

 **commodore**

Vol 2 No 4 £1
AUGUST 83

COMPUTING

INTERNATIONAL



A PERSONAL INFORMATION STORAGE PROGRAM FOR THE 64

The independent magazine for all Commodore computer users



USA \$3.50 CANADA \$3.50 GERMANY 6DM FRANCE Fr18.5 AUSTRALIA \$3.00

70151

KAYDE

In the Swamp, no one can hear you scream.

Fight tooth and nail with Leopard Lord.



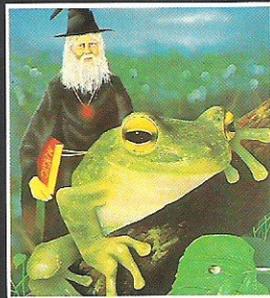
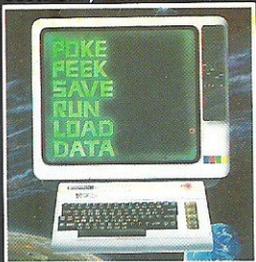
Specially designed for Vic 20 16k, Commodore 64, Dragon 32, Oric 48, 48k Spectrum and New Brain.

Death stalks the Swamp at every turn. Nowhere is safe and you're on your own. You survive on your wits alone with nobody to help you. Be thankful it's only the latest game from Kayde. You'll gasp with relief when you come to the end of the struggle against some of the most dangerous monsters ever programmed. You can be sorcerer, wise man, mercenary, knight or a druid. But you've got to be good. No silly problems to hinder your progress. It's just you against the swamp. **£9.95**

The first of the new exciting adventure games, specially commissioned by Kayde and written by a science fiction writer. The first game is set in and around a castle littered with monsters, mazes and magical items. You must find the correct items before facing Fordel, the elite Leopard Lord, because you won't get a second chance. Leopard Lord or the Swamp for just **£9.95**

Leopard Lord is not available for Vic 20.

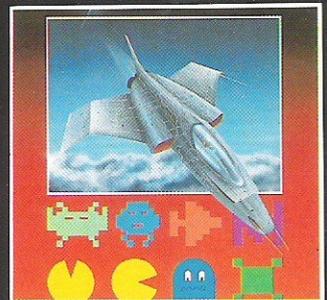
KAYDE KEYS - THE FUNCTION JUNCTION
Get the best from your VIC 20 with Kayde Keys - the program that saves time and effort on function keys and characters. The function keys will run, list, save and load your programs and enable you to write your own software. Just load and run. Kayde Keys works on just over 300 bytes and costs only **£6.95**.



TOUCHWOOD (16K ZX81) £5.95
A fast moving, exciting and highly graphical game based on Frogger the popular arcade game. Dodge cars and juggernauts then combat the log infested river to get safely to the other side.

DESIGN/RESTORE

Create your own characters the easy way. You get three character sets with this program and it enables you to load characters into the VIC 20 for use in your own games. Just the thing for the adventurous programmer for only **£9.95**



We offer the fastest delivery time of all times.

Mail Order + Showroom
Kayde Software Ltd., The Conge
Great Yarmouth Norfolk NR30 1PJ
Tel: (0493) 55253/57867 Telex: 975525 KAYDE G.

New London Showroom
Kayde Home Computers Ltd
1 Station Approach
New Eltham London SE9 Tel: 01-859 7505

ALL ITEMS AVAILABLE AT GREENS STORES
24 HOUR TELEPHONE SERVICE:
Tel: (0493) 55253/57867
Dealers Welcome

ALL MAIL ORDERS
TO: KAYDE SOFTWARE LTD,
DEPT. CC7 THE CONGE, GREATYARMOUTH,
NORFOLK NR30 1PJ

PLEASE PRINT AND STATE TYPE OF COMPUTER

Qty.	Item	Item Price £	Total £

Please allow £2.00 P&P for all Hardware 50p for all software.



DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. DEALERS WELCOME.

*I enclose a cheque/postal order payable to **KAYDE Software Ltd,** for
£..... *Please charge to my Access/Barclaycard/Trustcard account no.

*Please delete/complete as applicable. _____

Signature _____

Name: Mr/Mrs/Miss _____

Address _____

commodore

COMPUTING

INTERNATIONAL

AUG 1983

Managing Editor
Nick Hampshire

Staff Writer
Martin Bush : tel 01-636 6531

Programmers
Richard Franklin
Kevin Bergin

Advertisement Manager
Peter Chandler: tel 01-636 6408

Subscriptions Manager
Deidree Hammond-Parker
tel 01-636 6354

Art Director
Paul Clarkson

NEWS _____ 4

Looking back at the 4th International Commodore Computer Show.

NEW PRODUCTS _____ 9

Switchable RAM packs for the VIC, accountancy software for the 64, new games for the VIC plus lots more information.

SOFTWARE REVIEW _____ 14

This month we go over Wordcraft 20 for the VIC, visit the Temple of Apshai for the 64 and have a look at Attack of the Mutant Camels.

BOOK REVIEW _____ 20

Commodore 64 Games Book and Selected Essays in Contemporary Computing.

UTILITY REVIEW _____ 22

A comparative review of two programming aids, Sysres 64 and Power. Which is the best to buy and why?

APPLICATION STORY _____ 24

Nav-log is the new computerised flight planning system for small aviation companies.

INFO _____ 28

What you need to know about a personal information system for the 64.

EDUCATION _____ 33

Many educational games put the learning process second to enjoying the game. This does not apply to ASK's packages reviewed here.

HINTS AND TIPS _____ 39

The cold start command on the 64, poking to disable and enable routines and how to combine lines from one program to another.

SOUND AND VISION _____ 48

Following on from Synthy-64 in June, Roy Wainwright has now come up with a hi-res package called Screen Graphics-64.

DISK USER _____ 56

Reading and writing the directory and scratching the files.

HARDWARE NOTEBOOK _____ 60

How to convert the PET into a computing integrator.

MACHINE CODE PROGRAMMING _____ 62

How to prevent your programs and disks from being copied by prying eyes and thieving hands.

BUSINESS PROGRAMMING _____ 68

More in the nominal ledger series. This time, it is all about amending the parameters.

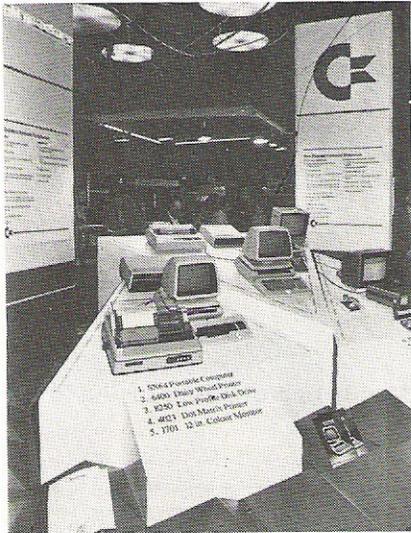
BASIC PROGRAMMING _____ 74

Playing cards with the PET, hi-res plotting and five programs for the VIC including shooting UFO's, a racing car arcade game and turning machine code into decimal data statements.

Printed by Spottiswoode
Ballantyne Ltd, Essex, England.

Distributed by Magnum
Distribution Ltd.

Commodore Computing
International is not in any way
connected with Commodore
Business Machines U.K. Ltd.
It is published monthly by
Nick Hampshire Publications,
167-169 Great Portland Street,
London W1.



Looking back at the show . . .

Held at the Cunard International Hotel in London on June 9, 10 and 11 the 4th International Commodore Computer Show surpassed everyone's hopes. Split into two floors with numerous places of refreshment and sustenance, 18,000 square feet of space was occupied by over 70 exhibitors – many of whom saw the show as an ideal vehicle from which to launch their new products – and over 16,000 visitors, which is more than double the attendance of last year even though the first day did coincide with the General Election. In fact 27 companies launched new products.

It would be fair to say, that the section that attracted the largest crowd was the bottom floor which was dedicated solely to games and education for the VIC and 64. Commodore themselves launched 17 new products and allowed the public to have a look at an amazingly, addictive game called Soccer, which is due for release in September. On the Commodore education stand, was the new speech module for the 64 which has a vocabulary of 235 words spoken at either a fast, medium or slow speed. Along with this, the module can also support cartridges of up to 128K and can be programmed direct from Basic or Assembler and mixed with music and graphics. A company called EDATA displayed, what they called talking book programs, which use a small add-on box that enables the 64 to talk to the user.

The cartridges have colour graphics, animation, sound effects and speech and at the moment 10 of these cartridges are available.

Alphatronic had a new series of light pens and dust covers, Automation Facilities came up with a new cleaning kit and companies like Audiogenic and Rabbit had mountains of games. Moving onto the business side of things, there was everything from interfaces to hard disc drives, word processors to complete data base systems, and of course, the new Commodore machines, which included the SX64 portable computer to be made available in this country later on in the year, the 6400P daisy wheel printer and the 4023 and 1526 printers, along with a mouse, track ball and graphics pad. There was also the four colour printer/plotter, the 8250SK disk drive and the 1701 colour monitor.

CP/M was not left out either. A 64 ran it with a Z80 cartridge demonstrating the Nevada Cobol language and the 730BX – 256K RAM machine with 8088 and 6509 processors – ran CP/M-86.

Amongst the many Commodore VIP guests was the Commodore boss Jack Tramiel and one of the things he must have discussed was the recent formation of a Commodore software division which is presided over by Mr Sigmund Hartman and, according to Mr Tramiel, his first main responsibility will be to establish "a broader nucleus of small business, educational, home and recreational software for Commodore microcomputers."

Commodore are already talking about next year's show and provisional bookings are already being taken. It is hoped that the Cunard Hotel will be the venue again and that the dates of the show will be between June 4 and 11.

Quicksilver Predicts a Golden Future

Nick Lambert, the founder member of Quicksilver who have recently published a new set of games for the VIC-20, is predicting a turnover of between £10 million and £50 million—good going considering that the company was founded only two years ago with the help of a £200.00 overdraft.

W.H. Smith, Boots, Menzies and Virgin have all started placing sizeable orders and the company is hoping to launch its products in America, although whether companies will be licensed to make Quicksilver's products remains to

be seen. It could be that the company plans to attack the market through distributors only.

Whatever course of action they take, they are not planning to rest on their laurels. They recognise the need for increased efficiency and inventiveness. Nick and John Hollis will partially relinquish their association with the company for a while—although they will still retain their shares—so that they can be creative in other computer projects.

Because everything is in such an early stage, Nick Lambert was rather reluctant to divulge their plans although the VIC is high on their list of priorities. Their stepping down means that the board of directors is going to be changed. The new board will be: Mark Eyles, Caroline Hayon and Rod Cousins.

Wilkes Award

The British Computer Society has named Dr. Paul Rautenbach as the winner of the Wilkes Award which has been instituted by the British Computer Society to mark the retirement of Professor Wilkes as Professor of Computer Technology at the University of Cambridge. Rautenbach received the award, a medal, for presenting a paper entitled 'Combining data flow and control flow computing' which was published in The Computer Journal. The judges believe that the winning entry will affect how computers will be designed in the future. The British Computer Society have also decided which schools are eligible for prizes in the Jubilee Schools Project Competition. In total, there are 27 schools and colleges from all over the country who have won prizes ranging from complete computer systems to cash vouchers. Although the major prize winner was King James 1st School, Bishop Auckland who produced a staff supervision program, Commodore Business Machines awarded two prizes. One was a 64 which went to the Meldrum Primary School in West Lothian for a reading and spelling system and the other was an 8032 to Our Lady of Lourdes High School, Ballymoney, Northern Ireland. Commodore decided that this entry had the most commercial value because the school has produced a system of herd book files for the farming community. All of the entries for the school competition were judged by Fellows of the British Computer Society.



Plans for a Super Computer/Video Show at the NEC

Looking back at the computer sales for last year's Christmas period and on the number of surveys which have been conducted since then, Clapp and Poliak have decided to stage their first consumer computer exhibition with a show called 'Brainwave '83'.

The show, which is to be held at the National Exhibition Centre in Birmingham on November 4, 5 and 6 will, according to the organisers, be the first home computing, video and electronics family show where members of the public can try out and buy any of the electronic wizardry available. Commodore have been approached as potential exhibitors but whether they

will put anything on show remains to be seen.

This sounds like an opportunity which is not to be missed since the organisers expect to attract a crowd of around 50,000. Previously purely trade exhibition organisers, Clapp and Poliak have moved into this market because it is highly competitive; they see the consumer market as a major growth area. Mike Rusbridge, the exhibition director, says that 'the show will be a family wonderland, bursting with the largest range of home computers, video games, electronic kits and accessories that has ever been assembled'.

One of the industrial surveys that the show is based upon concluded that 25% of all home computers sold in the UK last year were sold over the Christmas period. Another survey predicted that by 1985 over 2 million households would have their own computer. For a rule of thumb guide to what the exhibition will be like, other shows which Clapp and Poliak have organised include The Computer Trade Forum and The Scottish Computer Show. The show is to be advertised on radio, television and the press and there will be a firework display and bonfire to coincide with the Guy Fawkes celebrations.

Gallium Arsenide

There is a couple of things happening in Japan at the moment that could dramatically alter the performance of computers in the future, the first concerning integrated circuits. At the moment these circuits are based on silicon but the Japanese are now researching circuits based on Gallium Arsenide which would quickly outstrip the current mountain of computers available in terms of speed and efficiency used in scientific and engineering laboratories right through to integrated office systems. If the CPU were to be made of Gallium blocks it is estimated that they would be capable of up to 50 times greater performance. Should this happen, the use of GaAs technology would stretch its use far past the limited number of specialist computers into a larger and therefore more dynamic market. To put it more clearly, Japanese engineers are working on chips like 16 by 16 multipliers and 1000 bit static Random Access Memories. Something less exhilarating, but more immediate, is the development of Personal Basic that operates with CP/M 86 and MP/M 86. This version of Basic lets the user correct

errors as they write their program instead of the user having to run their program only to find out that it does not work. This is done by assessing the program statement syntax as soon as the statement is entered. Should an error be found, the relevant error message pops up in standard English. The amount of memory requirement for Personal Basic is at least 96K RAM and the cost is £100. Closer to home, Nottingham in fact, is another version of BASIC called BC Basic for the 64 which costs just £19.95. The main features of this language are two 9K hi-res screens which are independent of each other. Two modes accompany the screens, these being two colour 200 x 320 and four colour 200 x 160. With regard to sprites, there is a total of 22 commands and functions which may refer to more than one sprite. The sound is catered for by 18 commands and functions utilising the facilities of the SID chip and this includes facilities like Filter, Cutoff, Resonance and Waveform. BC Basic is available now on cassette from B C Computers, 31a Grosvenor Avenue, Sawley, Long Eaton, Nottingham NG10 3FQ.

Draughtsmen's Aid

Taylor-Wilson Systems Ltd. have come up with a computer aided draughting system which, they claim, beats most comparative systems for the price. This system, called Autoplan, costs £8000 and comprises an 8032 computer with a dual drive floppy disk system and the A3 1010 plotter/digitiser from Gould.

The whole system is based on a series of shapes which are stored on the disk as drawings. The drawings are formed by using a series of commands which can edit, scale, deform, rotate, shear and dimension the various shapes. It is possible to reconstruct complex drawings consisting of several separate elements with a single command.

Autoplan was first put on show at the Design '82 exhibition at the National Exhibition Centre last September and a prototype version has been used successfully by Derbyshire County Council.

Area: *Draughting.*
Company: *Taylor-Wilson Systems Ltd.*
Address: *Station Road, Dorridge, Solihull, West Midlands B39 8HQ.*

Tel: *05645-6192.*

AVAILABLE FROM LEADING PERSONAL COMPUTER STOCKISTS OR DIRECT
FROM COMMODORE COMPUTING INTERNATIONAL MAGAZINE

MAGNETIC MAGAZINE

AN EXCITING NEW DEVELOPMENT TO INCREASE AND IMPROVE YOUR COMPUTER
SKILLS MAGNETIC MAGAZINE IS MENU DRIVEN FOR SIMPLICITY OF USE WITH CBM64
AND VIC20 WITH A WIDE RANGE OF PROGRAMMES AND CONTENT.

VIC 20 £2.99

GAMES, HINTS, TIPS, NEWS AND
REVIEWS. FUTURE ISSUES WILL
INCLUDE READER/USER CONTRI-
BUTIONS AND VIEWS PLUS ADVERTISING.

CBM 64 £2.99

IMPROVE YOUR SKILLS - PLAY
ADVENTURE GAMES. LEARN HOW TO
MAKE MAXIMUM USE OF YOUR CBM
64 PLUS HOW TO USE SPRITES AND
THE 'SID' CHIP (SYNTHESIZER)

CCI SOFTWARE, 167 GREAT PORTLAND STREET, LONDON W1

TEL 01-636 6354



The "SX64"

Also at the Commodore show were some new products from Commodore making their UK debut, perhaps the most important of which, was the SX64 portable computer. This is really a version of the 64 apart from one or two alterations. The first to note is a built-in 5" colour monitor and optional dual or single disk drives and it is compatible with all the software currently available for the 64. Although this model is not yet available in this country, when it does come which will be some time later this year, prices are expected to start at £650. Following this, there are several printers, these being the 6400P, the 4023 and the 1526. The 6400 is a daisy wheel machine which operates at a speed of 40 characters per second. The printer has an optional tractor feed facility as well as a self-test facility to check the internal parts of the printer. Costing £1,195, it can operate with various standard print wheels. The other two printers, the 4023 and the 1526, are both dot matrix tractor feed, with alphanumeric and graphics characters and whilst the 4023 interfaces to the business machines, the 1526 connects to the VIC and 64 with both



machines, allowing white characters to be printed on a black background, as well as the usual black on white. The 1526 costs £345 and the 4023 £395 both excluding VAT. Also on show was the 1701 14" colour monitor which should suit all users of the 20 and 64 at only £230 including VAT.

Winchester

Built around the Z80A processor, up to 12 CBM computers can gain access to the AP 18 multi user hard disk system and all the connected computers can access information simultaneously, carrying out the same or widely differing tasks. However because the system manages each user independently and if the file and record looking facility is in use, then this simultaneous access is prevented. As everybody should know, the complete contents of a hard disk memory should be backed up regularly onto another data support and this Winchester system offers two choices.

The first, is a second disk drive in the same unit, raising the number of logical drives from four to eight and the capacity from 18 to 36 Mbytes, or, you can have a data streamer in the same unit which copies 18 Mbytes in about half an hour. You could of course always use the 8250 but this does have limits as far as the amount of data to be stored is concerned. For output, practically any printer can be used as a common device. The memory capability of the system is 64K and the drive comes from IMI Computing Ltd., PO Box 216, Witton, Birmingham B6 7BA telephone 021-356 4925/4848.

Magpie

Yet another data base system is about to wing its way on to an unsuspecting public, this one coming courtesy of Audiogenic Limited and going under the name of Magpie. This DBS is for the 64 and is supplied on a cartridge, whilst all the data generated by the user is stored on disk. This is of course a menu driven program with four keys controlling the entire menu operation and each menu is accompanied with the option to progress to other menus. Should this option be taken, then the second menu slightly overlays the first and so the user can chart their progress through the system. Each application for Magpie is controlled through one menu, which forms part of an integrated system, so that order forms are linked to invoices, which cuts out a lot of unnecessary work. Each record has a maximum length of 254 characters and a definition limit of 52 fields per record, the information being stored and accessed via several methods ie by number, key, sequential access, packed storage and sequential search. This DBS can also read and write data to ASCII sequential files so that information can be passed from Magpie to Wordcraft 64 an other spreadsheet programs. It is intended that complementary application disks will soon be available, the initial disk including mailing, invoicing, basic accounting and stock control. Audiogenic are at P.O. Box 88, Reading, Berkshire, telephone 0734 586334.

Sequential Filing on the 64

There is a new word processor out for the 64. It comes from Wego Computers Ltd. and is called the WordPro 3 Plus/64. The system is compatible with a 1541 disc drive and will operate with printers connected through the serial port. The interface needed for this, is of American design and can be Centronics parallel or RS232. This is sold separately although any other interface that will connect to the serial port will suffice.

The unit will run dot matrix or daisywheel machines. The filing system is sequential, the size being 329 lines of text 40 characters wide per file. Wego have priced the word processor at £80 plus VAT. More information is available from Wego Computers Ltd., 22a High Street, Caterham, Surrey, telephone 0883-49235.

Turn your Commodore into a full time Profit Centre

The New SCRIPTA II works all day long~

As a Data Terminal, producing perfect letters and reports from your favourite wordprocessor or impeccable invoices and statements from your trusty business system.

During non-computing periods, SCRIPTA II reverts to the finest electronic typewriter. Depending upon your mood, you can choose any one of 20 Whisper-disk daisy typewheels which are available in 10, 12, 15 and proportional pitch. Numerous fonts can be selected. Classic Gothic or Modern Pica for business, Fine Italic for those intimate little personal messages, Cubic for the chic replies, or Lecturer – the large character – for prompting you during speeches or sermons!

An optional tractor or sheet feeder can be easily fitted or removed at any time to handle all types of documents, forms or letter heads.

SCRIPTA II is a true dual purpose peripheral produced by Europe's largest office equipment supplier – it is not a typewriter modified by some electronic wizard! The product is eligible for an annually renewable on-site Service Contract carried out by the Manufacturer, including all parts and labour. A rare thing these days!

Just plug the SCRIPTA II into the mains and connect your data cable to its input port. Wordcraft, Word-Pro, Silicon Office, The Manager – in fact most software currently available for your Commodore machine, is readily configurable.

Should you require further convincing that SCRIPTA II is the ONLY terminal for your system, contact your Dealer, or write, ring or call Sole U.K. Distributor –

DATAPLUS

Dataplus Ltd., 39/49 Roman Road, Cheltenham, GL51 8QQ,
Tel: 0242-30030, Telex: 43594.



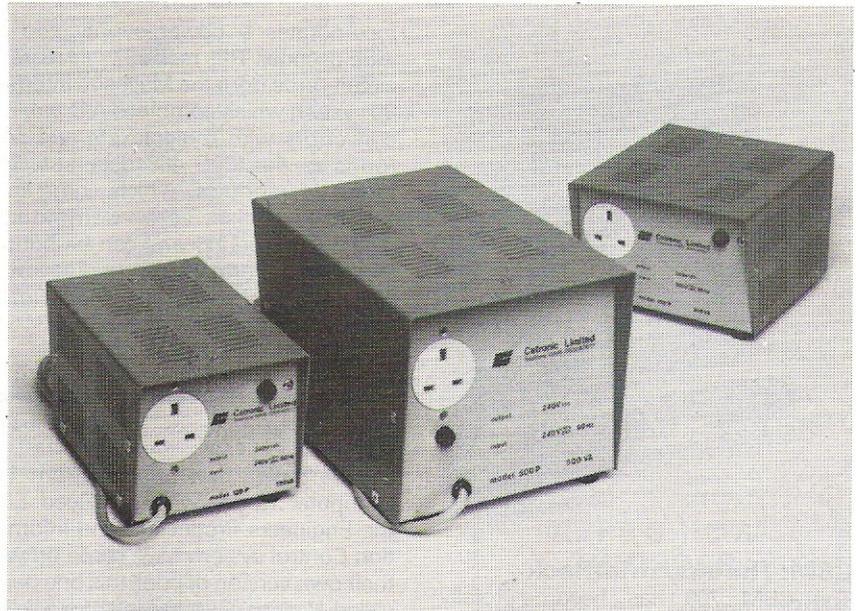
Switchable Ram Packs

With the continued popularity of the VIC 20 and a huge amount of adds-on currently available it is no wonder that many people are buying RAM packs. Most of these are the same as any other make. Have you ever tried the 16K and 32K packs from Ram Electronics? The innovative idea with these two packs is that they both have switchable positions.

The 16K has only one switch with three positions. Power up on the VIC with this switch to the right will display the message "19,967 bytes free" but if you have an 8K pack plus motherboard and the 16K, then you set 28,159 bytes free which is obviously an advantage. Memory on the VIC is divided into blocks and with the 16K and 8K and the switch to the right, blocks one and two come into use. With the switch to the left, you get blocks two and three.

The 32K pack on the other hand has three switches of which the left and right hand switches have two positions and the third switch has three and is applicable to the unexpanded VIC and VIC's with 3K, 16K, 24K, 24K plus hires and the 32K. Each switch on the 32K controls one particular block within the centre block controlling block 5 and the hi-res area. The advantages with this product are pretty obvious although you must make sure that the blocks that you enable with the packs are not already used by cartridges and adventure game cartridges require the RAM pack to be unplugged.

Area: RAM packs.
Company: RAM Electronics
Address: 106 Fleet Road, Fleet,
Hampshire.
Tel: 02514 5858.



Clean Voltage

Cetronic Components Limited have come up with a new range of transformers known as the Regu-volt P range, to overcome any serious irregularities and interference in the electricity supply. In fact, Cetronic are so confident about the reliability of their product, that they guarantee a clean supply regardless of the type of mains disturbance. As an isolated second piece of circuitry it should give complete electrical isolation between the mains and the computer and there is a limit to the overload current to protect equipment against damage during a fault. The models are available with ratings of 120, 250 and 500VA, although special voltages and frequencies can be supplied to order, and thus the application can be

attached to micro, mini and mainframe computer installations. They also come in a variety of sizes, the largest model measuring 255 x 180 x 167 mm and weighing 13kg. The actual life of the transformer – the guarantee is for two years – is anything from five to 10 years depending on how often it is called in to use and the environmental conditions. The 120 costs £110.25, the 250 £137.25 and the 500 £187.25.

Area: Backup Electrical Supplies
Company: Cetronic Components Limited
Address: Hoddesdon Road,
Stanstead Abbots, Ware,
Herts. SG12 8EJ
Tel: 0920 871077

Kestrel

There is a brand new comprehensive series of accounting software which has just been made available for the 64. It comes from Kobra Micro Marketing and the three packages are being marketed under the name Kestrel, these being the sales, purchase, and stock control systems. On the purchasing side of things, the systems' capabilities are limited to 300 ledger accounts and 2000 transactions per month and each purchase can go under any of 100 headings with four sales categories. Postings to the ledger can be invoices,

credit notes, payments and debit or credit adjustments. Many of the facilities that are available on the purchase system can also be found on sales and stock control, although obviously there are differences. The sales account has the same number of ledgers and transactions per month as the purchase account, although the stock control can handle 1000 stock items and 2000 movements per month. This part of the accountancy package also has a global price change facility and all the necessary order reports. This sounds like a good suite of 64 business software and

Kobra are backing this up with a scheme, whereby the customer pays an annual fee of £10 and receives telephone support from the Kestrel hotline and free copies of program and manual updates.

Still on the subject of Kobra and business software, Easy CalcResult now comes in versions for the 8000 series and the 64. This is a cassette based version of CalcResult 64 and costs only £69. For further information contact Kobra Micro Marketing, Duramark House, Farm Road, Henley-on-Thames, Oxon RG9 1PF.



CBM: The Industrial Rack

The CBM 700 has become totally transformed! It has been put into an environmental casing that fits neatly into a 19 inch industrial racking system, the purpose of which is to meet the needs of factories, processing plants and systems engineers, in research and industry. This industrialisation process has been carried out by Machsize and is not only peculiar to the 700, because they have also revamped the 4032, 8032 and 8096 and associated peripheral equipment. The data terminal for the 700 still has the 80 column display and 256K RAM for machine code programs. Each terminal includes cassette storage as well as the central processor and the video screen and an optional piece of equipment is the limited key-pad which fits directly on to the housing of the screen. This key-pad does not have the full set of alpha-numeric characters, as it is intended that this facility should satisfy the day-to-day requirements of industrial workers. A keyboard with the full set of characters can be plugged into the terminal and the interface, to connect the two (along with other items of equipment) is also supplied by Machsize. The industrialised peripherals include the 4040 and 8050 dual drive floppy disk stores and a rack-mounted tractor drive printer. Also included is a back that lifts off easily and thus allows quick access. For servicing, the terminals and disk drives have a built-in cooling system to prevent them from getting too hot. Machsize have not left their rebuilding at this point, because they are also supplying a new interface rack that

incorporates a power supply and an IEEE decoder. This rack unit will store 10 circuit cards from the Machsize Interface 80 system which combines A/D and D/A convertors with multiplexers and conforms to the IEEE 488 data bus. The range of products, which come in a two-tone finish, are Commodore Approved Products and can be bought separately. Further information from Machsize Limited, Collins Road, Heathcote Industrial Estate, Warwick CV34 6TF. Telephone: 0926 32141/2/3/4/5.

Hustler

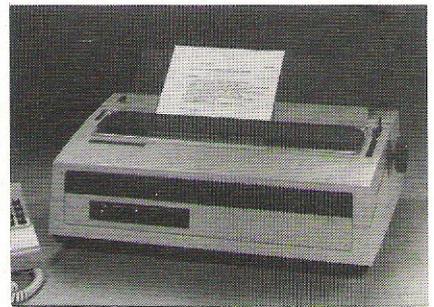
Bubble Bus, a new offshoot from The Computer Room who produced EPIC the Engineers Production and Information Control system have come up with their own version of pool, this one being called Hustler. This game is for use on the 64 and the user is given a view of the actual table, on which may be played six different versions of the game, which includes titles like Minipool, Superpool etc. One or two people are allowed to play the game. All the programs are written entirely in machine code and these are accompanied by music - if you listen closely you may realise you have heard the music somewhere before. These games are available from retail outlets or direct from The Computer Room.

Area: *Games*
 Company: *Bubble Bus*
 Address: *The Computer Room,
 87 High Street, Tonbridge,
 Kent*
 Tel: *0732 355962*

Super Rexagan

At the recent Commodore show, Imperial Chemical Industries were showing off their interfacing systems, amongst which, was Super Rexagan which allows for the control of laboratory and engineering systems. This system consists of a master unit which connects to the microcomputer and signal modules which slot into the master unit. Each master unit will accommodate 10 signal modules of which there are seven different types. These being the analogue input and output, digital input and output, power controller, frequency input and the serial input and output of which any combination is acceptable, so

you can connect it up to micros, spectrometers, valves, thermometers, et al. Each master unit incorporates its own power supply and watchdog system which can be used to activate alarms or shut down equipment. The distributors for this system are Dyson Instruments Limited, Sunderland House, Station Road, Hetton, Houghton-le-Spring, Tyne & Wear DH5 0AT telephone 0783 260433.



Ah So! cheap

Sanyo have entered into the printer market with what they term is an inexpensive daisy wheel printer. Costing £799.25 pence, I would not call it inexpensive, even though that price does include VAT. The printer goes by the name of PR5500 and is compatible with most word processors. Like most other printers around at the moment, this one has bi-directional printing at a speed of 16 characters per second and the output can be in bold type face with subscript, superscript, double striking and under-scoring. The characters, of which there is a set of 96, are set, so that there is a choice of 10, 12 or 15 to the inch on paper and no wider than 17 inches. There are other variable factors as well: line spacing offers 48 positions per inch, the top and bottom margins can be adjusted and there are horizontal and vertical adjustments that can be made to allow for various printing functions. Currently available only in tractor feed form, Sanyo plan to market a single sheet feed system.

Area: *Printers*
 Company: *Sanyo Marubeni (UK)
 Limited*
 Address: *8 Greycaine Road,
 Greycaine Estate,
 Watford, Herts. WD2 4QU*
 Tel: *0923 46363*

Does your PET need a new chip? You need a SOFTCHIP !

Write professional quality software. Save money and perhaps earn some !
YOU NEED SOFTCHIP.

As sold to Universities, Industry and Professional Software Houses. Our routines cut development time by half, increase normal disk capacity by a factor of three, the list goes on and on ! Harness our machine-code from your Basic programs using simple Basic commands like :

		APPROXIMATE MEMORY USAGE	
AUTO	40	MON	10
BEEP	60	MOVE	130
BLOOD	40	NUMIN	740
BSAVE	120	PCTRL	100
CALL	70	PLOT	170
CIF,CEND	220	POP	30
ELIF,ELSE		PRINT	130
CURSOR	30	PRINT	280
DATIN	690	PUSH	60
DELETE	70	RENU	930
DISABLE	50	REPEAT	50
DISP	140	REPLACE	490
DREAD	100	RESCUE	40
DSEARCH	330	RESET	170
DUMP	170	RESTORE	20
EDIT	70	REVERSE	50
EXEC	140	SCAN	190
FIND	200	SCOPY	340
GENIN	700	SCROLL	230
GSUB	110	SEARCH	270
GTO	90	SHRINK	190
INPUT	40	SORT	760
INVERT	160	SWAP	440
IRQ	60	SWIND	150
KILL	20	TRACE	110
LINES	50	VAR	390
LWIND	170	WINDOW	30
MERGE	380	WPOKE	50

★ ★ NEW COMMANDS NOW AVAILABLE

BORDER	100	Draws a border around the edge of the screen
CLOCK	250	Continually displays the time at a given screen position.
GRAPH	20	Gives access to the box-drawing characters on an 8032
ON	50	Branches to program line corresponding to key pressed.
PROTECT	90	Allows regain of control after system crash.
STATS	120	Outputs the number of statements in the current program.

★ ★ NEW FUNCTIONS which may be used in any expression

AVG	140	Calculates the average of the elements in a numeric array.
BLANK	40	Tests a string : returns true if the string is blank.
DEC	80	Gives the decimal equivalent of a hexadecimal number.
FACT	60	Provides the factorial function.
GAMMA	90	Provides the gamma function.
HEX\$	90	Gives the hexadecimal equivalent of a decimal number.
MAX	120	Returns the maximal element of an array.
MIN	120	Returns the minimal element of an array.
NORM	160	Provides the normal distribution area function.
PAD\$	90	Pads a string with spaces.
QUMES\$	70	Assists high-resolution plotting on QUME Sprint 5 printer.
SHR\$	260	Gives the compressed form of a number for compact storage.
SPC\$	30	Gives a string of spaces of given length.
SUM	130	Returns the sum of elements of an array.
WPEEK	40	Peeks a two-byte address.
XPD	220	Decompresses a number.

