start and change your model! The doors show which key is needed to open them by the keyhole, so, a door with a round hole will need a round key to open it.



This game is a little bit like Gauntlet where you can have two players involved at the same time. You can also collect various weapons as when you have that a certain amount of money power-increases start to appear. On collecting these you are given a free-machine type chance to pick a weapon, prize your location and a letter will be selected, with each letter being a different weapon and if you are lucky enough to get 'A' you will get extra strength and a random weapon.

Although there are only three ways to this game, they are so comprehensive that they are more than enough.

I wouldn't say this was a game for shoot-em-up freaks, as it involves a lot of thinking and memory, with a fair bit of blasting as well. Yet another playable and polished game from the main man Mr Crowther. Well, don't just sit there picking your nose, go and buy this game, it'll keep you busy for weeks on end.

S.B.

Distributor: Piko **Contarian:** Supplier: Activision, 68 Long Arch, Covent Garden London, WC2E 9AM **Tel:** 01-8383411 **Machine:** C&A **Price:** £8.99 **Originality:** 5/10 **Playability:** 9/10 **Graphics:** 2/10 **Value:** 6/10



Living Daylights

After the release of *View to a Kill*, I approached this latest title with an open mind. No doubt you have seen or at least heard of the new Bond film, the *Living Daylights*, if you haven't, sit tight.

You play the part of James Bond on a mission to rescue the lovely Kara and help a fellow agent General Keokov. But as you know, this will be no easy task.

You start the game in Gibraltar, training with the SAS. They conceal themselves behind rocks and jump on randomly and shoot you - don't worry though, it's only point profits. But somewhere on this level hides an enemy agent out to kill you, kill him and you will be taken to the next level.

Before entering the second level you are asked to choose a weapon from a list of four. Make sure you choose the right weapon though. Here it's just more of the same shoot-the-baddies, but not Joe Public - if you do shoot a passer by you'll lose points and a 'wherever' sound is played. This would have been better if when you shot an innocent person a blood curdling scream was heard (Friday the 13th style) and it would certainly get you off shooting any more Joe's.

You play the game over eight levels, with increasing difficulty, but as I said before this game is almost the same all the way through. Just shooting jumping and dodging, but don't get me wrong, it's not a bad game at all, if it was a bit more varied, it might have got very high marks. But as it stands, it is a playable game that is let down by repetitive levels. It's a shame though, there were so many things that could have been put in, for instance a lovely car chase with multiple weapons.

Oh well, there you have it, a great license that could have been brilliant, but unfortunately is only average.

E.R.

Available:

Title: Living Daylights. Supplier: Demand, Demarc4 Music, 22 Maryfield Road, 8 Southside, London, SW9 6JF. Tel: 01-847 5612. Maphor: C&A. Price: £9.95/£12.95 (D&A).

Originality: 5/5. Playability: 3/5. Graphics: 3/5. Value: 5/5.

Eggs Epic

Whenever a magazine does a retrospective of great Commodore blasters from the past you can guarantee that *Impossible Mission* will be mentioned somewhere. Now you can add it to your collection and have *Summer Games*, *Pinop II* and *Breakdance* added to the bargain. Yes, it's a big value item from US Gold with their latest compilation *Eggs Epic*.

Few American companies can boast the string of successes enjoyed by this Californian team and, with the exception of *Breakdance*, this is a collection of their golden Old racemasters.

I admit that *Pinop* is perhaps showing its age, if only from the technical point that *Grand Prix* uses no longer permit scheduling stops. As a racing simulation it still has the novel approach of fuel and tyre matching to recommend it over other Pole Position spin-offs. In addition there are six real international circuits to choose from, either three, six or nine lap durations and three skill levels.

Playing at Pro level against the computer is almost impossible but you can always drag in a friend to play against you. Could *Pinop II*'s re-release have something to do with bigger plans from US Gold? Watch this space... even better read the news pages.

In case you're forgotten, *Summer Games* is the one with



pole vaulting, diving, the crippling 4 x 400 metre relay, the 100 metre dash, gymnastics, freestyle swimming (100 metres) and relay and shoot shooting. Eight events in all to test your endurance, skill and speed. This is the one that started the *Eggs* sports craze which has now taken in *Summer Games II*, *Winter Games*, *World Games* and the new *California Games*. I hope we'll see the rest of them on compilation soon.

For me, *Impossible Mission* is the best look game. It has everything from simple but tricky gameplay through to the deeper level of puzzle solving. Add to this unsurpassed value synthesis with magnificently animated graphics and I think you'll agree this is the ultimate. With rumours that *Impossible Mission II* will be appearing soon I may have to revise my opinions, but until then this is the show piece.

Even Elton Alexander had a plan to destroy the world and several agents have been lost trying to foil his plot. Elton

has locked himself away inside his underground stronghold and the stolen keys to his hideout are scattered in pieces inside the furniture. Guardian robots will make sure that you won't get the codes easily as you race against time to defeat the mad professor.

When I first heard that Breakdanceur was being written I thought it would be awful but it was wrong - it's dull. A lot of effort went into trying to create an interesting game but it's basically a dance version of the Simple Simon music game.

There are four elements to the full game. In the first you match the moves of Hot Feet, the local hero. Then you try to outdance the Rooker Crew who try to dance you into the river. The third challenge is against the Breakdancing King and in the final phase you can build up your own dance.

At £9.99 for the collection, the relative cost per game is about £2.50. At this price it should be in everybody's library or you really are missing out.

E.B.

Touchline

Name: *Spies, Spies, Supplines* System: *MS-DOS, Gold, Dem 2/3*
 Platform: *WV, Hofoed, Birmingham B6 7AE, Tel: 021-334*
 3388, Machines: *CGI, Price: £9.99*
 Originator: *S/TB, Playability: 8/10, Graphics: 6/10, Value:*
10/10



Defender of the Crown

These I was, writing the mail, press releases and final demands on payment for our edition: halfpenny for HPI, when out of an envelope came Defender Of The Crown. 'Yeah, great' I shouted with glee and carefully studied it in the dark store. After a few whims and clicks a nice little screen appeared with glistering metal and smart moves. I knew then, I was in for a treat.

I'm sure most of you have heard of this game which grabbed the headlines of most magazines for its wonderful graphics and music.

The game is set in the 13th century in days of old when knights were bold and all that stuff. You can choose from a list of characters who are different skills ie. some are good leaders but poor at sword fighting or could be good at

planting but a gritty leader - it varies.

After the title screen and credits have gone you will be asked to choose the character you want by pushing left and right on the joystick and a picture of the character and their abilities will be shown.

This done, it's on to the game. You are represented by a black shield on the map, which incidently is where a lot of the game play takes place. You can transfer men from your home garrison to an army which you can place on a plot of land. When your move is over the computer then takes control of the other five players and so on.

Moves available to you are either to go raiding, where you can visit a local or not so local lord to and attempt to steal their gold, but being of Saxon blood it's best to pick a Norman castle. First you have to fight your way past two guards, and if you have picked a poor overlordman you stand a good chance of losing.

I must mention the shadows that appear on the walls as you fight the guard inside the castle, as they are especially well done. You can also call townsmen provided you have the cash. What you call a townsmen you are asked if you would like to grant for fairs or far land. If you lose the battle and you choose to give your trading rating will be reduced, or a piece of land lost depending on what you gambled for. If you do manage to win the game you are greeted by cheers from the crowd and on your third win a nice little piece comes up on screen showing you on your horse being presented with a prize from the King.

My favourite part of the game is the love scene. You are alerted by the wailing of a Saxon maid, and two options are available to you - either rescue or ignore her. If you manage to rescue her you will be greeted by an unexpected-looking maid, who flutters her eye-lids at you. As you look in, she takes her clothes off (you'll go blind: ED) and last but not least you take her in your arms and give her a big smacker on the lips.

After that excitement you are then rewarded with her hand in marriage and the joining of two kingdoms. However, if you ignore her, you are a coward.

My other favourite scene is the siege. Here (provided you have a catapult) you must attempt to knock down the enemies castle wall with boulders, but this is quite tricky as you have limited boulders and each shot fired is a day gone by. Debris and burning parts of rocks you are also on hand for reducing the enemies army, but to get them over the wall you have to shorten the wall. You will then go into battle and the player with the most men gets the castle.

All battle scenes and their outcomes depend on how many men you have and what strategies you use. You could try and outflank your opponent with your leadership or choose to just stand and fight among many other options.

Playing Defender of the Crown was a joy, there are so many options open that each game you play is almost different. The love scene for example is random - you never know when it's going to appear, so if you were out of cash, and a fair maiden needs rescuing it could be a good chance to bump up your riches. The graphics are also quite breathtaking and really build an atmosphere, though a lot of them are not animated. The music, well this is very good, loads of different tunes for each part of the game and very medieval too.

My only minor about the game is the various bugs which occur now and again. For example you could place too many in an army, then suddenly have too many, but they still bug

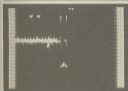
don't really spend the game. It just gives the slight feeling that you are not in control of the game. However this is no reason not to buy the game, and quite frankly you would be a fool if you didn't.

S.B.

Toughies:

Title: *Defender Of The Crown*. **Suppliers:** Miramax. **Address:** *News, 96-77 Shear Lane, London, EC4W 4AE. Tel: 01-277 4641.* **Machine:** *Com. Price: £14.95 (list only).*

Originality: 5/10. **Playability:** 5/10. **Graphics:** 18/10. **Value:** 9/10.

**Lazerforce**

One thing you are guaranteed from a quality budget range is a good choice of shoot-em-ups. Code Masters latest game is a blockbusting blast consisting of several mini game parcels of old time ups combined in a new and fresh way.

The rules are simple - survive! As the pilot of a delta winged starfighter you have to negotiate 10 levels of Hell, with each level consisting of four terrain chambers.

The first challenge is reminiscent of a stage of Salamander, the arcade classic. Tongues of flame reach out to lock round your Dargon red-blue missile trails. As the screen scrolls to endlessly down it reveals an amazing assortment of gun fodder attacking in several ways. From behind come the backward firing attackers; mean machines who can't fire but obstruct you in their path. It's all happening at once, it's hot, sticky, frantic action. Make contact with a WOP (who he'll) you double fire power; is increased to triple power and you can really give the enemy a roasting.

Another weapon in your armory is the Energy Disruptance Bomb which destabilises the kinetic energy of the aircraft and separates them all. Your store of EDBs is limited to use them wisely.

Assuming you survive, you meet the Guardian Zone, which is a Centipede style game, only four times more frenetic. Still the attack waves descend towards your small scrap of a ship but now centipedes appear spiralling down towards you through the mushroom shaped space debris. Here again you can relish the use of WOPs and EDBs.

Now the calm comes after this storm as you dock with your mother ship to refuel and gain bonus points for success.

These points can be increased as you pass through the controlled tunnel. If you crash in either of these phases you will not lose a life, so be as daring as you like.

Here ends the first level and although the rest of the game follows the same pattern the style changes. Level Two starts with mechanical arms reaching out and blocking your path, making you swerve like crazy to avoid collisions. Level Three has bubbles which don't move but have to be dodged around as you slip along on your way.

Lazerforce is the best game of its type that I have seen in a long time. If Jeff Miner wants to relinquish his crown as King Zap, Gavin Rieburn is a worthy successor. So much for so little, what a bargain!

E.B.

Toughies:

Name: *Lazerforce*. **Suppliers:** Code Masters, 1 Brunsonet Business Centre, Brunsonet Close, Bambery, Great Ouse, MK18 1AT. **Machine:** *Com. Price: £14.95.*

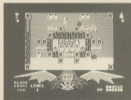
Originality: 5/10. **Playability:** 10/10. **Graphics:** 8/10. **Value:** 9/10.

The Astonishing Adventures of Mr Weems and The She Vampires

At first glance there is more than a passing resemblance between this game and Electric Dreams' Dandy. Not surprising really because they're both sourced by the popular but ever so slightly whacky Rare-Jam Corporation. This bunch have been on the games scene since the year dot; for the most part hiding behind larger companies such as Electric Dreams and Mosaic, but this time working for Nintendo.

Mr Weems is set in the distant past when there were two kinds of living dead - Vampires and Chartered Accountants. The only similarity between these breeds is their blood-sucking ways. Nowadays there are only CA's and this game provides a possible answer to the question of how the Vampires went into a decline.

Weems is not a run-of-the-mill accountant, he is a failed run-of-the-mill accountant. After firing with a heady



alternative career as a lion tamer, circus life lost its bite and so he turned to vampire hunting. Armed with a rapid-fire garlic gun and a single smart garlic pill we join our dull but brave friend in his greatest moment.

Deep in a Transylvanian chateau the She Vampires and their cohorts are out for blood as they stalk Mr Wooms. Necessarily, Wooms blasts bats, Frankenstein monsters and minor She Vampires with the same kind of detached indifference which he adopts when he bats up rows of figures in Company ledgers. This time it's his blood count which interests him, if it falls to zero so does he!

Hidden around the grotesque house are keys to rooms and secret passages. Vials of precious blood will replenish his fading health and garlic bombs help to clear across-upon-screen of hordes.

Wooms can blast away the corpulent containers permanently if he clears away all of the nasties in a particular area. This renders the evil-generating tanks vulnerable to his attacks. Each tomb-fire room becomes permanently exorcised, but just one unscathed generator will breed more creatures of the night when Wooms returns.

A floor cradling five floors of demons, Wooms faces the wrath of the Great She Vampire. If he has the tools he'll finish the job, if he is ill-equipped the She Vampire will prevail.

At first I thought this was just another Clamnet clone but it has a uniqueness which won't recover in the end. On the credit side, the game possesses that old and come again appeal which the frantic original failed to deliver. In the debit column is the Spectrum style of graphics (but not as ghastly ghastly as Dandy).

I think the similarity between Dandy and Mr Wooms may have an adverse effect on sales that even a silly title will fail to maintain. The cover illustration wins my vote as the worst I have seen in a long time. A shame really because Mr Wooms shows a vast refinement of style over its predecessor and deserves to win a larger audience.

E.D.

Touchline

Name: *The Astonishing Adventures of Mr Wooms and the She Vampires*. **Suppliers:** Pyramid, 4 Lady Essex Street, London WC2E 7JF. Tel: 01-836 6621. **Machines:** C64. **Price:** £8.95. **Originality:** 8/10. **Playability:** 9/10. **Graphics:** 7/10. **Value:** 8/10.

Mermaid Madness

Once upon a time there was a really ugly, old, cabbage-faced mermaid called Myrtle, who thought that at the ripe old age of a hundred and ten, she would be left on the shelf. So there she was sitting on the pier feeling sorry for herself, when up comes a dour sea diver by the name of Cassius Colin. With stars in his eyes she decides that this is her man and promptly tries to grab him. Colin may be straped, but not that stupid and he dives quickly off the pier to avoid her open arms. Foolishly however, he hides under a wooden boat and gets trapped. Myrtle the Mermaid is horrified and sets out to rescue Colin.

This is where you take over - you must guide Myrtle, who



can walk on land as well as swim in the sea, who will need to collect various objects, in order to progress. For example, you must find the dynamite to blow up rocks that block your path, find the net for the strange ankles, and collect bottles of stout to keep your energy levels up. Also you have to keep an eye on your heart, as this beats faster the closer you get to Colin.

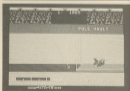
There are various sea creatures throughout the game and any contact with these will reduce your energy levels by little.

If you do not already have this game (it was released a while back by Electric Dreams) then go out and get it, as for £1.99 it's good value. I must mention the music which is also quite jolly.

K.R.

Touchline

Name: *Mermaid Madness*. **Supplier:** Firebird, 64-76 New Oxford Street, London WC1A 1PS. **Price:** £1.99. **Originality:** 8/10. **Playability:** 6/10. **Graphics:** 7/10. **Value:** 7/10.

**Devotion**

Joytick waggling can prove to be a very tiring affair. This is especially true when you have to keep it up for some time

minutes non-stop in order to compete in the 1500 metres, the last event in the Decathlon. Originally released by Activision, Pinchard have given the game a new lease of life at a budget price.

The events can be divided roughly into two sections - brute force and timing. There are three running events, 100, 400 and 1500 metres and you must keep the joystick moving from side to side just as fast as your hands will let you. In the other events, not only must you run up quickly, but you have to press the fire button to jump or throw.

Up to four players can take part simultaneously either in all ten events or just one. Points are awarded on the basis of your performance - the longer you throw the javelin, the better you score and as in real life, you soon discover that different people have different strengths and weaknesses.

Graphically, the game looks crude but that is irrelevant. Decathlon plays so perfectly, it was one of the first multiple-event type of game to be released and still stands the test of time. Superb value at under two pounds.

G.R.H.

Trashline:

Title: Decathlon. **Supplier:** Pinchard Silver, First Floor, 64-76 New Oxford Street, London WC1A 1PS. **Tel:** 01-476 6715. **Machine:** C&A. **Price:** £1.99. **Originality:** 5/10. **Playability:** 8/10. **Graphics:** 4/10. **Value:** 10/10.

**Clean Up Service**

Mr McQueen, owner of the Adèle Hotel has a little problem which is so bad, he can't keep his staff for long. What he needs is a hard-working person who can restore normality and the Hotel's reputation. Instead he employs Otto and Bobban, a pair of shirkers desperate for work after their exploits in Clean Up Time.

The instructions to this offering are non-existent, a deplorable habit which is common in the budget world. It took some time before I could work out what the game was all about. It was only when I discovered that there is a box of goodies on the screen that I started to understand the nature of the game. By merrymaking in the box you find a gun, a

brush and a bin lid which help to eradicate the litter bins who run from floor to floor.

In the impossibly difficult one player game Bobban sleeps upstairs as Otto dashes about in a futile attempt to rid the hotel of bins. The two player version brings Bobban into battle and the possibility of success becomes more feasible.

The bins emerge from several bins in the hotel, and the first task is to select which bin it is best to chase to keep the bins at bay. Once a lid has been placed on the bin the real clean up begins.

Armed with the gun and a brush the team can limit the amount of litter the bins spread until all the rubbish is removed. On subsequent levels the creatures and the aims change - in the kitchen make a hamburger, go fire fighting, and beat the wind. In all, there are eight levels, more than enough for an excellent value budget game.

This is a graphically interesting game and, in two player mode, the game is tricky, challenging and enjoyable. As a one player game it's a non-starter. If your social group includes another computer freak with his own joystick you could do a lot worse than to buy this co-operation game. If you are a secret Communiwave hacker send Clean Up Service at all costs.

E.D.

Trashline:

Name: Clean Up Service. **Supplier:** Playarc. **Tel:** 077336 77550. **Machine:** C&A. **Price:** £1.99. **Originality:** 8/10. **Playability:** 7/10. **Graphics:** 5/10. **Value:** 9/10.

**Street Games - Baseball**

If you're anything like me your experience of baseball games would be one of battling against the odds, and considering a twenty to seven defeat as being a pretty good achievement.

Egypt's Street Sports version of baseball from US Gold is the exception to the rule, allowing plenty of interaction before and during the game. There is plenty of opportunity to improve your team's performance and the excellent graphics and gameplay make it the best simulation that I've seen so far.

There are sixteen kids on 52nd Street and all of them want to play. As captain you have to use your skill to select the best possible team. Each captain takes a turn and then you have the option of salvaging your own batting order and field positions before the game begins.

None of the kids are great all-rounders and this makes the team selection a fascinating part of the game. Juice, for example, throws better than most of the boys on the team, but is better when it comes to batting. David, on the other hand, bats like a demon but makes a second-rate fielder. The skill of choosing is to select a team which covers its own failings as far as possible.

When the actual game begins you have a large degree of control over the action. You even choose whether you play on lawns or grass. When batting, your only worries are when to hit the ball and when to leave it alone. Timing of your stroke is important and not too difficult to master because you are given perspective and overhead views.

These two views are especially useful when it's your turn to pitch. The ball can be overtopped using the joystick in the most unusual ways. A double curve, or "S" shaped pitch, is possible and useful for confusing the opposition. The speed of the ball can vary too. It might start as a slow pitch, but suddenly you can make it pick up speed as it reaches the batting plate.

The main screen goes wherever the action lies. If the ball is flying towards the outfield you are shown the landing zone and it's up to you to move your nearest fielder into the zone ready for the pickup. Being basketball baseball there's plenty of rubbish for the fielders to trip over. Some of the players are not so good at straight catches let alone tackling an obstacle course!

The graphics are brilliant. Special attention has been paid to colourful and realistic animation but the sound is sparse though quite intensive. You even get the occasional car horn blaring away in the background.

During a game you really get to know the players quite well, and the next time you load the game you can select different teams or try different batting or fielding positions. This is a superb game and well worth its price.

E.D.

Touchline:

Name: Street Games - Baseball. Supplier: Epyx/DS Gold. Date: 2-3 Madras Way, Madras, Birmingham B6 3JE. Tel: 075-258 1288. Machine: C64. Price: £59.99/£14.99 disk. Originality: 8/10. Playability: 8/10. Graphics: 9/10. Value: 9/10.

Jackie & Wade

D Jacke has at long last perfected his transformation potion. Eager to see if it works, he takes a quick gulp and finds that he has a success on his hands. Well, not quite, as there are two slight problems. Although he has been transformed, the person that he has become, Mr. Wade, is not exactly the sort of person that you would like your granny to meet. In fact, he is thoroughly evil. The second problem? In your haste to try out your new option, you accidentally forget to prepare an antidote.

There is only one course of action left to you. You must sneak out the laboratory of your arch rival Dr. Piquet, hidden somewhere beneath Hyde Park. As he was working on the same problem, he might be able to provide the antidote.

The game is a problem solving arcade adventure in the format of wandering round, and picking up various items and using them to help you get past various obstacles. As such, it is no better or no worse than the hundreds of other games of this type but is not bad value at under two pounds.

G.R.H.

Touchline:

Title: Jackie & Wade. Supplier: Epyx. 8-11 Paul Street, London EC2A 4DE. Tel: 01-277 6880. Machine: C64. Price: £4.99.

Originality: 6/10. Playability: 5/10. Graphics: 4/10. Value: 6/10.

ACE 2

Ace is not only the sequel to the popular ACE combat flight simulator but also includes a second player and a second plane into the action.

The action takes place just off the coast of a foreign power where one player is based on an aircraft carrier sent to monitor a radar base. The land-based player takes exception to this and although the ship is in international waters a plane is sent out to intercept. Pyrr one launches its carrier based plane to intercept the other plane and destroy the radar station.

Before you take to the skies you can set up the game by tweaking parameters that decide the number of planes each player has, the number of hits required to blast each plane and the skill of the computer opponent if you can't find a human that can stand the pace.

You can arm your aircraft with a selection of close range heat seeking missiles and longer range radar guided missiles to dogfight with your opponent and also air to ground missiles to take out the carrier of the radar base. Unfortunately you can't carry everything you need all at once so you have to decide which weapons you need first.

As with any dogfight game you are in control if you're on his tail. Cut in range and you can hit him down with a salvo of missiles and then finish him off with cannon fire. However, he is trying the same tactics so you should be ready to take creative action if he loses to you. This action can either involve rapidly changing your speed, direction and height, or firing a flare or chaff to confuse the missile.

The action is fast and frantic so during manoeuvres must be carried out at top speeds. ACE 2 is a worthy successor to ACE and is certainly set to become a high flyer.

T.H.

Touchline:

Title: ACE 2. Supplier: Cascade Games Ltd, 3-5 Haywards Crescent, Harrogate, North Yorkshire, YO9 3BG. Tel: (0470) 525225. Machine: C64. Price: £

Originality: 5/10. Playability: 8/10. Graphics: 8/10. Value: 8/10.

Byting into the 6510

In the fourth part of our machine code programming series, we design a typewriter routine and learn more about flags and conditional branches.

By Burgard-Henry Lehmann

In the last three articles we have worked our way up to a point where we can now fill in the whole of the Commodore screen. In the following article I want to develop a simple word processing program. I feel that this will cover a lot of ground in terms of machine code programming, even if word processing is not your main interest, you will find that a lot of the principles we will deal with are just as relevant to you if you want to write an arcade game, an adventure game, a utility routine or whatever.

Of course, in the context of this series, it is not my intention to write a fully-fledged word processor you can use to back out a novel. All I want to develop is a simple 40 column typewriter routine and some associated editing routines.

Key Input

So far we have dealt mainly with writing the computer to output data, namely to the screen. Next, where we want to develop a word processing routine, initially we need to get the computer to input data, namely from the keyboard.

Computer keyboards are very versatile — each key on the board represents nothing more than an electronic impulse, and what result this impulse has depends on a program, resident in RAM, which interprets it. So each key on the board can do just about anything you want it to do. The *A* key on your C64, for example, can result in a capital letter *A* being printed onto the screen, as happens normally, or it can print a lower case *a*, if you switch the computer into the business mode or you could reassign the *A* key into something completely different, like function key 1, or make it start

your printer, turn a fan, or whatever you like.

All this is simply a matter of programming. As I have already mentioned, in the normal state of the C64 there is a program in the Kernal-RAM which interprets every impulse coming from the keyboard and converts it into an ASCII-code. This ASCII-code is stored in a series of locations, called the keyboard buffer.

Whenever the computer has nothing else to do, the keyboard buffer is emptied one by one and each ASCII-code is executed, that is, if it is a so-called printable character, the character is printed onto the screen, or, if it is a non-printable character, a certain action is taken, like moving the cursor, changing a colour, starting a new line, and so on.

