

Your

AN ARGUS SPECIALIST PUBLICATION

SEPTEMBER 1990

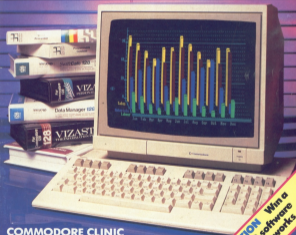
£1.00

# COMMODORE

YOUR BEST INDEPENDENT COMMODORE MAGAZINE

## COMMODORE'S 128

JUST WHAT IS AVAILABLE?



**COMMODORE CLINIC**  
FIRST AID FOR YOUR  
TECHNICAL PROBLEMS

**COMPETITION** Win a  
set of 128 software  
from Timeworks

# Serious about the 128?

Then this book is for you

ONLY  
**£16.95**

Commodore 128 Reference Guide for Programmers

David L. Helseman

"the definitive book for Commodore 128 Programmers"

This authoritative new book comes to you from Sams, the publisher who brought you the *Commodore 64 Programmer's Reference Guide* ... A Million Seller!

The *Commodore 128 Reference Guide for Programmers* is written to the same high standards as its predecessor and, as you would expect, it tells you everything you need to know.

The first chapters review elementary topics and later chapters concentrate on special programming applications.

*Commodore 128 Reference Guide for Programmers* offers these special benefits:

- Maximizes the Commodore 128's built-in capabilities, including graphics and sound
- Moves from simple to complex programming
- Describes all operating systems
- Includes hardware and software specifics
- Details all input and output features
- Presents complete RAM and ROM maps, with tips for managing all 128K of memory

You don't have to know the quirk of the Commodore 64 or other Commodore machines to make full use of the information. With a Commodore 128 and this book, you are ready to explore all the possibilities.

"Whether you're a beginner or an advanced programmer, this is the book for you."



The *Commodore 128 Reference Guide for Programmers* is available from Pitman.

Order your copy **now**

## ORDER FORM

To: Peter Marshall, Pitman Publishing Ltd, 128 Long Acres, London WC2E 9AN.

Please send me *Commodore 128 Reference Guide for Programmers* (ISBN 0-07-224710-0) price £16.95 plus £1.75 p & p

*Commodore 64 Programmer's Reference Guide* (ISBN 0-07-22566-3) price £12.95 plus £1.75 p & p

I enclose a cheque/postal order payable to Pitman Publishing Ltd for £

Alternatively, please debit me

VISA  ACCESS  BARCLAYCARD  
 DINERS CLUB  AMERICAN EXPRESS

Account No.

\_\_\_\_\_

Signed

\_\_\_\_\_

Name (in full) \_\_\_\_\_

Address (in full) \_\_\_\_\_

\_\_\_\_\_

Pitman Publishing Ltd

Please allow 28 days for delivery.

**Editor**

Stuart Cooke

**Assistant Editor**

Maria Curry

**Editorial Assistant**

Stuart Kirkham

**Technical Consultant**

Eric Doyle

**Advertising**

Peter Chaddler  
Jonathan McQuary

**Advertisement Copy Control**

Leona Champion

**Group Editor**

Dave Bradshaw

**Group Managing Editor**

Wendy Palmer

**Managing Director**

Peter Walker

**Origination**

Evony Typesetting

**Design**

Argus Design

General & Advertisement Office  
No 1 Golden Square,  
London W1P 0AE  
Telephone: 01-431 9020  
Telex: 6011856

Your Commodore incorporating  
Your 64 is a monthly magazine  
appearing on the first Friday of  
each month.

Contributor to: Argus Press  
Sales & Distribution Ltd, 11-13  
Red Green, London E15 4JF  
Postmaster: Address: Freeman's  
& Sons Ltd, Tork, Mableton,  
Som.

Subscription rates upon  
application to: Your  
Commodore Subscriptions  
Department, address 133, Times  
House, 133 The Strand,  
London WC2R 0BB, 0471 5471  
134.

ISSN 0269-8277



0269-8277(88)

The contents of this publication  
including all articles, designs,  
plans, drawings and projects  
and all copyright and other  
intellectual property rights  
therein relating to Argus  
Specialist Publications Limited,  
All rights reserved to the Law  
of Copyright and other  
intellectual property rights and  
by virtue of international  
copyright conventions are  
specifically reserved to Argus  
Specialist Publications Limited,  
and any translation, reprinting  
and any reproduction requires  
the prior written consent of the  
Company - 1988 Argus  
Specialist Publications Limited

## FEATURES

■ <i>Adventure Aid Graphics</i> .....	78
How to use your Adventure Aid program.	
■ <i>Assembler 128</i> .....	28
We bring you the final part of your 128 assembler.	
■ <i>Art for Art's Sake</i> .....	86
Glenop's 3-D Graphics Drawing Board.	
■ <i>Basic Computers</i> .....	38
Buying a computer for your 64? Read our comparative reviews.	
■ <i>3 in 1 Editor</i> .....	14
Demos to show you exactly what our editor can achieve.	

## SERIES

■ <i>Welcome to the Machine</i> .....	95
Another installment of our teach-yourself-machine code series.	

## REGULARS

■ <i>Swat shop</i> .....	90
■ <i>Communication corner</i> .....	93
■ <i>Top Draw</i> .....	32
■ <i>Commodore Clinic</i> .....	88
■ <i>Action Replay</i> .....	42
■ <i>Game of the Month</i> .....	36
■ <i>Data Statements</i> .....	5
■ <i>Competition</i> .....	10
■ <i>Listings</i> .....	48
■ <i>Software for Sale</i> .....	12
■ <i>Club 128</i> .....	92

## GAMES & UTILITIES

■ <i>All Clear</i> .....	76
Some unusual ways of clearing your screen.	
■ <i>Crossword</i> .....	70
Get square-eyed. Type in our Crossword program.	
■ <i>On Location</i> .....	67
Reconfigure your 64.	

## C128 SPECIAL

■ <i>C128 Roundup</i> .....	50
■ <i>Down to Business</i> .....	53
■ <i>C128 Revisited</i> .....	67
■ <i>C128 Database</i> .....	55
■ <i>C128 Wordprocessors</i> .....	61
■ <i>Best of the Best</i> .....	64
■ <i>C128 Touchline</i> .....	65

# Your key to communications!

*What's in it for me?*



**PRESTEL**

PRESTEL is a trademark of British Telecommunications

FREE Electronic Mail . . . International Telex . . . 10 National Charlines (Interactive Bulletin Boards) . . . 70,000 users across the UK . . . Telshopping . . . Multi-User Interactive Strategy Games

Instant computer news . . . Hardware and software reviews . . . Technical features . . . Hints and tips . . . On-line business advice and features

FREE and discounted quality software to download direct to your micro - 24 hours a day

300,000 pages of information on the huge Prestel database

**for just 20p a day**

*Micronet 800-*  
*The ultimate peripheral*

Micronet 800  
1 Herbal Hill, London EC1R 5EJ  
Telephone: 01-228 2142

To: Micronet 800, 1 Herbal Hill, London EC1  
Please send me a brochure on Micronet 800

Name

Address

Telephone No.

Age  Micro

1-COM 8/88

## Lucky Dip

At last someone has got the official rights to make the computer game of Trivial Pursuit. There have been several look-alikes but this one from Denmark is the real McCoy.

Apparently, not only is it the authorized version but it also features a great technical innovation called ambient. This is a unique system allowing a universal question tape to be loaded into either the Spectrum, C64 or Amibaid.

The game will be launched at the PC88 show in September and will set you back a mere £14.95 - cheaper than the board game!

Mattach has a new release due in August. W.A.R. is the story of a mechanical race whose sole purpose is to seek out and conquer. The latest victim of this lust for power is, of course, the Earth. The task is to save the world - which seems to be getting into a lot of scrapes lately. Now you can play at W.A.R. but look out for the command-line Droids!

WTF has recently launched a 'true arcade adventure' entitled Cox. The action takes place in real time with full graphical display, plenty of puzzles and over 1000 locations.

The object of the game is to guide Asteroid Andy around a labyrinth of tunnels to find nine parts of a biological memory bank which will reveal to you the cause of the sudden anthropic death of all the scientists on the asteroid. A bit speculative but probably better than saving the world again.

The game is for the C64 and costs £8.95.

The wild west once again reaches your computer screen, this time in the form of a new release from US Gold.

The Law of the West, sees you enrolled as sheriff of Gold Gulch with the job of cleaning up the town. Gunfighters, desperados and outlaws combine their evil forces to bring violence to this pioneer town. Clean it up or you lose your badge. However, although you can shoot to kill when it comes to the gunfighters, etc. mind you don't go round gunning down innocent people as this won't do your ratings any good.

The Law of the West is available now priced £9.95 on cassette and £14.95 on disk.

## Adventure Line

There is now a new adventure from the all American Adventures field entitled Quasiprobe featuring none other than the Human Torch and the Thing. Remember those characters from the famous Marvel comic?

It was written by David Adams, well known for his programs as an adventure programmer, and it is the third in the Quasiprobe series.

The C64 version costs £9.95 on cassette and £14.95 on disk.

# DATA STATEMENTS



The official Trivial Pursuit

Also on the adventure scene, but this time in the post nuclear age, after the holocaust, Mad Games springs into action with Jane Fraz. This game involves the forces of good versus the Dark Ones in a battle to the death in various different ages of man and beliefs.

Your performance is rated at the end of each game and you can progress from Pundling to Demigod - a rather amazing transformation by anybody's standards.

## The Lord of the Rings Trilogy

It should be in the shops now and the C64 version is priced at £9.95.

If you're a fan of Tolkien's novels then you can now have a full set on computer. The Lord of the Rings has arrived for the C64 to join the Hobbit. It is of course from Melbourne House and in a bumper pack at the amount of material demanded.

THE ULTIMATE UTILITY FOR YOUR COMPUTER

# SPEED!

**NO EXTRA HARDWARE  
REQUIRED**

**AS REVIEWED ON  
BBC TV**

**FOR THE  
COMMODORE  
AMSTRAD AND  
BBC COMPUTERS**

**COMMODORE 64/128**

Cassette **£9.95**  
Disc **£11.95**

**AMSTRAD CPC464/464/4128**

Cassette **£9.95**  
Disc **£11.95**

**BBC MICRO: B, B+, Master**

Cassette **£9.95**  
Disc **£11.95**

**THE RECENTLY RELEASED BBC MICRO  
VERSION HAS BEEN CHERISHED WITH  
ACCLAIM AND HONOURABILITY...**

At last, speech synthesis of a kind you can afford. **SPEED!** works entirely in software taking input from file of RAM in extra hardware with software is provided in a variety of systems. **SPEED!** features a sophisticated vocabulary. It will say anything you want it to, and surprisingly fast to boot. Simply type in: **say I AM A TALKING COMPUTER. AS FAST TO SEE AS I TALK...** and the computer speaks.

**SPEED!** has a built in parser which converts English words into "phonemes" or speech patterns. There are 40 phonemes and 4 different pitch settings which can be used directly by the "TTSAA" synthesizing "TTSAA" will also allow reverse or "intonation" can easily be added whenever desired. You can change the overall pitch with the "PITCH" command.

Every copy of **SPEED!** comes complete with extra software:  
**DEMO** — shows off all the features.  
**HELP** — an interactive educational program.

**EDIT** — speeds the time of your programs.

Applications in:

- games
- education
- business
- utilities

**SUPERIOR  
SOFTWARE**  
Limited



BY YOUR TELEPHONE  
ASSISTED SERVICE FOR ORDERS

- OUR GUARANTEE**
- All mail order items guaranteed within 24 hours by mail-order post
  - Postage and packing is free
  - 30-day guarantee and discs will be replaced immediately

Dept. 101, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 499453

**WE PAY TOP ROYALTIES FOR HIGH QUALITY SOFTWARE**



## Multi-Releases

Contrary to popular belief that the summer is a bad time to launch several new products, Aristocraft is going for it in a big way at the moment.

Aristocraft has recently imported a set of programs from Holland all of a very different nature.

Here's the Devil is a robot who needs to be programmed to clean up London's filthy streets. You'll have to wipe out bats, rats and crocodiles (in London!).

Map Britain is an educational program in which you climb aboard your helicopter and try and get yourself where you really want to go. Designed to push up your geography, it's all very well, but who wants to go to Milton Keynes anyway?

Datadisk, is as it sounds, a database for the Cdt and is priced competitively at £9.95. There are three index card boxes!

All these programs are for the Cdt and are being handled in the UK by Aristocraft for the Dutch company Radsoft.

## Hard Lines

Kempston has now launched a mouse which is compatible with the Cdt and Amstrad CPC4128D. Compatibility is achieved by a single flick of a switch.

The Kempston mouse uses an optical system to decide movements of an internal tracker ball and is precisely monitored by the interface using a single port serial. According to Kempston, this feature means that the program can be easily incorporated into existing or future graphics or business packages.

The mouse is £69.95 including VAT.

Remaining in the graphics area, Micro Peripherals has launched a six colour high speed plotter. However you'll need to save up a bit more pocket money for this one since it'll cost you £999.

## Cheapies Galore

As well as releasing the holocaustic game Five Days, Aggas Press software has decided to go for the slightly gentler market with the release of Rupert and the Ice Palace. On the Bug Byte label the game involves all your furry friends from those halcyon pre-school days and is a budget price at £1.99.

Speaking of budget software, Robotek has decided to go five steps ahead of everyone else and is releasing 58 games-one step for the Cdt. They are all brand new games so you don't have to worry that half of them are the ones you got fed up with in 1981 and the whole cassette costs a mere £9.95.

The AmigaCass range from US Gold is expanding beyond belief. There are now seven titles for the Cdt and two for the C-16. The Cdt cassette titles are their belly bust's three 80, Nuclear Nick, Performance and The Hulk. On disk for the Cdt are all these, except The Hulk, plus Cities Forever, Amokland and New York City. The C-16 games are Back Knight and The Hulk.

The printer/plotter is the Teknor MP1 - 830 and is a high resolution professional plotter with an accuracy of 0.025mm. There are 16 resident plotter commands.

Parallel and serial interfaces are standard and there is a choice of oil or water pens.

There's also a new printer from Citizen, CodeMaster the 12P-18. It is described by Citizen as a dot matrix printer specifically for the European market. It is priced at £235 and is available now.

Star Microtron is aiming to increase its sales by being kind to the consumer's pocket.

Two Star printers have been reduced in price: the 30cps Powertype dot-matrix printer (reduced from £149 to £125) and the 60cps star-88 thermal printer (reduced from £149 to £79).

## C-16 and Plus/4

Games seem to be coming through for these machines fairly thick and fast these days.

Tyresoft is releasing Allgate's Wfo Davey Wins P and Joe Set Wily II (originally from Software Projects) for the C-16. Launch of the two games is provisionally set for September.

From Bubble Bus, there is Drives for the C-16 and Melbourne House has now successfully converted the short running Way of the Exploding Fox for this machine.

Not content with this, however, Melbourne House is also doing a C-16 greatest hits cassette, featuring Minard and the Princess, Classic Adventure, Ruler King and Dark Tower, it costs £7.95.

## Touch Line

**Martech:** Bay Terrace, Pevensey Bay, East Sussex BN24 4EE. 01323 768696.

**Aggas Press Software:** including Bug Byte, Mind Games and A/V/I: Liberty House, 172 Regent Street, London W1R 7GB. 01 479 8866.

**US Gold/Americana/All American Adventure:** Unit 95, The Parkway, Industrial Estate, Henning Street, Birmingham B7 6LY. 021 219 4017.

**Melbourne House:** 60 High Street, Hampton Wick, Kingston Upon Thames, Surrey KT1 12B. 07543 1911.

**Robotek:** Unit 8, Islander's Business Complex, 5 Johns Road, Isleworth, Middlesex TW7 6AL. 01 847 4437.

**Tyresoft:** Address: Industrial Estate, Clayton Upon Tone, Torquay Wex 16 2 4TE. 091 434 8011.

**Bubble Bus:** 87 High Street, Tonbridge, Kent TN11 1BS. 0732 855 962.

## Generally Speaking

Having decided that the software industry is peopled with untidy about beings who know nothing about modern dress habits, Bug Byte has introduced its own range of designer clothes to amend this ghastly oversight.

As yet the range only contains one tee-shirt (but, we are reliably informed that underpants are on the way).

The clothes are designed by GJ, your old pre-teenage prodigy Mark Taylor, an ardent fan of Bug Byte games.

We haven't been informed as to whether Bug Byte designers will be featuring in any major fashion shows this season.

Still on the subject of fabric-wear for games players, Beyond is giving away a free tee-shirt to everyone who buys a copy of Beyond for the Cdt. One caveat that you have to buy another game at well to qualify for the offer which is available to mail order customers to those shopping at the PCW show.

Bounces costs £1.95 and the tee-shirt



Kempston's new mouse





## In Touch

from based on an intelligent resident! Apparently there's more use on the market from Miracle Technology. Called the M5-8000 it's fully intelligent and speed buffered and offers auto-dial and auto-answer as well as Hayes type compatibility for £149.95.

In standard version the M5400 supports the CCITT V.21 and V.22 standards offering speeds of 300, 600, 1200, 1200/75 and 75/1200. Optional upgrades include V.22 1200 baud/full duplex and V.22bis 2400 baud full duplex plus options of GNP tone dialling, battery

packed internal telephone directory, process control port and BIL standards for transatlantic communication.

It has been approved by British Telecom and is already available from Miracle Technology.

On a lighter note, Microsoft members will soon be able to enjoy a multi user game. From the end of August this year, SHADES will be up on the net.

The cost of the game is 99c per hour and there is no registration fee. At off peak time access will be charged at local telephone rates.

Microsoft has been searching for some time for a multi user game which would be both economical to run and could also cope with a large number of simultaneous users.

Microsoft's technical Director, Mike Brown, designed the protocol to convert scrolling text into windows format using split screen windows.

Mike said: "The overall effect is extremely good. We've exploited the positive features of windows - including colour - to provide elegant, easy access to SHADES".

## It's worth £3.95

If you're looking for a way to kill some time between August 1-5, then you may like to have a look at the British Music Fair at Olympia 2 in London.

The fair has a special section devoted to computer music. There will be half hour demonstrations by professional musicians throughout the duration of the show to illustrate how hardware and software can be used. In between demonstrations visitors will have the opportunity to try out the equipment themselves.

For the educational market there will be programs demonstrated which introduce children to basic musical concepts and for musicians there will be packages for different types of sound sampling, recording and editing.

Many of the exhibitors at the show will also be demonstrating new computer music systems on their own stands.



Designer T-shirts at 12½ years old

## Touch Line

**Compton:** Unit 4, Marston Lane, Bedford MK41 7BTF. 0294 427544.

**Micro Peripherals:** 6th Floor, Building 7, Units 3 & 4, Harewell Wood, Made Road, Basingstoke, Hants RG24 0NL. 0294 471211.

**CISS:** Barton Mansell, 25 North Row, London SE18 2BT. 01 499 0414.

**Star Micros:** Casson House, 40 Uxbridge Road, Ealing London W6 2BS. 01 840 1888.

**Miracle Technology:** 54 Princes St, Ipswich IP1 1AB. 0473 276141.

**Micronet:** 8 Marlborough, London EC1R 3SL. 01 276 2143.

**Big Byte:** Liberty House, 221 Regent Street, London W1R 7DB. 01 499 8666.

**Beyond:** Wellington House, Upper St Martins Lane, London WC2H 9DL. 01 276 2481.

**British Music Fair:** Nick Harvey & Associates, Warwick House, 9 Warwick Street, London W1R 6RA. 01 734 5743.

# COMPETITION

**This month we give 128 owners a chance to add to their collection of utilities in our Timeworks competition.**

THIS MONTH, WITH THE HELP OF Timeworks, we are able to offer a special competition for C128 owners.

There are three prizes each consisting of a set of utilities from Timeworks. These are three utilities in the set: *Bookable 128*, a spreadsheet; *Manchester 128*, a wordprocessing package and *Data Manager 128*, a database.

It's a very easy to enter competition just read the Rules and How to Enter section and then pop your entry in the post.

## How to Enter

Study the pictures on this page. There are several differences between the two.

Mark the differences on the picture which is attached to the entry coupon, then complete the rest of the coupon and send it to us. Make sure that you mark the differences very clearly. Write the number of differences you found on the back of your envelope.

## The Rules

Entries will not be accepted from employees of Argus Specialist Publications and Timeworks. This restriction applies to employee's families and agents off the company.

The How to Enter section forms part of the rules. The editor's decision is final and no correspondence will be entered into.



### Timeworks Competition Entry Coupon

Name .....

Address .....

.....

.....

.....

.....

postcode .....

Number of differences found .....

Send your entry for Timeworks Competition, four Commodore, 1 Golden Square, London W1R 3AR.  
Closing date: Friday 26 September 1986.  
Write clearly and fully and don't forget to write the number of differences you found on the back of your envelope.



Save your fingers a lot of  
work with our new software  
service.

# SOFTWARE FOR

# SALE

IT'S THREE O'CLOCK IN THE MORNING. You sit at the computer keyboard having just finished a marathon typing session entering one of the superb programs from Four Commodore. Your fingers reach for the keyboard and press the letters B, U and M. You sit back expectantly and... nothing happens.

Well, I'm sure that we have all had problems before now. 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.

Here, at Your Commodore, we pride ourselves on the quality of listing that we print. Unfortunately, this usually means that they are also very long, thus taking longer to type in and leaving more room for errors. All of the listings in Your Commodore are taken straight from a printout of working programs. It is therefore very unusual for errors to appear in the magazine.

Because of the length of our programs we do get a large number of requests from readers who would like us to put specific

programs on tape or disk for them. Obviously this is very time-consuming and means that we can't spend as much time working on the magazine as we would like.

The Four Commodore Software Service makes available all of the programs for the C64 or C128 on disk or tape published in Your Commodore. The cost of a cassette is £4.00 and a disk will cost £5.00.

Unless otherwise stated all C64 and C128 programs are available on the one cassette so you simply need to order the

one cassette.

None of the programs are protected and we suggest that you make back up copies before you use the programs.

All programs on the cassette will be used using a tape turbo routine. However, we cannot guarantee that all programs will work correctly with this turbo routine present. We therefore recommend that before you use any of the programs you make a copy of the programs on your own cassette or disk and use this version of the program not the original.

#### PLEASE COMPLETE IN BLOCK CAPITALS

All cheques/postal orders should be made payable to:  
ARGUS SPECIALIST PUBLICATIONS LTD

I would like to order the following cassettes: (please tick box)

SEPT86 — TAPE	YTSEPM6	£4.00	
SEPT86 — DISK	YDSEPM6	£5.00	
OCT86 — TAPE	YTOCT86	£4.00	
OCT86 — DISK	YDOCT86	£5.00	
OVERSEAS POST		£1.00	

I enclose a cheque/postal order for £.....

NAME.....

ADDRESS.....

POSTCODE.....

All orders should be sent to:-

YOUR COMMODORE SOFTWARE, READERS SERVICES, ARGUS SPECIALIST PUBLICATIONS,  
WOLSEY HOUSE, WOLSEY ROAD, HEMEL HEMPSTEAD, HERTFORDSHIRE HP3 4SS.

Please allow at least 28 days for delivery.



# DIMENSION computers l.t.d.

27/29 High Street  
Leicester LE1 4FP  
Tel: (0533) 57479



THE MIDLAND'S LARGEST HOME COMPUTER STORE

### DATABASE OFFER

Action Title Database 5-Disc Database with FREE Help to get you started with a basic Title Understanding Database Books worth £20.00

**£118.00**

VISA		
Vistaer R/S 84	<del>£225.00</del>	£75.00
Vistaer R/S 128	<del>£325.00</del>	£95.00
Vistaer/Classic 128	<del>£225.00</del>	£75.00

<b>ANAGRAM</b>		
Purchase Package	<del>£35.00</del>	£10.00
Telex Letter 84	<del>£35.00</del>	£10.00
Telex Computer	<del>£35.00</del>	£10.00
Custom 84	<del>£35.00</del>	£10.00

<b>MICRO SIMPLEX</b>		
Accounts 84	<del>£495.00</del>	£95.00

<b>PRECISION</b>		
Supersort 84	<del>£280.00</del>	£95.00
Supersort 84 & Supersort 84	<del>£380.00</del>	£95.00
Supersort 128	<del>£325.00</del>	£75.00
Supersort 128	<del>£325.00</del>	£75.00
Supersort 128 & Supersort 128	<del>£425.00</del>	£120.00

<b>COMMODORE</b>		
Financial Planning Packages, Disc	<del>£35.00</del>	£17.00
Executive (Word Processor), Disc	<del>£35.00</del>	£25.00
Personal	<del>£35.00</del>	£15.00
Simple Basic 1 Language, Disc	<del>£45.00</del>	£7.00
Comprehensive 84 Programming Reference Guide	<del>£45.00</del>	£7.00
Logo (Educational Language), Disc	<del>£45.00</del>	£9.00

<b>AUDIOCINC</b>		
Self-Synchronised 128 Disc	—	£29.00
WordStar 80 (Word Processor), Cartridge	<del>£95.00</del>	£29.00
Magix (Database), Cartridge & Disc	<del>£28.00</del>	£29.00

<b>HANDIC</b>		
8 Synchro-Synchronised, Cartridge	<del>£35.00</del>	£19.00
Disc, Cartridge	<del>£25.00</del>	£9.00

<b>PRACTICORP</b>		
Inventory (Stock Control Package), Disc	<del>£30.00</del>	£19.00
Processor II — Advanced Synchronised with Database/Multi-processing facilities, Disc	<del>£30.00</del>	£19.00
Processor (Synchronised), Disc	<del>£35.00</del>	£9.00

<b>MICRO CLERK 128</b>		
Accounts Package with Spreadsheet, Database and Report/Printer		£95.00
Postcard Ledger		£39.00
Index Ledger		£39.00
<b>OFFER PRICE — IF PURCHASED WITH ACCOUNTS PACKAGE</b>		£189.00

### CIETEK 1280 PRINTER OFFER

- 100% Commodore compatible • 128 pin-dot print mode
- 24pin near letter quality mode • Instant and balanced
- Prints no. matrices • Full two-year warranty

**£184.95**

### TRIO-JAN CAD MASTER LIGHT PEN OFFER

NEW PERSON — NOW INCLUDES SCREEN DUMP TO MASTER (OPTION)

The Trio-Jan Cad Master package contains a top-quality light pen with superior designed graphics software.

The extensive command menu includes: freehand draw, Point, Fit, Geometric shapes, etc., combining to create an ability to use full computer graphics capabilities. Complete Graphics Package — undoubtedly representing the best value package of its kind.

**£160.00** **£15.95**

**STOP PRESS — CAD MASTER NOW AVAILABLE FOR THE COMMODORE PLUS 4** ..... **£79.95**

**PERSONAL CALLERS AND EXPORT ENQUIRIES WELCOME.**  
ALL OFFERS STRICTLY SUBJECT TO AVAILABILITY.

### PERIPHERALS

M2280 Mouse - Two	<del>£64.95</del>	£57.00
M2280 Mouse - One	<del>£34.95</del>	£29.00
Print Cartridge Type Ia - disc and utility cartridge		£48.00
Commodore 87P-400 Tracker Pad unit		£34.00
New Commodore 84-128 Mouse		£79.00
Multi-Stake 128 Keyboard & Software		£34.00
8 Channel Synthesiser Pack		
with Intelle Keyboard and software		£149.00
Commodore Digital Drum Synthesiser		£79.00
Quikdial II-1281 IntelleUtility Cartridge		£79.00
Max 16 Commodore Compatible Discs		£79.00
Custom Speech 84		£79.00

### COMMODORE PRINTER OFFERS

87P-400 Cdr Mouse/Printer	<del>£239.00</del>	£209.00
87P-400 Cdr Mouse/Printer with Tracker Pad		£269.00
87P-400 Cdr Mouse/Printer	<del>£299.00</del>	£269.00
Including FPD1 Easyprint II Word Processor and Easyprint Synthesiser		

**AMIGA with software package** ..... **£1599.00**

<b>STRIKELIGHT PRINTER</b>		
Fully Commodore compatible		£749.00
Commodore 1811 Double 800D Drive		£279.00
Commodore 1801 Colour Monitor		£279.00
Philips SA708 Green Screen Monitor		£97.00
Commodore 1000M Green Screen Monitor		£129.00
Commodore 1A7.1/2 Disc Drive		£195.00
Commodore 128D		£289.00
Commodore 128 Commodore		£289.00
Commodore Compatible Data Recorder		£29.00
Commodore 87P-1000/128M Commodore Printer		£279.00
Citizen 87P-12 Colour Cdr Mouse/Printer, Fully Commodore Compatible		£39.00

### PRINTER RIBBON OFFER

87P-400, 862 880000		£6.00
87P-400 & 1000/1280/128		£6.00
87P-1201 M/S, 8800000		£6.50
<b>BUY 4 AND GET ONE FREE!</b>		

### ALL PRICES INCLUDE V.A.T.

Please check if you are registered for VAT on any orders with Particulars when you order. All orders are subject to a 3% reservation. For further details of our Terms and Conditions, please refer to our catalogue. It is with pleasure that we offer the best prices on all products. Access Range International. Please allow 7 days for delivery from nearest of our regional depots.

Send to Dept. No. 106, Dimension Computers Ltd.,  
27/29 High Street, Leicester LE1 4FP.



Item	Quantity	Price
.....		
.....		
.....		
.....		
.....		
.....		
.....		
<b>TOTAL</b>		
Name:	.....	
Address:	.....	
Telephone:	.....	

**Tom Crowther**  
provides some  
sample screens for  
use with his graphics  
editor.

# into 1

NO MATTER HOW GOOD A game is, the quality of its graphics always determines whether people will give it a second look or not. For example you could design the world's best shoot-'em-up but if the graphics were simply blocks flying around the screen I doubt that many people would play the game for too long.

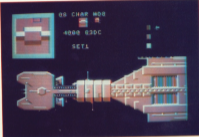
I hope that with my graphics editor, which was published in the August issue of Your Commodore, you will now be able to sit down and design great screens for your latest programs.

To help you on your way you will find with this article a few sample graphics routines. They are all printed in the form of Basic Loaders and will generate a machine code file on tape or disk as with the program itself.

If you do get any errors while typing the programs in, refer back to the August Your Commodore, to find out exactly what each error is and how to cure it. It is also worth pointing out at this stage that you will not be able to use these screens or view them without using the editor — for the reasons listed.

## The Programs

**DRAGCHAR** and **DRACK**, **BAK** are the user-defined graphics and the background from a new game that I am writing. The background file is designed to be 511 (255) characters wide by 515 (211) characters deep. When you load background into memory do remember to set the window size to 511\*15 or you will not be able to see what it is. Even though the graphics background is 244 characters wide I have only presented a small section of it here in the magazine. The rest is blank, so why not try to continue the background yourself? Remember you must also have the characters present in order to see the background.



**SHIPCHAR** and **SHIP**, **BAK** are the characters and background for a fantastic space game. I'm afraid the bit's out of mine but it is by P.A. Levin who has kindly given permission for us to use it in this article. This screen is 511 wide by 515 deep. Again only a small section of the screen is present so you can try to add your own ships.

Finally **SPRITES** is a collection of the sprites from my latest game **TBAP** mastered by Allegit. **LOAD** then into the sprite editor section of the **SPRTOE** EDITOR and have fun giving them.

A few points worth noting are:

- 1) All the screens and graphics are in multi-colour mode so do remember to set multi colour on.
- 2) The sprites are multi-colour.
- 3) **DON'T LOAD** the **GEN** programs into the editor. These are just the programs that will generate the actual data files on your cassette or disk.

4) If using cassette, don't forget to change the device number in each section of the program before attempting to **LOAD** any data.

## Pull Down Menus

At the end of last month's article I had to add a brief section about pull-down menus. I made a last minute decision to add these menus for a couple of reasons:

- 1) It looks pretty.
- 2) When **SAVING** data it can become very confusing working out which data you are actually saving. For example you could think that you were in the character editor and press the keys to save only to find at some later stage that you actually saved the background. On the pull-down menus each of these commands are now separate.

Using the menu is very simple. Press the **F7** key and the menus will appear on screen displaying all of the available commands. Move the reversed bar to the command that you want using the up and down cursor keys and press **RETURN** to

activate the command. To exit the menu you just press **F7** again.

## More to Come

Obviously there will be many people reading this article who have no idea what user defined graphics are or how to use them. When it comes to scrolling a background even people who are good at programming sometimes have problems.

However, don't despair. In a future issue of Your Commodore I will be starting a small series of articles that explain just how professional programmers achieve their effects. Any graphics will be compatible with the **SPRTOE** EDITOR. **PUSH** I will be giving you some routines that you can use in your own programs to animate characters, backgrounds etc.

Until then, have fun with the editor. And, if you don't think that your fingers are up to typing all of this data, then don't forget that the backgrounds are available on this month's cassette and disk and the editor is on the August cassette and disk.

# EDITOR



03 CHAR W00

4000 030C

SETL



## PROGRAMS: ASCII, CHR, CHR2, CHR3

1000 REP TYPE THIS PROGRAM I  
N 40 NORMAL

1010 REP THEN SAVE IT TO TAP  
E OR CDS\*

1020 REP DO NOT RUN IT YET !  
\*\*\*\*\*

1030 REP NOW TYPE NOW AND ON  
TAP TAP

1040 REP FOLLOWING LIST:

1050 REP F003 43, 1 4000 44,  
50

1060 REP F001 0101, 0400

1070 REP NOW LOAD THE PROGRAM  
N 40 RUN

1080 REP THE PROGRAM WILL DO  
IT: THE GOOD

1090 REP TO STOP: NOT CHANG  
E IT AT ALL

1100 REP FOR INFO:

1110 F001=0101 0001=0400=0

1120=0400=0101 0001=0400=0

1130=0400=0101 0001=0400=0

1140=0400=0101 0001=0400=0

1150=0400=0101 0001=0400=0

1160=0400=0101 0001=0400=0

0,24,360,183,29,123,100,183,  
0,1050

2050 007A24,100,183,178,183

1,80,43,0,60,180,76,76,76,19

2,40,0,1230

2060 007A28,198,183,180,182

,3,178,8,128,76,76,120,170,76

126,0,1260

2070 007A126,76,148,120,76,8

0,76,120,48,33,76,120,180,30

2,40,70,1240

2080 007A100,76,180,126,180,

180,180,0,40,24,24,24,24,24,

60,0,800

2090 007A30,12,12,12,12,108,

26,0,180,108,120,112,40,177,

50,0,840

2100 007A74,76,76,76,76,1

26,0,77,116,127,183,199,99,99

2,40,0,1240

2110 007A26,24,24,24,24,24,

24,0,180,181,180,180,180,100

140,0,840

2120 007A00,180,180,180,180

,80,24,0,77,77,77,180,123,11

77,90,0,1240

2130 007A00,180,80,76,80,11

0,180,0,180,180,180,80,24,24

,24,0,880

2140 007A26,8,12,24,40,76,1

26,0,34,80,80,80,80,100,87,1

87,1890

2150 007A01,1,10,80,80,80,0

9,180,84,84,80,80,80,149,181

126,1840

2160 007A18,80,80,80,80,8

4,180,71,17,187,77,171,186,1

74,176,1810

2210 007A170,174,170,174,120

,120,21,204,8,71,126,120,126

,121,126,26,0,120

2240 007A0,200,170,184,176,1

76,176,176,0,208,177,170,170

,176,176,176,2030

2250 007A04,127,187,174,170,

147,147,147,30,37,26,21,67,3

87,204,176,1280

2260 007A70,170,170,120,0,0

87,170,171,170,170,180,80,4,

21,126,120,2040

2270 007A00,120,181,84,0,20

0,208,184,126,176,176,120,17

0,148,101,80,1220

2280 007A00,149,180,150,180

,180,180,84,126,180,122,80,200

,124,122,20,1810

2290 007A170,170,170,120,170

,170,180,150,170,170,180,80,

8,84,148,144,2120

2300 007A14,123,180,84,0,0

0,0,80,84,80,84,84,84,84,8

70

2310 007A0,120,180,76,84,80,

64,84,64,0,0,0,64,184,64,7

70

2320 007A000,84,27,86,27,120,

70,22,180,140,184,140,184,18

0,144,160,1720

2330 007A07,86,121,180,180,0

20,180,0,80,141,121,220,181

,220,220,0,2200

2340 007A00,81,80,41,80,41,4

1,80,17,0,76,170,200,180,84

0,1200

2350 007A01,41,20,170,170,17

0,170,21,17,0,84,0,80,80,80,

0,1120

2360 007A0,0,0,0,27,41,80,41

,40,80,41,80,80,70,84,80,177

2370 007A0,8,8,0,80,84,180,

180,17,0,86,81,180,80,18,7

0

2380 007A02,80,80,8,84,0,76,

0,80,80,80,8,84,0,1,0,260

2390 007A00,80,81,80,81,80,8

2,81,208,204,200,208,204,221

,178,200,2214

2400 007A220,204,220,220,224

,220,224,204,224,224,224,220

,220,220,220,220,1840

# THE PRIZE OF YOUR DREAMS THANKS TO THE ALLIGATA

Buy any Alligata software product from one of the shops listed below and you'll receive a free entry to the amazing Alligata Prizespot. Enter and the chance to win the prize of your dreams up to the value of £500. See more than one and you receive more than one chance to win special prizes.

£500



Closing date 30th September, 1988

The prize of your choice to  
the value of £500.

Compton Harwood, Altrincham, Southampton, Sandberg, Inverness, Assembly, The Computer Centre, Birmingham, Brix and Dym, Rejoice Rejoice,  
Gomer, Brighton, Ryan and Paines, Berkeley, Mike Berry Software, Chatsworth, Cambridge Computer Centre, Cambridge, Farnham Micro Centre,  
Glasgow, Sun Electronics, Fleet, Gateway Home Computer Ltd, Grayswood, Computer Magic, Ipswich, The Shop & Get Centre, Millwall,  
N. Ireland, Computer Plus, King's Lynn, Quanta Computers, Lancashire, Linton, Linsbury B. Micro, Liverpool, Intech Print, Lincoln, Manor  
Radio, Liverpool, Creative Electronics Ltd, Kesteven Trade Ltd, London, Vico, London, Intech Print, Lincoln, Manor Radio, Liverpool,  
London, Virgin Games Centre, Oxford, M. London, Hardware Ltd, Luton, J. Marsh, Luton, Intech Print, Lincoln, Manor Radio, Liverpool,  
Members, Manchester, The Computer Shop, Newcastle on Tyne, David Computers, Newport  
Computer, Orange, Oxford, Pegasus, Perth Communications, Perth, Logic Sales, Peterborough,  
Micro Fun, Peterborough, Plugby Micro Systems, Rugby, Computer Plus, Stirlingbourne, J. Petersen  
Ltd, Southend-on-Sea, Farnley Personal Computers, Southend-on-Sea, SC4 Software,  
Stanstead Airport, Tappin Computer Software, Southampton, Tappin M. B. L., Tappin Ltd,  
Sturton in England, Sycamore, Swansea, Stroud, West Bromwich, Whitby, J. Whitt  
South of Humber, Walsby, Watling Computer Centre, Watling, and selected individual  
branches of Boots and W. H. Smith



**ALLIGATA  
BITES BACK**











**DATEL**  
ELECTRONICS

THE NO 1 NAME FOR COMMODORE

### Buckshot II

For C64  
or VIC 20

ONLY **£7.99** POST FREE

- TOP + TRIGGER FIRE BUTTON
- 8-1/2" FIRE MODS + EXTENSION LEAD
- ESTABLISHED SUCCESS PADS
- NOW FOR THE C18
- COMPLETE WITH HARDWARE
- POST FREE



**NEW!**  
with  
ELECTRONIC  
TRIGGER

THE ULTIMATE DISK ACTION REPLAY  
CALL FOR THE ACTION REPLAY  
AND SAVE! COMPLETE DISK OF 25

ONLY  
**£24.99**

### NEW FEATURE TO DISC ON TAPE

- A feature which allows you to store data on a single cartridge and load it into a tape.
- A feature which allows you to store data on a single cartridge and load it into a tape.
- A feature which allows you to store data on a single cartridge and load it into a tape.
- A feature which allows you to store data on a single cartridge and load it into a tape.
- A feature which allows you to store data on a single cartridge and load it into a tape.
- A feature which allows you to store data on a single cartridge and load it into a tape.



**ACTION  
REPLAY**

Cartridge Development System  
**£9.99**

Super Snooper  
**£18.99**

Turbo Ram  
Random Access  
**£10.99**

Disk Mate  
**£12.99**

DIGITAL SOUND SAMPLING  
FOR THE C64  
**£9.99**

The Digital Sound Sampling module is the first of its kind to allow you to sample any sound from any source. This includes any sound from any source. This includes any sound from any source. This includes any sound from any source. This includes any sound from any source.