ONLY £45 ALL INCLUSIVE FOR YOUR CHOICE OF 3700 BYTES

Full and free details of current library of SOFTCHIP commands available.

plus: *Whitby Basic*

...£99.00 incl..... a revolutionary new disk-based language for the Commodore range which is as big a step forward as electric light was from candles.....this is the language the PET should have had when it was introduced ! Get details now from your nearest Commodore dealer or direct from

WHITBY COMPUTERS LIMITED, 8, Chubb Hill Road, Whitby, North Yorks.
Telephone 0947-604966 or 604968

What will they think of next ?

HERE'S HOW TO ORDER

(1) Choose around 3700 bytes worth : the number of bytes is beside the name.

(2) Write your selections in order of preference - this is important as our numbers of bytes are only approximate.

(3) State which of these computers you have : New Roms, Basic 4, Fat 40, or 80-column : and also which socket you would like the chip to reside in (we will choose if you wish us to).

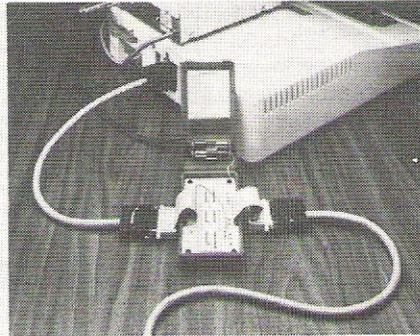
(4) Send order direct to us at the address below, giving a day-time telephone number, together with remittance for £45.00 incl. VAT & p/p for each new chip.

We take orders over the phone from government organisations.

Name change for M.M.S.

According to Shane Barnes, the manager of MMS Limited who are based in Ketwell House, 75/79 Tavistock Street, Bedford, the logo initials of the company are being too widely and innocently adopted by other manufacturers and this situation has become far too confusing from a sales and marketing point of view. The obvious answer to this problem, is to change the company name and this is exactly what Barnes has set out to about doing. The software will now go under the name, of Facts Software Limited and the dealership changes from MMS to SWW. Nobody appears to know what the new initials stand for, but it is connected with some kind of advertising ploy. What has all this got to do with new software? Well the fact is that a new range of software products are available from another MMS Limited which is not to be confused with the one above. This MMS Limited (and not SWW) call themselves Marketing Micro Software Limited and they have a total of nine packages which run on the VIC 20. On the games side of things, there is Barrel Jumper in which you have to confront a barrel-throwing ape on the rampage in a city and to run this game you must have 8K expansion. Continuing on a jumping and leaping theme, there is Johnny Jumpet who is late for his supper. This young gent has to avoid the deadly white mice on his race home and the strange bridges which have the habit of dropping you on the spikes below – not a very nice way to go at the best of times! Road test is also a dangerous game for sprites because crashing or running off the road in atrocious weather is certain death. Reversal and Reflections are both an awful lot safer. Reversal is a computer chess game on an eight by eight chess board format. This has also been called Othello or Reversi. Reflections is their last game (so far) for the VIC and the aim here is to demolish a star by hitting a ball with floating paddles.

All of these games are for the unexpanded machine unless stated. MMS also have something called VIC PAK 1 which is a collection of unexpanded cassette programs for the VIC 20, one of which is called U-Draw. This is a simple drawing program, which offers eight colour block graphics, for you to create on the television screen. Then there is a program called Expectancy,



Inmac

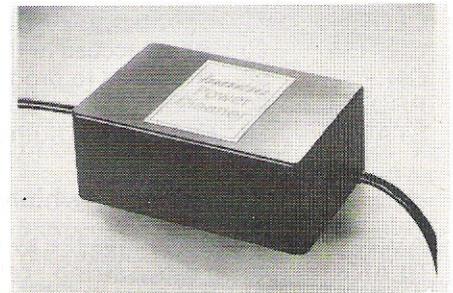
Inmac have recently hit the market with a couple of products, the first one being a mains interference suppressor called PowerCleaner which will detect any voltage above a certain level and earth the surplus. This compact little box plugs directly into the mains, with the equipment that is to be protected, plugging directly into the unit's own three pin socket. There is a 3A version which costs £69.00 and a 6A version which costs £119.00. This product has a one year guarantee, 30 day trial period and a next day delivery service. The second product they have is an RS2320 Interface Tester which should indicate whether any communications problems exist between modems, terminals, prin-

ters etc. How does it do this? Simply by connecting the male and female connectors to the interface cable and 12 LED's light up to display the state of different signals such as Transmit Data and Data Ready. Testing equipment can also be performed on a selective basis owing to the selection of switches as well as by cross-patching between connector pins by using the jumps provided. There should not be any severe drainage of energy whilst the testing is being performed because the unit has its own battery supply. The I/O tester comes in a plastic casing with batteries included and costs £150.00. This product also has the 30 day trial period and one year warranty. Both items are available from Inmac (UK) Limited, Davy Road, Astmoor, Runcorn, Cheshire WA7 1PZ. Telephone: 09285 67551/2/3.

which will not calculate the chances of getting your wife or girlfriend pregnant but it does in fact enable you to feed in personal information to provide a rough value for life expectancy. Mortgage is a program to find unknown variables for principal, monthly repayment, term and annual interest. In Elements, all you have to do is name the chemical symbol associated with the chemical. Calendar is a self-explanatory title and Statistics introduces the computer as a sophisticated calculating device. Once you've figured out the computer as a calculator, you can have a look at Marblestat to calculate probability and chance.

By now, you may think that the list of products is long enough, but we have a few more things to run through, which are not included in the VIC PAK. Drawings may be stored by etched in any of seven colours by a keyboard or a joystick. Called VIC Sketch, the drawings may be printed, saved or erased. For everybody who wants to develop their

mathematical skills, there is a program called Maths Duel which throws up problems in addition, subtraction, multiplication and division. Each operation has three levels of difficulty and once you have conquered one, you move on to the next. Fancy yourself as a modern Beethoven or the greatest lyricist since John Lennon? Well Composer might not be that good, but it does have a music sheet of up to 44 notes which are entered by keying in numbers from nought to nine. This program gives a range of 2.5 octaves and thus you can produce both sound and notation for simple melodies which can be stored and played back from a datasette recorder. All of these three programs are for the unexpanded machine and they all come on cassette. There should be enough there to keep you satisfied for some time and make sure you contact MMS Limited (and not SWW) on Goddard Road, Whitehouse Industrial Estate, Ipswich IP1 5NP telephone 0473 462721.



Micro Interface

Wego Computers Ltd have now made available a VIC and CBM 64 interface which fits into the serial port of the computers and into the parallel port of any Centronics type printers. This device is completely compatible with other devices on this port such as disc drives and so on. This interface, which transmits seven bit data as standard and can be altered to transmit eight bit data, can be set to device number four or five.

The power for the interface is supplied by a five volt line from the printer to pin 18 of the parallel printer connector although this can apply to other printers which do not have this facility as standard, as long as a small connection is established within the printer to its parallel port.

It is priced at £79 plus VAT.

Area: *Communication.*
 Company: *Wego Computers Ltd.*
 Address: *22a High Street,*
Caterham, Surrey.
 Tel: *0883-49235.*

Record Keepers for the Office

Precision Software have announced that several new products will be on exhibition at the PET show, including Superbase and Superoffice. Superbase is a DBS record manager with facilities similar to Silicon Office. The records are created on screen with a large number of fields including percentages and constants for VAT and a full calculator which calculates between fields on the form created.

There are two versions of this, one for the 64 and the other for the 500 and 700 series. The 64 version, which will cost around £100, will have the data base only, linking to Easiscript via the cartridge port.

Superbase for the 500 and 700 series, costing around £450 and the hard disk version costing £495, connects to Superoffice and an improved version of Superscript called Superscript 2. Superoffice has a record size of 1000 characters with 128 different fields. The records are redefinable with a maximum of four screens per record. Superoffice is expected to be priced at £825.

Superscript 2, which should be available by mid-May, performs calculations via the full calculator and also has mailing



Games

Five new cartridge games for the VIC 20 including the successful arcade game, Gorf. This particular package is made up of four space adventures these being Astro Battles, Laser Attack, Space Wars and Flagship. Each game uses a joystick and it is not until you have successfully overcome the first challenge that you can begin to overcome the next desperate situation. The cost of this package is £24.95. In Cosmic Jailbreak, there is a cell somewhere in the depths of space which holds one dangerous prisoner. You are the jailer and your job is to prevent the alien environment - which is made up of spaceships, bugs, meteorites etc - from releasing the convict. Cosmic Cruncher is another of

the you-against-them type of games and as long as you keep on destroying the alien satellites, you're alright. Now we move from the mundane stuff to the ridiculous, in Menagerie which has computer fleas on "a treacherous journey to home base" avoiding the flea-eating crocodiles. The last game, Money Wars, does sound a little bit more realistic and sensible. The excitement here is that instead of being the protector, the user is actually the thief who has to escape with as much money as possible. This game is played from the keyboard. All games cost £19.95 and have a joystick and keyboard option unless stated otherwise. From Commodore Business Machines and dealers.

and mail-shot facilities. New commands are also added, two examples being Alternate Headings and Alternate Offset Margin which enables a margin in, say, a book to be switched to left or right.

There is also the facility to select which area of text is to be printed and then you can go back and edit it where necessary. On the same disk, there is a fully integrated program for Superspell II which gives British and/or American spellings along with the option to add your own names and words to the dictionary.

All of these products are approved by Commodore and they may be exhibited in America following talks with Commodore's boss, Jack Tramiel.

Precision Software's next step will be to produce applications for the office system such as pre-programmed vertical market applications.

Area: *Database systems.*
 Company: *Precision Software.*
 Address: *4 Park Terrace, Worcester*
Park, Surrey KT4 7JZ.
 Tel: *01-330 7166.*

Arcade Games for the Commodore 64

Jumpman

A disc based arcade game for the Commodore 64, which requires much more than just quick reflexes if you're going to succeed in your mission and rescue Jupiter Headquarters from doom and destruction.

The game also requires a joystick to be installed in port two.

Getting Started

The first program on the disk is a simple and short one that boot-loads the master program that controls all the action. Whilst waiting for this 26K masterpiece to load, you're given a large scale view of a scene from the game. At least you've got time to adjust the colour and contrast before starting to play.

You could also take a look at the manual that accompanies the program.

This gives a straightforward explanation of the game, and how to play it, as well as some helpful hints for achieving mega scores.

And Into Action

The snappy demonstration at the beginning is well worth watching, as it gives a nice insight into the working of the game. Pressing return at any time takes you into the game proper.

You control a little man, whose job is to run around a collection of ladders, girders and ropes, dodging various hazards en route, and collecting a number of treasures at each level. There are thirty one levels in all, and each one features a different scenario, as well as different obstacles.

Simple, eh?

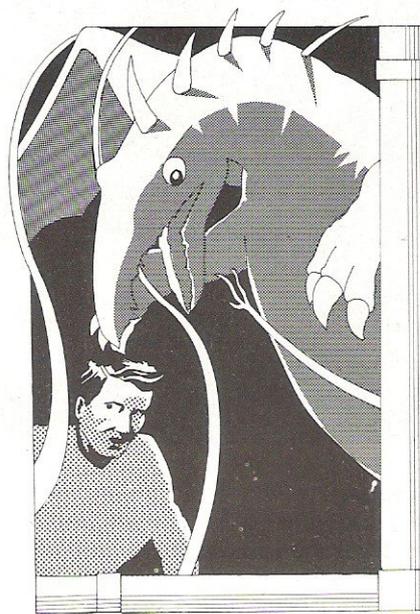
Well, not really. In addition to the number of levels, each one can be played at eight different speeds, ranging from soporific to suicidal!

After pressing return, you are presented with a five option menu, which allows you to start at beginners (levels 1 through 8), intermediate (9 through 19), or advanced (20 through to 31), so through the whole lot is a grand loop from 1 to 31, or finally leap about from level to level in a totally random manner, never knowing which one is coming next.

The individual difficulty of each level doesn't seem to progress in a logical way, for instance level 6 is much easier than 5, but as a complete group the above distribution is probably fair.

It would be difficult to describe each

level in detail in a review of this length, but some of the hazards you'll encounter are vampires, dragons, copy-cats who follow you about and generally get in the way, robots, bombs, missiles, and many others.



On some levels you'll have to attempt seemingly impossible leaps into space, climb up and down ropes whilst hoping nothing hits you, and on quite a few of them you'll also have to exhibit a fair degree of intelligence.

Some of the treasures will seem to be unreachable: there are no ladders going anywhere near them, no ropes to climb up or down, and the leap is far too great to even contemplate. However, a common feature of the game is that, as you collect things, ladders move about and appear or disappear, girders crumble or are re-created elsewhere, and so it becomes a question of doing the right thing in the right order at the right time!

Conclusion

A brilliant game!

Very occasionally an obscure bug appears, and stops a game after you've completed a level. However, pressing return gets you back to the menu again.

As a reviewer, one gets to see an awful lot of games. Of all the games I've seen so far on the Commodore 64, this is one of the few, the very few, that I would actually go out and buy.

Product:	<i>Jumpman</i>
Area	<i>Arcade Game</i>
Price	<i>£27.45</i>
Configuration:	<i>Commodore 64, Disk Drive, Joystick</i>
Company:	<i>Maplin Electronic Supplies Ltd.</i>
Address:	<i>P.O. Box 3, Rayleigh, Essex SS6 8LR</i>
Tel:	<i>0702 554155</i>

Three brilliant pieces of arcade software for the Commodore 64 this month, all from the Llamasoft stable, and we'll start with a look at Attack of the Mutant Camels.

Attack of the Mutant Camels

This, like the other two, is supplied on cassette, and requires a joystick to be installed in port 1 before you can start playing the game.

The scenario owes a lot to the Star Wars saga of films. You are defending your base against an attack of deadly mutant camels. These have been kidnapped by the enemy, and, by some devious genetic engineering, the normally harmless beasts have been transformed into 90 foot tall, neutronium shielded laser spitting death camels!

With your highly manoeuvrable space craft, your task is simple: to destroy the camels and save the base from destruction. Should you fail, you are yourself destroyed in a dazzling display of graphical pyrotechnics. Leaders can be so fickle!

To begin with there are six camels hot on your trail, and to a devastating backbeat of thunderous hooves the beasts march ponderously towards your base. Picking them up on your scanner (displayed constantly at the top of the screen), you must rush to the attack.

Being neutronium shielded it takes a lot of missile hits to actually destroy one of the camels. As the missiles find their mark the camels gradually change colour as the shields weaken, until, with a final volley, the dying camel rears its head skyward and emits a piercing scream as it perishes. But, if you continue firing as it dies it turns into a new mutant, and, moreover, one that cannot be killed. It may turn many different colours, but it still marches relentlessly onto the base and your ultimate doom.

SOFTWARE REVIEW

To defend themselves, the camels have two types of weapons. One relatively harmless laser that flits about the screen, from which you can survive four direct hits, and one that homes in on you: a hit from that is fatal, and another one of your five lives bites the dust.

Destroy all six camels, and you are faced with a hail of missiles which you must frantically dodge. A quick hyperspace jump later, and six more camels appear, more deadly, and more determined to destroy you than ever.

And so it goes on, thirty one levels in all, and level thirty one, let me tell you, is suicide within seconds.



Verdict

A great piece of software, definitely one of the lover of high speed action games, and it's nice to see someone using the capabilities of the 64 to the full. A snip, at £8.50.

Gridrunner

The game that's taken America by storm, as the advertisements would have us believe. No-one has ever progressed beyond level 13, they say.

One does tend to treat advertisements with a certain amount of justifiable cynicism, but in this case they are absolutely right.

Once again Llamasoft put you in the role of sole defender of earth freedom. The action takes place in the dim and distant future, where earth has erected a grid in outer space, the purpose of which is to supply energy to us humble earthlings below.

Alas, the energy being supplied is not as great as it should be, and investigations reveal that this is the work of horde of aliens, bent on earthly destruction.

Needless to say, you are sent up there to destroy them.

The aliens take many forms!

Caterpillar-like life forms stalk about the grid, getting ever nearer the bottom of it (and you!: you're restricted to the bottom seven rows), and these must be destroyed before you can progress to the next level, out of a total of thirty one levels in all.

Each segment of the caterpillar that you hit turns into a 'pod', which goes through an evolutionary life cycle before unleashing a bolt of energy down the grid, or screen.

These bolts are lethal, as are those fired by the so-called 'X-Y Zappers'. These patrol the boundaries of the grid, and fire at you as they wander around.

As you slowly progress through the levels, the action gets even more furious, more and more 'caterpillars' appear on the screen, moving faster all the time, until you reach lunacy level. At this point the many lives that you've built up over the earlier, easier, levels disappear, and you just have to play another game.



Verdict

Another one for the library, if you like fast and challenging arcade games that are different from the usual run-of-the-mill pub-ripoff games. At £8.50, Gridrunner is worth every penny.

Matrix

'Son of Gridrunner', is the easiest way to describe this latest arcade game for the Commodore 64 from Llamasoft.

After vanquishing the enemy, the earth was at peace for a millenia or two. But then people began to notice that

energy was being sapped from the grid once more, and immediately knew that the aliens were back!

And back with a vengeance. New life forms had appeared, more deadly than before, and early explorations had reported mysterious sightings of camels on the grid!

As an experienced gridrunner pilot, you are called upon to save the earth from doom once again. It must get tedious being a superhero, but you rise to the challenge and fly off to do battle.

The scenario is as before, with all the action taking place on the grid, but there are subtle differences. When pods reach the bottom they no longer re-appear eight rows higher up, but start bouncing around the screen like frenzied billiard balls, which makes them very difficult to hit.

A couple of levels into the game, and a little man appears at the top of the screen, guiding the X-Y Zappers so that their fire becomes more accurate. He unfortunately cannot be killed, and is, basically, a nuisance!

Levels four and five, as well as having a blank background, feature camels wandering around the screen, and a missile deflector in the middle. This, whilst occasionally causing you to kill yourself, deflects the lasers fired by the X-Y Zappers also: frantic stuff!

And so it goes on, amazingly fast and furious, and you'll be totally exhausted after just a few games.

Verdict

A great game, as long as you like the actin fast, and don't mind being obliterated within seconds at the higher levels.

Totally addictive.

Area:	Arcade Software
Titles:	Attack of the Mutant Camels Gridrunner Matrix
Price:	£8.50 each
Configuration:	Commodore 64, Cassette Deck, Joystick
Company:	Llamasoft Software
Address:	49 Mount Pleasant, Tadley, Hants.
Tel:	07356 4478

The Temple of Apschai

The Temple of Apschai, a disk based 'dungeons and dragons' game, was once voted the Computer Game of the Year.

This month we're taking a look at a new version of the program for the Commodore 64, and seeing if it really is worthy of that title.

Two further games, The Upper

microfacts

Integrated Accounting System

One of the premier accounting packages available for Commodore business systems.

- **Modular** – You choose which combination you need
- **Fully Integrated** – All postings made from a single entry
- **Requires only two disks** – No complicated disk changing
- **Large volumes** – Several thousand accounts/stock items/transactions
- **Multi-company** – Up to 5 companies accounts on 2 disks
- **Multi-ledger** – Up to 5 sales/purchase ledgers per company

Simple to learn and operate, robust and safe to use, well proven – 700 + live installations – 3 years development and sale worldwide – commodore approved product for 2 years, approved and used by professional accountants. Fully approved by H.M.C. & E. for V.A.T.

Available on 8032/8096 computers
8050/8250 disk drives
Any printer

Price £300.00 per module

Also available on the new CBM 700 Series

Sales
Invoicing

Sales
Ledger

Nominal
Ledger

Purchase
Ledger

Stock
Control

and

Job
Costing

See us on stand 46-47 in the Queen Mary Suite
at the 4th International Commodore Computer Show
or Contact:

Facts Software Ltd
Ketwell House, 75-79 Tavistock Street
Bedford MK40 2RR. Tel: 0234 218191

For further information and details of your local dealer

 **commodore**

SOFTWARE REVIEW

Reaches of Apshai and The Curse of Ra, have sprung up in the wake of the success of the parent game, and we'll have a brief glance in their direction as well.

Getting Started

The master disk (copyable!, but respect author's copyright please) contains all the necessary program data, and after the first main program has been loaded some atmospheric music and a character set changed to olde english lead you into the start of the game.

Getting started is a long process, because before the game proper can commence, you have to adopt the role of a character. As you will be this character for the rest of the game, and your ultimate fate is determined by the attributes of this character, it's worthwhile spending some time in choosing the right persona.

Either you or the computer can choose such items as strength, intelligence, stamina, and so on, and having selected all that you then have to enter into some hearty bargaining for swords, shields, armour and so forth.

You only have a limited supply of money, and must spend wisely. Magic arrows, whilst extremely useful, are expensive: ringmail armour is better than leather, but costs more. After a few games you will soon settle on a favourite character, suitably named of course, up to a maximum of 12 letters, and this can be saved onto disk for recall into later games.

And Into Action

You are standing at the entrance of the ancient Temple of Apshai, and your task is to explore the ruins and collect the treasures that are still rumoured to be found there.

In your explorations you will meet with many perils, and there will be problems to be solved before all the treasures can be gained.

In other words, the usual scenario.

Your character is represented on the screen in sprite form, and, as you press the appropriate keys, is seen to move about within the confines of the rooms displayed. The screen contents are updated every time you step into another room or corridor, so that the display is constantly being refreshed.

There are no actual room descriptions presented on the screen, but all of these are contained in the voluminous manual that accompanies the program disk. Thus one saves on both screen and memory space. The manual also contains hints on playing the game, and achieving the best results, as well as descriptions of all the monsters and treasures that you're likely to come

across in your travels.

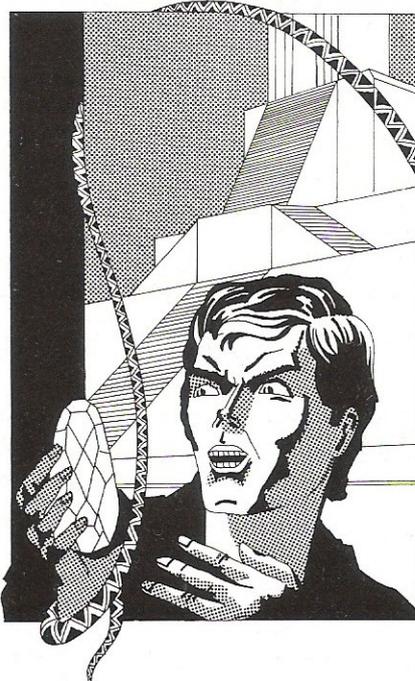
The monsters (antmen, centipedes, vast spiders amongst them) are also displayed as sprites, as are the treasures, although these have a tendency to look more like little mounds of sand than priceless gems. Still, the manual tells you what they all are.

Conflict with a monster is decided on a fairly random basis. The extent of your strength, fatigue etc. obviously comes into play, as does the type of weaponry you're carrying, the sort of armour you're wearing, and so on.

However, an individual combat is decided very much upon your pressing the right key at the right time. This may appeal to some people, but the seasoned adventurer, used to having time on his side and logical problems to solve, is likely to resent this 'key bashing' approach.

The same applies to the rest of the game. There is no time to sit around and arrive at a solution to a particular problem.

Given the 'You've got the cage, the bird, the iron rod, the food and water, now how do you get past the snake?' sort of case, one can sit back, attempt to do various things, and (hopefully!) work out a way of killing the snake and progressing further.



In Temple of Apshai the temptation is to hit out at the nearest key and hope that you do something right.

Also, the manual warns you that exploration may at times be hindered by an unhelpful wall or corridor getting in the way. Pressing the right key to invoke

the 'examine' sequence will give you a variety of messages in reply, usually of 'there is nothing here' variety.

But, and again the manual warns you of this, you will sometimes have to examine a wall several times before you get any kind of revealing message.

In other words, every wall you approach MUST be examined in the hope of finding something useful, and, moreover, must be examined several times. This is at best tedious and at worst downright annoying. You constantly waste valuable time in seeing if a wall has got something hidden behind it. This could have been made far more logical.

Once you have managed to progress beyond a reasonable level the game does manage to get a bit more interesting, but again the totally illogicality of it all, to this reviewer anyway, defeats the object of playing an adventure game. One is, after all, supposed to extend one's mind, not one's patience.

The two extensions to the original game, both of which require the data disk from Temple to be present before play can begin (but then again they do cost half the price of Temple), have the ability to take an existing character and transport him/her to the new world of play, and again allow you to roam around rooms, explore new corridors, and collect new treasures, whilst fighting off weird and wonderfully different monsters.

Conclusion

Temple and its offshoots are not games for the true adventure aficionado, nor are they likely to find many new fans amongst the traditional 'shoot-em-up and zap-em-down' arcade players.

As an attempt to merge the two into a traditional adventure setting with real time action it is to be applauded, and the use of the features of the machine (the moody music, the use of sprites and colour) are again a recommendation in its favour.

If you play adventure games already, and find you're getting totally bogged down in every game you play, it's worth a look.

If you're totally new to adventure games, again you could do worse than start with this: it's got the sight and the sound, and it isn't that difficult to progress to a reasonable level.

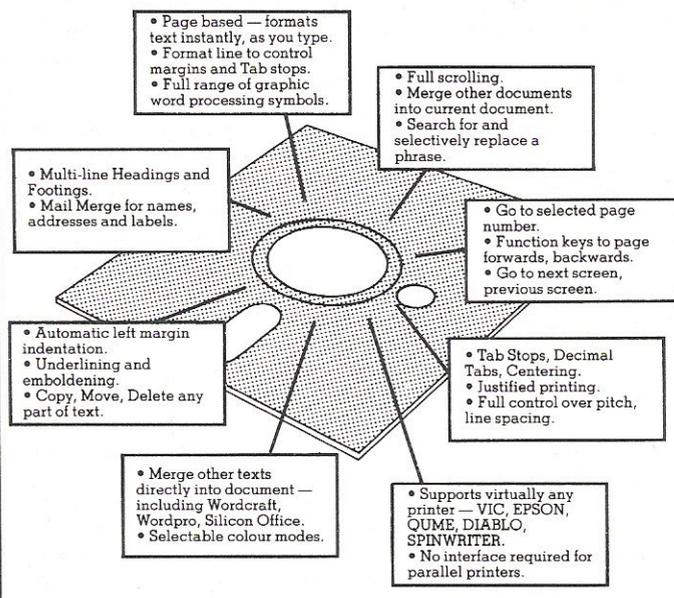
Dungeons and Dragon players, used to a traditional character playing role, will also find it an interesting introduction to the world of classic adventure games.

However, it is not an adventure in the true sense of the word (aka Crowther and Woods), and one can't really see

GET MORE FROM YOUR 64. WITH VIZAWRITE 64.

ONLY **£69** plus VAT

VIZAWRITE 64 — SPECIFICATIONS



THE PERSONAL WORD PROCESSOR

Vizawrite 64 is a high performance, low-cost word processor designed especially for the Commodore 64 computer. Vizawrite 64 takes full advantage of the colour, graphics and memory capabilities of the computer to bring you the power and style of a dedicated word processor.

Serious word processor users expect their word processor to format their text as they type, Vizawrite 64 does this instantly. Tabs, indentation, centering are all clearly visible and easily altered, so you know exactly the format of your text all the time.

Vizawrite 64 is a disk-based word processing program — it is available NOW from your local Commodore dealer or direct from Viza Software. It costs just £69.00 plus VAT (£79.35).

VIZA SOFTWARE,
9 MANSION ROW, BROMPTON,
GILLINGHAM, KENT ME7 5SE.
TEL: MEDWAY (0634) 813780.



SOFTWARE

VIC-20 GAMES

SOFTWARE FROM AMERICA

FROM

£2.65 EACH
IN SIX PAC

FROGGER. Incredible animation in this high performance graphics experience. Frogs, trucks, cars, boats, logs, turtles and lily pads all combine to give your brain a real workout. **£4.95.**

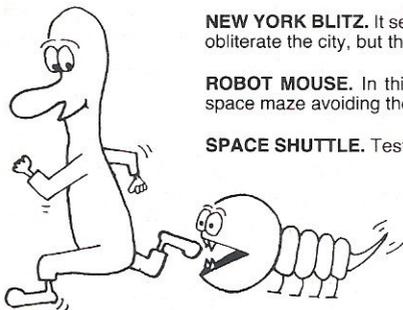
3D MAZE. The ultimate maze game features brain power not fire power. A visually breath-taking 3-dimensional display with a tormenting time factor as the 4th dimension. **£4.75.**

NEW YORK BLITZ. It seems a shame that the only way to safely land your nuclear bomber is to totally obliterate the city, but that's the way it goes. **£4.95.**

ROBOT MOUSE. In this futuristic homicidal game you collect atomic cheese from the floor of the space maze avoiding the mean malfunctioning androids who kill on contact. **£4.50.**

SPACE SHUTTLE. Test your reflexes to the maximum as you attempt to rescue dumb scientists from the lunar surface. Beware of the exploding asteroids in this hectic challenge. **£4.50.**

BUG DIVER. In this highly original game, as a mere beetle you've gotta be fast to avoid the angry carnivorous fish whilst stealing their precious eggs. Their favourite meal is raw beetle. So watch out! **£4.75.**



NOW FOR THE FIRST TIME IN UK

Six famous arcade quality games use machine code, Hi-res multi-color graphics, exciting sound effects, for any VIC-20, keyboard or joystick.

Available now in UK direct from manufacturer only thru our **super fast mail order service**, or 24hr credit card sales line. All games supplied on cassette with written money back guarantee.

Galactic Software

LAMBROOK RD. SHEPTON BEAUCHAMP. SOMERSET. TA19 0LZ

INTRODUCTORY OFFER

Any 2 games **£7.90**
Any 4 games **£12.95**

ALL 6 GAMES £15.90
(That's only **£2.65** each!)

MONEY BACK GUARANTEE

Please rush me copies of (tick box) CCII

- | | |
|---|--|
| <input type="checkbox"/> FROGGER | <input type="checkbox"/> ROBOT MOUSE |
| <input type="checkbox"/> 3-D MAZE | <input type="checkbox"/> SPACE SHUTTLE |
| <input type="checkbox"/> NEW YORK BLITZ | <input type="checkbox"/> BUG DIVER |

I enclose a cheque/PO for £.....
Please debit my Access account card no.

Name

Address

Tel: 0460 40744

SOFTWARE REVIEW

why it was once voted Computer Game of the Year.

A good game, but it falls short of being a brilliant one.

Area:	<i>Role Playing 'Epic Fantasy' Games</i>
Product:	<i>Temple of Apshai (plus Upper Reaches of Ampshai, Curse of Ra)</i>
Price:	<i>£27.45 for Temple, £13.80 for offshoots</i>
Configuration:	<i>Commodore 64, Disk Drive</i>
Company:	<i>Maplin Electronic Supplies Ltd.</i>
Address:	<i>P.O. Box 3, Rayleigh, Essex SS6 8LR</i>
Tel:	<i>0702 554155</i>

Wordcraft 20 the Processor for the more serious VIC

At the time this article was written, Wordcraft 20 was only available for the Vic 20. Although there are at this time loud rumblings of a version of Wordcraft for the CBM 64. The current price for Wordcraft 20 is £125, there is a version available for the Vic without the extra RAM this should be significantly cheaper. Wordcraft is manufactured and distributed by Audiogenic Software, PO Box 88, Reading, Berkshire.

Getting Started

What you actually get for your £125, is a cartridge that plugs into the expansion port, a comprehensive manual and a demo/utility tape.

The cartridge is placed in the expansion port or into an expansion board. When the Vic is switched on with wordcraft inserted you will be greeted with the wordcraft display. At this point the user must select from various options. This is done using the function keys. The first choice is type of printer, the selection is obtained with the F7 key to change the value and the F5 key to move to the next section. Which is a choice of Auto or non auto line feed, no form feed and continuous or hand fed stationery. After selecting the printer requirements there is a choice of disk or tape storage and expanded or unexpanded memory.

Wordcraft is now set up and ready to start, to enter the text area the F1 key is used, or alternatively the user may leave wordcraft and return to the Basic area

with or without the extra 8K RAM by pressing the F3 key. This is a nice touch, being able to leave wordcraft and use the extra memory available. One word of warning if you quit wordcraft whilst there is text in it, it will be lost. Also if you hit RUN/STOP RESTORE whilst wordcraft is plugged in it will automatically power return to the wordcraft initializing screen. Any Basic programs will still be in the Basic area and can be accessed by pressing the F3 key. However if the text area is entered any Basic programs will be lost.

In Use

Extra memory may be added to wordcraft using an expansion board in the usual way. For example this review was written using Wordcraft with an additional 8K RAM, giving the user an extra 8K of text area.

Now for the commands and controls available in Wordcraft. Once in the text area there are three display lines at the top of the screen. The first line contains the title and author the second line displays the mode, page, line, column and memory left (which decreases as text is entered). The third line displays any commands or controls given or removed. When the text area is first entered it is in command mode and may format the screen or enter the text area. To enter the text area press RUN/STOP and to exit to command mode again press RUN/STOP. The page length can be set from command mode with; l,n where n is a number from 0-60. To set the page width the format is w,n where n can be from 0-99. To justify the text both left and right the format is j,y or j,n to turn justification off. Loading and saving files takes the format, g, filename, to load and s, filename to save.