All this is done by our good friend, the 6502 microprocessor. But since there is only one 6510 chip in each Commodore 64 computer, the question arises of 'how can all this be done without the system getting into an awful muddle about what to do first?' Furthermore, when you press a certain key you expect to get the result almost immediately! How can this be done if there is only one microprocessor which has to do this and a whole lot of other tasks besides?

Interrupts

The answer to this important question is 'interrupts'. This is a fascinating subject because it permits an 8-bit computer like the C64 which can basically only do one thing at a time, to pretend to do several things at the same time. It works because the 6510 microprocessor is able to do things at such tremendous speed. It's a bit like a magician who does tricks by sleight of hand — you can't see how he does it,

mainly because he does it incredibly quickly.

The 6510 has all the speed of the best magicians, but, of course, it has none of the brain of a Houdini. Instead it does its tricks strictly to order.

Every 80th of a second it gets an interrupt command which it has to follow, except if it just has executed a machine code command which instructs it not to react to the interrupt. This is called a 'maskable interrupt', because the microprocessor can be stopped from reacting to the interrupt. There is also a 'non-maskable interrupt' which cannot be stopped at all. We will return to all this later.

If the 6510 is not programmed otherwise it executes the maskable interrupt by interrupting whatever it is doing at this moment and saving the current address in the program counter on the machine stack so that it can continue from where it left off afterwards. Basically, it is very much like being called to someone's attention. The only difference with an interrupt is that the subsequent call does not come from inside the program with a 'JMP' instruction but is hardware-generated.

Hardware-generated means that a certain action the microprocessor has to perform is not instigated by a program but an electronic impulse coming from outside the microprocessor, as from a printer or disk drive or, as a matter of fact, another chip in the computer.

The interrupt system which the 6510 executes every 80th of a second consists firstly of reading the keyboard. That is, the 6510 finds out if a key has been pressed. If a key has been pressed it goes through quite a complicated routine which interrupts

Figure 1

BNE = Branch if result is Not Equal - if the zero-flag is NOT set
 BEQ = Branch if result is EQual - if the zero-flag is clear
 BCL = Branch if the Carry flag is Clear (A is smaller than B)
 BCS = Branch if the Carry flag is set (A is larger or equal B)
 INC = INCrement contents of memory location
 DEC = DECrement contents of memory location
 CMP = CoMPare with memory
 CLC = CLear the Carry flag
 ADC = ADd with Carry
 SEC = SEt the Carry flag
 SBC = SuBtract with Carry

that happens.

I said before that each key generates an electronic impulse. This sounds very complicated, but isn't. All it means is that if any key has been pressed, a voltage is coming from the keyboard, while if no key has been pressed, there is no voltage. This means of course that the impulse generated is exactly the same for each key. How can it then distinguish between keys?

The keyboard is mapped into a coordination system and each key is interpreted by determining from which part of this co-ordination system the impulse comes. It's a long process of elimination, and the end result of this is an ASCII-code. This ASCII-code is then pushed into the keyboard buffer location 60H-64H.

Amazingly enough, this is not all the 65H does every 80th of a second, if the machine is in the normal mode it also puts the cursor on the screen into another "blink-phase" so that it will appear to us slow humans as if the cursor is flashing.

Having done all this, the 65H returns from the interrupt, recovers the address where it left off and continues with the task it was doing before as if nothing has happened. Quite amazing isn't it?

Returning now to our main processing task, there would be little sense in our writing a routine which reads the keyboard port. All we need to do is to get hold of the last ASCII-code produced by the microprocessor and then write a routine which tells the 65H what specifically we want it to do with that ASCII-code.

For that it would be best if we could have that ASCII-code in the A-register of the 65H. For this I use a very simple ROM-routine, called "GETIN", which gets one character from the keyboard buffer and puts it into the accumulator. If there is no

character in the keyboard buffer, that is, no key has been pressed, then a zero is loaded into the accumulator. This of course sets the zero-flag.

In line 140 of our program I introduce the opposite of the "BNE" branch instruction which we have already learnt about. "BEQ" stands for "Branch if the result is EQual", that is, if the zero-flag is set.

What we want to do here is obtain if no key has been pressed, which results in the zero-flag being set, we loop back to the "GETIN"-routine, until a key has been pressed.

Now the zero-flag will be clear because a number larger than zero will be in the accumulator. This is of course the ASCII-code we wanted. It tells us which key has been pressed. It is now up to us to do whatever we want with it.

Exit

"Exit already?" you may ask. "We haven't even started yet!"

But this is very important in machine code programming. Remember, the 65H has no safety-net and doesn't give any error reports. If you set it on a certain course and don't tell it when to stop it will go on ad infinitum. There might be no way you can stop it, except by unplugging the machine. So always ask yourself the question: "Has this routine I am writing got an exit? This is *very* important in machine code programming than in almost any other language.

Most other bugs you can iron out in due time without much frustration. But if the 65H gets itself into a routine or loop without an exit, you are well and truly lumbered. All you can do is unplug the machine and lose perhaps hours of your work!

Surprisingly enough this bug can

even occur when your routine is basically working fine. For example, our typewriter routine would work perfectly without an exit. The problem would only arise when we want to get out of it. Because we can't exempt by unplugging the machine...

The exit I have chosen for our program is function key 1. If it has been pressed the ASCII-code 133 will be in the accumulator. So in line 160 I compare whatever is in the accumulator with 133 so that, if it matches, the zero-flag will be set and the 65H will jump to the exit-routine in line 1100 via the branch instruction "BEQ EXIT".

In line 440 I do another test, this time against decimal 20. If you look some page 125 of your user manual where all the ASCII-codes and how the Ctrl-integers them are listed, you'll find that decimal 20 is normally the value for the delete key.

Since I wanted to include a deletion routine in our program, line 450 is where the microprocessor will branch to if the appropriate key has been pressed.

Printing a Character

The routine in lines 470 to 540 outputs a printable character to the screen.

There are two sides to this routine - first we have to convert the ASCII-code into a screen code which the 65H can put on to the screen in the usual way and secondly we have to determine the position on the screen where we want the character to be printed.

If you compare the ASCII-codes on page 123-127 in your user manual with the screen codes on page 122-124 you'll find the following main differences in the way the various characters are expressed.

Codes 32 to 63 match exactly. ASCII-32 is always a space and that is the first of the printable characters in the ASCII-range. After that follow various symbols, like "@" and "\$" then the numbers from 0 to 9, then some more symbols and punctuation marks. All these are the same in ASCII-codes and screen codes, which means that we can write them to the screen unchanged.

From ASCII-64 onwards the two lists diverge. The "A" in a code is ASCII-64, but screen code 4. In short, for everything that follows from 64 we have to subtract 64 in order to arrive at

the proper screen-code.

This kind of thing is unique to the Commodore range of computers. The reasoning behind it is to be able to have two separate character sets. Set 1 is essential for graphic purposes, while Set 2 is meant for word processing.

What if it word processing we want to do, so are interested in Set 2 which gives us capital and lower case letters.

Lines 280-290 switch the C64 into the business mode or lower case mode, as it is also called. ASCII code 64, which is one of those non-printable characters I have mentioned above, is loaded into the accumulator and the ROM-location at \$E71B 'executes' the code, meaning in this case, with the C64 into business mode. You get the same result if you enter the BASIC-command "PRINT CHR\$(64)" or press the Commodore and shift key together.

"\$E71B" is a hex-number. So far I have no purpose added dealing with hex, because, unlike other machine code programmers, I do not consider hex an absolute necessity to successful machine code programming. Nevertheless, at a later date I will introduce you to the mysteries of hex too. At this moment just enter the number as it is given in the listing.

If a key and the shift key are pressed at the same time the "GETIN" routine will return an ASCII code which consists of the normal ASCII code+128. Therefore any ASCII code larger than 128 has to be a capital letter. Anything smaller is lower case.

The Carry Flag

So we want to know first of all if a number in the accumulator is smaller or larger than 128.

This brings us to the second most widely used flag in the PS or flag register, the carry flag.

In simple terms, the carry flag is set if the result of a subtraction does not go, that is, if the result is negative and it is clear if the subtraction goes, that is, the result is positive. Since subtracting two numbers from each other is the arithmetical way of comparing them with each other, the carry flag serves the extremely important purpose of telling us when one number is larger or smaller than another.

If A is smaller than B, carry will be clear. If A is larger than B, carry will be

set. Furthermore, if A equals B, carry will be set too.

Where there is a flag there have to be conditional branch instructions testing that flag. By now it will have become clear to you that this is the way we program the 6502 to make decisions. We arrange a certain operation which has an effect upon the flag we are interested in, then we test that flag with the appropriate branch instruction and this makes the 6502 jump to the appropriate routine.

The carry flag is tested and acted upon by two branch-instructions which are "BCL" and "BCC". "BCL" ("Branch if the Carry flag is Clear") asks if the carry flag is clear. If yes, the 6502 branches, if no it doesn't. And "BCC" ("Branch if the Carry flag is Set") asks if the carry flag is set.

Or, to put it differently, "BCL" branches if the number we are testing is smaller than the one we are testing it against. And "BCC" branches if that first number is bigger than or as big as the second one.

In our routine we want to know if the carry flag is clear after it has compared the ASCII code in the accumulator with the value 128 after the "CMP" instruction.

If carry is clear, it will mean that we have a lower case letter, and, as you will discover shortly, in this case it suits us to jump forward.

If carry is set, we've got a capital letter on our hands and want to subtract 64 from it. Then we go into a second test, and if the remainder is larger than 64, then we again subtract 64. The result will be a number larger than 64, and if you look that up in the manual, you will find that in Set 2 that indeed gives us a capital letter.

In a minute it will become clear to you why I subtract 64 twice and not 128 once. First let us look at the subtraction operation itself.

Subtraction

As long as you operate within the 8-bit range of numbers, subtraction (and addition) is quite straightforward on the 6502. You simply put the number you want to subtract from into the accumulator and then give the number you want to subtract together with the "SBC" instruction, which stands for "Subtract with Carry". The result of your subtraction will then be put into the accumulator. But why subtract "with carry"?

With each subtraction the state of the carry flag is taken into account. Because of this it is prudent programming to use an additional instruction every time we subtract.

"SEC" stands for "Set the Carry flag", and this is one of the few instructions of the 6502 which are used to program the flag register directly. If we didn't do this (and the carry flag was clear, the subtraction would be incorrect) by one.

So always remember - before you subtract, ensure that the carry flag is set by using the "SEC" instruction!

Addition

Addition is done in the same way, but now you have to ensure that the carry flag is clear. To do this, use "CLC", which stands for "Clear the Carry flag".

Unlike other micro-processors the 6502 has no addition or subtraction instructions which do not take the carry flag into account. So, play safe and always set the carry flag properly before you add or subtract!

Both the add and the subtract instructions can be given in all the addressing modes. That is, you can give the number you want to add or subtract immediately or you can tell the 6502 the location, where the number is, in all the various addressing modes which we have described in the last three articles.

In our routine we do it immediately of course because we are dealing with fixed values.

At this point I have to admit that the use of "SEC" in lines 100 and 180 is not necessary in our routine.

Can you guess how this exception to the rule I gave you above comes about?

Well, each time, before we subtract, we test if carry is clear. And if carry is clear it jumps over the subtraction routine. Therefore, when it does the subtraction carry has to be set! So when typing the program in you can omit lines 710 and 750. But remember, in most other situations you can't be that sure and have to use either "SEC" or "CLC".

In line 200 compare the normal way ASCII-code again with 64. This is to test if it's a character in the range 32 to 63 or a letter in the range 64 and upwards.

If it is a letter then I have to

subtract 64 again, and now it will become clear to you why I subtract 64 twice in the case of a capital letter: In this way I have a nice fix to this routine, otherwise I would have to make it jump over the second subtraction which costs extra bytes for a jump-instruction.

Having at last arrived at the proper screen code we can now print the character onto the screen.

Print Position

We print the character onto the screen in exactly the same way as we have described in the last article by using indirect-Y.

There is only one major difference: Because of the nature of the program we are writing it doesn't suit us simply to increment the index to arrive at the next position. Instead we prefer to have the exact current position always in "SCREENMEM" and "SCREENCOL". This is useful for when we want to design all sorts of additional input routines, like cursor-left, cursor-right, cursor-up, cursor-down and so on. Using indirect-Y would make it too complicated.

But because of this we have to ensure that Y contains 0 whenever we output a character. This is done in line 800, and you might think that this is not really necessary since we haven't used the Y register anywhere else.

But remember the "GETIN" routine at the beginning! Most ROM routines use all of the registers and thus corrupt them. So we can't take it for granted that Y will still contain 0 after it has returned from the "GETIN" routine.

This is another important point: Always be aware that ROM routines (as well as subroutines written by yourself) use and corrupt registers. So if you need a certain variable, you might have to save it before calling on the ROM routine and restore it afterwards! Of course, in our case we don't have to save Y since we know that it always has to be zero when we print it.

Counting Upwards

The overall gist of our print routine is that we want to print a character to a certain position and then update our pointer-locations ("SCREENMEM" and "SCREENCOL") so they point at

the next print-position. Since we write in one column from left to right the next print position is one more than the former one. In other words, we count upwards.

Again because of the limitations of the 6502 this is not as straightforward as it should be. Sure, as long as we are within the 16-bit range there is no problem. We just increment the location of register by one. But the moment we arrive at 255 it will of course overflow, which means that the location of register reaches back to zero.

This is where the high-byte of the number we are dealing with comes in. Every time we reach 255 for 0, the high-byte has to be incremented by one.

This is not done automatically by the micro processor. It has to be programmed!

So, in line 670 we increment the high-byte of "SCREENMEM". Then we test the zero-flag. As long as the result of the former operation is between 1 and 255, the zero-flag will be clear. Therefore BNE branches to over the following instruction which increments the high-byte of "SCREENMEM".

Only when we reach the crucial 256 (or 0) point will the zero-flag be set. Now it won't branch and the high-byte of "SCREENMEM" will be incremented this 660s.

Lines 710 to 730 do the same thing with "SCREENCOL", and then our routine is finished. We jump back to the "GETIN" routine (lines 720 to 740 respectively, depending upon the high-byte having to be incremented or not) in order to await the next keypress and repeat the whole process.

Deletion

The deletion routine which follows is in a way more straightforward than the print routine. All we want to do is to decrement our print position by one and print a space over the character which we want to delete. In a later article I will give you a more sophisticated deletion routine which is similar to the one used when you press the delete key normally. But for the time being this one will suffice.

To start the routine it is prudent to build in a safety catch. After all, we don't want it to be able to go backwards ad infinitum and write

spaces into all sorts of locations. So we want to prevent the deletion routine from going over the beginning of the screen.

In line 820 to 870 I tested the current screen-position against the beginning of the screen, which is 1024. If the two values are equal, the routine jumps straight back to "GETIN", that is, no deletion-action is taken.

Because I compare two 16-bit numbers with each other I have to do the comparison in two parts. First I compare the two low-bytes. If they don't compare I will know already that it isn't at the beginning of the screen. In line 840 the zero-flag will be clear and it will jump straight to the beginning of the deletion routine.

If, on the other hand, the two low-bytes are equal this is still not conclusive evidence that I am at the beginning of the screen. So I now have to test the two high-bytes. If they too are equal, then I know for sure that it is at the beginning of the screen.

Counting Downwards

Now we want to decrement the screen position by one so that we can print the space and thus close the former letter.

Counting downwards on the 6502 is even more involved than upwards, if we are dealing with a 16-bit number.

First I load the low-byte into the accumulator in order to test the zero-flag. If the zero-flag is clear, that is, if the low-byte is between 1 and 255, then I need only to decrement the low-byte.

But if the zero-flag is clear, that is, the low-byte contains 0, then I have to decrement the high-byte as well as the low-byte.

Finally

The rest of the deletion routine and the main exit of our program in line 1114 should be clear.

Listing 1 gives you the whole of the program I have described in this article and in figure 1 I give you a list of the instructions we have dealt with in this article and in the last one.

When you try the whole program and you find that it rather irritatingly something is missing: There is no cursor!

Next time I will explain how we can add a cursor to our routine, and an interrupt driven-cursor at that. So until then, watch this space - it'll be good.

California Games

If you want sunshine and fun, then look no further than the latest release from Epyx.

By Eric Doyle

In the wake of Summer, Winter and World Games come the Epyx thrills and spills of the sunshine state.

Just when I thought that the Epyx's Games series had run its course, US-Gold pull a stunt like this on me! For my money California games is the best yet, and that's really saying something. The graphics are radical, the gameplay is smart and the sound...well it's better than the previous game!

Up to eight players can share the experience of the six competitions and each competitor can have a sponsor. Yes folks, Sponsorship has arrived and, when the finished version appears, US Gold hope to have a set of British sponsors.

First of all, dust off your skateboard for the Half Pipe event. As the name suggests this event takes place on the inner surface of an enormous tube cut in half. There are three basic turns you can make to score points: the basic Kick Turn, overhead Heave Plants and super flashy Aerial Turns. The trick is in your timing and speed - go too fast or hold a line too long and you'll wipe out.



You have just a minute and a quarter to start the judges with your talent, but fall three times and you'll hang up your skateboard early.

After all this action at earth's treacherous prime Beverly Hills, we now head for the beach because it's 'Foot Bag' time. Foot Bag? Yes it's the latest craze for macho types. Keep a little bobby ball in the air without the aid of your hands and perform as many tricks as you can for another minute and a quarter.

Surely there can't be that many kicks you can perform? Well there are eleven ways to score and each combination of moves results in a name such as Dirty Dean, Jester or Aole Foley. Each combination scores a different mark, the most difficult being the Dude. To complete this move you have to bounce the ball with an outside kick onto your head and then kick the ball back with an outside kick from your other foot!

Even California has sunbells and there is one that keeps flying across the screen. If you can hit it with your ball you can score extra points as the bird upon patron's nose awes back with threats of revenge.



After beating your feet on the beach you go on to ride the rollers of the Pacific. 'Surfing' is a passion for Californians and catching a wave is almost a religion. The massive rollers curl as they break forming a tube and it's the aim of every surfer to ride inside the tube. High scores can be achieved for this trick and you can also perform loops, catch air by just letting your 'woody' overlap the crest of the wave or perform during 360° turns.



At the end of each run a group of beach boys give their opinion of your run and a score is averaged out from this.

'Roller Skating' on the promenade of Californian beaches is hazardous because of all the junk scattered around. In this simulation you have to keep over all the obstacles thrown in your path. If you have the alacrity and grace to execute a tactical spin as you jump, your point score is boosted. Beach balls, cracks, uneven surfaces and junk food containers have all to be negotiated before you complete the course.



Did you know that 'BMX' stands for Bicycle Mexican? In this game it also stands for Blue Monkey and exasperation! It seems the little lewis have been at it again and the course is strewn with logs, trees and oil drums. The path simulates into series of whoop-d-dos and you can wheelie your way along the straight and perform superb loops from the tops of the highest ramps.

As you jump you can grab in one of several ways lots of lovely bonus points. The most difficult stunt to perform is the forward somersault which can bring a maximum of 6000 points. Compare this with my high score and draw your own conclusions.



By this time a more sedate pastime would be welcome and what have we got? Frisbia is to be more up-to-date the 'Flying Disk'. All you have to do is to throw it as far as you can and catch it before it touches down. Not as easy as it sounds. First the thrower has to gauge the strength and angle of the shot. Then the catcher has to get into position and catch the disk as it passes.



These are the games and I've spent hours trying to beat my own high scores. To give you something to aim for here are my scores so far:

Hill Pipe	2072	Roller Skating	2630
Foot Bag	17900	BMX	5432
Surfing	32	Flying Disk	1800

If I had to lose all but one of my Epps Games disks, I would choose to keep this one.

Touchline:

Name: *California Games*, Suppliers: *Epps/US Gold Ltd*, 2/2, Windmill Way, Hatfield, Northampton NN6 7AY, Tel: 025-138 1303. Machine: C64. Price: £9.99 (incl. VAT) per disk. Originality: 10/10. Playability: 10/10. Graphics: 11/10. Value: 10/10.

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ISSN 64

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Computer User

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Bothersome Basic

Continuing our Basic series, the highly strung personality of the Commodore is revealed

By Eric Doyle

One thing that never ceases to amaze me about computers is the way they appear to have intelligence. The more you get involved with programming the more you realize what an illogical phenomenon this is. The simplest way of building 'intelligence' into your programmes is by making the computer appear to respond on a personal level.

```
10 INPUT "CLR,DOWN,DOWN)
HELLO, WHAT'S YOUR FULL
NAME";NAMES
20 IF NAMES="" THEN 30
30 I "OH, IT'S YOU";NAMES:
I'VE HEARD A LOT ABOUT
YOU"
```

When you type in this program, remember that the characters in the square brackets are not entered as you see them here. After opening the quotation marks, ignore the square brackets completely and hold down the SHIFT key and press CLR/HOME. This will give a reversed out heart shape.

Next, you press the cursor down key to give a reversed out letter Q and then press again for a second Q. When the program runs, this will cause the computer to clear the screen and move down two lines before pointing out the question. For more information on

these symbols, refer to the *Living's* page in this month's issue.

I have used the word INPUT instead of PRINT at the beginning of the line and so when the program is RUN the computer will know that something will be entered later via the keyboard. After the question, the semi-colon prevents the computer from jumping down to the next line. In response to the INPUT command and the semi-colon the computer will finish off your question with a question mark and the cursor will reappear and flash at the end of the line.

The program is still running at this point but the computer is waiting for a response from the user. We want the computer to 'remember' what is typed in, so we have to tell it to store the answer somewhere. We have seen that the computer stores information as a variable but so far these have only been numbers. This time the variable will be a series of letters.

Variable Questions

For storing such an input, the computer has a special kind of variable known as a string which is indicated by a variable name (NAME) and this is labelled as a letter store by adding a dollar sign (\$) after it.

Number variables, or the correct term, numeric variables, can be directly assigned in a program (A=123) and strings can also be directly assigned: NAMES="ERIC". Notice that the string of characters is placed inside quotation marks. When a string is INPUT from the keyboard the computer assumes that the response has quotation marks around it, so you don't have to bother to put them in.

After RETURN is pressed the computer checks to see whether something was entered by executing line 20. The IF/THEN command is fairly self-explanatory. If the contents of NAMES has nothing between the quotes THEN the program will loop back to run line 10.

If something has been typed in, the program then executes the final line. This is simply a PRINT statement modified to insert the name in the middle. Once again semi-colons are used to force the computer to keep printing on the same line. To see the effect, erase everything after the first semi-colon and enter two new lines:

```
40 PRINT NAMES $;
50 PRINT " I'VE HEARD A LOT
ABOUT YOU!"
```

After running this to see that the result is the same as before, try erasing the semicolons to see what effect they had.

Once you have created a string there are special commands which enable you to manipulate it in various ways:

```
10 A$="YOUR COMMODORE"
20 B$=LEFT$(A$,3)
30 C$=RIGHT$(A$,1)
40 D$=MID$(A$,4,3)
50 E$=D$+D$+C$
60 TAB;TR$;TR$;TR$
70 PRINT
```

After line 10 sets up A\$, line 20 saves the three leftmost characters in a new string, B\$. Similarly, C\$ becomes the single letter to the extreme right of A\$.

Line 40 takes a little more understanding. It tells the computer to save an internal string from A\$ which starts at the fourth letter and takes eight characters in all. D\$ therefore consists of the row of letters from the B of 'Your' up to and including the D.

Line 50 shows how strings can be added. This is not like adding numbers together, because one string is absorbed into the end of another. It's rather like saying that 2+3+6 = 266. Strings can only be added, using any other mathematical operator other than plus will produce a TYPE MISMATCH ERROR message.

We can use string manipulations in our original program. Add this:

```
21 A=I$+0
22 FOR C=1 TO LEN(NAMES)
23 IF MID$(NAMES,C,1)=$CHR$(2)
  THEN PART$(A)=MID$(NAME
  $,I$+1,C-1)+B+C$+A+A+1
24 NEXT C
25 PART$(A)=RIGHT$(NAMES,
  LEN(NAMES)-B)
26 "POO! IT'S YOU "PART$(A)
  "I'VE HEARD A LOT ABOUT
  YOU!"
```

Forget line 21 for the moment and concentrate on 22. We're trying to split a full name into forename, middle name(s) and surname. When we write our names we denote the end of one word and the beginning of another by leaving a space between them. If we search along NAMES for a space we

know that all the characters before the space form a part of the full name.

How Long is it?

Several people may use this program, so we don't know how long each name will be. Fortunately BASIC includes a way of calculating this. The keyword LEN will return the length of any string mentioned in brackets after it. We use this in line 22 to determine the parameters in a FOR/NEXT loop which will repeat as many times as there are characters in NAMES.

In line 23 we use MID\$ to test each character in turn to see if it's a space. Instead of specifying which character the MID\$ starts with, we let the loop do this by using the current value of C, and because only one character is examined at a time we get the expression MID\$(NAMES,C,1). If this doesn't equal a space which has a character value of 32, a CHR\$(32), the program ignores line 23 and jumps to line 24. If it is a space THEN several things happen.

First of all a new string is formed. You'll notice that PART\$ is followed by (A). As the value of A changes we get a series of new strings: PART\$(1), PART\$(2) etc. What is known as an array. Each string, called an element in the array, has the same string name but the value in brackets denotes that each string is in fact different from all the others. The numbers in brackets can only range from zero to nine unless we tell the computer otherwise.