COM-DRUM  
Digital Drum  
System  
**£29.99**

COM-DRUM is a new way to play drum games on the Commodore 64. It is a new way to play drum games on the Commodore 64. It is a new way to play drum games on the Commodore 64.

**£9.99 ONLY** POST FREE WHEN PURCHASED WITH THE SAMPLE  
COM-DRUM SOFTWARE ONLY. TO WORK WITH THE DIGITAL SOUND SAMPLER

IT'S HERE...  
AMERICA'S BEST SELLING DISK BACKUP SYSTEM NOW AVAILABLE IN THE UK!

# FAST HACK'EM <sup>TM</sup> **£19.99** POST FREE

FOR THE COMMODORE 64/128 FAST HACK'EM IS QUITE SIMPLY THE BEST DISK COPYING SYSTEM AVAILABLE ANYWHERE AT ANY PRICE.

SINGLE 1541 MODULE  
• £19.99. Can copy any disk to disk. Includes software and hardware for copying any disk to disk. Includes software and hardware for copying any disk to disk.

TWIN 1541 DRIVES MODULE  
• £39.99. Can copy any disk to disk. Includes software and hardware for copying any disk to disk. Includes software and hardware for copying any disk to disk.

FAST HACK'EM IS THE ONLY DISK BACKUP SYSTEM AVAILABLE IN THE UK. IT IS THE ONLY DISK BACKUP SYSTEM AVAILABLE IN THE UK. IT IS THE ONLY DISK BACKUP SYSTEM AVAILABLE IN THE UK.

SINGLE 1571 DRIVE (64 OR 128 MODE)  
• £19.99. Can copy any disk to disk. Includes software and hardware for copying any disk to disk. Includes software and hardware for copying any disk to disk.

1541 PARAMETERS MODULE  
• £9.99. Can copy any disk to disk. Includes software and hardware for copying any disk to disk. Includes software and hardware for copying any disk to disk.

BECAUSE FAST HACK'EM IS PRODUCED IN THE U.S. IT WILL ALWAYS BE ON TOP OF THE LATEST PROTECTION TECHNIQUES. SINCE MANY OF OUR LATEST PROGRAMS APPEAR IN THE U.S. ONLY MONTHS AGE.

WARRANTY  
WARRANTY  
WARRANTY

**DATEL**  
ELECTRONICS

COMMODORE  
COMMODORE  
COMMODORE

COMMODORE  
COMMODORE  
COMMODORE

- HOW ABOUT HACKERPAK??
- 1 ACTION REPLAY + FAST HACK'EM ONLY **£39.99**
  - 2 SUPER SNOOPER + DISK MATE ONLY **£30.99**
  - 3 HACKERPAK 1+2 ONLY **£58.00**





22,22,212  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 19928+L11#  
S.#SECRET 0  
2299 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2299+L118#-STOP  
2299 NEXT L  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,41,41,41,41,  
42,24,225  
2298 8248 224,22,22,218,27,  
48,228,48,78,48,78,48,87,  
78,41,88,1440  
2298 8248 41,41,41,41,41,142,  
121,122,122,122,122,41,41,  
41,41,41,1440  
2298 8248 48,142,147,48,128,  
122,42,122,72,122,41,42,  
41,41,1,1,1226  
2298 8248 1,1,1,1,1,1,1,1,1,  
1,1,1,1,1,2,41,52  
2298 8248 42,228,144,41,41,  
41,128,48,41,41,8,224,  
214,41,41,41,1470  
2298 8248 41,41,41,41,22,127,  
102,122,122,102,102,102,  
127,127,12,242,2887  
2298 8248 102,21,122,72,122,  
41,41,41,41,41,41,41,41,  
41,22,22,1040  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,22,22,22,22,  
22,22,222  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 19108+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 22,22,22,22,22,22,  
22,48,42,41,42,224,41,42,  
224,224,1148  
2298 8248 228,224,224,48,42,  
48,42,48,42,48,42,22,24,  
22,24,22,1427  
2298 8248 84,22,84,22,122,  
102,102,102,102,102,41,  
142,247,41,41,41,122  
2298 8248 48,22,88,21,21,22,  
122,22,122,41,41,41,41,  
128,128,228,1224  
2298 8248 148,148,148,148,  
128,41,84,84,1,1,1,1,1,1,1,1,  
144,144  
2298 8248 41,41,41,41,41,41,41,  
48,41,41,41,41,124,221,  
224,41,41,1126  
2298 8248 41,41,22,22,41,41,

41,41,41,41,41,142,122,22,  
142,22,1124  
2298 8248 22,224,22,222,41,  
41,41,41,22,41,41,41,41,  
22,22,22,222  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,22,22,22,22,  
22,22,222  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 19448+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 22,22,22,22,22,112,  
48,214,288,48,42,224,41,  
41,288,288,2222  
2298 8248 288,288,48,41,4,42,  
48,42,48,42,22,22,22,22,  
22,22,222  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,22,22,22,22,  
22,22,8,242  
2298 8248 41,28,42,122,122,  
122,22,122,41,41,41,48,  
142,127,122,127,2888  
2298 8248 122,127,127,182,41,  
22,48,41,41,22,22,22,22,  
41,41,41,2222  
2298 8248 41,41,41,41,48,  
148,148,148,148,148,41,  
124,48,41,41,1487  
2298 8248 41,42,41,21,22,22,  
22,22,22,41,24,24,22,24,  
24,4,122  
2298 8248 122,72,148,148,  
148,148,148,148,148,41,41,  
22,22,22,22,222  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,22,22,22,22,  
22,22,222  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 1946+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 22,22,22,22,22,22,  
22,48,42,41,42,224,41,42,  
224,224,1148  
2298 8248 228,224,224,48,42,  
48,42,48,42,48,42,22,24,  
22,24,22,1427  
2298 8248 84,22,84,22,122,  
102,102,102,102,102,41,  
142,247,41,41,41,122  
2298 8248 48,22,88,21,21,22,  
122,22,122,41,41,41,41,  
128,128,228,1224  
2298 8248 148,148,148,148,  
128,41,84,84,1,1,1,1,1,1,1,1,  
144,144  
2298 8248 41,41,41,41,41,41,41,  
48,41,41,41,41,124,221,  
224,41,41,1126  
2298 8248 41,41,22,22,41,41,

102,102,1248  
2298 8248 102,102,102,41,41,  
41,41,21,21,21,21,21,21,  
142,41,41,1227  
2298 8248 41,41,41,41,48,41,  
41,41,41,41,41,222,144,41,  
41,41,2887  
2298 8248 22,22,41,41,41,41,  
41,41,41,128,148,22,128,  
124,22,124,2224  
2298 8248 22,122,41,41,41,41,  
41,41,41,41,41,22,22,22,  
22,22,222  
2298 8248 22,22,22,22,22,22,  
22,22,22,22,22,22,22,22,  
22,22,222  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 19922+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 22,22,22,22,22,22,  
41,41,41,41,42,248,124,  
142,22,224,122  
2298 8248 22,22,22,22,22,22,  
21,22,22,128,41,41,41,41,  
41,41,226  
2298 8248 41,142,127,127,127,  
127,127,41,41,41,41,41,42,  
144,247,48,1248  
2298 8248 84,84,41,122,72,28,  
41,41,128,21,21,21,21,  
22,22,222  
2298 8248 21,21,21,21,21,21,  
21,21,21,21,21,21,22,22,  
142,41,1448  
2298 8248 41,41,24,48,41,41,  
41,42,248,24,41,41,41,41,  
41,41,1828  
2298 8248 22,228,148,148,148,  
148,148,148,122,22,142,  
142,22,22,72,2884  
2298 8248 122,41,41,41,41,41,  
41,41,41,41,22,22,22,22,  
22,22,222  
2298 8248 8,8,8,8,8,8,8,8,8,  
8,8,8,8,8,8,8,8  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 24288+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 22,48,228,288,42,  
41,41,41,41,22,224,22,22,  
22,22,22,222  
2298 8248 22,22,182,22,22,22,

22,22,22,122,22,41,41,  
41,41,212  
2298 8248 122,122,122,  
122,122,41,41,41,42,228,  
244,41,247,48,124,2822  
2298 8248 228,228,222,22,122,  
22,41,21,21,21,21,21,22,  
21,22,22,226  
2298 8248 21,22,41,41,41,41,  
41,288,41,41,41,41,41,48,  
142,247,1148  
2298 8248 41,124,48,41,41,22,  
48,41,41,41,41,41,41,41,  
41,2,222  
2298 8248 122,122,122,122,  
182,182,182,182,182,182,  
182,182,2,22,22,122,222  
2298 8248 41,41,41,41,41,  
41,41,41,22,22,22,22,22,  
22,22,222  
2298 8248 8,8,8,8,8,8,8,8,8,  
8,8,8,8,8,8,8,8  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 19448+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L  
2298 8248 122,22,22,122,  
228,228,78,122,22,22,22,  
22,22,22,22,142  
2298 8248 22,182,22,22,22,22,  
22,22,22,22,22,22,41,41,  
1,42  
2298 8248 1,1,1,1,1,1,1,1,1,  
144,41,41,41,22,22,21,21,  
22  
2298 8248 82,122,22,122,41,  
42,142,8,142,142,8,142,  
142,8,142,142,142  
2298 8248 8,142,142,8,142,8,  
122,122,1,1,1,2,41,48,22,  
142  
2298 8248 41,48,41,21,48,  
41,41,41,41,41,47,41,22,  
4,48,1422  
2298 8248 21,21,21,21,21,21,  
21,21,21,21,21,122,72,  
122,41,1222  
2298 8248 41,41,41,41,41,41,  
41,41,41,22,22,22,22,22,  
22,22,222  
2298 FOR L#8 TO S-CI#8  
FOR S#8 TO 15:00:00 S  
CI-CI#8+PQKE 24288+L11#  
S.#SECRET 0  
2298 8248 8:17 ACCT THEN PR  
INT\*\*8888 IN LINE\*\*  
2298+L118#-STOP  
2298 NEXT L





769, 767, 763, 766, 770  
2700 987485, 761, 75, 763, 75, 24  
9, 8, 7, 179, 176, 175, 165, 81, 6, 8, 9, 1460  
2710 987486, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8  
2720 987486, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
1, 84, 164, 87, 67, 186, 274, 275, 1  
67, 132  
2730 987492, 256, 261, 265, 277  
167, 274, 276, 278, 282, 283, 279, 281  
282, 277, 278, 283, 286  
2740 987491, 256, 253, 213, 21  
52, 211, 8, 21, 148, 21, 170, 74, 8, 8  
5, 5, 1470  
2750 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8  
2760 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 140, 80, 84, 186, 272, 273, 10  
7, 1540  
2770 987492, 256, 261, 265, 277  
167, 274, 276, 278, 282, 283, 279, 281  
282, 277, 278, 283, 286  
2780 987488, 261, 265, 261, 26, 2  
21, 21, 8, 21, 150, 1, 176, 87, 8, 8  
85, 26, 1470  
2790 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8  
2800 987488, 8, 8, 8, 1, 81, 8, 1, 14  
8, 85, 81, 164, 86, 85, 172, 182, 1  
927  
2810 987488, 278, 156, 261, 111,  
182, 276, 278, 281, 80, 276, 281, 2  
85, 272, 25, 92, 2708  
2820 987492, 1, 362, 213, 1, 79,  
157, 8, 8, 149, 8, 8, 186, 8, 8, 21, 1  
810  
2830 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
2840 987488, 8, 8, 8, 21, 84, 23, 18  
69, 186, 84, 84, 164, 254, 255, 18  
7, 1270  
2850 987492, 272, 140, 276, 172  
169, 278, 211, 273, 275, 8, 182,  
283, 277, 279, 281, 290  
2860 987492, 261, 87, 87, 25, 25  
5, 25, 1, 86, 86, 1, 169, 169, 8, 84  
84, 1744  
2870 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
2880 987488, 8, 8, 8, 21, 84, 23, 18  
69, 186, 84, 84, 164, 254, 255, 1  
87, 1290  
2890 987492, 272, 140, 276, 172  
169, 278, 211, 273, 275, 8, 182,  
283, 277, 279, 281, 290  
2900 987492, 261, 87, 87, 25, 25  
5, 25, 1, 86, 86, 1, 170, 169, 8, 8  
8, 8, 8, 8, 8, 8  
2910 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
2920 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8

8, 84, 29, 1, 308, 29, 252  
2930 987485, 268, 29, 141, 208, 2  
5, 233, 148, 29, 233, 148, 2, 141, 4  
4, 8, 84, 1670  
2940 987484, 5, 17, 84, 17, 17, 14  
17, 17, 8, 17, 8, 1, 17, 8, 168  
167, 204, 177, 8, 16, 8, 16, 8, 16, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
2950 987490, 8, 8, 8, 14, 8, 8, 118  
8, 8, 125, 8, 8, 29, 8, 8, 290  
2960 987488, 84, 17, 183, 8, 157,  
262, 88, 125, 255, 94, 29, 11, 14,  
8, 84, 1250  
2970 987488, 1, 81, 28, 8, 81, 8, 8  
169, 88, 8, 84, 84, 8, 8, 252  
2980 987490, 5, 14, 8, 4, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 30  
2990 987488, 144, 8, 7, 209, 144, 7, 1  
82, 174, 21, 168, 144, 28, 164, 144  
24, 1420  
3010 987488, 164, 24, 162, 144,  
5, 164, 148, 28, 209, 8, 28, 125, 1  
84, 26, 128, 1281  
3020 987488, 144, 24, 162, 144, 28, 1  
48, 144, 8, 26, 144, 28, 164, 144, 1, 8  
4, 1200  
3030 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8  
3040 987488, 8, 8, 1, 237, 8, 7, 18  
7, 88, 7, 187, 238, 7, 149, 147, 8, 1  
232  
3050 987488, 164, 24, 162, 144,  
21, 208, 169, 132, 199, 164, 128, 1  
25, 84, 186, 84, 1890  
3060 987488, 164, 182, 144, 28, 1  
86, 85, 2, 86, 86, 86, 84, 8, 25,  
8, 1800  
3070 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8  
3080 987488, 21, 8, 8, 122, 84, 5, 7  
24, 184, 29, 234, 184, 177, 204, 14  
4, 122, 1470  
3090 987492, 188, 164, 182, 148  
122, 187, 187, 196, 197, 184, 184  
122, 148, 25, 128, 1980  
3100 987492, 8, 87, 165, 8, 142  
84, 8, 147, 85, 1, 165, 8, 8, 8, 8, 8, 1299  
3110 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
3120 987488, 1, 84, 5, 79, 208, 28,  
278, 184, 20, 284, 184, 222, 284, 1  
84, 122, 8, 12  
3130 987488, 144, 122, 182, 144  
28, 187, 85, 1, 209, 144, 4, 123, 1  
87, 26, 196, 168  
3140 987488, 14, 142, 152, 24, 1  
47, 89, 26, 191, 84, 5, 142, 89, 1,  
84, 8, 1299  
3150 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
3160 987488, 1, 84, 5, 79, 208, 28,  
278, 184, 20, 284, 184, 222, 284, 1  
84, 122, 8, 12  
3170 987488, 144, 122, 182, 144  
28, 187, 85, 1, 209, 144, 4, 123, 1  
87, 26, 196, 168  
3180 987488, 14, 142, 152, 24, 1  
47, 89, 26, 191, 84, 5, 142, 89, 1,  
84, 8, 1299  
3190 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8  
3200 987488, 8, 8, 8, 1, 84, 2, 174, 84, 2, 1  
87, 144, 2, 25, 144, 4, 8, 84, 8, 220,  
794

8, 187, 157, 144, 182, 187, 164, 17  
2, 271, 195, 26, 1741  
3210 987492, 298, 17, 181, 208,  
164, 202, 204, 187, 179, 204, 119,  
202, 204, 168, 170, 212  
3220 987494, 254, 258, 254, 182  
162, 264, 87, 258, 84, 204, 204,  
24, 87, 144, 220  
3230 987486, 154, 84, 1, 81, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
3240 987486, 16, 8, 8, 16, 8, 8, 8, 16,  
8, 8, 168, 8, 8, 160, 8, 8, 280  
3250 987488, 8, 8, 188, 8, 1, 147  
8, 1, 165, 8, 1, 175, 8, 178, 194  
3260 987488, 8, 178, 88, 174, 8  
8, 8, 175, 84, 1, 185, 8, 1, 252, 8, 1  
237  
3270 987488, 84, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8  
3280 987488, 11, 8, 1, 27, 8, 27, 1  
47, 86, 127, 240, 233, 127, 204, 11  
8, 121, 1482  
3290 987492, 212, 127, 225, 118  
127, 285, 212, 127, 243, 118, 127  
174, 212, 11, 243, 2082  
3300 987488, 3, 242, 208, 23, 24  
1, 88, 23, 245, 87, 147, 88, 7, 24  
2, 88, 2734  
3310 987492, 247, 88, 28, 245, 88  
17, 245, 208, 12, 245, 208, 28, 24  
5, 182, 8, 202  
3320 987488, 245, 175, 12, 245, 1  
75, 4, 118, 84, 1, 118, 8, 8, 118, 8,  
8, 1280  
3330 987488, 8, 8, 8, 128, 8, 8, 8,  
8, 8, 118, 8, 8, 118, 8, 8, 8, 208  
8, 8, 1890  
3340 987488, 8, 118, 8, 8, 8, 8, 208  
8, 8, 8, 8, 8, 8, 8, 8, 208  
3350 987488, 48, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 270, 202  
3360 987488, 8, 8, 1, 8, 1, 8, 8, 8, 8, 1  
8, 8, 8, 8, 8, 8, 8, 8  
3370 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
3380 987488, 144, 144, 144, 1, 170  
1, 144, 8, 144, 8, 1, 85, 147  
3390 987488, 1, 87, 8, 8, 1, 87, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8  
3400 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 225, 202  
3410 987488, 8, 8, 1, 8, 1, 8, 8, 8, 8, 1  
8, 8, 8, 8, 8, 8, 8  
3420 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
3430 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 29, 29, 8, 29, 29, 8, 8,  
169, 228, 8, 175, 294, 8, 158, 294  
8, 2047  
3440 987488, 116, 8, 22, 88, 8, 8,  
384, 8, 22, 144, 8, 22, 88, 8, 22, 88,  
116, 142, 22, 148,  
3450 987488, 8, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8  
3460 987488, 8, 1, 8, 8, 8, 8, 8, 8, 8, 8  
8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8

3470 987492, 144, 26, 254, 144,  
26, 254, 8, 26, 186, 76, 26, 186, 7  
8, 45, 187, 1580  
3480 987492, 268, 8, 4, 255, 252  
259, 259, 258, 8, 758, 255, 255  
257, 253, 2584  
4000 987488 \* 987488 \* 987488 \* 987488  
80 987488 \* 80 987488 \* 80 987488  
\* 987488 \*

---

PROGRAM SPOTLIGHT

4000 987488 \* 987488 \* 987488 \* 987488 \* 987488  
1748 987488 WILL FOLD THE  
SECOND HALF \*

1000 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488  
1478 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1020 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1030 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1040 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1050 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1060 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1070 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1080 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1090 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1100 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1110 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1120 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1130 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1140 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1150 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1160 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1170 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1180 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1190 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1200 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1210 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1220 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1230 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1240 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

1250 987488 \* 987488 \* 987488 \* 987488 \* 987488 \* 987488

5,125,1475  
2388 0470144,26,85,184,29,48  
1,206,76,144,26,71,144,27,  
1,206,9424  
2389 047023,1,144,27,1,208,2  
8,1,208,4,8,84,8,8,8,8,7,14  
2390 04703,2,8,8,21,80,8,164  
8,8,164,84,1,176,148,1,800  
2391 047076,148,1,164,149,2  
1,12,145,2,118,149,2,164,144  
18,80,1483  
2392 0470144,26,85,80,121,28  
14,129,26,84,21,2,109,8,208,  
118,8,1274  
2393 047088,114,8,84,188,8,1  
1,206,8,1,208,8,8,84,8,8,842  
2394 047080,80,8,8,84,8,8,149  
8,2,148,8,22,174,14,80,172  
2395 047078,14,86,174,84,90  
1,75,80,21,182,80,24,169,208  
22,145,1276  
2396 0470144,2,85,144,1,144,  
149,1,144,26,1,121,25,8,87,7  
1,122  
2397 04708,29,8,8,27,1,8,7,4  
8,8,7,84,8,1,8,8,195  
2398 047026,8,8,195,84,8,2  
25,144,28,178,164,26,174,188  
1,84,1428  
2399 0470124,169,122,176,175  
1,84,176,221,121,176,173,109  
1,76,169,122,234,2446  
2400 047017,182,114,221,122  
1,202,175,184,208,148,34,194,  
188,26,174,144,2387  
2401 047044,228,144,5,165,86,  
7,82,208,2,45,208,7,45,208,8  
1,423  
2402 047040,26,8,1,182,84,8,2  
21,144,26,176,144,26,174,188  
1,84,1428  
2403 047029,144,121,224,121  
1,87,224,225,225,176,212,147  
1,176,148,121,176,2211  
2404 0470255,167,224,149,121  
124,176,184,226,147,26,244,  
206,26,176,164,2262  
2405 047018,223,144,180,160  
144,208,114,8,85,188,8,1,208  
8,8,1428  
2406 04708,26,8,1,202,84,8,2  
25,144,26,176,144,26,174,188  
1,84,1428  
2407 0470124,169,122,176,175  
1,84,176,221,121,176,173,109  
1,76,169,122,234,2446  
2408 0470257,167,224,149,121  
124,176,184,226,147,26,244,  
206,26,176,164,2262  
2409 047018,223,144,180,160  
144,208,114,8,85,188,8,1,208  
8,8,1428  
2410 04708,26,8,1,202,84,8,2  
25,144,26,176,144,26,174,188  
1,84,1428  
2411 0470124,169,122,176,175  
1,84,176,221,121,176,173,109  
1,76,169,118,176,2086  
2412 0470129,121,176,81,124,  
221,8,122,176,121,126,204,2  
27,21,29,188,2411  
2413 0470128,124,2,224,2,224,28  
8,1,122,14,8,26,8,8,8,8,12  
84  
2414 04704,18,84,1,127,144,2  
1,82,80,28,167,148,167,176,2  
86,85,1271  
2415 0470126,85,222,164,162,  
124,184,148,86,226,188,160,1  
26,81,148,204,2268  
2416 047089,109,176,121,147,  
176,149,126,174,121,194,84,82  
124,126,148,126,1716  
2417 047011,118,164,160,164  
144,27,186,124,27,121,148,4  
1,84,84,8,1277  
2418 047018,8,8,8,8,8,8,8,8,8  
8,8,8,1,85,84,5,222  
2419 047022,80,2,176,244,2,222,  
27,126,221,28,226,244,2,222,  
188,188,204  
2420 047044,8,26,14,14,8,4,8  
8,8,8,8,8,8,8,8,8,124  
2421 04708,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8  
2422 04704,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8,8,8,8  
2423 04704,8,8,8,8,8,8,8,8,8,8  
144,124,122,144,202,27,144,8

5,14,22,25,82,1,82,198  
2444 047044,8,8,84,16,8,8,8,8,  
8,8,8,8,8,8,8,8,184  
2445 04708,8,8,8,8,8,8,8,8,8  
26,8,8,8,8,8,8  
2446 04708,8,8,8,8,8,8,8,8,8  
8,8,8,8,148,20,26,252,80,2,  
760  
2447 047089,84,8,84,84,2,178  
1,1,148,8,1,82,8,1,84,767  
2448 04708,1,84,8,2,1,84,8,8  
8,8,8,8,8,8,8,8,144  
2449 04708,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8  
2450 04704,8,23,8,23,20,88  
1,82,26,89,182,26,122,100,20,  
274  
2451 047084,89,26,258,87,28  
1,84,89,26,258,89,28,176,188,  
20,122,127  
2452 0470165,26,126,100,26,1  
22,100,27,176,89,27,127,89,4  
1,124,148,118  
2453 04704,127,80,8,127,84,8  
1,27,8,8,25,8,8,8,8,8,8,8  
2454 04701,2,8,2,88,84,8,8,8  
1,2,8,1,1,8,8,144  
2455 04708,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8  
2456 04708,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8,8,8,8  
2457 04708,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8,8,8,8  
2458 04701,152,8,7,129,84,18  
124,144,4,126,144,11,1,128,8,  
84  
2459 047012,126,18,2,126,1,  
1,8,2,2,8,8,8,2,2,418  
2460 04704,8,8,8,2,2,8,8,8,8,  
8,8,8,8,8,8,8,8  
2461 04704,8,8,8,8,8,8,8,8,8,8  
8,8,8,8,8,8,8,8  
2462 04704,76,84,27,176,144,  
4,124,84,46,126,224,27,124,1  
44,14,1248  
2463 04702,124,8,124,128,2,7  
4,84,18,8,128,7,128,8,18,2,7  
48  
2464 047028,8,126,126,18,2,  
128,2,2,8,2,2,8,8,8,8,200  
2465 04702,2,8,8,8,8,8,8,8,2  
2,8,8,8,8,8,8,8  
2466 04704,14,8,8,100,8,1,19  
5,8,1,125,8,1,107,8,1,122  
2467 047016,8,8,114,8,12,11  
4,12,12,100,102,12,187,176,  
45,182,122  
2468 047024,28,184,86,76,28,28  
4,86,76,224,76,26,254,144,27  
1,201,144,2,102  
2469 047027,187,144,186,186,  
144,124,122,144,202,27,144,8

4,8,84,8,1258  
2498 047018,8,8,8,8,8,8,1,194,  
8,8,228,8,8,244,8,8,8,8  
2499 047028,8,1,221,128,1,2  
25,128,9,182,192,22,185,224,  
12,186,1828  
2500 04708,2,164,76,1,184,1  
186,8,176,144,8,176,228,6,228  
228,2244  
2501 047084,228,167,4,173,148  
4,127,182,4,148,24,2,144,8,8  
1,227  
2502 04708,8,8,8,8,8,8,8,8,8,8  
8,27,148,8,26,208,8,879  
2503 047027,144,2,274,84,2,21  
8,84,11,116,76,11,116,122,76,  
174,2224  
2504 0470114,8,174,14,8,174,  
14,8,174,144,27,174,144,27,1  
87,144,1642  
2505 0470164,187,144,186,122  
1,144,187,118,144,26,22,144,8,  
1,80,8,1444  
2506 04704,8,8,8,8,8,8,29,1,2  
88,29,1,208,26,114,27,185  
2507 04704,208,26,76,144,26,  
76,144,26,27,208,26,85,144,2  
2,122,1422  
2508 0470144,8,176,14,8,224,  
64,22,176,88,26,176,144,26,1  
76,80,1271  
2509 047026,126,88,22,144,8,  
4,8,84,8,1,85,8,8,8,8,48,88  
8  
2510 047026,226,8,8,226,222  
1,222,222,222,8,202,226,222,  
222,222,2268  
4008 000 88 8800 0 0 0 0 0 0 0 0  
4010 0000\*\*0000 00000 00000  
880 000 0 0 0 0  
4012 0000 0000\*\*00000000  
4028 0000 41,00 0000 44,88 000  
000,00 0000 44,88  
4040 0000 0000\*\*0

**3** into **1**  
**EDITOR**

# ASSEMBLE

**Steve Carrie brings you an Assembler for your C128.**

EVERYONE WHO IS USING their computer seriously, as opposed to merely playing with it, needs an Editor/Assembler.

In *Your Commodors*, July '88, we printed the Editor. This is the second and final part - the Assembler.

## The Assembler

The assembler is called by the C command to operate on source text in RAM 1. A range of directives allow space reservation, byte, word and text insertion. Symbols may be up to 128 characters in length and post-assembly messages detail memory usage and any relevant relocation data.

Several subcommands are available in the C command:

- S - list symbol table at end of assembly.
- I - list program at end of assembly.
- A - assemble to memory. These are in any order after the C.
- CEM - assemble, list prog & sym.
- CA - assemble.
- C - compile only, no code sent to memory.
- CL - compile and list only.

Assembly begins at the first line and continues until either the end of text or the ] directive is found. Symbols up to 127 chars. in length may contain the following characters: a-z, 0-9, \$, %, &, and -. The assembler translates all uppercase chars. to lowercase except in the ] directive.

### Summary of Operators

- \$ hexadecimal
- % binary
- > high byte
- < low byte
- # immediate
- + plus
- minus

you would likely crash the system or corrupt the program. The L directive allows you to place the code elsewhere, but assemble it to run at the required address. For example:

```
*=$8000
# L($8000)
```

This causes the code to be placed at \$8000 hex, but it will be assembled to run at \$0000 hex i.e. all JMP and JSR calls will be assembled correctly. After assembly, the monitor commands may be used to save the program and/or relocate it to the run address.

At the end of assembly, J sets of addresses are printed. For example:

```
ASSEMBLY COMPLETE
ADDRESS: A81 -
($508A00,7) $0000-$1175
LOCATION: 0-$8000,$9175
```

### Directives

Directive	Example	Function
*=	*=\$8000	set assembly address
# L:	# L(\$8000)	set relocation address (see below)
# B:	# B 0,1,2	insert byte data
# W:	# W \$1000	insert word data
# R:	# R 1,40	reserves a specified number of bytes
# I:	# I 0,0,0	insert ASCII data
# M:	# M 0	sets assembly bank
.	. Jockey	define symbol
		end of prog. (not req.)
;	;	insert comments in text

## Entering the Assembler Code

Again, the program is given here as hex data strings. Use the LOADER Program from *Your Commodors*, July '88 (remember to run RELOCATE first).

Before you begin to enter the assembler code, first load the current work file which should contain the code you typed in last time i.e. the working editor code. For the first start address, enter \$040.

### Summary of Directives

*=	code assembly location
# L:	code relocation address
# B:	byte
# W:	word
# R:	reserve
# I:	text
# M:	memory bank
	end of code
.	symbol declare
;	comment

### Operators

- \$, % declares following number in hex. format
- % number in binary format
- > load low-order byte of 16-bit quantity
- < load high-order byte of 16-bit quantity
- # standard 8002 immediate
- + value of expression is increased
- value of expression is decreased

Note: decimal numbers have no prefix

Examples of above:

- 1. lda \$01
- 2. lda = \$117710811
- 3. lda#-cyc
- 4. lda# -sc
- 5. lda# \$00
- 6. sta buffer+1
- 7. lda buffer-2

The relocation works like this. Suppose you want to assemble to an address that is occupied by another program plus assembler (for example). If you went ahead,

This shows that the code has an assembly address of \$0800 hex but actually resides at \$0000 hex. If no relocation was required, the address would be the same.

# BLER128

If an error occurs, assembly stops and the error type is printed along with the line number in which the error occurred. Assembly may be stopped at any time by the RUN/STOP key.

## Bits and Pieces

The symbol table occupies about 16K in RAM0 following the program. Therefore, if you want to assemble code in RAM 0 in the area 1C00-7FFF hex, relocate it elsewhere. The assembler also uses the

### Possible Error Messages

#### Illegal memory bank

**Bad operation**  
**Too many symbols**  
**Symbol redefined**  
**Bad addressing mode**

#### Under'd symbol

**Branch range**  
**Symbol error**  
**Bad directive**  
**Bad operand**  
**Syntax**  
**Illegal quantity**

- only 0-15 valid in PC
- not a valid mnemonic
- symbols table full
- symbols declared twice
- not valid mode for mnemonic
- symbol not declared
- relative branch error
- illegal character
- problem with directive
- problem with operand
- overall syntax error
- number out of range

area 8000-80FF, 8080-80FF, 8088-80FF.

Try to keep symbols short as meaningful as possible. At an average of 30 chars. per symbol, about 1580 symbols may be accommodated. This falls to 750 with an average of 20. These figures are, of course, average and will vary considerably.

I hope some of you find this program useful. If you have any comments/constructive suggestions, please write to me at the Your Commodore office.

## PROGRAM: ASM-HEXDATA

```

3841 4CA9 3AFF696575FF6D7D794171FFFF292535FF2D3D393131FFFAFFFC16FF021E 0899
3861 FFFFFFFFFFFF24FFFF2CFFFFFFTTTTTTC9C5D5FFFC6D059C1D1FFFFFFD0E4FFFC 1065
3881 FFFFFFFFFFFFC04FFFFCFFTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT 1065
3901 4050594151FFFFFF64F6FFEEFTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT 1809
3921 FF20FFFFFFFFFFFA9A385FFAD8D9A1B1FFFFA216FF848FF8EFFFFTTTTTTTAA6 1A36
3941 34FFACBCFFFFFFF6FFF6FFF46567T4E3FFFFTTTTTTTT090515FF901D190111FF2A 1341
3961 2630FF2E3EFFFFFFF6AFF6476FF6E7EFFFFFFTTTTTTE825P3FF8FD961F1FFFF 1943
3981 FF8595FFD0D0998191FFFF96FF968EFFFFTTTTTTTTTTTTTTTT8494FFC96EFFFF 1A2A
39A1 4243439042434338004243551F042404930424845D042504C104254435042565370 0AC9
39C1 434C4313434C44D8434C4958434C5688444559CA44455988494258889494859C8 0C05
39E1 50484148D50485D085D04C4168904C502852D489405254536D3443438534544F9 9D9D
39A1 5345497054415BA544159A85483888A5458418A5458538A54584198A84F50EA 0CAC
39C1 42524B0041444300434E440B41534C1642495421434D502C4350885743505942 07D7
39E1 4445434D454F5258494E43634A4D566E4A5362794C44441844C44588F4C44599A 08A0
39A1 4C5353A54F5341B0524F4C8B534F52C6534243001535441DC33948E7535459F3 08CE
39C1 C63EFFF0000000000000000000000000000000000000000000000000000000 0890
39E1 414C204D45484F53592042414E4B00424144204F5045524154494F4E00544F4F 084C
39A1 20484142E92053594D424F4C530053594D424F4C2053245444546494E45440042 085C
39C1 414420414444582485383494847304D4F444400554E44454637442053594D424F 0855
39E1 4C00425243424E43482052414E47450033594D424F4C2053594E54455800424144 082B
39A1 2044495249435489564800434144204F504552414E440053594E544558004494 0819
39C1 4C4347414C205155414E5449549900540E4445463744204C494E45003C325032 082B
39E1 5E326F3260329432A38280388E30CC3260326F32F032204552924F532044E2D 0C0C
39A1 001027E8038400A0D04183594540424C45322052954E4E494E4F0D00504415353 07B3
39C1 20310D00504153520320D064183534540424C45320434F4D504C455445044144 075F
39E1 4452455353485320425248208E284153534540424C453292000D02E2000203030 071B
39A1 392020202020202020284C4F434154494F4E292000435353494D424E592059 0702
39C1 544F505045440D00A20A20A2C8A2082CA2D0C8A0AA8D032EFC3220373A917A083 084D

```

33C1 203735A541A4422099302084304CBE3EE630D062E63E2A00076A301A93D20D0F7 0078  
33E1 5B397FC920F0E96079A201A93D30D0F7506079A201A93D30D0F7506297F607048 00CA  
3401 A9F8D8D902658E3232F00A8AE283220DAF7506079A201A93D30D0F700264820E3F7 070F  
3421 5060303090123947800ED93A80003295F60C941900E937604CA9320D7332023 0C24  
3441 346A0A0A0A0A0A0A3220D11330232340002A32603A324CD133203CA8E3A339516A9 005F  
3461 00001720D733207A3480D16E2039C3A85160517AD3A328836800200C34900160C9 0A2A  
3481 419004C94002328601580DC93990FAC93A80F6386020283269001604C9C9343094 0D2D  
34A1 34900160C92320006C92600023660C920F0FA1660C941900D9258386E9A56030D7 0E38  
34C1 33A200082A323200C930F0100346C933290F0D3A328D2A32201133888000D0 0C15  
34E1 01600E2A324C733A03D30E9F1053DA53EE900853E9A000516001720D133C9F30 0064  
3501 7033C93A803F48A51748851648D816261706163626176619851600160065178617 008C  
3521 0616281768290F1865166516A51769A0005174CFC94608549844A0008149F066 00P9  
3541 20D2FFC8D0F6604547A64885380A3CA808D3A328836338D3A328D33285F845 00CD  
3561 FE85FE85FC8D33260A940A33D2D735AD3522AC2633288930A93C20D2FFA5FD 0F5C  
3581 A4FE20E93DA97A039303735AD3432AC353220930A93C20D2FFA5FD420E9 0F85  
35A1 320E4E4D060A9292CA93203CA92CA00D2D1434D0034CD1334CA933A0D0320E93385 0062  
35C1 43C820E933C900000000296048544C8D0E93385441C8288938544ED2733C932D019 0092  
35E1 AD3632F0144260C88E263230E933AE2E32D00C0EAD00000000000000001880A343A6 007C  
3601 448530863E208830800EC898166530D053D53E8900853E1864A538A83C4C0236 0045  
3621 131232E223285828883A000C548D00BE44CD04A2001860A192A8CD000ED01 0057  
3641 AAEBE2E2E23C828900ED182500E9C0C2E32D0F3A2030668E8E8E88A1845828582 1076  
3661 A5B36900E93AA5E24C2B3620B53480093A3074CB133A0D020F330309F34900B 0C22  
3681 99010E9C0A000F04C7236C000E1898453D853D453E6900083E64030213680D3 0DAB  
36A1 A3050A0C00C0881E28584C881E2858530D733C932F007C920F0034CE736482D 0E99  
36C1 D13320F63860C92BD00E18A1649048516A5176048051760A564888516E8316A5 0D1F  
36E1 8D85178D1760A280516A50585176020F6464CB33C20D733C9324D00820D1332D 0D21  
3701 50343880C925D0112D0133208F34A9908517AD2A3288163860C93CF0E4C93ED0 0C7B  
3721 164820D13320F63860C92BD00E18A16490485176516A90005173880208C34900530E93438 0B40  
3741 00C932D00E20D13388516A900851720013306803D053480034CA93330683620FC 0051  
3761 36E00F00023860A02733C901D0021866A32054CB13320D133A9320A8E3530F638 00E9  
3781 A316A51785FD8D353286FE83E3A3C332F176016085F88D34328AF8E35328632 0E34  
37A1 D133C93AF0034C8933D0133A00020E933C930A018C900F014AE2732E03D0D03 00B6  
37C1 20FF33C9C046D0E6A2004CB13318888F0F85FD45F66900E93E18888F685FA5 120E  
37E1 FC890085FC603D0133C9570004AC3238C942F0034CF78820D133A932D0A83530 0038  
3801 F636A317F0034CAC33AE2732E0C2D07A000A51630FF33E8FD0D02E8FEE6FE8 10BD  
3821 038EFC30D733C92CD0043D01334CD03985200193A93A20AEC3E320F63E16733E0 001E  
3841 03D00A000A51E20FF33C8A51720FF33A5F018600285FDA2FE99085FA5AF818 0750  
3861 690285F8A9FC690085FC2D733C92CD00E082D01334C3A3860C854D0053CA037C9 0089  
3881 52D02820E133C93D08A32D013320F83E18A5FD651685FDA5FE831785FEA5F818 103C  
38A1 651685F8A9FC651785FC80C943D0D30D133C93A8D0E3D0D13320F63E3A517D06A 0F3A  
38C1 A516C91080048D283360A2004CB133C94CD021260017600133C93AD01A2D013320F63E 0CE9  
38E1 A910ED3332A516A51785F88D343286FCE3532804CA933A85F32C901F007802D 0C0C  
3901 713D4C0C3620D13320689628D733C930F011C92D0F0DC938F009C938FD085A2D7 0C90  
3921 4CB13320213608A8E90E888E32329905A2D034CB133AE2E32E88A18E548E5 0088  
3941 86A54C890085E7CD243290008A00C9CBE3532804CA933A85F32C901F007802D 0C96  
3961 2E32D0F820D733AC2E33C93D0F0148EAEAEAEAEAEAEAEAEAEAEAEAEAEAEAEAEAEAEAE 1274  
3981 87854C80984820D13320F63E6688A516914BC8A51791484C7C98989A9668503D 00D0  
39A1 32A200A00089012ED184D00C80093D0F4B1040D293238E0E8EC2D32D0021080 0DCE  
39C1 18A904A5848584A585869005854CA39206D38AD00EC903F005A32014CB133A9 0C35  
39E1 41A331A008209B3990D3A160A961A231A0189189B999003A90260A9C5A231A9 0C56  
3A01 172698399003A903604C8E39E188C9FFF0838E293360A3D44CB13320E1FFD006 00F2  
3A21 A9FF8D73360A5FDA6F8D36D328E3932A5F8AFC9D9A328E3C32D0733C92D0F733 1647  
3A41 062076374C783A29050160C93E0034C783A8C93E000430F8384C753A93A23D0 0C09  
3A61 0620E7374C753A2085348D0E8A2014CB133208A38E000993D0733C900F007C93A 0A7F  
3A81 F614CA93A93D733C902D08A3632F0033638E20F63E0094C13A20D1334C 0062  
3AA1 1C3A60A9204CD3FF20443D2024835A2A8C933203735A9008D3332A9018D2733A9 0A0E  
3AC1 0C8D283285384D9032A3C8D03132AD2132AE23285848964C201A36A93D0A0320 0A80  
3AE1 3735201C8AE2793F02AD90032853BAD3132853C20505301A36A945A0332037 0A13  
3A81 35201C3A8E2732F0E8A03733F063204C3E2D8A354C8E3E8998A0332D73354CE 0052  
3AA1 3E4D4F542D4120434F525245435430434F4D5C494C452053543434F4D40414E 0080

3841	446D06A9068D32328D37328D3632A00C889000E0920F0P8C943F0F4C900DD01	0050
3861	60C941F006E832324C5138C993D0066E3E37324C5138C94CD006EE36324C5138A9	004D
3881	22A03B2037394CB8E3E300139C901D005A9014CA338C901D00620E83E4CA33820	089C
39A1	453C0D2E32AE2732D002001E8A000AD39320FF3308CC2E32F010A91620FF3308	0E08
39C1	CC2E32F003A51720FF3318AD2E3365FFD65F0A5F6490085FEAD2E321865F3665F	0F0C
39E1	A5F0890085FC80AD2732C902F003A90360AD2932D03D32A92020A83E20P83E6A9	0E69
3D01	17D0034C333CA5FD1869032E684A0F6490085E3A51638E5040516A517E500F009	00FF
3C91	C9FF7F017A2064CB133A516C98090094C353C9AD29328D2932A90280A516C98090	0E7C
3C81	E34C333C2AD29328D2F321868448F688A90690085E9A9A92020A83E3C94D0035A001	0C13
3C61	20F333209F34B00820D133ADD820D03A8A90160C932001730D13320F836900CA8	08AD
3C81	17F0034C333CA5FD1869032E684A0F6490085E3A51638E5040516A517E500F009	0E7C
3CA1	78F004C9A6E003A9036020F0368D003A90360A517D03F20D733C92CF018AD0F32	0091
3CC1	C9E7F004C979D008A005200D3A8A90360A0D2200D3A8A9028020A83E3C958F9007C9	0C53
3CE1	58F0074CA933A0360002A00420003A20D133A9016020D733C92CF008A005200D	0B10
3D01	3A8A9036020A83E3C958F9007C9590F0074CA933A0360D032A0D720D003A20D133A90	08F4
3D21	8D20D13320F83620D733C92CF02620A635C92CF008A0A200D3A8A9036020A83E	0C09
3D41	A95920A83E3A517F0034C333CA5FD00D3A8A9028020A83E3C958F9007C9	089F
3D61	35A517F0034C333CA5FD00D3A8A9028020A83E3C958F9007C92E32AD2E52AE2032	0A96
3D81	0D2D328E2E32AD2E32AD2E32AD2E32AD2E32AD2E32AD2E32AD2E32AD2E32AD2E32	0E0E
3DA1	32A20A54938F922338549A54AC8F922338549A54AC8F922338549A54AC8F922338	0D62
3DC1	9549A8D0D72C293230D7100A2808E2952093020D2FFC9C0C00890C5A5490930	0C10
3DE1	4CD2FFA90D4CD2FFA90D4CD2FFA90D4CD2FFA90D4CD2FFA90D4CD2FFA90D4CD2	0E88
3E01	20D2FF984CD2FF9844A4A20193EAA82390F20193EAA82390F20193EAA82390F2019	08C4
3E21	3060AD8A32AC3E3220E93D20A43AD3E32AC393220E93D20A43AD3E32AC393220E9	0BCD
3E41	0620D2FFC9D0F030E430E08A9A5A03E2D3735AD2132AE32308590869A502C52	0726
3E61	0A0A8583C54CD00420E430E08A9A5A03E2D3735AD2132AE32308590869A502C52	1003
3E81	20A43A8A03E318330CF0C0C2A3290F520E430E08A9A5A03E2D3735AD2132AE3230	078D
3EA1	834CF0D38D5441424C45204F46462083594D42424F4E320555345440D00D0A08D	0884
3EC1	00FF4C161C00	017D

FORM 44 AND 128 • TRANSFER ALL MAJOR TURBO • AUTOMATIC • NO USER KNOWLEDGE •

## COMPARE THE REST WITH THE BEST NOW DOSOFT OFFERS YOU EVEN MORE!

### MegaTransfer Disk V.4.0

After you finish, it offers you an additional 10% off the price!