There are a great number of commands for Wordcraft and although we will look at some more not all of them will be examined in this review. To replace a previously saved file the format is; r, filename. Wordcraft also has the standard commands such as merge, the format is m, filename, pages. There is an ascii command, this is for immediate use and sends any ascii values to the printer, the format is a,nn,nn where nn is any number from 0-254. There is a keystroke beeper to turn it on type b and to turn it off type b again. The last command in Wordcraft is printing documents. The format to print is p or p,pages,type,copies. This will print specified pages of a document with bold or underlined type and the number of copies required. To simply print the whole document once type p.

There is a whole range of controls for Wordcraft. Perhaps an important feature

is the function keys, they are initially set up to do the following. F1 = delete word, this will delete the current word under the cursor. F2 = delete line, this will delete the line from the position of the cursor. F3 = insert on, this will open up spaces for insertion. F4 = insert off, closes spaces left after insertion. F5 = normal tab, this resets wordcraft to its normal tab. F6 = decimal tab, this tabs to the next tab position. F7 = new line, this forces a new line. F8 = new page, this forces a new page. It is very useful to have the function defined although they could have possibly had a better choice of controls.

To use any of the controls other than the function key controls the user must first press the CBM key, control will be displayed on the second line, the control may then be entered. Some of the controls are +n to skip lines, where n is the number of lines, RETURN to start a new line, HOME to force new page. Some of these controls are available from the command level or the function keys.

The other controls consists of moving text, centering text, inserting and deleting blocks, lines and words, moving blocks, highlighting text, search and exchange text. As well as a whole range of tab and ruler commands, together with commands such as fill and other special controls for letters. All the controls are invisible, but can be displayed by pressing the CBM key and 'c', to remove controls from a line press CBM and n then the control you wish removed.

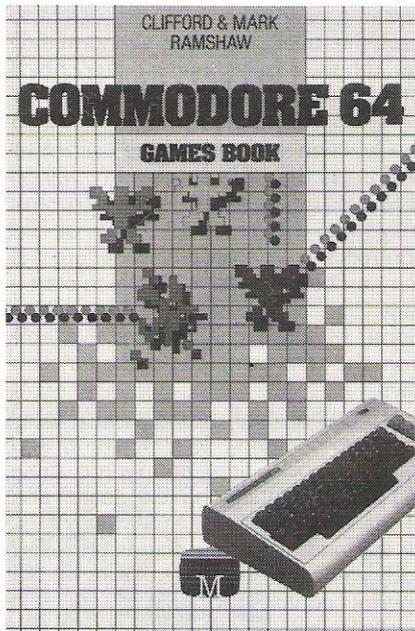
Conclusion

To conclude Wordcraft is definitely good value for the wordprocessing power the package contains, the manual is very good (has even been updated!). The tape provided contains mostly files for letters and formatting within the processor plus a Basic program to convert Wordcraft 20 files to Wordcraft 80, for the Pet. If there is anything lacking it is the speed and agility of the more expensive wordprocessor's. Then Wordcraft does not cost in excess of £1000. It is obviously very slow on storage if you are using cassette rather than disk and is also limited to the amount of memory available on the Vic. Even so Wordcraft is still a good buy, one would need to think very carefully and consider the needs required from a wordprocessor before purchasing one. This is as true of Wordcraft as any other package. It work's very well, the question is what one wants to use it for and will it cope. It is probably not suited to a busy office but well suited for the homework a business person may wish to do.

BOOK REVIEW



Commodore 64 Games Book



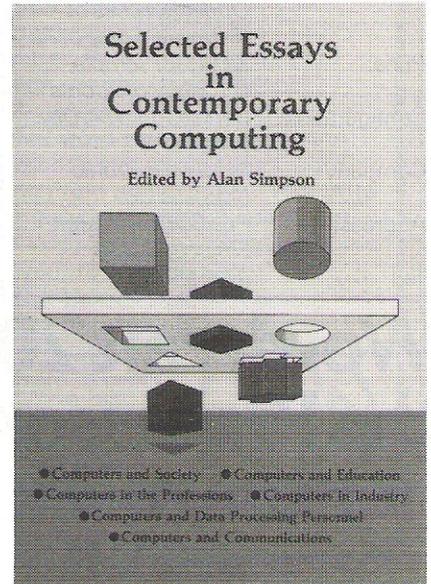
The Commodore 64 Games Book has been written by two young boys and the copy that we got for review was accompanied by a couple of press releases, one of which extolled the virtues of the book and the other told us that the programmes were written over the Christmas holidays – which is perhaps too short a time to write 30 programs even if the authors did take an equal workload. Apart from that, I was quite pleased to see that all of the games were not solely dedicated to mindlessly destroying hordes of aliens, enjoyable though it may be. You can go horse racing and place bets, play cards, have a cowboy shoot-out, a tank attack and, amongst many other wonderful ideas, keep on throwing a turkey up in the air. But unfortunately, not all the programs are wonderful. In Paranoid the aim of the game is to draw seemingly never-ending lines across the screen – is this really a game? – which I found slow and a little bit boring. The next item I found off-putting, was actually in the publisher's note, which reads "We have taken care to design the format in such a way that the programs will be easily read, to reduce the possibility of transcription errors especially with the

graphics characters." Not so! The programs – which are not straight listings, but have been re-type set, so errors have inevitably crept in – need more spacing out, because I got lost quite easily whilst typing the programs in and thus missed out text. Secondly, it is unfortunate that the screen illustrations have not turned out in a better quality, as this would give a clear pictorial example of what the screen is supposed to look like, although admittedly the written description of the game is clear and concise. Finally, the book is not error free. The first line of the first program reveals this reading 0 background = 0. Wouldn't it make better sense if the background was changed to 1 or 16? This book is far from the best games book around at the moment and I suppose that the best thing you could say about this book is that it has a nice cover. However, as I have said before, some of the ideas are good, although it's just that they need a little more thinking about – and not just over the holidays!

Title:	<i>Commodore 64 Games Book</i>
Price:	£5.95
Authors:	<i>Clifford & Mark Ramshaw</i>
Publisher:	<i>Melbourne House</i>
Available from:	<i>Glebe Cottage, Glebe House, Station Road, Cheddington, Leighton Buzzard, Bedfordshire LU7 7NA.</i>
Tel:	<i>01-405 6347</i>

Selected essays in Contemporary Computing

The second book for review this month is one of general interest in the computer field and is called 'Selected Essays in Contemporary Computing.' This is not to say that they are of any practical use to budding programmers, because it does not go to any great length over the actual programming techniques, but is mainly concerned with the applications of computers in education, society, industry, business and communications and the social problems that they may cause, such as the invasion of privacy etc. However, if you feel that you have read some of the information elsewhere, you are probably right because some articles



have already appeared in a series of books called "Current Aspects of Computer Technology." There is a total of 34 articles which cover many of the ways in which computers affect our lives and each article is written by a relevant expert in the particular field and it is hard to pick out one article in particular because they are all very, very good. If you are unsure about computer applications in your field then this book should act as a very good reference guide. However, the point to remember here, is that the computer industry, because of its nature, is changing all the time and the changes come fast and furious. You can read articles on contemporary computing until you are blue in the face and still find that the best advice you can get is from computer users, experts and dealers. Obviously it is impossible for this book to tell you which system to choose, but as a general outline to computerisation, this book is well worth buying, reading and thoroughly understanding.

Title:	<i>Selected Essays in Contemporary Computing</i>
Price:	£5.95
Editor:	<i>Alan Simpson</i>
Publisher:	<i>Gower Publishing Company Limited</i>
Available from:	<i>Gower House, Croft Road, Aldershot, Hampshire GU11 3HR</i>
Tel:	<i>0252 331551</i>

32K* RAM PACK FOR YOUR
COMMODORE VIC20

SPECIAL OFFER

CHOOSE ANY *ONE* OF THE FOLLOWING 'GEMINI'
SOFTWARE CASSETTES REQUIRING
32K MEMORY EXPANSION:

- 1—DATA BASE MANAGEMENT
- 2—STOCK CONTROL
- 3—MAILING LIST
- 4—INVOICE STATEMENTS
- 5—HOME ACCOUNTS
- 6—COMMERCIAL ACCOUNTS

AND ADD A 32K RAM PACK BY PLUS 80
(rrp £69.95 for both)
ONLY £59.99 (incl)

PLUS 80 LTD
31-33 LOWER ROAD
HARROW
MIDDX HA2 0DE
01-423 6393

(Generous dealer discounts)

**Gives 28159 bytes*

ALLOW 10-14 DAYS DELIVERY

NAME.....
ADDRESS
.....
32K RAM PACK with Software
1 2 3 4 5
32K RAM PACK on its own at £49.99
SOFTWARE on its own at £19.95
1 2 3 4 5 6
16K RAM PACK at £37.99
I ENCLOSE CHEQUE/PO FOR £.....

Programmers Aids for the 64

This month we're taking a look at two of the more popular programmers aids for the Commodore 64, one brand new and one not so new.

Both these packages aim to make the programmers life simpler, and in their individual ways, both succeed. However, no-one is likely to want to buy both, so we'll examine each in turn.

To get the ball rolling:

Sysres 64

Available from Solidus International, at a cost of £59.00, Sysres comes on an intriguingly protected disk.

The master disk will allow you to make three working copies of the program, and no more. This is working on the theory that three will be enough to cover any mishaps, but is NOT enough to encourage you to give them away.

A sound idea, and one that other software suppliers ought to take note of. So often, when the master protected disk has somehow become corrupted, it has to be sent back to the manufacturer for repair, thus depriving you of your system for a few days.

This way, you should never be without a working version of Sysres.

Getting Started

You can not use Sysres until you've taken at least one copy of it, so as well as buying it, you'll also have to buy a few spare disks. You may resent this at first, as the copying process is very tedious on the single disk drive for the 64, and indeed you are advised to seek out a friend with a dual disk drive and a suitable interface.

But note, Interpod (from Oxford Computer Systems) is NOT a suitable interface! Sysres will not work with this product, so you'll need something like DAMS IEEE cartridge.

However, once you've made a copy you can relax in the secure knowledge that you now have a safe, backup version of the master disk.

After this initial session Sysres can be loaded like any other program, and as it sits below the start of Basic you lose none of your precious memory (apart from a miserly 256 bytes!). It can, if required, be loaded 'over the top of' an existing program, so as not to disturb that program and still leave it sitting in memory.

Once loaded and initialised, Sysres adds an impressive array of commands to your computing armoury.

In Use

None of these can be used in a program, as they are all intended as programmers aids, both in writing and in debugging a program.

However, it does mean that a program developed using Sysres can be transported to other 64s, without the owners of those other computers also having to buy the package.

Some of the commands added, will be familiar to all owners of toolkits and other utilities: auto, block delete, find (with change if required), renumber, trace, variable dump, and so on, but Sysres offers a lot more besides.

The most immediately obvious addition is the ability to scroll a program listing in both directions! In other words, by moving the cursor up to the top of the screen, whilst displaying a program listing, you can see previous lines of the program. You can continue on back through the program, until you reach the very first line.

This feature also works, whilst in the monitor, thus allowing you to see lines of a Basic program without coming out of the monitor.

'In the Monitor'? On a Commodore 64? As well as supplying you with Sysres, Solidus have put a few more programs on the disk, including a version of the public domain program Extramon, specially adapted for use with the 64, and this can be used whether or not you've got Sysres loaded into the computer.

This program not only gives you a machine language monitor, but also an assembler, disassembler, quick step etc. Almost worth the price by itself!

Other useful features, rather than actual commands, include a screen

dump achieved by just pressing two keys. This suspends program operation and immediately dumps the contents of the screen onto a Vic printer.

Added Commands

Dos Support is another feature much beloved by PET enthusiasts, and in light of Commodore's decision to only equip the 64 with Basic 2.0, it becomes doubly invaluable.

Essentially any disk command can be sent in, in short hand form, provided it is preceded by the '@' symbol. Thus @10 becomes initialise drive 0, @ on its own reads the error channel, and so on. This also makes it possible to read the disk directory without losing the program currently sitting in memory: a very useful addition.

All told there are something like 50 new commands to make programming easier, but some of these are only extensions to existing commands, albeit useful ones.

Load and Save now default to the disk drive, Run ignores any garbage printed on the screen (the world famous RUNDY. command!), Close, closes one or all of the files that are open at the time, and CMD no longer sends a Ready, down the line.

On top of these, Bload and Brun allow the loading and executing of machine language files. So what else can you do?

There are a number of commands that we haven't covered yet, and to go into each one in detail would take up far more room than we actually have available for this review!

But, some of the other commands include OLD, which restores a program after an accidental NEW; WHY, which prints in reverse field, the command being executed when a program fails through some kind of error; Append and Merge, which respectively add a file to the end of an existing one and merge a file into one already residing in memory; KEY, which defines a key as a special function (be it a Basic keyword, a subroutine, a short program listing, or whatever), and many more besides.

Conclusion

A comprehensive and extremely useful

UTILITY REVIEW.

set of additional commands for anyone who intends using their Commodore 64 at all seriously.

In particular the bi-directional scrolling is a godsend, and FIND speeds up program development considerably. The addition of Extramon for the 64 is the ideal finishing touch to a fine piece of software.

Well written and well packaged, at £59.00 Sysres is worth every penny.

Area:	<i>Programmers Aid</i>
Product:	<i>Sysres 64</i>
Price:	<i>£59.00</i>
Configuration:	<i>Commodore 64, Disk Drive (with optional printer)</i>
Company:	<i>Solidus International Corporation (UK) Ltd</i>
Address:	<i>Mill House, Wandle Road, Beddington, Croydon CR0 4SD</i>
Tel:	<i>01-688 5164</i>

SYGRES™

Extended Editor Commands

/ and † (quick load / run)
APPEND
AUTO
BLOAD
BRUN
CHANGE
CLOSE
CMD
DELETE
DUMP
EXEC
FIND
GET
KEY / KEYS
KILL / KILL*
LIST
LOAD
MERGE
MON
OLD
PUT
RENUMBER
RUN
SAVE
SETD

SETP
TRACE
VERIFY
WHY / WHY?

Power 64

Although we took a brief look at this in our April issue, it's worth devoting a few more words to it, in light of the arrival of Sysres.

Power similarly comes on a protected disk, but this one doesn't allow you to make any copies of it, thus rendering your system inoperable if something should go wrong with the disk.

As a program it takes up considerably more room in the 64 than Sysres does, and you lose about 10K in total. Is it worth the loss?

In Use

The first thing that you'll notice about Power, is that it too, gives you bi-directional scrolling, operating in exactly the same way as Sysres. The manual (written by Jim Butterfield) makes great play about this, and, as in the rest of the manual, this section is littered with awful jokes.

Jim may know a lot about computers, but one can't help wishing that he'd keep his sense of humour out of computer manuals.

Apart from this, the rest of Power consists mainly of familiar commands, without the addition of a monitor. Instead you're recommended to buy a program called PAL, produced (and written) by the people who gave us Power.

Find, Change, Renumber, Auto, Block Delete and Trace are all there, as well as the ability to define a single key to produce Basic keywords and/or sub routines, again like Sysres.

There are a number of other commands as well, including resetting of Basic pointers, if you've been doing something untoward, but a total of 14 commands is a little low when compared with Sysres.

More Power

However, there have been extensions made to the original version of Power, and these make it an altogether more interesting package.

Called MorePower, this extra program comes on the same disk as Power itself, for no extra charge, and there is the possibility that more and more commands will be added to the system and made available with the basic package. Whether existing users will get these commands or not is unclear, but we feel they should take this point up with their supplier.

The chief attraction of MorePower is that it will allow you to look at a listing of a program stored on disk, without disturbing the program currently in memory. Thus selective merging becomes possible by looking at a short piece of the program at a time, and just hitting return, over the lines as they appear on the screen.

Two programs can also co-exist in memory, as the system can set aside one portion of memory for one work area, and another for something else. This means that you can, for example, have a master program stored in one area of memory, and start altering it in another, looking back to the original to check various points. Very useful!

Conclusion

Despite the name, not as powerful as Sysres, and it is also £10 more expensive. The commands given are probably the ones that you'll use most often, but the lack of a monitor and the DOS Support commands is a shame.

The manual falls down also as an attempt to give you a serious guide to using Power and MorePower: that sort of humour deserves to be elsewhere, not in a software manual.

Sad to report, but Power has probably had its day, and Sysres will (no doubt temporarily) take over as the leading programmers aid for the Commodore 64.

Area:	<i>Programmers Aid</i>
Product:	<i>Power 64</i>
Price:	<i>£69.00</i>
Configuration:	<i>Commodore 64, Disk Drive</i>
Company:	<i>Kobra Micro Marketing</i>
Address:	<i>PO Box 28, Henley-on-Thames, Oxon RG9 1PF</i>
Tel:	<i>04912-2512</i>

Micros in the Sky

The computer industry has really taken off. Anybody seeing the mountains of micros and associated products currently on offer, should already be aware of this. For most of the smaller businesses in the aviation industry, buying a computer is a major expense, as a result, computer control is for them a subject that is still up in the air.

Apart from the larger airlines – Lockheed and Boeing were among the first to develop world-wide aviation systems which attracted many companies – the aviation industry has been reluctant to get involved in computing. Technology saw to it that computers became much more common and smaller in size, and this should prove to be a real boon to many small airlines.

The system known as Nav-log began its existence in the hands of a Dan-Air captain and was finally developed by Ian Beattie-Edwards, the Managing Director of Beattie-Edwards Aviation Ltd., who needed a small flight planning system. He approached Wego Computers Ltd, in Caterham to put the idea into practice. It is an 80 column system which runs on either the 8032 or 8096 with an 8050 disc drive and any compatible 132 column printer and although it works in the northern hemisphere because it accepts northern latitudes, all you have to do to change hemispheres is change latitudes. If there was any overriding principle in developing the system, it was to make flying much safer, reliable and accurate.

The system is dongle-ized and the first thing you must do to get the system operational is to enter the password or licence number which is supplied with the system. As soon as the program starts up, the user can either go into the maintenance section and change some of the variables or just go straight into the normal routine. The time is entered in Greenwich Mean Time followed by the date. It might be stating the obvious but one of the first important things you need to know is where you are going to and what type of aircraft you are getting there in. You will find this on the next screen, where there is a list of routes and analysis according to the type of plane used. If, in this example, we select the route called the Upper Amber 34, you will find that you can go to the French coast, Chartres, Amboise, Limoges, Barcelona . . . The aircraft has a series of

characters by which it can be identified, the first two of which, identify the country.

The actual flight identification number consists of a letter, a dash and then any four other letters, for instance; S-CCIM. This does not bear any actual resemblance to the aircraft, but the operator in the control tower uses it for a radio call sign. This series of characters is then followed by the name of the flight captain and, because we are dealing with the flight of a particular aircraft – the aircraft parameters – like the head of the aircraft and the weight of the aircraft. The difficulty here is to contain enough information as possible, to memorise the aircraft's performance. Then there is the aircraft registration. If you key in an aircraft that is not recognised by the system all you have to do, is set new parameters. Should you hit the escape key by mistake, the computer throws up a random number and if the user does not come up with the corresponding number then the screen carries on – an original safety device that is designed to make the system idiot-proof. The route is actually selected by keying in the required numbers and letters, and the editor routine is put into motion by hitting the return key, which should display the start and finish points. These consist of either three or four figures. To the pilots, Heathrow is known as EGLL and Gatwick as EGKK. It is also important to record the estimated flying time, the level of flight and the SID which is the distance of and time between the airport runway and the actual airplane. So far, all the information that has gone into the system has been data which is unlikely to change.

Should something go wrong during the actual flight and the pilot needs to know where to land in an emergency, he needs to know all the possible alternative destinations which are called the en-route alternatives and any relevant

information which could affect the pilot's final choice of alternative destinations. Flying from Gatwick to Lepa Palma, Toulouse is an ideal en-route alternative, if the airport is not covered with fog and it is not a weekend when the airport is closed due to French military activity. The weather is the main cause of any change in flight and the pilot can keep up to date on this subject by recording information issued by the Meteorological Office every six hours. Once this time period has elapsed, the information automatically becomes invalid and is wiped out.

To print out a route report, the computer will produce a finished flight plan in about three minutes, although this is subject to the type of printer used. If the route to be typed in has only just been created, the final output should take about one minute longer. However, should you decide to opt out of the system without printing, the system always assumes that you do not want to print, and all you have to do is complete the random number device correctly. When you have been through the entire system this number device offers your last chance of escape before you are committed to print.

The whole system is based around a data base system with all the files linked together by chain prints. The keys are looked at by hashing on a key field, so that what is input on the screen is converted to a number. To save space on the system, the files obtain prints, so that if you have to change one variable, all the other details are updated. The printing characters are stored in ASCII but most of the data is in binary. Although each comes with two diskettes the system runs on only one drive. This is definitely a good system and one well worth looking at if you operate a small airline.

Area: Flight Planning
Company: Wego Computers Ltd
Address: 22a High Street,
Caterham, Surrey CR3
5UA
Tel: 0883 49235

APPLICATION STORY

Example displays for flight information maintenance.

NAV-LOG MAINTENANCE

11:20 / 19-05-83

WAYPOINT DATA

CONTROL

P

Store Data

Print

Escape

CODING BIG

NAME BIGGIN }- This field may be used for FIR boundary
information eg EGT/EINN.

FREQ 115.1 }

IDENT BIG }- For 5 fig waypoints these fields can be
} used for R NAV data eg 270/25 BIG.

	DEG	MIN		DEG	MIN
COORDINATES {	51	19.8	N	MAG.VAR	6 30 W E/W
{					
{	0	2.2	E E/W		

NAV-LOG MAINTENANCE

11:28 / 19-05-83

A/C REGISTRATION TYPE

G-IMBE
PA31

(see note)

CONTROL

P

Store Data

Alternate

Print

Escape

	MEAN FUEL	T.A.S. knots	CLIMB/DESCENT RATES	FUEL UNITS
TAKE-OFF	20			L
CLIMB	150/hr	120	up 15 mins.	Kg
CRUISE	120/hr	180	to 12000 ft.	Pounds
DESCENT	80/hr	160	down 10 mins.	Imp.gal
LANDING	20			U.S.gal
				Litres

NOTE :- To use ALTERNATE aircraft data from an existing aircraft on file you may input into the TYPE field the existing aircraft type, press <HOME> to return to the control square then take the A option. The chosen aircraft data will be displayed and can be modified as required to create the new aircraft record.

ADMAN ELECTRONICS

Add on the Adman way

The Vic 20 really can speak...but only if you use an ADMAN SPEECH SYNTHESISER. It's word power is endless as there is no set vocabulary. Yet operation is simple. The 64 elements of English speech are pre-programmed to let you put your own words together as soon as you switch on. Just imagine...program adventure games with characters that can actually talk!

Also for your Vic 20 there are 8K and 16K RAM PACKS and the ADMAN 3 PORT EXPANSION MOTHER BOARD. With proven designs of the highest quality they are the best value for money around.

Available from Spectrum, Dixons and other major computer accessory shops

Prices around:

8k Ram Pack £39.95
 16k Ram Pack. £49.95
 Motherboard. £19.95
 Speech Synthesiser . . £49.95

To find out more about these products, why not take a lead from our speech synthesiser...go to your local dealer and ask for it! Or post the coupon.

Dept. C, Adman Electronics Ltd., Ripon Way, Harrogate, N.Yorks, HG1 2AU. Tel. 0621 740972

Adman Electronics Ltd. is a member of the Adam Leisure Group PLC

The Vic 20 speaks out!

Please send me information on Adman Vic 20 Accessories

Name _____
 Address _____

CC/7/83

EXCITING NEW RANGE OF 20 & 64 SOFTWARE.

Machine Code Monitor HES	.....E-KK28F-£27.50
Monster Maze	.....E-KK11M-£27.45
Music Composer	.....E-KK57M-£19.95
Mutant Herd	.....E-KK58N-£19.95
Pirate's Peril	.....E-KK37S-£27.50
Plattermania	.....E-KK14Q-£27.45
Predator	.....E-KK42V-£27.50
Protector	.....E-KK38R-£27.50
Raid On Isram	.....C-KK33L-£13.95
Rescue At Rigel (+16K)	.....C-KK08J-£20.75
Ricochet (+8K)	.....C-KK15R-£13.80
River Rescue	.....E-KK56I-£19.95
Robot Panic	.....E-KK40T-£27.50
Scorpion	.....E-KK19V-£29.95
Shamus	.....E-KK39N-£27.50
Sidewinder	.....C-KK24B-£22.50
Submarine Commander	.....E-KK59P-£24.95
Swarm	.....C-KK23A-£22.50
Sword Of Fargalo (+16K)	.....C-KK09K-£20.75
Synthesound	.....E-KK29G-£39.95
Torg	.....C-KK24B-£12.95
Turtle Graphics	.....E-KK30H-£27.50
Word Processor	.....E-KK26D-£27.50
6502 Assembler/Editor	.....C-KK25C-£19.95

VIC20

AggressorE-KK36P-£27.50

Coco 2 (+16K) teaches you how to create your own arcade gamesC or D-KK41U-£27.50

Crush, Crumble & Chomp (+16K)C-KK10L-£27.75

Datestones Of Ryn (+16K)C-KK13P-£13.80

Deadly SkiesE-KK20W-£29.95

Fort ApocalypseE-KK43W-£27.50

Forth (Language)E-KK27E-£39.95

Fourth EncounterE-KK60Q-£19.95

Galactic BlitzC-KK22Y-£18.95

Games Pack 1 contains Dam Bomber, Pak Bomber, Skier, Tank WarsC-KK34M-£13.95

Games Pack 2 contains Laser Blitz, Maze of Mikor, Pinball, Tank TrapC-KK35Q-£13.95

Gold FeverE-KK21X-£29.95

Gridrunner HESE-KK31J-£27.50

Invasion Orion (+16K)C-KK12N-£17.25

COMMODORE 64

Benji's Space RescueD-KK51F-£29.95

Coco teaches you how your computer worksC or D-KK54J-£34.95

Coco 2 teaches you how to create your own arcade gamesC or D-KK55K-£29.95

Crush, Crumble & ChompD-BC61R-£20.75

Curse Of Ra (Apschai Part 3)D-BC59P-£13.80

Forth (Language)E-KK45Y-£47.50

Gridrunner HESE-KK49D-£27.50

Jump manD-BC62S-£27.45

Machine Code MonitorE-KK46A-£27.50

Omnicalc (Financial Modelling)D-KK52G-£67.50

Retro BallE-KK50E-£27.50

Sword Of FargaloD-BC60Q-£20.75

Temple Of Apschai (Part 1)D-BC57M-£27.45

Time & Money ManagerD-KK53H-£47.50

Turtle Graphics IIE-KK47B-£39.95

Upper Reaches Of Apschai (Part 2)D-BC58N-£13.80

Word ProcessorE-KK48C-£29.95

6502/6510 AssemblerC-KK44X-£19.95

BOOKS

Memory Map VIC20WK48C-£6.95

Memory Map 64WK49D-£10.45

Trade enquiries welcome
 Phone Mapsoft Ltd. (0702) 554002

Key C-Cassette, D-Disk, E-Cartridge, Order Code e.g. KK51F. Prices include VAT & Carriage. Subject to availability.

MAPLIN MAPLIN ELECTRONIC SUPPLIES LIMITED, P.O. Box 3, Rayleigh, Essex SS6 8LR. Telephone: Sales (0702) 552911. General (0702) 554155. Shops at: 159 King Street, Hammersmith, London W6. Telephone: 01-748 0926. 284 London Road, Westcliff-on-Sea, Essex. Telephone (0702) 554000. Lynton Square, Perry Barr, Birmingham. Tel. (021) 356 7292. Shops closed Mondays. All mail orders to Rayleigh address.

A PERSONAL INFORMATION SYSTEM FOR THE 64



What is an information storage and retrieval system? It is a computerised card index program that will create, store, update and access data. The most obvious use for such a program is to keep records that need frequent access and regular updating. One could therefore use the program as a telephone or address book. It could also be used as a more serious data base (note the program will only hold a maximum of 356 date numbers). The idea was taken from a program by Commodore. Written entirely in Basic, the program is centered around seven different routines. These are the Update entry, Remove entry, Find entry, List all, Disk save, Tape save and End program. The operation of the program is achieved by an auto data statement generator, which actually creates and stores new data within the Basic program. This method is used in all of the routines to create new data and access data that already exist. Do not forget to SAVE the program after entering it and before RUNNING it as it executes a cold start before exiting the program.

THE ROUTINES

Before describing the routines a word should be said about the Bytes free message given whenever the menu is accessed. Line 19 deals with the bytes free and checks to see if it is less than zero. If so, it calculates the true bytes free, by adding 2 to the power 16 to the number. This is a necessary calculation on the 64 as it will give a negative bytes free count if there is more than 32K or RAM available.

The first entry one might wish to use after Loading and running the program (or typing in and running the program), is the List all option. In the program we have included two Addresses and these will be displayed. To select any one of the options, one simply enters the first letter e.g. for List all type L. The List all routine starts at line number 66. Firstly it clears the screen, then restores the data and reads the data. This read actually sets up the Line number to read and continues to read until it reads an asterisk at which point the List all option is aborted as the asterisk marks the end. On line 68 X is set to equal $PEEK(63)+PEEK(64)*256$ which is the current data line number and CX stores the previous records starting line number. As one may see in this routine, addresses 63,64,65 and 66 are very important. Addresses 63 and 64 are the Current Data line number and 65 and 66 are the pointers to the Current Data item address.

Some of the other features of the List all option are; when the List all option is chosen, one needs to press the shift key to scan through the addresses. To return to the Menu before finishing the List option, press shift and the left arrow together. Line 70 scans for the shift key and Line 71 scans for the shift key and the left arrow. Line 72 prints the address and returns to scan for the next address or return to the Menu.

After choosing the Update/entry option the program does a bit of jumping around, firstly to Line 38 where it executes a gosub to Line 810. Line 810 is the Input routine and expects the user to

enter a Date or an Address No. The Address No should be a numerical input, the date should be input in the form; 26jul1983. The month should be entered in lower case. The routine then does a check (lines 811-813) for legal or illegal entries, if an illegal entry is found the routine starts again. The return in line 813 takes the program back to line 38, which executes another gosub, this time to line 820. Line 820 checks Y and if $Y = -1$ then the entry was in the form of an Address No and not a Date and the routine returns to line 38.

Lines 821-826 is the date verification routine. This will validate a date and calculate the day as well as check that the inputs are within certain general limits. The day is calculated in W and W\$ in line 822, the rest of the routine dissects the input date and gives it the correct suffix e.g. 'st', 'th' or 'rd'. The routine then exits back to line 38. If the input was originally numeric rather than an address, then the routine returns to line 38. In both cases the Address No or the Day and Date are printed on the screen and the program is awaiting the next entry.

The Update routine now jumps from line 39 to line 830. This line calculates the first line number of the record. Back to line 39 and C\$ is reset and a gosub to line 840 is executed. Line 840 jumps to 850, then clears the data pointers, reads the first address and then searches through the Basic program until it either reaches corresponding line number and data, or there is no equivalent entry in which case the program awaits on a blank entry. At this point the existing entries can be altered or new entries can be made.

To exit the Update routine the user must enter the up arrow and press return, to print out the entry simply enter a '?' and press return. The routine now returns to line 840 where it pokes in the Line number and address before returning to line 40. Line 40-50 is a routine which displays any record previously there and updates the record. If any changes are made quotes are put up in

front of the amended line. Lines 51-58 add the data into the program in lines with step numbers of one. Lines 59-61 are the print routine for the entries. This routine does not include updating the program, to do this one needs to update the record before printing.

Lines 62-65 remove a record, it displays the line numbers and necessary variables at the top left of the screen whilst erasing the record. Lines 73-81 save this program on disk. The routine initializes drive zero of unit 8 (disk drive usually), then checks for any errors, saves the program including any alterations and checks for errors again. If any errors are found it asks 'do you want to try to save again', otherwise the routine returns to the main menu. Lines 82-88 is the Tape Save, this routine saves the program on tape, waits for the user to rewind the tape and then verifies before returning to the menu.

Lines 89-110 is the find entry routine. Lines 89-90 ask for a key on the entry, the key must be from the start of any line in the record. Lines 91-96 search through the data for the key, if a * is found then it returns to the main menu as this is the end marker. Lines 97-99 display the record that the key was in. Lines 100-110 restore previous data line number and address number and search for further occurrences of the key.

Lines 29-37 is the End program routine. A check is made before ending the program that the program has been saved or if the user wishes to save the program. If the program needs to be saved the End routine is aborted and the program returns to the menu. If the user does not wish to save the program then a cold start is executed. This can easily be altered if so desired.

The program should be well suited for use in the home or possibly in the office, but care should be taken when entering and running the program as it accesses and enters new lines and data into its own data. Please let us know of the kinds of uses that you find for this program, whether they are unusual or as mentioned.