When the first space is met A has the value of 1 as specified in line 21 so PART\$(1) takes the result of the MID\$ expression calculated on the other side of the equals sign. Let's study how this formula is derived.

A space has been found at character number C of the name. This part of the name starts from the beginning of NAMES to the character before the space which means the last letter's position is the space's position minus one, that is C-1. For the forename this would mean PART\$(1)=MID\$(NAMES,1,C-1) so where does the B come in?

Let's see what happens with the second name. Again the last character will be the one before the next position (C-1) but the name starts somewhere in the middle of NAMES. The actual position is the last space position plus one. If we calculate this when we separate off the first name with the

expression B=C we can use B+1 as the start of the second name. This makes MID\$(NAMES,B+1,C-1) but C-1 gives the total number of characters from the beginning of NAMES to the character before the second space. That's too many, so we only want the number of characters from the last value of C to the current value of C.

Luckily, we have stored the last value of C when we said B=C so if we subtract B from the current value of C we get the length of the second name. This includes the space at the end of the second name, so we still have to subtract one, hence we get MID\$(NAMES,B+1,C-1-B).

What value do we give B to start with? Remember I said earlier that the first name could be given by the expression MID\$(NAMES,1,C-1). If we substitute a zero for B in MID\$(NAMES,B+1,C-1-B) we get MID\$(NAMES,0+1,C-1-0) which simplifies to MID\$(NAMES,1,C-1). Eureka! We have the magic formula which covers all cases if B is given an initial value of zero (as specified in line 21).

What happens when we reach the end of the name? Since there is no space at the end the 'IF MID\$ is a space' condition is not fulfilled so a string is set up for the surname. To convince this we have line 25:

```
25 PART$(A)=RIGHT$(NAMES,
  LEN(NAMES)-B
```

All we have done here is to chop-off the end of NAMES from the last value of C which was stored as variable B. This is subtracted from the full length of NAMES to give the length of the surname: LEN(NAMES)-B. As the surname goes to the end of the string we can isolate it by taking the RIGHTS to the length of the surname: RIGHT\$(NAMES,LEN(NAMES)-B).

Finally, I've modified the last line to address the user by first name(s) only: PART\$(1).

We can now see what we've found to make the computer appear even more human:

```
40 IF A > 1 THEN "YOU
  HAVE:"PART$(1) "TO YOUR
  NAME:"PART$(1)";"
50 "GIVE MY REGARDS TO THE
  BEST OF THE "PART$(A)
  60 "FAMILY WHEN YOU NEXT
  SEE THEM."
```


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Amiga News

Expand your RAM

A two megabyte RAM expansion box is now available for the Amiga PC1800 from Ramtek. The unit, which costs less than £400, is compatible with all Amiga's and plugs into the bus expansion connector. For PC5000 users, a special interface is available for £14.95.

Books and Software Galore

Users of Commodore's A500 and A2000 can now read all about it in four recent publications from Abacus.

Amiga Basics - Amiga and One will tell you all you need to know about programming the Amiga in Basic. Approx. retail price: £16.95.

Amiga Tricks and Tips will enable you to program a wide range of the Amiga's features such as accessing Intuition and making use of the advanced graphics programming using windows and menus. Approx. retail price: £12.95.

Amiga for Beginners will give the first time user an introduction to the Amiga and will cover the necessary housekeeping chores and the first steps in Basic programming. Price to be announced.

Amiga Hardware Language is the guide for those who program in list machine language and need to get to grips with the 68000 processor, address modes and instruction set. Price to be announced.



When you've had enough reading, consider the new range of productivity software packages from Abacus.

FormPro is an intermediate level wordprocessor which has been designed with fast entry in mind. The package features fast on-screen formatting, automatic hyphenation, the capability to include graphics with text, 48 user-definable function keys and flexible printer driver installation. Price to be announced.

BeckerBox is a professional quality wordprocessor which features the additional functions of WYSIWYG formatting, multiple

column printing, real-time online dictionary for type along spell checking and automatic index generation. Price to be announced.

Data Address is a data management package which features pull-down menus which enable the user to quickly define files and cover information using consistent and flexible screen templates. Price to be announced.

Assembler is a language development package which contains all the tools for writing programmes in fast machine code. Price to be announced.

Games Update

English Software have come up with a game that could be the known snooker player with *Q-Rail*. Imagine playing a pool game inside a cube, firing up shots in three dimensions and being able to rotate the table in 3D while you make your shot. If you feel you're up to the challenge that *Hardware Higgins* might even say

don't, this game is for you!

Rainbird's Level 9 programming team have come up with a three-part fan packed adventure in *Twilight One*. You play the role of an oppressed one in a magical world of illusion and deception where you will communicate with other characters, learn spells and solve puzzles.



English Software's Q-Rail



Lord F Celebrating Knight On

Turn on On

A useful utility for Amiga users is an ON/OFF switch for the A500, which allows the power supply unit to be placed well away from the computer, allowing freedom of movement around your computer. The existing power inlet is simply plugged into the A70 switch and then the whole unit is plugged into the power socket - what could be easier? Price at £14.75, the switch is available from Lifetime Products, 22 Winstan Avenue, Stockbridge, Sheffield S20 3LA.

Forms in Flight

The Amiga Centre in Scotland continues its policy of importing some of the most interesting graphics software for the Amiga from the USA. The latest addition to its catalogue is *Forms in Flight*: a 3D drawing and animation utility. Objects can be drawn in both two and three dimensions and can then be viewed from any perspective or direction. The objects can be moved or rotated about any point to create animated effects with pan, roll, magnify, multiple light sources and hidden line removal all possible. But watch out, you will need 100Ks of RAM minimum to work this magic.

The £50 inclusive price tag is reflected in a large spiral bound

manual and a highly professional presentation. The software is menu driven. Playback supports low resolution with 32 colours and medium and high resolution with 16 colours. Plotters understanding the standard Hewlett Packard drivers can plot the objects, which are maintained in libraries, on paper. Details on 011 357 4242.



Amiga in Flight

Games Galore

The Amiga is looking more and more like the natural successor to the C64 with a flood of new games available. MicroPress have premiered us *Bludius*, a fantasy role playing adventure and Amco's 'budget' 40 Amiga priced range of 6945 games is the first indication of more reasonably priced software.

Advertising Available

Commodore are promoting the computer trade an Amiga 'advertising available' this Christmas. Advertising in the trade press has spelled out the advantages of the Amiga 500 over any rival home computer so there should be no shortage of shops to buy an Amiga from over the holiday period.

How do I get it?

It's alright in giving you an exotic address and ZIP code for some Los Angeles neighbourhood but how do you get the software? Well, you can either:

1. Check the ads - English Commodore dealers are importing more and more software all the time.
2. Try our contact addresses/telephone numbers.
3. Get in touch with Commodore UK who can supply you with a brochure full of goodies for your Amiga.

Amco, 2201 Salamano S.E., P.O. Box 1219, Grand Rapids, MI 49510. Tel: (616) 241 2500.

SB Computers, 173 Thornbury Road, Garsley, Ilkworth, Middlesex, TW7 4JQ. Tel: 01-888 7348.

Addison Wesley, Finchampstead Road, Wokingham, Berkshire, RG11 2WZ.

Agis Development, Tel: 213-982 9872. Amiga Centre Scotland, 4 Hill Street Lane, Edinburgh, EH1 3BN. Tel: 031 957 4242.

Applied Vision, 15 Oak Hedge Road, Medford, MA, 02155. Tel: 617-488 3682.

Artistic Software, 275 Kennal Road, London, W10 5DB. Tel: 01-880 0200.

Artlines, Trenchvale Cottage, High Cottages, Walskburn, Pocklington, YO44 6AZ. Tel: 0846607 503.

Cavendish Commodore Centre/UK Amiga Users Group, 66 London Road, Linslade, LE12 0QD. Tel: 0519 250905.

Club Amiga, 85 Upper Drumcondra Road, Dublin 9, Ireland.

Commodore (UK), Commodore House, The Switchback, Gardner Road, Midsford, Berks, MK7 7XA. Tel: 0628 750888.

Computall Ltd, 7579 Chadderton Way, Oldham, OL4 6DH. Tel: 061 652 8006.

Diamond Software, 54 Knighthill, London SW27 0JD. Tel: 08 761 7965.

Edwards, Matt Farm, Stokenham, Essex, RM34 3QH. Tel: 0208 856468.

English Software, 1 North Parade, Parsonage Gardens, Manchester, M3 2PL. Tel: 061-835 8358.

Felkin Software, 3175 South Hoover Street, # 275, Los Angeles, CA 90007.

George Thompson Services Ltd, Whycorps House, Old Regate Road, Beckenham, Surrey RM5 7DR. Tel: 031 784 4875.

Gold Disk, 890 Box 789, Sacramento, Mississippi, Ontario L5M 2C2. Tel: 416 828 0963.

HB Marketing Ltd, Pier Road, North Fylham Trading Estate, Fylham, Midlesex TW14 0TT. Tel: 01 844 1302.

CONTINUED IN JANUARY 1985

WordPerfect

We take a close look at what could be the ultimate word processing package for the Amiga.

By Anne Owen



WordPerfect Family

Sentinel are lucky, selling WordPerfect and the associated family of software products in the UK is 'fun' for them. Everyone in the company uses them and looks forward to the next package from across the Atlantic. The latest Amiga version of WordPerfect arrived to great excitement while I was visiting. If the Amiga family (especially the 2000) does well, then we Amiga users can also look forward to more software from the Unix based WordPerfect programmers. Current products include a spreadsheet and database.

WordPerfect Amiga takes its place beside Atari ST, Apple Macintosh and IBM versions in the PC field. The Amiga 2000 can, in particular, take advantage of the text file compatibility between different computer types. At the recent Commodore show, Sentinel had both Amiga and IBM versions running side by side in the 2000, one in the Amiga, one in the MSDOS task window. When you buy WordPerfect on the Amiga, you buy a product which is available on almost everything, including DEC VAX and PC networks.

Working with WordPerfect

WordPerfect has got every 'standard' feature you would expect of a wordprocessor. Each feature is accessed via push-down menus and submenus - all with alternative (function) key presses - with a choice of iteration modes. For instance, on selecting a search and replace on formatting codes, all the codes are listed on screen for you to choose. You are not expected to remember them or look them up. Substantial help texts can also be called up to explain any operation.

No requirement therefore to start with the manual whereas the more advanced features can be learned by using the tutorial disk and the manual together. WordPerfect, unlike some packages, is fully in tune with the Amiga environment. Just click on the disk icon, then the WP icon and you are into the full-screen text window, which can be

The persuasive professionals from Sentinel Software recently took me through an extensive demonstration of WordPerfect, a wordprocessor whose functionality no other Amiga software package can match so far. The finished product should be available from your local dealer by the time you read this.

I had heard about WordPerfect on the IBM PC, the best selling wordprocessor - 13% of the UK market. I heard that Sentinel has target sales of three million pounds this year (you will have no trouble getting a £ sign on this wordprocessor - see below). I heard that WordPerfect was becoming a standard, number one in the charts, used or more by Marks and Spencers no less.

I also heard that on the PC WordPerfect 4.2 costs £425 but that Sentinel employ twice the staff supporting WordPerfect users than selling it to the non-WordPerfect users. The Amiga version is WordPerfect 4.1 and costs £295. I also heard that there is an educational price of £75 for training (£135 for administration departments).



sted and scrolled like any other. A number of document windows can be open at the same time. The function keys are surrounded by a printed template with colour coding for the different key press combinations, e.g. SHIFT and function key. In this way a key can, say, activate a word count or go to a page number.

The programmers have cut down disk access to a minimum, meaning fast retrieval of file information. This is displayed in a window with ten options listed alongside. Files can be marked for selective operations such as delete, copy or printing (which is in the background from this window - in other words you can continue wordprocessing). 'Info' files are available but can be suppressed from the WordPerfect display. Files are sorted alphabetically and can be searched for a word match. They can also be protected by password. An 'ASCII check' provides a quick way of displaying the contents of a file.

The recovery option adds the selected file to document so standard text can be merged. Each document is held in 'virtual memory' which means that the text can be as large as disk storage will allow with text loaded into memory as required without intervention by the user. WordPerfect periodically makes a backup of your file in case of accident but documents also have to be saved at the end of a session.

Editing Text

Before describing some of WordPerfect's editing abilities, it is necessary to explain that each document has two elements. For each text that is visible on screen, there is a second text 'below' with formatting codes included. This second text can be displayed in the bottom part of a split window and/or be edited in the same way as the 'top-layer'. The codes look like this:

```
(Margin, Set:0.74)
(C)
(HE)
(Tab Set 1:15)
(TAB)
```

and affect the text after them until the next equivalent command takes precedence. As required, the user can get to know them and take precise control of the text at low level. For the great majority of users these codes will be inserted invisibly as you edit a document, choosing line-spacing,

centering, justification, hyphenation and so on. All style and formatting features can be generated with the mouse or from the keyboard. Differing line lengths, simply adjusted on the ruler, tabulation and bold and italic styles are shown on screen.

Modifications to the text can be made by character, word, paragraph or marked block. Rectangular blocks can be copied, deleted or moved out and pasted. As well as editing text over a single line length, you can type into columns across the page. The columns can be protected or 'newspaper style', where the text flows from the current column into the next column to the right of it.

Advanced Facilities

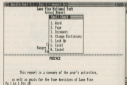
WordPerfect is plenty for the Amiga user who processes large amounts of text. For the product catalogue, information booklet or book, an automatic outline facility is available. Once activated, each paragraph is assigned a new number. Each new tab position gives a new level (and style) of numbering. There is a large range of styles to choose from, for instance IV, I, A, a.

Each page of WordPerfect document can have its footers and headers and a footnote generated as you write will automatically appear (with correct formatting) at the bottom of the page. A table of contents and an index, both with headings and sub-headings and a variety of presentation styles, can be automatically generated by marking the required words.

For anyone who wants to incorporate straightforward maths into a document a type of mini spreadsheet is available within WordPerfect. Figures, formulas and descriptive text are entered into up to 20 tabulated columns. Subtotals and totals are displayed and any changes recalculated.

The mail merge facility is always a vital part of any wordprocessing. At its simplest level WordPerfect will merge a standard document with a list of alternative texts typed into WordPerfect itself. WordPerfect uses a set of special merge codes which are prefixed with "" (CTRL). "R" indicates a record end in a merge list for instance, "Q" quits the merging process and "C" takes text direct from the keyboard. Text can be merged from a primary and secondary file with the results going to the printer or a disk file.

Macros repeat old-used keystrokes and WordPerfect will



This report is a summary of the year's activities, as well as plans for the four divisions of Lane Park National Park for 1987.

meant a set of keypresses like a digital tape recorder ready for replaying at any time, for instance from within a merge file. You must call the macros by the name you choose for the definition.

Spell checking has become a standard feature of modern wordprocessing. WordPerfect can check by document, page or marked block. If an error is detected then likely replacement spellings are offered for a quick click of the mouse. The checker can also pick up double words and numbers in words if required. A supplemental dictionary can be created from words unrecognized by the main dictionary and there's a program module to add it to the main dictionary if required. Foreign language options are available. The thesaurus complements the dictionary with a vocabulary broken down into verbs, nouns, adjectives and antonyms (opposites). You can quickly move around alternative possibilities by clicking on them with the mouse.

Output

Printer features such as font, pitch, lines per inch paper and subscripts, though not displayed, can be specified by codes in the text. The 256 printer drivers, as well as making Professional look stupid, mean that, whether you use dot matrix, daisywheel or laser, there is in all probability a simple setup procedure for you. You can also build your own printer driver and assign any character number to any

printer code. For instance you can assign the Amiga internal character code 163 (the £ sign) to the code which generates that character on your printer.

Sophistication

For me the sophistication of WordPerfect is reflected in this sort of attention to detail: when you mark a block of upper case text and turn it into lower case, WordPerfect will, by default though not necessarily, retain upper case characters at the start of any sentence within the block, Marvellous! And if you get anything wrong there are three levels of 'undo'.

There are more of the desk top or form drawing features of some specialist wordprocessors, but WordPerfect appears to provide sophisticated and well-directed facilities without leaving the user behind. My brief acquaintance left me impressed and pleased that the Amiga's potential is beginning to be fulfilled by ambitious software, the power of which I have only been able to hint at in this article.

Availability

WordPerfect Amiga in version 4.1. It comes on four floppy disks with manual and keyboard templates. Price is £295. The Amiga Users Group is offering a £50 trade-in discount for Scribble users who wish to upgrade to WordPerfect.

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Amiga Games

Another batch of games for the Amiga, old favourites and hot new properties jostle for places inside Your Amiga.

Crasher Factory

Do you remember Pac Man? That seemingly rare game where you controlled the movements of a yellow, ball-shaped mouth that ate and ate and ate...?

After Asteroids, Pac Man was probably one of the first arcade games to make it big Stateside; it is probably the only arcade with a children's cartoon series in its name (thank God), and after setting off a whole genre of theme-orientated spin-offs, Pac Man sank into obscurity, occasionally popping up here and there in steady motorway traffic.

Well, this time Pac Man has surfaced on the Amiga, called Crasher Factory, this is not only Pac Man with all the bells and whistles, but it is the first Pac Man I have ever seen with the option to have two players playing at the same time!

The crasher moves about the screen, eating the little dots and the larger green dots, which work as power pills, enabling you to eat the mazes for a short period of time. Sometimes a fruit appears and can be eaten for bonus points (unless the monsters get it first).

However, Crasher Factory has a great deal more than its name might suggest. Because the Amiga has huge of memory, Amigo have added features such as Random with appearing in the middle of the game (often leaving you in it the last minute), 30 different and increasingly wicked mazes, and the option to design another 30 of your own!

These days, maze designers are becoming increasingly popular in games of this genre, and in the case of Crasher Factory, it stops it becoming just another version of Pac Man. Now you can create mazes inside up of your own name, or you can draw shapes, or you can even have an empty screen full of dots, with just the monsters to get in the way!

The maze designer uses the screens above level 30 for your own designs and while designing them can be a time-consuming task, it is well worth the effort, as creating 30 original and interesting screens to play, or to get your friends against, while the two-player mode, gives great satisfaction (especially if they can't finish the screen) as well as keeping the game from getting boring.

Other features include the ability to knock down the wall with the arrow during the game, as well as being able to start the monsters into Atari symbols (you can then add a little music to return by turning yourself into an Amiga 'bouncing' ball... now is your personal?)



It's not that Crasher Factory isn't an enjoyable game, it's just that without these little extras, Crasher Factory would be just another Pac Man rip-off, good for perhaps a few games, thankfully, Crasher Factory is insanely addictive and I can't stop booting the disk up whenever I have a free moment to spare.

If you are looking for Pac Man on the Amiga, then this is a reasonable game; it doesn't make the most of the Amiga's graphics capabilities, but even the less, it is enjoyable.

C.G.

Crasher:

Name: Crasher Factory, Kapsler: Amiga, JP West Ltd, Stuyford, Area 241 2EL, Tel: 0322 825108, Machine: Amiga, Price: £5.95

Originality: 5/10, Playability: 5/10, Graphics: 5/10, Value: 5/10

Karate King

This game is a karate 'simulation' where the Amiga is used to create some stunningly beautiful backgrounds. Against which, you create your fighters while you battle it

out either against the computer as the Red Fighter, or "between friends", with an opponent.

The mouse is not used with this package, and a joystick is required for all screen moves. The Amiga handles the graphics with such ease that the red fighter seems to almost swirl as he lunges at you with some pretty nasty kicks.

The sound effects are very good, with sampled shouts and cracks, and a few good groans as well. The problem is that I don't really know what I am fighting for! The immediate aim is fairly simple though - to knock the red fighter unconscious so that you can move onto the next screen.

After each bout there is a short interlude as some unseen opponent throws boulders at you from the sides, which have to be demolished before you can move onto the next screen, and exactly the right move is required to shatter these into pieces.

This is a good combat game, with some very clean graphics and some nice music to boot (you interested). All nine screens are beautifully presented and although the game is very difficult in the first three or four screens, it does not get as difficult as would be expected after level six has been reached.

The joystick in port two controls the white fighter. The red fighter has the advantage of being more powerful than the white fighter, and at higher levels he also has various killing devices at his disposal, including starvation, throwing darts and so on...

As you progress, it seems that some types of punches are more effective than others. For instance in the first level, you can use just about any blow you wish, but in the second level a kneeling punch or a low kick seems to work wonders!

If you are defeated by the red fighter, a couple of birds fly over you and your opponent (probably will come on the floor) with a banner proudly proclaiming his superiority. They fly off and it's time for more mutilation and mayhem... all good clean stuff.

Karate King is the best version of this sort of game I have seen running on any machine and the ease with which the Amiga presents such movement forces obvious looks from all the non-Amiga users I have played this game with. This would make an ideal first time purchase for any new Amiga owner wanting some back and play software to while away a cold evening.

C.G.



Features:

Name: Karate King, Supplier: Acorn, 15 West Hill, Dorking, East Surrey, Tel: 01323 521158, Price: £9.95, Originality: 7/10, Playability: 7/10, Graphics: 8/10



Hardball

Imagine you are in the good old US of A and you are at a major league ballpark just before most of the fans have arrived. The sun is shining and the hot dogs have been cooking all summer, you find yourself a seat with a good vantage point (let's say just behind the batter) and you sit down ready for the day to begin.

Accolade Software have really gone to town on the packaging for this one. Hardball is a game that has not only captured the essence of a major league baseball game, but I believe, will successfully make the transition from America to Britain with consummate ease.

Hardball - In America - is a game that is played on a pitch like rounders, using the scoring of cricket, and has the popularity of football, add to this the tactical strategy of a small (and passionate) Irish American country with a large nuclear arsenal, and I think you'll get the gist of this slice of American pie.

So, knock out with baseball bat, a six pack (of Davey Crockett) and my Amiga, I boosted up the game and prepared myself for a whole new experience.

First of all, you are given the option to use either a mouse or a joystick. You can play Hardball against the computer, against friends or even set the Amiga to play against itself!

From here on, you are going to have to know a number of things. First, you are going to have to know how to play baseball. This isn't too difficult, as the game is essentially the same as rounders (i.e. hit a ball and run like ball) but unlike rounders, there is an umpire behind the batsman who decides whether or not the ball is in the "strike area" (for more information, just see the hilarious "Bad news Bears" film which is, incidentally, all about a bunch of losers in the league, and you'd soon pick up on how things work in the game).

Another thing you will have to know is the ability of the

times you are currently waging war against. The tips in the back of the handbook are reasonably useful - should you happen to know baseball jargon - but the best way to get to know an opponent is to see how he reacts to a pitcher's throws, and this is where pen and paper come in useful.

Play begins with the pitcher's screen, depicting the pitcher, the batter, and the well-protected catcher. You are looking from the entire field and are able to control either the "Champs" team or the "All Stars". If you are the team batting, you simply decide which is the best type of strike to attempt (don't forget you don't have to try to hit a ball - if you don't think you can hit it, the umpire usually agrees with you).

You give the ball a great big whack and you run around the pitch, passing as many of the bases as you can. If you get there before the ball, then all is well; if you don't, then you are out, and the crowd squeals in delight - nice to know when your friends are!

Pitching is even better? You select which is the best (or rather worst) throw for your opponent (i.e. can you get the ball past him three times, with the umpire calling "strike" each time?). If the batter hits the ball, the screen clears to display the field, and the ball slowly arcing over to one of your fielders. You, with mouse in hand, then take on the role of fielder and move the closest player to meet and catch the ball, and then throw it on to the next base or from the mound - like rounders, you are to try to get the ball there before the runner, and so catch him out.

The attention to detail is amazing! In the corner of the screen is a Barnacka box, propped up against a wall eternally blowing gum. The crowd murmurs excitedly between pitches, and cheers wildly whenever anything gets hit. The sound as the bat strikes the ball is very realistic - a wonderful track that could have inspired Sir John Betjeman's "sound of leather on sodden" quote.

The animation is very smooth, especially when pitching the ball, or when you are batting; and when the scene changes to the field, you can run about with the selected fielder. Batching on and off until he throws the ball. As a batter runs against an approaching ball, they slide into base in a cloud of dust and gravel... great stuff!

Substances are easily made.

Should you find a man beginning to sweat under the strain of being active in the field for too long, and should you work out the playing tactics of a pitcher as batter, then you can improve your chances of beating him by selecting a more suitable opponent, so there's quite a bit of thinking to be done as well as playing.

Hardball is an amazing game; it is delightfully free of violence, and it has captured not only the competitive spirit of the game, but also, I believe, the atmosphere of the ballpark, the excitement of the crowd and the smell of those lovely searing hot dogs!

C.G.



Challenger

Another one of Amso Software's "silver" range of software packages for the Amiga. The aim of the game is to collide as little as possible with the objects at the upper (grey) level and the lower (green) level on the screen. Players can use a joystick, plugged into port two, which is used to control the speed at which the green background scrolls past and determining the rate at which the blue ship moves forward. The computer, for player two) controls the rate at which the grey background scrolls past, as well as the flight of the green ship, if played in "two player" mode.