**WITH TEN FREE DISKS**

• **FREE DISKS:** 10 disks are included with each MegaTransfer Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaTransfer Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaTransfer Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

**\$17**

### MegaUtility Disk V.4.0

• **FREE DISKS:** 10 disks are included with each MegaUtility Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaUtility Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaUtility Disk V.4.0 purchase. These disks are preformatted and ready to use. They are a great value for the price.

**\$17**

### MegaSave Super Value

• **FREE DISKS:** 10 disks are included with each MegaSave Super Value purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaSave Super Value purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each MegaSave Super Value purchase. These disks are preformatted and ready to use. They are a great value for the price.

**\$9.90**

### 3M Disks at Low, Low Prices

• **FREE DISKS:** 10 disks are included with each 3M Disks at Low, Low Prices purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each 3M Disks at Low, Low Prices purchase. These disks are preformatted and ready to use. They are a great value for the price.

• **FREE DISKS:** 10 disks are included with each 3M Disks at Low, Low Prices purchase. These disks are preformatted and ready to use. They are a great value for the price.

**\$12.50**

**AND SAVE MONEY**

How to get your DoSoftware!  
 Order your DoSoftware from DoSoft.  
 DoSoft will ship your DoSoftware to you in a secure, padded envelope.  
 DoSoft will ship your DoSoftware to you in a secure, padded envelope.  
 DoSoft will ship your DoSoftware to you in a secure, padded envelope.

**DoSoft**  
 You'll Do it Better with DoSoft

• FAST DISK UTILITIES • LOADERS • 3-MIN DISK COPY • FAST DISK FILE COPY • FAST FORMAT •

Bits and pieces from  
Allen Webb to  
improve your control  
of your 64's graphics  
capabilities.

# TOP DRAW TOP DRAW

IN THIS ARTICLE I WILL BE describing two routines which will hopefully be of value to you.

The first is an editor to improve your handling of scrolling backdrops. You may recall that routines published in an earlier issue of *Your Commodore* allow you to display a portion of a backdrop moved behind the Basic ROM on the screen (March 1988 issue). While I provided a demonstration program, I did suggest that a proper editor was necessary. As part of my sandy drablog, I have written such an editor — it is listed in Listing 1. Before you use the editor you must load the code given in the earlier article.

The routine assumes that the backdrop occupies the area \$A000 to \$BFFF leaving the area between the ROMs free for code, character designs etc. The backdrop is assumed to be 80 characters wide and 180 characters high and can be considered to be eight screens sized pages. You will see that line 80 sets up the variable CP. This is the value put in location \$C271 to decide which characters are shown in the backdrop. The default value of 21 gives the normal character set. The program changes back to normal characters for the menu. The system automatically sets multicolour mode.

The menu offers nine options. You can return to the menu at any time by pressing F1. Option one allows you to scan each page in turn. The pages are arranged as shown in figure 1 and are displayed by pressing the appropriate number key.

This option allows rapid checking of the design. If you

1	2
3	4
5	6
7	8

want to scroll through the backdrop, use option two. The cursor keys control the scrolling.

Option three allows you to edit a screen. Once you've selected the option, press the number of the page you wish to edit. To add characters, place the cursor at the required position using the cursor keys and press the key corresponding to the character selected. The chosen character is shown as a flashing multicoloured square. This means stability over any background colour. The character will be entered in the colour shown by the screen border. This can be changed by pressing F7. To move on to a new page press F6 followed by the number of the new page. When you enter a character, the colour table is updated and all other occurrences of the same character will turn to that

colour. The reverse on and off keys act as normal, to allow use of reverse field characters. Similarly, the HOME key acts as expected. The F3 and F5 keys are used to change the background colour for the edit and scan modes.

Option four clears the backdrop by filling the area behind the Basic ROM with character 32. The colour table is set so that all characters are white.

Options five and six allow you to SAVE and LOAD the backdrop and colour table from a device decided by option seven. On startup, the device is set to eight.

To help maintain the backdrop and colour table as saved as a single block, to load them into your own program, simply use the following line at the start of your program:

```
10AAA=1:IF A=1 THEN LOAD "filename",A:1
```

Replace the eight with one if you use a cassette.

Options eight and nine allow you to see what the backdrop looks like in a smaller window. Option eight sets the size and position of the window and must be used before you try to use option nine.

The last option is for disk users only. If you want to edit it, simply leave out lines 180 and 181.

Everyone seems to have gone mad over the use of icons in games and other programs. In essence, the use of icons is fairly simple. You simply have to check the coordinates of the pointer when a key is pressed and perform the relevant command. The second routine is a simple control program allowing you

to drive a pointer icon with a joystick in port 2.

On activation you will see a flashing hand on the screen. This can be moved and its position read from a register. The commands are simple:

```
SYS $2800 turns on the pointer.
```

```
SYS $2003 turns the pointer off.
```

```
SYS $2000 resets the pointer to the default design.
```

The code contains the design for a hand. On activation, this is copied down to sprite position 13 in the cassette buffer (\$C0-\$E4). The routine is locked into the IRQ interrupt and will continue to run whether or not a program is running. The position of the pointer is returned as follows:

```
X position = 190 least significant byte, 191 most significant byte
```

```
Y position = 192  
Fire button = 194  
Fire button not pressed, 195  
Fire button pressed
```

To calculate the X position use:

```
XP = PEK(191)*256+PEK(190) + X Offset
```

and

```
YP = PEK(192) + Y Offset
```

Offset is the difference between the end of the pointer and the top left hand corner of the sprite. In the case of the hand given here:  
Y offset = 24  
X offset = 24

The pointer colour cycles through all the available colours so that it is visible over any background colour.



## PROGRAM BACKDROP EDITOR

```

10 REM*****
20 REM* BACKDROP EDITOR *
30 REM* SPC3124 1991 SPC41*
40 REM*****
50 IF FL=1 THEN 130
60 POKE 530,120
70 POKE 55,81:POKE 58,48:CLR
80 POKE 53272,1:PEEK(53272)AND 248:OR
  10
90 POKE 53281,80:CT=48485:BC=0
100 FOR I=1 TO 81:READ X(I),Y(I)
  :NEXT
110 DATA 8,8,48,8,8,25,48,25,8,58,48,
  58,8,25,48,25
120 DEF FNAC(X)=40000+Y*800+X
130 DEF FNBC(X)=1624+Y*48+X
140 POKE 53282,41:POKE 53283,1
150 DATA 32,312,325,30,333,174,32,130
  120,32,247,182,165,28,27,185,21,72
  32,233
160 DATA 174,32,130,173,32,247,180,
  185,1,41,254,133,1,165,28,164,21,
  184,133,21
170 DATA 184,133,28,165,28,32,30,225,
  185,1,3,1,133,1,55
180 FOR I=53250 TO 53846:READ X
  :POKE I,X:NEXT:CC=1:Z=DEIR
190 PRINT CHR$(147):PRINT TAB(12)
  :@=ATE3BACKDROP EDITOR:DOWN3
200 POKE 53288,14:POKE 53281,0
  :PRINT TAB(13)";.VIEW PAGES"
210 PRINT TAB(13)";2. SCRAM PAGES"
220 PRINT TAB(13)";3. EDIT PAGES"
230 PRINT TAB(13)";4. CLEAR SPCS"
240 PRINT TAB(13)";5. LOAD SPC"
250 PRINT TAB(13)";6. SAVE SPC"
260 PRINT TAB(13)";7. DEVICE SPC41"
270 SYS 48195,48,25,88,8,81X+81Y+8
280 GET I4:IF I4<1"OR I4>8"THEN 290
290 POKE 53281,8E
300 ON VAL(I4)GOTO 300,350,430,650,
  650,730,770
310 POKE 53289,3
310 GET I4:IF I4=""THEN 310
320 IF I4="F1"THEN 100
330 IF I4="1"OR I4="8"THEN 310
340 I=VAL(I4)+SYS 48195,X(I),Y(I)
  :GOTO 300
350 POKE 53288,40:X=I:Y=8
  :SYS 48195,X,Y
360 GET I4:IF I4=""THEN 360
370 IF I4="RIGHT"THEN X=X+1
380 IF I4="LEFT"AND X=8 THEN X=X-1
390 IF I4="UP"AND Y=8 THEN Y=Y-1
400 IF I4="DOWN"THEN Y=Y+1
410 IF I4="F1"THEN 100
420 SYS 48195,X,Y:GOTO 360
430 GET I4:IF I4<1"OR I4>8"THEN 430
440 POKE 53288,CC
450 FN=VAL(I4)+SYS 48195,X(I),Y(I)
460 X=81+48X+48Y:Y=8
470 SYS 48195,X(I),Y(I)
  :Z2=PEEK(FN+X)
480 GET I4:IF I4<1"THEN 500
490 POKE FN+X+54272,AND(I)*10
  :POKE FN+X+1,80
500 POKE FN+X+1,22:GOTO 430
500 IF I4="RIGHT"AND X=8 THEN X=X+
  X+1:GOTO 470
510 IF I4="LEFT"AND X=8 THEN X=X-
  1:GOTO 470
520 IF I4="UP"AND Y=8 THEN Y=Y-1
  :GOTO 470
530 IF I4="DOWN"AND Y<24 THEN Y=Y+
  5:IGOTO 470
540 IF I4="F1"THEN 100
545 IF I4="HOME"THEN X=8:Y=8
  :GOTO 470
545 IF I4="F5"THEN RF=1:GOTO 490
547 IF I4="F6"THEN RF=8
  :GOTO 490
550 IF I4="F7"THEN CC=CC+1
  :POKE 53288,CC:I4=""IGOTO 480
551 IF I4="F3"THEN BC=BC+1
  :POKE 53281,BC:I4=""IGOTO 480
555 A=ASC(I4):IF A<30 OR A>127 THEN
  490
560 I=ASC(I4):GOSUB 610:Z2=C
  :IF RF=1 THEN Z2=Z2+120
565 POKE FN+X+1,22:I=X+X+X(I)
  :Y=Y+Y(I)
570 POKE FN+X+1,22:POKE CT+Z2,CC
  :SYS 48195,X(I),Y(I):IGOTO 470
610 F=C+(I-31)AND(1-84)24+(I-30)AND(
  1-82)36+4+(I-19)3AND(I-224)1+120
620 F=F+(I-19)59AND(I-192)36+11+235
  :X=I
630 IF F=1 THEN C=1:RETURN
640 C=1+F:RETURN
650 FL=1
660 PRINT CHR$(147)";LOAD FILE(DOWN)"
670 INPUT"FILENAME"=F14
  "
680 LOAD F14,DE,1
690 POKE 53288,10:FOR I=48000 TO 49120
700 POKE I,30:NEXT
710 FOR I=8 TO 3554:POKE 48480+I,1:NEXT
720 GOTO 100
730 PRINT CHR$(147)";SAVE FILE(DOWN)"
740 INPUT"FILE NAME"=F14
750 SYS 53250,F14,DE,2,48485,49150
760 GOTO 100
770 PRINT CHR$(147)";CHANGE DEVICE
  (DOWN)"
780 INPUT"DEVICE I..CASSETTE:SPC3
  0..DISK"=DE
790 GOTO 100

```

**PROGRAM: JCDN DRIVER**

```

1 DATA 76,82,283,76,41,283,76,76,283,
  129,189,49,141,29,3,189,234,141,21,
  3,89
2 DATA 173,21,289,41,234,141,21,289,
  55,32,76,283,128,189,283,141,28,3,
  189,283
3 DATA 141,21,3,89,99,189,8,189,129,
  283,153,84,3,289,24,192,83,144,244,
  129
4 DATA 21,289,9,1,141,21,289,189,13,
  141,246,7,189,189,141,212,3,141,
  214,3,141
5 DATA 8,289,141,1,289,189,8,141,212,
  3,173,18,289,41,254,141,18,289,189,
  1,141
6 DATA 39,289,99,8,8,8,8,8,14,8,8,28,
  8,8,36,8,8,112,8,8,224,8,112,192,8,
  59
7 DATA 192,8,31,224,8,21,248,8,31,248,
  8,83,252,8,127,252,8,255,252,1,255,
  248
8 DATA 8,255,248,8,127,224,8,83,8,8,
  38,8,8,12,8,8,8,8,8,238,29,289,
  173,33
9 DATA 289,41,15,141,29,289,173,8,229,
  41,21,141,215,3,281,91,248,189,24,
  129
10 DATA 3,289,214,3,24,129,3,238,214,
  3,24,129,18,72,56,179,212,3,239,1,
  141
11 DATA 212,3,173,212,3,233,8,141,212,
  3,184,24,129,15,72,24,173,212,3,
  283,1
12 DATA 141,212,3,173,212,3,189,8,141,
  212,3,184,179,212,3,41,18,141,212,
  3,129
13 DATA 212,3,141,8,289,173,214,3,241,
  1,289,173,212,3,289,11,173,18,289,
  41
14 DATA 254,141,16,289,76,76,284,173,
  18,289,9,1,141,18,289,76,43,234
20 REM
21 FOR I = 32000 TO 32296
22 READ X: T=I+8: F=I-X: NEXT I
23 IF T=32876 THEN PRINT"ERROR IN
  DATA"
24 REM*****
25 REM*(SPC3) JCDN (DRIVER SPC3) *
26 REM*(SPC4) REM 1983 (SPC3) *
27 REM*****

```

# EPILOG-1

## CARTRIDGE SYSTEM

COMMODORE 64 and 128  
LOAD PROGRAMS FAST!



- Are you spend ages finding your Resources/Program?
- Are you fed up waiting tapes back and forward?
- Do you want to find and load program fast, instantly and automatically?

It can be done! A unique user-friendly system now allows you to automatically store tapes or magnetic disks programs in 104 cartridges. A special master system is provided which can erase the cartridges for reuse.

**EPILOG-PACK** (includes you get 4 104) **SYSTEM** (removable cartridges) - £29.95 each or £249.00 for pack of 4 (plus 40% P&H)

**SIRCAL INSTRUMENTS (UK) LTD.**  
11 Southfields Court, Sutton Common RD, Sutton, Surrey SM1 3RU  
Telephone: 01-844 0861. Telex: 3083 TO SIRCAL G

**EPILOG-1 SYSTEM PACK INCLUDES:**

- Cartridge Programmer
- Cartridge Eraser
- User-friendly Operating System
- Spareable Cartridge



# BINDERS

FOR YOUR VALUABLE COLLECTION OF YOUR COMMODORE MAGAZINES  
"SMART" EASY TO USE  
"TOP QUALITY"



To ASP Readers Service, PO Box 35, Watley House, Watley Road, Hemel Hempstead, Herts HX1 3SS (0462-41121)  
Please specify the number of binders (100, 250, 500) and the number of magazines to be bound. Please specify the magazine title and issue number. Please specify the number of copies to be bound. Please specify the number of copies to be bound.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Please allow 14 days for delivery.

# TELETEXT

A world of information at your fingertips

The Microtext teletext service gives you 24 hours a day access to a vast range of information. It's the only service of its kind in the world. It's the only service of its kind in the world. It's the only service of its kind in the world.

Access the service and transfer messages to your home or office. It's the only service of its kind in the world. It's the only service of its kind in the world. It's the only service of its kind in the world.

0167 888 000  
Name: \_\_\_\_\_  
**MICROTEXT**  
T Bird's Place, Hemel Hempstead, Herts, PG8 9PW  
Tel: 0462-888004

# Plus/4 and C16 owners

# WIN an AMIGA!

## Buy...SCRIPT/PLUS

ONLY  
**£19.95**  
including VAT

### PROFESSIONAL WORD PROCESSOR

Suitable for typing letters, reports, student essays, business forms, etc. Quick and easy electronic storage - no retyping - just edit and print out.

- From the authors of Easy Script - easier to use - more powerful - more facilities.
- Works with DISK or TAPE.
- Robust clip-on cartridge - uses no memory - loads instantly!
- Full featured system has all editing commands, disk commands, print preview, row and column arithmetic, mail merge, and on-line help screens.
- Works with all popular printers.

### FAR SUPERIOR TO PLUS/4's 3-in-1 WORD PROCESSOR

Also available

### CALC/PLUS

- Spreadsheet with 254 columns and 63 rows
- Cartridge
- Disk or tape
- Bar chart facility

**£19.95**

INCLUDING VAT

WHILE STOCKS LAST

PARASOFT LTD

6 Park Terrace Worcester Park  
Surrey KT4 7JZ Tel: 01-330 6911

### ORDER FORM - CLIP AND POST

● Buy Script/Plus by 30 Nov 86 to enter in the Amiga prize draw - details with your purchase.

- Please send \_\_\_\_\_ Script/Plus @ £19.95
- Please send \_\_\_\_\_ Calc/Plus @ £19.95
- Please send \_\_\_\_\_ Script/Plus with Calc/Plus @ £34.95
- Add 75p P&P per item

Cheques payable to Parasoft Ltd

Access  Visa Card No:

Signature \_\_\_\_\_ Expiry date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Dispatch within 24 hours where possible but please allow up to 28 days.

10

# Game of the Month

**Stuart Cooke finds himself under attack with CRL's latest release TAU CETI.**

TAU CETI HAS BECOME A PLANET OF runaway robots. It is a totally desolate of human life and the planet's automated defence systems prevent anyone from going home.

In their infinite wisdom the powers that be have decided to send in an armed ground-skimmer to shut down the planet's fusion reactor which is in the capital city, Central, this means that the defence systems would stop working and minimal damage should occur to the buildings on the planet.

Of course before they can send the skimmer to the planet they must find a pilot stupid enough to take on this mission. Guess who volunteers, yes you've guessed it, you.

The game starts with a view of your skimmer's control panel, with your docked with your landing ship.

The skimmer operates in two modes landed mode and flying mode. When in a building or resting on the ground you are considered to be landed and can use your on board computer to examine maps of the city, or, if docked with the correct type of building, re-stock your ship with essential supplies such as fuel and missiles.

Once you launch from the landing ship, you're on your own. Your job is to dock with buildings scattered around the various cities and collect cooling rods which will eventually allow you to shut down the reactor. Oh! don't forget that whenever you are flying around in any of the cities the defence systems are out to get you.

Travel between the planet's cities is made possible by a series of jump pads which are present in the cities. All jump pads will take you from one city to another. You can see where any particular jump pad leads by landing and going into map mode, which will display a map of the planet. Then, ask for info on a specific city. The picture of the map will enter into the city that you require showing you its position and the names of the cities around it. You will then be given specific details about the city, such as how heavily it is defended and where each of its jump pads lead.

On your travels around the planet



you will come across the following types of building. The reactor itself, the substations in each of the cities, civilian supply centres, military supply centres, foreman and control towers. Docking is possible with many of the buildings so that you can go inside and use the LDDK command to see if there are any objects around, but I wouldn't suggest going too close to the Fortresses or the Control Towers as they are sure to start shooting at you.

Control of your ship is extremely easy, even though there are 17 different keys. At any one time you will probably only use speed-up, slow-down, left, right and fire and all of these are available from your joystick. Other keys are quite easily found as you simply press P for fire, I for land, M for missile etc. If you don't like the keys you can always re-define them when landed.

Your view of the planet is through a small viewing window at the top left of the screen. This shows you all of the buildings in 3D getting larger as you move towards them. What makes life even more difficult is the fact that they gradually blend into the background as

the sun sets. Before you know it, you could have suns heading into the side of a building. Don't worry too much though as your ship is supplied with flares which will light up the sky and an infra-red system which will also make life a little easier.

Not only do you have to worry about the buildings shooting at you but you are bound to come up against some of the planet's mobile defences. These are mainly Hunters mark I, II and III. These are really flying saucers that have a habit of creeping up on you from behind.

Tau Ceti can be looked at from two different angles. Firstly you could say that it was a shoot'em up, since you can gain points by simply flying around and blowing everything in sight. On the other hand you could also describe it as an adventure since the instructions don't tell you about everything you meet and a lot of the time you will have to figure things out for yourself.

Tau Ceti is an extremely fast game with excellent graphics and more than a few surprises in store. If you fancy being the saviour of a planet yet again go and give it a whirl.

# A Flash Of Genius!

## THE NEW 64 MULTIMODEM

**GIVES YOU DATABASES, BULLETIN BOARDS, ELECTRONIC MAIL, PRESTEL — ALL ON YOUR COMMODORE 64 OR 128**

At last! The perfect modem for your Commodore™ 64 or 128, giving you access to Prestel™, Micronet™, videotex and a host of other services — plus user-user communications. It couldn't be simpler. The 64 Multimodem has auto-dial and auto-answer, with all communications software on-board in ROM. 64 Multimodem fits your Commodore's cartridge port, and has just one external connector — the telephone lead.

The 64 Multimodem is menu driven and multi-speed, with CCITT V21/33 and Bell 103 standards, handling baud rates of 300/300, 1200/175 and 75/1200. Functions include save and print frame and auto-mailbox with edit and save.

Buy your 64 Multimodem now and we'll give you free introductory subscriptions to Micronet and Microtel — an unbeatable package at an unbeatable price — it's pure genius!

**£98.50**  
(exc)



Approved supplier for

Buy in bulk made at the manufacturer's price.

From the Communications  
Powerhouse



# MIRACLE TECHNOLOGY

MIRACLE TECHNOLOGY (UK) LTD ST PETERS STREET IPSWICH IP1 1BB ENGLAND  
(0473) 216141 8 LINES TELECOM GOLD 79 KEY 001 (Dealerlink 72, DTB 10135)  
946240 CHEASY G 16002585 PRESTEL MAILBOX 519992285

send to:  
Commsense Support, Miracle  
Technology (UK) Ltd,  
St Peter's Street, Ipswich IP1 1BB

please flash me  
64 Multimodem/s  
@ £115.35 inc VAT & tax delivery

I enclose cheque/postal order  
please debit my Access/Visa

card no: \_\_\_\_\_

name: \_\_\_\_\_

address: \_\_\_\_\_

postcode: \_\_\_\_\_



# BASIC

# COMPILED

## Allen Webb with a round up of basic compilers now available.

MANY COMMODORE 64 USERS ARE happy to program in Basic but perhaps become a little unhappy when it comes to the speed of execution. The alternative of learning a new but faster language won't appeal to all computer owners as a way of speeding up Basic is required. Enter the compiler.

In this article I want to do two things:  
1) Explain how compilers work and suggest why you might need one.  
2) Comparatively review some of the compilers currently available.

### Basic faults

First, let us consider what is wrong with Basic. Two real drawbacks arise:

- 1) It's bulky.
- 2) It's slow.

Why is it bulky? Consider the simple line:

```
10 POKE 1004,23-Y*124*(X)
```

If you look at how this line is stored in memory, you get the following picture (please note that all numbers are in hexadecimal):

```
17 08 EA 80 9F 39 38 32 34 3C 32 3A 99 81 C0 28 98 29 0 0 8  
link line POKE 1 0 2 4 . 2 5 : Y = 124 * ( X )  
byte number
```

As you can see, Basic is stored as a series of numbers. Keywords such as POKE are stored as a single token and numbers and other characters are stored as ASCII values. The link bytes point to the start of the next line and the line number is stored as a 16 bit number, in all, very RAM hungry.

When a Basic program runs, the interpreter scans each line in turn and checks the byte sequence according to the syntax rules. Tables help to convert

a token to the start address of the ROM routine. This all takes time. The real crux here is that this process is repeated each time a line is executed. The process of examining the line and sorting out the routine to execute is called compilation.

The obvious way of speeding up matters is to perform compilation once only and leave it at that. Since the only real virtue of having an uncompiled program is that you can fix and edit the program, once a program is finished,

you don't need to fix or edit it. This affords fundamental ideas behind compile languages such as FORTRAN and PASCAL. These use an editor to allow you to write and edit a source code. Once it is written, the code is compiled into a fast but uneditable object code.

So how do compilers improve performance? In simple terms, the code is converted into a simpler form. Key words are converted to jumps to machine code routines, variables are rationalised and unnecessary trivia such as link bytes are removed. The result is a machine code program rather than a lump of meaningless code which needs translation. Most compilers use a library of routines. This is tacked on to the end

Table 1: Benchmark 1

	Size (kbytes)	Speed (seconds)
Basic	1	-
BBB	24	8.8
IFN	24	4.7
EP		
Laaser		
INT	21	6.7
EP	12	1.8
Basic 64		
IFN	22	7.8
EP	12	3.8
ASC	28	12.9
Fastspeed		
INT	18	8.8

Table 2: Benchmark 2

	Size (kbytes)	Speed (seconds)
Basic	1	9.18
BBB	25	8.67
Laaser	32	8.77
Basic 64	22	8.7
Fastspeed	18	8.65

Table 3: Benchmark 3

	Time seconds	Speed increase
Basic (BNT)	13	-
Basic (PNT)	7	5
Laser (BNT)	7	5
Basic 64 (BNT)	7	5
Basic 64 (PNT)	1.4	8.5
Jetpack	1.62	7.4

Table 4: Benchmark 2

	Object code size (bytes)	% size reduction	compression (%)
Basic	25788	-	-
Basic	23881	91	69.5
Laser	28617	111	69
Basic 64	28825	104	82
Jetpack	31258 (34761)	96	69

of the compiled code. For some reason (possibly after the system used in PASCAL), this library is generally called p-code.

In this article, I will refer to the starting Basic program as the source code, the compiled Basic as the object code, and the tacked-on library as the p-code.

Because a lot of unnecessary garbage has been eliminated during compilation, the object code is smaller than the source code. Since, however, you have the p-code tacked on at the end, the object code may not be smaller than the source code. Generally, small source code will be larger on compilation and large programs smaller. Consider a hypothetical compiler which gives 60% compression and has an 8K p-code block. If the source code is 3 kilobytes in size, the object code size will be 480 in size. The size of complete compiled code will be given by:

$$\text{size} = X + .65 + 8$$

After a bit of algebra this equation can be solved and shows that any source code less than 22.9K is larger when compiled and any above 22.9K is smaller. As I will describe later, there are exceptions to this simple system.

An additional bonus is that compilers can allow extra tricks. Some, for example, allow illegal integer loops. Benchmark 3b is illegal in Basic but can be compiled and used.

As far as I am aware, there are five compilers currently on the market. While I have used all five, I can only comparatively review four of them. Generally, compilation is more easily achieved if you have a disk drive, but there are two cassette compilers around.

I will now take a brief look at some compilers.

### Basic (Disk Only)

This disk based compiler of German/Austrian origin is available from Supersoft. A customer version called MiniBasic was distributed by the now defunct STACK computers and may still be available.

Basic is the most tolerant of the compilers tested in that it will accept most Basic extensions. It also gives the most compact complete. In spite of it being rather long in the tooth, it's my favorite.

Basic attempts to convert all variables to integer unless a floating point value is used or if the variable is out of the integer range.

### Basic 64 (Disk Only)

Another continental product, this compiler is distributed by First Publishing. It's the most versatile of the lot. Two "optimizers" are offered. One is purely floating point and the other integer. These both use p-code. A machine code option is available with the integer optimizer. I don't know how this is different to p-code but it gives faster albeit bulkier object codes. Lots of other options are available catering for all possible needs. Basic 64 tends to be rather slow when compiling with continuous screening of the disk. The other remarkable feature is the extremely obscure instruction basic. I know it's a translation from German but it's really not good enough.

### Laser Compiler (Disk and Cassette)

This product is marketed by OCLAN/DASIS and is provided as a

complement to the earlier products Basic Lightning and Laser Basic. These are two extended Basic's offering excellent graphics facilities. In addition to offering a dedicated compiler for these products, there is also a compiler for normal V2 Basic. I shall be looking at the normal compiler only. Both floating point and integer options are supported.

The product is available to those without disk drives, which is a nice bonus. I found the compiler rather pedantic and it certainly doesn't recognize any Basic extensions. Additionally, I experienced one or two inexplicable crashes when naming compiled codes. This is scary of this and is looking into it. Laser is the latest when compiling. When dealing with small programs, all compilation takes place in the machine. This is a nice touch that other compilers could mimic.

### Jetpack (Disk Only)

This is another well known compiler which, at one time, was distributed by Commodore. It is now being distributed by System Software. While being extremely pedantic when compiling, the resulting object codes zip along at quite a bit. No Basic extensions are supported but it seems to handle most programs without coughing. Another color bit bonus. The fact that Jetpack has been re-released at a price below £20 should add to its appeal.

### Jetpack (Disk and Cassette)

I have seen this compiler quite some time ago but don't have a copy so I couldn't test it. Jetpack is produced by ST, who came up with a pretty good compiler for the PET. Again, cassette users will probably want to look at this one and the low price will be an attraction.

Comparison is not easy. I shall use a number of benchmark programs to get some quantitative data and then make a qualitative assessment.

Benchmark 1 simulates a commonly encountered situation. We want to fill the screen with a specified character. Two versions of the benchmark were used. Version 1a tests a simple loop and 1b tests a normally illegal integer FOR/NEXT loop.

```
Benchmark 1a
5 TH="00000"
10 FOR I=10000 TO 8000
20 FOR J=12/NEXT
30 PRINT I
```

```
Benchmark 1b
5 TH="00000"
10 FOR I=10000 TO 8000
20 FOR J=12/NEXT
30 PRINT I
```

The results were as shown in Table 1.

The abbreviations have the following meanings:

**BM:** integer FOR/NEXT loop used  
**RV:** integer variable used  
**FP:** floating point variables  
**MC:** Basic 64 claims a machine code mode which is faster than its p-code mode.

So what does this first bench mark tell us? Since the source code is of minimal size (less than 256 bytes), the size of the object code is near enough the same size as the p-code overhead. That being the case, there is little to choose between Blitz (both integer and floating point), Basic 64 (all modes) and Laser (integer mode). Petrosed and the Laser floating point modes are somewhat larger.

In terms of speed, there is an obvious increase when using integer instead of floating point. This is inevitable since floating point routines are slow. Floating point is also wasteful in memory use. Petrosed and Blitz gave the fastest performance although the Basic 64 machine code mode was best of all.

Benchmark 2 doesn't tell us much about the compilers other than show how slow floating point routines are (Table 2).

#### Benchmark 2

```
5  T%=0000000
10 FOR I=0 TO 1.5 STEP.02
20 Z=FN(I)*Z+COS(I)
25 NEXT I
30 PRINT I
```

These figures suggest that Blitz and Petrosed have the edge but only by a slim margin.

The benchmark 3 attempts to simulate a real situation. Here we use a bubble sort to arrange 99 strings in alphabetic order. The time to perform the sort is monitored.

#### Benchmark 3

```
10 DIM A$(99): X=RND(3)*PI
20 FOR S=1 TO 99
30 FOR T=1 TO 99
40 A$(S)=A$(X)+CHR$(RND(3)*256+90)
50 NEXT T
60 PRINT A$(S)
70 NEXT S
80 T%=0000000
90 B%=0
100 FOR I=1 TO 99
110 IF A$(I)<A$(I+1) THEN X=I
120 I=A$(I+1): A$(I)=A$(X): A$(X)=I
130 NEXT I
140 IF I=99 THEN 90
150 T%=T+1
160 PRINT:FOR I=1 TO 99
180 PRINTA$(I)
190 NEXT I
200 PRINT"ELAPSED TIME = "T/60"
    SECONDS"
```

Table 3: Overall comparison

	Basic 64	Blitz	Laser	Petrosed
Speed (BM)	1	2	4	2
Speed (FP)	1	2	4	1
Overall Size	1	1	4	2
Reduction	4	2	3	1
Compression	2	1	4	4
Basic Extensions	1	2	4	2
Options	1	2	4	2
Reliability	3	1	4	2
Speed of compilation	4	2	1	4
Cost	3	2	2	1
Documentation	4	2	2	1
Overall position	3	1	4	2

The results are shown in table 3. This time Blitz, Laser and Basic 64 in integer mode were pretty well identical. Basic 64 in machine code mode and Petrosed performed well.

One final check to be made was a comparison of compression where compiling a large program for this purpose. I created a synthetic program of about 266 in size. Table 4 shows the effect of compilation.

This table requires a little explanation. Petrosed saves the object code with a complete set of variables. While this is the largest space the program will ever occupy, it is an additional overhead. I have estimated the space occupied by the variables and have put the estimated size of object code plus p-code in brackets. The second column gives the difference between the size of the object code plus p-code and the source code. The last column gives the difference between the object code and the source code and is a direct indication of the degree of compression.

Clearly, Blitz gives the greatest overall size reduction and Petrosed the worst. In terms of compression on compilation, there is little to choose between Blitz, Laser and Petrosed. I haven't included Basic 64 in machine code mode since it gives bulky object code with large source codes.

OK, it's time to say which compiler is best. Being a bit of a coward, I will not fully commit myself since different users seek different attributes. To help comparisons, I have used a well known ranking tool. Table 5 shows a number of criteria, the performance of each compiler has been scored in order of performance (best, forward). The total score is a simple sum of the individual rankings. In reality, of course, different criteria will carry different weighting. Thus, I'm afraid you must place your own priorities.

Reliability is an odd parameter which I've included to add a subjective element. It reflects how readily a compiler handles any program, whether

it gives unexpected errors or crashes and general usability.

Well there you have it. Despite being long in the tooth, both Blitz and Petrosed are still pretty good. Basic 64 is incredibly versatile with lots of features and it can often very fast integer programs. When it comes to program size, floating point speed and documentation, it's not quite there. As a Basic compiler, Laser isn't quite up there either, but most users will buy it since it compiles the excellent Oasis extended Basics. It will therefore earn a piece of the market share that Basic alone.

I want to finish with some comments for our friends with Commodore 128. You'll be pleased to hear that there are two compilers for you. Since you don't have a 128 I haven't tested them. You should not, of course, assume that the performance of these compilers in any way reflected by the above since we are dealing with a different machine using a different Basic, the following comments are based on a reading of the instruction booklet to take heed!

#### Petrosed 128 (Disk)

The compiler appears to support most of basic 7.5. There are one or two oddities but these aren't much of a problem. There are a number of enhancements not covered in the 64 version. These include option long variable names, Basic extensions and improved file handling. The p-code overhead is about 118, and the break point at which you achieve compression on compiling is about 208.

#### Basic-C128 (Disk)

This is the first Publishing upgrade of Basic 64. It appears that all of the Basic 64 options are supported. In addition, some enhancements are offered. It appears that the compiler uses its own floating point routines giving a claimed five fold increase in speed. If this is the case, it is an important and valuable feature.



# FIRSTLINE SOFTWARE

Your firstline  
of supplies

SUITABLE FOR  
COMMODORE  
MACHINES

## Disc Drive Summer Sale

Enhancer 2000

free bundled software...

**£115** + VAT



- \*Commodore compatible
- \*Super high speed
- \*1 year warranty
- \*Exceptional durability
- \*Double density 5 1/4", 35 track
- \*Direct drive spindle motor
- \*Does not use any computer memory
- \*Slimline vented case

**FREE SOFTWARE**

Masterwriter

worth £50, icon driven word processor —  
premium quality special import from the USA

All for **£115**  
add VAT  
and £5 p+p

**5 1/4" Floppy Disc SALE**

- \*100% certification
- \*top quality
- \*lifetime guarantee

10 pack  
**£9.99**  
p+p 50p

- \*double sided
- \*double density
- \*Incl. VAT

● Enhancer 2000 all-in price £137.50

● Send cheque (R.E.Ltd.) or  
phone Access on 0480 213969

● 1 day express mail — £5 extra

R. E. Ltd.  
206 Great North Rd.  
Eaton Socon, St. Neots,  
Combs. PE19 3EF.



**Don't queue — Be first in line with FIRSTLINE**

**SAVE:SAVE:SAVE:SAVE:SAVE:SAVE:SAVE**

Lowest Price — Best Service

## FINGERS MALONE

Mastertronic £1.99 C-16

5 9 7 9

IF YOU'RE LOOKING FOR an arcade game which is addictive, fast, colourful and very exciting then you have to buy this.

It's a really basic platform game with a few tricks but it had to tear myself away from it to come and write this review.

You have to collect keys, avoid menacing subcases and open a safe before dashing to the exit to get to the next of the 15 screens.

It's incredibly frustrating because it's very easy to die but having said that there's no way that you can leave it alone until you've achieved a

certain level and then you'll be itching to get back to it to improve on your performance.

The colours are pretty making the screen extremely attractive to look at and there are one or two quite good sound effects.

This game is not for those who relish intellectual pursuits but if you want something which will keep you occupied for a couple of hours without straining your gray cells then you couldn't do better than go and buy this. Good fun at a very good price. **M.C.**



## STREET OLYMPICS

Mastertronic £1.99 C-16

3 4 5 4

IF YOU'VE EVER SEEN Summer Games then you'd better not have a look at Street Olympics because the contrast would shock you.