A PERSONAL INFO

```
1 GOSUB900
10 PRINT"*** RETRIEVAL MENU ***"
11 PRINT"00 1-UPDATE ENTRY"
12 PRINT"01 2-REMOVE ENTRY"
13 PRINT"02 3-FIND ENTRY"
14 PRINT"03 4-LIST ALL"
15 PRINT"04 5-DISK SAVE"
16 PRINT"05 6-TAPE SAVE"
17 PRINT"06 7-END PROGRAM"
18 PRINT"***** BYTES FREE =";
19 IF FRE(0)<0 THEN PRINTFRE(0)+2*16:GOTO 21
20 PRINTFRE(0)
21 GET AN$:IFAN$="" THEN 21
22 IF AN$="U"THEN38
23 IF AN$="R"THEN62
24 IF AN$="F"THEN89
25 IF AN$="L"THEN66
26 IF AN$="D"THEN73
27 IF AN$="T"THEN82
28 IF AN$<>"E"THEN21
29 PRINT"DO YOU WANT A COPY OF THE PROGRAM"
30 GET AN$:IFAN$<>"Y"ANDAN$<>"N"THEN30
31 IF AN$="N"THEN33
32 PRINT"END OF PROGRAM !!!":SYS64738
33 PRINT"DO YOU WISH TO SAVE THE PROGRAM"
34 GET AN$:IFAN$<>"Y"ANDAN$<>"N"THEN34
35 IF AN$="N"THEN32
36 PRINT"RETURN TO MENU"
37 GOSUB800:GOTO10
38 GOSUB810:GOSUB820:PRINT"*****AD#*****"
39 GOSUB830:C$="":GOSUB840
40 FORV=0TO10:V$(V)="":NEXT:CH=0:POKE64,0:NL=0:IFC=4THEN43
41 NL=NL+1
42 IFX+10>(PEEK(63)+PEEK(64)*256)THENPRINTTAB(11)C$:X$(NL)=C$:READ C$:GOTO41
43 PRINT"*****PRESS ^↑ AND RETURN FOR MENU"
44 PRINT"*****":FORNN=1TO10:PRINTTAB(11);
45 HH=PEEK(209)+PEEK(210)*256+PEEK(211):S=PEEK(HH)
46 OPEN1,0:INPUT#1,C$:CLOSE1:PRINT
47 IF LEFT$(C$,1)="^"THENPOKEHH,S:GOTO51
48 IF LEFT$(C$,1)="?"THENPOKEHH,S:GOTO59
49 IF X$(NN)<>C$THENPRINTTAB(10)"^"CHR$(34):CH=1
50 NEXT
51 IF CH=0THEN10
52 C=0:C1=1274
53 IFC>10THENRUN
54 IFPEEK(C1)<>34THENC=C+1:C1=C1+40:GOTO53
55 PRINT"X="X":C="C+1":C1="C1+40":GOTO53
56 PRINT"*****":FORC2=0TOC:PRINT:NEXT
57 PRINT"*****X+C*****"TAB(6)"DATA"
58 POKE631,13:POKE632,19:POKE633,13:POKE198,3:SYS42140
59 OPEN4,4:FORNN=1TO9:PRINT#4,"X$(NN):NEXT
61 PRINT#4:CLOSE4:GOTO10
62 GOSUB810:GOSUB820:PRINT"*****AD#":GOSUB830:C=0
63 IFC>9THENRUN
64 PRINT"X+C:PRINT"X="X":C="C+1":GOTO63"
65 POKE631,19:POKE632,13:POKE633,13:POKE198,3:SYS42140
66 PRINT"*****":RESTORE:READX$:CX=0
67 READ X$:IFX$="*"THENGOSUB860:GOTO10
68 X=PEEK(63)+PEEK(64)*256
69 IFX>CX+10THENCX=X:GOSUB860:GOSUB820:PRINT"*****AD#*****"
70 IF(PEEK(653)AND1)=0THEN70
71 IFPEEK(197)=57THENFORI=1TO1000:NEXT:GOTO10
72 PRINTTAB(11)X$:GOTO67
73 PRINT"*****ENSURE CORRECT DISK IS PLACED IN DRIVE 0 OF UNIT 8 AND PRESS ^-3^"
74 GETAN$:IFAN$<>"E"THEN74
75 OPEN1,8,15,"I0":CLOSE1:GOSUB870:IFEN<>0 THEN78
76 SAVE"00:RETRIEVAL",8:GOSUB870
77 IFEN=0THENPRINT"*****PROGRAM SAVED OK":GOSUB800:GOTO10
78 PRINT"*****EN:EN$:ET:ES:PRINT"DO YOU WISH TO TRY TO SAVE AGAIN ?";
79 GETAN$:IFAN$<>"Y"ANDAN$<>"N"THEN79
80 IF AN$="Y" THEN73
```

RMATION SYSTEM

```

81 GOTO 10
82 PRINT "REWIND TAPE TO START AND HIT ^-3^"
83 GETAN$: IFAN$<>" " THEN 83
84 SAVE "RETRIEVAL"
85 PRINT "REWIND TAPE AND HIT ^-3^"
86 GETAN$: IFAN$<>" " THEN 86
87 VERIFY "RETRIEVAL"
88 PRINT "FINISHED": GOSUB 800: GOTO 10
89 X=0: RESTORE: PRINT "ENTER ENTRY ? (###?)":
90 OPEN 2,0: INPUT #2, AA$: CLOSE 2: PRINT: READ XX$
91 READ XX$: IF XX$="*" THEN X=0: GOTO 96
92 IF LEN(AA$)>LEN(XX$) THEN 91
93 IF AA$<>LEFT$(XX$,LEN(AA$)) THEN 91
94 X=PEEK(63)+PEEK(64)*256: X=INT(X/10)*10: X1=X
95 GOSUB 850: C=C+4: POKE 66, INT(C/256): POKE 65, (CAND255)
96 IF X=0 THEN GOSUB 800: GOTO 10
97 GOSUB 860: GOSUB 820: PRINT: PRINT "AD$: PRINT
98 AX=PEEK(65)+PEEK(66)*256: READ XX$: BX=PEEK(63)+PEEK(64)*256
99 IF BX<X1+10 THEN PRINT TAB(11)XX$: GOTO 98
100 POKE 64, INT(BX/256): POKE 63, BX-INT(BX/256)*256
101 POKE 66, INT(AX/256): POKE 65, AX-INT(AX/256)*256: GOTO 91
800 PRINT "PRESS ^-1^ TO CONTINUE"
801 GETAN$: IFAN$<>" " THEN 801
802 RETURN
810 INPUT "ENTER DATE/ADDRESS NO.": C$: IF C$="" THEN 810
811 DD=VAL(C$): LL=LEN(C$): IF LL>3 THEN 814
812 DD=VAL(C$): IF DD>365 OR DD<1 THEN 810
813 Y=-1: M=1: RETURN
814 IF DD<10 OR DD>31 THEN 810
815 Y=VAL(RIGHT$(C$,2)): IF Y>0 THEN Y=Y-Y0+1900
816 X=3+(DD<10): MM#=MID$(C$,X,3): FORM=1 TO 12: IF MM$=S$(M) THEN RETURN
817 NEXT: GOTO 810
820 IF Y=-1 THEN AD$="          #ADDRESS /0." +STR$(DD): RETURN
821 TT$="TH. ": S=DD: X=Y+Y0: S=S+X*365: IF M>3 THEN S=S-INT(M*F1+F2): X=X+1
822 S=S+INT(M*31+(X-1)/F): W=S-INT(S/7)*7: WD$=W$(W): MD$=M$(M)
823 IF DD=10 OR DD=21 OR DD=31 THEN TT$="ST."
824 IF DD=20 OR DD=22 THEN TT$="ND."
825 IF DD=30 OR DD=23 THEN TT$="RD."
826 AD$="          "+WD$+STR$(DD)+TT$+" "+MD$+STR$(Y+Y0): RETURN
830 X=INT(Y*T+T*M*1000+DD*10): RETURN
840 GOSUB 850: C=C+4: POKE 66, INT(C/256): POKE 65, CAND255: IF C<>4 THEN READ C$
841 RETURN
850 RESTORE: READ XX$: AD=PEEK(65)+PEEK(66)*256
851 AA=PEEK(AD+3)+PEEK(AD+4)*256: IF AA>X THEN C=0: RETURN
852 IF AA<>X THEN AD=PEEK(AD+1)+PEEK(AD+2)*256-1: GOTO 851
853 C=AD+1: RETURN
860 X=X-T: Y=INT((X-1000)/T): M=INT((X-Y*T)/1000): DD=INT(((X-Y*T)-M*1000)/10)
861 IF Y=-1 THEN DD=DD+(M-1)*HU
862 RETURN
870 OPEN 1,8,15: INPUT #1, EN, EN$, ET, ES: CLOSE 1: RETURN
900 X=0: HU=100: T=12000: F1=.4: F2=2.3: F=4
910 Y0=1983: DIM M$(12), S$(12): POKE 53280,2: POKE 53281,2: POKE 53272,23
920 W$(0)="TUESDAY": W$(1)="WEDNESDAY": W$(2)="THURSDAY": W$(3)="FRIDAY"
930 W$(4)="SATURDAY": W$(5)="SUNDAY": W$(6)="MONDAY"
940 M$(1)="JANUARY": M$(2)="FEBRUARY": M$(3)="MARCH": M$(4)="APRIL": M$(5)="MAY"
950 M$(6)="JUNE": M$(7)="JULY": M$(8)="AUGUST": M$(9)="SEPTEMBER": M$(10)="OCTOBER"
960 M$(11)="NOVEMBER": M$(12)="DECEMBER"
970 S$(1)="JAN": S$(2)="FEB": S$(3)="MAR": S$(4)="APR": S$(5)="MAY": S$(6)="JUN"
980 S$(7)="JUL": S$(8)="AUG": S$(9)="SEP": S$(10)="OCT": S$(11)="NOV": S$(12)="DEC"
990 GOTO 10
1000 DATA*
1010 DATA "COMMODORE COMPUTING INT.
1011 DATA "RICK HAMPSHIRE PUBLICATIONS
1012 DATA "167/169 FT. PORTLAND ST.
1013 DATA "LONDON W1
1014 DATA*
1015 DATA "TEL 01-636 6531
19060 DATA "*****
19061 DATA "*COMMODORE MAGAZINE*
19062 DATA "*****
63999 DATA*

```

```

Update entry
Remove entry
Find entry
List all
Disk save
File save
End program

bytes free = 33884

```

```

x= 1010 :c= 6 :c1= 1514 :goto 53

1010 data/Commodore Computing Int.
1011 data/Rick Hampshire Publications
1012 data/167/169 Ft. Portland St.
1013 data/LONDON W1
1015 data/Tel 01-636 6531
press 'T' and return for menu

```

A100....C100



Unidirectional IEEE-488 Interface Type C100 £120.00

This self-contained, microprocessor controlled IEEE-488/RS232 interface enables standard serial devices such as printers, VDUs or teletypes, to be driven from the IEEE-488 bus by controllers such as the Commodore Pet computer.

Parallel IEEE-488 Interface Type A100 £106.00

This third generation IEEE-488-Centronics/Anadex interface enables standard parallel devices to be driven from the IEEE-488 bus by controllers such as the Commodore PET COMPUTER.

Software

The interfaces are supplied with a suite of short BASIC programmes to run on the Commodore PET to illustrate the various capabilities and modes of operation in different configurations.

Warranty

90 days against defective workmanship or component failure under normal operating conditions.



small systems engineering limited

2-4 Canfield Place, London NW6 3BT. Telephone: 328 7145 Telex 264538



EDUCATING THE CHILDREN.

Last August we received Number Chaser Facemaker, We Want to Count and Twister and concluded that if they could keep up their professional standards, then it would be better for everyone. Have they managed to do this?

If you don't ask you won't find out: this has been the cry of teachers of all kinds down the centuries: a cry taken very much to heart by the people behind Applied Systems Knowledge – A.S.K. – who have built up a series of software programs for younger members of the family.

Educational software packages all too often play lip-service to the concept of nurturing young hearts and minds, before getting back to the true, immutable purpose of home computers – the destruction of advancing hordes of space invaders, munchymen and other colourful undesirables who inhabit the world of the visual display unit and probably form the real basis for the popularity of the home computer.

A.S.K. on the other hand – the Company was conceived by Professor Tom Stonier of the School of Science and Society at the University of Bradford – has assembled an impressive group of educational, graphics and programming experts to produce programs which reinforce and enhance what the child is learning elsewhere by creative and active involvement with the computer, whilst preserving an appealing “games-like” format.

The team of educational authors is co-ordinated by Dr. Michael Thorne, who plays the role of Consulting Editor. Currently a lecturer in the Department of Computing Mathematics at University College, Cardiff, he is one of the regional organizers for MUSE – Microcomputer Users in Education, in addition to being well known as a presenter of Thames TV's Database programme.

Having kicked off last August with four programs for the VIC-20, their range now totals ten different items, the four latest releases being Words, Words, Words, Hide and Seek, Shape Up and Number Puzzler.

Number Puzzler designed by Michael Thorne is an intriguing exercise in addition and subtraction, based on the theme of noughts and crosses, the idea

being as in Noughts and Crosses to complete a line vertically, horizontally or diagonally to win the game, playing either against the computer or a two handed option with a friend opponent. After loading, you are presented with three choices of routine: addition, subtraction and a combination of the two, followed by a choice in board size: a three by three grid or six by six.

I tentatively took the three by three addition only option (the simplest) and was confronted by this grid

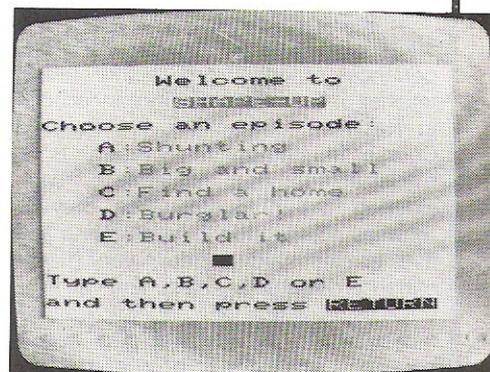
9	6	5
4	1	7
8	3	2

The computer then displayed two figures, in this case 5 and 2 in the left hand corner of the screen. I could then either use the 5 and 2 as they stood, or add them together to give the 7, given that it was an available option. Proceeding in this way and, as numbers became filled up by my opponent, the wily computer, I had to combine strategy with maths in order to win.

Making a game of it encourages kids to develop their numeracy almost without realising it. The game was certainly having that effect on me – and I was declared a lost cause in mathematics quite a few years ago! Soon I was being drawn into the game's more complex options: subtraction, where I was given only one number by the computer which I could either use as it stood, or could take two numbers on the grid, if they were available, whose difference it was; then the addition-subtraction combination, using both the above techniques. Thence on to the six by six option, where four three by three boards can be played simultaneously, having really to keep all my wits about me. Finally this game offers the “Magic Square”, where rows, columns and diagonals have to be generated which add up to the same total and finally “Self

Test” where each player can set his own limits of time and difficulty.

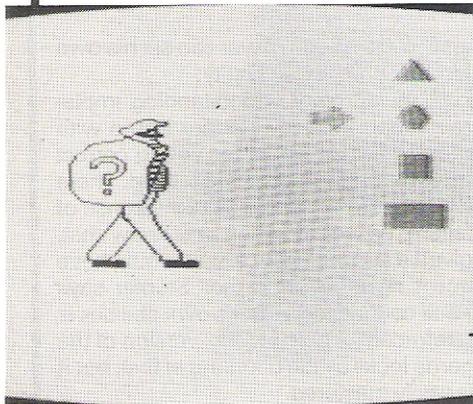
This is a very understanding implementation. Mis-keyings are borne with patience, and it waits for you to correct errors – very important to a child. There can be nothing worse than the sense of failure, especially when you know that, given a second chance, you would have got it right. As Professor Stonier says “Self confidence in one's own abilities is reinforced”. The six by six version of the game looks a little daunting at first, but it is easily mastered.



Shape Up, a program by Michael Holt, an ex-research physicist and well-known author of mathematics and science school text books is not a keep-fit course, but a game designed in five levels encouraging the younger user to distinguish between large and small and then to recognize various shapes and patterns, eventually graduating to using the shapes to build a variety of objects. Shape Up has some delightfully humorous touches – the fourth level, Burglar, stars a suspicious-looking character who “steals” one of the shapes displayed on the screen; the user has to identify afterwards which one is missing.

The Fifth level, Build It, encourages more constructive urges. The computer sketches out a domicile or mode of transport and the idea is to select the right shape and size – from a selection of objects that go bleeping by overhead – to fill in doors, windows, walls and roofs. When the drawing is completely filled in, a colourful screen display ensues.

A.S.K.'s sense of humour manifests itself once again here – there is a steam train that goes chuff-chuff and whistles, a rocket whose nose-cone blasts off, and on completing one of the houses, the sun comes out and birds start twittering. These unexpected little touches must inevitably help to amuse and maintain a child's interest.

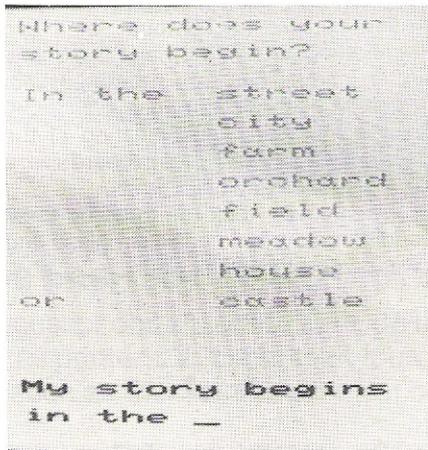


Hide and Seek by Gloria Callaway, another imaginative author whose experience ranges from being head-teacher of a multi-ethnic primary school in Hackney to teaching a University Course in English in Sweden, is a miniature graphic masterpiece, considering the program takes only 2 minutes 45 seconds to load. There are five levels: hard, harder, very hard, extra-hard and super-hard. You will fill a three by three grid with either flowers or faces which include bearded social science students, bowler-hatted businessmen, clowns, suburban housewives, and Rastafarians. Once the boxes in the grid are filled with either the botanical or physiognomical options, Venetian blinds are drawn across them, and the computer challenges you to remember where a particular face or flower is.

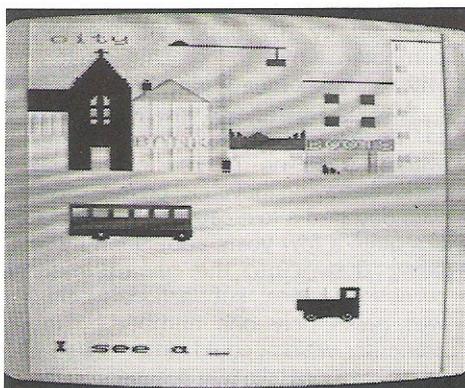
It does this by means of a display in the bottom left-hand corner of the screen. By pressing the spacebar, you change the option and when you pick one, you press RETURN. The blind is raised and you discover the awful truth. The serious point of this educational game is that – again quoting Professor Stonier, "It improves short term memory and the ability to differentiate between symbols". This is a vital consideration for those who are learning to read – and they may not necessarily be children. Improving power of concentration can be important in the treatment of dyslexic adults. This game is, however, reckoned to be more generally applicable to the 5 – 12 year old age range.

The best of these programs have the kind of branching routines which ensure that a child is kept sufficiently uncertain of what will happen next to have one more go. Words, Words, Words, written by Professor Stonier is a good example of this, and programs of this quality, or those with the hypnotic elements of Number Chaser will make A.S.K. indispensable if they can keep up the good work.

Words, Words, Words was the program that I personally had most fun reviewing. It must have been quite a marathon of programming since it takes some 5.25 minutes to load and has a wealth of interesting little twists. "Where does your story begin?" queries the VIC.



It can begin in the street, in the city, on the farm, in the orchard, field, meadow or castle. Anxious to prove my street credibility I naturally typed in the first option. A picture of a house duly

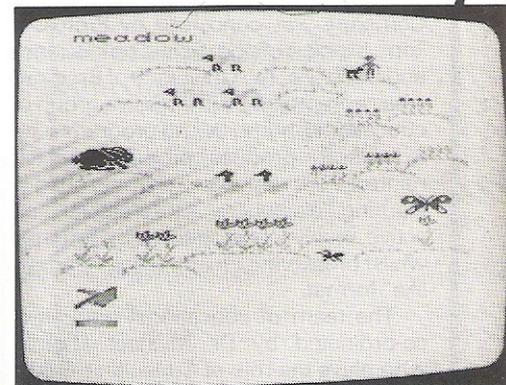


appeared, and the computer displayed the legend "I see a ..." It is down to you to supply the missing words – you have two goes. What is so pleasurable about this program is that one can actually see what things are meant to be. I rather tentatively typed in "pillar-box" at one point, expecting it to be a rather badly-drawn man, but no – it was a pillar box.

Gradually by identifying the object and spelling it right, I build up a static scenario consisting of house, trees, clouds, a car, a bus, smoke from the chimney, and, of course, a pillar box.



Suddenly the whole picture comes to life, the smoke billows, the car drives off, and we are following the bus – by no means as obvious a bridge between routines as one sometimes encounters in more primitive implementations of Adventure games. "Where do you want the bus to go?" asks the computer. I chose the castle, and was duly rewarded by an eerie Gothic experience. The bus drops out of the story, and having been shown by the computer and typed in a star, a moon, a castle, walls, windows, an owl and a ghost, the picture once



again sprang into action as the ghost glided ghoulishly along the battlements then adopted V/STOL mode and rose gracefully heavenwards to the accompaniment of creepy music. There is a punchline of sorts. "Where is the ghost going?" the computer enquires. As you sink slowly into philosophical meditation, a monstrous owl fills the screen. "Who knows?" it says inscrutably, and then winks leeringly. Whatever the theological implications of all this, it should give the kids a laugh, at the same time as teaching them to spell and identify objects.

I was rather less impressed by

PAYROLL and SSP

If you are responsible for payroll we will make 'payroll day' the day you look forward to, rather than the day you dread!

More and more companies, accountants and even bureaux, are finding that running their payroll is a pleasure with the payroll program that gives new meaning to the overworked phrase 'user friendly'.

The name of this program is PAYROLL 2 and it runs on the Commodore CBM 8000 and 700 microcomputers.

It would make very great sense to ensure you see a demonstration of this remarkable program before purchasing a payroll package. It would be highly frustrating to purchase another and then become aware of the PAYROLL 2 excellence afterwards.

The price for transforming your payroll days is £375. The hardware, if you don't possess it will cost round £2300 (prices subject to VAT).

From your Commodore Dealer or send for a leaflet to:

LandSoft 

28 Sheen Lane London SW14 8LW
Telephone: 01- 878 7044/7

SUPERIOR PROGRAMS FOR THE CBM PET

Superscript

The Ultimate CBM Word Processor

A Commodore enthusiast wanted a word processor that was simple, fast and easy to use. He wanted to handle up to 20,000 characters of text, to use a wide screen format of up to 240 characters, with full window scrolling in all directions, and be able to use the screen while printing. He wanted a word processor at a reasonable price. The enthusiast, Simon Tranmer, couldn't find one... so he wrote

Superscript

Superscript does everything he wanted... and much more. It provides a complete document preparation and storage system, making optimum use of memory and disk space. It gives full access to all the letter quality printer features, such as boldface and ribbon colour change. In short, it provides all of the advantages of a dedicated professional word processor.

Superscript

is easy to instal, because there's nothing to instal! Just load the SuperScript diskette, and your PET becomes a world quality word processor. Superscript runs on the CBM 2001, 3016, 3032, 4016, 4032, 8032 and 8096 computers, on the CBM 2040, 3040, 4040, 8250 and 8050 disk drives, all Commodore printers, and on a wide range of letter quality printers.

Superscript

does everything Commodore wanted... which is why they are adopting it for all of their forthcoming models. And finally, the magic ingredient...

Superspell

a 30,000 word disk-dictionary with automatic spelling checker, that will verify the largest SuperScript (or Wordpro) document in under two minutes... and you can easily modify the dictionary, or add your own words.

Superscript and SuperSpell are just two of our fine CBM & PET products... please phone or write for our comprehensive data sheets on the other products listed below:

SUPERSCRIPT The Ultimate CBM Worprocessor	£249.00
SUPERSPELL Disk Dictionary/Spelling Checker	£150.00
MASTER Program Development System	£300.00
MASTER Additional run-time keys	£45.00
PH96 96K Memory Management/Basic Enhancement	£99.50
VIC SCREEN Screen management/Dos Support etc.	£49.50
KRAM Keyed Disk Access (state which disk)	£86.95
COMMAND-0 (for Basic IV, state which Pet)	£39.95
DISK-0-PRO (Adds Basic IV etc to Basic II)	£59.95
SPACEMAKER 4-Rom adaptor (not for 8096)	£29.95
VISICALC 32K/96K RRP £180.00, less £35.00	£145.00

ORDERING INFORMATION: Add 15% VAT to quoted prices. Order by post, telephone or Prestel, using cheque, ACCESS or BARCLAY card. For same-day service, telephone 01-546-7256. For over-the-counter sales, see your Commodore Dealer. (Ref AD9)

Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY, KT2 7QT. TEL 01-546-7256

NEW

64

SYNTHY-64

**MUSIC AND SOUND SYNTHESIZER FOR
COMMODORE-64**

The **COMMODORE-64** has the most sophisticated sound capabilities of any of the personal computers on the market today. A **CBM-64** can play music with three voices simultaneously over a range of eight octaves!

But that's just the start of the **CBM-64's** sound features. You can vary the entire character of each voice. You can make the music sounds of a piano, banjo, flute, drum or most any other instrument. You can make special effect sounds such as from chimes, bells or wah-wah in endless combinations.

Commodore's manual gives you information on using the sound synthesis features. If you can make your way through the technical jargon and can **POKE** all of the "control registers," then you're on your way to creating your own exciting music. But if you don't want the hassle of **POKING** around and want to turn your **CBM-64** into a full-fledged music synthesizer **NOW**, then **SYNTHY-64** is for you.

SYNTHY-64 makes it easy for you to create music, by adding a comprehensive set of powerful commands to **BASIC**.

SYNTHY-64 is available on cassette with manual for just £14.95 from all main **CBM-64** dealers.

SCREEN GRAPHICS 64

SUPER GRAPHICS FOR THE COMMODORE-64

Here's **THE** finest graphics software for your **COMMODORE-64**. **SCREEN-GRAPHICS-64** gives you High Resolution, Multicolour and Sprite graphics all in one package! You get 320 x 200 points in High Resolution mode, 160 x 200 in Multicolour mode and Sprite graphics in either HiRes or Multicolour modes. This is the most powerful package for the **Commodore-64** yet developed.

SCREEN-GRAPHICS-64 adds more than 20 powerful commands to **BASIC** – commands to plot points, draw lines and boxes, use Sprites and even display text with graphics. The commands are simple to use and make programming in **BASIC** with **SCREEN-GRAPHICS-64** easy. No need to learn a new language with **SCREEN-GRAPHICS-64**.

SCREEN-GRAPHICS-64 is available on cassette with manual for just £14.95 from all main **CBM-64** dealers.

NEW FROM ALL CBM 64 STOCKISTS

CCI SOFTWARE, 167 GREAT PORTLAND STREET, LONDON W1

TEL 01-636 6354

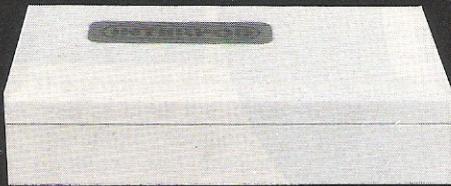
GIVE YOUR VIC20 & 64 IEEE PLUS RS232

VIC and 64 users

Would you like to be able to access any of these peripherals from your computer?

- 1/3 megabyte disks (Commodore 4040 drive)
- 1 megabyte disks (Commodore 8050 drive)
- 10 megabyte disks (Commodore 9090 hard disk)
- Printers including a wide range of inexpensive IEEE and RS232 matrix and quality printers
- IEEE instruments such as volt meters, plotters etc.

Now you are no longer limited by the VIC or the 64's serial bus. Simply by attaching INTERPOD you can vastly increase the power of your VIC 20 and when used with the new 64, INTERPOD



INTERPOD

turns the computer into a really powerful system.

With INTERPOD the VIC and 64 become capable of running really professional quality software such as Word-processing, Accounting, Instrument control and many more.

INTERPOD will work with any software. No extra commands are required and INTERPOD does not affect your computer in any way.

Using INTERPOD is as easy as this:

Simply plug INTERPOD into the serial port of your computer, power-up and you are ready to communicate with any number of parallel and serial IEEE devices and any RS232 printer.

Oxford Computer Systems (Software) Ltd.

Hensington Road, Woodstock, Oxford OX7 1JR, England Tel. (0993) 812700

£125

ASHLEY COMPUTER SERVICES

SOFTWARE FOR THE PET AND CBM 64
LEAGUE SOCCER 32K PET (New Rom) and CBM 64 £6.50

Features 92 League Teams, Promotion/Relegation, Cup Competitions, Team Selection, Injuries, Etc. Guide your chosen Team to League and Cup Glory!

LONDON EXCHANGE 32K PET (New Rom) and CBM 64 £6.50

Invest your money in any of the 233 Companies-Commodities and attempt to gain a controlling interest in 16 of Britain's major Companies!

BRIGHTON BEACH ROULETTE 16K PET (New Rom) and CBM 64 £5.50

Make your fortune on the spin of a wheel or by hawking your Ice Cream Van around Brighton (with due regard for nude sunbathers and Marauding Elephants!)

TEST MATACH SPECIAL 32K PET (New Rom) and CBM 64 £6.50

Features include choice of 4 international teams, full field settings, complete batting and balling averages kept. Your chance to improve on England's recent tour of Australia.

All prices inclusive: (Please don't forget to state machine—CBM 64, Basic 3, 4 etc)

Cheques/Postal Orders to:

ASHLEY COMPUTER SERVICES

5 Garden Street, Kirkham,

Preston PR4 2TU.

Tel: (0772) 686122

For VIC 20 and
CBM 64 Users

SIP ACCOUNTING SYSTEM

Highly comprehensive program designed for 16K, 24K, VIC20 & Printer, 40 col VIC20, CBM 64. Makes an ideal introduction for you and your staff to the world of computer accounts.

Features include:

- Menu driven—simplicity to use!
- Up to 250 accounts per tape
- Day book
- Sales and purchase ledger (or just 1 type)
- Statements print (for all or just one company)
- Overdue account statements (as above)
- End period carry on to next data tape
- Cash summary—debtors and creditors
- VAT entry (net or gross)
- PLUS many, many more features—all in ONE program.

SIP/AC20 - VIC20 16/24K Tape Based
SIP/DC20 - VIC20 16/24K Disc Based
SIP/A40 - VIC20 16/24K + 40 column card
SIP/AC64 - CBM64 Tape Based
SIP/DC64 - CBM64 Disc Based

Tape Version £24.95 + VAT
Disc Version £29.95 + VAT

Price includes comprehensive manual (+ date tape for tape versions).

1515/1525/1526/GP 100 VC printer required.

SIP ACCOUNTING SYSTEM PRINTOUT				DATE 28/02/83
SALD LEADER	ANVCO	STATEMENT		
NO.	DATE	DEBIT	CREDIT	
5112	28/02/83			00070.85
5112	16/3/83			00070.85
4003	1/3/83	00021.00		00049.85
4001	1/3/83		00054.00	
TOTAL BALANCE				£ 00071.85

Printer plinths

— designed to save space, improve paper flow, and tidy stray cables, has anti-vibration mounting, superb design in high impact smoked Perspex.

SIP/P1515 for VC 1515 and GP 80 £37.95 + VAT
SIP/P1525 for VC 1525 and GP 100 £39.80 + VAT

Acoustic covers

— reduces noise levels dramatically, smartly styled.

SIP/C80 for VC1515 and GP 80 £37.50 + VAT
SIP/C100 for VC1525 and GP 100 £39.80 + VAT

SPECIAL OFFER! GP 100 VC Printer PLUS SIP accounting program.

Phone for details

Please specify machine size when ordering. Available direct or from leading Software dealers. Send your orders or for further information please write or telephone:

Shore Industrial Plastics Ltd
1-13 Corsham Street, London N1 6DP.
Telephone: 01-250 1978.
Telex: 943763 Ref. SHM

NOW AVAILABLE ON DISC



SNIPPETS FOR THE 64

Interesting Pokes on the 64

Firstly this month a few small snippets for the 64. For those of you not yet acquainted with the 64, the command SYS(64738) is the cold start command, this seems to reset the machine and to a certain extent it does. Although the cold start command leaves any Machine Code programs in memory untouched, this can be very useful, it also helps you save wear and tear on your power switch. Another useful tip for the 64 that disables the LIST command, thus stopping easy access to programs. To disable the List command POKE 775,200, to enable POKE 775,167. This can be used inside programs which will disable the LIST command after the program has been RUN, or in direct mode. The POKE is to the Vector Basic text LIST.

The RUN/STOP key can be disabled on the 64 with: POKE 808,239 to re-enable the RUN/STOP POKE 808,237.

To disable the RUN/STOP and the RESTORE keys: POKE 808,225, to re-enable POKE 808,235. When the RUN/STOP and RESTORE keys are disabled, your program listing will look strange, although it will still run and will be as normal when the keys are re-enabled.

There are many other pokes that may be used for fun or for more serious applications on the 64. For instance, one can disable the SAVE and LOAD routine, by placing the correct values into the SAVE and LOAD vectors. To disable the SAVE routine POKE 818,32, to re-enable the SAVE routine POKE 818,237. To disable the LOAD routine POKE 816,32, to re-enable the LOAD routine POKE 816,165. To disable the keyboard POKE 649,0 and to re-enable 649,10. One of the uses that a combination of these POKE's could be put to, is to protect programs from over anxious eyes.