The players pilot their space ships and try to avoid colliding with either the landscape on the grey level, as each impact causes an energy drain. If the way ahead is clear, you simply accelerate, hopefully causing your opponent to collide and explode. The upper level is filled with a latticework of anonymous, nondescript grey buildings, occasionally labelled "hard here" (you can't), the lower with trees, shrubs and more small buildings. After the third, "underwater" level, the game improves a little - but not much, and certainly not enough to distract you from wondering how the spaceships got underwater in the first place.

Challenger is essentially a 'sodge out of the way' game with eight different levels. The problem is that there is very little substance to the game, as all that you are doing is dodging out of the way whenever an obstacle in the lower or upper levels approaches. A basic explanation of scenarios of the type often found in accompanying manuals might have relieved this, as at least there might be an underlying goal. As it stands, twelve lines of instructions are clearly not enough.

Instead, the game revolves around the one (or two) spaceships, which are controlled by joysticks; none that neither the mouse nor the keyboard are used here, which is unusual, and annoying, is that not all users will have joysticks for their Amiga, and this will seriously limit the game's appeal.

Playing the game is a rather unenjoyable and boring affair as you are simply avoiding the trees and bushes and the various ground based buildings, while keeping an eye out for

Teacher:

Name: Hardball. Supplier: AmsoSoft, 3000 Stevens Creek Software, Cupertino, California 95014. Medium: Amiga 11K.

Difficulty: 8/10. Playability: 8/10. Graphics: 8/10. Value: 8/10.

the upper 'grey' level buildings that seem to sweep past you, and anyway how can buildings (and faster) than the ground they are supposedly supported by?

One interesting aspect of Challenger is the method of scoring. For instance, I was starting a new game when I suddenly abandoned the joystick, allowing the ship to carry on unaided for a short while, until it ploughed into something that can be best described as a runway with 'land here' (possibly unintentional) on it (I told you, you couldn't!). The high score table told me that this was worth 64,000 points, whereas a controlled flight lasting a good few minutes was worth only a few hundred points!

Now either I'm going crazy, or there is something seriously wrong with a scoring system that takes absolutely no account of flying, dodging or tactical skills whatsoever!

Playing against the computer is even less enjoyable, as nothing new happens. The sound effects are virtually nonexistent, while the ships themselves are unimpressive. They consist of one dimensional objects that do not fit in with the otherwise well-designed graphics, nor do they look anything like the ship in the loading screen. Even the explosions are unsatisfying!

The loading screen provides something of an anticlimax in that the long list of credits seems to promise more from the game than it actually delivers. I am well aware that this is a low price game, but the waste of the Amiga's facilities is reprehensible, although Acorn have proved, with games such as *Karate King*, that they can provide excellent software for this machine, that utilizes its capabilities to the full. Full use of this file usually tends to be restricted to free distribution among user groups and public domain libraries.

All in all, I would give Challenger a miss, unless, of course, you have money to burn.

C.G.

Teacher:

Name: Challenger. Supplier: Acorn, 21 Wyre Road, Northford Ave, 2641 262, Tel: 0122 931178. Machine: Amiga. Price: £8.95.

Originator: 2/18. Playability: 2/18. Graphics: 4/18. Value: 4/18.

Brian Clough's Football Features

Will the Americans have had it their way with *Hardball* but CEDS Software have converted a popular program across to the Amiga which offers a little bit of English culture for this primarily American machine.

Brian Clough's Football Fortunes has the unusual approach of being probably the world's first computer game that plays side by side with a board game. It is suitable for two to five players and each player takes on the role of a football club manager.

The object of the game is for each player to successfully steer his team through the season, using his skill to make the team stronger as the games proceed. Each manager competes against both human and computer controlled teams in a ten-strong first division for the league championship and, of course, the F.A. Cup. From the second

season onwards, each team will compete towards the European competition, through the usual practice of league champions going through to the European Cup, the FA Cup winners going through to the European Cup Winners Cup, and the remaining clubs going on to the UEFA Cup.

The winner of Brian Clough's Football Fortunes is the manager who survives to the end of the game and has the highest number of game points. Game points are those awarded by the computer and are based on each manager's performance in the league cup competitions, and on the amount of raw cash he has managed to accrue and, more importantly, retain, by the end of the game.

Sounds familiar? You bet it is! Brian Clough's Football Fortunes is simply a well presented and very enjoyable variant of the old board game of Monopoly. The main aim of the manager is to create as strong a team as possible, by increasing the star rating of his side. However while doing this, he must not neglect any section of the team or he will lose matches, nor must he overplay on the scales of fate sometimes (particularly) when at a time when you could really do without the extra hassle.

All well, such is the stuff of which football managers are made, and if you can look after your bank balance while retaining your star players, then you could go far.

Footballers are purchased from other football managers and a player can also obtain star material from Auctions, this must be done slowly and with skill - you see would all like a world cup goal scorer in our teams, but unless you can survive buying him, and you gain the results you expect quickly, then you may just as well have thrown your money down the drain, as a foolish purchase can cost you your job - and nobody knows more about getting the boot than Brian Clough!

The game is most of less managed by the computer, but don't think this is a quick 30 minute to play job, as playing Brian Clough's Football Fortunes can take anything from a couple of hours to a whole afternoon, depending on how many people are playing.

The computer doesn't do all the work for you, it provides lots of forthcoming features, the current league table, details of points scored by both clubs and managers throughout the game and the chance cards allotted to players, as well as the all important printout of results on the screen at the end of each league game. This is in the same way that the results are presented at five a'clock every Saturday afternoon during



The Desk Top Video Market

By Anne Owen

Many people believe that the Amiga is going to dominate the Desk Top Video (DTV) market in the way that the Apple Macintosh has cornered Desk Top Publishing. Software packages are emerging which allow microcomputer graphics and video to combine powerfully, both at professional and amateur levels.

3D on TV

Amiga, already renowned for their graphics software, such as Animater, on the Amiga, have released the \$199.95 VideoScope 3D graphics and animation package. Amiga are pitching it against expensive professional software like Digital Art's DOS system and Cubicon Corp's PictureMaker.

A minimum of 512K is required to generate 'television quality graphics', although Amiga suggest 1Mbytes and a dual drive system or hard disk. The software consists of Designer 3D, created by Colin French, for making 3D objects; PlayANIM, created by Gary Bombard of SpartaFilm, for playing animations back in real time; and VideoScope 3D, created by Allen Hastings, for making finished videos. There are also utilities for creating common geometric shapes such as spheres, cones, rectangles and fractal landscapes.

3D objects are created either by numeric entry of X,Y,Z co-ordinates or by one of the supplied utilities or by point and click with the mouse. With DSD, there are three windows representing front, side and top views

of the object. Scaling, numeric value display and numeric entry help maintain accuracy as the object is drawn. When finished, a motion file can be loaded and the object is passed to the preview window. In real time, the object can be shown in motion from all sides. Each frame of the motion file is recorded in RAM and played back at an adjustable speed.

Once the objects are created, they are loaded into VideoScope's main control panel. Here, the scenes are put together. Details regarding camera and object motion, backgrounds, foregrounds, horizons and other information are determined, and a complete scene is created. At this point a video cassette recorder can be hooked up to record the scene one frame at a time, or a few seconds at a time using the PlayANIM module. Frames can be previewed either manually or automatically at any time, and their settings can be changed on the fly.

To create an ANIM file requires at least one megabyte, although they will play back in 512K. An ANIM file can compress a 40K frame into less than 1K. Jeff Brevic, computer graphics expert and Richard Lewis, production designer for Max Headroom, are using VideoScope 3D to create background logos as well as some on-screen wireframe animation for the well-known show. So watch your screens.

Animator's Apprentice

Animator: Apprentice software, written by Hash Enterprises is

designed to generate frames for animation in 4096 colours. The Apprentice costs £195.00. Two dimensional images are turned into 3D landscapes by 'Sculpt'. Character movements, called 'actions', are defined with another interactive module and are applied to the objects in 'Director'. Here characters are positioned, the light source and camera focal length set and the scripts written.

Each frame is generated automatically, taking between five and twenty minutes (which is quick). When finished the frame can be recorded to video. Playback of frames in near real-time on the Amiga is also possible.

Animator comes into the category of organic animation and is strong on representing people and animals with naturalistic shading. It is for the budding Disney who wishes to put together story-rolling with characters rather than logos, fly-bys or mathematical shapes.

Marin Lowe, of the amiga Centre Scotland - who market Animator in the UK - has distributed what must be the definitive list of software requirements for Desk Top Video:

1. Extensive graphics and sound capabilities.
2. Convolving capability (for mixing video and computer graphics).
3. Overcan (no screen borders).
4. Real-time playback so that editing can be done on frame video records.
5. A linker program.

DESK TOP PUBLISHING

6. A HAM (hold and modify) in 4896 colours, paint program.
7. A Video digitiser for inputting pictures into the computer from a video camera.
8. A 32 colour paint program.
9. An 'organic' 3D animation program.
10. A 'mechanical' 3D animation program.
11. A special effects program (types, screens, spliting, etc).
12. Other animation programmes which perform specific tasks (such as water, clouds, mirrors, etc).
13. A mouse or tablet for artistic input.
14. An editing video recorder.
15. A 3D animation program.
16. An audio digitiser.
17. A music program.
18. A sound synthesis program.

I'm sure you can identify some of the software and hardware above; the majority of which is now available for the Amiga. If you have ideas of your own about combining Amiga and PCB don't keep them to yourself, drop us a line. A professional setup with all the above would cost an arm and a leg. At home you can start out with some good animation software

with real-time playback, a home VCR to record the screen and a cable to plug them together.

Ray Tracing

Following the popularity of Eric Gribben's Juggler animation, ray tracing could become this year's computer lull. Eric's ray tracer software is available from Amiga Centre Scotland, but beware because it isn't an animation package, it only generates a single frame at a time. Eric is working on an animator for his ray tracer generated images but in the meantime just putting together your own picture is a fascinating exercise.

To create a picture, the positions, size and colours of the spheres and lamps (light sources) have to be defined in a data file. The program ray processes the input file, puts the resulting image on screen and sends it to a specified output file. The finished file can be more rapidly displayed by the vi program. This is just as well because the original takes an age. Its last one of the useful options you can set from the command line is when you call ray is the picture size. A small, and

more quickly generated, version can be used to check your input data. Other options available include a vertical format picture and anti-aliasing (blurring at the edges).

The input file contains the position of the observer, the direction that the observer is looking, the focal length of the observer's camera lens, the objects - a series of spheres, tubes and chains - the number of lamps, the specification of each lamp, the colour of the ground, the diffuse illumination and the sky.

The software is supplied with full documentation, some finished and an example ray tracer file ready to be worked on.

Summary

The software mentioned above ranges in price and power. You can try your hand at ray tracing from £11.50 - who not send us your results to share with other Amiga owners - or you can invest heavily in DTV by purchasing both Gimbok hardware from Artcube Software and programmes such as Videoscope - for 3D - or Animator - for organic - animation. I can't wait for the first Year Amiga video!

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The Debugger

MoreAmiga is the symbolic, front-panel debugger with built-in disassembler. All the usual features like multiple breakpoints, single-step etc. are supported plus sophisticated search capability, multi-tasking and a backup screen so that you can see your program's output independently of MoreAmiga's display.

Devpac for the Amiga comes with a full, ring-bound manual with tutorial and the Motorola 68000 Programming Pocket Guide.

HiSoft The Old School, Greenfield, Bedford, MK45 5DE. (0525) 718181

Book Review

There's no need to be bogged down with heavy reading when you're learning about the Amiga. A recent publication from Ariadne seems to have provided the answer.

By Clive Grace

The Amiga is to many people a closed machine; there are no advanced reference manuals readily available to the first-time user, and the massive four volumes of the 'Technical Reference Guide' published by Addison Wesley is considered heavy night reading matter and is really only suitable for the machine code programmer who is already adept at programming in the Amiga's native tongue.

The 'Kickstart Guide to the Amiga' is, by contrast, a smaller issue. Published by Ariadne Software, this large format paperback book has 220 pages and contains so much information, I had to put the book down every ten minutes to stop myself getting overwhelmed by the sheer mass of information.

The Kickstart Guide is written from the point of view of the serious self-taught programmer who has, for the first time, delved into the world of 16 bit computers only to be confused by the extra memory and facilities that the Amiga has over other machines in its class.

The book is neatly divided into three sections, part one is an introduction to the Amiga, and I couldn't wish for a more comprehensive introduction to the general hardware. It satisfies the craving for more information after devouring the BASIC reference manual and the Amiga 'Welcome' manual for the first time.

The opening chapter serves to explain the 68000 processor, its interrupt handling facilities and its rather over-intelligent register handling system. The introduction explains how the 68000 fits into the Amiga's working environment and where necessary, it pulls comparisons from the more familiar world of the 6802 processor, as users upgrading from their C64's or C128's will find it easier to understand the complex interrupt facilities the 68000 has to offer.

The second section is divided into five smaller sections, and attempts to explain I/O streams, how to access various devices and setting up a few serial ones of your own. This chapter goes on to setting up multitasking operations leading off with an intriguing chapter called 'Serial port debugging, and the Joy of Whack' - sounds like fun!

Have you ever wondered what those numbers are at the end of the 'Guru Meditation' message? The Kickstart Guide not only tells you how to translate them, but also explains when an error in an operating system crash, a hardware fault or an application bug, and there are ways of retrieving information after the Guru has meditated. Overstatements.

The Amiga's famous graphics capabilities are covered, possibly for the first time, and the book goes

even further by discussing how the graphics can be more freely accessed through the Amiga's 'copper' co-processor hardware, and introduces us to the special custom chips named 'Paula', 'Angus' and 'Demic'. These chips can be used to obtain beautifully fluid computer animation by synchronising the blitter and busman chips to the screen 'flyback state'.

The third section is an introduction to 'C', and promptly pushes you off at the deep end into programming with arrays, strings, data pointers and all of the most useful things you will need when programming in a new language for the first time.

While this section does not purport to be a definitive description of 'C', I would, however, recommend this section to programmers wishing to sample the delights of this powerful programming language for the first time. It does jump ahead of itself at times, but with a little note taking, many of the trivial questions regarding 'C' are answered. Incredibly enough, the style of the manual becomes less drab, underlining Ariadne's serious commitment to the 'C' language.

There are quite a few examples in 'C' short enough to go through without resorting to buying a 'C' compiler, but as many of the serious programmes and games are written in 'C', it seems sensible to think of 'moving up' to 'C' at some point or another.

In all, 'The Kickstart Guide to the Amiga' is competently written in a friendly style without too much rambling on about how 'amazingly wonderful the Amiga can be, if only you could program the darned thing'.

The most important thing about this book is that it is written in a style that is very alluring, moreover, it inspires confidence in the programmer and while this initially leads to a few monumental mistakes, it also puts you on the road to experimenting with the Amiga, which is a good deal more interesting than just pushing the mouse around your desk... although that can be fun as well.

This is an excellent book and necessary reading if you have an Amiga; be it a 1000 or A300 or even the A2000. If you are thinking of getting an Amiga then this book may just tip the balance, I can't imagine what my Sunday afternoons were like before this book!

Availability:

Title: The Kickstart Guide to the Amiga

Publisher: Ariadne Software Ltd, 273 Arsenal Road, London W10 3SS. Tel. 01-948 4265. Price £12.95 (UK) plus p.p.

ProWrite

*New Horizons have come up with a
wordprocessor with a difference -
ProWrite offers colour, high resolution
and graphics in text.*

By Anne Owen

First impressions are always good with New Horizons software. The packaging and manuals are up with the best for any micro. ProWrite's 'fold flat' manual is especially handy, pitched at the beginner but with full index, glossary and hints to feature explanations. Request boxes and menus are printed alongside text for ease of recognition and there's a beginner's manual incorporating one of the three examples of text on the disk.

Different breed

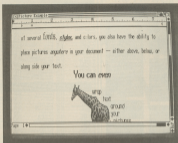
ProWrite is different enough from any rival software to prompt the question 'what do you want from your wordprocessor?' Personally I decided I wanted high resolution (interlace mode) but I couldn't cope with the flicker on my IBM monitor. ProWrite's default background colour is paper white and a command (SHIFT/HELP) is provided with cut-down flicker a little. Also recommended

is the product, Inter-Kid, a screen which fits over the monitor but I didn't get the chance to test this out. The best and most expensive answer is the Commodore 2080 long persistence monitor. I soon returned the medium resolution version of ProWrite as my default ProWrite to boot up into.

I also decided I like colour on screen. There are seven to choose from, corresponding to the seven ribbon colours available on a colour dot-matrix printer. The standard font is and three others, Granite, Marble and Serpentine (12 point on 19 point only) can take any of the colours, different colours for alternate characters if you really want.

In combination with a colour printer and colour photocopier, ProWrite can be an effective specialist wordprocessor for the editor/designer of promotional print, children's worksheets (colour is a very effective tool in education), overhead transparencies (depending on the printer again), indeed any promotional material in which text is a vital element.





Of course you can print out from ProWrite in black and white, draft, NLQ or standard. If you wish to print out on a daisywheel then topic 11 point has to be used to get the correct formatting. Standard here means a graphics printer which reproduces the fonts on screen as well as the italics, bold, subscripts and so on. Colour is nice but it's expensive to deliver on paper.

No Doubt about Graphics

Without qualification I welcome ProWrite's ability to combine graphics and text. ProWrite allows you to cut out a rectangular block of HP graphics, created in a 'paint' program. This is achieved by opening a second document and loading the graphics. At this stage you are prompted to choose the degree of shading to apply to the graphics, full, partial or none. The choice depends on the picture and the printer. Once 'cut', the graphic appears in the top left-hand corner of the text document in which you 'paste'. You can then move the graphic around the document to wherever it looks best. Text can take on the background colour of the graphic which creates a very impressive feature when printed.

Unlike a program such as GEMwrite, ProWrite lets the text flow around the graphics box, it doesn't have to stop above and below. You can even type into the spaces in the picture.

I have begun to experiment with clip art: dinosaurs in the background of a draft letter to the bank manager; fun things like teddy bears - I suppose it should have been bears or penguins - on children's stationery. Graphics can also be used to impress. A 3D graph from Argis Impact can nicely explain (as well as wow) some figures. Even the figures themselves used as an HP file (you Zong! or Ginkbot!) from Anafloat can be used as a table. Company logos, letterheads and standard artwork can also be created and used over and over. ProWrite allows them to be incorporated into displayed footers or headers.

Standards

ProWrite lets you have a number of documents open at the same time, each in its own window which can be sized or placed in the background or windowed. Text can be moved or copied between windows. Each layout is controlled by the margins, indents and tabs set on the ruler at the top of the document. Settings apply to individual paragraph blocks (defined as text between presses of the RETURN key). The markers for these blocks can be made visible for editing purposes and a format can be copied between paragraph blocks.

As you type, ProWrite wraps the text according to the selected format, e.g. justified, centred, double-spaced, etc. ProWrite indicates page breaks as they occur. Footers and headers are entered via a menu option with a number of page numbering styles to choose from. They can be displayed on screen if required and there's an option to turn the header (and footer) off for the title page.

The pull-down menus give a good idea of the more standard features of ProWrite. The search and replace operation is particularly friendly through the use of on/off buttons and check boxes with which you can set the exact search pattern you require. The keyboard shortcuts, the keyboard equivalents of pull-down menu options, some of which are on function keys, are also useful for the regular user.

Summary

I very much enjoyed using ProWrite. Although it does lack a spellchecker and supports only *Professional* printers, and you can't print marked sections of a document, only a minimum one page. The ERM plus price tag makes it an unlikely buy for the beginner, which is a shame because ProWrite is very easy to use. ProWrite can achieve the more ambitious print projects you may have in mind, which its rivals cannot. In respect of graphics and colour ProWrite is out on its own, but is it also ahead of its time or your hardware budget?



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Digi Paint

Stretch the graphics capability of your Amiga to the full with this up-market arts package.

By Clive Grace

The Amiga is, as everybody knows, a stunning graphics computer; it has enough memory set aside for all but the most demanding of applications and to make life even easier, there are a number of screen 'modes' offering various resolutions and colours suitable for various applications.

The Amiga can display a maximum of 32 colours, which can be logical colours, or shades of any particular colour, i.e. black and white ('grey scale') colours.

One of the least understood and most underestimated of the screen modes available on the Amiga is the 'load and modify' video display mode. Initially it was considered something of a curiosity, enabling colour palettes to be shared on the screen at the same time. To the best of my knowledge, no package has yet used this facility to the full.

With the HAM mode, the Amiga can display all of the 4096 colours at the same time, which is no mean feat. And when you consider the many hours that have gone into the programming of this new screen mode, it is amazing that the software was finished at all!

Introducing Digi Paint

Digi Paint is a new software package which is quite frankly, comparable to professional graphics workstations which cost many thousands of pounds. Digi Paint is capable of working in, and displaying, very high resolution pictures using the HAM mode, in both the 320 x 200 and the 512 x 400 resolution modes.



Digi Paint reads standard DIF files, so if you have drawn a picture using any art package, for example Deluxe Paint, or if you have a digitised photograph, you can quite happily load screens in and modify them using Digi Paint. Indeed, New Tek regard Digi Paint as a companion software package to their Digi View video digitiser.

The HAM mode uses six-bit planes to display images, which means that each Pixel uses six bits to determine its colour. If the first two bits are "00" then the remaining four bits are used to determine the pixel's colour, thus giving a choice of a possible sixteen colours from the total of 4096 available.

If the first two bits of a pixel are

"01", then the pixel has the same colour as the pixel to the left; if the bits are "10" then the last four bits (remember they are the ones that determine the pixel's colour) replace the green value, and if the first two bits are "11", then the last four bits replace the blue value.

The effect of all this is that you can display all 4096 colours on the screen at once, although you cannot change from black (red, green and blue all set to "0") to white (red, green and blue all set to "1") immediately. However, such a small limitation is hardly noticeable when using any HAM mode screen.

Naturally, such efficient house-keeping takes a lot of programming, and for the Amiga 580, Digi Paint



requires just about every byte of memory it has to offer, so if you still have a 256K, Amiga 3000, now may be the time to think about getting that memory upgrade you have been considering.

Using Digi Paint

The Digi Paint package contains a single disk and a manual and to use it, you simply boot up the disk from the workbench prompt and you are then greeted with the Digi200 and Digi400 icons. You can examine the drawers holding Digi Paint art work by opening them up. Once opened a miniature of each of the screens is displayed as an icon. This is very useful, especially as you can enter the package by double clicking the icon you wish to edit.

Both the 200 and the 400 resolution programmes have the same screen and menu displays, although the 400 resolution is 'non-interlaced'. Really, you need a slow refresh monitor to stop the screen flickering, however the standard HRS monitors fare very well while using this mode.

The whole of the screen is used for your artwork, leaving a static window at the bottom, crammed full of options, including brushes of various shapes and sizes, a pair of scissors for cutting out areas for 'brushing' elsewhere on the screen, or for other files, a magnifying glass for really close up work, and a very comprehensive fill option.

Other facilities include being able

to pick a colour from the picture you are drawing on. For example, Floh tones are some of the most complex colours a painter can achieve, but if you are using a digitised colour photograph, these tones are instantly accessible by simply clicking the 'pick colour' icon and moving the arrow to the desired position on the screen.

The ability to take a colour from one picture and move it to another is a very useful feature. Have you ever taken a black and white photograph and later wished it was in colour? Well, with Digi Paint you can simply take the digitised image of the photograph, transfer the colours from another photograph (or even from the colour board on the same screen) and then paint away by using the fill option. The end result can be very effective, especially with old fashioned photographs such as the presidents of America supplied with the 'Butcher' graphics utility disks.

Should you have drawn something that didn't work out as planned, you can 'undo' that portion of the drawing a little like stepping back in time to a point before you committed something to the screen. You can also repeat options by pressing the 'again' icon, enabling you to quickly repeat operations that require complex actions.

Brushing Up The Act

Dithering is a process used by many 8 bit art packages to obtain shades of

colour. For example, by having alternate pixels of red and yellow, a computer can generate an orange of sorts. With the Amiga, even subtler shades of colour can be created using dither, so that a possible 65000 shades of colour can be obtained, comparable to the total colour capability of a Quantel graphics workstation.

The colouring of black and white pictures has become quite a heated issue in the world of cinematographers, some of whom take offence at the false colouring of old films in order to give them new life and lustre. For black and white photographs however, Digi Paint has some very real applications. For instance, since our experiment with combinations of face make up (assuming you have the right colours to begin with) or sketch out ideas for interior decoration and clothes design.

For the sheer fun of painting, the computer can be a very expressive tool, but after being so used to the limitations of 8 colours on other art packages for other machines, the choice of colours can be somewhat constraining. The mouse is an excellent tool for drawing with, although I have yet to use a graph pad in conjunction with this piece of software.

Custom shapes can be manipulated for added depth and realism. A circle can be drawn with both the 'fill' option and the 'shading' option set, and this will draw a wonderfully busy circle with concentric circle patterns running around it. By altering the 'dither' slider to make the effect of the dithering less localized, the concentric circles change into fuzzy balls, not dissimilar to Voyager photographs of some of Saturn's moons.

Of all the menus on the screen, the Mode menu is the most useful. Digi Paint modes can be thought of as different paint types. Choosing the correct mode for a particular part of a drawing can be an art form in itself, and they are especially useful if you are merging pictures together.

More importantly perhaps, the mode effects are used to create the many subtle and varied effects possible while using Digi Paint.

The options include drawing when using solid paint, blending, tinting, light tinting, minimum and maximum painting, as well as the usual Add, Or and XOR (exclusive or) painting and painting styles available on other packages.