I know it's a budget game but I have to say that there is very little in the way of enjoyment here.

There are four events at which you can try your hand and all of them are basically the same. The sprint merely involves running along a very repetitive Cartesian Street type road. The faster you go, the more you get to the record and that's it.

The jogging event is absolutely identical so it's

probably best to miss out that option and go on to the next one which is jumping.

This is the same as the sprinting and jogging except that you have to leap the old brick wall every now and again.

The throwing is a variation on the same theme except that when you stop running you have to throw a ball.

This kept my attention for a maximum of five minutes, and although buying it wouldn't break the bank, I couldn't recommend it, sorry, Mastertronic.

**M.C.**



## BEER BELLY BERT'S BREW RIZZ

SN Gold/American £1.99 C-16

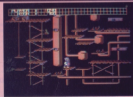
5 7 5 5

THIS GAME IS SET IN A brewery as the title may suggest to you, and the central character is another fat purple alcoholic who explores the brewery presumably in the hope of getting a free drink at the end of it.

There are several sections of the game but all are fairly similar. I'm sorry to say, it's a platform and each screen has to be completed in order to progress to the next these are various walls which get in your way and you have to pick up objects in order to remove these obstacles.

I can't say that it was particularly addictive since I've seen a lot like this before and in all of them the graphics have been better and they have been far less tedious to play. Beer Belly Bert is not very agile, I suppose it's something to do with the state of his liver. He seems to find it a little hard to move around but that's not really surprising with his figure. Judging by his colour he hasn't got long to live because if the alcohol doesn't get to him first then the high blood pressure certainly will.

**M.C.**





## TIME TRAX

Mind Games 19/91 C&A



IN A BUNKER AFTER A holocaust, one survivor, your honourable self, is being lured by another survivor (a, with Winterbottom M&S, lucky he dies so that you are left in peace, however, not before he's had time to tell you about what the Dark Ones are getting up to these days.

Unfortunately, at this point in my reading of the instruction booklet, I became thoroughly confused because Mind Games had already spent 'graphics' in two different

ways and I wasn't sure whether I dared read on to find out if there were yet more ways of spelling this complicated word. I solved it by assuming that every word beginning with 'F' meant the same.

The Eight Minch, who seem to represent God, in this god-vert evil simulation, have lost their most treasured possessions. You have to find them and restore them to the good ones while avoiding the forces of darkness. These items are scattered through-

out time and you must utilize the flashing time portals to enable you to address this wondrous feat. There are various different ages in which you can find yourself including Billerdays, Holocaust, Ice Age and Dawn of Man. These are all pretty good inspiring and there are an awful lot of frightful creatures which will make sure that you never get where you want to go.

The time portals have a very nasty habit of disappearing just when you want to use them and then you have to hang around for a while waiting for a new one to appear.

A lot of this may sound as if I didn't like the game, and that's not true at all. It's merely very frustrating and fairly complicated to get started. Once you have managed to get on your way then it becomes very interesting and although this can take a while it is actually worth it.

I would recommend that you read the instruction booklet a couple of times before you even load up Time

Trax. It's only about 18 pages long. Even when you've done this you'll find that you have to keep referring back to it until you have a good grasp of what's going on.

Your list aim should really be to get yourself a weapon and some ammunition as there isn't really much you can do without the amazingly essential sword. Possible weapons are pistol, crossbow and sword and their respective ammunition is bullet, bolt and gem. Without these you won't get far but at least you'll be able to enjoy the spectacle of yourself as a white robot angel rising up into the cold blue yonder.

As graphic adventures go, it's got a lot of qualities. Your energy is indicated by a red heart in the bottom left of the screen which gradually drains of colour as your life blood runs out. Good bit graphic.

If you're the sort of person who wants to spend a lot of time over a game then I believe that you will enjoy this. There's quite a lot of variety and it is tricky too.

M.C.

## THE STANDING STONES

Artisoft 1989 C&A



BOUND ABOUT THE TIME of King Arthur, Merlin, the famous magician decided to throw a party to end all parties. So successful was it that most nearly hours later, all the guests were still sleeping soundly having eaten and drunk far too much. All the

guests that is apart from one. For a certain Karamaz, the sticky fingered one, was busy stuffing away as many silver spoons and plates as he could fit into his hat.

That was bad enough, but it was the fact that he also took the Holy Grail and the

magic sword localiser that annoyed everybody most of all. Merlin promised revenge and offered great fame and fortune to anyone who could recover the items. Lancelot too promised to help in whatever way he could. And so all that was required was a brave knight to venture into Karamaz's dungeon beneath the magical Stonehenge and recover the treasure.

Your knight has five different traits which determine his character. Vitality determines your strength and ability to carry treasure. Intellect is important for spell casting of a magical nature while boldness is more concerned with clerical spells. Agility is a measure of luck picking up items at general speed of mind and body and initial hits is an indication of how much damage your body can suffer. The points are

randomly determined but you get the opportunity to change the whole set as often as you want until you end up with a decent series of numbers.

You will need to save your character frequently and can have up to 16 knights stored on disk. One slight problem is that the disk supplied has no write-protect notch cut in the side, so unless you cut one yourself, you cannot save anything! The Standing Stones is quite fun to play although it looks very dated now (it was written back in 1981). There are several more sophisticated role playing games on the market (notably the Ultima series) but this one is very easy to get into and may well pass away as little more when you are looking for something not too demanding.

C.B.S.

## TRAP

Alligata C-75 CW



ONE OF BRITAIN'S BEST known programmers, Tony Crowther, started his career working for Alligata a few years ago. After many wanderings, events have now turned full circle and he is back where he started from. Alligata has always claimed that his best work was written there and his latest game would appear to prove the point. Trap is quite simply one of the best shoot-'em-ups that I have seen and seems classed from almost every genre.

My initial reaction to playing the game was that it looked like a thinking man's Zaxxon. The appearance is that of a scrolling screen (although it scrolls vertically and not diagonally). You fly through gaps in walls, missing everything in sight, but there is a lot more to it than that. Down in the bottom right hand corner is a small table marked A, B and I, together with some numbers. These indicate the number of aliens, boats and lasers that will remain to be destroyed before you are allowed to land. An exclamation mark in one of the columns indicates a figure of more than 9.

Success in shooting the necessary numbers and the background changes colour to red allowing you to land your craft and continue your mission on foot in a space version of commando. But more of that anon.

Before you can start eliminating aliens and lasers, you must first negotiate your way through a field of space mines. There are no points to be scored for blasting them, you only do it to clear a path for yourself but even so, careful flying is necessary as one slight collision takes you back to the start minus one of your lives. Control of your ship is quite straightforward being left and right, accelerate and brake. Fire shoots a missile and pulling back on the joystick and firing simultaneously drops a bomb. There are also keyboard options if you don't like using a joystick.

Bombing is necessary for destroying boats and fuel dumps on the ground. Your ship won't fuel at an alarming rate and if you don't pick up

extra by bombing dumps pretty quickly, you find yourself hyperoxygenated to level 10 where your chances of survival are, to put it mildly, minimal. Also worth looking out for the ground are the eyes. These act as radar systems and mark the point of your intrusion. If you don't take out the eye quickly enough, you must fight off a variety of gunfire craft although there is a help bonus if you shoot all of them.

If things really get to be too much for you, you have a smart bomb at your disposal which instantly destroys everything on the screen although the bills are not credited to your list of things to be shot. One final way of destroying something is by doing it backwards! By careful manoeuvring, you can dispose of an enemy craft by using the flames of your engine.

Whilst you are busy shooting everything that moves, you must still pay attention to where you are going. Some parts of the superstructure are taller than others and an accidental collision can have disastrous effects. Watch for the dark shadows. There are various types of alien craft, all of them hostile, some of them indestructible and all doing their utmost to remove you from the scene. One that is especially worth looking out for though is the cargo ship. Blast this and its cargo is released into free space. Collect the cargo and then drop it to the little men that are wandering about for a bonus life.

When you have landed your craft, your little pilot gets out and you can start blasting everything on foot making sure that you don't get killed or fall down one of the holes. There is a method in the apparent madness for you are searching for orbs, the local currency. Up to four can be carried at once (arguing points just state you bonus points) and they are used to buy yourself a bigger and better ship. When you start the game, you have no choice as to what craft you use. If you have some orbs to spend however,



then you have access to different models. These give you different armour capabilities, rates of fuel consumption, cargo carrying potential and recharge time between jumps. Which ship you choose is dependent on your own personal taste and is limited only by what you can afford. Should you have the misfortune to get hit or walk off the end of the platform, then you return to the beginning of the level although you do not suffer the added indignity of losing a life.

Everything about Trap is well thought out. The graphics look stunning, even the instructions show the pages of a book turning as they display the different types of alien craft that you are likely to encounter. The game itself plays exceptionally well and possesses that indefinable little something

that makes you want to have "just one more go." There is even a hidden demo mode but as we are under strict instructions from Alligata, you will have to find this for yourself. It lasts for about seven to eight minutes and is the music for the game with a character reminiscent of those huge, bald convicts that they have in all the old films about galley slaves where he does nothing but beat his large drums in order to give the rowers a rhythm. The music is highly atmospheric and there is also a stress icon for you to play and learn about.

If Trap is going to be the standard of products from the Tony Crowther/Alligata partnership, game players everywhere will be hoping that they stay together for a long time.

G.R.H.



## GHOSTS 'N GOBLINS

File: C64 • joystick



I FOUND THE ARCADE version of *Ghosts 'n Goblins* to be an extremely easy way to lose money very quickly, and I'm pleased to see that the computer version is just as demanding.

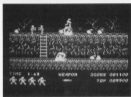
The object of the game is to rescue yet another princess from an evil wizard who has summoned goblins and demons to thwart your knight in shining armor who is in quest to free the unfortunate young lady.

The instructions with the game are minimal and I feel that a little more help would have been useful. As it stands, you will have to play through

many screens advancing your knowledge little by little.

Each knight has two chances to succeed. The first time that he is hit by one of the creatures he loses his shining armor and ends up dashing around in a loincloth until he can regain his armor. His weapons change too as he fights better equipped demons and takes over their arms when he defeats them.

I loved this game but it is very, very difficult to play. Even the first screen is difficult and the hosts of ghosts and goblins will overtake you in seconds.



Leaving your knight as a pile of bleached bones.

E.D.

## THE LAW OF THE WEST

US Gold • C64 • joystick



ANYBODY DRESSED UP AS a bank is the best description for this game. The graphics are superb but the game's style is as old as them: that's all.

As sheriff of (USA) Gold Gulch a man's gotta do what a man's gotta do, and all this man's gotta do is survive and sweat. In a frontier town like Gold Gulch that ain't easy.

All manner of drunks, hombas and wisemin folk cross the path of the lawman from sun up to sun-down and some of those are mean gunfighters. Everyone lives off a knife edge and a line of smooth talking is needed if you're going to avoid any early trip to Boot Hill.

Even the Doc's like a bear with a sore head. Him and liquor ain't no strangers and at a morning he sure needs to be handled gently 'cos you're gonna need him before long.

All day long them Dalton are trying to rob the bank, hijack the stagecoach or make off with the railroad payroll. Just one dare thing after another. If your draw ain't as fast as a rattler strike you're deadlier than a night in Milton Keynes.

Strangers keep drifting into town and you never know what's on their mind. Take the Mexican kid, he's got so many notches on his gun it looks like a lanky piece of

network and get a nice guy I've never met, if you know how to handle him.

Miss Rose from the saloon and Miss April the school-ma'am are poles apart but behind this hard steel badge beats the tender heart of a lonely lawman and I know I'll have to make up my mind one day but all that...

The first time I played this game I was impressed. The animation of the graphics looks almost like a cartoon but each time you play the story is very much the same. Each time a character appears you have to select a response to their opening gambit from four alternatives which range from the skilful jockey to the meekest samurai who ever walked. Their response depends on the tone of your conversation and if you're not careful you'll have a fight on your hands.

When you draw the characters wandering about in the distance run for cover. A gunfight appears and you must lead it to your target. The graphics of the lawman's right arm as you wave his gun around are a higher calibre than a Remington shotgun. This part of the game does bring out the worst side of human nature. When a child with a secret appeared on the screen as I was playing the game in the office, a chorus went up of "shoot the kid!"



and who am I to disappoint such an appreciative audience!

At the end of the game you get a rating measured by the number of villains killed, your success in romantic engagements, the number of innocent people you shot unnecessarily and the number of crimes you failed. In fact, everything you did as lawman for the day is assessed and an icon chart is produced with a numeric score.

How long does the game last? You may well ask. How long is a cowboy's leisure. You can go through the game in no time at all if you shoot everything in sight. The editor proved this to me. I worry about him sometimes (I don't think today's the day to ask for a pay rise). If you make a

few skilful decisions the game lasts for about half an hour. Once you finish, you start again from the beginning to face the same day again as history repeats itself, well almost.

When the novelty of the graphics had faded, I found that the game started to become repetitive. Investigate a few options and increase your score is the best you can hope for. It reminded me of Adrian Mole's game or even the old character which starts with the phrase "You are the ruler of a country..." but the gameplay in this is not as complex as either. As a budget game this would be superb value but at over £5 there are better ways to spend my cash.

E.D.

## CORE

A 3-D Platform Game • Jaydisk

CORE IS A SPECTRUM game. Even this version is a Spectrum game. Never, since my computer-loaded Music Mixer, has it looked more like a Spectrum (I don't want my beloved 84 to look like a kiddie toy; I want it to look like a computer). This was my first attitude to CORE but having persevered I've recovered from the culture shock and come to enjoy the game (but not, alas, the graphics or the sound).

Definitely a brain teaser this one, even the name is a mystery. What does CORE stand for?

As Andy Angella the deep space enable shooter, you receive a message from the Federation. The existing complex an ERDC has been recolonized by aliens and the two memory banks have been scattered. As always you are left to clean up the mess and collect the two memory segments.

As you teleport down you realize that this isn't going to be easy. The mine's heavily infested with all manner and type of alien and the wretched zombies keep running out of batteries.

On entering the mine, one thing struck me immediately, no colors. Colors are used but only in that monochromatic way which Spectrum games have come to know and accept. I don't mind conventions but

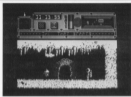
they should take into account the capabilities of the new machine and not work to the limitations of the old one.

Your first task is to find a metal detector to help find the missing segments. Unfortunately, the detector is buried somewhere so you have to find a metal detector! This search is not helped by the fact that, as time passes, the batteries in your torch start to fade and the screen dim.

There is an ample supply of fresh batteries in the mine so you have to take them when you find them. This involves manipulating the icons at the top of the screen. I think this could have been easier to do, after all, it did take five MAN years to develop this program (perhaps a woman could have done it more quickly).

The icons allow you to pick up, drop and use any items you find. Only four items can be carried at a time which means a lot of trial, error, exploring and backtracking is involved in the search. Other icons allow you to search for meals or to save the game at bedtime. There is also a HELP facility which can prove useful, if a little enigmatic.

Not all of the mine is accessible by using the down and antique lifts so you must make use of the teleport facility. This means learning



how they inter-relate because the pre-programmed destination may not be where you want to be, and you have to be able to return.

Collision with one of the aliens will have one of two effects, both of them detrimental. Floating aliens will drain energy from you but collision with a robot will kill you outright.

Wherever you move from one location to another the screen changes in a novel way. The effect looks like Venetian blinds being opened and closed to reveal a new scene, sometimes it is difficult to know if you have come up through the floor or simply passed through a doorway. This means you can't always tell where your next move will bring you. Producing a

map is essential. Why not enlist Andy's help, you never know.

I've tried to enter into the spirit of the game by not disclosing any of the solutions to the problems. The manual has several tantalizing hints for the beginner and added to a modulus of common sense the items which are encountered will soon have a relevancy to the game.

A lot of the puzzles are related to one another and often the most obvious course of action is not necessarily the best.

CORE provided hours of amusement and I have no doubts that it will, just keeping the lights on is enough of a burden. This game's a mine of entertainment. **E.D.**

## THE COMET GAME

Hardcore C&A • Jaydisk

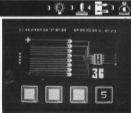
HALLEY'S COMET HAS faded back into the stars but once now it's not so distant as this game. Actually, The Comet Game is not one but several games collated together to make a whole (a Black Hole).

Before even sighting the Comet your journey is beset by more problems than the American Shuttle Project. Attacks from aliens, ill-aligned greenies, deadly germ bugs in the life support system and the all important ceremony of making the coffee.

The alien attack is based heavily on the game where moles come streaking in and you must create a defensive

cloud to protect your base. Antenna alignment is still a mystery to me and I can't say I care. Germ bug infestation is a bit like the bouncing ball demo from the Commodore manual mixed with the excitement of washing wallpaper (and the excitement of making coffee involves ensuring your hibernating astronaut's bladder don't explode).

Hopefully, once this game catches Halley's Comet it will go past and disappear into the black beyond. I do hope Einstein's Theory was wrong. If space does bend this game will be back to plague future generations.





## FLOYD THE DROID

Ridgewell Cat - joystick



THANK GOODNESS IN DAIRY-cult didn't decide to investigate total experience software with the release of Floyd the Droid. Smallisation would be too much to bear as the little robot ploughs his way through the sewers of some of the world's greatest capital cities.

Floyd is a Probot (PRO-grammable robot) specially equipped for his task of cleaning up those lesser known high spots of the great cities. Looking a little like R2D2, Floyd travels along on wheels and he meets something which offends his sensory apparatus. This might be a water blockage or a leaking crack in the pipe but there are greater terrors underground. Rats, rats, alligators and obnoxious criminals rush around in the gloom and they are joined by Floyd's malfunctioning predecessors who crashed up under the state.

Probots are equipped to face any problem. They have laser guns in their heads which not only break down blockages but also make suitable weapons for dealing with bats and criminals. Rats and alligators are dealt with in a simple but efficient way. Floyd traps into the air and crushes them underfoot.

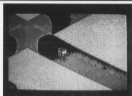
We first meet our megawatt enemy from down under in the sewers of London. The screen displays the first pipeline maze which

gives way to the main menu/cockboard screen. The display shows Floyd's status on the left and the sewer's condition on the right. All problems are stated as percentages. Water blockages and leaks must be reduced to zero but vermin only need to be reduced by 20%. There is another condition to be met and that refers to the minimum score required to allow entry to the next screen.

The bottom of the screen displays the options which control Floyd's mode of action. The part of the sewer labyrinth which Floyd has investigated can be viewed. He can be switched into one of three operation modes (manual, semi-automatic or automatic) and he can be programmed for specific actions in automatic mode.

The bottom of the screen displays the options which control Floyd's mode of action. The part of the sewer labyrinth which Floyd has investigated can be viewed. He can be switched into one of three operation modes (manual, semi-automatic or automatic) and he can be programmed for specific actions in automatic mode.

The final option takes you into the sewer with Floyd and the graphics are very good at this point. We see Floyd in the pipeline from an elevated angle giving a 3D effect. Now the joystick is used to move



him along the channels in search of his prey.

Occasionally, the pipeline loops right over Floyd's head. There are danger points and you should prepare yourself for all eventualities. A touch of humour is provided by the Probot's method of invoking help. By pressing the fire button a speech bubble appears with the word 'Doo' written in it and this is echoed by speech synthesis.

When a creature or obstacle is located, the screen switches to a 2D side view of the sewer. The obstacles are

all dealt with automatically by Floyd's ROM programming but vermin can be dealt with either manually or automatically.

For automatic mode and method of dealing with an opponent can be set using one of the sub-menus from the main menu screen. Here each type of foe can be selected by icon and a series of a dozen moves may be programmed into memory. When in auto or semi-auto mode, Floyd will execute the actions and hopefully defeat his opponent.

## MAPS BRITAIN

Ridgewell Cat - joystick



GEOGRAPHY HAS ALWAYS been a painful subject for me. The incision-scar on my old teacher still rings in my ears. If only I'd had this educational game to help me things might have been different.

Maps Britain makes learning fun by combining a quiz with a touch of ITV's 'Treasure Hunt'. The star of this program, however, is the scrolling British countryside rather than the rolling Ecosh backdrop of the television game.

The main options allow you to ask the computer to find a particular place in the British Isles, play a quiz game

with the computer or dash around in a helicopter to nominated towns.

The quiz game has four variations. The first two games are similar in that you have to name towns and cities highlighted by the computer. The third game is naming islands and countries in and around the British Isles and the final game involves waterways and counties.

Apart from the first option which involves a limited number of large cities, the level of the quiz is high enough even to challenge a jet-setter like me.



**Listings will be much easier to enter with our new system.**

COMMODORE LISTINGS ARE BATHER well known for the horrible little black blobs that always abound. Unfortunately the graphics characters which are used to represent graphic and control characters do not reproduce very well and they are also difficult to find on the Commodore keyboard.

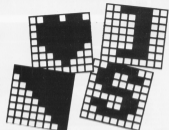
In future all control and graphic commands will be replaced by a mnemonic within square brackets. This mnemonic is not typed out as printed in the magazine but rather the corresponding key or keys on the keyboard are pressed. For example [RIGHT] means press the cursor right key, you do not type in [RIGHT]. All of the keywords, what keys to press and how they are shown on the screen are shown below.

Any character that is accessed by pressing shift and a letter will be printed as [Letter].

- [A] shift and A
- [\*] shift and \*

Any character that is accessed by pressing the Commodore key and a letter will be printed as [Cletter].

- [CA] Commodore and A
- [C\*] Commodore and \*
- [C1] Commodore and 1



# LISTINGS

If any characters are repeated the mnemonic will be followed by a number. This number is how many times you should enter the character. Any number of spaces over one will also be represented in this form.

- [RIGHT8] press cursor right 8 times
- [C\*10] press Commodore and \* 10 times
- [SPC70] Press the space bar 70 times.

Any other characters should be easily recognizable for example CTRL-N means press CTRL and N and LEFT-ARROW means press the left arrow.

Any number of mnemonics can be enclosed in brackets for example

- [SHIFTSPC10A10] means type 10 shift A's 10 spaces and another 10 shift A's.

Mnemonic	Symbol	what to press
[RIGHT]		left/right
[LEFT]		shift left/right
[UP]		Shift & up /down
[DOWN]		up/down
[F1]		F1
[F2]		shift & F1
[F3]		F3
[F4]		shift & F3

Mnemonic	Symbol	what to press
[F5]		F5
[F6]		shift & F5
[F7]		F7
[F8]		shift & F7
[CLEAR]		shift & CLR /HOME
[HOME]		CLR/HOME
[INSON]		CTRL & S
[INSOFF]		CTRL & S

Mnemonic	Symbol	what to press
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[CYAN]		CTRL & 3
[MAG]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8



# Now the great record-breaking Commodore Show moves North



**TWO  
WALK-IN  
THEATRES**

Renold Building, UMIST,  
Sackville Street, Manchester

Friday to Sunday, September 12, 13 & 14

The Official Commodore Computer Show – the show that hit the headlines when it attracted record London crowds in May – now moves North, with lots of bargain offers from leading suppliers of Commodore hardware and software. Spread over two exhibition floors will be stands featuring the very latest developments for the entire Commodore range, including a wide variety of newly-released games, business and utilities software. It's going to be an action-packed show that will bring you right up to date with all the many exciting developments now taking place in the Commodore world!

#### **EASY RAIL TRAVEL!**

500 yards from Piccadilly railway station, with speedy connections from all parts of the North, Midlands and Wales.

#### **EASY COACH TRAVEL!**

Bus and coach stations serving all parts of this vast region are just a short walk from the UMIST campus.

#### **EASY PARKING!**

Dozens of leading motels – or parks – either within the campus itself or nearby car parks.

*On show for the first time outside London – the fabulous Amiga!*

#### **AMIGA THEATRE**

Demonstrations of the most talked-about computer of 1986, showing the growing range of business and recreational software.

#### **8-BIT THEATRE**

Leading Commodore experts show how to make the most of the 16, 64 and 128 range, answering questions on games, graphics, utilities and communications.

#### **PLUS!**

Live shows from top groups – Commodore music as you've never heard it before!

**Avoid the queues!**

**Get your ticket in advance and...**

**SAVE £1 A HEAD!**

Adult/Student £2 (over £1) ..... £.....

Under-16s/Children £1 (over £1) ..... £.....

Total £.....

Cheque enclosed (made payable to Database Publications Ltd.)

Please debit my credit card account

Name/Title .....

Address .....

Admission of door: £2 (adults), £2 (under 16s)

*The 5th official  
Commodore  
computer show*

**Advance ticket order**

Post to: Commodore Show Tickets, Europe House, 68 Chester Road, Hazel Green, Stockport SK7 5NY.

Name .....

Address .....

..... Signed

PHONE ORDERS: Ring Show Offices 061-456-0820

Please quote order number 0014/0014/0014 - Jul 1986

Stuart Cooke takes a look at  
what is available for the  
C128.

# 128 ROUNDUP

WHEN THE C128 WAS LAUNCHED, it was aimed at two different markets. The first aim was to attract the games player and the second to break into the small business market, a market to which the earlier Commodore 64 is not entirely suited.

So has Commodore's little plan worked? Being honest it has and it hasn't. The games player is well catered for with the C128's compatibility with the Commodore 64. However, very few manufacturers are launching games specifically for the C128. After all why write a game for one market, i.e. the C128 market, when you can write for the 64 market and sell to all 128 owners as well?

As for the business angle, things are looking very good. As you are no doubt aware the Commodore 128 has an in-built 280 processor and has the ability to run CP/M software. Now packages such as Wordstar, DBASE and SAC2 are all becoming available at reasonable prices. In a future issue of Your Commodore we will be taking a very close look at CP/M explaining exactly what it is and how you should use it. All of the above packages and many more will be discussed in further detail in this future article.

The C128 in its 128 mode has taken off surprisingly well. Numerous packages have become available and all use the C128 to its full. Most of the software that runs in 128 mode is far superior to that that is available in CP/M mode. The fact that it has been written specifically for the C128 and it is a lot newer probably has something to do with this.

So down to business, what exactly is available for the C128? Is it any good? How much does it cost? Read on and find out.

## Playing around

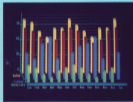
As previously mentioned there are very few games aimed for the C128, even the American market seems to be very slow



on this front which is a great shame as the machines massive memory could lend itself to some very good games.

Mastertronic is the first company to launch C128 games software. It's afraid that the games are nothing new but are

expanded versions of a couple of earlier C64 games, *3in 1* and *The Last 48*, both of which were very popular on the C64. The *Last 48* finds you seated in a car trying to get back to your base before you die due to radiation poisoning. On



the Cid you must drive around the city and get to the underground bunker once you are there you can try and find your base. The C128 version has an extra screen at the beginning where you are on the planet surface and must collect a number of objects before you gain access to the city.

All in all great fun, although a different game to play.

Kilnset finds you set stop a motorbike trying to navigate yourself over a number of obstacles. You play against either a computer controlled opponent or you can give a friend a race.

This game offers nothing spectacular though it is quite fun to play. The only difference between this and the Cid version is the addition of some more tasks where you can try your hand.

C18 is supposed to be launching a C128 version at the Boddy Warner Picture Show though at the time of writing it hasn't been seen.

As far as we on Your Commodore are aware, that is all the games that are available for the C128. No doubt some of you out there are going to prove us wrong. I hope you do as the computer certainly warrants some more games.

## Down to Business

As previously mentioned the C128 is extremely well supported with some excellent 'business' software. Visa, Precision, Commodore and a company new to the UK, Timeworks, have all launched a range of products.

As for the future we will have to wait and see, every day we hear of new products that are planned or due for release. Your Commodore will of course review all of these products as they become available.

# Compumart



**10-AMSOFT  
3 1/2" CF2 Microdisks**  
**ONLY £32.00**  
*plus p.p.h.*

**TOP Quality 3 1/2" Microdisks**  
BOXED IN 101-LABELS...  
SINGLE SIDED 135 LFL. **£19.00**  
DOUBLE SIDED 135 LFL. **£24.00**  
*plus p.p.h.*



Major Credit Cards  
Order Line  
05109 25589

Please send cheques/postal orders to

Compumart, (Dept 78-4)

Unit 8, Falcon Street, Loughborough,  
Leics. LE11 1EH

Compumart  
05109-262259

**1st**  
FIRST SOFTWARE LTD

**dBASE™**  
**II**



ANOTHER FIRST FOR FIRST - **dBASEII**, the world's best selling database is now available on your computer (if you have an AMSTRAD 6128, 8256 or 8512, Commodore 128, Tatung and Atari) exclusively through First Software Ltd or your local dealer for only £119.00 inc VAT, including the full manual.

Join the millions of users worldwide, doctors, students, solicitors, accountants, stockbrokers and collectors, who get the best from their information by using **dBASEII**. Use simple English like commands to do your repetitive tasks, by commands such as Do invoices, Do analysis etc.

At last, the business world's standard database, available for you.  
**dBASEII quite simply dBEST.**

For more information call us on 07357-6244 or write to First Software Ltd, No. 20 Horseshoe Park, Pangbourne, Berks.

Access or Barclaycard welcome.

**1st**  
FIRST SOFTWARE LTD

# DOWN TO BUSINESS

DATE	AMOUNT	DATE	AMOUNT	DATE	AMOUNT
1/15	100.00	1/22	50.00	2/5	75.00
2/12	200.00	2/19	100.00	3/4	150.00
3/11	300.00	3/18	150.00	4/1	200.00
4/8	400.00	4/15	200.00	4/22	250.00
5/6	500.00	5/13	250.00	5/20	300.00
5/27	600.00	6/3	300.00	6/10	350.00
6/17	700.00	6/24	350.00	7/1	400.00
7/8	800.00	7/15	400.00	7/22	450.00
7/29	900.00	8/5	450.00	8/12	500.00
8/19	1000.00	8/26	500.00	9/2	550.00
9/9	1100.00	9/16	550.00	9/23	600.00
9/30	1200.00	10/7	600.00	10/14	650.00
10/21	1300.00	10/28	650.00	11/4	700.00
11/11	1400.00	11/18	700.00	11/25	750.00
12/2	1500.00	12/9	750.00	12/16	800.00
12/23	1600.00	12/30	800.00		
TOTAL	16000.00				

ITEM	QTY	UNIT PRICE	TOTAL
Apple	10	1.50	15.00
Banana	20	0.75	15.00
Orange	15	1.00	15.00
Pineapple	5	3.00	15.00
Strawberry	10	1.50	15.00
Watermelon	5	3.00	15.00
GRAPE	10	1.50	15.00
LEMON	5	3.00	15.00
LIME	5	3.00	15.00
MANGO	5	3.00	15.00
PAPAYA	5	3.00	15.00
PINEAPPLE	5	3.00	15.00
PLUM	10	1.50	15.00
RAISIN	10	1.50	15.00
STRAWBERRY	10	1.50	15.00
TOTAL			150.00

**Stuart Cooke has a look at  
spread sheets currently  
available for the C128.**

A SPREAD SHEET IS ONE OF THE MOST important tools for anyone who has to deal with a large amount of numerical data. Basically a spread sheet consists of a piece of paper split into numerous boxes, rather like a piece of graph paper. Each box in turn gives a particular 'function'. For example the box at the top left hand side corner could be the amount of money in a bank account. The ones below it could be deductions from the account, then at the bottom you could have the new bank balance. You could then work across the sheet using the columns to represent the amount of money in the account at the end of each month.

Obviously until the advent of computers all of the calculations in each of the columns had to be worked out by

hand, now the computer has made life much easier for you. You can put formulae into the boxes. For example in our bank account spread sheet the formula at the bottom for the total could be something like: NEWTOTAL=OLDTOTAL+SUM OF ALL DEDUCTIONS. Obviously the formula would not be entered like this but it does give you an idea about what is possible.

SwiftCalc 128 from Timeworks again, is the simplest program for the 128, in keeping with all of Timeworks' other programs, all commands are available from pull down menus, this makes it very easy to find the command that you want. Visa Star is by far the most complex program but again has far superior features with its inbuilt database, programmability etc. All commands in Visa Star are also available from menus making it easy to find the one that you want. Even so SwiftCalc is more than adequate for most applications.

Both of the spreadsheets can be interlaced with their corresponding wordprocessors and databases, this means that transfer from one program to the other is free from error, very

important if you were producing a financial report for a company.

The actual size of the spread sheet available is far greater than that of the screen. This means that as you move around the screen the columns and rows will scroll across the screen so you can always see the information which you require. SwiftCalc allows you to have up to 250 rows and 250 columns in which you can place information. Visa Star has 64 columns and 100 rows. As you can see both allow very large work areas.

When you come to printout your spreadsheet you will of course fit a snag. As a guess your printer will only be 80 characters wide. This means that you will have to printout your spreadsheets in pieces or write them in such a way that they only take up 80 columns. SwiftCalc gets around this in a very interesting way, it allows you to print the program sideways on any printer that is capable of graphics. In other words all information is printed at 90 degrees to its normal position. You can now print your spread sheets as wide as you want. sideways is available separately as a CMI program and will work with information from most spread sheets.



# C128 DATABASES

## Stuart Cooke with an

### Illuminating look at the C128 databases currently available.

A COMPUTER IS AN IDEAL DEVICE FOR storing information. A database program simply lets you turn your computer into an electronic card index system, a high-tech version of those little plastic boxes with the cards in them.

If you have ever used a card index system then you probably know that you need to design a format for each card. For example if you were setting up a list of members of a computer club you may set the cards up so that they have the following information:

NAME  
ADDRESS  
TELEPHONE  
COMPUTER  
MEMBERSHIP OWNING

Well, a database program is used in the same way, you simply set up the format for each of the cards or records and enter the information.

Because the information is now in a computer you can do a lot more with it. For example you may want a list of all club members who live in London. With the card box type of system you would have to go through each card in turn and make notes as you went along. A computer is much more versatile than that as it takes all of the donkey work away from you. You could instruct the computer to give you a list of all the people who live in London AND who still haven't paid their membership fee. You could even get the database to print out a list of the people's names and addresses on to sticky labels ready to go into envelopes.

Most database programs also let you transfer details between the database and a wordprocessor or a spreadsheet. This means that you could then send personalised letters to every one who owed money with their name at the top of the letter and the amount owing in the correct place on the letter.

```
CHARGE THE TITLES FOR FIELD: GET AND THEN PRESS THE RETURN KEY.
```

```
+ EXCESS + FIELD LEFT: 04 BYTES LEFT=004 PAGE NO. OF 02 LINE NO. COLUMN IS
```

```
NAME: _____ title: _____
NAME: _____
NAME: _____
NAME: _____
NAME: _____
NAME: _____
NAME: _____
```

```
REFERENCES
```

Of all the packages that we will look at here, Superbase is probably the easiest one to use for this type of application since you can have both this and Superwrite in memory at the same time.

Vite Star is a combined database and spreadsheet program which is loaded into memory as one unit. If you wanted to use information from the database with Vite Classic then you would have to store the information that you require on disk, then LOAD the wordprocessor so that you could print out the information. I must stress that this is the norm for transferring data between programs and that it doesn't cause any problems whatsoever.

Data Manager (DM) from Timesworks also works on the same principle as Vite Star and the different programs must be loaded separately.

Obviously as with the wordprocessors, you get what you pay for. As the more expensive packages Superbase and Vite Star are the more complex and versatile programs. Both of these programs have the ability to be programmed. This means that you can actually write a program to control the way that the database works, just as you would a Basic program.

A programmable database is extremely useful. Let's take a look at the typical office where a program such as this would be used. For a start most people in the office will probably not be computer literate. Most databases are quite complex to use and have lots of commands available, to get a database up and running may take quite a number of key presses. The office worker is going to get lost and probably miss things up. Now if you were to write a program that LOADED the correct database into memory and then gave all of the options that the user would ever need on a simple menu, wouldn't things be easier? For example with our club membership list the user may be presented with the following options:

- 1) ADD NEW MEMBER
- 2) CHANGE EXISTING INFORMATION
- 3) SEARCH FOR SPECIFIC INFORMATION
- 4) FINISH

Now isn't that a lot easier than having to remember a lot of complicated instructions?

Superbase is probably the most powerful database of the three that have been mentioned. Obviously this does



mean that it is quite difficult to use, especially for someone new to computers. The manual which accompanies the program can only be described as excellent; the first 56 pages are devoted to giving a beginner's tutorial, but down with this for a few hours and you should no longer be frightened by the program.

As if this wasn't enough Precision has also launched a book called quite simply, *Superbize the Book*. If you have never used a database before this is an excellent supplement to the manual as it explains some of the more complex operations in greater detail.

Viz Star is probably the most baffling of the three programs, and probably the hardest to get the hang of. Usually a spreadsheet and a database are totally separate programs. With this package they do help on each other

quite heavily. For example, if you wanted to write a program you actually write it on the spreadsheet. Again a training course is supplied with the program so you should have no problems getting to grips with it.

Data Manager is the most simplistic of the three packages, even so it is extremely powerful and more than adequate for most applications. As with Timesworks' wordprocessor, all the commands in this program are selected from a series of pull-down menus. This makes it extremely easy to use. Again a tutorial is included in the manual to help get you going. Data manager is very well suited to dealing with lots of numerical data. The example given in the tutorial is of an expense form for a week. Obviously the numerical functions of this program are not as powerful as those in the combined spreadsheet/

database of Viz Star but once again are adequate for most applications.

Both Data Manager 128 and Viz Star have graph options built into them. These allow you to graphically represent any numerical information within the database.

So which of the three programs should you buy. As a standard database they all perform equally well, with Data Manager 128 as the easiest to use. If you are looking for something a little more elaborate then I suggest that you look at both Viz Star and Superbize to see which one suits you best. Personally I would use Superbize since having a combined database and wordprocessor (Superbize) in memory at the same time is extremely useful to me. Other people who use spreadsheets more often would obviously be more at home with Viz Star.



# C128

## Revisited



### Eric Doyle explains the triple personality of the C128.

WHEN IS A COMPUTER NOT a computer? Arguably, it's when there's no software to run on it. This has been the case with the Commodore 128 so far. "Ah," you may say, "there's a wealth of C64 and CP/M software available," but where are the dedicated 128 goodies you'd like to see? With all this memory available and an 80-column screen it's like running a Rolls-Royce on paraffin.

Things are changing. Already there are two games from Atari/Intronic (Kickstart and The Last Vill) and a bumper issue of The Rocky Horror Show in CRL's pipeline. Precision Software has a brilliant compendium of SuperScript

and Superbase competing with Visa's Classic wordprocessor. Many more companies are contemplating launching their own and inspired titles, so now is the time to revisit the 128 and study the pros and cons of this hybrid machine.

A computer with several modes of operation is a new start on the incompatibility problems which have beset Commodore since the replacement of the Vic 20 with the C64. At last, buying a new machine does not mean throwing out the old software and learning the new, in C64 made the machine operate exactly as its predecessor. Well, almost!

Most 64 software runs happily on the 128 and the earlier models which produced the occasional 'black' spots have been superseded by a modified machine. Some programs will hiccup but I've never found this to be a major problem. The real base of my life emanates from companies who give the

impression that their product is C128 compatible when all they mean is that it's a C64 program. Book publishers are also guilty of this and the only advice I can give is encapsulated by that old legal saw "caveat emptor" let the buyer beware.

The styling of the 128 breaks away from the old Vic casing which we've come to know and love. It also provides a substantial shift from the rich man's top appearance of the Plus/4 which belied the powerful nature of the machine. In the 128 we see a stylish keyboard with a numeric pad which looks rather businesslike and PC-ish. With the work station style 128S, the PC image is complete. Both in monitor, disk drive and detachable keyboard.

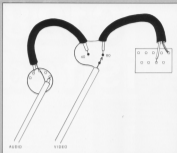
My criticisms are few but heartfelt. Cherry plastic is an aesthetically pleasing colour but it does attract the dirt. With grubby little fingers such as mine typing with gloves an seriously inhibits my two-finger typing speed.

Sparks Insect, our editorial editor, has a personal problem which he managed to keep secret until the appearance of the 128, he's allergic. Not the grubby man in the park variety (as far as I know) but the static electric charge type. One walking Van de Graaf generator only has to look at the joystick port and his finger gloves like IT's, closely followed by a flash of such intensity that the internal chips are always lit in no time at all.

My final small gripe is about the arrowed cursor keys. One good thing about the Plus/4 was that the equivalent keys were laid out in a diamond formation, on the 128, they are in line.

The 128 has three major modes of operation: C64, 128 and CP/M. This is further enhanced by the Bitstream option. The 128 model's Basic is a vast improvement on the dialect language with which the C64 was cursed. Popular number has it that a more advanced language was planned for the 64 but disagreements led to its non-implementation. At least Version 7.8 Basic supports sprites, high resolution graphics, sound and disk access.