There is still yet another interesting aspect that appeared whilst testing the above POKE's. One may, of course, produce a cold start in the usual way SYS(64738), but you may have hidden inside your program a cold start, for instance, POKE 770,226:POKE771,252, which will do a cold start and reset the machine. the POKE actually points the warm start vector to the cold start address (for the Vic POKE 770,34:POKE 771,253). This can also be done to the LOAD vector (POKE 816,226:POKE 817,252), the SAVE vector (POKE 818,226:POKE 819,252), the LIST vector (POKE 774,226:POKE 775,252) and any key press (POKE 655,226:POKE 656,252). Included this month, is a listing which incorporates most of the afore mentioned POKE's, thus it is totally self-defeating but worth studying perhaps, even trying to check we got it right?? SAVE it before you RUN it.

```
10 REM ** THIS PROGRAM WILL COMPLETELY
20 REM ** DISABLE THE 64, USING THE
30 REM ** POKE'S MENTIONED IN THE ARTICLE
40 REM ** LINE 50 DISABLES THE LIST COMMAND
50 POKE775,200
60 REM ** TO RE-ENABLE POKE 775,167
70 REM ** LINE 80 DISABLES THE RUN/STOP
80 POKE808,239
90 REM ** TO RE-ENABLE POKE 808,237
100 REM ** LINE 110 DISABLES THE RUN/STOP-RESTORE KEYS
110 POKE808,225
120 REM ** TO RE-ENABLE RUN/STOP-RESTORE POKE 808,235
130 REM ** LINE 140 DISABLES THE LOAD ROUTINE
140 POKE816,32
150 REM ** TO RE-ENABLE POKE 816,165
160 REM ** LINE 170 DISABLES THE SAVE ROUTINE
170 POKE818,32
180 REM ** TO RE-ENABLE THE SAVE ROUTINE POKE 818,237
190 REM ** LINE 200 DISABLES KEYBOARD
200 POKE649,0
210 REM ** TO RE-ENABLE KEYBOARD POKE 649,10
220 PRINT"␣ YOU NOW HAVE NO KEYBOARD"
230 PRINT"␣BUT YOU CAN LIST THE PROGRAM!!"
235 FORP=1TO1000:NEXT
240 POKE649,10:POKE808,237:POKE774,226:POKE775,252
READY.
```

SOUND TRAINING for WORDCRAFT*

a faster, more enjoyable
way to learn.

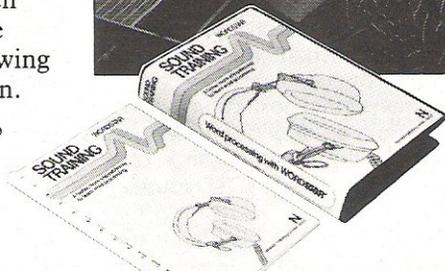
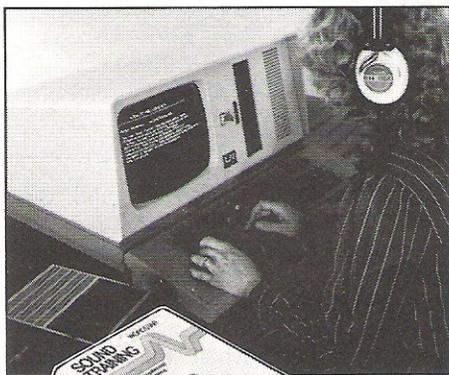
Word Processing with Wordcraft is a Sound Training pack that enables users to operate Wordcraft easily and effectively within only a few hours – without the need to rely on the manuals.

The **Word Processing with Wordcraft** package consists of two audio cassettes, reference book, checklists and job aids.

The interactive package is a complete, self-contained training course which involves listening to the tapes while operating the computer – and following the instructions when they are given.

It's an ideal way to learn – it's fast, enjoyable and effective. Just as important, it builds up confidence in using the program.

* Wordcraft is a trademark of Dataview Ltd



Other Sound Training packs cover **Using Your CP/M Micro**, **Using Mailmerge**, **Word Processing with Wordstar**, **Introduction to Plannercalc** and other titles are planned for the future. Price £40.00 (inclusive of VAT and postage).

To Newtech Publishing Ltd, 8 Forge Court, Yateley, Camberley, Surrey GU17 7RX. Telephone (0252) 873373

- Please send me _____ copy/ies of **WORD PROCESSING WITH WORDCRAFT** @ £40.00
- I enclose my remittance of £ _____
- Please invoice my company
- Please send me full details of your Sound Training packs

Name _____
 Title _____
 Company _____
 Address _____
 Signature _____ Date _____

'SIMPLY WRITE': the kind of word processor you didn't think you could afford. Some £300 programs have fewer facilities. Tape or disk; any printer; any 40 or 80 column PET. Needs 16K. Tape £40, disk £45.

'SIMPLY FILE' Records System (DBMS). Selects by any key. Prints alphabetical lists, mailing labels, columnar reports of all or selected records. Calculates between fields. Totals, averages columns. Works with 'Simply Write'. Fast, easy, robust and very, very versatile. Disk £65.

GOTTA PET? ADDA VIC! High resolution graphics, programmable characters, colour and sound for your PET/CBM system? All this PLUS a complete extra computer using your PET's disk drives, printer etc? Under £200 including VIC computer and our 'SIMPLY LINK' PET-VIC link system.

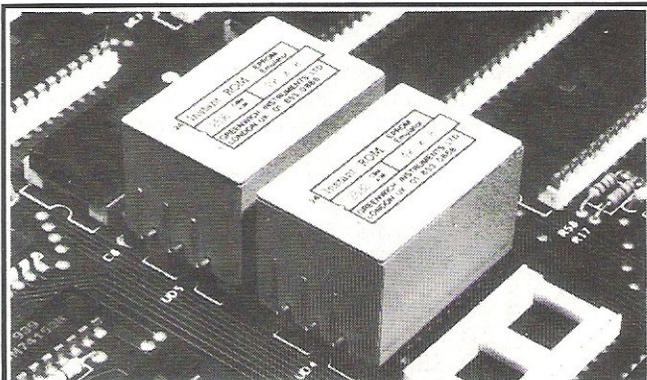
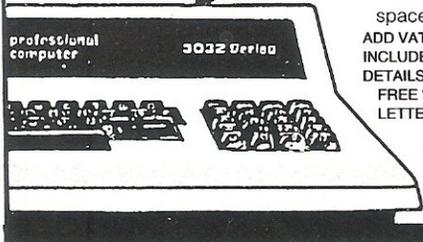
A WINDOW ON YOUR DISK! Our 'Simply Recover' disk file repair kit (4040 only at present) will allow you to save crashed files, append BASIC or m/c subroutines, change disk names and IDs, devise protection systems, etc. Disk & detailed instructions £17.

ZYGIAN INVADERS. Super second generation machine code invaders game.

Tape £6, disk £7.50

ASTEROID PATROL. Classic game with sound effects, 9 levels of play, hyper-space jump etc. Tape £6, disk £7.50
 ADD VAT TO PRICES PLEASE, BUT ALL INCLUDE P&P. SEND FOR MORE DETAILS, MORE ITEMS, AND GET OUR FREE 'MICROMAIL' PET/VIC NEWS-LETTER.

Simple Software Ltd.
 15 Havelock Rd., Brighton.
 Sussex BN1 6GL
 Tel: (0273) 504879



INSTANT ROM (Commodore Approved)

Greenwich Instruments' ROM/EPROM Emulators are non-volatile memory modules which plug into any ROM/EPROM socket. When the power is switched off, data is retained for up to 10 years. Emulators from 2 Kbytes to 32Kbytes are available. In the PET, a 4Kbyte Emulator can be fitted in the 9000 or A000 socket, and used for fast program development. Basic or Machine-code programs can be stored permanently.

GR2532 4Kbyte Emulator.....£56.00
 Adaptor GA1 (essential for PET users)£ 6.00

PETCLOCK (Commodore Approved)

PETCLOCK plugs into any Commodore machine with User-Port, and gives time (hour/minute/second) and date (year/month/date/day of week). Battery backup—accuracy is maintained when the power is off.

GCC1 PETCLOCK.....£62.00

G-ROM E

A 4 Kbyte EPROM which runs, at switch-on, any Basic or Machine-code program stored in INSTANT ROM, eliminating the need for tape or disc. Basic programs can be stored with a few key-strokes.

Some powerful utilities are included for program revival. PET's power-up memory test is made non-destructive, and UN-NEW is provided. A program for reading Date and time from PETCLOCK is also included.

G-ROM E (specify type of PET).....£25.00

Postage (£1.00) and VAT are extra. Leaflets are available.

GREENWICH INSTRUMENTS LIMITED, 22 BARDSLEY LANE,
 GREENWICH, LONDON SE10 9RF.
 Tel: 01-853 0868. Telex 896691 Attn. GIL.

HINTS & TIPS

Merging Programmes

The next routine is a technique described by Jim Butterfield, called Magic Merge (this technique works on both the 64 and the Vic). It allows the user to combine lines from one program with another. There are seven sections, or steps, they are:-

- 1) Insert a blank tape, rewind and then type:
OPEN,1,1,1,"PROGRAM
NAME":CMD1:LIST
("PROGRAM NAME" is the name of

your program).

2. When the tape stops and the message 'READY' appears back on the screen, enter:
PRINT#1:CLOSE1
3. After the tape stops you can remove it.
To merge with a program in memory the following steps are needed.
4. Put the Merge tape in the cassette unit and rewind the tape to the start.
5. Enter POKE 19,1:OPEN1

6. After the 'READY' message comes back, clear the screen with (SHIFT HOME).
7. Press exactly three cursors down.
8. Enter:
PRINTCHR\$(19):POKE 198,1:POKE 631,13:POKE 153,1
9. The tape will finally stop with an error message. Ignore the error and enter:
CLOSE 1
10. The lines are now 'magically merged', have a look and see.

VIC Video

The 6522 Video Chip is the next stop for hints and tips, this is a very complex chip, perhaps the best place to start is with smooth scrolling. The control registers are from \$D000 - D02E HEX or 53248 - 53294 Decimal. Smooth scrolling is controlled in the horizontal direction with address 53265. Therefore, we can take away half of the top and half of the bottom line of the 64 screen with POKE 53265,19, to return to normal POKE 53265,27, which is the value usually in this address. Using this poke we can have a smooth scrolling routine of the bottom of the screen. It is also possible, although not so simple, to have a smooth vertical scroll on the 64. By POKE 53270,3 (this is the address of the Vic control register), we put the 64 into 38 row mode with a split column each side of the screen, and can now build a routine to do smooth vertical scrolling. So, if we use the formula FOR A = 8 TO 15:POKE 53270,A:NEXT, we will see the characters shift right. The possibilities using the 6522, for this particular application can be utilised in games, business, education or any other application.

The address mentioned above also has other functions, the most obvious is the regularly mentioned blanking of the screen. This is achieved with POKE 53265,11 and of course the screen can be put back with POKE 53265,27 the most obvious use for this is the use of the 1540 with the 64 (see June issue Hints and

Tips). Extended colour mode can also be accessed with address 53265, POKE 3265,59 will put you into hi-res mode, but the character set is also visible at the bottom of the screen, and at the top of the screen is the page zero values, which will be visibly working away. What you are in fact seeing, is a bit map of RAM from 0 - 4096 as well as the character generator. Now clear the screen, and enter the following (you will have to type blind), FOR A = 2880 TO 3839:POKE A,0:NEXTA, this should clear three lines of the high-res screen. Now enter this line FOR A = 2880 TO 3839:POKE A,255, this will fill three lines on the hi-res screen. This needs some experimenting with, to find out exactly what one can do and how we'll leave it for this month.

Another way of setting up and clearing the hi-res screen is with the following formula; POKE 53265,29:POKE 53272,29:FOR I = 8192 TO 16191:POKE I,0:NEXT. The first POKE selects the hi-res bit map mode and the second POKE selects the RAM for the hi-res screen, the loop actually clears the hi-res screen. To get back to the normal screen enter POKE 53265,27:POKE 53272,21. A few small points about location 53272. It usually contains a value of 21, if this is changed to 22, the 64 is put into lower case mode (POKE 53272,22) to get back into upper case type POKE 53272,21. This location also selects the bit map mode as mentioned above.

Multi-colour Mode is entered through address 53270. If you enter

POKE 53270,216 this will put you into Multi-colour Mode to get out of Multi-colour Mode POKE 53270,200. To get into Extended Colour Mode POKE 53265,91 and to return to Normal Mode POKE 53265,27. Included in this month's Hints and Tips, is a routine which selects Multi-colour Mode and switches between banks to set up two screens. Here is a brief break down of the routine:-

Line 5 jumps to Line 35. Line 10 sets all the bits to output in the 6522. Line 20 selects bank two. Line 30 redirects the character generator. Line 35 clears the normal screen, jumps back to line 10 and sets up a second screen in bank two, then clears the screen in bank two. Line 40 sets the background colour to yellow. Line 50 sets the border colour to red. Line 60 sets the second background colour to purple. Line 70 selects Multi-colour Mode. Line 90-120 prints a message. Line 130 waits for either f1, f2 or f3 to be pressed. Line 140 jumps to the routine to select normal screen if f3 is pressed. Line 145 exits the program if the f5 key is pressed. Line 150 jumps to the selection of bank two routine if the f1 key is pressed. Line 1000 selects the normal bank and line 1100 sets the character generator to point to that bank, but still in Multi-colour Mode. Line 1110 selects the two background and the border colours. Line 1120 - line 1150 prints a message. So a simple demonstration of Multi-colour Mode and bank selection, is not very useful as a routine, but only meant to demonstrate how to select multi-colour and the use of bank selection.

HINTS & TIPS

```

5 GOTO35
10 POKE56578,PEEK(56578)OR3
20 POKE56576,(PEEK(56576)AND252)OR1
30 POKE648,132:RETURN
35 PRINT"Q":GOSUB10:PRINT"Q"
40 POKE53281,7:REM SET BACKGROUND TO YELLOW
50 POKE53280,2:REM SET BORDER TO RED
60 POKE53282,4:REM SET BACKGROUND TWO TO PURPLE
70 POKE53270,PEEK(53270)OR16
90 PRINT"##### THIS IS MULTI COLOUR MODE"
100 PRINT"##### IN BANK TWO
110 PRINT"##### TO SWITCH BETWEEN BANK 0 AND 2"
120 PRINT"##### USE 'F3' FOR 0 AND 'F1' FOR 2"
130 GETA#:IFA#<"#"ANDA#<"#"ANDA#<"#"THEN130
140 IFA#="#"THENGOSUB 1000:GOTO130
145 IFA#="|"THENPOKE56578,PEEK(56578)AND252:POKE648,4:POKE53270,200:PRINT"Q":END
150 GOSUB35:GOTO130
1000 POKE56578,PEEK(56578)AND252
1100 POKE648,4:POKE53270,PEEK(53270)OR16
1110 POKE53282,2:POKE53280,3:POKE53281,12
1120 PRINT"##### THIS IS BANK 0"
1130 PRINT"##### TO RETURN TO 2 PRESS 'F1'"
1140 PRINT"##### OR TO EXIT PRESS 'F5'"
1150 RETURN
READY.

```

64 Function Keys

This version is not the one printed in the June issue, it is one sent in by a reader and has been printed, as it seemed more appropriate to give readers space. The reader's name is Robert E Sargent, of RAF Chicksands, Shefford, Beds, he says:-

"A one key function can be a great time saver when writing and debugging programs. Here is a program that allows you to assign your own values to the eight function keys.

Enter the program exactly as written, being particularly careful about the DATA statements. The DATA is a machine Code program that is POKE'd directly into memory. One missed number in the DATA could cause a SYSTEM lockup.

Once you've entered the program SAVE IT first, then RUN it. This could save you the trouble of entering the program a second time after losing the program. The program will only take a few seconds to execute. When the program has finished, this message will appear on the screen:

USE SYS 49152 FOR ACCESS

READY.

Typing SYS 49152 and pressing RETURN will start the program. Upon execution this message will appear on the screen:

F1=?

Enter the value or the string you wish to assign to F1, then press the return key.

```

10 PRINT"Q"
20 PRINT"#####PROCESSING 'FUNCTION KEYS'"
30 FORX=49152TO49415
40 READA:POKEX,A
50 NEXTX
60 PRINT"#####USE SYS 49152 FOR ACCESS
100 DATA169,0,170,157,0,194,157,0
110 DATA195,157,0,196,232,208,244,133
120 DATA251,169,194,133,252,169,49,133
130 DATA253,169,133,133,254,169,13,32
140 DATA210,255,169,70,32,210,255,165
150 DATA253,32,210,255,169,61,32,210
160 DATA255,169,63,32,210,255,32,207
170 DATA255,72,160,0,165,254,145,251
180 DATA104,32,133,192,201,13,240,17
190 DATA201,95,208,2,169,13,145,251
200 DATA32,133,192,32,207,255,76,68
210 DATA192,230,253,165,253,41,1,208
220 DATA10,24,165,254,105,4,133,254
230 DATA76,114,192,56,165,254,233,3
240 DATA133,254,165,253,201,57,48,165
250 DATA120,169,144,141,20,3,169,192
260 DATA141,21,3,88,96,166,251,224
270 DATA255,208,2,230,252,230,251,96
280 DATA165,197,197,254,240,58,201,3
290 DATA48,54,201,7,16,50,133,254
300 DATA201,3,208,3,24,105,4,24
310 DATA105,129,174,141,2,240,3,24
320 DATA105,4,133,253,160,0,169,194
330 DATA133,252,132,251,177,251,197,253
340 DATA240,19,200,208,247,230,252,165
350 DATA252,201,197,208,239,76,49,234
360 DATA133,254,76,49,234,200,208,8
370 DATA230,252,165,252,201,197,240,242
380 DATA177,251,201,13,208,10,230,198
390 DATA166,198,157,119,2,76,213,192
400 DATA201,0,240,222,201,133,48,7
410 DATA201,141,16,3,76,49,234,32
420 DATA210,255,76,213,192,0,0,0

```

LLAMASOFT!!

MORE THAN JUST A PRETTY PACKET!

LLAMASOFT!!
PRESENTS
MATRIX
(GRIDRUNNER 2)

FOR VIC-20 (8K) and Commodore 64



Jeff Minter has taken Gridrunner — the game that topped bestseller charts in USA and UK — and created an awesome sequel — Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflexor fields, diagonal tracking, count-down/panic phase and much, much more... Packed into 20 mind-zapping zones and accompanied by incredible sonics.

N.B. MATRIX REQUIRES A JOYSTICK
FOR VIC-20: £6.00 FOR C64: £7.50

MATRIX ENTER THE ZONE OF EXCELLENCE

LLAMASOFT SOFTWARE
49 MOUNT PLEASANT,
TADLEY, HANTS,
07356 4478

J = JOYSTICK CONTROL

VIC-20

LASERZONE (8K+)

NEW J
Destroy the oncoming ALIENS with your TWO independently controlled laser bases! Lunge for the ELECTRO button and blast your enemies into expanding clouds of SPACE JUNK! An exhilarating and totally original game with a unique system of control from a standard joystick. A mere £6.00 + 50p P&P

ABDUCTOR

J
A classic new space game! ZAP the swirling alien hordes before they ram you — and abduct your humanoids! Survive the assault for long enough and you'll get an extra stage on your spaceship with double firepower! Awesome unexpanded Vic Action. £5.00 + 50p P & P.

GRIDRUNNER

J
Finally, true arcade quality on the unexpanded VIC! Shoot down the segmented DROIDS invading the grid. Beware of the pods and zappers! The awesome speed, sound and graphics gives you the best blast available for unexpanded Vic. £5.00 + 50p P & P.

ANDES ATTACK (8K)

J
Your spacecraft must attack the descending aliens and frustrate their evil intent. Fly your Ramjet fighter over the Andes mountain range and protect your llamas from kidnap by hostile UFOs. Features 5 kinds of UFO, controls include up, down, reverse, fire, thrust and smart bomb. Entirely in machine code. Requires 8K expansion and joystick. £5.00 + 50p P & P.

TRAXX M/C (8K + EXPANSION)

J
This is VIC-20 cross breed between the now famed 'Pacman' and the game 'Quix'. All in machine code, fast and fun with joystick controls, uses Hi-Res colour graphics. 8K or larger expansion needed. Only £6.00 + 50p P & P. complete with instructions.

COMMODORE 64

ATTACK OF THE MUTANT CAMELS

J
Planet Earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the human stronghold. You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner, 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! £7.50 + 50p P & P.



LLAMASOFT GAMES now available in **BOOTS** and many other retail outlets.

PLEASE ADD 50p TO ALL ORDERS

LLAMASOFT!!

YES

YES, HE'S DONE IT AGAIN

JEFF MINTER's done it again, not only is Laserzone the best VIC-20 game in existence, now this action packed, mind-zapping game is soon to be released for the COMMODORE 64. Graphically superb!!



ONLY
£7.50

ONLY
£7.50



ROX-64

Rox is a challenging game involving the defence of your lunar base from a deadly meteor shower. Rox-64 includes amazing sprite graphics displays and spacy sound effects, and an awesome 'mothership' display if you win the game. Top 10 scores are tabled along with their names. This program shows just what can be achieved using only Commodore-64 basic. Study the listing and learn how to use sprites and sound on this outstanding machine. £3.00 + 50p P & P.

GRIDRUNNER 64

J
The No 1 best game for the Vic has been improved for your COMMODORE 64! Gridrunner is a smash hit in the USA. Now experience the lightning-fast challenge of the grid on the 64. Features 31 skill levels and excellent sound and graphics. Sore trigger finger free with every game! £5.00 + 50p P & P.

SPECTRUM

GRAPHICS CREATOR (16K)

Not just another character editor! Allows you to define not only the 21 user definable characters. Also allows you to change the entire 96 character ASCII set. Creates BYTES files ready for you to load into your own programs. Includes advanced Reflect, Invert, Field commands etc. Complete with full documentation. Bin the BIN statement and use Graphic Creator with its easy on-screen cursor editing. £2.50 + 50p P & P.

BOMBER (16K)

Yes, a full feature version of the popular game 'Blitz', supplied for the 16K or 48K Spectrum. For only £2.50 + 50p P & P.

HEADBANGER (48K)

Colourful new game starring Chico the headbanger who you must guide to riches through an increasing shower of heavy metal. Gain bonuses for headbanging but be sure to take an aspirin when the pain gets too much! Basic + m/c to speed up action. Great graphics, nice animation. Will even drive William Stuart system's voice synthesiser to produce speech output. Can you attain the grade of 'Rocker Class One' or will you be 'Barry Manilow Class 5'? Start headbanging today and find out. £4.00 NEW.

SUPERDEFLEX (48K)

Bounce 'Sid', the space invader, around the screen into the power pods keeping away of course from the devil who chases you around the screen. Steer with your Deflex shields, but beware the mines or you may be burned alive! Superb graphics and fantastic sound on the 48K Spectrum only. Only £2.50 on cassette + 50p P & P.

ATARI 400-800

GRIDRUNNER

J
Now play the best selling VIC/C64 game on your ATARI 400/800. Any memory size (16-48K). Basic cartridge not required — 100% machine code autoboot tape. Play this awesomely fast and addictive game on your Atari. For only £7.50

TURBOFLEX

Superb ultra-fast and totally new ball game. Uses ATARI's unique features to the full. Incorporates superb colour/sound effects and uses Player/Missile graphics. Tables top 10 scores along with Scorer's name. £4.00 + 50p P & P.

ZX81

CENTPEDE (16K)

THE ORIGINAL game from the ORIGINAL author. This is the identical program to that being sold by other companies for three times our price. The game has received ecstatic reviews in the computing press. Program has 30 speed levels and ever increasing Centipede hordes. Tables top 10 scores and names. Why wait to pay more? Only £1.95 + 50p P & P.

LLAMASOFT SOFTWARE

49 Mount Pleasant, Tadley,
Basingstoke, Hants. RG 26 6 BN
Tadley 07356 4478

TRADE ENQUIRIES WELCOME

HINTS & TIPS

You will receive a prompt for F2, F3 and so on, until all eight functions have a value. If no value is desired for a particular key, just press RETURN after the prompt and you will move on to the next function key.

There are a couple of features to this program that will make programming more pleasant. The first of these, is the LEFT ARROW key. When assigning values to the function keys, enter a LEFT ARROW for a CARRIAGE RETURN at the end of the line. Whenever this FUNC-

TION key is pressed, the function will automatically be executed.

The function key values can be changed at any time. However, there is a specific procedure for doing this. First, press the RUN/STOP and RESTORE keys. This resets the system pointer values. Then type SYS 49152 and the program cycle will begin again. Assigning new values to the function keys will in no way harm or disturb whatever program you are currently working on.

If you use RUN/STOP and RESTORE

while working on a program, the function keys will stop working. There is a way of getting them back without using the reprogramming cycle. Using the direct mode, type:

```
POKE 788,144:POKE 789,192
```

Making sure both POKE's are on the same line. Now press RETURN. The function keys should now be working as you programmed them."

Our thanks to Mr. Sargent, for his worthy contribution.

VIC Colours

Included this month is a simple routine for the Vic colours, the routine uses the DEF FN instruction. Line 20 sets the DEF FN instruction, line 30 is the colour address, line 40 is the start of the loop for the background colours. Line 50 clears the screen and prints in white, line 60 prints in black if the background colour is not black. Line 70 prints the screen colour, line 80 is the start of the loop for the border colours. Line 90 POKE's the screen and border colours using the DEF FN instruction. Line 100 prints the border colour, line 110 is a delay loop line 120 and 130 close of the loops, line 140 puts back the original Vic screen and border colours. Line 150 clears the screen and prints in blue.

```
10 REM COLOUR ROUTINE
20 DEF FNA(D)=D*16-8
30 S=36879
40 FORBA=1TO16
50 PRINT" ";
60 IFBA>1THENPRINT" ";
70 PRINT"SCREEN";BA
80 FORBC=8TO7
90 POKES,FNA(BA)+BC
100 PRINT"BORDER";BC
110 FORP=1TO500:NEXT
120 NEXT
130 NEXT
140 POKES,27
150 PRINT" ";
200 END
READY.
```

Reserved words and the 64

The last routine for this month is for the 64, it allows the user to change all the reserved words. The program actually reads a copy of the BASIC ROM into RAM and allows the user to enter another word of the same length, but if the new word needs to be shorter, then the new word may be put inside quotes, for example: to change RETURN to TURN, enter "TURN". You may also switch the BASIC ROM in or out from direct mode whilst using this program. To switch BASIC ROM in POKE 1,55 to switch BASIC ROM out POKE 1,54. Now for a breakdown of the program:

There are many REM statements in the program for documentation purposes, these need not be typed in, but do not alter the line numbers. Line 20 - 40 copies the BASIC ROM into RAM behind the ROM. Line 60 switches out the BASIC ROM, line 80 is the input for the word to be changed. Line 100 sets R\$ to the word

```
10 REM LOOP TO COPY ROM INTO RAM, BEHIND ROM
20 FORA=40960TO49151
30 POKEA,PEEK(A)
40 NEXT
50 REM TAKE OUT BASIC ROM
60 POKE1,54
70 REM PUT RESERVED WORD INTO R$
80 INPUT"RESERVED WORD";R$
90 REM SET TERMINATOR MARKER ON LAST BYTE OF STRING
100 R$=LEFT$(R$,LEN(R$)-1)+CHR$(ASC(RIGHT$(R$,1))+128)
110 REM ROUTINE TO SEARCH ROM FOR RESEVED WORD
120 GOSUB290
130 IFF=0THENPRINT"NOT FOUND":GOTO80
140 INPUT"YOUR WORD (SAME LENGTH)";N$
150 REM CHECK LENGTH OF WORDS ARE THE SAME
160 IFLEN(N$)<OLEN(R$)THEN140
170 REM ADD TERMINATOR
180 N$=LEFT$(N$,LEN(N$)-1)+CHR$(ASC(RIGHT$(N$,1))+128)
190 REM LOOP TO POKE IN NEW WORD
200 FORJ=1TOLEN(N$)
210 POKEA+J-1,ASC(MID$(N$,J,1))
220 NEXT
230 PRINT"ANOTHER WORD (Y/N)"
240 GETA$:IFA$<>"Y"ANDA$<>"N"THEN240
250 IFA$="N"THENEND
260 REM ANOTHER WORD
```

**80 COLUMNS
NOW AVAILABLE**
PETS 3000/4000 9IN SCREENS
(BASIC 4)
EASY TO FIT BOARD
YOUR PET THINKS IT IS AN 8032!!!
£169.95 inc VAT
**FOR RADIO AMATEURS.
RTTY MODULES**

SEND/RECEIVE VERSIONS
PETS/VIC20/CBM64
FROM £69.95
FURTHER INFO FROM:-
T.A.L. COMPUTER DIV
11 HIGH STREET
LEIGHTON BUZZARD
BEDS.
Tel: (0525) 372114

CalcResult

THE 3D SPREAD SHEET

- Three Dimensional Format
- Up to 32 pages with consolidation
- Pass information between pages
- Split screen and windows
- Formatted Printing
- Formula Editing and protection
- Histograms on screen and printer
- Your current VisiCalc data and formula files can be input
- Help functions on screen

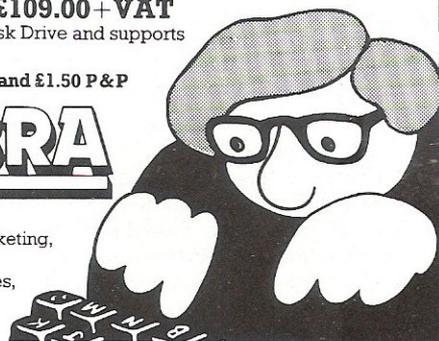
8000 Version £149.00 + VAT
(8032, 8096, 8050, 8250 9060 and 9090 supported)

64 Version £109.00 + VAT
(Requires 1541 Disk Drive and supports serial printer)

Please add VAT and £1.50 P&P

KOBRA

Send cheques to:
Kobra Micro Marketing,
P.O. Box 28,
Henley-on-Thames,
Oxon.
Tel: 04912 2512



DISCOVER ADVENTURE THE ULTIMATE PET GAME

ADVENTURE

Will run on any 32K PET
Available on cassette or disk
ONLY £11.50 INCL VAT (p&p free)
Please specify whether cassette or disk required.

SUPER ADVENTURE

Disk based only.
Will run on a 4032 or 8032 with a 4040 or 8050 disk drive
ONLY £20.00 INCL VAT (p&p free)
Please specify Computer & Drive when ordering.

NOW AVAILABLE FOR CBM 64

Please send cheque/P.O. to:
IMPETUS COMPUTER SYSTEMS
Freepost Hendon, London NW4 1YB

HI-RESOLUTION GRAPHICS

A high resolution graphics board that gives a 64,000 dot (320x200) resolution. Versions available for any dynamic ram Pet, BASIC 2,3,4, FAT40 & 80 columns. No soldering or track cutting required, supplied complete with fast GRAPHIX software in ROM and full fitting & operating instructions. **£149.00**

SUPER ROM-SELECTOR

A high quality printed circuit board giving 64K of utility ROM space, software selectable!!! Allows 16x4K ROMs/EPROMs to reside in the expansion area of your PET. One 'POKE' enables any two ROMs at a time. Suitable for bank-switched software. **£75.00**

PET UPGRADES

WHILE-U-WAIT service! (Dynamic ram pets only).
Memory expansion:
8K-32K..... £59.90
16K-32K..... from £48.70
8K-16K..... £38.26
40 column (12in VDU only) to 80 column conversion.
40-80 column..... £89.00
40-80 column switchable (two machines in one!)..... £105.00
Full keyboard functions: i.e. TAB, ESC, REPEAT, SCROLL up/down, define WINDOW, lowercase/graphics mode and DELETE from/to cursor. All available in direct or program mode.

REPAIRS AND SERVICING

Fast and efficient repairs to all Commodore Business Machines at reasonable prices. WHILE-U-WAIT service whenever possible.
Please add VAT to the prices shown at the current rate.
Telephone Mick Bignell for more details at:

7 Clydesdale Close,
Borehamwood, Herts. WD6 2SD.
Tel: 01-953 8385

HINTS & TIPS

to be changed plus the terminator. Line 120 jumps that search for the reserved word. Line 130 prints not found if the found flag is set. Line 140 INPUT's the new word, line 160 checks that both reserved and new words are the same length. Line 180 sets the new word with a line terminator. Line 200-220 is the loop to poke the new word in, 230-270 is the repeat or finish routine. Line 290 set the start address to the beginning of the BASIC ROM, line 310 sets C to the first character of the reserved word. Line 330 jumps to the routine to check the remaining characters of the reserved word, only if the first character is correct. Line 350 - 370 checks for the first character until it reaches the end of the reserved word table. Line 400 goes to the start of the check routine. Line 420 increments the start address by 1. Line 440 - 470 checks that all the characters match, if not, it carries on looking until it reaches the end of the reserved word table. Line 490 resets the start address and sets the found flag.

This routine will be fun to use and within additions, has unlimited number of possibilities. Until next month, please send your contributions for Hints and Tips to one of the programmers. Names and addresses are on the inside cover!!

```
270 GOTO80
280 REM START ADDRES OF ROM
290 AD=40960
300 REM GET FIRST CHARACTER
310 C=ASC(MID$(R$,1,1))
320 REM IF FIRST CHAR. CHECK OTHERS
330 IFPEEK(AD)=C THEN420
340 REM LOOK AT NEXT ROM POSITION
350 AD=AD+1
360 REM CHECK FOR END OF WORD TABLE IN ROM
370 IFAD=>42000 THENF=0:RETURN
390 REM STARTS NEXT CHECK
400 GOTO310
410 REM SET POINTER TO POSITION OF SECOND CHAR.
420 AD=AD+1
430 REM LOOP CHECK REST OF CHAR. MATCH
440 FORJ=2TOLEN(R$)
450 REM CHECK EACH CHAR.
460 IFPEEK(AD+J-2)<>ASC(MID$(R$,J,1)) THEN310
470 NEXT
480 REM SET POINTER TO FIRST START OF WORD AND
SET FOUND FLAG
490 AD=AD-1:F=-1
500 RETURN
READY.
```

Our readers are now due an apology for the Hints and Tips section in June. Firstly, on the routine to use the 1540 with the 64, the POKE's needed are POKE 53265,11 (turn screen off) and POKE 53265,27 (turn screen on). Next correction is in the INPUT routine, a line is missing, it is 45. The whole routine has been included again, with correction.

READY.