...There are twelve brushes in all, these range from small circles to large diamonds and lines. There are a few basic shapes as well, including either solid or outlined circle and ellipse shapes, rectangles and squares, not to mention the spray can!

For really fine detail drawing, or particularly erasing/bleeding work, the magnifying glass is often useful. This provides a close up image of any portion of the screen and the section you are magnifying is displayed in real time in the top right hand corner. You can happily perform most of the standard editing functions while in zoom mode, except for moving the magnifying glass around.

The scissors are used to cut out sections of a picture and move them wholesale to another part of the screen. Technically, this is creating a new brush, and the cut out portion can be used to a 'brushes' file. Using the scissors with the 'blend' option set in the screen mode area can create some stunning effects, such as adding extra limbs and organs to a body. Interestingly enough, in order to create a mirror image with a brush created by using the scissors, you have to first cut out at least your 'brush' and then reverse the whole screen! Once pasted down, you can, of course, reverse the screen again, but it strikes me as being a little drastic!

Digital Drawings

Digi Paint is an amazingly intuitive art

package; the mouse being very responsive and an excellent artist tool. The interesting thing about this package (other than the amazing range of colours of course) is the way that pictures can be drawn so quickly. My first attempt with the package yielded a complete artists rendition of a strand of DNA, complete with Purines to Pyrimidine crosslinks!

There are a great many facilities that are suitable for advanced work, such as sampling and creating quarter-tones by diluting two shades of colour together. The effect is so subtle that I had to put both colours together before I (or anyone else)

could notice the difference!

The 340 x 480 resolution version of Digi Paint takes up a lot of memory, on a 512K Amiga and this can result in certain functions, such as the magnifying glass and the brushes, being inhibited. However, you can reclaim these functions by moving to the 'preferences' window and checking off the workbench. Digi Paint does not use the workbench for itself, so it doesn't need to be active while you are using the 340 x 480 package. No problems are encountered when using 1 megabyte Amigas.

Digi Paint is an excellent drawing tool, especially if you are looking for low cost professional art package with high quality outputs - the only problem is finding a printer with a good enough output!

All in all, Digi Paint is an excellent art package. It pushes the Amiga's already impressive graphics capability to its limits, and it is a friendly and powerful package with amazing potential, especially if you are interested in modifying digitized photographs (both colour and black and white), or if you are adapting pictures drawn by other, less powerful packages.

Finalists:

Name: Digi Paint, Supplier: Newtek Incorporated, 115 W. Chase Street, Topeka, Kansas 66601.



Burning Ambitions

Clarify your knowledge of Eproms and Eprom programming with this handy article.

By Mike Connors

The subject of Eproms & Eprom programming seems now to have stimulated the minds of the average computer user over here in the UK. And not before time. For some considerable time our Dutch and West German counterparts have been whipping the lids off their computers and disk drives for a quick 'chip transplant' on an almost daily basis.

Well maybe not quite, but you only have to glance through any German computer magazine and see advertisements for a whole plethora of Eprom programmers, kernel expanders, replacement operating systems and the like to realize that we are missing out on something.

We are obviously much more relaxed when it comes to touching the 'tricky bits' let alone removing those screws which lead to the inner sanctum. And yet this shouldn't be the case. After all the C04/128 was actually designed with ROM expansion in mind.

So what's it all about? What kind of Eprom projects can be attempted on the Commodore? These fall into three main types:

Straight forward 3800 type eprom cartridges.

Replacing internal operating system ROMs with alternative or faster operating chips.

More complex 'clever' type cartridges for taskloaders, monitors, etc.

Tools Of The Trade

So what are the basic prerequisites for this mysterious art? Access to an Eprom programmer is an obvious one. I on the list if you wish to program or 'burn' your own devices. If you intend to buy your own programmer there are not too expensive nowadays and you can pick up a good one for around £40. Look out for one with a monostab built into the software and make sure that it burns up to 32K devices since these are now the most economical to use.

If you are to experiment with 38000 cartridges then a universal or configurable cartridge board will make this easy. These boards are available for under £10 and they usually have small DIP switches or links to make the Eprom on board

appear in various places in computer memory. If you have an old game cartridge this could be used after removing the old chip.

For replacing the internal ROMs in the computer or disk you will need a connection or carrier board. This as the name suggests is a simple little device that plugs into the socket from where the ROM has been removed (24 pins) and this in turn accepts a conventional 28 pin Eprom. These usually come with a switch-on board to allow bank switching and again cost less than £10. If you are handy with a soldering iron you could probably knock one of these up using a couple of IC sockets and a switch.

A small supply of 2K, 16K, or 32K Eproms are required. Since most Commodore projects will involve replacing one or more 8K blocks we can use the bigger of the devices and use bank switching (more later) to select the banks or pages of the chip.

Eproms come in three main guises. Standard standard types which can be programmed and then erased by UV light many times. Plastic one time programmable which as the name

CBM80 Autostart Routine

8000	09 80	cartridge hold start vector = 80009
8002	25 80	cartridge warm start vector = 80025
8004	C3 C2 C1 30 30	CBM80 Auto Start key letters
KEYBALL RESET ROUTINE		
Turn on VIC PAL clock.		
8008	8E 18 D0	STX \$D066
800C	70 A3 F0	JSR \$F0A3
800F	20 50 F0	JSR \$F050
8012	20 15 F0	JSR \$F015
8015	20 50 F0	JSR \$F050
8018	56	CLI
Init BASIC RAM sectors		
8019	20 53 E4	JSR \$E453
801C	20 8F E3	JSR \$E38F
801F	20 22 E4	JSR \$E422
8022	A3 F8	LDX \$F8
8024	8A	TXS
8025	Reduce stack pointer for BASIC
START YOUR PROGRAM HERE.		

suggests can only be burned once. These types are less expensive but are not suited to development work for obvious reasons. They need to get used for production runs where the program is not likely to need changing. The last main type is the EEPROM. This device can be erased electrically, usually with an Eeprom programmer, and re-burned many times. The EEPROM is the most expensive type but doesn't require a UV eraser.

Programming an Eprom

Programming an Eprom is really a very simple operation. The program designated for your chip is first loaded into memory. This could be from a number of sources: disk, tape, another Eprom or maybe from another internal Ram in the 64/128. A good Eprom programmer will allow you to make any changes to the code via its own monitor. When you are ready to program your device first check the type and program voltage. Again the ability to support a range of devices and voltages is standard with a decent programmer. With a suitable blank Eprom in the programmer, you would usually just press a key and the chip would be burned. This takes less than a minute and the contents of the chip can then be verified against the source program in Ram in just the same way as a save to disk or tape. If all is well you would then either burn another chip or quit.

Conventional 80000 Or Basic Cartridges

The 64/128 has the ability via its internal PLA to 'use' either an internal Rom or internal Ram in an 8K block from 80000. In addition it will use either internal or external Rom in the BASIC user 8K block from 8A000. What the PLA does is simply controlled by two lines on the cartridge port. These lines GAME and EXROM when grounded will configure the computer in either of the above ways. So if you had a M/C program that ran at 80000 or A000 then you could burn it into a chip and plug it into a simple cartridge board. By setting the DIP switch or links to ground either or both of the EXROM and GAME lines you have yourself a cartridge based program.

Auto Start Cartridges

The above cartridge would be started by setting it into action. This would involve typing SYS (start address). This would probably be OK but the Commodore has the ability to instant start cartridges. On power up, one of the first things that the CPU does is look at the first few bytes at 80000 to see if the letters CBM80 are present. If these bytes are found then the CPU will jump to and execute your cartridge code.

A typical autostart routine is placed in front of your own code in the cartridge.

The above is a sort of

'Housekeeping' routine that does all the things that the computer would have done had it not found the CBM80 bytes. In fact the routine is taken almost directly from the Kernel and Basic system Roms. So now on power up your cartridge would 'Boot in' and, after initializing the system, jump to your program at 80025.

As you can see, if your program is designed to run in the cartridge area then it is very straight forward. However many programmers including Basic Programmers will not run directly in this way, though you can still get them on to a chip provided of course they are of a suitable size. In these cases you would use the chip as a sort of microchip which on power up downloaded its contents to the normal place in computer Ram and then jumps to and executes the code. A relevant routine should be tagged on to the end of the autostart program at 80025.

If you think this might be a bit complicated then the add-on manufacturers can come to the rescue. There are Eprom generator programmes on the market that make your M/C or Basic program and create a file ready for burning onto a chip. All the auto-start and reloading (required) is done for you. There are also expander boards available that accept up to 8x128 ROMS that can be selected from a menu on power up. As you can imagine it would be very convenient to have your word processor, database or financial utility available instantly. Again these devices usually have the generator program built in.

Replacing Internal ROMS

There are a number of replacement operating system Roms on the market. These include faster kernels, extended Basic and alternative DOS chips. You may however feel that you don't like a particular aspect of these devices and think you can improve them or you may just want to do something as simple as changing the screen power up message and/or colours.

When modifying the kernel one of the main considerations is space since Commodore have already filled the chip with their own code. Most alternative kernels on offer concentrate on fast disk operation and so the extra space is achieved by

I.Q.

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THE CHESSMASTER 2000

All chess programmes, apart from the fastest playing of the game, offer various features. Different skill levels, 3-D graphics, joystick control or whatever. To date, it has been very much a case of pick the accessories that you like the best. Now your search is over.

The Chessmaster 2000 has the most comprehensive set of features that I have yet witnessed in a single chess program. Indeed, it is difficult to think of anything that has been left out. As well as the eighteen skill levels plus an indefinite mode, there are special, easy and colloquial modes.

You can choose from 2 and 3-D displays, rotate the board, change the colour of the board, alter your method of capturing pieces (algebraic or numeric), set up the board to solve specific problems, take back moves, replay a game, ask for all legal moves to be displayed and even ask for a hint!

Partially played games or games that you wish to study later can be saved to disk. The package also includes a second disk containing 100 classic games ranging from the second world century to the 1882 Kasparov - Kasparov World Championship.

But these features are really only the icing on the cake. The play's the thing. It is difficult to assess how well a program plays without setting up a series of games against other machines or against a good player.

One of the nice things about a beginner or casual player playing against the computer is that you can set the skill level to be always (or quite) better than you are.

Having played against most chess programs at some time or other, I felt that Chessmaster was occupying all over me what other programmes wouldn't have done so. There is no quoted ELO rating for the program but it does boast an opening library of 71,000 moves.

As far as any beginner or non-tournament player is concerned, I would have no hesitation in saying that this was the best chess program currently available, both in terms of playing skill and features. And I strongly suspect that all but the very top players would find Chessmaster 2000 a more than useful opponent.

GURU

Timeline:

Name: The Chessmaster 2000. **Supplier:** Electronic Arts, Langley Business Centre, 11-19 Station Road, Farnley, Leeds, Yorks LS15 1JN. Tel: 0753 49492. **Hardware:** CD-ROM only. **Price:** £12.99.

Originality: 5/10. **Graphics:** 6/10. **Playability:** 10/10. **Value:** 10/10.

GUARD OF THIEVES

With the release of just one game, The Fines, Magnus Skjeltveit shot straight to the top as Britain's leading adventure house. Their pursuit is unqualified and they brought a quality of graphics to the game that made every other graphic adventure look positively primitive. Even if the story line didn't quite gel at times, the game was head and shoulders better than any I've ever written on this side of the Atlantic. The Guild of Thieves is their second release and is

guaranteed to maintain their number-one position.

You are an aspiring burglar, but all crime in *Reveries* is controlled by the Guild. If you want to keep any of your ill-gotten gains, you will need to become a fully paid-up member of the Guild or else risk becoming a permanent fixture at the bottom of the Reverian equivalent of the M23.

The Guild however does not let any old stiff-stuff in. You have to prove your ability first. Your initiation trial comes in the form of a large mansion just waiting to be looted. To make sure that you don't try to pull a fast one, the Guildmaster has wired the joint and knows exactly what goodies lie around the place.



On your quest, *Reveries* rewards the thief who can out-thieve the thief. (Continued on page 102)

The game is almost a return to the very first adventures, i.e. a treasure hunt but you are never quite sure what is going to be valuable before you steal anything in the safe. Items placed there cannot be retrieved again.

The storyline, the world element in the *Paves*, is much improved and the game flows very well with some excellent and original puzzles to be solved.

I have already mentioned the puzzle as being one of the art but Magnus Sorells are never satisfied. One additional note is that if you have previously examined a location, you can skip in 'sketch mode' and providing there are no problems in the way, you will travel to your chosen destination via the most direct route. A boon to people who can't be bothered to draw maps.

The graphics are again excellent and have an impressionist feel to them. You can choose to have either the full picture, a small camera in the top right hand corner of the screen or even the just repeat all if you prefer text only games.

Superbly packaged with copies of the latest *What's Simple magazine*, which includes a coded list section should you get stuck, *The Guild of Thieves* deserves a place in any adventure's collection. Highly recommended.

G.R.H.

LEGACY OF ANCIENTS

As a poor shepherd living on the planet Tarnation, you have never strayed far from home - you have never needed to. All that is about to change, when one day you discover a body-out in the hills. The dead man is wearing a gold bracelet and carrying a scroll and you feel compelled to take them, even though your first reaction is to run. Curiouser and curiouser, especially when you see a large building without of you where none stood before.

The building is a museum and you wander round looking at the various exhibits. Most of them require a jewelled coin to access their information. You only have two jade coins at present, but that is enough to start you on your adventure.

The geography of Tarnation is large and varied. Towns lie dotted around, but the land between them is treacherous, and monsters lurk everywhere. A few well-travelled with you but most are alien your kind. At least, if you defeat them, you can help yourself to the contents of their bag - usually gold!

As you start, so you have little idea of what your quest entails and to make matters worse, you soon have the scroll stolen. The towns are a good source of goods, especially if you have your ferret sold. Here you can also buy weapons and armour, food and magic spells. Horses are plentiful but you need to perform a task before they will help you. Schools allow you to improve some of your attributes, for a fee of course. Money is always in short supply but there are places where you try your hand at a couple of gambling games. It's worth banking any profits too as not only do you earn interest, but your money stays put should you need an early closing.

There are many smaller games to complete before you get near your goal. Chances need to be explored and dangers understood. You will need to buy boats and bigger and better weapons before eventually employing the services of a winged messenger to fly you to your final confrontation.



Apart from moving your character, the game is entirely menu-driven. The system works well and is very simple to use - no huge list of different commands to learn. The graphics come in two forms. A top-down view for when you are in the wilderness, viewed on a grid and a 3-D view in the dungeons and museums. The dungeons especially are accompanied by some excellent graphics for the monsters.

Timeline

Name: *The Guild of Thieves*. Supplier: Kainbird, First Floor, 7 New Oxford Street, London WC1A 1PS. Tel: 01-260 8848. Minkler: C&A - dist only. Price: £19.97. Developer: B/W. Graphics: B/W. Playability: B/W. Paves: B/W.

Legions of Armies is like some role-playing games, is very easy to get into. The plot is in a few points you in the right direction as to what you should do next and there is no need for complex map taking. Despite that, it is no pushover and I would estimate some 40-50 hours of gameplay. The ending is also nicely done as your exploits are recorded for posterity as one of the museum displays. Highly recommended to both newcomers and fans of this type of game.

G.B.H.



Teacher:

Name: Legions of Armies. **Supplier:** Electronic Arts, Empire Business Centre, 1149 Empire Road, Lowley, St. Albans, Herts AL1 2SN. **Tel:** 0753/66661. **Machine:** 4/4 - disk only. **Price:** £19.95.

Originality: 7/10. **Graphics:** 8/10. **Gameplay:** 9/10. **Value:** 8/10.

LURKING HORROR

Horror is the name of the game in this latest adventure from Infocom. Written by Dave Liding, author of *Zork*, *Sam and Max* and *Spillwaker*, the story mixes atmosphere

You are trying to finish your last assignment, at G.B. Tech. The terminal room is far more neatly decorated, probably due to the inaccessibility of some outside and the business of the house. The only other occupants of the room is a somewhat spaced-out hacker, darkly looking into some ancient phone book.

Logging on, you call your half-completed essay but suddenly the things have all changed and you find yourself being dragged into another universe as you are activated in a weird, a strange, weird experience.

Returning to the terminal room, the hacker is most impressed by your efforts, especially if you mention his daily fix of Cheese Food. He suggests that there might be some sort of mix-up with the Academy department and suggests that you pay them a visit.

Due to the maze, getting there is not as easy as it should be. However, there is another maze. Secret passages, prohibited corridors, are ransomed to lie below the main

buildings, linking them. It seems that you have no choice but to explore the maze depth. Shifting piles of rubbish with a few left-trick moves reveals a trap door. You open it and your nightmare is just about to begin.

This is another typical Infocom game - and that makes excellent. Superbly packaged, an excellent parser (although it's beginning to show in a few areas) and a story that just flows with atmosphere. *Lurking Horror* is a game that just demands to be played after midnight with all the lights turned out.

G.B.H.

Teacher:

Name: *The Lurking Horror*. **Supplier:** Electronic Arts, Empire Business Centre, 1149 Empire Road, Lowley, St. Albans, Herts AL1 2SN. **Tel:** 0753-66661. **Machine:** 4/4 - disk only. **Price:** £19.95.

Originality: 9/10. **Graphics:** 8/10. **Playability:** 9/10. **Value:** 9/10.

THE PAY OFF

Never verb adventures strike again but who uses complex puzzles that really annoy? The Pay Off is a welcome seasonally budget intelligence tester for those who still haven't experienced the genre and are daunted by Infocom prices.

Here, are you a trouble? You own the local bookmaker a cool three thousand green baize and all you've got to do is work in £50 and a bet for the 4/30. How can you pay off Luigi and please your bet in time?

You can try to play a few words long but his 'boss' object you without ceremony each time. All roads seem to lead to dead ends and if you discover a shortcut, this leads you on to discover that a fabulously expensive problem seems to be in front. The answer to your question is about to fall in your lap and all you have to do is work out where, when and how you contacted the same.

Although the vocabulary in this adventure is limited to about 100 words, the game is not bounded by small-time thinking. Completing your adventure takes quite a bit of time but it's worth it. How do you tackle a hidden safe? Start out an electric line? Start out a hidden line? From seven to purchase you have to bring no stone into a road if Luigi is to be pleased in time. Cross him and he'll cross you with one of those pesky white marble ones on Boss Hill.

First-class adventures are making a come-back as people realise that a lack of graphics means an excess of complexity within the logic of the game. All that has to be done now is to alert the multiples that the tide is turning and get them to stock the new games.

The Pay Off isn't the best of the best, but it will convert your brain and deliver your brain. How else will probably you call from Luigi?

G.B.H.

Teacher:

Name: *The Pay Off*. **Supplier:** The Arts, Empire Business Centre, 1149 Empire Road, Lowley, St. Albans, Herts AL1 2SN. **Tel:** 0753-66661. **Machine:** 4/4. **Price:** £29.95.

Originality: 7/10. **Playability:** 7/10. **Graphics:** 6/10. **Value:** 7/10.

Plus/4 and C16 Disk Menu

*Find the program you want quickly and easily with this
handy menu.*

By Jeffrey Hoyle

It can be infuriating trying to find the program you require when you have a lot stored on one disk. This program displays all the program files on the disk presently in the disk drive, and places a corresponding letter or number beside the program name. On selecting a program, pressing the relative key will load and automatically run the chosen program file. If the disk menu program is set as the first program in the directory, then it may be loaded and auto-run by pressing SHIFT and RUN/STOP together. The overall result is that the program saves considerable key presses when loading and running programmes from disk.

It should be noted that the program only displays those files on disk, which have the abbreviation "PRG" after the file name, when directoryed. The other kinds of files cannot be loaded and run, like a program.

Typing In

Type in the program as listed - the REM statements may be omitted. Before running the program, it is essential that you save it, as it overwrites itself. If there are any errors, then they should be noted and corrected after the program has been

loaded from disk. After the program has been entered correctly and run, there will be a new program sitting at the start of BASIC. When listed, it should read:

```
10 5Y54115
```

The program now has to be saved, as machine code, so it is necessary to go into MONITOR. Type the following:

```
MONITOR  
5'DISK MENU HEADER".R,001,  
1288
```

From now on, the program may be saved and loaded as a BASIC program, which omits any undue complications.

Using the Program

It is best to place the program as the first file on the disk, in which it is to be used. If the disk already has files saved on it, then it is necessary to re-organise the directory, so that a free space is created at the top-of-the directory. The new program saved to disk, will sit in this place.

The re-organisation may be achieved, by the use of the COPY and SCRATCH commands, e.g. if the first program on disk was called "OLD", then
COPY "OLD" TO "TEMP"

would copy the file "OLD" to a file called "TEMP", elsewhere on the disk. A check should be made, by listing the directory, before:

```
SCRATCH "OLD"  
RENAME "TEMP" TO "OLD"
```

The result is that "OLD" sits further down the directory, and that a free space at the top, has been created for the disk menu program.

From BASIC, type
LOAD"DISK MENU HEADER"
after inserting the relative disk, and then replace the disk onto which the program is to be saved. Type in
SAVE "NAME"
where the NAME may be the title of the disk. It is possible to insert the Commodore control and colour codes into the program name string. In the case of the disk menu program, reverse character mode could be used, to highlight the disk name.

I have included some points, which enable you to customise the screen colours, etc.

POKE 4134 with the Commodore character colour code, to alter the ink colour.

POKE 4128 to alter the paper colour.

POKE 4134 to alter the border colour.

POKE 4166 to alter the vertical start

position, of the menu.

POKE 4170 to alter the horizontal

start position, of the

menu.

For example, the default is 0 for the horizontal position of the menu.

Foking with 11, centers the first column and is useful if you decide to

have 16 or less programmes on the disk.

When you are satisfied with the colours of your choice, save to the disk, as instructed before.

The program also loads and runs a machine code program, if it has a SYS command, at the start of BASIC. I have found this extremely useful for auto-running games and utility programmes, and provides a more professional system. Since the program can locate a machine code program, in the correct place in memory, a BASIC program which was initially saved to disk with the high resolution graphics area set aside, will not load at the normal start of BASIC - hence the program will not run or list. To enable successful loading and auto-running of this program, it will have to be loaded into the computer using DLOAD, and then saved once again.

See Listings on page 122



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Commodore 128 Preferences

Predefine your defaults with this time-saving C128 utility.

by D. Anderson

One of the more useful features provided by some of the WIMP operating systems now being employed on new computers, is the ability to define the default characteristics of your computer, rather than have them dictated to you by the manufacturer. This means that when you turn on your computer, it retrieves a special file from the disk drive which contains all the information necessary to set up the system (e.g. screen colours, cursor type, key repeats etc.). You could do this manually every time, but it is time consuming and will in any event be next to useless as you press RUN/STOP and RESTORE.

Luckily, the Commodore 128 automatically boots the disk drive at switch on, so it has the ability to load and execute a preferences file, but for this to be really useful it is necessary to be able to direct the computer to reset the characteristics of the computer to those in the preferences file every time RUN/STOP and RESTORE are pressed. This means that if a particular program changes, for example the screen colours, you can reset them to your preferred choice simply by hitting RUN/STOP and RESTORE - which is what this program enables you to do.

Furthermore, whilst dabbling around with the machine, I have managed to correct two minor, but very irritating bugs, the routine for which is included in the preferences

file, so that they should never rear their ugly head again!

The first is the split screen glitch - if you type GRAPHICS 2,1-RETURN you will see at the junction of the graphics screen and the text screen an unsightly flickering which is intensely annoying, and really can spoil what would otherwise be very professional looking programs. The split screen is handled by the editor interrupt routine which has a vector at location \$B04. So, by redirecting this vector to the new interrupt location, I have been able to correct the bug.

Essentially, the problem of split screen glitches occurs because of an oversight by programmers. Now to explain this, I am afraid that I shall have to get a little technical, but bear with me, as I have tried to simplify it as far as possible. Firstly, you must know that a television picture (such as generated by your computer), is generated by firing electrons in a beam at the screen, which causes it to glow - this beam of electrons moves from left to right, generating each line on the screen (raster lines). In order to program a split screen, the point line at which the split is to occur is defined, and the computer causes an interrupt to occur when the beam on the television reaches this line.

Once this has occurred, the IRQ routine is entered and the computer has to determine what has caused the interrupt, since there are several

possible causes. Then, when it is sure the interrupt was for the split screen, it can then change the screen mode for the rest of the screen. However, all the time the computer is deciding what caused the interrupt, the television is still drawing the picture, so by the time the screen mode has changed, the electron beam which draws the television picture, is halfway along the line. Furthermore, the computer does not always change the screen mode at the same time, since its timing can not be 100% precise, and so the position at which the split actually occurs oscillates about - hence a glitch is produced.

Delaying Tactics

Now, good programmers take note of this, and build a delay into their program once the split routine has been entered, so that they can be sure that the change will occur within the borders, and so any glitch will not be seen. You might well ask why Commodore did not do this, after all they ought to understand their own machines, should they not? Well, after inspecting the split routine, it seems that they have tried to do it.

But what I suspect has gone wrong, is that the UK operating system is the same as the US one, but the US runs at 60 Hz, and the UK at 50 Hz. This means that there is a difference in

timing on the computer between the two routines, which has not been taken into consideration, and hence the delay is not of the correct length to ensure the glitch is pushed into the buffer. Care change the length of the delay, and the problem is solved.