A disk drive is a must with so much memory available and if you want to



access the CP/M mode it is obligatory because the system only works with disks. The TIT disk drive, which is not recommended, has one major advantage over the old TIT, it's faster; it won't break loading records but it's a vast improvement.

While I'm on the subject of disk drives, let me explore one myth. The new drives behave with all the sluggishness of the TIT in C64 mode so don't expect any improved performance if you're thinking of plugging one into your old 64.

A bigger, better Basic has one apparent drawback. It takes up more memory than the earlier versions but this is counterbalanced by the fact that programs take up less space because the terminable PRG's and POK's of earlier versions have been replaced by short, sharp commands.

This is further enhanced by the banking system used. This has nothing to do with Net West or Bartleys but is the way in which several layers of memory are overlaid on the same memory locations and the computer selects which one it must use. This means that from power up almost 128k of memory is available to the user. In the 64 almost 28k of memory was reserved for Basic leaving only 88k for programs. Banking means that a more comprehensive Basic can be housed in an apparent 96k of memory!

The new Basic is yet another development of the original Microsoft Basic which means that any program written for Commodore machines from the early PET machines onwards will run on the 128 with one proviso. The limitation is that the internal architecture of the machines are so

different that any PEEK, POKE or SYS commands will not work on the 128.

I've already mentioned that there are BASIC commands specifically for sound and graphics. These are supported by further keywords for helping with programming e.g. TRACE, TROFF, DELETE. Plus more variations on POK/NEST loops such as DCO/WHILE, DO/UNTIL, BEGIN/END and IF/THEN/ELSE.

Thank goodness for the implementation of the POINT command which puts an end to line upon line of string manipulations for laying out mathematical tables.

CP/M compatibility was first meted with the appearance of the 88.1% facility was undermined by the limitations of the 88 column screen. With a built in DMA and the 88k video processor, the 128 is in a much better position to use the best of the available software. The only problem is the expense of some CP/M programs but the prices now seem to be dropping to meet the needs of a new generation of users.

CP/M 3.0 is a Disk Operating System (DOS) which was specifically written for handling disk files in a business environment. Before IBM took over this field with PC/DOS, CP/M was the first and only system of its kind. As you can imagine, this means that there is a mountain of software to support CP/M.

The one limitation is that all programs must require less than 38k of workspace. This is no major limitation because a lot of software was designed for 48k machines. The use of random access filing on disk means that the data can be pulled from disk to be worked on as and when it is required. In this way the effective storage space is expanded way

beyond the apparent limitations of a 48k machine.

The DOS is also a programming language and user originated programs can be devised. The manual does not help greatly with this and the dedicated Commodore CP/M manual is not easy to understand. However, a search of a good computer book shop will turn up some of the gems which have been written in the past for those eager to understand this new environment. Be warned, this is a programmer's language and some aspects are very very unfriendly, often it is better to buy application software than to struggle through a program of your own.

For the 88-column mode RGBI display is best. Ordinary TV output is totally unsuitable and composite video can be as bad. Not that these options are available. If you select 88-column mode the output switches automatically to the RGBI socket.

Put simply, composite video means that the picture information is sent out as a single signal. From this signal the monitor sorts out the red component from the blue and the green. This information is then relayed to the appropriate picture forming 'guns' deep inside the monitor and then on to the screen.

RF signals are simply composite signals mixed together with the sound signal. Then the whole mixture is absorbed up to a Radio Frequency to which the aerial socket on a TV will respond. The whole process is then reversed. The signal brought down to its original level, the sound sifted out and the colours separated. This obviously involves more stages than unfolding a composite signal and the more stages the signal is put through, the more it is degraded.

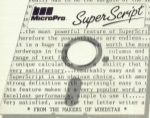
RGB on the other hand sends out its signal in the three colours separately (hence the RGB of its name). This means fewer stages are needed than was required for even the composite signal and therefore the image is sharper and clearer.

The disadvantage of a mixed RGB 88-column mode and a composite 40-column mode is that it is awkward to switch from one mode to the other. Each screen works independently of the other and screen handling is complicated. Fortunately there is a way to display the big screen on a composite monitor and Robotek and Horowitz are marketing adaptors for around £11. They are just simple cross-over switches and the price you pay is the loss of colour in 88-column mode. DSI enthusiasts may be interested in the little diagram which shows the necessary wiring.

With the 128, Commodore has taken up a posture outside the twilight zone between home and business computing but with a firm footing on either side. With the computer industry uncertain which way computers will go, the 128 is a good way to bridge your bet.

# WORDAHOLIC

really has to be the bargain of the year



...the most powerful feature of SuperScript... therefore the possibilities are endless... it is a huge time-saver worth the more wordwraps in form letters, columns and range of text styles... breathtakingly unique calculator... facility that is very satisfactory... remarkably easy and a SuperScript is an obvious choice, with most strong definition with surprisingly easy to use... this feature makes it a very popular word processor. Excellent performance, simple to use it..... Very satisfied, used for the letter writer a

\* FROM THE MAKERS OF WORDSTAR \*

## SUPERSCRIPT WORDPROCESSING

From the makers  
of WORDSTAR

Most wordprocessing packages will do the bare minimum. SuperScript can't wait to do the lot!

### JUST LOOK AT THIS WORKLOAD

<b>Takes on</b>	writing, storing and editing all your correspondence and other documents.
<b>And</b>	produces letters, invoices, price lists, contracts, labels etc.
<b>Next</b>	even personalised mailings, with lists or database output.
<b>Then</b>	creates and reviews top quality presentation reports and tables.
<b>On to</b>	typing form papers, technical reports or notes.
<b>And even</b>	adds, subtracts, multiplies, divides and does percentages.
<b>At the same time</b>	giving all round editing and printing facilities such as block-cut-paste, insert and replace, full search and replace.
<b>Not to mention</b>	print preview, layout options and simplified document selection. And much, much more!

### ◆ SPECIAL MAIL ORDER PRICES ◆

COMMODORE 64, ATARI 800XL/1000 £49.95  
COMMODORE 128, APPLE IIe/IIx £79.95  
UPGRADE FROM EASYSCRIPT £39.95



SuperScript comes complete with Comprehensive User Manual.

## ORDER NOW

By calling MicroPro  
on 01-879 1122 Ext 290  
 quoting your Access or Visa no.

Also available from  
all good stores.



### UPGRADE FROM EASYSCRIPT TO SUPERSCRIPT - JUST £39.95

- \* Improved performance \*
  - \* Maths \*
  - \* Spelling checker \*
  - \* Print or view \*
  - \* Integrate with SuperBase \*
- see Commodore 128

COMMODORE 64, ATARI 800XL/1000 £49.95  
 COMMODORE 128, APPLE IIe/IIx £79.95  
 UPGRADE FROM EASYSCRIPT £39.95  
 I would like to purchase the following software:  
 SuperScript £49.95  
 EasyScript £29.95  
 SuperBase £49.95  
 SuperDraw £49.95  
 SuperText £49.95  
 SuperForm £49.95  
 SuperMail £49.95  
 SuperTable £49.95  
 SuperChart £49.95  
 SuperCalc £49.95  
 SuperPrint £49.95  
 SuperView £49.95  
 SuperEdit £49.95  
 SuperMerge £49.95  
 SuperSort £49.95  
 SuperIndex £49.95  
 SuperFind £49.95  
 SuperReplace £49.95  
 SuperUndo £49.95  
 SuperRedo £49.95  
 SuperCut £49.95  
 SuperPaste £49.95  
 SuperCopy £49.95  
 SuperDelete £49.95  
 SuperInsert £49.95  
 SuperFormat £49.95  
 SuperAlign £49.95  
 SuperBold £49.95  
 SuperItalic £49.95  
 SuperUnderline £49.95  
 SuperStrikethrough £49.95  
 SuperColor £49.95  
 SuperBackground £49.95  
 SuperFont £49.95  
 SuperSize £49.95  
 SuperStyle £49.95  
 SuperTheme £49.95  
 SuperLayout £49.95  
 SuperPrint £49.95  
 SuperView £49.95  
 SuperEdit £49.95  
 SuperMerge £49.95  
 SuperSort £49.95  
 SuperIndex £49.95  
 SuperFind £49.95  
 SuperReplace £49.95  
 SuperUndo £49.95  
 SuperRedo £49.95  
 SuperCut £49.95  
 SuperPaste £49.95  
 SuperCopy £49.95  
 SuperDelete £49.95  
 SuperInsert £49.95  
 SuperFormat £49.95  
 SuperAlign £49.95  
 SuperBold £49.95  
 SuperItalic £49.95  
 SuperUnderline £49.95  
 SuperStrikethrough £49.95  
 SuperColor £49.95  
 SuperBackground £49.95  
 SuperFont £49.95  
 SuperSize £49.95  
 SuperStyle £49.95  
 SuperTheme £49.95  
 SuperLayout £49.95

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
Postcode \_\_\_\_\_  
Country \_\_\_\_\_  
Telephone \_\_\_\_\_



Approved AMIGA Dealer

Maintenance, Service, Support, Training,  
from your No.1 **COMMODORE** dealer

**Specialist Business Packages**

**HARDWARE**

C128D with Monitor & Printer  
MPS 1000 NLQ.

**SOFTWARE**

Accounts (cash book & VAT), W/P,  
Database, Spreadsheet.

all for only **£879.00**

**Computers**

6-4 3/4 Sealed  
£39

- C64 Compendium ..... 189.00
- C128 Computer ..... 265.00
- C128B inc. disk drive ..... 489.00
- C128B inc. 6/4, Monitor, .. 585.00
- 15 41 3/4 disk drive ..... 169.00
- 1571 D/5 disk drive ..... 265.00

**Colour Lore**

- 1901 Colour Monitor ..... 285.00
- 1900 80 Columns ..... 145.00
- Green/Amber Screens ..... 95.00
- Cable for above inc. case ..... 10.00
- C128 40/80 cable ..... 14.95

**Printers**

- DPS1101 Dotm. Wheel... 295.00
- MPS1000 NLQ inc. T/F .. 269.00

**Software**

- SuperScript 64... 69.00 Superbase 64... 59.00
- S/Script 128... 74.00 Superbase 128 79.00
- S/Script + S/Base 64... 99.00
- S/Script + S/Base 128... 139.00

Comprint Interface 61.99 Disk Interface 69.00

Miracle modem ... 119.25 COM modem ... 79.00

HS2000 Mouse 69.90

**PHONE for FULL LISTS**

**COMPLASORIC Computer Centres**

49 Junction Rd Archway London N19 5SD  
308 Maxwell Rd Broadway London N10 3SH

**01-283 9400's or 01-283 1700's**

All prices include VAT. Payment by Access,  
Visa, Bankers Draft, Building Society Cheques.  
Saver cheques need at least 3 days clearance.

**Commodore**

**128** The world's best-selling home computer yet, it's now still able to ship the world's largest selection of software. And now you can get it all in one place. The Commodore 128 is the only home computer that ships with 128K of RAM. And when you add our range of add-on products you can

Commodore 128 computer	£179.00	Commodore 128K monitor	£275.00
Commodore 128K printer	£159.00	Commodore 128K mouse	£89.00
Commodore 128K floppy	£29.00	Printer + Printer interface	£79.00
Commodore 128K disk drive	£259.00	Printer + Printer interface	£79.00

Prices are for the Commodore 128 computer system only. Prices include postage, packing and insurance. All prices are in £ sterling and include VAT. Prices are subject to change without notice.

**Classic 128**

With a classic Commodore 128, you can enjoy the best of both worlds. The Commodore 128 is the only home computer that ships with 128K of RAM. And when you add our range of add-on products you can

**VIDASTAR 128**

The Commodore 128 is the only home computer that ships with 128K of RAM. And when you add our range of add-on products you can

**FASTEST SUMMER SAVINGS ON ALL YOUR PRODUCTS**

Commodore 128 computer	was £179.00	now £169.00
Commodore 128K monitor	was £275.00	now £265.00
Commodore 128K printer	was £159.00	now £149.00

**Superbase**

The new Commodore Superbase is a professional database management system. It's the only database system that can handle up to 100,000 records. It's the only database system that can handle up to 100,000 records. It's the only database system that can handle up to 100,000 records.

**BEST EVER SUPERBASE PRICES**

Superbase 64	was £29.00	now £24.00
Superbase 128	was £39.00	now £34.00

**Tricks & Tips for the 128**  
The Commodore 128 is the only home computer that ships with 128K of RAM. And when you add our range of add-on products you can

**The Anatomy of the 128**  
The Commodore 128 is the only home computer that ships with 128K of RAM. And when you add our range of add-on products you can

**SELECTED SOFTWARE FOR YOUR COMMODORE 128**

SuperScript 64	The original word processor for your 128	£69.00
SuperScript 128	The original word processor for your 128	£74.00
SuperScript 64 + S/Base 64	The original word processor for your 128	£99.00
SuperScript 128 + S/Base 128	The original word processor for your 128	£139.00

**MORE SOFTWARE BARGAINS FOR YOUR COMMODORE 128**

SuperScript 64	The original word processor for your 128	£69.00
SuperScript 128	The original word processor for your 128	£74.00
SuperScript 64 + S/Base 64	The original word processor for your 128	£99.00
SuperScript 128 + S/Base 128	The original word processor for your 128	£139.00

WRITE TO: COMMODORE, CALL 01-283 9400 OR 01-283 1700



COMMODORE 128, COMMODORE 128K, SUPERSCRIPT 64, SUPERSCRIPT 128, SUPERSCRIPT 64 + S/BASE 64, SUPERSCRIPT 128 + S/BASE 128

# C128 WORD PROCESSING

## Stuart Cooke analyses three C128 wordprocessing packages and gives his recommendations.

ONE OF THE MAIN 'SERIOUS' USES OF a computer is as a wordprocessor. Some companies have made a fortune selling dedicated wordprocessing systems. The only difference between these and your Commodore 128 is that the dedicated machines have a wordprocessor built into the machine while the C128 may load one from disk or tape, obviously this makes the C128 much more versatile since you could use it for lots of different applications.

So exactly what is a wordprocessor? Well to put it in simple terms, a wordprocessor is just a glorified typewriter. Instead of typing your text, be it a letter or a chapter from a book, on to a piece of paper, you type it into your computer. Once your text is in your computer's memory you can read it through, correct any spellings, make any other alterations such as moving paragraphs around and eventually, when you're satisfied, print it out on to your computer printer.

Obviously the quality of your print-out depends upon the type of printer that you have attached to your C128. If you only have a very cheap dot-matrix printer you can't expect to get typewriter quality. If you have a high quality laser printer hooked up to your machine you can print pages that are as good as a printed page. In other words you get what you pay for!

Obviously if you have a printer, a wordprocessor is a must, you can use it to write your latest novel or simply a thank you letter to an aunt at Christmas. If your handwriting is as bad as mine everyone else will probably be pleased that you bought a wordprocessor.

So what is available for the C128? Three companies have launched packages in Britain. These are Prevision Software, with an updated version of SuperScript wordprocessor so that it works on the C128. Vira Software has launched Vira Classic again which is an update of an earlier C64 program. The third company is a newcomer to the English market, although extremely well known in the States, Interworks is launching Word Writer 128.



All of the programs come complete with a spelling checker. Once your text has been entered, run this option and the program will compare all words in the text against those held in its dictionary. Obviously they can't correct your spellings, but they do highlight any words that they find unfamiliar so that you can check them in a normal dictionary. You can even add words to the dictionary so that the program will 'know' the words the next time they come up.

### Vira Classic

Vira Classic can only be described as the 'prettier' program of the bunch. It works only in 80 columns, so PC owners will not be able to use it without an interface, even so it would probably be very difficult to read the text.

The program disk is a 'flipper' (has programs on both sides) and has the wordprocessor on one side of the disk and the dictionary on the other. The disk is easily copied so you need not worry about having to use your master disk all of the time. Vira Classic is however still protected as it will not run without the necessary cartridge plugged into the back of the computer, and of course you only get one of these. This is the way that all expensive software should be. After all if you spill coffee on a £100 disk it is difficult to replace. If it is only a copy of the disk and the protection is blown here you are a lot better off since you can soon make another copy of the master disk.

When running, the program displays all of your text within a border and the available commands are accessed by a series of pull down menus across the top of the screen.

Many extremely useful options are available. For a start you can see at a glance exactly how many words, sentences and paragraphs you have entered. This is essential for journalists who must write to a certain length. Also available is a calculator which also has the ability to perform calculations on values within the text.

You can use data from other programs such as Vira's own Vira Classic database and spread them or you can load in data from other wordprocessors. Basic programs obviously can't be loaded in to the wordprocessor since they are interpreted. If, however, you really want to wordprocess a program you can always list it to disk as a sequential file and then LOAD it in.

Listing programs loads me quite nicely into getting printouts from the wordprocessor. Within Vira Classic there are a number of options available to aid with the formatting of text. These range from underlining and centering text to indenting columns of text so that any tables are printed out neatly.

All these functions are accessed from a combination of the CONTROL key and a letter. This is where Vira Classic has one of its very few bad points. There is no indication on the screen as to what keys you should press to get a specific function. If you can't remember, then two options are open to you, either

place your Visa Classic disk in the drive and press the help key. The help files will then be loaded from disk without affecting your text. The other option is to refer to your manual. Obviously you soon learn the commands that you use a lot but the ones that you don't often need have to be looked up.

When you come to the actual printing you have many options available to you. For a start you can define what sort of printer you are using so that the program knows which commands to send to the printer for a specific effect (eg. underline). You can say whether you want headers and footers, these have their own pages in memory so they can be a number of lines long. If you have a printer that can cope with graphics such as an Epson Star or a Commodore MEMOD you even have the option of using one of three default, proportionally spaced, Near Letter Quality fonts.

You can force the program to make sure that paragraphs are not split over pages with the paragraph command and you can change the width and length of the paper or the number of lines to a page etc.

One area in which I found the manual lacking was an explanation of the HiQ fonts. HiQ, as it explained how to use them but I could have done with knowing the size (ie. number of lines per page) and number of characters per column since I wasted a lot of paper before I got it right.

As with Visa's program the available commands can be seen at the top of the screen, this time however all commands can be selected from here as well as by pressing keys. This means that you don't have to worry about remembering the commands as a quick look through the relevant menu will find it for you. As you would expect, there are numerous commands available to you. Again you have a maths function which will perform calculations within the document as well as the normal print format commands. If you have ever used Superscript on the C128 or even the earlier Superscript you will be at home with Superscript since there is very little difference between the programs.

If you don't have a Commodore printer don't worry, as with the previous program you can set up the printer to suit your own requirements, including Commodore and RM12 printers.

Again the supplied disk is a floppy with the program on one side and the dictionary on the other. Unlike Visa Classic you can't copy the program though you can get a backup copy when you send off your registration form.

One extremely handy feature of this program is the ability to have both this program and Proviser's data base program, Superbase, in memory at the same time. Press a few keys and you're in the relevant program. This is superb if you have a large address list, such as the one used by Star Commodore, as you

the C128 it may not look as 'pretty' as Visa Classic but it does have points in its favour - for example, the 40 column mode and the fact that all commands are available from the menu. Superscript is a very easy to use and comprehensive program.

## Word Writer 128

This program is similar to Visa Classic since all of the commands are selected from pull down menus. Since this package is far cheaper than the Visa-one, a number of the 'extras' that are available with the more expensive package are missing. Even so this package is very easy to use and has all of the facilities that most people would want from a wordprocessor.

Unlike Superscript, Word Writer 128 does not expect you to select some of the commands by pressing keys (rather than from the menu). However, a HELP file is always available to show you when these keys are. Unlike Visa Classic this file is resident with the program and doesn't need to access the disk.

It seems to have become the norm with C128 wordprocessors that all of them have an inbuilt calculator. Unlike the calculator in the other programs this one will not allow you to perform calculations on numbers in the text. Instead all calculations must be performed manually. The result of the last calculation can be copied into the document.

The reason went to the magazine for review was the American one complete with American dictionaries for the spelling checker. Don't let this worry you as the version that is going to be on sale here will come complete with an English dictionary.

As with both of the previous wordprocessors, Proviser is made for mailing list operations. This means that you can set up a file of names and addresses on disk and merge them in with a standard letter.

Files from Timework's spreadsheet program, Swiftcalc 128, can be merged into a document so that you can print out reports from any spreadsheets that you may use.

Information from Timework's database program Data Manager 128 can also be included within documents. You can even use an address file from your database as a mailing list for your letters.

Wordwriter is a very clear and easy to use program. It has all of the standard wordprocessor functions such as margin setting, line spacing alteration and changing the type style, but it does lack some of the more 'complex' features of the other two programs. If you're looking for a reasonably priced Wordprocessor that is easy to use then this may be ideal for you.



Obviously I don't have enough room here to mention all of the features of this wordprocessor and there are many that I haven't even launched upon. All I can really add is that even though it may seem a little pricey and I do have a few gripes it is a real joy to use and I wouldn't be without it.

## Superscript

Unlike Visa Classic, Superscript allows you to use either 40 or 80 columns thus making it an ideal choice for C128 owners who are using either a TV or one of the older 40 column Commodore monitors.

can simply pull the relevant information, name, address, etc., into your text file. Other programs do allow you to do this but having both programs in memory at the same time is a great time saver, not to mention very handy.

Superscript comes complete with an extremely helpful manual. Every bit of information that you could want is readily found from a very comprehensive index. Don't let the size put you off however as the program is very simple to use and the first few paragraphs are in the form of a very easy tutorial that will help to get you started.

Many people say that Superscript is the best wordprocessor for the C128. On

## COMMODORE 128 Advanced Programming



The Commodore 128 can be used in three separate modes, the 128 mode is particularly suited to the experienced user. This book is intended for the owner who already knows the rudiments of programming in BASIC, and who wants to take the Commodore 128 into the territory of the BASIC of the 128 to do much more than draw other 128 modes. Much more can be accomplished with knowledge of machine-code, and this book fully explains the abilities of the new BASIC, the viewpoint of each chapter with applications BASIC subroutines code.

processing, and so that many very useful and original subroutines are included. For example, how to work with graphics (BASIC), how to expand up to 64K using the device extensions to any memory.

Revised your interests to graphics or program, today or you, this is a book that will reward your reading and bring you progress to you use of Commodore 128.

ISBN 1-85181-034-X

PRICE £5.95

## LEARNING ASSEMBLY LANGUAGE ON THE C128



A complete course with text and software, this complete package introduces the complete beginner to assembly language programming. The materials provided with the course is especially designed for self-teaching purposes and the book includes understanding assembly language is explained, the reader can understand the other Commodore built-in assembler with a minimum of effort and trying to explore the capabilities of machine code.

The software contains a complete build assembler/interpreter using assembler/interpreter using

Uninterrupted, with Symbol Tables, Macros, Interrupts, Memory Labels, and Variables.

The assembler shows programs to be written easily in assembly language and these are translated automatically into machine code.

ISBN 1-85181-023-7

PRICES £12.50 tape or £14.50 disc.

## 3D GRAPHICS DRAWING BOARD FOR THE C64 AND C128



This software package allows you to create, edit and combine 3D images on the screen. The program's graphics capabilities are extensive, and the user can create 3D perspective images for the screen, rotate, scale, shift, and manipulate. Screen size removal page further features and the format design can be used permanently to edit or print.

PRICES C64—£14.95 (disc only)

ISBN 1-85181-028-5

C128—£14.95 (disc only)

ISBN 1-85181-029-3

## WATSON'S NOTES FOR THE C128 + C64

Authors: D. Kedem & I. Kalisky

The concept of the Watson's Notes books is of a series of easy to follow, easy to copy, specific areas of BASIC programming. The books are aimed at younger readers, but any beginner to computing will find that the explanations used to clear and rapid progress through the various subjects used.



C128

Unit 1:  
First Steps in BASIC £3.95

C64

Unit 1:  
First Steps in BASIC £2.95

Unit 2:  
Exploring BASIC £2.95

Unit 3:  
Making BASIC work £2.95

Unit 4:  
Creative Graphics £2.95

Unit 5:  
Sprites £2.95

Unit 6:  
Concepts in Graphics £2.95

# GLENTOP

PUBLISHERS □ LIMITED

Granite House, Bath Place, High Street, Barnet, Herts. EN5 5JZ Tel: 01-441 4130 Telex: 22820

# BEST of the REST

## Stuart Cooke ties up loose ends in our C128 Roundup special.

EVEN THOUGH THE COMMODORE 128 is an excellent choice as a machine for a small business, it's not only business people who will buy it. It is an ideal machine for learning on or simply upgrading to from a C64. The advanced Basic in 128 mode is helpful to beginners and has been improved dramatically from the C64. Now it has graphics, sound and toolkit commands.

Obviously one of the best ways to learn about a computer is to read up on it. 128 users are extremely well catered for.

First Publishing, true to form, has produced a series of technical books, as they did for the C64 and have done for many other computers. Three books are available and it would be fair to say that no Commodore 128 owner should be without any of them. The three books in question are 'The Anatomy of the Commodore 128', which gives a complete breakdown of the Commodore 128's internal hardware at a very deep level. 'Hints and Tips for the C128' gives many handy hints as well as a large number of programs for your own use and finally 'The Anatomy of the 127' gives a complete breakdown of the workings in Commodore's latest disk drive. The 127 is built into the 128. Beginners beware, these books are very technical and trying to read them knowing nothing about computers would probably put you off computing for life. On the other hand if you want to program your C128 you'll soon be referring to them as your bible.

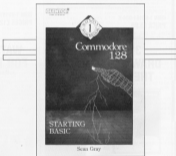
There are books available for beginners so you needn't worry if you're new to computers. 'Starting Basic, Commodore 128 book 1' is a useful little tome from Glengay Computer Books. It is principally a replacement for the Basic section of the 128 manual and is far superior to it. The book is full of programming examples and illustrations to help you on your way and is definitely recommended to anyone who wishes to learn about their machine.

SAMI has produced a couple of C128 books, they are both available in the UK from Pitman Publishing. The first book is the 'Official Book for the Commodore 128 Personal Computer' which, like Glengay's book is an introduction to the machine and how to use it, though it doesn't go very deeply into

programming. The latest book 'Commodore 128 Reference Guide for Programmers' is quite a lot better. It is not, as its title would suggest, a technical book for programmers but, as with the Glengay, is more of a re-write of the manual. Even so, it is extremely well written and an ideal choice as a beginner's book, or even for an expert, as an invaluable reference guide, and it's so much better than the manual!

More advanced programmers will be

for the Commodore 128. At that time we hadn't come across any that were commercially available though we did print a superb assembler by Steve Currie in the July 1988 issue of Year Commodore. Since then Commodore have launched an Assembler and Program Development System. This is a suite of programs available on disk for all Commodore machines, all on the same disk. Depending on the machine, different functions are available. For



pleased to find complete breakdowns of the machine's memory maps, including entry points to many useful machine code routines. I must say that it isn't as technical or as informative as the First Publishing books but is definitely a good all rounder.

### All in Machine Code

At the recent Commodore Show I was asked if we had heard of any assemblers

example, the C64 version has a monitor but since the C128 has one built into the machine there is no point in having another one. The Assembler offers nothing out of the ordinary but it does work well. If you are used to macros and other such fancy bits then I'm afraid that you may be a little disappointed!

Many of the functions available with the editor can also be used with Basic, for example moving the cursor to the top of the screen and pressing cursor up



## MULTISOFT

Assembler  
and  
Program Development System  
FOR  
C128 CMI and PLUS1 Computers

A comprehensive package for fast machine language application programming.

COMMODORE

# BASIC Compiler C128

- Compiles machine language code or high-compact-code, or uses the two during single compilation.
- Compiles a series of programs using assembly.
- Listing language instructions.

**The Complete BASIC  
compiler and  
development system**



will display the previous line of any listing on the screen, i.e. you now have bi-directional scrolling. A Search and Replace function is also available in Basic, one of the few that I have come across for Basic routines and extremely useful.

The manual is quite clear but if you have never touched machine code before then you will need to read up on it first because the manual doesn't try to teach you.

If you want an assembler for your 128 then this package is one that you shouldn't be without.

For those of you who want the speed of machine code but without the inconvenience of learning another language, First Publishing has come to your aid with their Basic Compiler Basic 128.

Basic 128 is an updated version of their CMI compiler. It understands all of the C128 Basic commands and will turn most programs into machine code without too many problems. This package is extremely powerful and allows you to produce either integer programs for speed or floating point programs if you need to use a lot of numerical data in your program.

Basic 128 would be an excellent and welcome addition to any C128 software collection.

## Late Arrival

Commodore has just released a suite of programs for the C128 for small businesses. The programs, called Micro-Cler, comprise of a wordprocessor, database, spreadsheet, accounting package and lots more.

First impressions are extremely favourable, the program is fully integrated with many sections being in memory all of the time. You always have jokers available at the press of a function key, you can leave phone numbers or messages on these. A convenient diary function will allow you to keep track of appointments, birthdays etc. all at the touch of another button. All in all, Micro-Cler should make most of your other software obsolete.

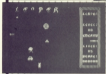
I don't think it would be unfair to say that this is the type of package that Commodore should give away with the C128 computer. Other manufacturers have done it and have reaped vast rewards thereby. For a full review of this unbeatable package you will have to wait until next month.

## More!

In this small series of articles I have tried to mention all of the packages that we have seen in the Year Commodore office. I would hope that there are many more out there to fulfil the growing demand for software on this machine. If you do know of something or you are producing something do let us know about it, we would love to cover it in a future issue.

## Touch Line

PRECISION SOFTWARE LTD.	8 Park Terrace, Westcliff Park, Salford, RTH 7TD TEL 01-506 7100
R1280 FOR SUPERBASE 128	100.00
R1280 FOR SUPERBASE 127 128	100.00
SUPERBASE THE BOOK	111.00
VISA SOFTWARE LTD.	Grange Road, Innes Road, Chelms, Essex SSO 6BB TEL 0462 614000
RICH STAR	1225.00
RICH CLASSIC	100.00
TIMEWAVE (UK) LTD.	P.O. Box 482, Haddenham, Berkshire SL4 2BT
WORDWRITER 128	107.00
SOFTWARE 128	107.00
SOFTWARES 128	107.00
FIRST SOFTWARE LTD	Unit 128, Wellington Road, Huddersfield Park, Huddersfield, West. Yorks. HD1 2HT TEL 0474 71000
BASIC 128	100.00
REVISIONS OF THE C128	111.00
REVISIONS OF THE 1271	111.00
TIPS AND TRICKS FOR THE C128	111.00
COMMODORE BUSINESS MACHINES	Murray Road, Winton, Gorty, Northants, NN1 1JG
R1280 CLASS	100.00
ASSEMBLER AND PROGRAM DEVELOPMENT SYSTEM	
FITPAGE	
THE COMMODORE 128 REFERENCE GUIDE FOR PROGRAMMERS	120.00
THE OFFICIAL BOOK FOR THE COMMODORE 128	111.00



## LEAPER

Amazing old action arcade animation and sonics. 6 really nasty gribbles, 6 levels, 3 tunes, and even the last VMC. The game you've been waiting for... C16, C64.



# BUG-BYTE



## JEEP COMMAND

Escape through uncharted enemy territory under ferocious fire. Drive that jeep. Fire those guns. Jump the ramps. It's fast, furious and addictive. C64, C16.



Argus Press Software Group, Victoria House, Leicester Place, London WC2H 7NB. 01-438 0868.  
For mail-order and 'Byte-me' T-shirts (small, med, large) £3.

Allen Webb shows

you how to

reconfigure your

C64.

ONCE YOU START DIGGING, it soon becomes apparent that the C64 is a highly versatile machine. The Vic chip is particularly cunning in its ability to address any part of RAM for the screen memory and character set.

Machine code users won't be too concerned about this, but for Basic users, it's a godsend. The way in which the machine decides on the memory usage is quite simple.

First, the RAM is split into four banks of 64K. The particular bank in use is specified by the lowest two bits of location \$027E.

The position of the screen memory and character set within the current bank are specified by bits four to seven and bits one to three of location \$107E, respectively. While constraints, manipulation of these two locations allows you to change the configuration of the bit to suit your needs.

### Why Bother?

Why reconfigure the machine? The main reason is that you may want to use redefined characters. If you use Basic, however, you will want to maximize the memory available to Basic. The simple demonstrations in the Programmer's Reference Guide use the default bank with the characters starting at 1024 (\$0400). This leaves you a pathetic 12K for Basic and minimal space for sprites. With a bit of thought, as I will show, you can have redefined characters with no loss of memory!

So where can we move the screen and character memories? The character memory requires 2K and the screen needs 1K. That means that in each bank there are eight positions for the character set and 16 positions for the screen. The limitations are as follows.

# ON LOCATION

## PROGRAM - RECONFIGURE

```

1 REM*****
2 REM* RECONFIGURE PROGRAM *
3 REM* GENERATOR AEW[SPC2]1986 *
4 REM*****
10 PRINT CHR$(147);POKE 53280,15
   :POKE 53281,0
20 PRINT"[DOWN]"TAB(10)"(WHITE)CRM
   :64 RECONFIGURE"
30 PRINT"[DOWN]"TAB(12)"A E WEBB[SPC2]
   :1986"
40 INPUT"[DOWN]"WHAT OUTPUT DEVICE (DI
   :SC=0, CASSETTE=1)"DE
50 PRINT CHR$(147);PRINT"(WHITE)WHAT
   :FILE NAME IS THE RECONFIGURE[SPC7]
   :PROGRAM TO";
60 INPUT " HAVE";F1$
70 PRINT CHR$(147);TAB(12)"SCREEN POSIT
   :ION"
80 PRINT"[DOWN]"THE AVAILABLE LOCATIONS
   :ARE...";
90 PRINT"[YELLOW]BANK 0:[CYAN]"
100 PRINT"1024 ($0400)...DEFAULT VALUE"
110 PRINT"8192 ($2000) TO 15360 ($3C00
   :)"
120 PRINT"[DOWN,YELLOW]BANK 1:[CYAN]"
130 PRINT"16384 ($4000) TO 31744 ($7C00
   :)"
140 PRINT"[DOWN,YELLOW]BANK 3:[CYAN]"
150 PRINT"32768 ($8000) TO 39792 ($9400
   :)"
160 PRINT"[DOWN,YELLOW]BANK 3:[CYAN]"
170 PRINT"49152 ($C000) TO 52224 ($CC00
   :)"
180 PRINT"[DOWN,MAGENTA]IN INCREMENTS
   :OF 1024 ($0400)"
190 PRINT"[DOWN,WHITE]"INPUT REQUIRED
   :POSITION"
200 INPUT IS:IF LEFT$=""$
   :1)="E"AND LEN(1$)>5 THEN 40

```

Bank 0 (\$0000-\$3FFF)

# on

The machine uses this bank by default with the video memory at 16384 (\$6800) and the character set image from 4096 to 8191 (\$1000 to \$1FFF).

1) You cannot use the zero page and page one since this will corrupt the operating system.

2) The use of this bank will generally severely limit your RAM for Basic and is therefore of little value. You could use a character set at 14336 (\$3800) if you're prepared to live with only 12K for your program.

3) You may not use 4096 to 8191 (\$1000 to \$1FFF) for screen memory since this is the character set image.

## Bank 1 (\$4000-\$7FFF)

You can use all of this bank but my earlier comments on reduced RAM apply.

## Bank 2 (\$8000-\$BFFF)

1) There is a character set image between 8664 and 40000 (\$2000 to \$9FFF). This area may not be used for screen memory.

2) The Basic ROM occupies 40840 to 49151 (\$A000 to \$C000) precluding the use of this area for either screen or character. It can, however, be used for high resolution graphics or sprite designs.

## Bank 3 (\$C000-\$FFFF)

1) The area 49152 to 52047 (\$C000 to \$CFFF) may be used for screen memory and character.

2) The area from 12448 (\$2800) is occupied by the kernel ROM and other chips and is of limited value. The ROM area (\$4000 onwards) may be used for high resolution graphics or sprites only.

If you use banks 0, 1 or 2 you must remember to lower the top of memory to protect your screens or characters from corruption by Basic variables. If your screen or character (whichever the lower) starts at address AD, you may protect them by the line:

```
POKE 1640/256: CLR
```

The area between the ROMs in bank 3 is a perfect area to use. This memory cannot be corrupted by Basic

```

210 GOSUB 760:SP=1
220 IF INT(SP/1024)<>SP/1024 THEN 70
230 PRINT CHR$(147):TAB(10) "CHARACTER
POSITIONS"
240 PRINT "AVAILABLE LOCATIONS ARE...."
250 PRINT "[YELLOW]BANK 0:[CYAN]"
260 PRINT "2048 ($0000)"
270 PRINT "8192 ($2000) TO 14336 ($3800
)"
280 PRINT "[DOWN,YELLOW]BANK 1:[CYAN]"
290 PRINT "16384 ($4000) TO 20720 ($700
0)"
300 PRINT "[DOWN,YELLOW]BANK 2:[CYAN]"
310 PRINT "32768 ($8000) TO 34816 ($BB0
0)"
320 PRINT "36864 ($9000) TO 38912 ($9B0
0) ROM IMAGE"
330 PRINT "[YELLOW]BANK 3:[CYAN]"
340 PRINT "49152 ($C000) TO 51200 ($CBB0
0)"
350 PRINT "[DOWN,MAGENTA]IN INCREMENTS
OF $8000"
360 PRINT "[DOWN,WHITE]INPUT REQUIRED
POSITION"
370 INPUT I$:IF LEFT$(I$,
1)=-"B"AND LEN(I$)<=5 THEN 230
380 GOSUB 760:CP=I
390 IF INT(CP/2048)<>CP/2048 THEN 230
400 IF SP=CP THEN 70
410 IF INT(SP/16384)<>INT(CP/16384)THE
N 70
420 FOR L=0 TO 0:CY=0:FOR D=0 TO 15
:READ A:CY=CY+A:POKE 828+L*16+D,A
:NEXT D
430 READ A:IF A<=CY THEN PRINT "ERROR
IN LINE":2040+(L*16):STOP
440 NEXT L
450 DATA 160,0,185,1,192,153,1,8,200,
192,187,208,242,96,0,235,2083
460 REM
470 FOR L=0 TO 11:CY=0:FOR D=0 TO 15
:READ A:CY=CY+A:POKE 12*4096+L*16
+D,A:NEXT D
480 READ A:IF A<=CY THEN PRINT "ERROR
IN LINE":2040+(L*16):STOP
490 NEXT L
500 DATA 21,8,193,7,158,32,50,48,55,51,
58,143,33,65,76,195,1192
510 DATA 32,87,69,66,66,66,0,0,0,173,158,
8,172,159,8,133,353,1384
520 DATA 132,254,169,0,133,251,169,208,
133,252,173,14,220,41,254,141,3544

```

# LOCATION

```

530 DATA 14,220,185,1,41,251,130,1,160,
0,177,251,140,253,24,165,200)
540 DATA 251,105,1,133,251,165,252,105,
0,133,252,24,165,253,105,1,2194
550 DATA 133,253,165,254,165,0,133,254,
165,252,201,218,208,220,165,1,2725
560 DATA 0,4,133,1,173,14,220,9,1,141,
14,220,173,24,208,41,1365
570 DATA 240,53,163,8,41,15,13,161,8,
141,24,208,173,162,8,143,1319
580 DATA 136,2,173,2,221,9,3,141,2,221,
173,0,221,37,252,13,1608
590 DATA 160,8,141,0,221,169,164,160,8,
32,30,171,96,0,182,0,1332
600 DATA 32,200,0,147,54,32,32,78,79,
87,32,82,69,67,79,78,1168
610 DATA 70,73,71,85,82,69,68,0,0,255,
0,255,0,255,219,83,1585
620 PA=SP/256:POKE 49314,PA
630 POKE 49311,CP/256:POKE 49310,
CP:(PEEK(49311)*256)
640 BA=INT(SP/16384):POKE 49312,3-BA
650 SP=(SP-(BA*16384))/64:POKE 49313,SP
660 CP=(CP-(BA*16384))/1024
:POKE 49315,CP
670 PRINT CHR$(147)"(WHITE)SCREEN AT
:(SPC,YELLOW)"SP
680 PRINT"(WHITE)CHARACTERS AT(SPC,
YELLOW)"CP
690 PRINT"FILENAME "T1$
700 PRINT"(DOWN.GREEN)IF YOU ARE SURE,
MAKE CERTAIN THAT A(SPC4)DISK OR
CASSETTE IS IN THE",
710 PRINT" OUTPUT DEVICESAND PRESS ANY
KEY."
720 GET I$:IF I$=""THEN 720
730 PRINT CHR$(147)"(DOWN)POKE45,185
:POKE46,8:CLR":
740 PRINT"SAVE"CHR$(34)F1$CHR$(34)":.DE
750 PRINT"(HOME)":POKE 138,1
:POKE 631,13:SYS 629:END
760 I=0:IF LEFT$(I$,1)="# THEN 760
770 I=VAL(I$):RETURN
780 I$=RIGHT$(I$,4)
790 FOR CH=1 TO 4:GOSUB 810
800 I=I+(V-1)*16/4-CH:NEXT:RETURN
810 V=1
820 IF MID$(I$,CH,1)=MID$("0123456789A
BCDEF",V,1)THEN 840
830 V=V+1:GOTO 820
840 RETURN

```

and leaves you with all the Basic memory you have on your C64. If you want to be clever, since the normal screen memory is now unused, you can lower the start of Basic to 1625 (8040) leaving you nearly 4K, for Basic usage! If you want to use this area in bank 5, you can put the screen at:

```

$C000(4932),
$C400(5076),
$C800(5120), or
$CA00(51254)

```

and the characters at:

```

$C800(49152), or
$CA00(51254)

```

One extra warning, don't try to put the screen and character memories in the same place, it won't work properly!