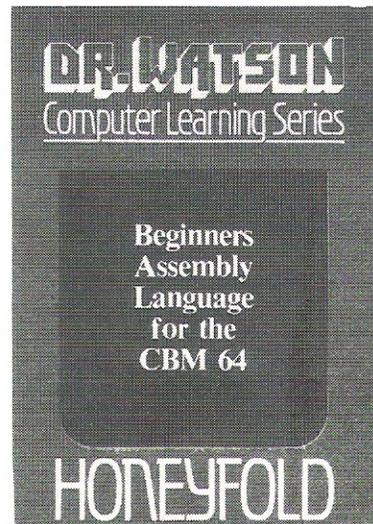
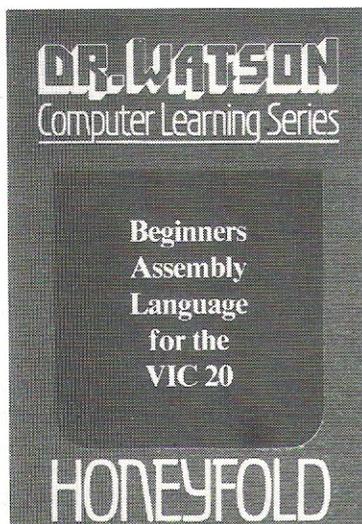
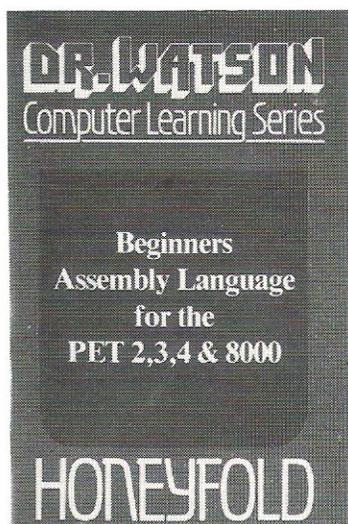
```
10 OPEN4:0:REM OPEN KEY BOARD AS A DEVICE
20 PRINTCHR$(147):REM CLEAR SCREEN
30 DIMA$(100):REM SET UP ARRAY FOR TEXT STORAGE
40 FORI=0TO100:REM INPUT LOOP FOR TEXT
45 INPUT#4,A$(I)
50 PRINT:REM SKIP TO START OF NEXT LINE
60 IFA$(I)="" THENI=100:REM TEST FOR END OF PRINT LOOP
70 NEXT:REM END OF INPUT LOOP
100 FORI=0TO100:REM PRINTING OF TEXT LOOP
120 FORJ=1TOLEN(A$(I)):REM LOOP FOR LENGTH OF STRING
130 B#=MID$(A$(I),J,1):REM B# = JTH CHARACTER FROM STRING
140 IFB#="!" THENPRINT:GOTO200
150 REM DO CARRIAGE RETURN IF EXCLAMATION MARK
160 PRINTB#:REM CHARACTER OF TEXT LOOP
200 NEXT:NEXT:REM CLOSE LOOPS
300 CLOSE4:REM CLOSE KEYBOARD CHANNEL
400 END
```

COMPLETE

BEGINNERS 6502/6510 COURSE

IN

ASSEMBLY LANGUAGE PROGRAMMING



Each tape contains a complete 6502/6510 Assembler plus a BIN/BCD/Hexadecimal tutor.

This self paced course takes you from the absolute beginner in Assembly language, through the whole 6502/6510 instruction set and, as the press reviews have said, these are the FIRST books really written for the beginner.

From the earliest chapters your programs will run as the book is written to suit the purpose-designed assembler. Just to nurse you through these early stages the tape contains a complete binary, binary-coded decimal and hexadecimal tutor.

The chapters will tell you about:

- How to get started.
- Conditional and unconditional jumps.
- Setting the flags.
- Screen displays.
- Timing things.
- Mathematical operations.
- Labels, memory labels and macros.
- Saving loading and printing machine-code programs.
- Interrupts, overflow and break flags.
- The USR command.
- Floating point numbers.
- The 6502/6510 instruction set.
- and lots more.

Just to check that you are on the right road, each chapter has numerous exercises, all of which are explained in full – at the back.

Each book is a bargain with a complete 6502/6510 reference text, a full assembler and a book that the beginner will understand.

Available from all good computer and bookshops or direct from Honeyfold.

BOOK AND TAPE COURSE FOR BEGINNERS

14.95
inc p&p

“The existing books are far surpassed by Dr Watson” D. Bolton, Vic Computing.

“There aren’t easier ways of learning how your computer does it” K. Dallas, P.C.N.

HONEYFOLD

Honeyfold Software Limited
Standfast House, Bath Place,
High Street, Barnet, London.
Tel: 01-441-4130

ROY'S 64 GRAPHICS PACKAGE

The Commodore 64 has superb Graphics capabilities, in this article we review a very comprehensive Graphics package – it adds 24 graphics commands to Basic.

This month we take a look at Screen Graphics-64 written by Roy Wainwright. This package is a complete High-Resolution package for the 64.

One of the only disappointments that I found with the 64 when I first got my hands on one was that there was so much user RAM available but no hires graphics commands. There is plenty of room for the graphics screen but this facility was not taken advantage of. Roy Wainwright has seen this and produced Screen Graphics-64.

The package sets up a hires screen and 24 hires commands for the 64. It comes with a manual explaining all of the commands, a demonstration program and a tutor program.

The hires commands are as follows:

HIRES a,b – set up standard hi-res screen.

MULTI a,b – set up multi colour hi-res screen.

With both of these, a = screen colour, and b = border colour.

TIC a,b,c, – mark the screen edge with points. a = X step, b = Y step, and c = colour of dots.

DOT x,y,c – plot a point at coordinates x,y with colour c.

DRAW x1,y1,x2,y2,c – draw a line between the two points x1,y1 and x2,y2 with colour c.

BOX x1,y1,x2,y2,c – draw a box where x1,y1 and x2,y2 are opposite corners of the box and c is the colour.

CIRCLE x,y,r,c – draw a circle with centre coordinates x,y, radius r, and colour c.

CHAR g,x,y,c,"str" – plot a string of characters on the screen with x,y the start position of the string, c the colour, "str" the string to be displayed, and g is the character set (1-4).

BLOCK x1,y1,x2,y2,c – fills a rectangular area of the screen with the colour c, the coordinates are as in BOX.

MODE a – set mode of display, a is either 0,1, or 2 for normal, erase, or reverse mode.

FILL x,y,c,e – fills an enclosed area of the screen where the point x,y is anywhere within the area, c is the colour and e is the 'paintbrush' (only required in multi mode).

PIXEL (x,y) – returns a value greater than 0 if the point is turned on.

These are all of the plotting commands.

There are two other sets of commands, screen control commands and Sprite control.

SCREEN CONTROL:

DUMP "filename" [,dev] – dump graphic display to device, tape (1) or disk (8).

GREAD "filename" [,dev] – read the graphic display from device.

NORM – switch to normal screen.

GRAPH – switch to hires screen.

SPRITE CONTROL:

Screen Graphics also helps the user manage Sprites with another 8 commands, these are:

BIT "111111110000000011111111" – for a hires Sprite, the pattern may be coded with 21 lines as above.

COLOURS "012301230123" – as above for multi-colour Sprites.

SDATA "255,0,255,1,2,3,4,5,6,7,8,9" – another method of defining Sprites by giving the value of each byte.

HEX "FF00FF010203040506070809" – as SDATA but with hex values.

These four commands are treated as REM lines by basic and are by-passed.

When the Sprite has been defined as above, the next four commands may be used to manipulate the Sprite.

COPY a, 11111 – copy Sprite image defined starting at line 11111 into one of the 15 Sprite slot numbers (a=1 to 15).

SPRITE n,s,m,p,x,y,c1,c2,c3 – turn Sprite on.

n is the Sprite number (1-8),

s is the slot number that it was copied in to,

m is the multi-colour control (0 – single colour, 1 – multicolour),

p is the priority control of the Sprite with the background (0 – Sprite in front, 1 – Sprite behind),

x is the x expand (0 – normal,

1 – large x),

y is the y expand (0 – normal,

1 – large y),

c1 is the Sprite colour,

c2 and c3 are the other colours only needed for multicolour Sprites.

OFF n – turn off Sprite number n (1-8).

PLACE n,sx,sy – place Sprite n on the screen at coordinates sx,sy.

sx=graphic x+24,

sy=graphic y+6.

Apart from these commands, which may be used in direct mode or in a program, all four function keys have direct mode operations:

SHIFT F1 (F2) – Save screen.

Followed by a prompt for filename,dev.

SHIFT F3 (F4) – Restore screen.

Prompt as above.

These two routines are equivalent to DUMP and GREAD respectively.

F5 – Equivalent to NORM.

F7 – Equivalent to GRAPH.

These two may also be used whilst the program is running, but whenever any of the program commands are carried out, the Hires screen is automatically switched to so that whatever is being plotted can be seen.

The display format is arranged as in standard hi-resolution graphics with the origin(0,0) in the bottom left corner of the screen.

The plotting of the points with their respective colours is straight forward in standard Hi-res mode, but in multi colour mode, the colour of the point must have either 0, 100, or 200 added to it to specify the 'paintbrush' used.

With the CHAR command, in normal hires mode, the characters appear as normal character size but with a position resolution of 319 by 199. In multi colour mode, however, each character will appear on the screen four times its original size because of the fact that multi-colour points take up two bits of the bit map each. The double size in the y axis is just to make the characters look good on the screen. If the y size was normal the character would look like it had been flattened.

Earlier it was mentioned in the CHAR explanation the choice of four character sets, these are as follows:

- 1) Upper case letters and graphics characters,
- 2) Reverse upper case and graphics,
- 3) Lower case and upper case,
- 4) Reverse Lower case and upper case.

The package is loaded from tape and run. When run, all of the commands are added to the 64. The bottom of basic is then moved to start at \$1D00 (7424) and the residing graphics routines are left below the bottom of basic.

SOUND & VISION

When in graphics mode, bank 2 is selected so that the normal video screen is still as it was and the colour screen is taken from the equivalent video screen in the said bank.

Although all of the commands for normal basic are still available, the video screen has been moved to a different location. Instead of being from 1024 to 2023, the new video screen is from

35840 to 36839 but the colour screen is still at location 55296. This means that any programs written for the original 64 may easily be converted to work with Screen Graphics resident.

The colours used instead of being values 0-15 are instead values 1-16 where the first eight colours correspond to the keys on the keyboard. The other eight colours are the colours available

with the commodore key and the number keys.

A final note about Screen Graphics is that there are only 25K bytes of basic RAM left once the package has been loaded. This is not really a problem considering that the Hi-res screen takes up 8K of memory.

This is a very good package and a must for anyone who wishes to use their 64 to its full graphics capacity.

Multi-Colour sketching for the 64

In the past few months, we have tried to cover most aspects of sound and vision on the 64.

Hi-res graphics principles have been explained for standard hi-res but only a small mention of multi-colour hi-res graphics. To rectify this, following this text is a program that allows the user to choose colours and plot with them using the cursor keys. This program is fairly slow as it is totally in basic, but using machine code plotting routines, the program will work a lot faster.

This program was not written as a utility but was written primarily to

provide usable hires plotting routines for further use.

To use the program, is fairly simple but has to be mentioned as no text can be displayed on the screen. The first thing to do is to choose a colour for each of the 'paintbrushes', this is done by hitting the F1 key. The first of the blocks at the bottom will flash. To move the cursor to the required colour, use cursor right to move it right and cursor down to move it left. Having chosen the right colour, F3 will select that colour. The next keypress will be either 1, 2, or 3 which selects which brush to use.

Repeat this for the other two brushes and when you want to plot on the screen press the key P. To choose which brush to paint in, just hit the corresponding key (0 for unplot). Move the cursor with the corresponding cursor keys. If you wish to change the colours of the brushes, hit RETURN and repeat the process as above.

To exit the program hit RETURN again.

Please remember that this program is slow because of the fact that the point plotting is totally in basic.

READY.

```
1000 REM *****
1010 REM * THIS PROGRAM IS A SKETCHING MULTI- *
1020 REM * COLOUR PALLET. IT ALLOWS YOU TO PLOT *
1030 REM * POINTS ON TO THE SCREEN USING THE *
1040 REM * CURSOR KEYS IN MULTI COLOUR MODE. *
1050 REM * THERE ARE TWO SECTIONS OF THE PROGRAM*
1060 REM * THEY ARE AS FOLLOWS: *
1070 REM *   COMMAND SECTION: IN THIS SECTION, *
1080 REM *   THE USER CAN DEFINE WHICH COLOUR TO *
1090 REM *   WHICH 'PAINT BRUSH', EXIT PROGRAM, OR*
1100 REM *   CHOOSE TO PLOT POINTS. *
1110 REM *   DEFINE COLOURS IS SELECTED BY *
1120 REM *   PRESSING 'F1', MOVE THE CURSOR OVER *
1130 REM *   THE PALLET USING THE KEYS *
1140 REM *   CURSOR RIGHT TO MOVE IT TO THE RIGHT *
1150 REM *   CURSOR DOWN TO MOVE IT TO THE LEFT *
1160 REM *   WHEN THE CURSOR IS IN POSITION, *
1170 REM *   PRESSING 'F3' SELECTS THAT COLOUR. *
1180 REM *   THEN ONE OF KEYS 1,2,3 ARE PRESSED TO*
1190 REM *   SET THAT COLOUR TO THAT BRUSH. *
1200 REM *   THE SECOND SECTION IS THE PLOT *
1210 REM *   TO PLOT POINTS, PRESS THE KEY 'P' *
1220 REM *   POINTS SECTION. *
1230 REM *   A BRUSH MAY BE SELECTED AT ANY TIME *
1240 REM *   BY PRESSING THE CORRESPONDING KEY. *
1250 REM *   THE CURSOR KEYS MOVE THE HIRES CURSOR*
1260 REM *   TO EXIT PLOT MODE, PRESS THE RETURN *
1270 REM *   KEY. *
1280 REM *   TO EXIT THE PROGRAM COMPLETLY, *
1290 REM *   PRESS RETURN WHEN IN COMMAND MODE *
1300 REM * *
1310 REM *****
```



TRY FIGHTING THESE WITH YO



UR BARE HANDS.

Slot "Mutant Herd" into your VIC 20 computer and all of a sudden plutonium-crazed mutants will try to eat you alive.

Keep a look-out for falling boulders. They'll crush you to death at any second.

Avoid these successfully and all you have to do is save the world by destroying the heavily guarded Mutants eggs.

"Orc Attack" (on ATARI 400/800/1200) isn't exactly child's play either.

Imagine yourself standing on the battlements of a castle, defending your Kingdom against an army of ferocious Orcs.

Watch out for the hail of deadly crossbow bolts. You've only got two lives to lose.

And you've only got a few rocks, a sword and boiling oil to defend yourself.

Lose your head and you'll be decapitated.

If your hands aren't sweating after that try our other action packed titles.

There's "Fourth Encounter" (on VIC 20), an exciting new game with 3 skill levels.

The challenging "River Rescue" and "Music Composer" are also on VIC 20.

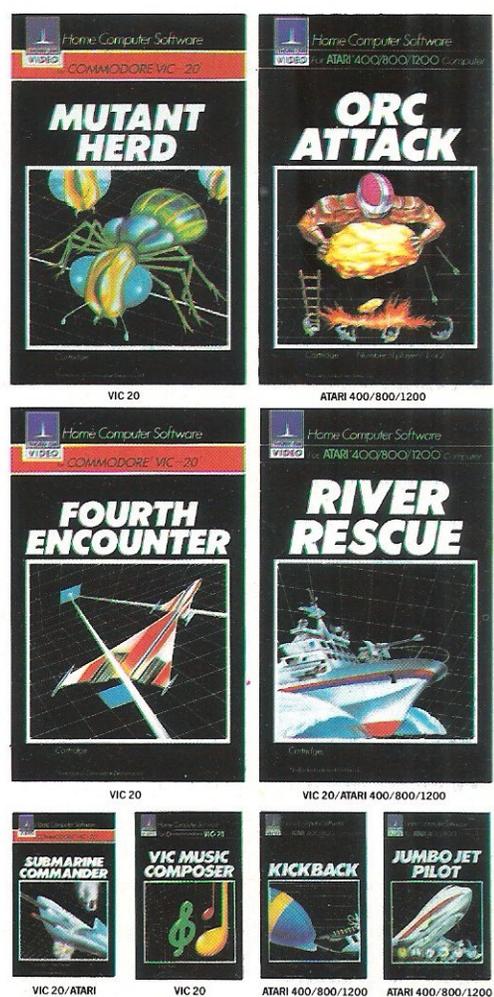
And to make the blood rush to your head the successful "Submarine Commander" is now available on VIC 20.

Or, if you've got ATARI 400/800/1200, there's the anxiety provoking "Jumbo Jet Pilot," as well as the best selling "Submarine Commander," "River Rescue" and "Kickback," all in the shops now.

Buy any one of THORN EMI Computer games and you'll have to fight off all your friends to use it.



The world's greatest computer games.



VIC 20/ATARI 400/800/1200 VIC 20 ATARI 400/800/1200 ATARI 400/800/1200
 PROGRAMS FOR ATARI 400/800/1200 (Trademark of Atari Inc. except where indicated).
 *PROGRAMS FOR COMMODORE VIC 20 (Trademark of Commodore Electronics Ltd.).

SOUND & VISION

```
1320 INPUT "SCREEN COLOUR";N
1340 B=8192
1350 GOSUB 5000
1360 POKE53280,N:POKE53281,N:POKE53265,59:POKE53272,29:POKE53270,216
1370 DEFFNP(ZZ)=B+INT(X/8)*8+INT(Y/8)*320+(YAND7)
1380 DEFFNK(ZZ)=55296+INT(X/8)+INT(Y/8)*40
1390 GOSUB 1970:GOSUB 1870
1400 GETA$:IFA$=""THEN1400
1410 IF A$="■" THEN 1490
1420 IF A$=CHR$(13) THEN 1950
1430 IF A$="0" THEN BR=0
1440 IF A$="1" THEN BR=1
1450 IF A$="2" THEN BR=2
1460 IF A$="3" THEN BR=3
1470 IF A$="P" THEN 1670
1480 GOTO 1400
1490 I=0
1500 Y=192:X=I*16+40
1510 POKE FNK(0),N
1520 FOR J=1 TO 50
1530 GET A$:IF A$<>" "THEN 1550
1540 NEXT J
1550 POKE FNK(0),I
1560 IF A$="M"THEN I=I-1
1570 IF A$="M"THEN I=I+1
1580 IF A$="■"THEN CL=I:POKE FNK(0),I:GOTO 1620
1590 IF I<0 THEN I=0
1600 IF I>15 THEN I=15
1610 GOTO 1500
1620 GET A$:IF A$="" THEN 1620
1630 IF A$="1" THEN COL(1)=CL
1640 IF A$="2" THEN COL(2)=CL
1650 IF A$="3" THEN COL(3)=CL
1660 GOSUB 1870:GOTO 1400
1670 X=XX:Y=YY
1680 GOSUB 10000
1690 GET A$
1700 ON BR+1 GOSUB 10000,11000,12000,13000
1710 IF A$="" THEN 1680
1720 IF A$="0" THEN BR=0:GOTO1680
1730 IF A$="1" THEN BR=1:GOTO1680
1740 IF A$="2" THEN BR=2:GOTO1680
1750 IF A$="3" THEN BR=3:GOTO1680
1760 IF A$="M" THEN Y=Y+1
1770 IF Y>183 THEN Y=183
1780 IF A$="J" THEN Y=Y-1
1790 IF Y<0 THEN Y=0
1800 IF A$="M" THEN X=X+2
1810 IF X>319 THEN X=319
1820 IF A$="M" THEN X=X-2
1830 IF X<0 THEN X=0
1840 IF A$=CHR$(13) THEN XX=X:YY=Y:GOTO 1400
1850 ON BR+1 GOSUB 10000,11000,12000,13000
1860 GOTO 1680
1870 FOR I=1 TO 3
1880 Y=184:X=16*I+48
1890 POKEFNK(0),COL(I)
1900 FOR J=0 TO 7
1910 POKEFNP(0),255
1920 Y=Y+1:NEXT J
1930 NEXT I
1940 RETURN
```

“*practically speaking...*”

Machines:

Commodore 64 · VIC 16K · CBM8000/4000/3000

Programs:

DFM Database

Fully User-definable
Up to 15 fields per Record
Search & Sort on any Field
Select/View/Print/Calculate
Report Generator

DFM Mail Labels

Reads Database Files
Resort/Select to User's specification

DFM Workflow (coming soon £19.50)

Word processor to link with Database

Catalog

Library Filing System
36 Element Records
Cross-referencing
Search/Sort/View/Print

Datalog

Professional/Academic Notebook
Definable 4 Index Reference
Re-orderable 8 Line Text
Replicate & Update
Search/Sort/View/Print

Journal

Financial Diary
Calendar
Re-organise Agenda
Replicate Entries
ID File Recognition
Search with Totals
Monthly Reports

Notes:

Prices include P&P and VAT
All programs are disk and tape compatible,
easy to use and supplied with documentation.
Registered Users receive regular notification
of all new programs and updates.
Fax sheets available on request.

Please supply for : Computer Model

: Disc drive type

: Tape (tick)

Copies	Programs	Price	Value
	DFM Database	£19.50	
	DFM Mail Labels	£ 9.50	
	Journal	£19.50	
	Datalog	£17.50	
	Catalog	£16.50	

I enclose a cheque/PO to the value of £

Name:

Address:

c/c Please send me details of your programs (tick)

“*dialog...*”

Dialog Software

19 Short's Gardens, London WC2H 9AT

Or phone 01-289 6904 for information/Access & VISA orders.

SOUND & VISION

```
1950 POKE53265,27:POKE53272,21
1960 POKE53270,200:POKE53281,6:PRINT"J":END
1970 FORI=0TO15
1980 X=16*I+40
1990 Y=192:POKEFNP(0),I
2000 FORJ=0 TO 7
2010 POKEFNP(0),255
2020 Y=Y+1
2030 NEXT J
2040 NEXT I
2050 RETURN
5000 REM SET UP MULTI SCREEN
5010 FOR I=0 TO 999
5020 POKE I+1024,0
5030 POKE I+55296,0
5040 NEXT I
5050 FOR I=8192 TO 16191
5060 POKE I,0
5070 NEXT I
5080 DEF FNB(ZZ)=INT((7-(XAND7))/2)*2
5090 DEF FNC(ZZ)=INT(X/8)+INT(Y/8)*40+1024
5100 RETURN
10000 REM ROUTINE TO UNPLOT
10010 BI=FNB(0)
10020 LOC=PEEK(FNP(0))
10030 LOC=LOCAND255-2*(BI)
10040 LOC=LOCOR2*(BI+1)
10050 POKE FNP(0),LOC
10060 RETURN
11000 REM ROUTINE FOR BRUSH 1
11010 BI=FNB(0)
11020 LOC=PEEK(FNP(0))
11030 LOC=LOCOR2*BI
11040 LOC=LOCAND255-2*(BI+1)
11050 POKEFNP(0),LOC
11060 POKEFNC(0),(PEEK(FNC(0))AND15)+(COL(1)*16)
11070 RETURN
12000 REM ROUTINE FOR BRUSH 2
12010 BI=FNB(0)
12020 LOC=PEEK(FNP(0))
12030 LOC=LOCAND255-2*(BI)
12040 LOC=LOCOR2*(BI+1)
12050 POKEFNP(0),LOC
12060 POKEFNC(0),(PEEK(FNC(0))AND240)+COL(2)
12070 RETURN
13000 REM ROUTINE FOR BRUSH 3
13010 BI=FNB(0)
13020 LOC=PEEK(FNP(0))
13030 LOC=LOCOR2*(BI)
13040 LOC=LOCOR2*(BI+1)
13050 POKEFNP(0),LOC
13060 POKEFNC(0),COL(3)
13070 RETURN
READY.
```

16K RAM PACK FOR YOUR VIC-20 £27.95 inc VAT

Other products available:-

32K switchable – **£69.95** with free cartridge game (phone for availability). **16K** switchable to **3K** – **£44.95**, **8K** – **£22.95**, **3K** – **£17.95**. Centronics Interface Cartridge – Vicsprint 20 or 64 – **£57.50**. Vicsprint 80 – IEEE serial to Centronics adaptor (fits any Epson printer). Super Expander – **£34.95** with free book – 'Vic Graphics' worth £6.95. SAE for free S/W or H/W lists (state which Micro) & RAM pack/Vicsprint brochure.

All prices include VAT, post and packing £1 per order. All hardware fully guaranteed 1 year.

Send Postal Orders or ring with your Access or Visa number for immediate despatch, or send your cheque.

**RAM Electronics (Fleet) Ltd., (Department VC), 106 Fleet Road, Fleet, Hants. GU12 8PA.
Ring (02514) 5858 Monday to Saturday (closed Wednesday). Callers welcome.**



**YOUR VIC-20 SOFTWARE
CASSETTE HIRE ONLY £1.40 (inc P&P)
per fortnight
CARTRIDGE HIRE ONLY £2.50 (inc P&P)
per fortnight**

MEMBERSHIP FEE ONLY £10.00 FOR 2 YEARS

Send Membership Fee on FULL money back approval or
£1.00 for catalogue and further details, REFUNDABLE
against membership fee upon joining.

**To: VIC-20 USERS SOFTWARE LIBRARY
(Dept. C.C.)
11 NEWARK ROAD,
BREADSALL ESTATE
DERBY DE2 4DJ.**

WORDSHAPER

Word Processor for CBM 8032 + 8050 +
3022/4022/8023
Usual editing facilities +

Powerful form letter facility. Selective printing
using multiple selection parameters.
Local or Global Search with Display, Erase or
Replace, 8 zone text buffer, addressable
individually or collectively, Linked disk files,
Pagination, headers or trailers and many
other features.

**Price inc. manual £50.00
Manual separately £1.50**

**Patrick Walshe, Loughteague,
Stradbally, Laois, Ireland.**

Tidy Directories on the 1541

Keeping directory entries in alphabetic sequence has been no problem on my 4040 disk drive. The copy disk utility would do it every time I took a backup copy of a disk. So it was easy to find names in a disk directory, even a long one, as it scrolled up the screen.

Having added a Commodore 64 and a 1541 disk drive to my collection, I needed some way to rearrange a disk directory. Although the disks are read compatible with 4040 disks, and so can be backed up on the 4040, it is not a good idea to intermix the drives for writing. Generally it works, but occasionally there are difficulties, and files can be corrupted. So this program was born. It is written for the CBM64, but with minor changes will run on a PET with a 4040 disk drive (just delete line 110).

Reading the Directory

The disk drive manual describes the format of the directory entries in track 18. The directory starts in sector 1, and pointers link it to subsequent sectors. They are not adjacent to each other, and so the trail has to be followed by the program. The final sector points to track 0 sector 255 to mark the end of the chain, so the program has to look for this. Each directory sector is read with the U1 command, and then GET# is used to create strings for the directory entries.

Scratched Files

When you scratch a file, the directory entry is not removed. Instead the DOS sets the file type to zero, and all of the other entries stay in their existing slots. Next time you add a file to the disk, the first empty slot in the directory is used for it. New entries will not necessarily go to the end of the list, and so your carefully sequenced list will be spoiled. The disk tidy program only selects entries for properly closed live files, ignores scratched entries, and stops if the file had not been closed properly. When the new directory is created there will be no empty gaps from scratched entries.

Writing the Directory

The well-known Shell sort is used to sequence the file names, and the program gives you the option to group them by file type (PRG, SEQ, USR, REL) if you wish. It then starts at the first directory sector, and rewrites the directory entries, following the original trail, using the U2 command to write the blocks. After the final entry, remaining slots are filled with blanks to the end of the original directory chain. So now when you add files to the disk, they will go at the end of the list.

```

100 rem *****
101 rem * directory tidy 1541/4040 *
102 rem * w.owen murcott 1983 *
103 rem * read / sort / rewrite *
104 rem *****
110 poke53280,15:poke53281,15:printchr10
120 printchr$(14)"Crlf" TIDY DIRECTORY "
130 print"Cdd:Load disk in drive 0. RETURN = ready."
140 getz$:ifz$<>chr$(13)goto140
150 rem *****
151 rem * open files & buffer channel *
152 rem * set up initial parameters *
153 rem *****
160 dn=8:d=0:c2=2:cc=15:t=18:s=0:bp=144
170 opencc,dn,cc,"i0":gosub1000
180 open c2,dn,c2,"#":gosub1000
200 rem *****
201 rem * get disk id : track18/sectr0 *
202 rem *****
210 print#cc,"u1:"c2;d;t;s:gosub1000
220 print#cc,"b-p:"c2;bp
230 id$="":n=20:gosub1030:id$=z$
240 print"Cd:Disk loaded : "id$ " "
300 rem *****
301 rem * set up directory arrays *
302 rem * and sector trail *
303 rem * allow for 19 sectors *
304 rem * allow for 152 entries *
305 rem *****
310 dim sZ(19):rem next directory sector
311 dim ft$(192):rem file type
312 dim ts$(192):rem t&s of first data block
313 dim nf$(192):rem file name
314 dim fe$(192):rem file entries
315 dim sk$(192):rem sort keys
320 dim t$(4)
321 t$(1)="seq":t$(2)="prg":t$(3)="usr":t$(4)="rel"
for blank entries
330 fori=1to30:z0$=z0$+chr$(0):next:rem
350 rem *****
351 rem * read directory entries *
352 rem *****
360 s=1:rem start sector
370 e=1:rem start file entry
380 print#cc,"u1:"c2;d;t;s:gosub1000:bp=1

```

DISK USER

```
390 print#cc,"b-p:";c2;bp;gosub1100;sZ(s)=a;rem get next sector
400 print#cc,"b-p:"c2;bp;gosub1100;ft=a;rem get file type
410 ifft=0orft=128thenbp=bp+31;goto500;rem blank entry
420 ifft<128 thenprint"<Cd> FILE ERROR Not closed";goto999
430 ft$(e)=a$
440 n=2;gosub1040;ts$(e)=z$;rem get t&s
450 n=16;gosub1040;nf$(e)=z$;rem get name
460 n=11;gosub1040;fe$(e)=z$;rem get file entries
470 rem *****
471 rem * print directory entry *
472 rem *****
480 print,"      "nf$(e)" : "t$(ft-128)
490 bp=bp+2;e=e+1
500 ifbp<256goto400;rem for next entry
510 ifsZ(s)<255thens=sZ(s);goto380;rem next sector
520 gosub1130;rem get ok to continue
530 e=e-1;ife=0goto730;rem directory is empty
540 print"Group by file type ? (y/n)
550 getz$;ft$=z$;ifz$="y"goto570
560 ifz$<"n"goto550
570 rem *****
571 rem * set sort keys *
572 rem * sort directory entries *
573 rem * uses shell sort *
574 rem *****
580 print"<Cd>Sorting ..."
590 fori=1toe;k=16
600 forj=1to16;ifmid$(nf$(i),j,1)=chr$(160)thenk=j-1;j=16
610 nextj;sk$(i)=left$(nf$(i),k)
620 ifft$="y"thensk$(i)=ft$(i)+sk$(i)
630 nexti;m=e
640 m=int(m/2);ifm=0goto730
650 k=e-m;j=0
660 ifj>kgoto640
670 i=j
680 ifi<0goto700
690 ifsk$(i+m)<sk$(i)goto710
700 j=j+1;goto660
710 a$=ft$(i);ft$(i)=ft$(i+m);ft$(i+m)=a$
711 a$=ts$(i);ts$(i)=ts$(i+m);ts$(i+m)=a$
712 a$=nf$(i);nf$(i)=nf$(i+m);nf$(i+m)=a$
713 a$=fe$(i);fe$(i)=fe$(i+m);fe$(i+m)=a$
714 a$=sk$(i);sk$(i)=sk$(i+m);sk$(i+m)=a$
720 i=i-m;goto680
730 rem *****
731 rem * write directory entries *
732 rem *****
740 print"<Cu>Writing ... : "id$ "
750 z$=chr$(0)+chr$(255);rem to terminate directory chain
760 s=1;n=1;rem start sector
770 print#cc,"u1:"c2;d;t;s;gosub1000;rem read directory sector
780 bp=2;rem first entry
790 ifn>egoto890;rem no more live entries
800 ifbp<256goto840;rem not yet full
820 print#cc,"u2:"c2;d;t;s;gosub1000;rem write directory sector
830 s=sZ(s);goto770;rem next sector
840 print#cc,"b-p:";c2;bp;rem set pointer to next entry
850 print,"      "nf$(n)" : "t$(asc(ft$(n))-128)
860 print#c2,ft$(n);ts$(n);nf$(n);fe$(n);;rem directory entry
870 bp=bp+32;n=n+1;goto790
890 ifbp>255goto930;rem full sector
```

BANKING ON PET

1. RECONCILIATIONS
2. AUTOMATIC INCLUSION OF STANDING ORDERS
3. CARRY FORWARD OF UNCLEARED ITEMS
4. PRINTING FACILITIES

£19.95 or s.a.e. for details

ROXSOFT LIMITED
166A HIGH STREET
HOUNSLOW
MIDDLESEX
UB2 5QT

*Please state model(s) and
 disk/cassette.*

SOLE UK DISTRIBUTORS OF SOLIDUS SYSTEMS COMPLETE RANGE OF SOFTWARE

also supply a comprehensive range of vertical market and bespoke software.
 Full systems supplied including hardware and after sales maintenance on a truly National basis.

Why not call us to check our prices and the full range of services available?