The second bug is that in some of the early Commodore 128 that were shipped, the Caps-Lock key did not work with the letter Q. As a result, when this key was depressed, you had to use the SHIFT key to get a capital Q, which was rather inconvenient, especially if you forget.

The reason for this niggling fault is just one faulty byte in the Kernel ROM. Within the Kernel, there are several tables which define the ASCII code which is to be returned for each key-press - one for normal, Shift, C-, Caps-Lock and the Alt key. Also within the same-page are vectors which point to the start of each of these tables. So all that is necessary to fix this bug is to produce a corrected version of the faulty table and redirect the vector towards the new version. This vector, at \$348/\$349, is redirected to the start of the new table.

As I said, there are tables for all the different 'modes' of the keyboard, and they all have vectors. So if you wish, it is quite feasible to redefine the keyboard using the procedure outlined above - just by redirecting the vectors, and replacing the ROM tables. Also, as a result of tinkering with this routine I have noticed that the ALT key can be used to acquire lower case letters whilst the Caps-Lock key is depressed - something not noted by Commodore.

Keeping your Options Open

The program as listed, corrects both of the above mentioned bugs, and also allows you to set the default options, which include:

- 40 column background colour
- 40 column border colour
- 40 column foreground colour
- 40 column cursor flashing, or solid keys to repeat or not
- Type of 80 column cursor (fast, or slow flashing, solid, underlined)
- 80 column background colour
- 80 column foreground colour
- Default to upper or lower case

Enable or disable SHIFT/CBM character set change.

The machine code contains checkroutines, so if you make a mistake typing in the code, you will be informed of it once the program is executed. The routine resides at \$1360, which is destined to become to the C128 what \$C080 is to the C64 - a special 'safe' section of memory in which routines can be located without fear of being interfered by BASIC. Once the options have been set, the preference file is saved onto the disk, and you are given the option of setting up the boot sector to load the routine when the machine is switched on. If you wish to do so, you will probably need a blank disk. This is because on a used disk, the special sections of the disk used for booting, is quite likely to contain a file. In any case, if you do use a used disk and the boot sector is occupied, the program will report this, and not allow you to set it up.

For the cassette users, lines 1110 to 1380 can be omitted. The program can then be loaded and executed at the beginning of every programming session.

See Listings on page 122

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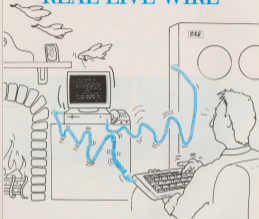
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ST-100 VIII	1988	1900	1800	1850	1900
ST-100 IX	1988	2000	1900	1950	2000
ST-100 X	1988	2100	2000	2050	2100
ST-100 XI	1988	2200	2100	2150	2200
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ST-100 XIII	1988	2400	2300	2350	2400
ST-100 XIV	1988	2500	2400	2450	2500
ST-100 XV	1988	2600	2500	2550	2600
ST-100 XVI	1988	2700	2600	2650	2700
ST-100 XVII	1988	2800	2700	2750	2800
ST-100 XVIII	1988	2900	2800	2850	2900
ST-100 XIX	1988	3000	2900	2950	3000
ST-100 XX	1988	3100	3000	3050	3100
ST-100 XXI	1988	3200	3100	3150	3200
ST-100 XXII	1988	3300	3200	3250	3300
ST-100 XXIII	1988	3400	3300	3350	3400
ST-100 XXIV	1988	3500	3400	3450	3500
ST-100 XXV	1988	3600	3500	3550	3600
ST-100 XXVI	1988	3700	3600	3650	3700
ST-100 XXVII	1988	3800	3700	3750	3800
ST-100 XXVIII	1988	3900	3800	3850	3900
ST-100 XXIX	1988	4000	3900	3950	4000
ST-100 XXX	1988	4100	4000	4050	4100
ST-100 XXXI	1988	4200	4100	4150	4200
ST-100 XXXII	1988	4300	4200	4250	4300
ST-100 XXXIII	1988	4400	4300	4350	4400
ST-100 XXXIV	1988	4500	4400	4450	4500
ST-100 XXXV	1988	4600	4500	4550	4600
ST-100 XXXVI	1988	4700	4600	4650	4700
ST-100 XXXVII	1988	4800	4700	4750	4800
ST-100 XXXVIII	1988	4900	4800	4850	4900
ST-100 XXXIX	1988	5000	4900	4950	5000
ST-100 XL	1988	5100	5000	5050	5100
ST-100 XLI	1988	5200	5100	5150	5200
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ST-100 XLVII	1988	5800	5700	5750	5800
ST-100 XLVIII	1988	5900	5800	5850	5900
ST-100 XLIX	1988	6000	5900	5950	6000
ST-100 L	1988	6100	6000	6050	6100
ST-100 LI	1988	6200	6100	6150	6200
ST-100 LII	1988	6300	6200	6250	6300
ST-100 LIII	1988	6400	6300	6350	6400
ST-100 LIV	1988	6500	6400	6450	6500
ST-100 LV	1988	6600	6500	6550	6600
ST-100 LVI	1988	6700	6600	6650	6700
ST-100 LVII	1988	6800	6700	6750	6800
ST-100 LVIII	1988	6900	6800	6850	6900
ST-100 LIX	1988	7000	6900	6950	7000
ST-100 LX	1988	7100	7000	7050	7100
ST-100 LXI	1988	7200	7100	7150	7200
ST-100 LXII	1988	7300	7200	7250	7300
ST-100 LXIII	1988	7400	7300	7350	7400
ST-100 LXIV	1988	7500	7400	7450	7500
ST-100 LXV	1988	7600	7500	7550	7600
ST-100 LXVI	1988	7700	7600	7650	7700
ST-100 LXVII	1988	7800	7700	7750	7800
ST-100 LXVIII	1988	7900	7800	7850	7900
ST-100 LXIX	1988	8000	7900	7950	8000
ST-100 LXX	1988	8100	8000	8050	8100
ST-100 LXXI	1988	8200	8100	8150	8200
ST-100 LXXII	1988	8300	8200	8250	8300
ST-100 LXXIII	1988	8400	8300	8350	8400
ST-100 LXXIV	1988	8500	8400	8450	8500
ST-100 LXXV	1988	8600	8500	8550	8600
ST-100 LXXVI	1988	8700	8600	8650	8700
ST-100 LXXVII	1988	8800	8700	8750	8800
ST-100 LXXVIII	1988	8900	8800	8850	8900
ST-100 LXXIX	1988	9000	8900	8950	9000
ST-100 LXXX	1988	9100	9000	9050	9100
ST-100 LXXXI	1988	9200	9100	9150	9200
ST-100 LXXXII	1988	9300	9200	9250	9300
ST-100 LXXXIII	1988	9400	9300	9350	9400
ST-100 LXXXIV	1988	9500	9400	9450	9500
ST-100 LXXXV	1988	9600	9500	9550	9600
ST-100 LXXXVI	1988	9700	9600	9650	9700
ST-100 LXXXVII	1988	9800	9700	9750	9800
ST-100 LXXXVIII	1988	9900	9800	9850	9900
ST-100 LXXXIX	1988	10000	9900	9950	10000
ST-100 LXXXX	1988	10100	10000	10050	10100
ST-100 LXXXXI	1988	10200	10100	10150	10200
ST-100 LXXXXII	1988	10300	10200	10250	10300
ST-100 LXXXXIII	1988	10400	10300	10350	10400
ST-100 LXXXXIV	1988	10500	10400	10450	10500
ST-100 LXXXXV	1988	10600	10500	10550	10600
ST-100 LXXXXVI	1988	10700	10600	10650	10700
ST-100 LXXXXVII	1988	10800	10700	10750	10800
ST-100 LXXXXVIII	1988	10900	10800	10850	10900
ST-100 LXXXXIX	1988	11000	10900	10950	11000
ST-100 LXXXXX	1988	11100	11000	11050	11100
ST-100 LXXXXXI	1988	11200	11100	11150	11200
ST-100 LXXXXXII	1988	11300	11200	11250	11300
ST-100 LXXXXXIII	1988	11400	11300	11350	11400
ST-100 LXXXXXIV	1988	11500	11400	11450	11500
ST-100 LXXXXXV	1988	11600	11500	11550	11600
ST-100 LXXXXXVI	1988	11700	11600	11650	11700
ST-100 LXXXXXVII	1988	11800	11700	11750	11800
ST-100 LXXXXXVIII	1988	11900	11800	11850	11900
ST-100 LXXXXXIX	1988	12000	11900	11950	12000
ST-100 LXXXXXX	1988	12100	12000	12050	12100
ST-100 LXXXXXXI	1988	12200	12100	12150	12200
ST-100 LXXXXXXII	1988	12300	12200	12250	12300
ST-100 LXXXXXXIII	1988	12400	12300	12350	12400
ST-100 LXXXXXXIV	1988	12500	12400	12450	12500
ST-100 LXXXXXXV	1988	12600	12500	12550	12600
ST-100 LXXXXXXVI	1988	12700	12600	12650	12700
ST-100 LXXXXXXVII	1988	12800	12700	12750	12800
ST-100 LXXXXXXVIII	1988	12900	12800	12850	12900
ST-100 LXXXXXXIX	1988	13000	12900	12950	13000
ST-100 LXXXXXXX	1988	13100	13000	13050	13100
ST-100 LXXXXXXXI	1988	13200	13100	13150	13200
ST-100 LXXXXXXXII	1988	13300	13200	13250	13300
ST-100 LXXXXXXXIII	1988	13400	13300	13350	13400
ST-100 LXXXXXXXIV	1988	13500	13400	13450	13500
ST-100 LXXXXXXXV	1988	13600	13500	13550	13600
ST-100 LXXXXXXXVI	1988	13700	13600	13650	13700
ST-100 LXXXXXXXVII	1988	13800	13700	13750	13800
ST-100 LXXXXXXXVIII	1988	13900	13800	13850	13900
ST-100 LXXXXXXXIX	1988	14000	13900	13950	14000
ST-100 LXXXXXXX	1988	14100	14000	14050	14100
ST-100 LXXXXXXXI	1988	14200	14100	14150	14200
ST-100 LXXXXXXXII	1988	14300	14200	14250	14300
ST-100 LXXXXXXXIII	1988	14400	14300	14350	14400
ST-100 LXXXXXXXIV	1988	14500	14400	14450	14500
ST-100 LXXXXXXXV	1988	14600	14500	14550	14600
ST-100 LXXXXXXXVI	1988	14700	14600	14650	14700
ST-100 LXXXXXXXVII	1988	14800	14700	14750	14800
ST-100 LXXXXXXXVIII	1988	14900	14800	14850	14900
ST-100 LXXXXXXXIX	1988	15000	14900	14950	15000
ST-100 LXXXXXXX	1988	15100	15000	15050	15100
ST-100 LXXXXXXXI	1988	15200	15100	15150	15200
ST-100 LXXXXXXXII	1988	15300	15200	15250	15300
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The Video Title Shop

A look at one of the latest graphics packages.

By Tony Hetherington



The Video Title Shop is described as a computer and VCR utility which can generate animated introductions to your video tapes. This is obviously useful to those hobbyists who own a video camera, but also applies to anybody who records and keeps anything, as well as being a way to produce animated shop window displays.

The Video Title Shop is supplied on disk and is accompanied by a 48 page manual that takes you through the steps of planning your sequence following the programmer's Command list prompts, using microcomputer plus to draw your backgrounds, adding text in a variety of font sizes and colours and how to link it all together into a sequence complete with scrolling and fade effects. And of course the all important instructions explaining how to connect your computer to your video are also included.

Micro painter plus is a straight forward graphics package to use complete with solid and editable pattern files, so interesting backdrops can quickly be created for your sequences which are then saved to disk. The Video Title Shop can then use these backdrops as canvases and a base for a sequence.

A typical Video Title Shop sequence consists of four or five pages, a couple of backgrounds and one or two special effects. Each page is actually quite a lot bigger than your computer screen so it's easy to create some text that can be scrolled on to the screen. This text can appear in a variety of font sizes and colours and is typed into an object. If you want to mix text colours and sizes then you need a new

object for each style of text, if not then your entire page of text can be a single object.

Once an object is created it can be moved around the page to get the positioning exactly right.

A single page may be enough to announce that the video tape contains the pictures taken at Fred's third birthday, but for other occasions and advertising demos you'll want a series of pages and you'll want to link them together in an interesting way. The Video Title Shop makes this easy.

The number of pages you can have is only limited by the C64's memory but since the final sequence is to be recorded on video tape you can record the whole sequence in two or three sections (naturally the package will work with both VHS and Betamax videos).

As I mentioned earlier you can scroll text across the screen and you can also set up a timed page that will run on the screen for any set time between 1/3 second and 15 minutes when the sequence continues. My favourite effect is undoubtedly the fade in which a new page fades over the old one, pixel by pixel until the image is complete.

The Video Title Shop is actually little more than a graphics package with built-in animation (and a few added effects) but it could be just what you've been looking for.

TH

Tweaking

Video Title Shop. Supplier: C.S. Gold, Cross St., Hatfield, Herts. Hatfield, Birmingham 26 741. Machines Ltd.

ROM Blow

Feel the burn as Datel's professional DIY cartridge system.

By Eric Doyle

Datel has recently leaptfrogged over other utility manufacturers, putting itself in close competition with Erosform Micros. As their product range increases, Datel is refreshing parts of the Commodore system which users could never reach: the cartridge port.

The Datel Eprogrammer's armory is growing daily but the main elements of their cartridge system are the Eprogrammer 64, the Cartridge Development System, the 16K EPROM board and Five Way Kernel Expander.

Before assembling a cartridge you need a programmed chip to put into it. EPROMs are identical to the ROMs already inside the C64 in all but one respect, an EPROM can be erased and reprogrammed. Datel's Eprogrammer 64 is tailored to the C64 and provides all you need to transfer your program from memory to chip.

EPROMs have a code number which reveals their memory size. Most codes start with 27 and the next two or three characters reveal their memory size multiplied by eight. For example, a 7K EPROM would have a value of 972 or 1K, therefore its code would be 2716, this coding leads to a lot of misloading advertising where 2716 types are referred to as 16K (presumably 16 kilobits), through to 256K chips which are really only 32K.

Eprogrammer 64 is supplied with its own software which controls the hardware through the user ports. The largest chip which the system can handle is the 27256 (32K) which is equivalent to half of the C64's memory.

Before you start getting too excited about this, let me explain that the maximum space a cartridge system can



access easily is a block of 16K. Furthermore, because the C64 cartridge system is designed to access 8K chips, a 16K chip can only be accessed as two 8K blocks; this means that two 8K programmes can be stored in one cartridge. There is also a dual 8K cartridge but I'll come to that later.

Before you can use the Eprogrammer effectively you have to penetrate the mysteries of one of the most documented indices in computer history. Commodore treat their cartridge system like a trade secret and for most owners it is (near) space's answer to a Black Hole, we know things go in but the where, how and

why of what happens next form part of the greatest original know-to-exist.

Fortunately Datel have unlocked the mystery and their 20 page manual of bits have the inner secrets of the cartridge operating system.

What it boils down to is that the system can be tricked into thinking that your cartridge is a normal part of C64 memory occupying locations \$B000-\$BFFF. When the computer powers up, among other things, it does a test to find if the code \$B000 is stored at location \$B004. This is the master key and causes the normal reset routine to abort in favour of the cartridge and a jump is made to a vector pointed to by \$B004-01.

The user program can only run in cartridge space unless a routine is included which will transfer and execute it in normal RAM space.

Obviously, this means a certain number of modifications will have to be made to your program before loading up your EPROM. Data's Epsommer software allows for this by including a monitor as well as the fully comprehensive chip burner.

How Keys

Once prepared, the programming of the chip is child's play. The computer displays a menu and using single key presses the parameters for the same can be set.

First of all the type of EPROM is selected by scanning through all five alternatives from 2716 to 27256. This also alters the display to the most commonly used voltage and speed for the burn. Before proceeding it's important to check that the voltage is not too high for the chip you're using, otherwise permanent damage will be caused. If the voltage or speed is wrong it can be changed independently by cycling through the alternatives using the relevant key.

My sample EPROM, part of the Cartridge System kit, was rated at about half the voltage automatically suggested by the program. Perhaps it would have been better if Data halved all the voltages to the low 12.5 volts and let the user increase this as necessary.

There are three programming speeds between 3 and 50ms. This is too fast for some chips. 4ms is more usual and 5ms is only used for older 2716 and 2732 EPROMs.

Normally the program for transfer will be stored in RAM but occasionally you may want to back up a kernel chip. Selecting ROM using the arrow key switches in the ROM chip ready for reading.

Today's chips can have such large memories that you may want to program it in 8K blocks. An ALL or RANGE toggle is provided for this purpose. When set to ALL the whole chip will be programmed but on RANGE it depends on which range has been set.

To set a range requires the minimum of thought. All you need to know is where your program starts in memory, its length and where it will



start on the EPROM. Remember that the location of the program in memory at burn time need not bear any relationship to its eventual location in memory at run time, all this is preset under cartridge program control later.

The start and length of the program are easily entered if you know hexadecimal. When Data's programmer has time on his hands he may like to add a decimal/hex calculator to the menu screen.

The EPROM position is very easily worked out. The first program goes on at location 2000 and subsequent programs normally go on at 8K intervals. If it is 8400 bytes therefore the second program will start at \$2000.

Several DOS commands also appear on the screen: directory display, disk commands, loading and saving. These are supplemented by a TEE command which pokes a zero-byte into all memory locations within the limits set as the program range.

The remaining commands are the vitally important EPROM commands. Firstly, you can check if the chip is blank. If not you must follow the correct procedure to wipe the memory using ultra-violet radiation for EPROMs or the specially included erase function for EEPROMs.

The next step is to write your program to the chip (burning) and then verify it against the RAM source.

For those doubting Thomas's who want further convincing, you can also read the EPROM into memory again. This comes in useful when you want to back up a commercial EPROM, such

the program into memory, and blow it out onto your disk.

A In Cart

Now you have your Epsom you can tackle cartridge production. The Cartridge Development System has a ready-to-blow 18K EPROM installed on the boards and components (all four of them) necessary to set up your board. A reset switch is already fitted next to a switch to allow the selection of which half of the 18K EPROM you are using. The supplied cartridge casing has two windows through which the switches will protrude.

Also included in the package is a full 20 page explanation of cartridge theory and assembly. With a minimum of soldering ability, most people will be able to produce professional-looking cartridges.

The other cartridge containing the 18K EPROM board can hold two 2712s which may be switched into memory at \$0000 and \$4000 giving 16K of contiguous RAM (8K from each chip). As with the single chip version the other halves of the two chips can be used to store another 18K program.

The only problems I found with the system were difficulties related to cartridge assembly. Firstly, an experienced programmer may not be very knowledgeable about electronics. To fit a cartridge doesn't require any electrical know-how but it would help if the test reactions pointed out the ways to tell which way round a chip should be fitted into the cartridge.

After fitting the chip your problems are not over, the currently fitted DIL sockets which hold the EPROM are too thick. Fitting the two halves of the cartridge together leaves a gap around the edge which, although small, detracts from the professional look of the product.

A final point, concerning the 18K board only, is that the bank switches on the dual chip cartridge are internal. Everyone the user wants to switch from one program to the other, the cartridge has to be unscrewed, opened, switched and then closed.

With the inclusion of two excellent battery backed-up RAM cartridges (Smart Cart) in Data's catalogue, the question must be asked: Why bother with burning when Smart Carts are so cheap?





The cost of a Smart Cart is £14.99 for an 8K pack. For a Cartridge Development System the cost is £12.99 but you have the added expense of £29.99 for theEPROM 84 unit. The difference being that the System cartridge has two 8K programs and you are free of the worries of battery replacement or failure. If you only envisage using two or three cartridges the Smart Cart is good enough. If you can foresee a need for dozens of cartridges and extra Kernal chips then an EPROM system is your only option.

ROM Banking

Dani also has other interesting products which link in with the EPROMmer 84. Take the Five Way Kernal Expander for example. Carefully replace your Kernal ROM with a socket and you can plug this board in and into your ROM. Banking it on either side is a pair of 16K EPROM sockets which allow you to add four more 8K operating systems. Using the supplied switch to select the chip you want, you can power up into an operating system of your own making.

Each month when I see these adverts, Dani's range seems to have grown. The EPROMmer 84, Cartridge System, and Kernal Board are superbly conceived, extremely easy to use and, with 16K EPROMS costing less than a fiver, the cost of producing your own cartridge compares favourably with that of commercially produced ones. With motherboard, Supervern boards and cartridges already on Dani's books ask yourself



how much longer you think you can ignore EPROM programming.

Timeline:

- Product: EPROMmer 84 Price: £29.99
- Product: Cartridge Development System Price: £12.99
- Product: 16K EPROM Board Price: £5.99
- Product: 5 Way Kernal Expander Price: £12.99
- Address: Dani Electronics, Units 6/8, Deverbury Road, Weston Advonville Estate, Frome, Strick On Trent, Tel: 0475 273 815.

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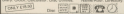
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PLEASE NOTE - Pegasus is for the Commodore 64 and is **DISK** only.

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Study the two cartoons, there are a number of differences between them. Once you have decided how many differences there are complete the entry coupon and send it to the editorial address (see below). Please write the number of differences that you have found on the back of the envelope. If you don't then your entry will not be accepted.

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Bulletin Boards

Continuing our computer communications series, this month we look at the various uses of bulletin boards.

By Jennifer Goldsmith

Generally speaking, a bulletin board is an electronic notepad, which permits two-way communication. This means that the user can obtain information and contribute to the system. It differs from a conferencing system in as much as there are no closed user groups (CUGs) and there are no individual conferences, which are separate entities, with different people organising each conference.

Conferencing systems are usually run by commercial organisations and the subject matter is very diverse. Whereas bulletin boards are usually, but not always, run by the hobbyist and the subject matter is usually specialised in as much as the topics are related to a specific hobby or interest, e.g. PCs, Commodore Computers, Amateur Radio, etc.

How do Bulletin Boards Work?

Basically, there are two different ways in which they work. Either you phone

them and when the modem answers, you connect your modem in the appropriate manner for your software, and then you log on. Or, after you phone the bulletin board, you hang up and the bulletin board's modem phones you back. This latter type of logging on is not so common as it is more expensive to implement, but it does give greater security. If you go to log on to a bulletin board after having used a commercial system like Prosal, you may find the bulletin board unfriendly.

Exactly what is required differs from system to system but you will find that often your name is required followed by a carriage return or hash. Next, you'll divulge your Prosal ID or password, or any password on any other system (unless everything is free and you have nothing to loose by doing so).

Some bulletin boards, especially those whose software originated in the USA, operate at 300/300 baud scrolling. However, with the growth in

popularity in the UK of videodata systems, some software has been written for bulletin boards using the Kermit, cc, colour and I204/715 baud. Therefore as mentioned in the October issue, you have to make sure that you have the appropriate software and that the modem and software are compatible.

Growing in Popularity

One of the reasons why bulletin boards have become popular, is that anyone can set them up. For example, a CG4 with disk drive, autonomous modem and bulletin board software for the 64 costing £89, which is available from T3 Computing, is all you need.

However, many of the popular boards have a hard disk attached. This allows an increase in speed of operation and allows much more material to be available to the user. For example, with a 1541, only a couple of hundred or so frames (in the case of videodata compatible boards

could be stored, but with a hard disk, thousands of frames could be stored and/or much information as well. Therefore, bulletin boards are not only expensive to set up but they are also hard work.

For this reason, you will find that access to some bulletin boards is restricted to certain hours only, yet others are available 24 hours. No-one can give you hard and fast rules when it comes to bulletin boards as there are about 200 in the UK, thousands in the USA, and the number is on the increase.

You may have difficulty in accessing popular boards, as many people are using simultaneously and there is usually only one phone line, which means of course that only one person can use the system at any given time. You must bear this in mind when you're using a bulletin board, so that you minimise the time you are on-line in order to let others on the system.

Listings of Bulletin Boards

It would be very difficult and impractical for me to provide a complete listing of bulletin boards in the UK. There are various sources for lists. Firstly the Bulletin Boards Operators Association, which is an association to which systems operators (sysops) can belong. This information is also supplied to Clublog on Protel. However, these sources of lists are not currently available as unfortunately they were destroyed in a fire, and are in the process of being re-compiled at the moment.

The other source of lists is the magazine *Teklink*, which comes out six times a year. It is a magazine wholly devoted to communications in the UK and at £15 for two years subscription, it is a MUST. Just contact Database Publications on Protel Mbs 014568383 or on Telcom: Code 7256AC6001 and credit cards are an acceptable means of payment.

Finding Your Way About

There is no easy way of knowing what bulletin boards have what information. Either you get information from your friends and colleagues or you just phone around. Anyway to get you going, here is a brief description of some of them.

However, I can take no responsibility for any errors or omissions.

The first one I would like to mention is a fairly new board, based in Wolverhampton, telephone number 0902 745335. (It may be on PMS but I am not sure.) What is unique, is that (to my knowledge) it is entirely devoted to Commodore users, covering all machines including the Amiga. There is an increasing amount of software. It is available 24 hours on both 300/300 and 1200/75 scrolling.

The next bulletin board is devoted purely to a hobby. In this case it is Amateur Radio. The Radio Society of Great Britain run a bulletin board (tel: 0797 52542) which is available 24 hours on 1200/75 local standard format. Normally only one phone line is available but I believe it is hoped that two lines will be in use before long.