## The program

The listing generates a short program which will reconfigure the 64 for you. You tell it where you want the screen and character memories and it generates a short machine-code program and automatically saves it to disk or cassette. The creation of the program involves destroying the original program so make sure that you:

1) Type it in exactly as listed.  
2) Don't try to stop it during its execution.

To reconfigure your machine, simply load the machine code routine and RUN it. If you fail it, you will see that it has just one line of Basic. Once the machine is reconfigured, you will get a remaining message on the screen.

What the program actually does is:

1) Copies the normal (uppercase) character set to the new character area, and  
2) Resets the bank and memory areas as required.

The program contains some prompting to help you remember what is allowed, and it will prevent the more fundamental mistakes. Now all it stops you from using an illegal area of memory is be careful.

# CROSSWORD

## Tax your grey matter

### with this program

### from M R Gillings

IF YOU ARE FED UP OF blasting aliens, don't want to try to solve another adventure and would like to have a go at something different, how about a crossword?

This program comes complete with a suite of four crosswords for you to try and solve. In a future issue we will be printing these crosswords and giving details of how to enter your own.

Crossword displays a standard grid on the screen and each clue is scrolled across the bottom with space beneath to enter the answer.

The function keys are used to select the question that is being displayed. Their functions are as follows:

F1 - Reset to first across clue.  
F2 - Reset to first down clue.  
F3 - Finish, save or another grid.  
F4 - Displays next clue without entering current answer or to grid.

RETURN - Enter answer on to grid and display next clue.

### Getting It All In

Crossword is presented as a set of two Basic loaders, the first set, 'CROSS LOAD' will set up and save a machine code program called CROSSWORD on to tape or disk. This is the program that you should always RUN when you want to use the program.

Before you RUN the CROSS LOAD program you

should enter the following command:

POKE 45,6:POKE 44,5:POKE 7675,0:NEW

This will ensure Basic so that the CROSSWORD program will be generated correctly.

The second set of loaders, 'CROSS LOAD' will set up the questions on either disk or tape. Before you RUN this set of programs switch your machine OFF and ON. When RUN, this set of loaders will create a file called 'CROSS' on disk or tape. You will not be able to list this program as

it is just data for the crossword.

Before LOADING the CROSS LOAD program enter the following line: POKE 43,0:POKE 44,0:POKE 2770,0:NEW

**NOTE:** If using cassette make sure that all of the loaders are saved in order, as each section of program when finished will LOAD the next and automatically RUN it.

### Using the Program

To use the program, simply LOAD the program 'CROSSWORD' and RUN it. The initial screen will show the controls and ask for the Data Filename. This is the name of the data file which you have created. At the moment this is 'CROSS'. After loading you will be asked for which of the four crosswords that you wish to use.

### Next Month

Because of the length of this article we are printing the CROSSWORD LOAD program this month and the rest of the CROSS LOAD programs

in next month's issue.

If you purchase this month's cassette or disk from our software service all parts of the program will be on it.

### Crossword 1

0000 750,0:GOTO 10:GOTO 10:GOTO 10	0100 047010,1,1,0,150,30,50,	0200 047010,1,1,0,150,30,50,	0300 047010,1,1,0,150,30,50,	0400 047010,1,1,0,150,30,50,	0500 047010,1,1,0,150,30,50,	0600 047010,1,1,0,150,30,50,	0700 047010,1,1,0,150,30,50,	0800 047010,1,1,0,150,30,50,	0900 047010,1,1,0,150,30,50,	1000 047010,1,1,0,150,30,50,	1100 047010,1,1,0,150,30,50,	1200 047010,1,1,0,150,30,50,	1300 047010,1,1,0,150,30,50,	1400 047010,1,1,0,150,30,50,	1500 047010,1,1,0,150,30,50,	1600 047010,1,1,0,150,30,50,	1700 047010,1,1,0,150,30,50,	1800 047010,1,1,0,150,30,50,	1900 047010,1,1,0,150,30,50,	2000 047010,1,1,0,150,30,50,	2100 047010,1,1,0,150,30,50,	2200 047010,1,1,0,150,30,50,	2300 047010,1,1,0,150,30,50,	2400 047010,1,1,0,150,30,50,	2500 047010,1,1,0,150,30,50,	2600 047010,1,1,0,150,30,50,	2700 047010,1,1,0,150,30,50,	2800 047010,1,1,0,150,30,50,	2900 047010,1,1,0,150,30,50,	3000 047010,1,1,0,150,30,50,	3100 047010,1,1,0,150,30,50,	3200 047010,1,1,0,150,30,50,	3300 047010,1,1,0,150,30,50,	3400 047010,1,1,0,150,30,50,	3500 047010,1,1,0,150,30,50,	3600 047010,1,1,0,150,30,50,	3700 047010,1,1,0,150,30,50,	3800 047010,1,1,0,150,30,50,	3900 047010,1,1,0,150,30,50,	4000 047010,1,1,0,150,30,50,	4100 047010,1,1,0,150,30,50,	4200 047010,1,1,0,150,30,50,	4300 047010,1,1,0,150,30,50,	4400 047010,1,1,0,150,30,50,	4500 047010,1,1,0,150,30,50,	4600 047010,1,1,0,150,30,50,	4700 047010,1,1,0,150,30,50,	4800 047010,1,1,0,150,30,50,	4900 047010,1,1,0,150,30,50,	5000 047010,1,1,0,150,30,50,	5100 047010,1,1,0,150,30,50,	5200 047010,1,1,0,150,30,50,	5300 047010,1,1,0,150,30,50,	5400 047010,1,1,0,150,30,50,	5500 047010,1,1,0,150,30,50,	5600 047010,1,1,0,150,30,50,	5700 047010,1,1,0,150,30,50,	5800 047010,1,1,0,150,30,50,	5900 047010,1,1,0,150,30,50,	6000 047010,1,1,0,150,30,50,	6100 047010,1,1,0,150,30,50,	6200 047010,1,1,0,150,30,50,	6300 047010,1,1,0,150,30,50,	6400 047010,1,1,0,150,30,50,	6500 047010,1,1,0,150,30,50,	6600 047010,1,1,0,150,30,50,	6700 047010,1,1,0,150,30,50,	6800 047010,1,1,0,150,30,50,	6900 047010,1,1,0,150,30,50,	7000 047010,1,1,0,150,30,50,	7100 047010,1,1,0,150,30,50,	7200 047010,1,1,0,150,30,50,	7300 047010,1,1,0,150,30,50,	7400 047010,1,1,0,150,30,50,	7500 047010,1,1,0,150,30,50,	7600 047010,1,1,0,150,30,50,	7700 047010,1,1,0,150,30,50,	7800 047010,1,1,0,150,30,50,	7900 047010,1,1,0,150,30,50,	8000 047010,1,1,0,150,30,50,	8100 047010,1,1,0,150,30,50,	8200 047010,1,1,0,150,30,50,	8300 047010,1,1,0,150,30,50,	8400 047010,1,1,0,150,30,50,	8500 047010,1,1,0,150,30,50,	8600 047010,1,1,0,150,30,50,	8700 047010,1,1,0,150,30,50,	8800 047010,1,1,0,150,30,50,	8900 047010,1,1,0,150,30,50,	9000 047010,1,1,0,150,30,50,	9100 047010,1,1,0,150,30,50,	9200 047010,1,1,0,150,30,50,	9300 047010,1,1,0,150,30,50,	9400 047010,1,1,0,150,30,50,	9500 047010,1,1,0,150,30,50,	9600 047010,1,1,0,150,30,50,	9700 047010,1,1,0,150,30,50,	9800 047010,1,1,0,150,30,50,	9900 047010,1,1,0,150,30,50,	10000 047010,1,1,0,150,30,50,
------------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	-------------------------------

27,25,102,177,1,156,208,207,  
22,41,9,1984  
2450 BAF022,14,20,148,4,140,  
23,208,140,121,208,149,8,142,  
8,40,9,1984  
2460 BAF026,76,78,30,148,81,1  
0,229,18,107,88,141,227,19,  
79,158,1425  
2470 BAF028,149,88,140,227,1  
0,148,83,140,227,18,142,8,22  
4,127,43,1826  
2480 BAF029,2,94,128,168,28  
2,208,43,140,91,9,183,80,42,  
121,80,1811  
2490 BAF034,24,100,83,128,1  
1,168,188,128,83,128,83,180,  
29,41,121,1284  
2500 BAF038,28,124,42,34,12  
0,97,1,141,228,10,22,234,18,  
222,74,1422  
2510 BAF039,18,147,79,141,9  
20,18,22,224,10,22,74,158,1  
9,1,100,1873  
2520 BAF040,127,80,142,80,142  
80,24,149,22,19,122,80,144  
2,229,1689  
2530 BAF046,200,204,91,8,208  
224,94,147,147,22,208,220,1  
49,1,140,2287  
2540 BAF051,208,24,12,208,2  
40,128,188,228,24,120,42,2,2  
34,204,197,2289  
2550 BAF059,9,241,92,9,140,  
8,149,4,183,9,22,6,22,9,227,  
22,1420  
2560 BAF060,228,120,8,22,8,182  
0,84,120,8,4,182,0,42,121,0  
,128  
2570 BAF05,182,0,94,122,8,8,  
182,8,47,122,8,7,208,208,228  
,1410  
2580 BAF064,98,148,8,120,12  
1,228,128,208,220,224,144,18,  
79,186,12,1210  
2590 BAF068,0,22,182,11,24,  
142,85,182,8,120,88,149,3,22  
9,44,1273  
2600 BAF069,192,40,208,227,  
94,122,67,149,10,121,282,24,  
227,223,10,2284  
2610 BAF074,22,22,246,12,19,  
244,2,22,148,11,19,244,2,22,  
24,1022  
2620 BAF071,122,220,180,8,27  
7,221,149,85,200,192,8,208,2  
47,184,67,2219  
2630 BAF076,220,222,220,222,  
220,222,94,142,0,142,0,22,24  
7,11,22,2282  
2640 BAF08,12,12,14,12,222,2

26,46,208,242,262,9,180,0,22  
,41,1422  
2650 BAF012,20,20,12,22,14,2  
2,222,224,40,208,242,142,0,1  
40,8,1440  
2660 BAF022,42,12,12,8,22,22  
1,6,12,222,224,40,208,242,14  
2,0,1228  
2670 BAF044,6,8,22,79,12,22,9  
8,12,22,27,22,222,224,40,208  
,242,1422  
2680 BAF020,88,142,86,208,8  
208,1,94,148,80,142,80,262,  
208,220,2220  
2690 BAF0126,208,248,74,122,  
12,107,128,122,221,149,129,1  
22,222,149,128,248  
2700 BAF011,282,120,224,74,  
227,220,149,221,208,192,7,28  
8,247,74,182,2887  
2710 BAF020,24,100,8,120,22  
2,149,12,228,224,182,220,24,1  
06,8,122,2882  
2720 BAF028,144,2,220,221,1  
44,9,74,149,120,122,220,149,  
29,122,220,2422  
2730 BAF049,0,122,222,149,2  
7,120,224,94,122,122,148,221  
78,148,0,2222  
2740 BAF0122,221,148,1,120,2  
22,148,27,122,220,122,228,94  
224,148,7,2884  
2750 BAF0122,221,148,27,122,  
222,94,148,0,142,220,94,22,8  
1,9,204,208  
2760 BAF022,208,2,74,220,12  
281,724,208,2,74,220,12,208  
,120,208,2081  
2770 BAF0176,122,14,201,126  
228,2,74,100,12,74,192,12,2  
24,189,1879  
2780 BAF01182,192,122,122,1  
1,7,126,208,242,122,92,9,48  
2,208,42,2022  
2790 BAF048,148,94,79,149,24  
2,120,202,7,124,208,220,122,  
92,9,182,2,188  
2800 BAF060,42,122,78,148,24  
222,94,148,8,127,98,120,284  
7,200,1887  
2810 BAF026,94,9,208,220,28  
8,8,148,29,120,284,7,189,8,1  
22,204,2814  
2820 BAF076,74,221,92,9,208  
29,208,2,14,228,12,201,120,  
208,2,1922  
2830 BAF074,242,122,74,8,12,1  
48,182,120,204,7,149,0,122,2  
04,229,1818  
2840 BAF028,204,94,9,208,1  
126,187,20,222,224,7,148,2,1

28,204,1946  
2850 BAF029,74,92,12,148,18  
2,120,204,7,149,8,120,204,20  
9,124,14,1922  
2860 BAF040,206,74,222,12,224  
224,140,92,9,122,92,8,204,2  
8,208,1,27  
2870 BAF074,20,22,201,22,2  
40,22,122,92,9,201,91,48,2,7  
8,1228  
2880 BAF090,22,201,47,14,1,7  
4,92,12,122,92,9,26,220,44,1  
71,1278  
2890 BAF090,8,120,184,7,74,2  
12,12,122,92,9,26,188,122  
8,41,1246  
2900 BAF022,89,220,127,42,2  
22,90,129,94,9,202,124,42,24  
27,249,1428  
2910 BAF01,140,88,12,74,88,2  
7,1,180,0,182,144,7,142,87,2  
40,12272  
2920 BAF024,94,9,244,22,149  
127,24,109,80,12,122,188,244,  
2,220,1824  
2930 BAF049,74,79,12,148,74,  
148,80,22,74,89,12,148,24,28  
4,22,1222  
2940 BAF081,122,7,122,199,7  
149,4,122,120,222,122,199,2  
19,124,228,2241  
2950 BAF022,22,122,18,74,14  
0,1,224,224,224,224,224,224  
224,224,222,2288  
2960 BAF099,24,220,92,8,22,  
92,8,202,127,42,208,8,149,2,  
141,1422  
2970 BAF090,8,148,8,120,88,2  
2,22,29,122,92,9,10,208,182,  
64,1286  
2980 BAF042,122,220,182,42,4  
2,122,224,148,8,120,88,148,2  
7,122,286,1977  
2990 BAF022,89,22,148,8,120,  
88,22,120,12,22,14,22,120,  
12,2028  
3000 BAF074,22,12,22,90,24,1  
47,8,241,92,9,122,88,74,182,  
22,1224  
3010 BAF022,80,14,122,126,42  
142,92,9,74,227,12,224,224,  
224,122,1842  
3020 BAF090,9,182,144,42,140  
124,208,189,8,241,20,208,122  
92,9,1422  
3030 BAF09,148,189,8,42,140,7  
4,208,189,148,141,1,208,12  
2,92,1422  
3040 BAF08,188,208,42,140,24  
8,7,189,1,141,22,208,142,0,1  
42,12,2747

3050 BAF08,120,147,144,24,12  
8,1,148,24,141,22,2,88,94,8,  
264,1287  
3060 BAF080,8,208,18,187,18,  
241,88,9,174,82,14,222,128,4  
1,12,1487  
3070 BAF041,42,14,181,28,28  
8,74,49,224,122,187,48,141,2  
8,2,148,2628  
3080 BAF024,140,21,8,88,148  
9,9,21,22,208,141,14,208,74,  
9,22,1217  
3090 BAF09,14,187,0,122,88,  
22,122,11,148,220,142,8,182,  
220,22,1278  
3100 BAF017,220,40,240,8,22  
4,208,242,74,144,4,222,74,1  
24,14,142,2279  
3110 BAF011,24,224,220,208,  
8,74,181,22,224,224,224,204,  
224,224,149,2644  
3120 BAF0208,122,220,149,22,  
122,204,149,122,182,149,27,  
122,84,22,2288  
3130 BAF088,12,148,8,120,88,  
22,122,11,148,22,148,22,122,  
271,7,1422  
3140 BAF088,247,22,122,120,  
7,128,208,222,14,8,204,89  
208,1,1942  
3150 BAF074,26,122,202,78,208  
220,149,8,122,88,22,122,11,  
180,22,1424  
3160 BAF088,22,122,120,121,7  
126,208,247,22,41,4,224,224  
224,224,2282  
3170 BAF024,200,89,208,2,74  
4,12,22,178,208,222,0,8,8,1  
40,128  
3180 BAF022,188,199,22,120,1  
82,7,126,208,247,22,41,9,224  
224,224,2222  
3190 BAF024,224,220,82,208,  
2,74,48,12,204,74,204,227,18  
0,222,148,2488  
3200 BAF022,120,202,22,126,2  
26,202,149,0,140,91,9,74,208  
224,149,1208  
3210 BAF08,241,92,9,74,249,1  
8,148,8,120,88,22,122,11,240  
-12,1228  
3220 BAF088,22,22,122,120,7  
-126,202,247,22,41,9,202,88,  
208,2,1227  
3230 BAF074,142,12,201,84,98  
8,242,148,44,182,67,22,120,1  
22,7,126,191  
3240 BAF028,197,12,92,9,22,  
44,92,148,0,142,1,148,220,22







3140 047AC0F,39,151,91,6,305  
,43,26,251,167,4,183,250,28,  
152,66,1600

3150 047AA,156,204,211,166,2  
1,160,229,26,152,157,7,182,2  
61,27,22,2077

3160 047A92,4,162,208,26,12  
3,224,6,124,208,223,22,41,4,  
149,247,2020

3170 047AD,209,252,249,21,1  
41,24,208,167,7,182,164,27,1  
81,158,6,184

3180 047AC6,204,247,66,249,  
147,22,49,66,22,24,72,12,87,  
25,82,1268

3190 047AD,74,71,82,49,77,2  
2,67,77,77,49,82,22,47,74,77  
,1118

3200 047AD,76,49,64,49,22,8  
7,73,24,72,22,82,67,82,75,82,  
,1120

3210 047AD,87,79,82,49,82,0  
2,65,78,68,22,65,22,82,66,49,  
,1088

3220 047AF,17,76,79,62,69,0  
2,76,82,67,77,76,77,84,89,22,  
,1262

3230 047C1,44,74,72,68,77,8  
0,79,22,42,76,68,22,84,22,80

,1020  
3240 047AF,66,22,22,22,22,2  
0,46,22,87,72,49,79,22,82,49  
,1080

3250 047C1,82,49,82,84,49,6  
0,22,76,79,82,22,68,82,84,82  
,1216

3260 047C2,76,77,76,49,72,8  
0,77,64,22,22,49,76,84,64,82  
,1070

3270 047C2,197,198,204,207,  
211,22,22,65,76,68,22,204,1  
75,212,217,1209

3280 047C2,1394,22,72,64,89  
,46,22,22,22,22,21,66,22,84,  
72,1140

3290 047AF,82,49,22,45,82,6  
9,22,76,79,82,82,22,67,74,79,  
,1072

3300 047AA,82,79,76,22,72,4  
9,84,82,66,22,124,177,22,45,  
22,1247

3310 047AD,49,82,49,84,22,8  
4,79,22,76,77,82,82,84,22,65  
,1162

3320 047AD,82,79,82,82,22,4  
7,76,82,64,46,124,179,22,45,  
22,1291

3330 047AD,49,82,49,84,22,8

4,79,22,76,77,82,82,84,22,68  
,1116

3340 047AF,87,76,22,67,76,8  
0,68,46,22,22,124,181,22,45,  
22,1187

3350 047C1,72,76,72,82,72,8  
4,82,68,86,64,22,76,82,22,62  
,1188

3360 047AF,74,74,22,49,82,7  
0,76,82,76,49,66,22,20,22,20  
,1064

3370 047AC,182,22,45,22,78  
,18,82,84,22,67,76,82,49,44,  
22,1202

3380 047C1,22,22,22,22,65,7  
0,82,22,76,49,82,64,79,22  
,1094

3390 047C1,79,62,62,22,68,6  
0,84,62,46,67,82,77,82,82,87  
,1129

3400 047C1,22,62,22,66,89,2  
0,77,66,82,46,71,72,76,76,72  
,1089

3410 047C1,71,82,46,22,22,0  
2,18,22,22,22,22,22,22,22,22,  
8,779

3420 047C1,149,22,22,22,2  
,22,22,7,22,42,22,22,229  
,122,181,192

3430 047C1,126,208,227,74,  
250,21,224,224,224,224,224,2  
24,224,224,2,242

3440 047A6,8,8,8,8,8,8,8,8,8,8,8,  
8,8,8,8,8,8,8,8

3450 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3460 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3470 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3480 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3490 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3500 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

3510 047C1,208,224,224,224,224,  
224,224,224,224,224,224,224,  
224

SUBSCRIPTION ORDER FORM

Your **COMMODORE**



Whatever your interest in the Commodore range of computers and peripherals, you simply cannot afford to miss a single issue.

SUBSCRIPTION RATES

- \$56.00 for 12 Issues U.S.
- \$61.50 for 12 Issues Overseas Surface mail
- \$67.00 for 12 Issues Overseas Air mail



Send this form with your remittance to:  
EMULATED LTD, Times House, 175 The Barbours,  
Bristol, Gloucestershire, G1 1BB.

Name   
 Address   
 City   
 Country   
 Tel. No.   
 Name (if different)   
 Address   
 City   
 Country   
 Tel. No.   
 Name (if different)   
 Address   
 City   
 Country   
 Tel. No.

# ALL CLEAR

**William Fong**  
 provides some  
 unusual ways of  
 clearing your screen.

PROFESSIONAL PROGRAMS always have the edge on those that you write for yourself at home. Even something as simple as a screen clear can look so much better. Text may split into two and scroll off into the margins. Text may scroll off the top off the screen. In fact the number of different ways that the screen is cleared is quite amazing.

Now you can add these professional touches to your own programs with a series of routines that are called by a simple SYS call. There are 21 different screen-clear routines in this package ranging from a simple right scroll to one that I call Shake Quarter Split screen scroll.

## Getting It All In

Typing in the programs should give no problems. It is

presented in the form of a Basic loader with a check on every line to make sure that you have entered it correctly. Once you RUN the Basic loader it will generate a Machine Code file called 'ALL CLEAR' and save it on to a disk. If you are using tape make sure to change the # in the SAVE instruction to #1 as indicated in the ROM line above.

## Using the Program

Whenever you wish to use ALL CLEAR in your programs you simply have to LOAD it into your C64 with one of the following commands:

```
LOAD "ALL CLEAR".S1 for disk
or
LOAD "ALL CLEAR".L1 for tape.
```

Before you will find a list of all of the SYS calls and the type of clear that they perform, some I couldn't even think of a name for. To use a routine simply type SYS followed by the number.

An example program is included so that you can see what each routine does.

Call	Description
SYS 49152	Logged right
SYS 49155	Split right
SYS 49158	Diagonal right
SYS 49161	Split right up colour
SYS 49164	Split right up
SYS 49167	Logged left
SYS 49170	Split
SYS 49173	Double split
SYS 49176	Secondary double split
SYS 49182	Double break
SYS 49185	Strip
SYS 49188	Left break
SYS 49191	Right break
SYS 49194	Bottom break split
SYS 49197	Routine 1
SYS 49200	Routine 2
SYS 49203	Quarter split
SYS 49206	Shake quarter split
SYS 49209	Full again split
SYS 49212	Temp shake
SYS 49215	Moist off
SYS 49218	Moist shake play

PROGRAM: ALL CLEAR.GEN

```
1000 REM *****
***
1010 REM *
*
1020 REM *   ALL CLEAR GENERATOR
*
1030 REM *
*
1040 REM *****
***
2000 FORL=0TO128:CX=0:FORO=0TO15:REA
DA:CX=CX+A:POKE49152+L*16+O,A:NEXTO
2010 READA:IFA<=CXTHENPRINT"ERROR IN
LINE",2040+(L*16):STOP
2020 NEXTL
2040 DATA76.69,192.76.83,192.76.104,
192.76.123,192.76.149,192.76.1944
2050 DATA170,192.76.184,192.76.190,1
92.76.214,192.76.230,192.76.246,2582
2060 DATA192.76.6,193.76.19,193.76.3
5,193.76.51,193.76.70,193,1718
2070 DATA76.85,193.76.114,193.76.146
,193.76.184,193.76.219,193.76,2170
2080 DATA0,194.76.63,194,160,0,32,12
6,194,32,183,194,200,192,40,1860
2090 DATA48,245,96,160,0,32,126,194,
200,192,40,48,248,160,0,32,1821
2100 DATA163,194,200,192,40,48,248,9
6,160,0,32,126,194,32,163,194,2082
2110 DATA169,13,33,210,255,200,192,2
5,48,249,96,160,0,32,126,194,1932
2120 DATA200,192,40,48,248,160,0,32,
97,197,169,13,32,210,255,200,2093
2130 DATA192,25,48,243,96,160,0,32,1
26,194,200,192,40,48,248,169,2013
2140 DATA13,32,210,255,200,192,64,48
,248,96,160,0,32,97,197,32,1674
2150 DATA80,197,200,192,40,48,249,96
,160,0,32,97,197,32,126,194,1816
2160 DATA200,192,40,48,245,96,160,0,
32,60,197,32,163,194,200,192,2081
2170 DATA30,48,245,76,184,192,160,0,
32,97,197,32,126,194,200,192,2005
2180 DATA10,48,245,76,188,192,160,0,
32,115,197,32,144,194,200,192,2035
2190 DATA30,48,245,76,214,192,160,0,
32,124,197,32,135,194,200,192,2079
2200 DATA40,48,245,76,230,192,160,0,
```

32.80.197.200.192.40.48.248.2008  
2210 DATA76.246.192.160.0.32.60.197.  
32.97.197.200.192.10.48.248.1984  
2220 DATA76.214.192.160.0.32.126.194  
32.183.194.200.192.35.40.245.2083  
2230 DATA76.19.193.160.0.32.97.197.3  
2.124.197.32.126.194.200.192.1871  
2240 DATA10.48.242.76.30.193.160.0.3  
2.163.194.32.80.197.200.192.1894  
2250 DATA15.48.245.76.31.193.160.0.3  
2.172.194.32.69.197.32.181.1897  
2260 DATA194.32.78.197.32.190.194.32  
.87.197.200.192.5.48.233.78.1887  
2270 DATA70.193.160.0.32.183.194.32.  
128.194.32.172.194.32.130.194.1923  
2280 DATA32.181.194.32.144.194.32.19  
0.194.32.153.194.200.192.40.48.2052  
2290 DATA237.98.180.0.32.163.194.32.  
126.194.32.172.194.32.138.194.1903  
2300 DATA32.113.197.32.78.197.32.124  
.197.32.87.197.32.124.197.32.1705  
2310 DATA87.197.200.192.40.48.221.96  
.160.0.32.163.194.32.60.197.1919  
2320 DATA32.173.194.31.69.197.32.78.  
197.32.190.194.93.87.197.32.1767  
2330 DATA190.194.32.87.197.200.192.4  
0.48.224.96.180.0.32.97.197.1906  
2340 DATA32.128.194.32.106.197.32.10  
6.197.32.124.197.32.69.197.32.1765  
2350 DATA144.194.32.78.187.32.159.19  
4.200.192.20.48.224.76.86.193.2043  
2360 DATA160.0.32.23.195.32.100.199.  
32.81.190.200.192.40.48.242.1773  
2370 DATA160.0.32.56.198.32.106.198.  
32.228.194.32.41.196.32.50.1587  
2380 DATA199.200.182.40.48.236.160.0  
.32.156.198.32.0.199.30.10.1734  
2390 DATA197.32.47.195.32.191.198.20  
0.192.40.48.236.76.6.193.160.2041  
2400 DATA0.32.137.197.32.163.197.32.  
200.199.32.175.199.32.228.195.2043  
2410 DATA32.181.198.200.192.40.48.23  
3.160.0.32.253.194.32.237.197.2229  
2420 DATA32.231.196.32.25.195.32.216  
.196.32.181.196.200.192.40.48.2053  
2430 DATA233.160.0.32.60.197.200.192  
.15.48.248.76.219.193.32.228.2133  
2440 DATA194.32.32.195.32.72.183.32.  
122.195.32.172.195.32.222.193.1929  
2450 DATA32.16.196.32.66.198.32.118.  
196.32.166.196.32.216.196.32.1752  
2460 DATA10.197.96.32.203.194.32.253  
.194.32.47.195.32.97.193.32.1841  
2470 DATA149.195.32.197.195.32.247.1  
95.32.41.196.32.91.196.32.143.2001  
2480 DATA196.32.191.196.32.241.196.3  
2.35.197.96.162.32.142.205.3.2030  
2490 DATA162.39.189.205.3.187.0.4.18  
9.235.219.157.0.216.202.224.2267  
2500 DATA0.16.239.96.162.32.142.39.4  
.162.39.189.39.4.157.40.1369

.224.0.16.239.96.162.32.142.2974  
2520 DATA79.4.162.39.189.79.4.157.80  
.4.189.79.216.157.89.216.1574  
2530 DATA202.224.0.16.239.96.162.32.  
142.119.4.162.39.189.119.4.1749  
2540 DATA157.120.4.189.119.216.157.1  
20.216.202.224.0.16.239.96.162.2207  
2550 DATA32.142.159.4.162.39.189.159  
.4.157.160.4.189.159.216.157.1932  
2560 DATA160.216.202.224.0.16.239.96  
.162.32.142.189.4.162.39.189.2082  
2570 DATA199.4.157.200.4.189.199.216  
.157.200.216.202.224.0.16.239.1423  
2580 DATA96.162.39.142.239.4.162.39.  
189.239.4.157.240.4.189.239.2137  
2590 DATA216.157.240.216.202.224.0.1  
6.239.96.162.32.142.23.5.162.2132  
2600 DATA39.189.23.5.157.24.5.189.23  
.217.157.24.217.202.224.0.1625  
2610 DATA16.239.96.162.32.142.63.5.1  
62.39.189.63.5.157.64.5.1439  
2620 DATA189.63.217.157.64.217.202.2  
24.0.16.239.96.162.32.142.103.2123  
2630 DATA5.162.39.189.103.5.157.104.  
5.189.103.217.157.104.217.202.1958  
2640 DATA224.0.16.239.96.162.32.142.  
143.5.162.39.189.143.5.157.1754  
2650 DATA144.5.189.143.217.157.144.2  
17.242.224.0.16.239.96.162.32.2187  
2660 DATA143.143.5.142.39.189.183.5.  
157.184.5.189.183.217.157.184.2184  
2670 DATA217.202.224.0.16.239.96.162  
.32.142.223.5.142.39.189.223.2171  
2680 DATA5.157.224.5.189.223.217.157  
.224.217.202.224.0.16.239.96.2393  
2690 DATA162.32.142.7.6.162.39.189.7  
.6.157.6.6.189.7.218.1837  
2700 DATA157.0.218.202.224.0.16.239.  
96.162.32.142.47.6.162.39.1750  
2710 DATA109.47.6.157.48.6.189.47.31  
8.157.48.218.202.224.0.16.1772  
2720 DATA239.96.162.32.142.87.6.162.  
39.189.87.6.157.88.6.189.1687  
2730 DATA87.218.157.88.218.202.224.0  
.16.239.96.162.32.142.127.6.2014  
2740 DATA162.39.189.127.6.157.128.6.  
189.127.218.157.128.218.202.224.2277  
2750 DATA5.16.239.96.162.32.142.167.  
6.142.39.189.167.6.157.168.1748  
2760 DATA6.189.167.218.157.168.218.2  
02.224.0.16.239.96.162.32.142.2236  
2770 DATA207.6.142.39.189.207.6.157.  
208.6.189.207.218.157.208.218.2384  
2780 DATA202.224.0.16.239.96.162.32.  
142.247.6.162.39.189.247.6.2009  
2790 DATA157.248.6.189.247.218.157.2  
48.218.202.224.0.16.239.96.162.2627  
2800 DATA32.142.31.7.162.39.189.31.7  
.157.32.7.189.31.219.157.1432  
2810 DATA32.219.202.224.0.16.239.96.  
162.32.142.71.7.162.39.189.1832

```

3820 DATA71,7,157,72,7,189,71,219,15
7,72,219,202,224,0,16,239,1922
3830 DATA96,162,32,142,111,7,162,39,
189,111,7,157,112,7,189,111,1634
3840 DATA219,157,112,219,202,224,0,1
6,239,96,162,32,142,151,7,162,2140
3850 DATA39,189,151,7,157,152,7,189,
151,219,157,152,219,202,224,0,2215
3860 DATA16,239,96,162,32,142,191,7,
162,39,189,191,7,157,192,7,1829
3870 DATA189,191,219,157,192,219,202
,224,0,16,239,96,32,162,192,32,2367
3880 DATA212,197,32,6,198,32,96,198,
32,106,198,32,156,198,32,206,1891
3890 DATA198,32,0,199,32,90,199,32,1
99,199,32,150,199,32,200,199,1853
3900 DATA98,32,137,197,32,187,197,32
,237,197,32,31,198,32,81,198,1916
3910 DATA32,131,198,32,181,198,32,23
1,198,32,25,199,32,75,199,32,1627
3920 DATA25,199,32,175,199,32,225,1
99,96,162,32,142,40,4,162,0,1824
3930 DATA189,0,4,157,255,3,189,0,216
,157,255,215,232,224,40,48,2184
3940 DATA239,96,162,32,142,80,4,162,
0,189,40,4,157,39,4,189,1939
3950 DATA40,216,157,39,216,232,224,4
0,48,239,96,162,32,142,120,4,2007
3960 DATA162,0,189,80,4,157,79,4,189
,80,216,157,79,216,232,224,2066
3970 DATA40,48,239,96,162,32,142,160
4,162,0,189,120,4,157,119,1674
3980 DATA4,189,120,216,157,119,216,2
32,224,40,48,239,96,162,32,142,2396
3990 DATA200,4,162,0,189,160,4,157,1
59,4,189,160,216,157,159,216,2136
4000 DATA232,224,40,48,239,96,162,32
,142,240,4,162,0,189,200,4,2014
4010 DATA157,189,4,189,200,216,157,1
99,216,232,224,40,48,239,96,162,2578
4020 DATA32,142,24,5,162,0,189,240,4
,157,239,4,189,240,216,157,2000
4030 DATA239,216,232,224,40,48,239,9
6,162,32,142,64,5,162,0,189,2090
4040 DATA24,5,157,23,5,189,24,217,15
7,23,217,232,224,40,48,239,1824
4050 DATA96,162,32,142,104,5,162,0,1
99,84,5,157,63,5,189,64,1439
4060 DATA217,157,63,217,232,224,40,4
5,239,96,162,32,142,144,5,162,2180
4070 DATA0,189,184,5,157,183,5,189,1
84,217,157,183,217,232,224,40,2048
4080 DATA48,239,96,162,32,142,184,5,
162,0,189,144,5,157,143,5,1713
4090 DATA189,144,217,157,143,217,232
,224,40,48,239,96,162,32,142,224,250
4
4100 DATA5,162,0,189,184,5,157,183,5
,189,184,217,157,183,217,232,2269
4110 DATA224,40,48,239,96,162,32,142
,5,6,162,0,189,224,5,157,1794
4120 DATA223,5,189,224,217,157,223,2

```

```

17,232,224,40,48,239,96,162,32,2520
3130 DATA142,48,6,162,0,189,0,6,157,
7,6,189,6,216,157,7,1310
3140 DATA216,232,224,40,48,239,96,16
2,32,142,80,6,162,0,189,48,1928
3150 DATA86,157,47,6,189,48,216,157,4
7,216,232,224,40,48,239,96,1972
3160 DATA162,32,142,120,6,162,0,189,
88,6,157,87,6,189,88,216,1640
3170 DATA157,87,216,232,224,40,48,23
9,96,162,32,142,144,6,162,0,2013
3180 DATA189,120,6,157,137,6,189,120
,216,157,127,216,232,224,40,48,2184
3190 DATA239,96,162,32,142,208,6,162
,0,189,168,6,157,167,6,189,1929
3200 DATA160,216,157,167,216,232,224
,40,48,239,96,162,32,142,248,6,2397
3210 DATA162,0,189,208,6,157,207,6,1
89,208,216,157,207,216,232,224,2588
3220 DATA40,48,239,96,162,32,142,32,7
,162,0,189,248,6,157,247,1807
3230 DATA6,189,248,216,157,247,216,2
32,224,40,48,239,96,162,32,142,2498
3240 DATA72,7,162,0,189,32,7,157,31,7
,189,32,219,157,31,219,1511
3250 DATA232,224,40,48,239,96,162,32
,142,112,7,162,0,189,72,7,1784
3260 DATA157,71,7,189,73,219,157,71,
219,232,224,40,48,239,96,162,2203
3270 DATA32,142,152,7,162,0,189,112,
7,157,111,7,189,112,219,157,1795
3280 DATA111,219,232,224,40,48,239,9
6,162,32,142,192,7,162,0,189,2095
3290 DATA152,7,157,151,7,189,152,219
,157,151,219,232,224,40,48,239,2344
3300 DATA96,162,32,142,232,7,162,0,1
89,192,7,157,191,7,189,192,1937
3310 DATA219,157,191,219,232,224,40,
48,239,96,224,0,0,0,0,1889
3320 DATA0,87,0,3,0,31,0,91,0,27,0,9
1,0,27,4,91,432
4000 REM *****
***
4010 REM * SAVE ROUTINE
*
4020 REM *
*
4030 REM * IF USING CASSETTE MAKE SURE
E *
4040 REM * THAT YOU CHANGE THE :
* 4050 REM * .8.1 AFTER HAVE "ALL
CLEAR"
4060 REM * TO .1.1
4070 REM *
*
4080 REM *****
***
4090 POKE43,0:POKE44,192:POKE45,2:PO
KE46,200
4100 SAVE "ALL CLEAR",8.1
READY.
```

# Adventure Aid GRAPHICS

Allen Webb shows  
how to add graphics  
to your adventure  
programs.

MANY PEOPLE WHO become addicted to programming their home computers, enjoy the challenge of writing their own adventure games. This is all very well, but one area where you may have trouble is in providing the graphics which will enhance your finished work. This program will do just that.

It is designed to complement the Adventure Aid program which appeared in *Your Commodore*, May '86.

The problem with using graphics in adventures is that there is an inevitable conflict for memory. Since graphics are memory hungry, then we need a degree of cunning. There are a number of ways of implementing them.

1. Use of high resolution bit mapping. This is particularly demanding on memory with a full screen requiring 96K of RAM.

There are a number of ways of using this system.

Firstly, pictures can be loaded direct from storage. This, however, is only suitable for disk based systems.

Alternatively, you can draw the picture using simple drawing and filling commands. This tends to give pictures of limited complexity but works quite well. Another way is to store high resolution pictures in RAM using data compression.

2. Use reduced characters. There is a minimum overhead of 1024 bytes per character set, but with interrupts or fast

data moving you can use several character sets. You must, however, develop a system of encoding pictures in a memory efficient way. This method is not used that frequently with commercial adventures (Lambert's *Book of Diction* is an exception). Asacle adventures however, rarely use anything else.

3. Use sprites. This method has a number of bonuses and is the method I've chosen.

## C64 Painter

This package uses a block of sprites - four wide by two high - to provide a rectangular picture. This has a memory overhead of 512 bytes plus 50 bytes per picture. The system also saves the colours giving a further 10 bytes overhead per picture. The virtues of the system are:

1. You can position the picture anywhere on screen.
2. You can use sprite expansion to give pictures of four sizes.
3. The range of colours is wide: each basic sprite has three colours plus the background colour; the background colour can be extended by placing characters behind the sprite - this can become a special effect shading to give texture.

Overall, the theoretical maximum number of colours is in any given square is 76 (assuming fully expandable sprites).

4. You don't need interrupts to mix text and pictures.
5. The resolution is the same as bit mapped mode.

As is explained, the picture comprises of a block of eight sprites offering a resolution of 96 points horizontally and 42 points vertically. The code allows you to create and manipulate pictures.

I plan to show you how to generate pictures using two methods:

1. By recalling pre-drawn pictures as blocks of data from RAM.

2. Using a sequence of commands to draw the picture as you need it.

Since the code is rather large, the article will be in two parts. This part introduces the code and tells you how to use it. Next time I will give two editors and describe their use.

## How it Works

First, let me describe the code. The machine code is loaded in the usual way (using T) and starts at \$7800. The loader automatically drops the top of basic to protect the code. The commands offered are listed in Table 1.

These commands need a little more explanation.