Impact Microcomputer Services Ltd
Micro House, Station Approach
Mansfield Road, Alfreton
Derbyshire DE5 7JR
0773-831547

COMPLETE SYSTEMS - COMPLETE CARE

MASTER

MASTER is a totally new concept... a complete package for program development. Used by top professionals in the USA and Europe, MASTER has everything you need to write your own software, to the highest professional standards... up to 85 new commands that work with CBM Basic IV... and just one command can replace whole paragraphs of Basic code. That's why Master is...

a new concept in CBM Basic

MASTER has 17 DISK HANDLING commands (both keyed and sequential access, masked retrieval, batch operation, existence tests, etc)... 12 INPUT MANAGEMENT commands (input/output screen zones, with alpha, numeric and date formatting, etc)... 8 SCREEN MANAGEMENT commands (with screen pages loadable from disk or memory)... 10 commands for REPORT MANAGEMENT (with disk-loadable report formats)... 18 BUSINESS BASIC commands (with 20-place arithmetic, data compression, automatic date control etc)... and on the CBM 8096, all the features of PM96 (46K for programs, 26K for variables, as well as 17 BASIC UTILITY commands).

MASTER supports the CBM 8032/8096, 8032+CP/MAKER, and 4040/8050/8250 floppy disks, plus CBM 9060/9090 hard disks, and is supplied with a User Reference Manual, Quick Reference Guide, Demo Disk, and with a key for either cassette port. Supplementary RUN-TIME keys are available for multiple users and software houses.

PM 96

At last you can program the full capacity of the CBM 8096, with 53K for programs (up to 15 simultaneously) and 26K for variables (maintained even while editing or loading)... and use 17 new Basic commands as well, including all the TOOLKIT commands, plus PRINT USING, IF-THEN-ELSE, STOP KEY disable, HARDCOPY screen dump, CALL, FETCH, PLOT (50 by 150), WINDOW, and more. PM96 comes with a User Reference Manual, Quick Reference Guide, Disk with demo programs, and UD11 Support Rom.

Superscript

is the ultimate CBM wordprocessor! Wordpro-compatible (except for price)... with up to 20,000 characters of text, and 240 characters screen format... and no Roms or dongles to instal! SuperScript has been adopted by Commodore for their new models... and is now joined by SUPERSPELL, a 30,000 word disk dictionary, which easily verifies the largest Superscript (or Wordpro) document in 80 seconds... and user-defined words can be added. SUPERScript and SUPERSPELL suit most CBMs, disks and printers, and letter-quality printers.

These are just three fine products from our CBM/PET range... please telephone or write for our comprehensive data sheets:

MASTER Program Development System	£300.00
MASTER Additional run-time keys	£45.00
PM96 96K Memory Management/Basic Enhancement	£99.50
SUPERScript The Ultimate CBM Wordprocessor	£249.00
SUPERSPELL Disk Dictionary/Spelling Checker	£150.00
VIC SCREEN Screen management/Dos Support etc.....	£49.50
KRAM Keyed Disk Access (state which disk)	£86.95
COMMAND-O (for Basic IV, state which Pet)	£59.95
DISK-O-PRO (Adds Basic IV etc to Basic II)	£59.95
SPACEMAKER 4-Rom adaptor (not for 8096)	£29.95
VISICALC 32K/96K RRP £180.00, less £35.00	£145.00

ORDERING INFORMATION: Add 15% VAT to quoted prices. Order by post, telephone or Prestel, using cheque, ACCESS or BARCLAY card. For same-day service, telephone 01-546-7256. For over-the-counter sales, see your Commodore Dealer. (Ref AD10)

Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY, KT2 7QT. TEL 01-546-7256

DISK USER

```
900 print#cc,"b-p: ";c2;bp
910 print#c2,z0$;rem blank entry
920 bp=bp+32;goto890
930 bp=0;print#cc,"b-p: ";c2;bp
940 print#c2,z$;rem end of directory chain
950 print#cc,"u2:"c2;d;t;s;gosub1000;rem write directory sector
960 z$=left$(z0$,2);rem blanks for further chains
970 s=sZ(s);ifs=255goto999;rem finished
980 print#cc,"u1:"c2;d;t;s;gosub1000;rem read empty directory sector
990 bp=2;goto900;rem to clear out sector
999 closec2;closecc;end
1000 rem *****
1001 rem * input error channel status *
1002 rem *****
1010 input#cc,en,em$,et,es;ifen=0thenreturn
1020 print"Cls> DISK ERROR "en;em$;et;es;goto999
1030 rem *****
1031 rem * get n characters *
1032 rem * from buffer *
1033 rem *****
1040 z$=""
1050 fori=1ton;gosub1100
1060 z$=z$+a$;next;return
1100 rem *****
1101 rem * input from buffer *
1102 rem *****
1110 get#c2,a$;ifa$=""thena$=chr$(0)
1120 a=asc(a$);bp=bp+1;return
1130 rem *****
1131 rem * get ok to continue *
1132 rem *****
1140 print"Cd>OK to continue ? (y/n)
1150 getz$;ifz$="n"goto999
1160 ifz$<>"y"goto1150
1170 print"Cu>                                <Cu>;return
```

A COMPUTING INTEGRATOR

Part One

Chromatography is perhaps the most widely used tool in analytical chemistry. It is used for separating individual components from a complex mixture. Thus it is employed for identifying and quantifying compounds. Chromatography equipment will be found in laboratories ranging from those of water authorities and breweries to those involved in medical research and genetic engineering.

Chromatographic separation depends on how compounds react as they pass dissolved in a moving or mobile phase (e.g. water) over a stationary phase (e.g. silica). It is mainly the physico-chemical properties of the separating molecules, such as their solubility in the mobile phase and their absorption onto the surface of the stationary phase, that dictates how they will move and separate. At its simplest level, a drop of blue ink on blotting paper will separate into rings of its component colours. In the same way a hydrolysed protein can be made to separate into its component amino acids by passing the mixture through a tube containing suitable packing material.

Amazing advances have been recently made possible by developments in the manufacture of stationary phase, improvements in both the composition and mode of transport of the mobile phase and in the design of detectors. These days it is possible to separate and purify practically any compound into a pure molecular species. If a mass spectrometer is used as a detector then a compound's atomic composition and even its molecular structure can be computed – and all on a few micrograms of sample!

Two main types of chromatography – Gas and Liquid (indicating the state of the mobile phase) are used. Often one hears people talking about GLC and HPLC. Gas – liquid chromatography (GLC) has the stationary phase as a liquid film (wax) covering a solid surface. HPLC refers to high pressure liquid chromatography where the liquid phase is pumped at high pressure (many hundreds of atmospheres) over a very fine stationary phase (particles may be only a few microns in diameter). Both types of chromatography have a tube or column through which the mixture is passed. The detector is at the outlet (Figure 1).

Most laboratories have a chart recorder connected to the output of the

chromatograph. Figure 2 shows a typical tracing. The deflection of the pen is related to the concentration of compound emerging from the column. But how do we know how much is there? We could simply measure the heights of the peaks, but substances diffuse as they pass along the column. Peaks on the column for a long time (long retention time) are more spread out. It is therefore the *integrated* detectors response during the emergence of the peak that relates to the component's mass.

One can simply cut the little peaks out from the recording paper and weigh them. This is inaccurate and time-consuming. It's a disaster too if the signal goes out-of-range or one happens to sneeze at the wrong time!

The solution is to use an electronic integrator. This automatically reports the area under each peak. But what exactly does the analyst require? The analyst wants not only to be able to identify his compounds, but also to quantify them. Identification is normally done with reference to a compound's retention time. Under stable conditions, compounds remain on the column for a set time – the retention time – and this can be used for identification. Standards (made from mixtures of pure known substances) are employed not only for defining retention times, but also for quantification.

Blood alcohol analysis is a good example. Here an extract of the blood is put into a gas chromatograph. The alcohol (ethanol) volatilizes and separates as a discrete peak on the recorder (Figure 2). The retention time is known. Beforehand, however, a small amount of a different alcohol (propanol) was added to the blood to give a very precise concentration. This gives rise to the second peak in Figure 2. Clearly, by relating the peak area of the ethanol to that of the propanol we can estimate the blood alcohol in milligrams per hundred millilitres of blood.

Exactly what the analyst (and police!) need to know. The sort of integrator that the analyst requires, therefore, is one that not only integrates, but is capable of making 'time windows' for retention times which are then given a chemical name. It should also have the capacity of working out concentrations based on internal standard (as above) or external standard. The Reader will realize how simple this task is for a microcomputer!

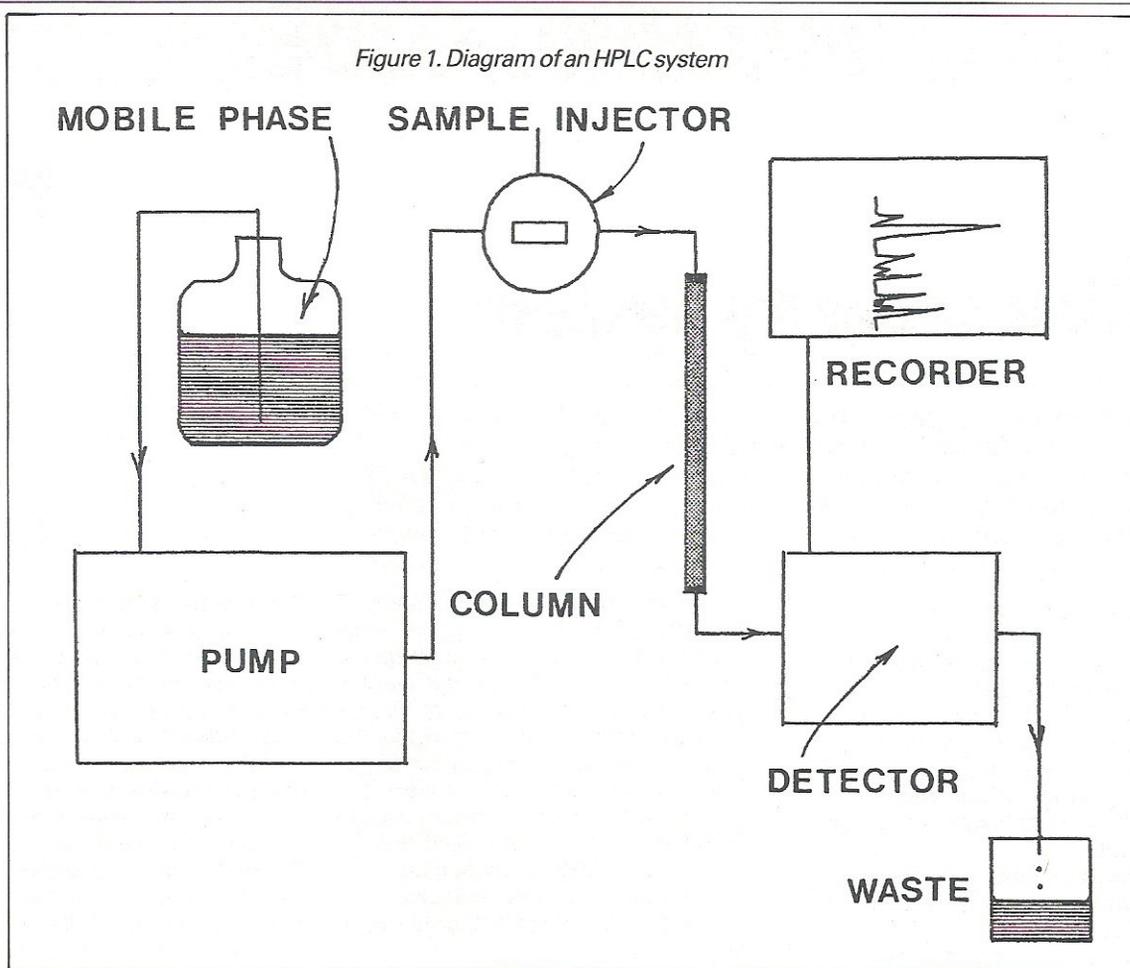
Indeed, there has been a move towards interfacing basic digital integrators (which report just areas and retention times) to computers like the Commodore PET and APPLE. This is quite costly because it involves purchasing an RS232 (teletype) board for the integrator, and then another interface for the computer (e.g. RS232/IEEE-488). Dedicated integrators which have computing capability (i.e. with a BASIC interpreter) can be very expensive. So how about getting a microcomputer to integrate? What are the problems?

The most important requirement of an integrator is that it does its job with great accuracy and precision. Integrators conventionally use a voltage to frequency converter and the string of pulses are counted. Another approach is to use an analogue to digital converter (ADC). To give the required accuracy their needs to have at least 12 bits resolution (i.e. 1 in 4096). It should also operate as a true integrating converter, rather than the successive approximation type. But chromatographers require a wide dynamic range – some peaks are very small, yet others may be large. So the ADC needs an amplifier whose gain can be under software control. An eight-stage programmable attenuator would give us ranges of: –

x 128, x 64, x 32, x 16, x 8, x 4 and 1.

We can see now how to design our hardware. If we are using a PET (as this article describes) then it would be nice to have the ADC on the IEEE-488 bus, or on the memory expansion port, leaving the parallel user port free.

The software is a different matter. Obviously it has to take in the digital data, possibly at rates of up to 20 Hz. For an IEEE device handled by BASIC, the data acquiring routine alone might not work faster than this! Therefore we either have the option of integrating in



real time by machine-code, or, after the run has finished, by PEEKing the (stored) data out of memory locations and doing a post-run analysis using BASIC.
End of Part One.

Part Two

Describes integration programming details for the PET microcomputer.

The sample is injected using the manifold at A. This will normally be dissolved in the mobile phase. The pump forces the sample under high pressure through the separating column which contains the stationary phase.

As the solvent emerges from the end of the column it passes along a narrow UV tube to the detector. This is often a UV detector which senses the absorption of light. A positive response occurs when a separated component crosses the light beam and is shown on the recorder. An integrator's task is to measure the area under each peak.

Four analyses are shown (1,2,3,4). Two main peaks can be seen, one of these is due to alcohol, presumably consumed by the subject, the second (larger) peak is another alcohol (propanol) used as an internal standard which was purposely added to the sample before analysis. By comparing the areas of the two peaks one can calculate the blood alcohol/ concentration.

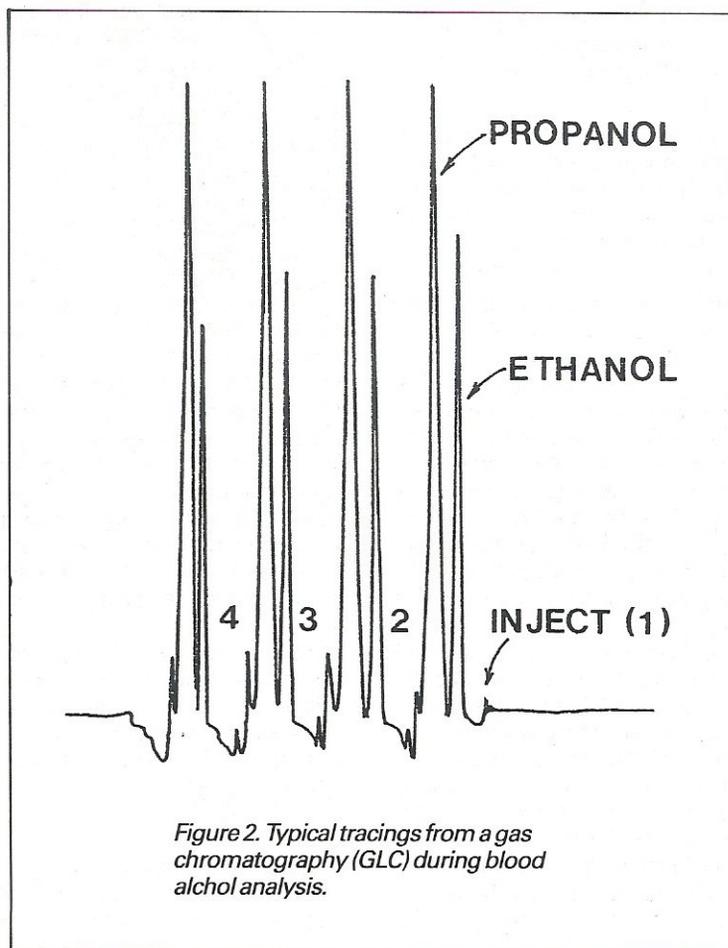


Figure 2. Typical tracings from a gas chromatography (GLC) during blood alcohol analysis.

A Disk Security System

A few months ago I decided to while away some time by developing a system that would provide a small degree of protection against the unauthorised casual copying of disk-based software. I set myself the task of writing a simple-to-use utility that would be capable of producing a fortified version of a user's program on diskette. The following goals were defined:—

- 1) Inhibit duplication of a disk by the BACKUP command.
- 2) Detect and react appropriately to the following situations:
 - i) Attempted execution of an unauthorised copy of a program
 - ii) Attempted program 'break-in' using the hardware reset.
 - iii) Planned, or inadvertent program halt.
- 3) Protect the user program against perusal by specially written dump utilities.
- 4) Force the user program into execution upon loading.
- 5) Incorporate features concealing the utility's own workings.
- 6) Minimise the need for user-program changes.

To a greater or lesser extent all of the above design criteria were met, and in this article I will try to explain most of the techniques that were developed to provide the required software protection.

The first problem addressed was that of preventing a disk being duplicated via the standard BACKUP command. To do this is fairly simple, but it should be stated that the technique to be described will only work on disk units running under DOS 2.1 or later. Although simple, the technique is quite effective and relies on the fact that many DOS directives, including the BACKUP command, are sensitive to disk formats. If the disk operating system (DOS) is fooled into believing, for example, that a 4040 formatted diskette is really a 3040 diskette then it will refuse to service the BACKUP command. To understand why this is so, one needs to know that every formatted diskette has a byte in the header block which has a code reflecting the DOS and unit type under which the diskette was HEADERed. By tweaking the format identifier in the header block, we can disguise the disk's true format. Not only will said tweak cause the DOS

to reject any subsequent BACKUP command, but also, any further write requests will be rejected and disappear in a puff of red LEDs. The fact that the disk cannot be written to, means that it is not a straightforward task to restore the disk to its original format, which is just fine from a security point of view. The short program in listing 1 can be used to massage the format of a 4040 diskette into that of a 3030, but remember once the program has been executed your disk will be locked against further write operations.

Of course preventing BACKUPS from being made does not stop somebody from using the COPY command to duplicate a program. So what can be done about that? Frankly, not a lot! It is practically impossible to disable the COPY command, but what we can do, is to provide a means of detecting that a COPY has been made and then take appropriate action. For the purpose of my own experiments, I decided to use a primitive labelling technique, which made use of one of the free bytes that can be found in the header block. By writing a special value into a selected free byte, I could effectively software label a diskette. Later, a simple test could be made by reading the label byte back. Obviously if the byte did not contain the label value then it would indicate that a labelled diskette was not being read. The program shown in listing 2 should give a fairly good idea of how the software labelling and verification technique works.

So, having provided a little protection against BACKUP and COPY, the next problem to tackle was detecting deliberate or accidental program halts. Take a look at the following one-line public domain program:—

```
10 GOTO 10
```

The effect of running this program will be to put the machine into an endless spin, until halted by a depress-

ion of the RUN/STOP key.

Many programmers, as a security measure, include code in their programs to disable the RUN/STOP key and so force the user to power-off the machine when finished with the program, thus ensuring that the program cannot be copied. However, it is possible to stop any program's execution with the contents of memory maintained intact. The ROM-resident operating system, in fact, has code to support a forced program break-in. Briefly, a program can be halted by first grounding the diagnostic sense pin on the user port and forcing a hardware reset. This can be done by getting under the bonnet of the machine with a couple of pieces of wire, although a more elegant and safe approach is provided by commercially available reset boxes. What this all means, is that whatever steps are taken to, say, force automatic program execution with the stop key disabled, the user still has a way of halting the program, regaining control of the machine, and examining and saving the contents of memory. That is unless we do something to stop the young boy. Probably the most effective way of putting paid to reset boxes and the like is to modify the clock interrupt routine to include a test on the status of the diagnostic sense pin. For those of you not familiar with the internal workings of the PET's operating system, every $\frac{1}{60}$ th of a second, an interval of time which is sometimes referred to as a jiffy, any active program is suspended and a routine in ROM is given control. The routine performs various 'housekeeping' tasks, like blinking the cursor, updating the system clock (variable TIS), and scanning the keyboard for keystrokes. After completion of this 'interrupt activity', as it is called, control is returned to either the BASIC input routine or to the user program, whichever was active when the clock interrupt occurred. It is beyond the scope of this article to discuss

MACHINE CODE

interrupt handling in detail, suffice to say that it is possible to extend the jiffy clock interrupt routine to include user own-code. If you take a look at listing 3, you will find a routine that demonstrates how a small piece of code can be added to the interrupt routine to provide a check on the diagnostic sense pin status.

For those who do not have access to a reset box and are fearful of messing around with the innards of the machine with bits of wire in hand, I have provided a simple simulation of the diagnostic sense pin by turning the RUN/STOP key on the keyboard into a pseudo diagnostic sense pin. If pressed, the RUN/STOP key will yield the same result as if someone had attempted to use a reset box, i.e. a splodge will be displayed near the top of the screen.

The program in listing 3 can also be used to show how an interrupt routine can be used to monitor and trap a halt of program execution. The trap developed is particularly useful because it will catch any program halt, whether caused through an error, dropping to the end of program, or because the user responded with a RETURN in reply to an INPUT directive. The trap is actually sprung any time the BASIC 'READY' message is displayed, and that includes those occasions when the user returns to BASIC from the machine language monitor via an 'x' command. How does it all work? Well, as a result of some experimentation, I discovered that whenever the 'READY' message appears, there are 4 bytes in PAGE ZERO that wind up containing 4 specific values. The bytes in question are \$5F, \$60, \$6C and \$6E: When BASIC is given control, and displays 'READY', those bytes contain \$12, \$B3, \$12, and \$1A respectively. So by continuously moni-

toring the contents of the 'READY' bytes in the interrupt routine it is possible to detect when a program has halted. It is then a relatively simple matter to place the machine into a state of graceful quiescence!

The next technique I would like to describe is that of getting a program to automatically RUN when loaded. The method I developed for this is given, I admit somewhat obscurely, in listing 4. Again, interrupts play an important role, and the automatic RUN is achieved by overwriting some of the zero-page locations with a small 'BOOTSTRAP' routine. To force control to be given to the BOOTSTRAP, the IRQ interrupt vector is overwritten. Normally, the IRQ vector, which is located at \$90/\$91, points to \$E455 (BASIC 4.0). When the BOOTSTRAP routine is loaded, it overwrites location \$91 with zero, effectively changing the IRQ vector address to \$0055. The next interrupt that occurs gets routed to \$0055, which of course is the start of the BOOTSTRAP routine! From there, the BOOTSTRAP loads the user's program simply by reducing the filename (the BOOTSTRAP'S) by one character and performing a load from disk. Once the user's program has been loaded, PAGE ZERO is restored to a working state, and the BOOTSTRAP then exists by passing control to the loaded program. A more sophisticated version of the BOOTSTRAP than that shown in listing 4 has been developed to handle decoding of encrypted program code. The encryption by the way is achieved through exclusively ORing the user's program with a page of ROM bytes.

On the subject of concealing the workings of system, there is one technique worth experimenting with.

Essentially, it involves liberally sprinkling the code routine with non-implemented machine codes. Some of the unimplemented codes actually perform skips of one, two, or three bytes, depending on the code used, without altering any of the registers, stack, or status bits. The codes also have the useful property of playing absolute havoc with the average disassembler!

Well, that just about covers most of the main techniques that were employed in the fortification utility. Having read this article, many readers will be forgiven for harbouring the thought that the author has decremented his marbles count by revealing information that only has worth if kept secret. However before dismissing too lightly the wisdom of publishing my techniques, the following points should be noted. Firstly, faith in software security on stand-alone micros is for those who believe in Father Christmas, perpetual motion machines, and a benevolent chancellor. In short, there ain't no such thing as a secure program for a micro. Dongles, security rooms, specially formatted disks, and encrypted programs have all been tried and have all been broken. In spite of this, there are companies which sell expensive packages and claim that their products are capable of preventing the user's software from being pirated. The claims are false, and the companies making them may find themselves facing another sort of claim from the user—one for damages.

The second point to make is that the techniques described in this article are fairly simple, but may prompt others to do further experimentation and develop the methods described a little further. Although it is not possible to provide 100% security on the existing hardware, we should still try to keep folk honest!

By Danny Doyle

LISTING 1

```
100 : GOTO 220
110 : CHANGE HEADER BLOCK VERSION BYTE SO THAT
120 : ATTEMPTED BACKUP COMMANDS WILL FAIL.
130 : AS A SIDE EFFECT, DISK BECOMES WRITE-PROTECTED.
140 :
150 : AUTHOR: DANNY DOYLE
160 : DATE: MARCH '83
170 :
```

MACHINE CODE

```
180 : *****
190 : * WARNING - ASSUMES DISK IS IN DRIVE 0 *
200 : *****
210 :
220 OPEN 15,8,15 :REM OPEN COMMAND CHANNEL
230 OPEN 10,8,10,"#" :REM OPEN BUFFER FOR BLOCK I/O
240 PRINT#15,"U1:10,0,18,0" :REM READ HEADER BLOCK
250 PRINT#15,"B-P:10,2" :REM POSITION TO VERSION BYTE
260 PRINT#10,CHR$(1); :REM T W E A K !
270 PRINT#15,"U2:10,0,18,0" :REM WRITE BACK HEADER BLOCK
280 CLR :REM CLOSE ALL OPEN FILES
290 OPEN 15,8,15,"I0" :REM FORCE BAM UPDATE
300 CLOSE 15 :REM CLEAN UP
310 PRINT" NORMAL TERMINATION" :REM QUIT
320 END
330 :
340 :
350 :
```

LISTING 2

```
100 : GOTO 200
110 : LABEL BYTE NUMBER 186 IN THE HEADER BLOCK WITH
120 : A SHIFTED SPACE ( CHR$(160) ).
130 :
140 : AUTHOR: DANNY DOYLE
150 :
160 : *****
170 : * WARNING - ASSUMES DISK IS IN DRIVE 0 *
180 : *****
190 :
200 GOSUB 350 :REM PERFORM LABEL CHECK
210 OPEN 15,8,15 :REM OPEN COMMAND CHANNEL
220 OPEN 10,8,10,"#" :REM OPEN BUFFER FOR BLOCK I/O
230 PRINT#15,"U1:10,0,18,0" :REM READ HEADER BLOCK
240 PRINT#15,"B-P:10,186" :REM POSITION TO FREE BYTE
250 PRINT#10,CHR$(160); :REM LABEL THE DISK
260 PRINT#15,"U2:10,0,18,0" :REM WRITE BACK HEADER BLOCK
270 CLR :REM CLOSE ALL OPEN FILES
280 OPEN 15,8,15,"I0" :REM FORCE BAM UPDATE
290 CLOSE 15 :REM CLEAN UP
300 GOSUB 350 :REM PERFORM LABEL CHECK
310 PRINT" NORMAL TERMINATION" :REM QUIT
320 :
330 : LABEL CHECKER
340 :
350 OPEN 15,8,15 :REM OPEN COMMAND CHANNEL
360 OPEN 10,8,10,"#" :REM OPEN BUFFER FOR BLOCK I/O
370 PRINT#15,"U1:10,0,18,0" :REM READ HEADER BLOCK
380 PRINT#15,"B-P:10,186" :REM POSITION TO LABEL BYTE
390 GET#10,LABEL$ :REM READ THE LABEL
400 PRINT "DISK HAS "; :REM REPORT LABEL STATUS
410 :
420 IF NOT ( ASC(LABEL$) = 160 ) THEN PRINT "NOT YET ";
```

MACHINE CODE

```
430 PRINT "BEEN LABELLED."  
440 CLOSE 10 : CLOSE 15 : REM CLEAN UP  
450 RETURN : REM RETURN  
460 :  
470 :  
480 :
```

LISTING 3

```
100 : GOTO 250  
110 : ROUTINE TO DEMONSTRATE HOW PROGRAM BREAK-INS  
120 : CAN BE DETECTED AND ACTED UPON. AN EXTENSION  
130 : TO THE CLOCK INTERRUPT HANDLER IS SITED IN  
140 : THE SECOND CASSETTE BUFFER. THE EXTENSION  
150 : PROVIDES A CONTINUOUS MONITOR OF THE DIAGNOSTIC  
160 : SENSE PIN, RUN/STOP KEY, AND PROGRAM STATUS.  
170 : A SPLODGE ( CHR*(255) ) IS DISPLAYED CONTINUOUSLY  
180 : IF THE PROGRAM HALTS, OR INTERMITTENTLY IF THE DSP  
190 : OR RUN/STOP KEY IS ACTIVATED. SPLODGE ACTION COULD  
200 : BE UPGRADED TO PROVIDE QUICK BUT GRACEFUL QUIESCENCE!  
210 :  
220 : AUTHOR: DANNY DOYLE  
230 : DATE: MARCH '83  
240 :  
250 DATA 120 , 169 , 68 , 133 , 144 , 169 , 3 , 133  
260 DATA 145 , 96 , 32 , 234 , 255 , 173 , 16 , 232  
270 DATA 16 , 30 , 165 , 155 , 201 , 239 , 240 , 24  
280 DATA 165 , 95 , 201 , 18 , 208 , 23 , 165 , 96  
290 DATA 201 , 179 , 208 , 17 , 165 , 108 , 201 , 18  
300 DATA 208 , 11 , 165 , 110 , 201 , 26 , 208 , 5  
310 DATA 169 , 255 , 141 , 255 , 128 , 169 , 255 , 133  
320 DATA 155 , 76 , 88 , 228 , 234  
330 :  
340 FOR I= 826 TO 886  
350 READ N  
360 POKE I,N : REM BUILD INTERRUPT HANDLER  
370 NEXT I  
380 :  
390 SYS 826 : REM INITIALISE INTERRUPT HANDLER  
400 :  
410 PRINT "ATTENTION" <---- WATCH WHEN STOP KEY PRESSED"  
420 PRINT " OR RESET BOX IS USED  
430 PRINT " TO STOP PROGRAM ENTER %"  
440 GET A$  
450 IF A$ <> "%" THEN 410  
460 PRINT"TRY TO CLEAR SCREEN."  
470 PRINT"BUT IT WILL NEVER BE CLEAN."  
480 PRINT"THE SPLODGE WILL REMAIN"  
490 PRINT"UNTIL RUN AGAIN."  
500 END  
510 :  
520 :  
530 :  
READY.
```

MACHINE CODE

LISTING 4

```
100 :                                                                 GOTO 220
110 : ROUTINE TO CREATE A BOOTSTRAP LOADER FOR ANY BASIC PROGRAM.
120 : AFTER EXECUTION A PROGRAM CALLED 'B#STRAP' WILL HAVE BEEN
130 : CREATED.
140 : USER-PROGRAM SHOULD BE RENAMED WITH LAST CHARACTER DROPPED.
150 : B#STRAP SHOULD BE GIVEN THE ORIGINAL USER-PROGRAM NAME.
160 : AUTOMATIC EXECUTION OF PROGRAM WILL THEN OCCUR IF USER-PROGRAM
170 : IS LOADED SPECIFYING ORIGINAL NAME.
180 :
190 :   AUTHOR: DANNY DOYLE
200 :   DATE: MARCH '83
210 :
220 DATA 76 , 115 , 195 , 8 , 0 , 91 , 22 , 0
230 DATA 19 , 4 , 0 , 0 , 50 , 0 , 20 , 32
240 DATA 0 , 128 , 0 , 22 , 19 , 0 , 8 , 18
250 DATA 179 , 0 , 146 , 0 , 18 , 96 , 210 , 176
260 DATA 5 , 233 , 206 , 32 , 22 , 0 , 85 , 32
270 DATA 1 , 4 , 178 , 5 , 178 , 5 , 178 , 5
280 DATA 0 , 120 , 254 , 127 , 0 , 120 , 165 , 202
290 DATA 133 , 43 , 165 , 201 , 133 , 42 , 32 , 233
300 DATA 181 , 32 , 182 , 180 , 169 , 0 , 133 , 98
310 DATA 133 , 99 , 133 , 100 , 133 , 101 , 76 , 74
320 DATA 183 , 76 , 31 , 0 , 19 , 169 , 228 , 133
330 DATA 145 , 198 , 209 , 230 , 120 , 169 , 0 , 133
340 DATA 150 , 32 , 113 , 243 , 200 , 208 , 138 , 255
350 DATA 0 , 0 , 0 , 0 , 0 , 0 , 14 , 179
360 DATA 230 , 119 , 208 , 2 , 230 , 120 , 173 , 2
370 DATA 4 , 201 , 58 , 176 , 10 , 201 , 32 , 240
380 DATA 239 , 56 , 233 , 48 , 56 , 233 , 208 , 96
390 DATA 128 , 79 , 199 , 82 , 134 , 0 , 9 , 169
400 DATA 85 , 0 , 120 , 212 , 255 , 179 , 64 , 13
410 DATA 0 , 95 , 2 , 255 , 0 , 170 , 256
420 :
430 OPEN 10,8,10,"@:B#STRAP,P,W"
440 PRINT#10,CHR$(0);CHR$(0);
450 READ N
460 IF N <> 256 THEN PRINT#10,CHR$(N); : GOTO 450
470 CLOSE 10
480 PRINT "NORMAL TERMINATION"
490 END
500 :
510 :
520 :
```

BUSINESS AND PLEASURE ON THE 64!

The Commodore 64 is the ideal machine to combine business with pleasure. It has a typewriter keyboard and lots of memory — ideal for word processing or financial planning — plus some rather clever colour and sound chips that are just what you need for realistic arcade action.

BUSICALC is just the program for those who need to juggle with figures. You could use it to plan your household finances or your personal tax — but it's equally capable of handling much larger figures. If you've got a printer you'll be able to produce reports that are good enough to put before the board (or the bank manager) — but a printer isn't necessary, and neither is a disk drive. BUSICALC costs just £39 plus VAT on tape, or £40.50 on disk; there are versions at the same prices for the PET and VIC-20 (with 16k expansion).