This bulletin board has a fairly large database on various aspects of amateur radio, including band plans, a diary of events, rallies and contests, information on moon tests and the radio amateurs examination (incl. news from both home and abroad, packet radio, solar propagation, club information and news, RAYNET, repeaters and beacons, books and other products which can be purchased from RSGB, RSGB articles, satellites and information for beginners.

In addition to this, there are response frames for ordering books, etc. by credit card, for obtaining information and you can write your own messages as well. Unlike most boards, it is updated more working days as a full-time editor/database manager is employed.

The Gemini at Home is a very popular board which supports six phone lines 24 hours a day. Two of these phone lines are for the general public, the other four are logs for the paying subscribers. Subscription is very cheap and only costs £1.50 a month which is well worth while, just to be able to access the board more readily. The two lines for the public are on 01-484 8894 at 1200/75 baud, using viewdata compatible software.

The London Underground bulletin Board is available 24 hours on 01-463 9198 on 300/300, 1200/75 and 1200 full duplex and has about 4000 callers a year. This is quite good, but I believe RSGB has between 14-37 callers a day. However, this bulletin board runs on a

PC whereas RSGB's database uses a BBC. Both make use of a hard disk as does the Commodore one which also uses a PC clone.

There are two BABS boards. BABS stands for British Apple Bulletin Board System. They run at 300 baud, are sponsored by BABS(UK), British Apple System User Group and are available 24 hours a day on 0394 276536 and 0268 779955.

Robert O'Donnell's bulletin board in Manchester was the first bulletin board to use a BBC micro and colour. Robert has worked for a few computer companies and has even written his own communication software. His board covers more interests, something for everyone - advertising, BBC software, jokes and advertisements. No wonder Microsoft are currently employing him! Bob's board is available 24 hours at 300 baud on 061-427 1996.

Lynn Hard, who is the sysop for the Commodore Hope bulletin board in Porth, Wales was most probably the first female sysop in the UK. There are currently only about three of four female sysops on the UK (in over 200 boards).

One important point is that in order to access the board if you do NOT have to be using the same computer as the one which is running the board. For example, a BBC may be running the RSGB board but any computer which has viewdata compatible software using 1200/75 will be able to access it.

Accessing Boards in America

The bulletin board industry in America is, unlike its British counterpart, very organised. Most States operate on what is known as Bell frequencies. The UK (EXCEPT) does not work in the US (and Canada). Therefore your modem will have to be able to cope with the Bell frequencies. The Bell frequencies, in Hertz, are: Bell 103 (300 baud) is Original; transmit 1030 40 (1200/11); receive 2025 40 (225) (1). Bell 202 (1200 baud) transmit and receive 2000 (1200/1).

This is half-duplex and is the same as our 1200 half-duplex. However the 300 baud is not the same as the British 300 baud.

Once you have overcome the problem of the Bell tones, your next problem will be the logging on. As

commodore



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Number Tumble

A frustrating game for two players.

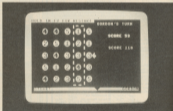
By John Phillips

The basic idea of the game is that a 5x5 grid of numbers between one and five is presented. Player one can move a column one place up or down (with a wraparound effect) to produce either a winning sequence of 1,2,3,4,5 reading up, down, left or right, or to produce scoring sequences of 2,3,4 or 5 identical numbers in a line (up or down). Player two (or C84 if in one player mode) then has to move a row one place backwards or forwards with the same aim.

The winner is the first to produce either a 1,2,3,4,5 sequence or the first to create a large differential in points which will remove the opponents bar marker from the bottom of the screen. Both methods result in a 100 points bonus.

To add to the fun, after all 1, 4 and 5 number scoring sequences, at least two of the numbers are changed by one count in either direction. There are not random changes but they are explained more fully in the program.

In 1 player mode, a pre-selected level of 1 to 5 gives the computer 30% to 100% chance of achieving the highest obtainable score for its turn, but will always detect a 1,2,3,4,5 sequence if one is available. The higher the level, the longer the time the computer needs to respond, but this is indicated on screen via a countdown timer.



Other than the random selection of the initial grid the game is totally logical and requires careful thought. Games may last a couple of minutes to half an hour or more, depending on intellect between players or the level selected.

Getting it in

The program is presented in two parts; the first contains all the data for m/y sequences and U.P.C.s and also for copying character sets. The DATA LOADER must be typed and saved

before the Number Tumble program.

A small normalising program has also been given because if RUN/STOP and RESTORE buttons are used after running the main program the screen blanks and no typing can be seen. This is due to the banks, screens and characters having been shifted around.

Type RUN 10000 (even though you can't see it) and the computer will return to normal after RETURN has been pressed. This add-on program proved useful during development of the game and may similarly help white de-bugging take place. ☐

See Listings on page 111

Software for Sale

If you think that one of our programmes looks very interesting, but you can't afford the time to type it in then our software service will help you out.

Let's face it/look in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programmes from Your Commodore. Your fingers reach for the keyboard and press the letters R, U, and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The Your Commodore Software Service makes available all of the programmes from each issue on both cassette and disk at a price of £8.00 for disk and £4.00 for cassette. None of the documentation for the programmes is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

IMPONET LTD, 5 River Park Estate, Berkhamstead,
Herts HP4 1PH.
TEL: (0447) 768174.

please contact this address for prices and availability.

The Disk

Programmes on the disk will also be supplied as totally working versions, i.e. when possible we will not use Basic Loaders thus making use of the programmes much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programmes for these machines will be available on the disk.

What programmes are available?

At the top of each article you will find a strap containing the article type, C64 Program etc. So that you can see which programmes are available on which format you will also find a couple of symbols after this strap. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

Please Note

Since the programs supplied on cassette are total working versions of the program, we do not put disk-only programmes on tape. There is no sense in placing a program that expects to be reading from disk on to tape.

JUNE 1987

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JULY 1987

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- WINDOWS** — A text window system for the C64.

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SEPTEMBER 1987

- DISKET 2** — Copy your disk programmes to turbo tape with ease (C64 — disk only.)
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Commodore disks are available from March 1986. Please ring the editorial office (01-457-8626) for details of these.

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Communications Corner

David Janda is back with more news and views from the communications world.

IN AN UNEXPECTED move, major tariff changes for the Telecom Gold system were made in early August. The good news is that the peak rate time charge is now 6.5p per minute, down from 11p, and that the off-peak rate is now 2p, down from 3.5p. The bad news is that Telecom Gold has imposed a £3 per month subscription fee on every mailbox.

But by far the most controversial change is a new tariff for data transfer. Each block of 512 characters sent to or from Telecom Gold will cost the user 4p at peak time and 1p off-peak - with the first 312 characters free. This means that a 1000 word document will on average cost 48p at peak time or 12p off-peak to read or send.

The new tariff structure will affect all users across the board, especially domestic users as they will not be able to offset the cost of using Telecom Gold as a company expense. Further, domestic users tend to make extensive use of areas on Gold that rely on sending/receiving text such as Email, news areas, and on systems 71 which is operated by Interlink - the bulletin board facility.

Almost overnight, the new pricing structure has changed Telecom Gold from being one of the most cost-effective databases, to one of the most expensive. For example, a user wishing to facilitate one of the on-line information services such as FinTech

will have to pay the information provider a time charge for accessing the database as well as the connect charge and the data transfer charge imposed by Telecom Gold. Worse still, users accessing Gold via PMS also have to pay a data transfer charge on top of that. Add to all this the cost of the phone call to your local PMS node/Gold port and the cost begins to add up!

Microsoft Goes for Gold

However, there is a way to avoid the £3 subscription fee and the cost of long distance phone calls, and yet still have access to all the facilities of Telecom Gold - by simply joining Microsoft.

Interlink is the name of a 'gateway' that enables Microsoft subscribers to be connected through to Telecom Gold. From within Microsoft, the user goes to the Interlink from page (*00000000) or (*INTERLINK) and presses '1' to make the connection. Once this is done, the user logs on by calling system 74, enters their ID and password, and is through to Telecom Gold, some clever software converts Gold's 80 column format to 40 columns that's required by Protext. At the end of each frame the user is prompted to press RETURN; the screen will then clear and more text, if any, will follow.

To use Interlink, Microsoft subscribers must first register online. Once done, you will be provided with your own Telecom Gold mailbox which you can access through Interlink, or by accessing Telecom Gold directly. There is no registration fee and Interlink members do not have to pay the £3 subscription fee each month. There is a charge of 1p per minute for using the gateway, but when you take into account local call access for Protext/Microsoft subscribers and the saving of the £3 subscription fee, accessing Telecom Gold via Interlink is very cost effective. Consider the following subscription charges for a period of one year:

Telecom Gold:	£90
Protext:	£35
Microsoft/Protext:	£66

Subscribing to Telecom Gold and Protext will cost £96 per year, yet subscribing to Microsoft (which also means subscribing to Protext as Microsoft is an information provider on the Protext database) will get you all these services for £66 - and that is exceptional value for money.

According to Microsoft's PR manager, David Rosenbaum, Protext are currently developing an 80 column gateway which can be used with Protext/Microsoft, and the Microsoft have made 'a mega

development in online chat facilities." Full details on both items next month.

CompuNet Changes

SEVERAL MAJOR CHANGES have happened at CompuNet over the last few months. First, CompuNet has "moved" the whole database onto their new 'mainframe' computer. Previously, the service was run on a DEC 10 mainframe computer which was a timesharing system. The result was slow login time, slow page access, slow everything. However, with their new mainframe, which consists of a series of 68010 microprocessors, things should be speeded up. New applications software has been written in C, and single processors are allocated to individual tasks such as updating the directory.

There should be several benefits to the subscriber as a result of the move. Firstly speed - the time taken to move through the database should be improved dramatically. Capacity will be doubled, allowing more people to

subscribe. Facilities such as the multi-user game (MUG) Federation is now available and may soon be followed by Gobs. Including MUG, this would bring the number of MUGs to three on the system. CompuNet also intend to cater for micros other than the C64/C128 in the near future. The BBC micro was to have been the first of these micros, but the plan to accommodate the Beek has been abandoned earlier this year.

Finally, the cost of using CompuNet has gone down - well, sort of. Previously, a subscriber could access CompuNet by calling one of several numbers that were scattered around the country. These 'free' numbers have been scrapped and everyone must access the service through the local network. Local prices have gone down to 1p per minute, and the cost of accessing CompuNet during peak hours has gone down to 60p per hour for London users and 84 for all other users.

Gold subscribers can take out a quarterly subscription of £3.49 (inc

VAT) to cover off peak connect charges.

Obviously the price reductions are a move in the right direction. But what seems unfair is the removal of the free phone numbers.

Snippp

The cost of accessing CompuNet in the evening requires a local phone call to an local port during the off-peak period and the local charge; the total is £1.04 per hour (ex VAT on the phone call). Accessing Micronet in the evening requires a local call to a Prestel port in the off-peak period; this costs 40p per hour (ex VAT). There is no charge for using the Prestel network.

Feedback

Telephone Gold: 01-403 6777.
Micronet: 01-278 2124
CompuNet: 01-497 2281.

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Adventure Kit II

*Continuing our adventure writing series, this month we
look at everything you need to know about the text.*

By Allen Webb

This month I will deal with the text; the life-blood of adventures. Since text is RAM hungry, this section will utilize the unused RAM lurking behind the ROMs. The actual code is quite small but it needs four tables occupying 1K. In order to print text, we need to know two things. First we need the start address of the text and secondly some way of knowing when the text ends.

In this case, I will use a zero byte as a sentinel to mark the end of each piece of text. Since only simple indexed addressing is used, each block of text is limited to 256 bytes. The actual text is stored in an uncompressed form to allow you the full use of characters and control codes. If you want to use compressed storage, refer to my article in *Four Commodore* (September 1987) which covers it.

How the Code works

Below I describe the editor for this section. I will give some detail on how the code works, for those of you who want to write their own editor. The syntax for the code is:

```
SYS 51968,BANK,MESSAGE  
NO,LINE
```

BANK refers to the block of RAM concerned and has the value:
0 = area below the BASIC ROM

between 4096 (8A000) and 4912 (8DFFF)

1 = area below the Kernal ROM between 57344 (8F000) and 65535 (9FFFF)

This gives a total of about 18K for text.

MESSAGE NO is a 1211-explanatory and has the value between 0 and 255. The editor initializes the table values to zero. If you try to call a non-existent message the zero bytes are detected and you get a flashing border to warn you of your error. This action does not, however, terminate execution of your BASIC program.

LINE refers the starting line for the message. The normal scrolling as occurs with PRINT will be avoided.

The memory used by the code is as follows:

8CB00-8CBFF...main code
8CC00-8CCFF...low byte table for BASIC ROM area

8CD00-8CDFF...main code
8CC00-8CCFF...low byte table for BASIC ROM area

8CD00-8CDFF...high byte table for BASIC ROM area

8CE00-8CEFF...low byte table for KERNAL ROM area

8CF00-8CFFF...high byte table for KERNAL ROM area

The start addresses of each message are kept in the above tables. For example, the low byte (LB) of the start address of message 1 under the BASIC ROM is held in location 8CC00 (32E25). Similarly, the high byte (HB) is in 8CD00. The start address of the message is then given by:

Address = HB x 256 + LB

The editor given seems rather disproportionately large for the code it serves, but my reasons for using nearly machine code are simple. Any text editor written in BASIC will be sluggish and the other operations involved will give an unwieldy program. The main editor is coded by a short jump of BASIC. It is driven by a main menu screen which also gives help and shows the current memory map in each bank.

The two memory banks are handled separately and you can only work on one at a time. You can toggle between them by pressing F1, and the border colour will change accordingly. This option is selected from the main menu only. Subsequent actions such as initialization and text entry act on the current bank.

Listings

Get it right first time with our deluxe program system for the C64.

You may have noticed that our listings are free of those horrible little black blobs which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the funny numbers by the side of each line of the listing. First, no more, it's all part of our easy entry aid.

Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an array of spaces in layman's terms, and [TAB] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realize that [C+2] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement then this will be printed as [SPC4] or, exceptionally, [SPCN]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as:

[CTRL N, DOWN2LEFTS, BLUE, F3,C]

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2) would of course make the computer print in brown.

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears:

[88][C*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quotes mode. Hold down CTRL and press the number nine key [NINE], type the relevant number of reversed T's and then hold down CTRL and press zero [ZERO]. Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string the symbol for pi. This may appear when its value is needed in a calculation so this may look something like:

CC=2*[PI]*R

Ignore the square brackets and just type in a shifted upward pointing arrow (i.e. the pi symbol).

PROGRAMS WITHIN PROGRAMS

5: REM DEFINE DELTA=PI - ERIC DOYLE

10: REM:100 100-70 100-10000
200 FOR L=0 TO 10:PRINT FOR S=0 TO 10

30: REM:4:PI* RADIUS**2/4/DELTA
40: FOR I=0 TO 2:PRINT:FOR J=0 TO 2

50: REM:4:PI* R**2/4/DELTA/PI**2/4/DELTA
60: FOR K=0 TO 2:PRINT:FOR L=0 TO 2

70: REM:1:PI**2/4/DELTA/PI**2/4/DELTA
80: FOR M=0 TO 2:PRINT:FOR N=0 TO 2

90: REM:100-70 100-70 100-10000
100: FOR O=0 TO 10:PRINT:FOR P=0 TO 10

110: REM:100-70 100-70 100-10000
120: FOR Q=0 TO 10:PRINT:FOR R=0 TO 10

130: REM:100-70 100-70 100-10000
140: FOR S=0 TO 10:PRINT:FOR T=0 TO 10

150: REM:100-70 100-70 100-10000
160: FOR U=0 TO 10:PRINT:FOR V=0 TO 10

170: REM:100-70 100-70 100-10000
180: FOR W=0 TO 10:PRINT:FOR X=0 TO 10

190: REM:100-70 100-70 100-10000
200: FOR Y=0 TO 10:PRINT:FOR Z=0 TO 10

210: REM:100-70 100-70 100-10000
220: FOR AA=0 TO 10:PRINT:FOR AB=0 TO 10

230: REM:100-70 100-70 100-10000
240: FOR AC=0 TO 10:PRINT:FOR AD=0 TO 10

250: REM:100-70 100-70 100-10000
260: FOR AE=0 TO 10:PRINT:FOR AF=0 TO 10

270: REM:100-70 100-70 100-10000
280: FOR AG=0 TO 10:PRINT:FOR AH=0 TO 10

290: REM:100-70 100-70 100-10000
300: FOR AI=0 TO 10:PRINT:FOR AJ=0 TO 10

By Eric Doyle

Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in *Your Commodore*.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.













If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type SYS4912 and the screen will return to the normal color columns. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SYS command.

Lower Case

Many of the listings are presented in lower case. To turn your computer to lower case mode press the Commodore key and the SHIFT key at the same time. TS

Mnemonic	Symbol	Keypress
[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RYSON]		CTRL & 9
[RYSOFF]		CTRL & 8

Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LBARROW]		←
[UBARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		no text
[Clear]		CRM + letter
[Store]		SHIFT + letter

LISTINGS

11	1800	02840	11,281.0,144.5,2	39	2020	028408	2,169.2,141,169	54	2070	02810	99,99,99,99,99
			40,84,79,29,20				2,362,152,168,24				99,99,99,99,99
20	2020	028179	14,208,41,129,2	48	2040	028402	125,134,95,173,1	57	2020	028109	100,100,100,100
			81,128,108,76,11,24				2,200,20,92,180,20				100,100,100,100
F0	1420	02820	261,80,208,13,1	29	1270	028205	110,101,201,201				100,100,100,100
			89,0,141,14,208,1779				20,70,121,170,0,200				100,100,100,100
33	1840	028115	208,41,127,141,1	30	2080	028118	140,240,40,240,18				100,100,100,100
			8,208,128,14,128,77				8,200,170,2,160,128				100,100,100,100
22	1840	028108	120,177,14,280,2	64	2070	028202	101,130,248,999				100,100,100,100
			81,128,108,76,11,24				240,118,281,7,176,128				100,100,100,100
26	1840	028106	128,141,28,20	64	2040	028107	120,240,204,201				100,100,100,100
			8,128,1,140,14,280				10,170,120,100,100,201				100,100,100,100
24	1870	028208	14,208,79,20,110	27	2090	028179	2,208,202,1,200,1				100,100,100,100
			2,173,14,208,40,218				70,169,41,128,120				100,100,100,100
78	1840	028211	128,208,24,173	81	2100	028201	202,189,40,208				100,100,100,100
			14,208,208,13,173,24				128,242,140,9,177,20				100,100,100,100
64	1840	028209	77,128,144,14,2	69	2110	028178	208,240,240,208				100,100,100,100
			89,169,225,141,14,208				208,240,208,208,208				100,100,100,100
83	1870	028204	14,208,79,20,110	2A	2100	028211	8,208,9,78,120				100,100,100,100
			2,173,14,208,208,13				128,201,4,208,3				100,100,100,100
8C	1870	028189	208,140,128,11	61	2100	028176	168,137,204,1,20				100,100,100,100
			73,14,208,8,128,140				8,12,129,0,141,129				100,100,100,100
4A	1790	028118	208,208,14,280,1	24	2120	028108	100,171,174,2,7				100,100,100,100
			73,124,2,141,80,108				8,20,140,201,2				100,100,100,100
10	1770	028107	0,78,173,15,180	01	2130	028102	118,200,141,1				100,100,100,100
			24,201,43,24,24				2,108,8,124,174				100,100,100,100
17	1740	028104	74,24,74,123,189	80	2180	028125	78,94,140,201,2,3				100,100,100,100
			173,14,208,80,220				68,6,169,6,141				100,100,100,100
8A	1780	02817	24,74,24,74,24,7	70	2170	028174	2,78,74,140,201				100,100,100,100
			4,124,25,280,15				2,240,2,78,120				100,100,100,100
30	1780	028105	281,16,179,2,105	46	2180	028123	78,171,140,169				100,100,100,100
			32,123,182,99,182				8,120,201,120,201,120				100,100,100,100
52	1700	028106	44,108,127,8	7E	2120	028107	200,240,240,4,4				100,100,100,100
			4,173,104,2,182				21,204,168,184,120,282				100,100,100,100
25	1790	028100	124,102,124,19,20	02	2120	028144	182,133,248,140				100,100,100,100
			8,209,209,108,127,8				214,123,250,2,209,121				100,100,100,100
69	1780	028164	173,124,12,17,0,2	01	2110	028120	202,1,209,8,129				100,100,100,100
			24,212,124,48,208				177,68,120,22,224				100,100,100,100
78	1880	028140	124,124,208,2,1	02	2120	028109	208,240,160,180				100,100,100,100
			69,12,12,12,12,12,12				20,247,208,248,8,100				100,100,100,100
11	1810	028103	189,240,2,189,0	9F	2120	028116	170,170,120,18				100,100,100,100
			94,98,100,100,100				4,140,140,170,14,64				100,100,100,100
F4	1820	028176	147,182,182,181	28	2140	028105	12,12,1,4,22,22				100,100,100,100
			18,178,44,182,182,181				120,69,18,2				100,100,100,100
7E	1830	028102	124,182,182,182,24	4C	2100	028122	8,12,20,228,66,2				100,100,100,100
			8,232,248,4,142,140				2,18,18,8,4				100,100,100,100
10	1840	028101	141,141,148,2,1	88	2160	028126	220,100,80,80,80				100,100,100,100
			65,0,141,142,2				2170,14184,141,187,2,248,8,1				100,100,100,100
22	1850	028109	229,169,4,14	94	2180	028140	249,2,140,2,103,0				100,100,100,100
			1,147,2,268,8,140				10,84,20,210,204,84				100,100,100,100
4E	1880	028140	124,124,124,141,1	70	2180	028170	24,200,50,40,14				100,100,100,100
			44,2,84,148,7,140				0,20,200,100,20,14				100,100,100,100
03	1870	028147	124,140,11,144,14	08	2170	028150	24,240,14,172,0				100,100,100,100
			8,2,169,84,141,169				270,41,15,249,248				100,100,100,100
14	1880	028101	208,120,120,201	FF	2110	028145	148,200,170,2,2				100,100,100,100
			120,201,120,247,120				40,239,21,114,120,248				100,100,100,100
44	1880	028146	148,128,123,224	58	2120	028149	248,2,78,22,129				100,100,100,100
			149,4,123,282,169,124				201,4,124,205,182				100,100,100,100
04	1840	028103	148,149,123,123	89	2180	028121	21,144,218,2				100,100,100,100
			180,180,0,182,4,177				91,13,178,218,168,188				100,100,100,100
28	1910	028101	148,123,177,247				12,248,120,201,2,240				100,100,100,100
			41,81,89,84,141,169				10,24,108,14,78				100,100,100,100
38	1880	028141	120,170,208,274	82	2080	028188	4,128,120,221				100,100,100,100
			230,230,120,248,140,0				282,189,40,108,202,250				100,100,100,100
86	1880	028102	208,230,84,173	32	2040	028100	8,177,201,70,12				100,100,100,100
			148,2,179,173,147,2				8,147,201,128,208,247				100,100,100,100
20	1880	028108	108,159,79,9	17	2178	028240	178,168,189,201				100,100,100,100
			28,157,89,128,120,120				2,248,120,201,2,240				100,100,100,100
28	1880	028101	224,84,4,9,12	40	2120	028119	141,141,20,208				100,100,100,100
			4,4,32,32,32				142,142,0,141,170				100,100,100,100
24	1840	028152	52,128,64,18,1,2	86	2060	028182	187,1,141,176,2,2				100,100,100,100
			2,5,32,32,32				8,78,140,188,220				100,100,100,100
88	1870	028120	22,128,65,22,5,1	95	2480	028141	173,2,168,1,141				100,100,100,100
			8,8,8,8,20,20				178,2,78,84,140				100,100,100,100
20	1880	028120	22,128,65,2,18,1	84	2420	028158	1,141,174,1,76				100,100,100,100
			8,18,18,12,32				7,80,80,1,10				100,100,100,100
11	1840	028150	128,128,64,4,9,18	8C	2420	028154	2,208,18,22,32,1				100,100,100,100
			2,5,32,32,32				6,48,120,60,4				100,100,100,100
20	2020	028119	22,128,65,2,12,1	84	2420	028158	1,141,174,1,76				100,100,100,100
			2,12,1,14,4				7,80,80,1,10				100,100,100,100
70	2018	028122	22,128,68,88,98	84	2420	028158	1,141,174,1,76				100,100,100,100
			88,94,88,98,98				7,80,80,1,10				100,100,100,100
00	2070	028146	94,244,244,7,242	43	2448	028150	24,4,20,20,20,2				100,100,100,100
			107,1,107,11,141								100,100,100,100