Command 1 initializes the picture and puts it on the screen. All sprites are set to colour - COG, - and TYPE specifies the type of picture i.e. 8-high and 8-multi-colour. HIG and HIR specify whether or not the picture is expanded - 3 expanded, 3 unexpanded. X and Y are the co-ordinates of the top left corner of the picture.

Command 2 sets up the individual sprite colours.

Command 3 specifies the multicolour registers and the background colour.

Command 4 fills the picture with a specified byte. A value of zero clears the screen.

Command 5 changes a dot at position X and Y in a high resolution picture. FLAG decides how the dot is changed:

0 - erases the point

1 - sets the point

2 - flips the point

3 in the range zero to 41 and

4 in the range zero to 95.

Command 6 turns off the picture.

Command 7 draws a multicolour dot at X,Y if X is in the range zero to 41 and Y is in the range zero to 47 (don't forget that a multicolour dot is twice the width of a high resolution dot). The pen specifies the colour:

0 - background colour

1 - colour register 1 (C1)

2 - the sprite colour as specified in commands 1 or 2

3 - colour register 2 (C2)

Command 8 flips the picture.

Command 9 draws a high resolution line according to FLAG between X1,Y1 and X2,Y2. The resolution and FLAG values are as for command 5 except that values of four and five give dotted lines. A value of four starts the line with a dot and the value five starts it with a space. In multicolour mode, this command draws a multicolour line with the same X range as high resolution and the pen value is as for command 7. This allows the use of the same coding in either mode.

Command 10 is included to give compatibility with command 7. It is identical to command 7 in multicolour mode but uses an X value in the range zero to 47. This is clearly more correct than zero to 95.

Command 11 moves the picture to an area of RAM. This is stored as 512 bytes followed by 10 bytes holding the colour data. You can use any RAM except for the lower portion below 2048. The area behind the ROMs is particularly handy.

Command 12 recalls a

picture from a specified address in RAM. All colour registers are updated accordingly.

Command 11 moves a picture in RAM with the current picture according to a specified rate.

0 - AND  
1 - OR  
2 - XOR

The colour registers are not involved in this command.

Command 16 saves a block of RAM between addresses 5A and 1A to disk or cassette (depending on DRV). Only the area up to 8000 can be saved.

Command 15 tells the machine which sprites to use.

Commands 16 and 17 draw a random pattern of dots as seen at a screen. Command 18 uses high resolution mode and command 17 uses multi-colour. The pattern occupies a rectangle with its top left corner at position X and Y. DENSITY has a value from one to 255 and decides how many dots are drawn in this rectangle. SIZE specifies the size of the rectangle and has the value zero for small, one for

medium and two for large. FLAG and PEN are as described before for the Dot commands.

Commands 18 and 19 draw filled rectangles. The top left corner is specified by X1,Y1 and the bottom right corner by X2,Y2. FLAG and PEN are as for the line commands. FLAG set to four, for example, will draw a stripes square. FLAG set to two will flip a rectangular area.

Commands 20 and 21 draw triangular shapes. X1 and Y1 specify the position of the apex. X2 and Y2 specify the bottom left corner. The main constraint is that the base must be horizontal and the bottom right corner is therefore specified by X3 and Y2.

Command 22 draws a sequence of shapes.

You will have noticed that the scaling is different for high resolution and multi-colour modes. In high resolution modes, X values remain in the range zero to 63. In multi-colour mode, X values are kept in the range zero to 47. In both modes, Y remains in

the range zero to 47. The error trapping means that if you try to exceed these ranges, you will simply get a dot at the maximum value. If, for example, you try to plot a dot at X=60 and Y=48 in high resolution mode, you will get a dot at X=63 and Y=47.

In order to give you maximum flexibility, I have written the code to act on any sprite positions. All you need to do is tell it the position of the sprite pointers and the starting position of the picture (using command 15). As I will show in the next part, the most effective way of using this system is to make the start of Basic and use the block starting at sprite 32 in the default block with the screen at the normal location. The sprite pointers therefore start at 2040 and command 15 has the form:

#### PROGRAM DEMO.1

```

1 REM*****
2 REM* SPRITE PICTURES *
3 REM* DEMONSTRATION 1 *
4 REM*****
10 SA=30720
20 SYS SA+42.2040.248
   : REM SET UP SPRITE POSITION
30 XS=31: YS=32
40 SYS SA.XS.YS.1.0.1.1
   : REM PUT ON SCREEN
50 SYS SA+9.0: REM CLEAR IT
60 FOR X=0 TO 95 STEP 6
70 SYS SA+24.0.Y.X.41.1: Y=Y+3
   : NEXT
80 FOR I=1 TO 20: SYS SA.XS.YS.1.0.
   RND(1)*2.RND(1)*2
90 FOR D=1 TO 200:NEXT:NEXT
95 SYS SA.XS.YS.1.1.1.1
96 FOR I=0 TO 7:C(1)=RND(1)*16:NEXT
97 SYS SA+3.C(0).C(1).C(2).C(3).
   C(4).C(5).C(6).C(7)
101 SYS SA+30.40960
102 SYS SA+9.0
103 FOR I=1 TO 30
104 SYS SA+24.RND(1)*96.RND(1)*42.
   RND(1)*95.RND(1)*42.RND(1)*4
   :NEXT
107 SYS SA+36.40960.2: SYS SA+31
110 FOR J=1 TO 100:SYS SA+6.
   RND(1)*16.RND(1)*16.6
120 FOR I=0 TO 7:C(1)=RND(1)*16
   :NEXT
125 SYS SA.RND(1)*60+40.
   RND(1)*100+50.1.1.RND(1)*2.
   RND(1)*2
130 SYS SA+3.C(0).C(1).C(2).C(3).
   C(4).C(5).C(6).C(7):NEXT

```

Table 1

Command	Name	Syntax
1	INIT	YS SA,X.Y.COLOUR.PEN,RES
2	COL	YS SA+5.C1.C2.C3.C4.C5
	CHANGE	C6.C7.C8
3	CORNER3	YS SA+6.C1.C1.C1
		Background
4	FILL	YS SA+8.SPRITE
5	DOT	YS SA+12.X.Y.FLAG
6	OFF	YS SA+15
7	MULTIDOT	YS SA+18.X.Y.PEN
8	INVERT	YS SA+21
9	LINE	YS SA+24.X1.Y1.X2.Y2.FLAG
18	MULTIBOX	YS SA+37.X1.Y1.X2.Y2.PEN
19	SAVE	YS SA+39.ADDRESS
20	LOAD	YS SA+41.ADDRESS
23	PIX	YS SA+46.ADDRESS.BLOCK
24	SAVE	YS SA+49."FILENAME",DRV.DSA.DSA
25	SETP	YS SA+42.PONDER,SPRINT
26	BRUSH	YS SA+48.X.Y.DENSITY,SIZE.FLAG
27	BRUSH	YS SA+48.X.Y.DENSITY,SIZE.PEN
28	TRIARE	YS SA+51.X1.Y1.X2.Y2.FLAG
29	BRUSH	YS SA+48.X1.Y1.X2.Y2.SQUARE.PEN
20	TRIANGLE	YS SA+57.X1.Y1.X2.Y2.X3.FLAG
21	BRUSH	YS SA+48.X1.Y1.X2.Y2.X3.TRIANGLE.PEN
22	MULTIBOX	YS SA+45.ADDRESS SA is equal to 30720

## Demonstrations

DEMO 1 shows briefly what the commands can do.

The sequence commands is a way of saving drawing instructions as a sequence of numbers. The instruction runs through the data starting at the specified address and executes the instructions until the number 255 is met. All commands have the same form. The first number is a sequence identifier the in-

struction and this is followed by the required parameters. The supported commands are:

Code	Function
0	command 1
1	command 2
2	command 3
3	command 4
4	command 5
5	command 6
6	command 7
7	command 8
8	command 9
9	command 10
10	command 11
11	command 12
12	command 13
13	command 14
14	command 15
15	command 16
16	command 17
17	command 18
18	command 19
19	command 20

- 11 command 11
- 12 command 12
- 13 command 13

These codes are followed by the requisite parameters as specified in the commands given earlier. Here are some examples:

To draw a line in high resolution mode from 0,0 to 30,30, the byte sequence is:

0,0,0,0,0,1

To set up a full size, multi-colour picture at 80,80 with all pixels set to red, the byte sequence is:

0,80,80,2,1,1

DEMO 2 shows how this works. The data statements hold each command sequence and these are POKE'd

into memory. All high resolution mode commands act in before. Multicolour commands use the same zero to 255 range for R but must start using an even value for A. If you think about it, it's obvious since each bit pair starts on an even number.

The square and triangle commands require that you set the X1 and X2 co-ordinates respectively are set to one higher than you need. Again this is because the sequence command bypasses the user-friendly inputs to the commands. Finally, you must ensure that the airbrush area does not overlap the top boundary of the window. If the top left corner of the brush area is at 0,0 then you must ensure that (D\*W1)<96 and (Y\*H1)<142 where W1 and H1 are as in Table 2.

### PROGRAM: DEMO 2

```

1 REM*.....
2 REM* SPRITE PICTURES *
3 REM* DEMONSTRATION 2 *
4 REM*.....
10 DATA 0,0,1,50,15,1,1,0
20 DATA 1,14,14,14,14,0,0,0,0,0
30 DATA 2,11,12,0
40 DATA 3,0
50 DATA 0,0,0,95,21,2
60 DATA 0,0,21,95,42,2
70 DATA 11,10,15,0,30,16,3
80 DATA 11,10,13,0,30,4,1
90 DATA 11,20,12,12,30,26,3
100 DATA 11,20,12,12,30,12,1
110 DATA 11,30,14,24,30,44,3
120 DATA 11,30,14,24,30,30,1
130 DATA 11,40,11,38,30,56,3
140 DATA 11,48,11,38,30,44,1
150 DATA 11,64,12,54,30,86,3
160 DATA 11,64,12,54,30,64,1
170 DATA 13,0,21,10,1,0
180 DATA 13,0,21,10,1,0
190 DATA 13,18,21,10,1,0
200 DATA 13,24,21,10,1,0
210 DATA 13,32,21,10,1,0
220 DATA 13,40,21,10,1,0
221 DATA 7,66,9,70,5,0
222 DATA 7,64,8,74,6,0
223 DATA 7,63,7,79,7,0
224 DATA 7,61,8,83,8,0
225 DATA 7,63,9,81,9,0
230 DATA 255
240 FOR I=0 TO 170:READ X
   :POKE 53000+I,X:NEXT
250 SA=30720
260 SYS SA+42,2040,348
265 PRINT CHR$(147)
266 PRINT"HOME.BYSON.C8.DOWN"
   :TAB(23)"|SPC8.DOWN.LEFT6.C3.
   :SPC7|"
267 PRINT"IC2"TAB(8)"|BYSON.CK.
   :SPC23|"
268 PRINT"YELLOW"TAB(8)"|BYSON.
   :CK.SPC23|"
270 SYS SA+83,53000

```

### High Resolution

BIT	W1	H1	W1	H1
0	4	4	0	4
1	8	8	8	8
2	16	16	12	16

sequentially into the area starting at 10000. A single SYS call is then all that is needed to draw the picture.

If you use the sequence command you must be careful since there is no protection offered by the error detector. Additionally, apart from the multicolour routine, all multicolour scaling is removed. In fact, scaling gets a little messy and

in order to make the sequence command operate as quickly as possible, it expects a sequence less than 264 bytes in length. This is no hardship since you can use any number of sequences to draw a picture.

Don't worry if all those restrictions appear to complicate life, next time I'll provide an editor which will take care of everything for you.

### PROGRAM: LOADER

```

10 REM*.....
20 REM* SPRITE GRAPHICS *
30 REM* 18PC31A + 18PC21198618PC31*
40 REM*.....
2000 FOR L=0 TO 180:GX=0
   :FOR D=0 TO 18:READ A:GX=GX+A
   :POKE 30720+L*18+D,A:NEXT D
2010 READ A:IF A<>GX THEN PRINT"
HOR IN LINE":2040+(L*18):STOP
2020 NEXT L:POKE 36,120:NEW
2040 DATA 78,66,120,78,42,121,78,
   :69,121,78,64,121,78,144,121,78,
   :1475
2050 DATA 201,122,76,307,122,76,62,

```



123,76,105,123,76,194,124,76,  
250,2013

2060 DATA 124,76,85,125,76,169,125,  
76,70,126,76,113,126,76,158,126,  
1747

2070 DATA 76,17,127,76,96,127,76,  
196,127,76,97,128,76,179,128,76,  
1618

2080 DATA 34,129,32,148,120,165,20,  
141,62,3,32,148,120,165,20,141,  
1480

2090 DATA 63,3,32,148,120,165,20,  
141,64,3,32,148,120,165,20,141,  
1385

2100 DATA 65,3,32,148,120,165,20,  
141,66,3,32,148,120,165,20,141,  
1389

2110 DATA 67,3,32,158,120,51,211,  
120,32,11,121,32,25,121,169,255,  
1509

2120 DATA 174,103,3,160,0,138,143,  
168,232,208,192,8,208,247,160,  
255,2385

2130 DATA 140,31,208,98,32,253,174,  
32,130,173,32,247,183,95,173,66,  
2064

2140 DATA 3,208,13,169,24,141,68,3,  
169,0,141,29,209,76,166,120,1958

2150 DATA 169,68,141,68,3,169,255,  
141,29,209,173,62,3,160,0,133,  
1792

2160 DATA 0,208,158,8,208,209,209,  
192,8,240,7,24,169,68,3,76,1704

2170 DATA 191,120,96,173,67,3,208,  
13,169,21,141,68,3,169,0,141,  
1583

2180 DATA 23,208,76,239,120,169,42,  
141,68,3,169,255,141,28,208,173,  
2058

2190 DATA 63,3,160,1,153,0,208,209,  
209,192,9,208,247,24,169,68,1845

2200 DATA 3,153,0,208,209,209,192,  
17,208,247,96,160,0,173,64,3,  
1924

2210 DATA 153,39,208,209,192,8,208,  
248,99,173,65,3,208,6,169,0,1976

2220 DATA 141,39,208,96,168,253,  
141,28,208,96,169,0,141,68,3,32,  
1784

2230 DATA 148,120,165,20,172,69,3,  
153,39,208,238,69,3,173,69,3,  
1652

2240 DATA 201,8,208,239,96,32,148,  
120,165,20,141,37,208,32,148,  
120,1919

2250 DATA 165,20,141,38,208,32,148,  
120,165,20,141,33,208,96,32,148,  
1713

2260 DATA 129,165,29,141,69,3,165,  
170,133,251,165,171,133,252,160,  
0,2117

2270 DATA 173,68,3,145,251,145,251,  
24,105,1,139,251,165,252,105,0,  
2092

2280 DATA 133,252,165,252,197,170,  
208,232,165,252,205,106,3,208,  
225,96,2868

2290 DATA 32,148,120,165,20,32,49,  
128,141,70,3,32,148,120,165,20,  
1391

2300 DATA 32,63,128,141,71,3,32,  
148,120,165,20,141,80,3,169,24,  
1336

2310 DATA 141,68,3,173,70,3,32,161,  
122,136,140,72,3,169,21,141,2473

2320 DATA 68,3,173,71,3,32,161,122,  
136,140,73,3,160,4,173,73,1435

2330 DATA 3,141,68,3,32,191,122,24,  
109,72,3,141,74,3,160,24,1170

2340 DATA 173,72,3,141,68,3,32,191,  
122,141,75,3,173,70,3,66,1396

2350 DATA 237,75,3,141,75,3,74,74,  
74,141,75,3,30,30,10,141,1147

2360 DATA 77,3,173,75,3,66,237,77,  
3,141,77,3,180,21,173,73,1352

2370 DATA 3,141,68,3,32,191,122,  
141,78,3,173,71,3,66,237,76,1400

2380 DATA 3,141,75,3,160,3,141,68,  
3,32,193,122,24,109,78,3,1157

2390 DATA 141,79,3,169,0,133,252,  
173,74,3,139,251,160,0,6,251,  
1828

2400 DATA 58,252,230,192,6,208,247,  
24,165,251,169,79,3,139,251,165,  
2523

2410 DATA 252,105,0,133,252,34,165,  
251,101,170,133,251,165,252,101,  
171,2528

2420 DATA 133,252,173,107,3,240,3,  
32,172,122,173,83,3,240,22,201,  
1956

2430 DATA 1,240,5,201,2,240,20,36,  
172,77,3,185,164,122,140,0,1698

2440 DATA 17,251,145,251,96,172,77,  
3,169,255,96,249,164,122,160,0,  
2187

2450 DATA 49,251,145,251,96,172,77,  
3,185,164,122,160,0,49,251,249,  
2215

2460 DATA 215,78,133,122,128,64,52,  
16,8,4,2,1,173,89,3,73,1130

2470 DATA 255,141,80,3,68,160,0,  
208,56,237,68,3,16,249,96,169,  
1824

2480 DATA 0,24,169,68,3,136,208,  
249,96,169,0,141,21,208,96,32,  
1560

2490 DATA 148,120,165,20,32,56,126,  
141,70,3,14,70,3,32,148,120,1368

2500 DATA 165,20,32,63,126,141,71,  
3,32,148,129,165,20,240,13,291,  
1560

2510 DATA 1,240,24,201,2,240,36,▶

201.3.340.52.96.169.0.141.80.  
1738

2520 DATA 3.32.174.121.238.70.3.32.  
174.121.96.169.0.141.80.3.1437

2530 DATA 32.174.121.238.70.3.238.  
80.3.32.174.121.96.169.1.141.  
1693

2540 DATA 80.3.32.174.121.238.70.3.  
208.80.3.32.174.121.96.169.1602

2550 DATA 1.141.80.3.32.174.121.  
238.70.3.32.174.121.96.169.170.  
1621

2560 DATA 133.251.165.171.133.252.  
160.0.177.251.73.255.145.251.  
165.251.2833

2570 DATA 24.105.1.133.251.165.252.  
165.0.133.252.165.251.197.170.  
208.2412

2580 DATA 231.165.252.205.106.3.  
208.224.96.32.148.120.165.20.32.  
49.2856

2590 DATA 126.141.82.3.32.148.120.  
165.20.32.63.126.141.84.3.32.  
1316

2600 DATA 148.120.165.20.32.49.126.  
141.80.3.32.148.120.165.20.32.  
1404

2610 DATA 63.126.141.85.3.32.148.  
120.165.20.141.80.3.169.0.141.  
1437

2620 DATA 107.3.32.148.126.173.83.  
3.56.237.82.3.141.86.3.173.1458

2630 DATA 85.3.56.237.84.3.141.87.  
3.169.1.141.88.3.141.89.1331

2640 DATA 3.173.87.3.16.10.160.253.  
140.89.3.73.255.24.105.1.1396

2650 DATA 141.90.3.173.86.3.16.10.  
160.255.140.89.3.73.255.24.1321

2660 DATA 105.1.141.91.3.173.91.3.  
56.237.99.3.141.92.3.16.1246

2670 DATA 35.169.255.141.93.3.169.  
0.141.94.3.173.90.3.141.98.1605

2680 DATA 3.173.91.3.141.96.3.173.  
87.3.48.3.169.1.141.92.32.1230

2690 DATA 3.76.52.124.169.0.141.83.  
3.169.255.141.94.3.173.91.1587

2700 DATA 3.141.95.3.173.90.3.141.  
95.3.173.86.3.48.5.169.1232

2710 DATA 1.141.94.3.173.95.3.141.  
97.3.56.237.96.3.141.98.1382

2720 DATA 3.173.98.3.141.99.3.78.  
95.3.173.96.3.56.237.95.1264

2730 DATA 3.141.100.3.173.82.3.141.  
70.3.173.84.3.141.71.3.1194

2740 DATA 173.28.208.240.14.173.70.  
3.41.254.141.70.3.32.235.132.  
1802

2750 DATA 76.118.124.32.174.121.  
173.100.3.18.30.24.109.89.3.141.  
1343

2760 DATA 100.3.173.82.3.24.109.84.  
3.141.82.3.173.84.3.24.1101

2770 DATA 109.83.3.141.84.3.76.160.  
124.56.237.98.3.141.109.3.1451

2780 DATA 173.82.3.24.109.89.3.141.  
82.3.173.84.3.24.109.86.1190

2790 DATA 3.141.84.3.204.97.3.48.3.  
76.84.124.169.0.141.107.1289

2800 DATA 3.96.32.148.120.165.20.  
32.56.126.141.82.3.14.82.3.1123

2810 DATA 32.148.120.165.20.32.63.  
126.141.84.3.32.148.120.165.20.  
1419

2820 DATA 32.56.126.141.83.3.14.83.  
3.32.148.120.165.20.32.63.1121

2830 DATA 126.141.85.3.32.148.120.  
76.165.123.32.148.120.165.29.  
133.1637

2840 DATA 253.165.31.133.254.164.  
170.165.171.132.251.133.252.160.  
0.130.2844

2850 DATA 165.1.41.248.133.1.177.  
251.145.253.24.165.251.105.1.  
139.2894

2860 DATA 251.165.252.105.0.133.  
252.24.165.253.105.1.133.253.  
165.254.2511

2870 DATA 105.0.133.254.165.251.  
197.170.208.220.165.252.305.106.  
3.208.2842

2880 DATA 213.165.1.9.7.133.1.88.  
140.0.185.37.208.145.253.200.  
1005

2890 DATA 201.10.308.246.96.32.148.  
120.165.20.133.253.165.21.139.  
254.2305

2900 DATA 164.170.165.171.132.251.  
133.252.120.165.1.41.248.133.1.  
160.2307

2910 DATA 0.177.253.143.251.24.165.  
251.103.1.133.251.165.252.105.0.  
2278

2920 DATA 133.252.24.165.253.105.1.  
133.253.165.254.105.0.133.254.  
165.2305

2930 DATA 251.197.170.208.220.165.  
252.205.106.3.208.213.160.0.177.  
253.2768

2940 DATA 193.132.3.200.192.10.208.  
246.165.1.9.7.133.1.88.160.1708

2950 DATA 0.165.132.3.133.37.208.  
200.192.10.208.245.96.32.148.  
130.1949

2960 DATA 165.20.133.253.165.21.  
133.254.32.148.120.165.20.141.  
80.3.1853

2970 DATA 164.170.165.171.132.251.  
133.252.120.165.1.41.248.133.1.  
160.2307

2980 DATA 0.173.80.3.240.22.201.1.  
240.9.177.253.61.251.145.251.  
3127

2990 DATA 76.3.126.177.253.17.251.

145,251,76,3,126,177,259,49,251,  
 2333  
 3000 DATA 145,251,24,165,251,165,1,  
 149,251,165,252,105,0,133,252,  
 24,2357  
 3010 DATA 165,259,105,1,133,259,  
 165,254,105,0,133,254,165,251,  
 197,170,2604  
 3020 DATA 208,191,185,252,208,166,  
 3,208,184,165,1,9,7,133,1,88,  
 1926  
 3030 DATA 95,201,96,144,2,169,95,  
 96,201,48,144,2,169,47,96,201,  
 1807  
 3040 DATA 42,144,3,169,41,96,32,  
 212,225,32,148,120,165,20,72,  
 165,1685  
 3050 DATA 21,72,32,148,120,165,1,  
 41,254,133,1,148,26,144,21,164,  
 1463  
 3060 DATA 133,21,104,133,20,169,20,  
 32,95,225,168,1,9,1,133,1,1262  
 3070 DATA 96,32,148,120,165,20,164,  
 21,133,168,132,169,32,148,120,  
 164,1832  
 3080 DATA 20,148,105,3,132,170,169,  
 0,133,171,168,0,8,170,38,171,  
 1580  
 3090 DATA 200,192,6,208,247,24,165,  
 171,165,2,141,166,3,96,32,148,  
 1846  
 3100 DATA 120,165,20,141,103,3,32,  
 148,120,165,20,141,104,3,32,148,  
 1465  
 3110 DATA 120,165,20,141,103,3,32,  
 148,120,165,20,141,101,3,32,148,  
 1481  
 3120 DATA 120,165,20,141,80,3,32,  
 238,128,24,109,203,3,32,48,128,  
 1289  
 3130 DATA 141,70,3,32,236,128,24,  
 109,104,3,32,83,128,141,71,3,  
 1284  
 3140 DATA 32,174,121,206,102,3,173,  
 102,3,208,219,96,168,255,141,14,  
 2018  
 3150 DATA 212,141,85,212,169,128,  
 141,18,212,169,128,141,24,212,  
 178,27,2123  
 3160 DATA 212,74,74,74,74,174,101,  
 3,208,1,74,224,2,240,1,74,1610  
 3170 DATA 96,32,148,120,165,20,141,  
 103,3,32,148,120,165,20,141,104,  
 1558  
 3180 DATA 3,32,148,120,165,20,141,  
 102,3,32,148,120,165,20,141,101,  
 1461  
 3190 DATA 3,32,148,120,165,20,141,  
 88,3,32,236,126,24,199,103,3,  
 1345  
 3200 DATA 32,56,126,10,141,70,3,32,  
 286,126,24,109,104,3,32,63,1187  
 3210 DATA 126,141,71,3,32,236,123,  
 206,102,3,173,102,3,208,218,96,  
 1841  
 3220 DATA 32,148,120,165,20,32,49,  
 126,141,108,3,32,148,120,165,20,  
 1429  
 3230 DATA 32,63,126,141,110,3,32,  
 148,120,165,20,32,49,126,141,  
 109,1417  
 3240 DATA 3,32,148,120,165,20,32,  
 63,126,141,111,3,238,111,3,32,  
 1348  
 3250 DATA 148,120,165,20,141,101,3,  
 141,80,3,173,110,3,141,84,3,1436  
 3260 DATA 141,85,3,173,108,3,141,  
 82,3,173,109,3,141,83,3,173,1424  
 3270 DATA 101,3,141,80,3,32,162,  
 123,238,110,3,173,110,3,205,111,  
 1598  
 3280 DATA 3,144,215,96,32,148,120,  
 165,20,32,56,126,141,108,3,14,  
 1429  
 3290 DATA 108,3,32,148,120,165,20,  
 32,63,126,141,110,3,32,148,120,  
 1371  
 3300 DATA 165,20,32,56,126,141,109,  
 3,14,109,3,32,148,120,165,20,  
 1283  
 3310 DATA 32,63,126,141,111,3,236,  
 111,3,32,148,120,165,20,141,80,  
 1534  
 3320 DATA 3,173,110,3,141,84,3,141,  
 85,3,173,108,3,141,82,3,1256  
 3330 DATA 173,109,3,141,83,3,32,  
 162,123,238,110,3,173,108,3,205,  
 1671  
 3340 DATA 111,3,144,221,96,32,148,  
 120,165,20,32,49,126,141,108,3,  
 1519  
 3350 DATA 32,148,128,165,20,32,63,  
 126,141,110,3,32,148,120,165,20,  
 1445  
 3360 DATA 32,49,126,141,109,3,32,  
 148,120,165,20,32,63,126,141,  
 111,1418  
 3370 DATA 3,32,148,120,165,20,141,  
 102,3,238,102,3,32,148,120,165,  
 1542  
 3380 DATA 20,141,101,3,141,80,3,  
 173,110,3,141,84,3,173,108,3,  
 1287  
 3390 DATA 141,82,3,173,111,3,141,  
 85,3,173,109,3,141,83,3,173,1427  
 3400 DATA 101,3,141,80,3,32,162,  
 123,238,109,3,173,109,3,205,102,  
 1587  
 3410 DATA 3,144,212,96,173,80,3,  
 201,4,208,9,169,1,141,187,3,1554  
 3420 DATA 141,88,3,96,201,5,208,10,  
 169,1,141,107,3,169,254,141,1729  
 3430 DATA 80,3,96,82,148,120,165,

20,32,49,126,141,109,3,14,109,  
 1245  
 3440 DATA 3,32,148,120,165,30,32,  
 63,126,141,110,3,32,148,120,165,  
 1428  
 3450 DATA 20,32,49,126,141,109,3,  
 14,109,3,32,148,120,165,30,32,  
 1333  
 3460 DATA 63,126,141,111,3,32,148,  
 120,165,30,141,102,3,238,102,3,  
 1518  
 3470 DATA 14,102,3,32,148,120,165,  
 20,141,80,3,173,110,3,141,84,  
 1339  
 3480 DATA 3,173,109,3,141,82,3,173,  
 111,3,141,85,3,173,109,3,1314  
 3490 DATA 141,83,3,32,162,123,238,  
 109,3,173,109,3,205,102,3,144,  
 1633  
 3500 DATA 218,98,32,148,120,165,30,  
 133,180,165,21,133,181,169,0,  
 141,1922  
 3510 DATA 114,3,173,114,3,177,180,  
 201,255,240,20,170,189,43,131,  
 141,2153  
 3520 DATA 112,3,189,57,131,141,113,  
 3,200,140,114,3,108,112,3,96,  
 1525  
 3530 DATA 177,180,141,62,3,200,177,  
 180,141,63,3,200,177,180,141,64,  
 2088  
 3540 DATA 3,200,177,180,141,65,3,  
 200,177,180,141,66,3,200,177,  
 180,2093  
 3550 DATA 141,67,3,200,140,114,3,  
 32,114,120,76,50,129,182,0,177,  
 1528  
 3560 DATA 180,157,39,208,232,234,8,  
 240,4,200,76,127,129,200,140,  
 114,2278  
 3570 DATA 3,76,50,129,177,180,141,  
 57,208,200,177,180,141,38,208,  
 200,2145  
 3580 DATA 177,180,141,33,208,200,  
 140,114,3,76,50,129,177,180,141,  
 68,2017  
 3590 DATA 3,200,140,114,3,32,102,  
 121,76,50,129,177,180,141,70,3,  
 1541  
 3600 DATA 200,177,180,141,71,3,200,  
 177,180,141,80,3,200,140,114,3,  
 2010  
 3610 DATA 32,174,121,76,50,129,177,  
 180,141,79,3,200,177,180,141,71,  
 1922  
 3620 DATA 3,200,177,180,133,20,200,  
 140,114,3,32,235,122,76,50,129,  
 1814  
 3630 DATA 177,180,141,82,3,200,177,  
 180,141,84,3,200,177,180,141,83,  
 2149  
 3640 DATA 3,200,177,180,141,85,3,  
 200,177,180,141,80,3,200,140,  
 114,3024  
 3650 DATA 3,32,157,123,76,50,129,  
 177,180,141,82,3,200,177,180,  
 141,1881  
 3660 DATA 84,3,200,177,180,141,83,  
 3,200,177,180,141,80,3,200,177,  
 2034  
 3670 DATA 180,133,20,200,140,114,3,  
 32,165,123,76,50,129,177,180,  
 141,1863  
 3680 DATA 108,3,200,177,180,141,  
 110,3,200,177,180,141,109,3,200,  
 177,2109  
 3690 DATA 180,141,111,3,200,177,  
 180,200,140,114,3,133,20,32,148,  
 127,1909  
 3700 DATA 76,50,129,177,180,141,  
 108,3,200,177,180,141,110,3,200,  
 177,2052  
 3710 DATA 180,141,109,3,200,177,  
 180,141,111,3,200,177,180,200,  
 140,114,2236  
 3720 DATA 3,133,20,32,148,127,76,  
 50,129,177,180,141,108,3,200,  
 177,1704  
 3730 DATA 180,141,110,3,200,177,  
 180,143,109,3,200,177,180,141,  
 111,3,2056  
 3740 DATA 200,177,180,141,102,3,  
 200,177,180,200,140,114,3,133,  
 20,32,2002  
 3750 DATA 97,128,76,50,129,177,180,  
 141,108,3,200,177,180,141,110,3,  
 1908  
 3760 DATA 200,177,180,141,109,3,  
 200,177,180,141,111,3,200,177,  
 180,141,2320  
 3770 DATA 102,3,200,177,180,200,  
 140,114,3,133,20,32,97,128,76,  
 50,1855  
 3780 DATA 129,177,180,141,103,3,  
 200,177,180,141,104,3,200,177,  
 180,141,2326  
 3790 DATA 102,3,200,177,180,141,  
 101,3,200,177,180,200,140,114,3,  
 32,1853  
 3800 DATA 195,126,76,50,129,177,  
 180,141,103,3,200,177,180,141,  
 104,3,1985  
 3810 DATA 200,177,180,141,102,3,  
 200,177,180,141,101,3,200,177,  
 180,200,2362  
 3820 DATA 140,114,3,133,20,32,94,  
 127,76,50,129,80,125,148,172,  
 187,1558  
 3830 DATA 214,240,23,61,99,137,181,  
 220,3,129,129,129,129,129,129,  
 139,2088  
 3840 DATA 130,130,130,130,130,130,  
 131,255,0,255,255,255,0,255,0,  
 255,2441

# JOHNNY REB II

The American Civil War is raging at its height. The Union and Confederate armies are recruiting anyone old enough to hold a musket. It's a time for brave and fearless men. You are Johnny Reb—one of the bravest of them all.



An accurate full scrolling graphics battle simulation



Argus Press  
Software Group

Argus Press Software  
Liberty House  
222 Regent Street  
LONDON W1B 7DB  
01-439 0666

Spectrum,  
Commodore,  
Amstrad  
£9.95



LOTHLORIEN

# ART FOR ART'S SAKE

**Evelyn Mills has been  
doodling with a new  
graphics package.**

THE 3D GRAPHICS DRAWING BOARD is a recent addition to the growing collection of graphics software for the G4 and IBM and is a definite must for those interested in geometric design.

Using this program you can create 3D images on the screen using either cursor or joystick control. These images can be altered with the commands available in so many ways that there is ample scope for your imagination.

The drawings which you create can be saved individually to disk, or as sub-pairs which may then be linked to existing designs at a later date. All drawings can likewise be saved to the Kodak Printer by an independent icon, thus leaving you with plenty of scope to use the full facilities of this software. The 3D Graphics Board however, is excellent in every way as a stand alone program.

## Try Your Hand

How does it work? On loading and running, a very well designed 3D Main Menu is displayed with 25 options available. Let us assume that you choose a cylinder from these options using any number of sides from three to 50. A press of the PB (or space bar) leads to the Secondary Menu with 12 options. Choose the pencil mode to draw, select three points as instructed and, in a matter of seconds there is your cylinder.

Now you may rotate, move, enlarge, reduce, twist, turn, stretch, extend, recalc, copy, change viewing angle and much more. A veritable arsenal of commands is there for your use and everything moves very smoothly and with commendable speed. Whatever you choose to do is visible on the screen as you manipulate the commands.



When you are happy with the result, press the PB or equivalent space bar and your drawing is complete. You may, of course add further designs to the existing one.

Basically you have a cube, a pyramid and a cylinder with which to work. Correct rotation of the cylinder will give circles or ovals. There is, of course, free hand drawing by various means and, for exact drawing, co-ordinates are listed at the bottom of the screen so that a design may be constructed accurately; this is particularly useful for architectural and perspective draughtsmanship.

Co-ordinates are also shown for most of the other features which help you to keep track of what you have been doing.

Erasure facilities are, of course, available - for total erasure, line/lines erasure and sub-part erasure. Files may likewise be erased.



Both the Main Menu and the Secondary Menu are freely interchangeable and the permutations and combinations of such interchanges are virtually infinite. This is extended even more by the ability to add previously saved sub-pairs to existing drawings (remembering screen limitations).

A demo is included on the disk which is intended to show you how the program works. This is not a display of graphics as such but is a teaching facility which highlights each icon as it is used, showing the result on screen.

The all important manual explains everything in a well defined manner, providing a printed display of each icon, a description of how it works and several programs you try. There are certainly no problems here and, on the final page, there is a display of the Main Menu in 'Basic English' which is a great help for quick reference.

The printer output is for the HP5801 or 802 and can be in normal or enlarged size.

Having enthused so much there remains little to say except that this is a very welcome and innovative addition to the world of 3D computer graphics on the G4/IBM.



## Touch Line

3D Graphics Drawing Board  
Clonning Publishers  
£14.95

# GO BANANAS

**FREE Slimpak Library Box**  
with every box of Bananas  
— Key Ring with every  
2 packs or more

Suitable for virtually ALL computers with 5¼" drives  
whether single or double sided. If a single sided drive, then you  
will be able to get twice the storage as you can flip these over.



**Only £8.65 exc VAT**

(£9.98 inc VAT per ten-pack)

#### Specifications:

- Double Sided (Double Density) 40 or 80 track
- Full Reinforcing ring means TOTAL reliability
- Truly REVERSIBLE with 1 notch & index holes
- TWICE the storage as HALF the cost
- Perfectly suitable for Double-Sided Disk Drives
- All our bananas are individually certified
- Made to our specifications by a major manufacturer
- Lifetime warranty on EVERY banana
- You can't afford to keep driving to your disk shop with prices like these, just pick up the phone & we'll have them at your door in a trice!

If you don't need disks today, just keep this ad.

\* Order exclusively by:

**DISKING**  
FREEPOST

Liphook

Ham GU20 7HR

Tel: (0488) 322843 (24hr Order Hotline)

8 coupons clipped - just call



Post To: **DISKING FREEPOST** Liphook Ham GU20 7HR

Tel: (0488) 322843 (24hr order hotline)

Please rush me \_\_\_\_\_ boxes of bananas @ £8.65 per box

plus P&P @ £1.00 per box. Total £11.04 per box inc VAT.

P&P is 89p/box for 3-5 boxes, 69p/box for 6-9 boxes

Ten boxes or more are POST FREE.

Official Government orders are welcome.

**FREE "Go Bananas" badge with every ten-pack**

All orders despatched in 4 hours\*

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ Tel No. \_\_\_\_\_

I enclose cheque payable to DISKING, or please debit my

ACCESS/VISA card No:

\* when stocked

# COMMODORE

# CLINIC

This month we introduce a new regular. Eric Doyle sorts out the most common technical problems which confuse many Commodore owners.

SLIPPING A CASSETTE INTO A recorder and saving a program is easy. Buy a disk drive and you move into a totally new environment. Tracks, sectors, drive numbers, and device numbers are just a few of the new terms which have to be copied with and mastered. The manual tries to be comprehensive but usually succeeds in being confusing. The next few paragraphs will not turn you into an expert but it should help you to get acquainted with the essentials.

To dispel the drive number confusion, let me explain. Many years ago when home computers were just a glimmer in Sir Clive's eyes, Commodore was a major force in the business world and the PET machines used single and twin disk units. A twin dual disk drive had to be able to differentiate between its two drive units, so one was christened drive 0 and the other was named drive 1. When the good old Vic 20 came along the new Vic 1540 drives were single units, all numbered drive 0. The DOS (Disk Operating System) stored inside the machine was based on the older dual drive system (only Commodore knows why) so a drive number will still have to be allocated even though this was always 0.

The new drives shared the serial DIN socket with printers and other peripherals, so that the computer knew which of these devices it was talking to, each peripheral was given a device

number. This is rather like a phone number on an international dialling system. It's not enough just to call up the correct number, you must also speak the correct language for the peripheral on the other end to understand what you want.

Most books also take great pains to explain about tracks and sectors. For the majority of users this is not essential knowledge, all you need to know is that disk drives store information in a specific, fixed format.

A 5.25 inch disk could be used on any of a range of disk drives and each manufacturer uses a different storage format. To tell the disk that it is now to behave as a Commodore disk it has to be formatted. The action of formatting also allows you to give the disk a name of your own choosing. The older Commodore 04 and Vic 20 do not have any disk commands but, since the launch of the C-16 and Plus/4, this area has become part of the standard set of commands. Format commands look like this:

```
Vic 20/C64  
PRINT # 15,"N0:diskname,0"  
or  
PRINT # 15,"N:diskname,0"
```

#### C-16/PLUS/4

```
HEADER"diskname",0,0,0,0,0,0  
or
```

```
HEADER"diskname",0,0,0,0
```

#### C18

```
HEADER"diskname",0,0,0,0,0,0,0  
or  
HEADER"diskname",0,0
```

Before using the Vic 20/C64 commands you must first open a file with OPEN:FILE. Where the first 15 is just a file number and could have any value from one to 255, the eight is the disk's device number and the last 15 is the number which tells the computer to go into commercial mode.

This form of command would work equally well with any of the other three machines but in all cases the whole operation must be ended with CLOSE:FILE after the formatting command has been completed.

The diskname can be any name you fancy as long as two rules are followed. Firstly, the name must be no more than 14 characters long and, secondly, you must avoid using certain characters. A good practice is only to use letters of the alphabet or numbers for file names.

The 'id' (identifies) is the disk's real name and, as in the case of the diskname, the two characters of the id must be alphanumeric. It doesn't matter if two disks have the same diskname but all ids should be different. This cannot be ensured because commercial disks already have an unchangeable id which



could match one of your disks. It's nine times out of ten this wouldn't matter but if a disk in the disk drive is swapped for another disk with the same id, the drive will not realize that a change has been made and chaos will inevitably follow.