LISTINGS

59	3900	8478191	152.1.189.185.1	79.141.162.0.30	04	3900	8478848	240.267.8.76.64.3	28.165.42.141.203		
60	3900	8478192	152.185.205.157	3900	8478849	255.70.58.169.2	39.41.138.240.5.187	07	3900	8478849	255.44.141.202.3
61	3900	8478193	152.185.205.157	3900	8478850	255.70.58.169.2	39.41.138.240.5.187	08	3900	8478850	255.44.141.202.3
62	3900	8478194	152.185.205.157	3900	8478851	255.70.58.169.2	39.41.138.240.5.187	09	3900	8478851	255.44.141.202.3
63	3900	8478195	152.185.205.157	3900	8478852	255.70.58.169.2	39.41.138.240.5.187	10	3900	8478852	255.44.141.202.3
64	3900	8478196	152.185.205.157	3900	8478853	255.70.58.169.2	39.41.138.240.5.187	11	3900	8478853	255.44.141.202.3
65	3900	8478197	152.185.205.157	3900	8478854	255.70.58.169.2	39.41.138.240.5.187	12	3900	8478854	255.44.141.202.3
66	3900	8478198	152.185.205.157	3900	8478855	255.70.58.169.2	39.41.138.240.5.187	13	3900	8478855	255.44.141.202.3
67	3900	8478199	152.185.205.157	3900	8478856	255.70.58.169.2	39.41.138.240.5.187	14	3900	8478856	255.44.141.202.3
68	3900	8478200	152.185.205.157	3900	8478857	255.70.58.169.2	39.41.138.240.5.187	15	3900	8478857	255.44.141.202.3
69	3900	8478201	152.185.205.157	3900	8478858	255.70.58.169.2	39.41.138.240.5.187	16	3900	8478858	255.44.141.202.3
70	3900	8478202	152.185.205.157	3900	8478859	255.70.58.169.2	39.41.138.240.5.187	17	3900	8478859	255.44.141.202.3
71	3900	8478203	152.185.205.157	3900	8478860	255.70.58.169.2	39.41.138.240.5.187	18	3900	8478860	255.44.141.202.3
72	3900	8478204	152.185.205.157	3900	8478861	255.70.58.169.2	39.41.138.240.5.187	19	3900	8478861	255.44.141.202.3
73	3900	8478205	152.185.205.157	3900	8478862	255.70.58.169.2	39.41.138.240.5.187	20	3900	8478862	255.44.141.202.3
74	3900	8478206	152.185.205.157	3900	8478863	255.70.58.169.2	39.41.138.240.5.187	21	3900	8478863	255.44.141.202.3
75	3900	8478207	152.185.205.157	3900	8478864	255.70.58.169.2	39.41.138.240.5.187	22	3900	8478864	255.44.141.202.3
76	3900	8478208	152.185.205.157	3900	8478865	255.70.58.169.2	39.41.138.240.5.187	23	3900	8478865	255.44.141.202.3
77	3900	8478209	152.185.205.157	3900	8478866	255.70.58.169.2	39.41.138.240.5.187	24	3900	8478866	255.44.141.202.3
78	3900	8478210	152.185.205.157	3900	8478867	255.70.58.169.2	39.41.138.240.5.187	25	3900	8478867	255.44.141.202.3
79	3900	8478211	152.185.205.157	3900	8478868	255.70.58.169.2	39.41.138.240.5.187	26	3900	8478868	255.44.141.202.3
80	3900	8478212	152.185.205.157	3900	8478869	255.70.58.169.2	39.41.138.240.5.187	27	3900	8478869	255.44.141.202.3
81	3900	8478213	152.185.205.157	3900	8478870	255.70.58.169.2	39.41.138.240.5.187	28	3900	8478870	255.44.141.202.3
82	3900	8478214	152.185.205.157	3900	8478871	255.70.58.169.2	39.41.138.240.5.187	29	3900	8478871	255.44.141.202.3
83	3900	8478215	152.185.205.157	3900	8478872	255.70.58.169.2	39.41.138.240.5.187	30	3900	8478872	255.44.141.202.3
84	3900	8478216	152.185.205.157	3900	8478873	255.70.58.169.2	39.41.138.240.5.187	31	3900	8478873	255.44.141.202.3
85	3900	8478217	152.185.205.157	3900	8478874	255.70.58.169.2	39.41.138.240.5.187	32	3900	8478874	255.44.141.202.3
86	3900	8478218	152.185.205.157	3900	8478875	255.70.58.169.2	39.41.138.240.5.187	33	3900	8478875	255.44.141.202.3
87	3900	8478219	152.185.205.157	3900	8478876	255.70.58.169.2	39.41.138.240.5.187	34	3900	8478876	255.44.141.202.3
88	3900	8478220	152.185.205.157	3900	8478877	255.70.58.169.2	39.41.138.240.5.187	35	3900	8478877	255.44.141.202.3
89	3900	8478221	152.185.205.157	3900	8478878	255.70.58.169.2	39.41.138.240.5.187	36	3900	8478878	255.44.141.202.3
90	3900	8478222	152.185.205.157	3900	8478879	255.70.58.169.2	39.41.138.240.5.187	37	3900	8478879	255.44.141.202.3
91	3900	8478223	152.185.205.157	3900	8478880	255.70.58.169.2	39.41.138.240.5.187	38	3900	8478880	255.44.141.202.3
92	3900	8478224	152.185.205.157	3900	8478881	255.70.58.169.2	39.41.138.240.5.187	39	3900	8478881	255.44.141.202.3
93	3900	8478225	152.185.205.157	3900	8478882	255.70.58.169.2	39.41.138.240.5.187	40	3900	8478882	255.44.141.202.3
94	3900	8478226	152.185.205.157	3900	8478883	255.70.58.169.2	39.41.138.240.5.187	41	3900	8478883	255.44.141.202.3
95	3900	8478227	152.185.205.157	3900	8478884	255.70.58.169.2	39.41.138.240.5.187	42	3900	8478884	255.44.141.202.3
96	3900	8478228	152.185.205.157	3900	8478885	255.70.58.169.2	39.41.138.240.5.187	43	3900	8478885	255.44.141.202.3
97	3900	8478229	152.185.205.157	3900	8478886	255.70.58.169.2	39.41.138.240.5.187	44	3900	8478886	255.44.141.202.3
98	3900	8478230	152.185.205.157	3900	8478887	255.70.58.169.2	39.41.138.240.5.187	45	3900	8478887	255.44.141.202.3
99	3900	8478231	152.185.205.157	3900	8478888	255.70.58.169.2	39.41.138.240.5.187	46	3900	8478888	255.44.141.202.3

LISTINGS

48	4800 DAT100,10,10,10,10,10,10	49	4900 DAT100,10,10,10,10,10,10
50	4100 DAT100,10,10,10,10,10,10	51	5100 DAT100,10,10,10,10,10,10
52	4100 DAT100,10,10,10,10,10,10	53	4100 DAT100,10,10,10,10,10,10
54	4100 DAT100,10,10,10,10,10,10	55	4100 DAT100,10,10,10,10,10,10
56	4100 DAT100,10,10,10,10,10,10	57	4100 DAT100,10,10,10,10,10,10
58	4100 DAT100,10,10,10,10,10,10	59	4100 DAT100,10,10,10,10,10,10
60	4100 DAT100,10,10,10,10,10,10	61	4100 DAT100,10,10,10,10,10,10
62	4100 DAT100,10,10,10,10,10,10	63	4100 DAT100,10,10,10,10,10,10
64	4100 DAT100,10,10,10,10,10,10	65	4100 DAT100,10,10,10,10,10,10
66	4100 DAT100,10,10,10,10,10,10	67	4100 DAT100,10,10,10,10,10,10
68	4100 DAT100,10,10,10,10,10,10	69	4100 DAT100,10,10,10,10,10,10
70	4100 DAT100,10,10,10,10,10,10	71	4100 DAT100,10,10,10,10,10,10
72	4100 DAT100,10,10,10,10,10,10	73	4100 DAT100,10,10,10,10,10,10
74	4100 DAT100,10,10,10,10,10,10	75	4100 DAT100,10,10,10,10,10,10
76	4100 DAT100,10,10,10,10,10,10	77	4100 DAT100,10,10,10,10,10,10
78	4100 DAT100,10,10,10,10,10,10	79	4100 DAT100,10,10,10,10,10,10
80	4100 DAT100,10,10,10,10,10,10	81	4100 DAT100,10,10,10,10,10,10
82	4100 DAT100,10,10,10,10,10,10	83	4100 DAT100,10,10,10,10,10,10
84	4100 DAT100,10,10,10,10,10,10	85	4100 DAT100,10,10,10,10,10,10
86	4100 DAT100,10,10,10,10,10,10	87	4100 DAT100,10,10,10,10,10,10
88	4100 DAT100,10,10,10,10,10,10	89	4100 DAT100,10,10,10,10,10,10
90	4100 DAT100,10,10,10,10,10,10	91	4100 DAT100,10,10,10,10,10,10
92	4100 DAT100,10,10,10,10,10,10	93	4100 DAT100,10,10,10,10,10,10
94	4100 DAT100,10,10,10,10,10,10	95	4100 DAT100,10,10,10,10,10,10
96	4100 DAT100,10,10,10,10,10,10	97	4100 DAT100,10,10,10,10,10,10
98	4100 DAT100,10,10,10,10,10,10	99	4100 DAT100,10,10,10,10,10,10
100	4100 DAT100,10,10,10,10,10,10		

LISTINGS

66	3000 RETURN	67	3000 RETURN	68	3000 RETURN
69	3000 PRINT(1)*****SCORESHEET	69	3000 PRINT(1)*****SCORESHEET	69	3000 PRINT(1)*****SCORESHEET
70	3000 RETURN	70	3000 RETURN	70	3000 RETURN
71	3000 PRINT	71	3000 PRINT	71	3000 PRINT
72	3000 PRINT	72	3000 PRINT	72	3000 PRINT
73	3000 PRINT	73	3000 PRINT	73	3000 PRINT
74	3000 PRINT	74	3000 PRINT	74	3000 PRINT
75	3000 PRINT	75	3000 PRINT	75	3000 PRINT
76	3000 PRINT	76	3000 PRINT	76	3000 PRINT
77	3000 PRINT	77	3000 PRINT	77	3000 PRINT
78	3000 PRINT	78	3000 PRINT	78	3000 PRINT
79	3000 PRINT	79	3000 PRINT	79	3000 PRINT
80	3000 PRINT	80	3000 PRINT	80	3000 PRINT
81	3000 PRINT	81	3000 PRINT	81	3000 PRINT
82	3000 PRINT	82	3000 PRINT	82	3000 PRINT
83	3000 PRINT	83	3000 PRINT	83	3000 PRINT
84	3000 PRINT	84	3000 PRINT	84	3000 PRINT
85	3000 PRINT	85	3000 PRINT	85	3000 PRINT
86	3000 PRINT	86	3000 PRINT	86	3000 PRINT
87	3000 PRINT	87	3000 PRINT	87	3000 PRINT
88	3000 PRINT	88	3000 PRINT	88	3000 PRINT
89	3000 PRINT	89	3000 PRINT	89	3000 PRINT
90	3000 PRINT	90	3000 PRINT	90	3000 PRINT
91	3000 PRINT	91	3000 PRINT	91	3000 PRINT
92	3000 PRINT	92	3000 PRINT	92	3000 PRINT
93	3000 PRINT	93	3000 PRINT	93	3000 PRINT
94	3000 PRINT	94	3000 PRINT	94	3000 PRINT
95	3000 PRINT	95	3000 PRINT	95	3000 PRINT
96	3000 PRINT	96	3000 PRINT	96	3000 PRINT
97	3000 PRINT	97	3000 PRINT	97	3000 PRINT
98	3000 PRINT	98	3000 PRINT	98	3000 PRINT
99	3000 PRINT	99	3000 PRINT	99	3000 PRINT
00	3000 PRINT	00	3000 PRINT	00	3000 PRINT

LISTINGS

7	1	100 PRINT "HELLO"	80	PRINT "BYE"
8	2	PRINT "GOODBYE"	81	PRINT "BYE"
9	3	PRINT "GOODBYE"	82	PRINT "BYE"
10	4	PRINT "GOODBYE"	83	PRINT "BYE"
11	5	PRINT "GOODBYE"	84	PRINT "BYE"
12	6	PRINT "GOODBYE"	85	PRINT "BYE"
13	7	PRINT "GOODBYE"	86	PRINT "BYE"
14	8	PRINT "GOODBYE"	87	PRINT "BYE"
15	9	PRINT "GOODBYE"	88	PRINT "BYE"
16	10	PRINT "GOODBYE"	89	PRINT "BYE"
17	11	PRINT "GOODBYE"	90	PRINT "BYE"
18	12	PRINT "GOODBYE"	91	PRINT "BYE"
19	13	PRINT "GOODBYE"	92	PRINT "BYE"
20	14	PRINT "GOODBYE"	93	PRINT "BYE"
21	15	PRINT "GOODBYE"	94	PRINT "BYE"
22	16	PRINT "GOODBYE"	95	PRINT "BYE"
23	17	PRINT "GOODBYE"	96	PRINT "BYE"
24	18	PRINT "GOODBYE"	97	PRINT "BYE"
25	19	PRINT "GOODBYE"	98	PRINT "BYE"
26	20	PRINT "GOODBYE"	99	PRINT "BYE"
27	21	PRINT "GOODBYE"	100	PRINT "BYE"
28	22	PRINT "GOODBYE"		
29	23	PRINT "GOODBYE"		
30	24	PRINT "GOODBYE"		
31	25	PRINT "GOODBYE"		
32	26	PRINT "GOODBYE"		
33	27	PRINT "GOODBYE"		
34	28	PRINT "GOODBYE"		
35	29	PRINT "GOODBYE"		
36	30	PRINT "GOODBYE"		
37	31	PRINT "GOODBYE"		
38	32	PRINT "GOODBYE"		
39	33	PRINT "GOODBYE"		
40	34	PRINT "GOODBYE"		
41	35	PRINT "GOODBYE"		
42	36	PRINT "GOODBYE"		
43	37	PRINT "GOODBYE"		
44	38	PRINT "GOODBYE"		
45	39	PRINT "GOODBYE"		
46	40	PRINT "GOODBYE"		
47	41	PRINT "GOODBYE"		
48	42	PRINT "GOODBYE"		
49	43	PRINT "GOODBYE"		
50	44	PRINT "GOODBYE"		
51	45	PRINT "GOODBYE"		
52	46	PRINT "GOODBYE"		
53	47	PRINT "GOODBYE"		
54	48	PRINT "GOODBYE"		
55	49	PRINT "GOODBYE"		
56	50	PRINT "GOODBYE"		
57	51	PRINT "GOODBYE"		
58	52	PRINT "GOODBYE"		
59	53	PRINT "GOODBYE"		
60	54	PRINT "GOODBYE"		
61	55	PRINT "GOODBYE"		
62	56	PRINT "GOODBYE"		
63	57	PRINT "GOODBYE"		
64	58	PRINT "GOODBYE"		
65	59	PRINT "GOODBYE"		
66	60	PRINT "GOODBYE"		
67	61	PRINT "GOODBYE"		
68	62	PRINT "GOODBYE"		
69	63	PRINT "GOODBYE"		
70	64	PRINT "GOODBYE"		
71	65	PRINT "GOODBYE"		
72	66	PRINT "GOODBYE"		
73	67	PRINT "GOODBYE"		
74	68	PRINT "GOODBYE"		
75	69	PRINT "GOODBYE"		
76	70	PRINT "GOODBYE"		
77	71	PRINT "GOODBYE"		
78	72	PRINT "GOODBYE"		
79	73	PRINT "GOODBYE"		
80	74	PRINT "GOODBYE"		
81	75	PRINT "GOODBYE"		
82	76	PRINT "GOODBYE"		
83	77	PRINT "GOODBYE"		
84	78	PRINT "GOODBYE"		
85	79	PRINT "GOODBYE"		
86	80	PRINT "GOODBYE"		
87	81	PRINT "GOODBYE"		
88	82	PRINT "GOODBYE"		
89	83	PRINT "GOODBYE"		
90	84	PRINT "GOODBYE"		
91	85	PRINT "GOODBYE"		
92	86	PRINT "GOODBYE"		
93	87	PRINT "GOODBYE"		
94	88	PRINT "GOODBYE"		
95	89	PRINT "GOODBYE"		
96	90	PRINT "GOODBYE"		
97	91	PRINT "GOODBYE"		
98	92	PRINT "GOODBYE"		
99	93	PRINT "GOODBYE"		
100	94	PRINT "GOODBYE"		

LISTINGS

FUNCTION KEY TEMPLATE

Please refer to Listings below
typing in any programs.

PROGRAM: FIVE SIX

90 1 GOPOS	91 WRITE TITLE AND PRESS	93 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
97 2 SAVE "00 TEMP",5,VERIFY	92 400 PRINT@ (SPC@TR@ (INC@R@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
98 3 NEW (NUMBER 0 TO 1) IN 400	93 400 PRINT@ (SPC@TR@ (INC@R@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
99 40 LINE OF USING TIME	94 100 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
10 10 REM *** YOUR COMMENTS **	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
11 "	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
12 20 REM *** 04 FUNCTION KEY T	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
13 TEMPLATE ***	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
14 30 REM *** PROGRAM OF JOB# 4	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
15 LABELS ***	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
16 40 REM *** INITIAL SCREEN 01	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
17 DISPLAY ***	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
18 50 PRINT@ (CLR)@,PRINT@ (SPC@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
19 FUNCTION KEY TEMPLATE ***	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
20 60 PRINT@ (INDIC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
21 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
22 70 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
23 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
24 80 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
25 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
26 90 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
27 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
28 100 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
29 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
30 200 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
31 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
32 300 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
33 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
34 400 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
35 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
36 500 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
37 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
38 600 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
39 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
40 700 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
41 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
42 800 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
43 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
44 900 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
45 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
46 1000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
47 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
48 2000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
49 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
50 3000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
51 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
52 4000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
53 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
54 5000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
55 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
56 6000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
57 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
58 7000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
59 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
60 8000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
61 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
62 9000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
63 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
64 10000 PRINT@ (SPC@)@,PRINT@ (ROW	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200
65 00@	97 400 INPUT@ I@	94 400 PRINT@ "0",400,-200	94 400 PRINT@ "0",400,-200

LISTINGS

```

*****
B rom *****
*****
B rom *****
*****
F rom ** set up screen/lines **
B B100 C000170)
30 SC0010
10 genre 00000
30 g="g"100
30 if g="0 then print sp0010) : d
line print sp0010)
40 print "Preferences Manager"
50 if g="0 then print sp0010) : d
end B000 B00100)
80 print *****
90 print
95 print
95 print sp0010) : "0" : g00 B0010
97 : finish with cursor
100 rom ** get options for prefs
sp0010 **
110 if g="0 then sp0010 : sp00
10
270 genre 10000
280 print
290 B0
295 : input "80-cold Background
d 0" : B0
299 loop until B0="0"
300 genre 10000
310 print
320 B0
320 : input "80-cold border 1" :
B0
324 loop until B0="0"
330 genre 10000
340 print
350 B0
350 : input "80-cold foreground
0" : B0
354 loop until B0="0"
360 genre 10000
370 print "40 cursor blink, w
rinking (B0) " :
380 B0
380 : genre 000
390 loop until B0="0" or B0="1"
400
410 if B0="0" then B0="0-cold b
0"
420 genre 10000
430 print "80 to reset (B0)
1" :
440 B0
440 : getting y00
450 loop until sp0="0" or sp0="1"
460
470 if sp0="0" then sp0="0-cold
0"
480 B0
490 print sp0010) : "0-cold" :
sp0
500
510 print sp0010) : "0-cold" :
sp0
520
530 print sp0010) : "0-cold" :
sp0
540
550 print sp0010) : "0-cold" :
sp0
560
570 print sp0010) : "0-cold" :
sp0
580
590 print
600
610
620
630
640
650
660
670
680
690
700
710
720
730
740
750
760
770
780
790
800
810
820
830
840
850
860
870
880
890
900
910
920
930
940
950
960
970
980
990

```

```

800 genre 10000
810 print
820 B0
820 : input "80-cold" : B0
824 loop until B0="0"
830 genre 0010
840 print
850 B0
850 : input "80-cold" : B0
854 loop until B0="0"
860 genre 0010
870 print
880 B0
880 : input "80-cold" : B0
884 loop until B0="0"
890 genre 0010
900 print
910 B0
910 : input "80-cold" : B0
914 loop until B0="0"
920 genre 0010
930 print
940 B0
940 : input "80-cold" : B0
944 loop until B0="0"
950 genre 0010
960 print
970 B0
970 : input "80-cold" : B0
974 loop until B0="0"
980 genre 0010
990 print
1000 B0
1000 : input "80-cold" : B0
1004 loop until B0="0"
1010 genre 0010
1020 print
1030 B0
1030 : input "80-cold" : B0
1034 loop until B0="0"
1040 genre 0010
1050 print
1060 B0
1060 : input "80-cold" : B0
1064 loop until B0="0"
1070 genre 0010
1080 print
1090 B0
1090 : input "80-cold" : B0
1094 loop until B0="0"
1100 genre 0010
1110 print
1120 B0
1120 : input "80-cold" : B0
1124 loop until B0="0"
1130 genre 0010
1140 print
1150 B0
1150 : input "80-cold" : B0
1154 loop until B0="0"
1160 genre 0010
1170 print
1180 B0
1180 : input "80-cold" : B0
1184 loop until B0="0"
1190 genre 0010
1200 print
1210 B0
1210 : input "80-cold" : B0
1214 loop until B0="0"
1220 genre 0010
1230 print
1240 B0
1240 : input "80-cold" : B0
1244 loop until B0="0"
1250 genre 0010
1260 print
1270 B0
1270 : input "80-cold" : B0
1274 loop until B0="0"
1280 genre 0010
1290 print
1300 B0
1300 : input "80-cold" : B0
1304 loop until B0="0"
1310 genre 0010
1320 print
1330 B0
1330 : input "80-cold" : B0
1334 loop until B0="0"
1340 genre 0010
1350 print
1360 B0
1360 : input "80-cold" : B0
1364 loop until B0="0"
1370 genre 0010
1380 print
1390 B0
1390 : input "80-cold" : B0
1394 loop until B0="0"
1400 genre 0010
1410 print
1420 B0
1420 : input "80-cold" : B0
1424 loop until B0="0"
1430 genre 0010
1440 print
1450 B0
1450 : input "80-cold" : B0
1454 loop until B0="0"
1460 genre 0010
1470 print
1480 B0
1480 : input "80-cold" : B0
1484 loop until B0="0"
1490 genre 0010
1500 print
1510 B0
1510 : input "80-cold" : B0
1514 loop until B0="0"
1520 genre 0010
1530 print
1540 B0
1540 : input "80-cold" : B0
1544 loop until B0="0"
1550 genre 0010
1560 print
1570 B0
1570 : input "80-cold" : B0
1574 loop until B0="0"
1580 genre 0010
1590 print
1600 B0
1600 : input "80-cold" : B0
1604 loop until B0="0"
1610 genre 0010
1620 print
1630 B0
1630 : input "80-cold" : B0
1634 loop until B0="0"
1640 genre 0010
1650 print
1660 B0
1660 : input "80-cold" : B0
1664 loop until B0="0"
1670 genre 0010
1680 print
1690 B0
1690 : input "80-cold" : B0
1694 loop until B0="0"
1700 genre 0010
1710 print
1720 B0
1720 : input "80-cold" : B0
1724 loop until B0="0"
1730 genre 0010
1740 print
1750 B0
1750 : input "80-cold" : B0
1754 loop until B0="0"
1760 genre 0010
1770 print
1780 B0
1780 : input "80-cold" : B0
1784 loop until B0="0"
1790 genre 0010
1800 print
1810 B0
1810 : input "80-cold" : B0
1814 loop until B0="0"
1820 genre 0010
1830 print
1840 B0
1840 : input "80-cold" : B0
1844 loop until B0="0"
1850 genre 0010
1860 print
1870 B0
1870 : input "80-cold" : B0
1874 loop until B0="0"
1880 genre 0010
1890 print
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990

```

```

1900 genre 10000
1910 print
1920 B0
1920 : input "80-cold" : B0
1924 loop until B0="0"
1930 genre 0010
1940 print
1950 B0
1950 : input "80-cold" : B0
1954 loop until B0="0"
1960 genre 0010
1970 print
1980 B0
1980 : input "80-cold" : B0
1984 loop until B0="0"
1990 genre 0010
2000 print
2010 B0
2010 : input "80-cold" : B0
2014 loop until B0="0"
2020 genre 0010
2030 print
2040 B0
2040 : input "80-cold" : B0
2044 loop until B0="0"
2050 genre 0010
2060 print
2070 B0
2070 : input "80-cold" : B0
2074 loop until B0="0"
2080 genre 0010
2090 print
2100 B0
2100 : input "80-cold" : B0
2104 loop until B0="0"
2110 genre 0010
2120 print
2130 B0
2130 : input "80-cold" : B0
2134 loop until B0="0"
2140 genre 0010
2150 print
2160 B0
2160 : input "80-cold" : B0
2164 loop until B0="0"
2170 genre 0010
2180 print
2190 B0
2190 : input "80-cold" : B0
2194 loop until B0="0"
2200 genre 0010
2210 print
2220 B0
2220 : input "80-cold" : B0
2224 loop until B0="0"
2230 genre 0010
2240 print
2250 B0
2250 : input "80-cold" : B0
2254 loop until B0="0"
2260 genre 0010
2270 print
2280 B0
2280 : input "80-cold" : B0
2284 loop until B0="0"
2290 genre 0010
2300 print
2310 B0
2310 : input "80-cold" : B0
2314 loop until B0="0"
2320 genre 0010
2330 print
2340 B0
2340 : input "80-cold" : B0
2344 loop until B0="0"
2350 genre 0010
2360 print
2370 B0
2370 : input "80-cold" : B0
2374 loop until B0="0"
2380 genre 0010
2390 print
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