When a disk is placed in the drive, the drive will read a map from the disk only if the new disk has a different id to the last disk used. This BAM (Block Allocation Map) tells the drive which parts of the disk have been used to store program information and which parts are free. If the disk has the same id as the last one used, the drive will not realize that a change has been made and will start writing to the new disk according to the BAM of the previous disk. This means that previous information on the new disk would be destroyed because the drive doesn't know it is there.

The drive number is always zero and can be omitted on most machines as does the ROM chip (based on the old dual drive system) and still reserves space inside the drive for the drive 1 BAM. When you become proficient with disk drive programming this could be worth noting to free internal disk memory for other purposes.

Other commands follow similar syntactical conventions.

If you must use two disks with the same id, an initiative command before accessing the information on the disk forces the drive to read the BAM on the disk. This command should not be confused with formatting, initiative merely reads from an already formatted disk.

#### W 26/04 C-N/PLUS/4

```
PRINT 15,"0"
PRINT 15,"1"
```

C18

00148 DO ON U8

00148

Some of the commands available are for dual drives and can be ignored because they either don't work with a single drive or perform no really useful function. These commands are COPY, INCRUP and DUPLICATE.

With the V28 Basic on the VIC and De you cannot list the directory to the screen alone, it must be loaded as a program (with LOAD"P:"). By this means the program is loaded into memory. The situation is similar with the other machines using DIRECTORY to list the disk contents on the screen. On the C18 you can also use the word CATALOG.

Sometimes after an unsuccessful save attempt a directory entry will be followed by an asterisk and the block count will be 0. This is known colloquially as a 'spare file'. The block count shows how much space the program occupies on the disk. As a rough guide divide this number by four

to get an approximation of the length of the program in kilobytes. A zero block count shows that something has gone terribly wrong. Before attempting to save again, the disk should be checked up.

#### Vic 26/04

```
PRINT = 15,"0"
```

#### C-N/PLUS/4/C18

COLLECT

This frees any disk space which may be locked up by open files or unallocated blocks left around by deletions.

There comes a time when program files must be removed from the disk. There are two official ways to do this but only one of them is trustworthy.

The worst way to erase, or scratch, a file is using the save and replace command. Popular rumour has it that if the number of stored files is a multiple of 16 the internal file pointers can get screwed up. No one really knows for sure what happens and so it is best never to use this command.

It is better to erase the original program with the normal SCRATCH command before saving the modified version under the old filename.

#### Vic 26/04

```
PRINT# 15,"program"
```

#### C-N/PLUS/4/C18

SCRATCH "program"

Changing the name of a stored program can be achieved with the following -

#### Vic 26/04

```
PRINT a 15,"RD:new program:old program"
```

#### C-N/PLUS/4/C18

```
RENAME "old program" TO "new program"
```

To load a program using the asterisk, you can use one of two forms. When a load instruction takes the form LOAD"\*\*\*.A" the last program accessed on the disk will be loaded into memory. The 'Y' tells the computer that this program does not go to the usual place where Basic is stored but that it should relocate it to the chunk of memory where it was originally positioned from.

If the syntax LOAD"P:Y.A" is used then the first program on the disk will load no matter which program was last accessed. The earlier form, without the colon, behaves in the same way as this if the disk has just been initialised using the PRINT # 15,"Y" command.

Disks are not quite as sensitive as the warnings may indicate but should always

be treated with respect. Certainly physical contact with the disk surface should be avoided as should strong magnetic fields.

Often it is tempting to cut a square slot on the opposite edge of the disk to the write protect/inable slot so that both sides of the disk can be used. Two warnings should be issued with this practice. Firstly, the disks are single-sided disks. Many single-sided disks start life as dual-sided disks which have failed their quality test on one side only. Trying to use the second side opens up these potential problems.

The second consideration is the design of the drive. As the head reads or writes on one side of the disk, the other side spins on a felt support pad. If a tiny bit of grit settles on this pad the surface of the disk will be damaged. On a single-sided disk this would not matter too much but on a double-sided it could prove catastrophic.

I doubt my disks and I've rarely had problems but as you can imagine my experience of this has not been trouble-free and has sometimes proved costly.

Using a disk drive doesn't solve the problem of head alignment experienced with tape recorders. An error on a disk is usually followed by the head chattering sound which still frightens the life out of me when I hear it. It sounds horrendous and sometimes it can knock your head out of alignment. Fan formatters are particularly guilty of doing this and head-to-alignment can be expensive. As a small help you may be interested in the short utility from Paul Barham of Danvers, Lancashire.

```
10 INPUT "BUMPS (Y/N) "B5
20 IF B5<>"Y" THEN D=0:G2
30 INPUT "HALF TRACK SIDES (Y/N) "S5
40 IF S5<>"Y" THEN D=D+44
50 INPUT "NUMBER OF LOADING ATTEMPTS "A
60 IF A = 0 THEN B0
70 IF A = 31 THEN A=1
80 E=0:K
90 REM *** TELL THE DISK DRIVE ***
100 OPEN 15,15
110 PRINT # 15,"Y-A-B"CHR$(186)CHR$(187)CHR$(188)CHR$(189)
120 CLOSE 15:END
```

Half track seeking means that the head searches the disk a half track on either side of the normal alignment. This has enabled me to read a disk which was created when my drive was slightly out of kilter. I hope it helps you one day.

## By The Way

The Commodore Clinic is to become one of our regular features. It's the four Commodore casually and where you can send your problems and we'll send them out as fast as we can. Can you letters written as our technical boys are sending to go.



Margaret Webb with ideas

on how to fill those long,

hot, summer, days.

HOPEFULLY THIS SUMMER WON'T BE as wet or cold as last year, however in the unbrag event of it being an action replay. I've been looking at ways of helping to alleviate the boredom that a combination of weather and school holidays can create.

Of course not all the products looked at here are marketed as educational but there again we are looking at the summer break period and it doesn't seem quite fair to insist on non-stop learning, in any case a lot of the programs have a fair amount of subliminal education.

OK let's get down to some ideas.

## Tongue Tied

Learn a language (or brush up on one you know).

If you want to use a couple of days practicing your French verbs before flying off to the Côte d'Azur try La Conversation from Ikkat. This is a disk and instruction booklet pack which sets out to help you improve your use of verbs. It does this by the time-tested method of game playing. There are four games to play, each testing a different combination of tenses. In each game you select the verbs you want from a comprehensive list and then decide on the tense or tenses you wish to use. After that you play a game and try to beat the computer.

In the first game "My Barn", you have to learn the balloons that do not match the real one. The aim being to test your knowledge of verb endings. In "Train Spelling" you have to spell and

score the times. The signal lights let you know how you're doing.

"Air Display" and "Walled In" test your knowledge by asking you to put your chosen verb in the same tense as the computer's in one game and build a wall of knowledge in the other.

A final game called "Mazeplay" tests you on all you have learnt in the previous games. Quite a good package and well worth a look at.

For the absolute beginner or anyone wanting to reinforce what they know, Academic offers a Linkword system. These programs use the premise that certain ideas or memory jogs help the retention of something learnt. Learning noun genders, for example, can be achieved but the linkword way is to picture the word you are learning in a fun way. The French for dog is "le chien" (masculine) and it can help if you remember the image of a boxer getting into a boxing ring. This links the ideas of male boxer to boxer dog. Conversely, cat is feminine in French and it may help to visualize a beautiful Persian cat sat on the back of Joan's knee. This is a double jigger since the French for cat (la chat) sounds similar to that and the Persian cat is a feminine image.

The linkword system is available on both the 64 and the Vic plus 66 memory and covers a range of languages. Overall, the system works well.

## Star Quality

Become a Hollywood or Baking (not Broadway) mogul.

If you don't feel like serious activities, how about something creative? There are several graphics systems on the market but apart from creating static pictures there isn't much else you can do with them. Autodesk has extended the "construction kit" concept to include animation - The Movie construction set. This package uses the well tried concept that if you look at a sequence of slightly different pictures, you will see movement.

The package opts for the use of multicolour high resolution graphics rather than sprites, thus allowing full screen animation. The package is laid out in a manner similar to the structure of a film studio. There is an art department, a camera man, a sound man and a director. Each is used to build up the final sequence. The really bad news about the package is that the manual is written by Americans, presumably for Americans. This means a rather involved and not particularly readable text.

The programming is of a high standard and is usable. In essence you create your drawings, lay down sequences of movement over several tracks following parallel movement, add the music and smooth the animation. Overall, a nice product which is limited only by the child's imagination and creativity.

## Music Maestro

So you don't want to be a Spielberg? How about a Mozart?

There are quite a number of music systems around (I described several in

your Commodore Christmas '88). Probably the best around at the moment is the Intasic System from Rainbird. This comes in two versions: the beginners system and the advanced system. Most of you will find the beginners system quite sufficient for the creation of music.

The system has two segments: a main editor and a synthesiser. The main editor allows you to write a short piece of music. You can either enter it by playing the tune. The plastic "light and sound" keyboard overlays words with the system and you lay down the tracks in the same way that you use a tape recorder. Facilities are provided to allow you to smooth out the timing of your masterpiece and limit the note length depending on your ability.

Alternatively, you can enter notes direct from written music. All the standard notation is supported and you can transpose your piece at will. This, in itself, is a powerful educational aid in that you can instantly link a sequence of written notes to its sound. Handy if you can't play from sight.

Once you've written your music, you can readily edit and create sounds using the synthesiser. An additional software feature called the Dynamic Response Analyzer allows you to create the most bizarre squeaks, burbles and other noises.

This isn't the cheapest package but it's excellently designed and is a joy to use.

## Light Relief

To many people the computer is simply a games machine and it is true that there is a multitude of "kill the nasty" type games. Despite my earlier comments, it is difficult to see how killing an alien will educate you. However, there is a category of game which can teach you a great deal - the adventure.

In the early days, adventures were simple affairs in which you were around picking up treasures and killing nasties -

not very educational. There is now, however, a new breed of adventure in which you can interact with the scenario - Intascom calls it "interactive fiction". Such games encourage the use of logic, lateral thought and problem solving. The examples are legion but the companies worth noting are Intascom, Telarium and Activision.

Intascom specialises in text only games based on disks. The plots are complex, amusing and difficult to unravel. The range of game is wide covering the surreal (Ditch Miller's Guide to the Galaxy), science fiction (Supernoid and Starroad), fantasy (The Zork Trilogy, Spellbinder) and crime (Deadline). I recommend these games without reservation.

Telarium offers text/graphics games generally based on well known fictional worlds. Earlier games include Fahrenheit 451, Rendezvous with Rama and Amazon. The two most recent games are Nine Princes in Amber and a Perry Mason game. Having read the book, I found that Nine Princes in Amber follows the original work closely. There is a variety of possible endings which depend on decisions made during play. The plot is perhaps less complex than Intascom's but with excellent graphics, it is highly playable. There are additional elements including combat which add to the overall adventure concepts.

Activision is a relative newcomer to adventures but nevertheless is producing polished and high quality games.

There is an increasing interest in role playing games, rather along the lines of Dungeons and Dragons. These tend to be rather more based on graphics but the skills required are different. These games are generally real time with the need for instant decisions and the control and distribution of resources.

Alternate Reality and Ultima II are two excellent examples. These use good graphics to paint up your travels. In these games you must interact with other beings, barter for goods and food and generally act as you would in real life.

A slight variant on the theme is Seven Cities of Gold. In this game you play a Christopher Columbus type who is exploring the new world. By discovering places and getting gold, you earn wealth and fame, by spending your gains on

new ships, men, provisions and goods, you can explore further and achieve more. The graphics are again excellent and this is a challenging game which needs care and thought.

Due to the data requirements, all of these games are disk based although Activision has converted some games to cassette.

## Do it Yourself

If you don't want to play but do seek mental stimulus, how about writing your own game?

There are a number of game creation packages around. If adventures are your thing, The Quill is a well known system. This allows you to create your own adventure database for your personal use or sale. This can be enhanced by a picture drawing add-on.

If you would rather create a graphical adventure, Activision's Adventure Constructor Kit is a possibility. This allows you to design your own graphics and layout and then lay down the rules for play. The system is most suited to Dungeons and Dragons scenarios although others are possible.

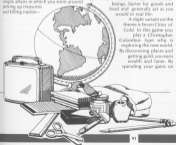
If arcade games are for you, two packages are worth a look.

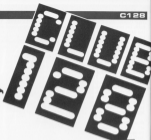
Activision offers GameMaker. This contains, backstop, sprite, sound and menu editors which can then be incorporated in the game logic. A simple programming language is provided to allow animation, movement and the specification of collision and movement rates. Very slick albeit a little pricey. If your wallet doesn't run to this package, Miramax offers a cheaper and simpler Games Creator. It is less flexible but works pretty well.

Most of these pieces of software can easily be purchased at your local shop so why not give them a look. The list is really aimed at a guide rather than intended to be exhaustive. The idea was to make suggestions as to the sort of activities which can be tried by one or more children to pass time and have fun but they also include a touch of learning.

## Touch Line

**Rainbird Intasic Systems £7.95**  
**Activision's Mindbender £9.95 (cassette)**  
**Tractor Simulator £8.95 (cassette)**  
**GameMaker £14.95 (cassette), £19.95 (disk)**  
**Telarium: Nine Princes in Amber £19.95 (disk), Perry Mason - The Case of the Mandarin Murder £19.95 (disk)**  
**Intascom Spellbinder £19.95 (disk), Starroad £17.95 (disk), Deadline £17.95 (disk), Zork Trilogy £17.95 (disk), Ditch Miller's Guide to the Galaxy £24.75 (disk)**  
**Adelsoft: Adventure Constructor Kit £14.95 (disk), Moviemaker £16.95 (disk), Seven Cities of Gold £14.95 (disk)**  
**US Gold: Alternate Reality £14.94 (disk)**





HAVE YOU EVER WANTED TO GET INTO communications? Would you like to get in touch with other Commodore owners? Well, Your Commodore, together with Computer, are pleased to announce the start of Club 128, and give you a chance of a special membership offer.

Club 128 will appear on-CompuNet as a 'free access' area open to all CNET subscribers.

The club will be the focal point for all 'serious' users of Commodore computers, hence the '128' affiliation. The 128 doesn't mean that owners of C64 can't join. In fact the club is open to all Commodore members though only 'serious' users are expected to make a great deal of use of it.

Many sections of Computer are due to be 'pulled in' to the online area, including the 'BricCase' business section that is already in existence.

Your Commodore will have a magazine section within the club area where you will be able to find news and the latest programs that are published in the Magazine.



## The Offer

So what do you get and what does it cost?

Your Commodore is offering a special membership to the Club for 699.99 (inc. VAT and P&P in the UK) including:

- A Commodore 64/C128 Communications modem (worth 179.99)
- A three month GOLD subscription to Computer (worth 115.00)
- A six month subscription to Your Commodore

### \* PLUS \*

£10.00 of discounts on selected business and communications software, including software for accessing Viewdata and Electronic Mail services such as Postal and Telecom Gold.

In order to take advantage of this special offer you simply need to send a cheque or Postal Order made payable to Club 128 to the address on the below order form.

I enclose a cheque made payable to Club 128 for 699.99 for my Gold membership to Computer, Commodore modem and six month subscription to Your Commodore.

Name .....

Address .....

Postcode .....

Please allow at least 28 days for delivery. Order should be sent to: Club 128/Computer Teleservices Ltd, 7-11 Minerva Rd, London NW10 6PJ.

# COMMUNICATIONS

David Janda keeps you in touch.

AT THE TIME OF WRITING THE CQ44, modem news has just cooled. It was good to see many items behind the 107's and have a good old cater! The slow (well, *perhaps slow*) was VHS interesting, to without any further delay — or with the news!

## Micronet

First TurboChat. This service should be well under way by the time you read this. I have covered the facilities it offers before, but to recap it will be a fast chat facility where the screen splits into four parts. New messages will be highlighted as they appear in each of the portions and there will be a facility to scroll back through an archive of 800 messages. The news is the price. TurboChat will cost a penny per message sent — no time charge. There will be no cost incurred looking at the current or previous messages. Now at a modest penny to send a message, TurboChat will knock the spots off CompuNet's Famine as far as value for money is concerned.

Several months ago Filebox, the method of transferring files between users on Freenet, was in the news. This facility is only available for BBC micro users at present because the filebox manager software has only been written for said micro. With the advent of Viscos I hope that Freenet and/or some third party software houses get their act together and write Filebox managers for other micros — such as the C64! We shall see.

## CompuNet

The alphanumeric CQTDs are now in operation on CNET. This means that some page numbers will be replaced with words, such as 10785 instead of 107781 and so on. A directory of Alphagems should be up on CNET by now, and the keyword which replaces the number will appear on the directory heading. So instead of fumbling about with lots of pages looking up page numbers for this and that, you can spend a lot of time online trying to guess what the darned page is called instead!

## Review!

Yep, here is the first review in *Communications Corner*. I have promised a review of the Voyager 7 modem from Modern House for some months now. Alas, delays in getting IBM approval and the lack of appropriate software for the device has prevented me from reviewing the modem previously. Anyway, here are my first impressions of the Voyager 7 V21/V22 modems from Modern House as used with Mustang 64 Communications Cartridge V2.2 from V2 Computing. Unfortunately the lack of software and manuals for the modem means that I cannot supply the full spec, but planet brain has managed to pull through!

The Voyager 7 is a V21/V22 device which is suitable for use with Viewdata and scrolling types of DB. The baud rates available are 300/600, 1200/75, 75/1200, and 1200 half-duplex. A test mode allows the modem to be tested offline at 300 baud. The Voyager 7 offers auto-dial and auto-answer as standard and Bell frequencies are available on expert mode only.

The modem is of 'average' size, 180x180x100mm. Four status LEDs keep the line busy on the table or whatever, and an ample length of mains and FT10 cable is provided. A four-pin dynamic (pin-demon) socket at the back is used to connect the Voyager to the Comarc Cartridge, and a six-way rotary switch on the front panel is used for selecting the baud rate (originate or answer) or test mode. Five coloured LEDs on the front indicate data flow, power, carrier detect and so on. In all the design is fine, I would have liked to have seen an inline socket at the back of the modem which would save you from buying a splitter socket, but these things do tend to up the cost.

The Mustang Communications Cartridge is a 18K Eeprom housed in a cartridge case with modern look/feeling from it. The package incorporates Viewdata and Terminal modes, and is menu driven with selections made by pressing the appropriate function key (surprise!).

The package will allow the user to dial manually or by entering a phone number automatically. Options in Viewdata and Terminal mode allow numbers to be dialled from a directory of numbers held on a directory disk (optional). An excellent aspect of this package is the setting of devices. Ten types of printer are supported and a

Centronics driver is included. Device numbers can be allocated and the package can load/save data to and from disk or tape.

In Viewdata mode a mailbox can be prepared offline and this facility can also be used to enter your user ID and password.

The terminal mode is a little more complex offering options for 1200/75 dial, 75/1200 answer, as well as 300/300 dial/answer. Another option from the terminal menu enables characteristics — such as line feed, start and stop bits — to be defined and so on.

## In Use

Setting up the Voyager and Mustang Cartridge was no problem whatsoever. Even though I didn't have a manual handy, it only took a few minutes to get the hang of the software. A nice feature about the Viewdata mode is that a real-time clock displays the amount of time logged on. Pressing F1 whilst online would return you to a help menu with options for downloading, re-displaying a page and such like. The more experienced user can access all these features while online by simply pressing the appropriate function key.

The terminal mode was a bit disappointing in use. Lots of online information such as file status, time 1024 status are displayed and a comprehensive help menu is also available. The two features missing from this package are 1200/1200 baud half-duplex support and the popular SMOODM file transfer protocol.

When used together the Voyager 7 and the Mustang Cartridge complemented each other. The only niggle I have is that the Terminal mode of the Mustang Cartridge would very occasionally drop the line before the service even answered the phone! Other than that the modem and software make an excellent combination and I wouldn't hesitate in recommending them.

## Legend

Next month a look at some scrolling software, bulletin board software, another modem and a VHS special offer from Microsat! Until next time!

David Janda can be contacted on one of the following services: Freenet 10700277, CompuNet ID B. JANDA, One-to-One 1417081 and Telecom Gold F2: MAGNIB.

# CORNER

# Precision Software's Business Software Family

for your  
Commodore 128

## Superscript

The Intelligent  
Word Processor

"This week's sophisticated and powerful word processor... the only version!"  
—Steve DeSoto, Commodore Magazine, July 1988

### What is Superscript?—

Superscript combines word processor, spelling checker, calculator and mailing labels. All in one package. So Superscript gives you the tools you need to produce high-quality reports, tables, lists, personalized letters and more, with quality, efficiency. Superscript is a renovated and vastly enhanced version of the popular Easy Script and Easy Mail programs that have sold more than 300,000 copies worldwide. So you know you can't go wrong.

### Simple for the beginner—

If you're new to word processing, Superscript's simple command menu set will get you immediately at work. Each command is a single word, and/or each command itself is a single line of help/description. To enter a command, you simply memorize the word. You don't search for obscure commands!

Once you become familiar with Superscript, you can bypass the menu.

### Powerful for the experienced user—

Superscript also gives you the ability to do our work to automatically using our command sequences or text on templates. You merely insert a single key to do your work, customize commonly used phrases or mail addresses from a glossary, load in documents/formats or variables per programmed sequence of operations. That's responsive!

### Editing options—

Superscript gives you all the editing options of a business-style word processor, with added manipulation for cut/insert, delete or text insertion, move, repeat and replace with calculated and optional user determination. Forward search, case sensitive single words or single blocks ahead. And much more.

### Good with numbers—

Superscript offers you an extraordinary editing line with 250 columns for wide documents like financial statements, and with decimal tabs if easy to enter properly calculatable numbers.

Superscript's complete set of calculator functions can be used interactively or you can store all operations from the final or your document. Append the usual mathematical functions like add, multiply, divide and percentages, and more.

You have a calculator with text, documents and tables built in.

### Good with spelling, too—

The built-in spelling checker goes right through you, checking the words words against dictionaries, and suggesting each word does not recognize. You have the ability to correct the error, translate new words, ignore. Superscript has over 30,000 word dictionary. In addition, it stores new words as it finds them.

### Mailing with Superscript—

The automated mailing goes easy with Superscript. You set under the data generator you use with another word processor or database. Mailing can be set up and addressed to non-envelopes. It makes envelopes/labels if needed, finally you complete your mailing and you can alter the template to suit your own letter format.

### Attention Easy Script users!

If you're an Easy Script user, then Superscript's obvious choice. With its enhanced features and more power facilities, you'll be able to do much more. There are no compatibility problems either. Precision's new Easy Script data or Easy Script/formats files under Superscript.

Also available on Commodore 64, Atari 800XL, Atari 130XE, Apple IIc and Apple IIe.

## Super TYPE

The Professional  
Keyboard Trainer

Suitable for all ages, SuperType guides the novice typed towards complete typing proficiency using a novel keyboard training technique. All the family can learn to touch-type of home, acquiring a valuable skill.

Amendably patient software helps you to improve your productivity without repetitive typing classes or travel.



Precision Software Limited  
107th Avenue, Mountain Park, Spring Hill, N.C., England  
Telephone: 01-330 17346 Fax: 033021 1783/3302

Available on Commodore 64, Atari 800XL, Atari 130XE, Apple IIc and Apple IIe.  
© Precision Software Limited

## Superbase

The Programmable  
Database

For better quality and performance,  
Superbase is a choice of yours.

### Easy to get started—

The first thing you notice about Superbase is the superb I/O page owner's manual.

The manual contains ideas both first time and experienced users might find helpful. Through accomplished programming, with the manual section is a proof of completeness. You have the manual ready-to-use, helpful instructions and comprehensive notes.

### Easy to use—

The Superbase is ready to use on your existing system—business information, professional data, financial records. You design your program, edit, register the records, modify to your own taste, will help on screen explanations are there that it's all yours.

With the Superbase files, you can then use Superbase built-in commands to enter, change or delete individual records. Once you have built up a file of records, you can search, sorted output data ready to go, ready. To begin with, you'll be learning Superbase commands through manuals. The manual you see is a very easy-to-use manual (having a readable simple).

### The hidden power—

As you become more familiar with Superbase, you'll find that you're not using commands. One way is through the command line. Any sequence of characters, you can enter, and you'll see the second line of the screen, insert or edit the command file. It's the Superbase language.

The response of Superbase is that you can string a number of these commands together to form complete programs, then saving programs, not only do you have access to the standard or Superbase commands, you can create the complete set of ordinary BASIC language commands.

The capability turns a sophisticated data management system into a true database or invisible power.

Developing complete applications for yourself becomes a matter of procedure, with your hardware configuration to the only limiting factor.

### The integrated office—

Superbase and Superbase's actually add the computer's memory together. This means that you can switch between Superbase and Superbase or will be using information systems that are just working on your computer and documents without ever leaving the manual. That's integrated!

Buy your copy today, and enjoy the thousands of satisfied Superbase users worldwide. They've proved its power and flexibility, and added to benefits:

- Extensive language program in a memory resident
  - Screen to printing or editing
  - Built-in editor (line feed, copy)
  - State of the art editing for text retrieval any record in the file (250 lines)
  - Fields may be added, omitted, specifications altered without the need to restructure the file
- Data type include character, numeric or screen-held operations, including file-based, menu systems
- Searches may be split into 100 fields, work up to 24 fields deep
- Report writer generates fully formatted reports from response language function and screen session
- Allow linking across separate files
- Multiple report printouts per file
- Superbase standard programming

### INFORMATION ORDER FORM

Code	Superbase	128	64	MSX
Code	Superbase	99.95	69.95	
In Home	Superscript	99.95	69.95	
Selection	Superscript (Data)	—	69.95	
	Superscript (Text)	—	69.95	

I enclose cheque/P.O. for £

Charge by  Access  Visa  Card No.

Name

Address

Postcode

Signature  Date

OR CALL US ON 01-330 17166.

MSX

# WELCOME TO THE MACHINE

Allen Webb shows

you how to speak

fluently to your

computer.

ONE OF THE ESSENTIAL pieces of equipment for a machine code programmer is an assembler. I have recently managed to get hold of a copy of *Later Genesis* from Quest/Design and I've had a good play around with it. My notion is that, at the price listed on its cassette and CD-ROM disk, it's a real gem!

The assembler/editor is essentially the same as that in *Machine Lightning* so there's no real surprises there that quarter. Unlike most other assemblers, the package uses its own operating system rather than the 64's editor. This not only means a lot of extra toil for the author but you get a large range of additional commands and toolkit aids. I found this a little irritating since a crash when using your own programs means that you must reload the system. With assemblers which use the 64's editor, a quick stab of the reset button followed by an **OSD** command generally saves the day.

The gem of the system is its new monitor/analysis. I can't say I'm happy about the monitor with *Machine Lightning* and this new addition is a great improvement.

On its simplest level, you can use the monitor to set up break points and single step through the program. This allows you to keep an eye on how the registers change and hopefully locate errors. If you see a complex program or have an intractable error, the analyzer may help. The analyzer uses a subset of **OSITH** to allow you to specify a break point. You need, for example, cause our program to stop the very instant that a specified

location is read. To the more experienced machine code user, this ability would be very handy.

I don't really have space here to fully review this product, no doubt someone else at *Your Commodore* will do this. I will simply say that, in my opinion, at the price, this package is probably the best around at the moment.

I mentioned a thing called a break point. When the 6508 encounters a zero byte, it performs a jump to the address held in locations **\$0116** and **\$0117**. This normally performs a warm reset returning you to a blank screen with **READY** at the top. Machine code monitors change these addresses to that when a zero byte is executed, the monitor is entered. This allows you to examine the registers and just out what's happening. The instruction **BRK** inserts a zero byte to allow breaks.

The use of **BRK** is handy if you're worried about a crash and want the program to stop at a specific point.

Some of the most frequently used features of the 64 are the interrupts. There are three available:

- 1) The interrupt request (IRQ)
- 2) The non-maskable interrupt (NMI)
- 3) Raster interrupts.

The IRQ operates 50 times a second. It scans the keyboard and handles the clock. Every 50th of a second, the processor stops what it's doing and jumps to the address held in locations **\$0116** and **\$0117** (**BRK**). This performs the necessary functions before returning to normal processing. It is a simple matter to wedge extra code into the IRQ. Consider listing 1:

## Listing 1

```
10 ASSEMBLE 900
90 RDM #=SC000
100 RDM $01
110 RDM LDA #C=MAIN
120 RDM STA MEM4
130 RDM LDA #C=MAIN
140 RDM STA MEM5
150 RDM CLT
160 RDM RTS
170 RDM JSR#AIN: INC 900
180 RDM LDA 900
190 RDM CMP 150
200 RDM BNE OUT
210 RDM LDA 10
220 RDM STA 900
230 RDM INC $D000
240 RDM LDA $D000
250 RDM AND 175
260 RDM STA $E000
270 RDM SEC
280 RDM LDA 175
290 RDM INC $D000
300 RDM STA $E000
310 RDM OUT: JMP#AIN
320 RDM |
```

Lines 180 to 190 put the start address of the new code into the **BRK** jump address. This introduces two new instructions:

**BRK**: this disables the interrupt by setting the interrupt flag. This prevents the execution of the IRQ before we've changed the jump address.

**CLT**: this restores the interrupt once the wedge is complete.

The main routine is designed to change the screen and border roughly once a second. Location **900** is a counter. This is incremented every time the routine is called and the colours are changed every time it reaches **50**. Since the routine is called 50 times a second, this should happen once a second. Good! If line **50** is not set once the routine is finished, we must finish the normal IRQ action. If you run the routine, you will see that the 64 will run as normal except that the screen will change colours continuously. Basic programs will run as normal albeit slightly more slowly.

Raster interrupts work in conjunction with the IRQ and perform action depending on the position of the screen scan. Listing 2 shows how to get split screen effects.

Lines 110 to 120 set up the raster routine. This is similar to the simple IRQ routine except that the raster check must be set up. Lines 120 to

## Listing 2

```
10 #=SC000
20 RDM#1100
30 RDM#12
40 #=001
50 #=004
60 #=004+25
70 #=004+50
80 #=004+75
90 #=004+100
100 STA SC000
110 STA SC000
120 LDA 000
130 STA SC000
140 LDA 000
150 STA SC000
160 LDA #020000
170 STA COUNT
180 LDA HEIGHT
190 STA $D000
200 STA $D000
210 STA $D000
220 LDA #0001
230 STA $D000
240 LDA #C=MAIN
250 STA MEM4
260 LDA #C=MAIN
270 STA MEM5
280 CLT
290 RTS
300 #=MAIN LDA SC000
310 STA $D000
320 AND 180
330 #=Q LOOPI
340 DEC COUNT
350 BR LOOPI
360 LDA #C=NONONIS
370 STA COUNT
380 DEC COUNT
390 #=Q LOOPI END COUNT
400 LDA #C=NONCOLX
410 STA $D000
420 LDA #C=NONCOLX
430 STA $D000
440 LDA #C=REGLA
450 STA $D000
460 LDA #C=REGLA
470 STA $D000
480 LDA #C=REGLA
490 STA $D000
500 LDA #C=REGLA
510 STA $D000
520 LDA #C=REGLA
530 STA $D000
540 LDA #C=REGLA
550 STA $D000
560 TR4
570 #=Q LOOPI
580 LOOPI PLA
590 TAY
600 PLA
610 TAY
620 PLA
630 RTI
640 LOOPI JMP#AIN
650 HEIGHT RPT 1,20
660 SC000: RPT 5,11
670 #=0000: RPT 5,11
680 R000: RPT 27,27
690 R000: RPT 6,4
700 MEM4: RPT 25,12
710 #=000000: RPT 2
720 COUNT RPT 8
```

750 turn on the IRQ raster. Lines 180 to 210 set the initial value into the raster compare. Lines 240 to 250 check to see if the raster scan has reached the required position. If not it branches to **LOOPI** and exits via the **RTI** (**RTI**) clears the

interrupt flag, restores the status register and performs an RTS. If the scan is at the switch point, the new set of VIC register values are set up and the new switch point put into the raster compare (line 330). If the last row has been handled, the routine exits via the normal IRQ address (LDOP).

Lines 650 onwards hold tables of the VIC register values, REG1 and REG2 specify the graphics mode and line 700 determines the character type. As set up, the routine makes the top 16 lines of the screen pale green with lower case characters and the bottom 15 lines dark green with upper case characters.

Sorry if my commentary on this routine is brief but space doesn't allow a fuller description. If you study the routine you should be able to sort it out.

I want to start discussing one of the most valuable tools of routines available, the ROMs. By using many of the on-board routines, you can save a lot of time and grief. First, we have the Kernel ROM. Most of the routines are accessed from a jump table (to allow upward compatibility between machines) near the top of memory.

Some of the most useful follow.

## Plot

This routine, depending on the carry flag, either sets or reads the cursor position. The X register is used to hold the row and the Y register to hold the column of the cursor. If the carry is set, the routine returns the current cursor position in these registers. If the carry is cleared, the cursor is set according to the

registers. Listing 3 shows a simple demo.

### CHRIN (\$FFCF)

This routine reads a byte from the current input channel. Unless you open a different channel, it takes a cursor and waits for input. Listing 4 shows an input and when RETURN is pressed, it puts the next input into a buffer - in this case the top of the screen. The routine functions correctly but for some reason the text is moved to the buffer only after RETURN is pressed. Can anybody tell me why? I can't see it!

#### Listing 3

```
10 ASSEMBLE 000
100 RIM #~4C000
110 RIM LDA 00
120 RIM LDOP ($R $FFCF)
130 RIM CMP 01
140 RIM BQZ DONE
150 RIM STA $4000,Y
160 RIM INY
180 RIM #MP LDOP
190 RIM DCA# RTS
200 RIM |
```

### GATIN (\$FFD4)

This routine reads a byte from the input channel and returns it in the accumulator. If no byte was read, a zero byte is returned.

### CHROUT (\$FFD0)

We've met this one before. It prints the character currently in the accumulator and is equivalent to PRINT CHR\$(X).

Listing 5 shows the use of CHRIN and CHROUT in the same routine to give a typewriter. Line 100 checks for RUN/STOP (CHR\$(1)).

#### Listing 4

```
10 ASSEMBLE 000 100 RIM #~4C000
110 RIM LDOP ($R $FFD4)
120 RIM BQZ LDOP
130 RIM CMP 01
140 RIM BQZ 010
150 RIM 0R $FFD0
160 RIM #MP LDOP
170 RIM DCA# RTS
180 RIM |
```

## Homework

We've got a lot to cover this month, so let's get last month's homework out of the way quickly.

Question 1 is a commonly encountered situation and is easily solved. Here is one solution:

#### Listing 7

```
10 ASSEMBLE 000
100 RIM #~4C000
110 RIM LDA #000
120 RIM Y#000
130 RIM LDA 00
140 RIM STA LDOP
150 RIM LDA 04
160 RIM STA LDOP+1
170 RIM LDOP# LDOP Y
175 RIM CMP 01
180 RIM BQZ LDOP#
190 RIM CLC
200 RIM LDA LDOP
210 RIM ADC 040
220 RIM STA LDOP
230 RIM LDA LDOP+1
240 RIM ADC 00
250 RIM STA LDOP+1
260 RIM 0R# Y
270 RIM #MP LDOP#
280 RIM LDOP# CLC
290 RIM CLC
300 RIM LDA LDOP
310 RIM ADC X
320 RIM STA LDOP
330 RIM LDA LDOP+1
340 RIM ADC 00
350 RIM STA LDOP+1
360 RIM RTS
370 RIM |
```

The basic equation is:

$$LOC = 804 + (Y-1) * 40 + X$$

Where Y is in the range one to 24 and X is in the range one to 25.

The routine splits the equation into three and works on that basis. First, it puts 804 into LOC (lines 100-108), it then adds (Y-1) \* 40 and finally adds on X. You will appreciate that when Y=1, the middle portion is unnecessary. Lines 175 and 180 detect this and branch accordingly. The middle portion evaluates the multiplications by repeated additions. For example, 40 \* 5 is the same as adding 40 five times. Lines 190 to 270 do this. To save space, lines 175 and 180 are used to jump out of this process. The test is simple to be arithmetic.

Questions two and three are linked. Let us consider how the high resolution screen works. The screen is split into 1600 characters squares. Each character square holds eight rows of eight dots. Each dot in any row is controlled by the relevant bit in that byte. For

example, the leftmost dot is controlled by bit seven and the rightmost dot by bit zero. To set a dot, you simply set the relevant bit. This is achieved by OR'ing the relevant bit with a mask. Since each bit represents a power of two in binary, we OR with increased to the power of the bit.

Question 3 asks you to do the reverse. We want to erase a specific bit. This is achieved by AND'ing with a mask. Since we want to leave all the other bits untouched, the mask must comprise of all ones except for the bit to be cleared. In to erase bit one use %10111111, to erase bit six use %10111111. These masks are simply the one's complement of the bit value (bit value minus 255). The routine to do the job becomes:

```
100 00
105 BIT
10A $PBY,Y
10B AND TABLE
10C $PBY,Y
10D RTS
TABLE BYTE 254,253,251,247,
239,223,191,127
```

The homework for this month follows my general theme of being matter:

- 1) An easy one. A routine to flash line number somewhere near the bottom of the screen (eg. "Page 4 of 4 start").
- 2) A routine to download the character set to start at location 12000 and turn it on. Here is a basic program which does the job:

```
10 POKE 5240: POKE 5640:
20 POKE 5634,PEEK(5634)
AND 254
30 POKE 1PEEK/5 and 255
40 FOR #0 TO 311
50 POKE 12000+PEEK/5120#
#1
60 NEXT
70 POKE 1PEEK/100# 0#5
80 POKE 5634,PEEK(5634)
0# 1
90 POKE 1327,PEEK(1327)
100 0#0=12
```

It's up to you to sort out how this works.

3) If you've got example 2 working, write a routine which rolls the design of the character specified in location 800 one pixel to the left. Don't forget that a roll means the leftmost pixel to the rightmost position so that eight rolls should leave you with the starting design.

#### Listing 5 (\$FFFF)

```
10 ASSEMBLE 000
100 RIM #~4C000
110 RIM LDA 000
120 RIM LDA 000
130 RIM LDA 001
140 RIM CLC
150 RIM #R $4000
160 RIM RTS
180 RIM |
170 FOR A=0 TO 9 STEP 1
180 POKE 800, A: POKE 900, SIN
(A * 3.1415926535) *
62831.853071795864
NEXT
```









# Choosing the right computer is a good start — but can you find the right software?



At SUPERSOFT we're very conscious of the fact that people who spend several hundred pounds on computer equipment are looking to do rather more than play 'space invaders'.

Financial planning is a rather grand name for something you've been doing all your life — making ends meet! Perhaps if Mr. McAvatar had used **BASICALC 3**, he would have been able to balance the books a little better.

For home, club or small business use **BASICALC 3** should pay for itself in no time at all. For larger companies we recommend **BASICALC 3**, one of the few really valuable programs that you can learn to use in a day.

Although your Commodore 64 is a powerful musical instrument you need to be a pretty good programmer to understand how it all works. Unless, of course, you buy **MUSIC MASTER**.

To use **MUSIC MASTER** requires no prior musical knowledge, though in the hands of an experienced musician it will prove an invaluable tool. You don't need to know the first thing about programming either! **MUSIC MASTER** is the musical equivalent of a word processor, remembering the notes you play and allowing you to replay and edit. That's it you wish.

**INTERDUTOR PILOT** is a space flight simulator. Nowadays simulators are widely used to train pilots and astronauts because — to be frank — it's a lot cheaper (and safer) than the real thing!

Imagine, if you will, life in the 23rd century; space travel is commonplace, and on the outskirts of the galaxy the first war between civilizations is being fought. A shortage of trained pilots has prompted the Federation to develop a computer simulation that allows new recruits to gain experience without paying for their mistakes with their lives. With the aid of your Commodore 64 you too can learn to pilot the Interdutor Mk 3 craft. But be warned — this is no game!

**SUPERSOFT**

SUPERSOFT, Winchester House, Corning Road,  
Weybridge, Surrey, Middlesex TW20 7JZ  
Telephone: 01-841 1166

Other SUPERSOFT products include the **MIND ASSEMBLER** cartridge, the only assembler that's ideal for beginners yet powerful enough for the professional brood of our competitors; use it! The **VECTOR** cartridge adds dozens of commands to Basic including toolkit sub-routines and macros; is on disk there's **MASTER 64**, a really comprehensive package for the keen programmer.

Of course, we do also publish games programs, and with classics like **STAR CRUISE** and **LAMB-CADE** in our range we are one of the leading leaders. But we most enjoy coming up with the sort of programs that are going to be in use for months and years, not hours and days — the sort of programs that make you glad that you bought a computer — and glad that you bought SUPERSOFT!

You won't find SUPERSOFT products on the shelves of your local supermarket. But most specialist shops stock titles from our extensive range (and are prepared to obtain other programs to order). However, you can also buy direct by sending a cheque (or cash orders are post free), by calling at our offices, or over the telephone using your ACCESS card.