The best word processor you can buy for the 64 is VIZAWRITE. The first thing you'll like is being able to use it right away — you won't have to re-read the manual ninety-four times to find out how to get started. The next is the wide range of printers you can use from the VIC printer to a Diablo or Qume — plus many others in between (like the Epson). Virtually any parallel printer can be operated off the User Port for the price of a simple cable, and features such as underlining, superscripts, subscriptions, and emphasised printing are easily accessed. Formatting on screen means that you can see the text as it will print before it prints — and this isn't the only resemblance between VIZAWRITE and dedicated word processing stations costing £10,000 or more. VIZAWRITE costs a mere £69 plus VAT on disk; a tape-based version should be available very soon.

MIKRO ASSEMBLER plugs into the cartridge port of the 64. As PET and VIC owners are already well aware, MIKRO makes writing machine code programs almost as easy as Basic, because it is a real assembler with LABELS. To help you write your program MIKRO has AUTO, DELETE, and FIND commands; to help you debug it there's a machine code monitor; and you can DISASSEMBLE from Basic or in the monitor! The TABLE commands displays or prints an alphabetically sorted symbol table after assembly — which is really fast (MIKRO will assemble 2k of code in just 20 seconds). If you are writing more than (say) 4k of code you may have to split your source code into several files, but MIKRO will automatically link these together at assembly time, loading them from tape or disk as appropriate. The MIKRO module costs £50 plus VAT; it could be the best investment you ever make.

With ARROW installed in your 64 the Commodore cassette unit LOADS AND SAVES PROGRAMS SEVEN TIMES FASTER! Almost as fast as the 1541 disk, in fact. There is however a small difference in price — because ARROW costs just £39 plus VAT. ARROW has its own load and save commands, so you can still load and save at normal speed if you should want to. ARROW is a tried and tested product that we've been selling on the PET for several years; now 64 owners can also benefit.

Now for the lighter side of our range. TANK ATAK, KAKTUS and MANGROVE are arcade games with colour and sound; a joystick is recommended, but is not essential. They each cost £8 plus VAT on cassette or £9.50 on disk.

Supersoft
Winchester House, Canning Road,
Wealdstone, Harrow,
Middlesex, HA3 7SJ, England
Telephone: 01-861 1166

A complete nominal ledger system for accountants

Part 5: Amending The Parameters

After a two month summer break, we return to our complete nominal ledger system for accountants with the parameter amendment listing.

This will allow you to alter records built up using previous programs in the series.

The original article, in our February issue, described the overall structure of this suite of programs, and although back issues are no longer available, we

have got a number of reprints of the article at a cost of 50p each (to cover time and copying).

The other programs in the series appeared in our March and April issues, and are also available as reprints, again at a cost of 50p each.

The whole system is available on disk, at a cost of £25.00. Send in a blank disk to the address on the masthead, telling us which disk system you'd like it formatted for, and we'll return it with all the programs, plus some sample data so that you can see it in action.

The program will actually work on any dual disk drive, and, with alterations, on a single drive as well. As it stands, data is stored on drive 1 and the programs on drive 0, but this could be altered if required.

It was designed to work on a 40 column, Basic 2 Pet, but with minor modifications will run on any of the Commodore family of computers. The line to be changed is line number 4150, which alters the start of variables prior to re-loading the menu.

```

100 DIMSR$(10),SC$(10)
110 LS$="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
120 RS$="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
130 NM$="":VT$="":TR$="":SR=0:SC=0
140 SP$="
1010 GOSUB9000
1020 PRINT"00"
1030 INPUT"OPERATORS NAME *###";OP$
1040 IFOP$="*"THENPRINT"0";GOTO1030
1050 INPUT"TODAY'S DATE *###";TD$
1060 IFTD$="*"ORLEN(TD$)<6THENPRINT"0";GOTO1050
1070 ID=VAL(LEFT$(TD$,2)):MM=VAL(MID$(TD$,3,2)):YY=VAL(RIGHT$(TD$,2))
1080 IFMM<10RMM>12ORYY<79ORDD<10RDD>31THENPRINT"0";GOTO1050
1090 OPEN15,8,15
1100 INPUT"IS THERE A B/F FILE (Y/N) Y###";BF$
1110 IFBF$="N"THEN1400
1120 IFBF$<>"Y"THENPRINT"0";GOTO1100
1140 OPEN1,8,3,"1:PARAMETERS,SEQ,READ":IFST=0THEN1160
1150 EL=1140:GOSUB9220:IFRP=1THEN1140
1160 INPUT#1,IR$:IFST=0THEN1160
1161 PRINTIR$
1170 EL=1160:GOSUB9220
1180 RT$=LEFT$(IR$,4):IFRT$="ZZZZ"THENCLOSE1:GOTO1400
1200 IFRT$="NAME"THENN$=RIGHT$(IR$,LEN(IR$)-4):GOTO1160
1210 IFRT$="VAT"THENV$=RIGHT$(IR$,LEN(IR$)-4):GOTO1160
1220 IFRT$="SORT"THENS$=SR+1:SR$(SR)=RIGHT$(IR$,LEN(IR$)-4):GOTO1160
1230 IFRT$="SPEC"THENS$=SC+1:SC$(SC)=RIGHT$(IR$,LEN(IR$)-4):GOTO1160
1240 IFRT$="TRRF"THENTR$=RIGHT$(IR$,LEN(IR$)-4):GOTO1160
1250 GOTO1160
1400 REM
1410 GOSUB9000
1420 PRINT:PRINT
1430 PRINT" RECORD TYPE REQUEST CODE"
1440 PRINT"
1450 PRINT" COMPANY NAME 1"
1460 PRINT" V. A. T. 2"
1470 PRINT" SORT CONTROL 3"
1480 PRINT" SPECIAL SYMBOL 4"
1490 PRINT" TRANS. REF. TABLE 5"
1500 PRINT
1510 INPUT"REQUEST CODE OR 'E' TO END *###";RQ$
1520 IFRQ$="E"THEN4000
1530 IFRQ$="*"ORVAL(RQ$)<10RVAL(RQ$)>5THENPRINT"0";GOTO1510
1560 GOSUB9000
1570 ONVAL(RQ$)GOTO1600,2000,2500,3000,3300
1600 IFNM$="*THENGOSUB9310:GOTO1630
1610 F1$=LEFT$(NM$,30):F2$=MID$(NM$,31,22):F3$=MID$(NM$,53,22)
1630 GOSUB1830

```

BUSINESS

```

1650 PRINTLEFT$(LS$,5);LEFT$(RS$,15);:INPUTF1$
1660 IFF1$="*"THENPRINT"␣";:GOTO1650
1670 PRINTLEFT$(LS$,7);LEFT$(RS$,15);:INPUTF2$
1680 IFF2$="*"THENPRINT"␣";:GOTO1670
1690 PRINTLEFT$(LS$,9);LEFT$(RS$,15);:INPUTF3$
1700 IFF3$="*"THENPRINT"␣";:GOTO1690
1710 GOSUB1830:GOSUB9050:ONFGOTO1650,1770,1780
1770 NM$="":GOTO1400
1780 REM
1790 NM$=LEFT$(F1$+SP$,30)+LEFT$(F2$+SP$,22)+LEFT$(F3$+SP$,22)
1800 GOTO1400
1830 REM
1840 PRINTLEFT$(LS$,3);"COMPANY NAME RECORD"
1850 PRINTLEFT$(LS$,5);"NAME":PRINT"␣␣␣";F1$
1860 PRINTLEFT$(LS$,7);"ADDR. LINE 1":PRINT"␣␣␣";F2$
1870 PRINTLEFT$(LS$,9);"ADDR. LINE 2":PRINT"␣␣␣";F3$
1880 RETURN
2000 REM VAT
2010 IFVT$=""THENGOSUB9310:GOTO2050
2020 F1$=LEFT$(VT$,1):F2$=MID$(VT$,2,5):F3$=MID$(VT$,7,1)
2030 F4$=MID$(VT$,8,5):F5$=MID$(VT$,13,1):F6$=MID$(VT$,14,5)
2040 F7$=MID$(VT$,19,3):F8$=MID$(VT$,22,3)
2050 GOSUB2350
2070 PRINTLEFT$(LS$,5);LEFT$(RS$,25);:INPUTF1$
2080 PRINTLEFT$(LS$,7);LEFT$(RS$,25);:INPUTF2$
2090 IFF2$="*"THEN2110
2100 F1=VAL(F2$):GOSUB2460:IFRP=1THENPRINT"␣";:GOTO2080
2110 PRINTLEFT$(LS$,9);LEFT$(RS$,25);:INPUTF3$
2120 PRINTLEFT$(LS$,11);LEFT$(RS$,25);:INPUTF4$
2130 IFF4$="*"THEN2150
2140 F1=VAL(F4$):GOSUB2460:IFRP=1THENPRINT"␣";:GOTO2120
2150 PRINTLEFT$(LS$,13);LEFT$(RS$,25);:INPUTF5$
2160 PRINTLEFT$(LS$,15);LEFT$(RS$,25);:INPUTF6$
2170 IFF6$="*"THEN2190
2180 F1=VAL(F6$):GOSUB2460:IFRP=1THENPRINT"␣";:GOTO2170
2190 PRINTLEFT$(LS$,17);LEFT$(RS$,25);:INPUTF7$
2200 IFF7$="*"ORVAL(F7$)<ORVAL(F7$)>999THENPRINT"␣";:GOTO2190
2210 IFLEN(F7$)>3THENPRINT"␣";:GOTO2190
2220 PRINTLEFT$(LS$,19);LEFT$(RS$,25);:INPUTF8$
2230 IFF8$="*"ORLEN(F8$)>3ORVAL(F8$)<ORVAL(F8$)>999THENPRINT"␣";:GOTO2220
2250 GOSUB2350
2260 GOSUB9050
2270 ONFGOTO2070,2290,2300
2280 GOTO2070
2290 VT$="":GOTO1400
2300 VT$=LEFT$(F1$+"0",1)+RIGHT$("00000"+F2$,5)+LEFT$(F3$+"0",1)
2305 VT$=VT$+RIGHT$("00000"+F4$,5)+LEFT$(F5$+"0",1)+RIGHT$("00000"+F6$,5)
2310 VT$=VT$+RIGHT$("000"+F7$,3)+RIGHT$("000"+F8$,3)
2320 GOTO1400
2350 PRINTLEFT$(LS$,3);" V.A.T. RECORD"
2360 PRINTLEFT$(LS$,5);"VAT CODE":PRINT"␣␣␣";F1$
2370 PRINTLEFT$(LS$,7);"%":PRINT"␣␣␣";F2$
2380 PRINTLEFT$(LS$,9);"VAT CODE":PRINT"␣␣␣";F3$
2390 PRINTLEFT$(LS$,11);"%":PRINT"␣␣␣";F4$
2400 PRINTLEFT$(LS$,13);"VAT CODE":PRINT"␣␣␣";F5$
2410 PRINTLEFT$(LS$,15);"%":PRINT"␣␣␣";F6$
2420 PRINTLEFT$(LS$,17);"VAT OUTPUT NOM. A/C NO.":PRINT"␣␣␣";F7$
2430 PRINTLEFT$(LS$,19);"VAT INPUT NOM. A/C NO.":PRINT"␣␣␣";F8$
2440 RETURN
2460 RP=0:FY$=STR$(INT(F1*100)/100+.001)
2470 FX$=RIGHT$("000"+MID$(FY$,2,LEN(FY$)-2),5)
2480 IFVAL(FX$)>99.99ORVAL(FX$)<0THENRP=1
2490 RETURN
2500 REM
2505 AC=0
2510 AC=AC+1
2520 IFAC>SRTHENSR=AC:GOSUB9310:GOTO2560
2530 F1$=LEFT$(SR$(AC),4):F2$=MID$(SR$(AC),5,20)
2535 IFRIGHT$(F1$,1)=" "THENF1$=LEFT$(F1$,LEN(F1$)-1):GOTO2535
2537 IFRIGHT$(F2$,1)=" "THENF2$=LEFT$(F2$,LEN(F2$)-1):GOTO2537
2540 F3$=MID$(SR$(AC),25,20):F4$=MID$(SR$(AC),45,2)
2542 IFRIGHT$(F3$,1)=" "THENF3$=LEFT$(F3$,LEN(F3$)-1):GOTO2542
2546 IFRIGHT$(F4$,1)=" "THENF4$=LEFT$(F4$,LEN(F4$)-1):GOTO2546

```

BUSINESS

```
2550 F5#=MID$(SR$(AC),47,2)
2552 IFRIGHT$(F5#,1)=" "THENF5#=LEFT$(F5#,LEN(F5#)-1):GOTO2552
2560 GOSUB2850
2570 PRINTLEFT$(LS$,3);RIGHT$(RS$,15);:INPUTF1#
2580 IFF1#="*"THENGOTO1400
2590 IFLEN(F1#)>4THENPRINT"J":GOTO2570
2600 PRINTLEFT$(LS$,5);RIGHT$(RS$,15);:INPUTF2#
2650 IFF2#="*"ORLEN(F2#)>15THENPRINT"J":GOTO2600
2660 PRINTLEFT$(LS$,7);RIGHT$(RS$,15);:INPUTF3#
2670 IFF3#="*"ORLEN(F3#)>15THENPRINT"J":GOTO2660
2680 PRINTLEFT$(LS$,9);RIGHT$(RS$,15);:INPUTF4#
2690 IFF4#="*"ORVAL(F4#)>80ORVAL(F4#)<1THENPRINT"J":GOTO2680
2700 PRINTLEFT$(LS$,11);RIGHT$(RS$,15);:INPUTF5#
2710 IFF5#="*"ORVAL(F5#)>80ORVAL(F5#)<1THENPRINT"J":GOTO2700
2720 GOSUB2850
2730 GOSUB9050
2740 ONFGOTO2570,2760,2790
2760 FORI=ACTOSR
2770 SR$(I)=SR$(I+1):NEXT:SR$(SR)="
2780 SR=SR-1:GOSUB9000:GOTO2510
2790 SR#=LEFT$(F1#+",4)+LEFT$(F2#+SP$,20)
2800 SR#=SR#+LEFT$(F3#+SP$,20)+RIGHT$("0"+F4$,2)
2810 SR$(SR)=SR#+RIGHT$("0"+F5$,2)
2820 GOSUB9000:GOTO2510
2850 PRINTLEFT$(LS$,1);" SORT CONTROL RECORD"
2860 PRINTLEFT$(LS$,3);"SORT NAME      #":F1#
2870 PRINTLEFT$(LS$,5);"INPUT FILE    #":F2#
2880 PRINTLEFT$(LS$,7);"OUTPUTFILE   #":F3#
2890 PRINTLEFT$(LS$,9);"START OF KEY  #":F4#
2900 PRINTLEFT$(LS$,11);"LENGTH OF KEY #":F5#
2910 RETURN
3000 REM
3005 AC=0
3010 AC=AC+1
3020 IFAC>SCTHENSC=AC:GOSUB9310:GOTO3050
3030 F1#=LEFT$(SC$(AC),10)
3034 IFRIGHT$(F1#,1)=" "THENF1#=LEFT$(F1#,LEN(F1#)-1):GOTO3034
3040 F2#=MID$(SC$(AC),11,12)
3044 IFRIGHT$(F2#,1)=" "THENF2#=LEFT$(F2#,LEN(F2#)-1):GOTO3044
3050 GOSUB3220
3060 PRINTLEFT$(LS$,5);RIGHT$(RS$,18);:INPUTF1#
3070 IFF1#="*"THEN1400
3080 IFLEN(F1#)>10THENPRINT"J":GOTO3060
3090 PRINTLEFT$(LS$,7);RIGHT$(RS$,18);:INPUTF2#
3100 IFLEN(F2#)<>12THENPRINT"J":GOTO3090
3110 F=0:FORI=1TO12
3120 IFMID$(F2#,I,1)<"0"ORMID$(F2#,I,1)>"9"THENPRINT"J":GOTO3090
3130 GOSUB3220
3140 GOSUB9050
3150 ONFGOTO3060,3170,3200
3170 FORI=ACTOSC
3180 SC$(I)=SC$(I+1):NEXT:SC$(SC)="
3190 SC=SC-1:GOSUB9000:GOTO3010
3200 SC$(SC)=LEFT$(F1#+SP$,10)+F2#
3210 GOSUB9000:GOTO3010
3220 PRINTLEFT$(LS$,3);" SPECIAL SYMBOL RECORDS"
3230 PRINTLEFT$(LS$,5);"IDENTITY      #":F1#
3240 PRINTLEFT$(LS$,7);"PARAMETERS (6X2) #":F2#
3250 RETURN
3300 REM
3310 IFTR#=""THENGOSUB9310:GOTO3350
3320 F1#=LEFT$(TR$,6):F2#=MID$(TR$,7,6)
3330 F3#=MID$(TR$,13,6):F4#=MID$(TR$,19,6)
3340 F5#=MID$(TR$,25,6)
3350 GOSUB3700
3360 PRINTLEFT$(LS$,5);LEFT$(RS$,6);:INPUTF1#
3370 IFF1#="*"ORLEN(F1#)=6THEN3390
3380 PRINT"J":GOTO3360
3390 PRINTLEFT$(LS$,7);LEFT$(RS$,6);:INPUTF2#
3400 IFF2#="*"ORLEN(F2#)=6THEN3420
3410 PRINT"J":GOTO3390
```

BUSINESS

```
3420 PRINTLEFT$(LS$,9);LEFT$(RS$,6);:INPUTF3$
3430 IFF3$="*"ORLEN(F3$)=6THEN3450
3440 PRINT"␣";:GOTO3420
3450 PRINTLEFT$(LS$,11);LEFT$(RS$,6);:INPUTF4$
3460 IFF4$="*"ORLEN(F4$)=6THEN3480
3470 PRINT"␣";:GOTO3450
3480 PRINTLEFT$(LS$,13);LEFT$(RS$,6);:INPUTF5$
3490 IFF5$="*"ORLEN(F5$)=6THEN3510
3500 PRINT"␣";:GOTO3480
3510 GOSUB3700
3520 GOSUB9050
3530 ONFGOTO3360,3550,3570
3550 TR$="":GOTO1400
3570 IFF1$="*"THENF1$="*****"
3580 IFF2$="*"THENF2$="*****"
3590 IFF3$="*"THENF3$="*****"
3600 IFF4$="*"THENF4$="*****"
3610 IFF5$="*"THENF5$="*****"
3620 TR$=F1$+F2$+F3$+F4$+F5$
3630 GOTO1400
3700 REM
3710 PRINTLEFT$(LS$,3);"TRANSACTION REFERENCE TABLE"
3720 PRINTLEFT$(LS$,5);"REF 1 ␣";F1$
3730 PRINTLEFT$(LS$,7);"REF 2 ␣";F2$
3740 PRINTLEFT$(LS$,9);"REF 3 ␣";F3$
3750 PRINTLEFT$(LS$,11);"REF 4 ␣";F4$
3760 PRINTLEFT$(LS$,13);"REF 5 ␣";F5$
3770 RETURN
4000 REM
4010 OPEN2,0,2,"@1:PARAMETERS,SEQ,WRITE":IFST=0THEN4030
4020 EL=4010:GOSUB9220:IFRP=1THEN4010
4030 PRINT#2,"NAME";NM$;CHR$(13);:IFST<>0THENEL=4030:GOSUB9220
4040 PRINT#2,"VAT ";VT$;CHR$(13);:IFST<>0THENEL=4040:GOSUB9220
4050 FORI=1TOSR
4060 PRINT#2,"SORT";SR$(I);CHR$(13);:IFST<>0THENEL=4060:GOSUB9220
4070 NEXT
4080 FORI=1TOSC
4090 PRINT#2,"SPEC";SC$(I);CHR$(13);:IFST<>0THENEL=4090:GOSUB9220
4100 NEXT
4110 PRINT#2,"TRRF";TR$;CHR$(13);:IFST<>0THENEL=4110:GOSUB9220
4120 PRINT#2,"ZZZZ";CHR$(13);:IFST<>0THENEL=4120:GOSUB9220
4130 CLOSE2:IFST<>0THENEL=4130:GOSUB9220
4140 CLOSE15
4150 POKE42,010:POKE43,036:CLR:LOAD"0:NOMINAL MENU",8
9000 PRINT"␣NOM. LEDGER PARAMETER FILE MAINTENANCE"
9010 RETURN
9050 PRINT:PRINT"ENTER 'S' TO SAVE"
9060 PRINT"      'A' TO AMEND"
9070 PRINT"      'D' TO DELETE"
9080 INPUT"CODE S␣␣␣";CD$
9090 F=0:FORI=1TO3
9100 IFCD$=MID$("ADS",I,1)THENF=I:I=3
9110 NEXT:IFF=0THENPRINT"␣";:GOTO9080
9120 RETURN
9220 REM
9230 INPUT#15,R1$,R2$,R3$,R4$
9250 RP=0:IFVAL(R1$)=0THENGOTO9300
9260 PRINT"␣DISC ERROR␣"
9270 PRINT"ERROR TYPE :";R1$
9280 PRINT"      MSG   :";R2$,R3$,R4$
9290 PRINT"PROGRAM LINE NO. = ";EL
9300 IFVAL(R1$)=62THENPRINT"LOAD CORRECT DISC":GOTO9350
9310 F1$="*":F2$="*":F3$="*":F4$="*":F5$="*":F6$="*":F7$="*":F8$="*"
9320 RETURN
9330 IFYN$="Y"THEN9380
9340 END
9350 PRINT"ENTER 'G' WHEN READY"
9360 GETYN$:IFYN$<>"G"THEN9350
9370 RP=1
9380 RETURN
READY.
```

Mator-closing the gap in Data Communications and Storage

Mator's products provide keenly priced, high capacity storage facilities and mainframe communications for your Commodore Computer.

Our range includes

SHARK — Hard disk systems with 22, 30, 60 and 120 mbyte capacities plus the NEW 5¼" units which extend the range down to 15 and 10 mbyte.

SHARKIVE — the fast tape back-up to the Shark.

DOLPHIN III — A low cost Protocol Converter to link the Commodore Computer to IBM and ICL Mainframes.

All Mator units are completely plug compatible with your Commodore Micro — no extra boxes, no hidden costs.

Interested? contact us today on 0273 726464

Prices start from £2,400 for the 10 Megabyte Shark

MATOR

Mator Systems Ltd.,
134-140 Church Road
Hove, Sussex BN3 2DL
Telephone (0273) 720451/2
Telex No. 877680

Mator Inc.
Willowbrook Executive Park
6610 Harwin Ste. 274
Houston, Texas 77036
Telephone (713) 266.9194

Mator Inc.
4203 Spencer Street, Torrance, California 90506
Telephone (213) 371.7531

BUSINESS

```

10 REM*AMEND/CREATE NOMINAL DESCRIPTIONS FILE
100 DIMNA$(1000)
110 LS$="#####"
120 RS$="#####"
140 SP$=""
1000 PRINT"AMEND NOMINAL DESCRIPTIONS FILE"
1020 PRINT""
1030 INPUT"OPERATORS NAME   *###";OP$
1040 IFOF$="*"THENPRINT" ";GOTO1030
1050 INPUT"TODAY'S DATE   *###";TD$
1060 IFTD$="*"ORLEN(TD$)<6THENPRINT" ";GOTO1050
1070 DD=VAL(LEFT$(TD$,2)):MM=VAL(MID$(TD$,3,2)):YY=VAL(RIGHT$(TD$,2))
1080 IFMM<10RMMD>12ORYY<79ORDD<10RDD>31THENPRINT" ";GOTO1050
1090 OPEN15,8,15
1100 INPUT"IS THERE A B/F FILE (Y/N)   Y###";BF$
1110 IFFB$="N"THEN1210
1120 IFFB$<>"Y"THENPRINT" ";GOTO1100
1140 OPEN1,8,3,"1:NOMINALDESC,SEQ,READ":IFST=0THEN1160
1150 EL=1140:GOSUB9220:IFRP=1THEN1140
1160 INPUT#1,IR$:IFLEFT$(IR$,4)="ZZZZ"THENCLOSE1:GOTO1210
1170 IFST=0THENEL=1160:GOSUB9220
1180 I1$=RIGHT$(IR$,LEN(IR$)-7):MD=VAL(LEFT$(IR$,3)):CT=LEN(I1$)
1190 IFMID$(I1$,CT,1)=" "THENCCT=CT-1:GOTO1190
1200 NA$(MD)=LEFT$(I1$,CT):GOTO1160
1210 F1$="*":F2$="*"
1220 PRINT"AMEND NOMINAL DESCRIPTIONS FILE"
1230 PRINTLEFT$(LS$,3);"A/C NO. (E' TO END)  ###";F1$
1250 PRINTLEFT$(LS$,3);RIGHT$(RS$,22);:INPUTF1$
1260 IFF1$="*"THENPRINT" ";GOTO1250
1270 IFF1$="E"THEN2000
1280 IFVAL(F1$)<0ORVAL(F1$)>999THENPRINT" ";GOTO1250
1282 F2$=NA$(VAL(F1$)):IFF2$=""THENF2$="*"
1285 PRINTLEFT$(LS$,5);"DESCRIPTION   ###";F2$
1290 PRINTLEFT$(LS$,5);LEFT$(RS$,22);:INPUTF2$
1300 IFLEN(F2$)>40THENPRINT" ";GOTO1290
1320 GOSUB9050
1330 ONFGOTO1220,1340,1350
1340 NA$(VAL(F1$))="" :GOTO1210
1350 NA$(VAL(F1$))=F2$:GOTO1210
2000 OPEN2,8,2,"01:NOMINALDESC,SEQ,WRITE":IFST=0THEN2020
2010 EL=2000:GOSUB9220:IFRP=1THEN2000
2020 FORI=0TO999
2025 IFNA$(I)=""THEN2050
2030 IR$=RIGHT$(STR$(1000+I),3)+"ND01"+LEFT$(NA$(I)+SP$,40)
2040 PRINT#2,IR$:CHR$(13);
2050 NEXT
2060 PRINT#2,"ZZZZ";CHR$(13);
2070 CLOSE2
2080 GOTO9340
9050 PRINT:PRINT"ENTER 'S' TO SAVE"
9060 PRINT"      'A' TO AMEND"
9070 PRINT"      'D' TO DELETE"
9080 INPUT"CODE   S###";CD$
9090 F=0:FORI=1TO3
9100 IFCD$=MID$("ADS",I,1)THENF=I:I=3
9110 NEXT:IFF=0THENPRINT" ";GOTO9080
9120 RETURN
9220 REM
9230 INPUT#15,R1$,R2$,R3$,R4$
9250 RP=0:IFVAL(R1$)=0THENGOTO9380
9260 PRINT"DISC ERROR"
9270 PRINT"ERROR TYPE :";R1$
9280 PRINT"      MSG :";R2$,R3$,R4$
9290 PRINT"PROGRAM LINE NO. = ";EL
9300 IFVAL(R1$)=62THENPRINT"LOAD CORRECT DISC":GOTO9350
9310 IFVAL(R1$)=63THENPRINT"REMOVE DISC AND LOAD CORRECT DISC":GOTO9350
9320 INPUT"CONTINUE ? (Y/N)   N###";YN$
9330 IFFYN$="Y"THEN9300
9340 POKE42,010:POKE43,036:CLR:LOAD"0:NOMINAL MENU".8
9350 PRINT"ENTER 'G' WHEN READY"
9360 GETY1$:IFY1$<>"G"THEN9360
9370 RP=1
9380 RETURN

```

BASIC PROGRAMMING

Card player

PET

Another collection of utilities (and a game or two) for all owners of Commodore computers, whether your own disk drives, printers, or just a stand-alone machine with a humble tape deck.

Taking the PET family of programs first, we start off with the inevitable game, based on the popular Bruce Forsyth television show 'Play Your Cards Right'. Whether you like the television program or not, the computer program will provide a few hours of fun and amusement, and possibly some ideas for other programs of your own as well.

In particular, one is thinking here, of the card shuffling (lines 35-50) and dealing (lines 55-64, with a subroutine at lines 1000 onwards) routines, which could really be incorporated into any card playing game, be it poker, black jack or whatever.

The program, as written, is designed for a 40 column PET, equipped with

either Basic 1.0, 2.0 or 4.0. Basic 1 owners will have to be careful about Upper/Lower case and Graphics.

The card drawings (lines 2000-2112), whilst lacking the sophisticated graphics that could be achieved with a Commodore 64 or a VIC 20, at least makes the cards distinguishable from each other, and this is an area that could be improved if you were thinking of adapting these programs for use on either of those two machines.

If you're a VIC 20 owner, adaption would be rather difficult, since the majority of the graphic movement is POKE-ed' to the screen, and of course both the VIC 20 and the Commodore 64 have different screen start addresses to

the 40 column PET, this was originally written for. With the VIC 20 having a 22 character wide screen, it would probably be easier to re-write the program from scratch, using just the card manipulation routines mentioned earlier.

For those of you with a Commodore 64, life is a lot simpler. You'll have to add your own sound, but conversion of the graphics routines should be a fairly straightforward task.

The variables SP and SC, defined in line 30, dictate the final position of all the graphical displays on the screen. Bearing in mind that the PETs screen memory starts at 32768, and the 64s at 1024, changing these values respectively to SP=1184 and SC=1584, should solve all your problems.

```
0 REM*** CARD PLAYER BY GRAHAM JONES ***
1 REM***BASED ON THE POPULAR TV GAME***
2 PRINT" ":GOTO15
5 GETA$: IFA$="" THEN5
10 RETURN
15 PRINTTAB(13)" " " ":PRINTTAB(13)" " PLAY YOUR " :PRINTTAB(13);
20 PRINT" " " ":PRINTTAB(13)" " CARDS RIGHT " :PRINTTAB(13)" "
"
25 PRINT" DO YOU REQUIRE INSTRUCTIONS (Y OR N) " :GOSUB5: IFA$="Y" THENGOTO300
26 IFA$<>"N" THENPRINT"TTTTT": GOTO25
30 DIMFL(52), D%(52), C(52): SP=32928: SC=33328: M=75: L=5
33 REM***SHUFFLE & DEAL***
35 PRINT"SHUFFLING THE PACK"
40 X=RND(-TI): FORI=1TO52
45 C%=52*RND(1)+1: IFFL(C%)<>0GOTO45
50 D%(I)=C%: FL(C%)=1: NEXT
55 PRINT"DEALING CARDS"
60 S=SC: FORQ=1TO5: GOSUB1000: S=S+8: NEXT: S=SP+8: FORQ=1TO4: GOSUB1000: S=S+8: NEXT
64 D=1: S=SC: GOSUB2000
65 GOSUB500: PRINT"FIRST CARD IS A"M$: PRINT"DO YOU WISH TO CHANGE"
66 PRINT"THIS CARD (Y OR N)": GOSUB5: IFA$="N" THEN70
67 IFA$<>"Y" THEN65
68 D=D+1: L=L+1: FORJ=1TO9: FORI=0TO7: POKES+I, 32: NEXTI: S=S+40: NEXT: S=SC
69 GOSUB1000: GOSUB2000
70 GOSUB500: PRINT"YOU HAVE"M"POINTS & CARD IS A"M$
71 PRINT"WHAT IS YOUR BET(MIN.10)": B$=""
72 GOSUB5: IFA$<>" " THENB$=B$+A$: PRINT" " : B$: GOTO72
73 B=VAL(B$): PRINT" " : GOSUB5: PRINTA$
79 IFB<10ORB>M THEN90
80 IFA$="H" ORA$="L" THEND=D+1: S=S+8: GOSUB2000: GOTO95
90 GOSUB500: PRINT"TRY AGAIN": FORI=1TO1000: NEXT: GOTO70
95 IFA$="H" ANDC(D-1)<C(D) THENM=M+B: GOTO115
100 IFA$="L" ANDC(D-1)>C(D) THENM=M+B: GOTO115
105 IFC(D-1)=C(D) THENGOSUB500: PRINT"NOTHING FOR A PAIR": FORI=1TO1000: NEXT
110 M=M-B
115 IFM=0 THENIFD<L GOTO70
120 IFM<10 THENGOSUB500: GOTO185
125 IFD>6 THEN160
126 GOSUB500: PRINT"CARD IS A"M$: PRINT"DO YOU WISH TO CHANGE"
130 PRINT"THIS CARD(Y OR N)": GOSUB5: IFA$="Y" THEND=D+1: GOTO150
135 IFA$<>"N" THEN125
```

BASIC PROGRAMMING

```
140 FORJ=1TO9:FORI=0TO7:POKES+I,32:NEXTI:S=S+40:NEXT:L=L-1
150 S=SP:GOSUB1000:GOSUB2000:L=L+5:M=M+200:GOTO70
160 GOSUB500:PRINT"YOU SCORED "M" POINTS"
162 IFM=>4000THENPRINT"WOW!! ";
165 IFM=>3000THENPRINT"DIDN'T YOU DO WELL":GOTO190
170 IFM=>2000THENPRINT"NOT BAD!!":GOTO190
175 IFM=>1000THENPRINT"BETTER LUCK NEXT TIME":GOTO190
180 IFM=>500THENPRINT"HARD LUCK!!":GOTO190
185 PRINT"AH WELL! WHY DID YOU BOTHER PLAYING"
190 FORI=1TO2000:NEXT
195 PRINT"DO YOU WANT ANOTHER GAME (Y OR N)":GOSUB5:IFA#="Y"THENRUN30
200 IFA#<"N"THENPRINT"J":GOTO195
210 PRINT"JTHANKS FOR PLAYING":END
300 PRINT"PLAY YOUR CARDS RIGHT":PRINT"-----"
302 PRINT"BASED ON THE TELEVISION GAME THE OBJECT"
305 PRINT"IS TO SCORE AS MANY POINTS AS YOU CAN"
310 PRINT"BY BETTING THAT THE NEXT CARD TURNED
315 PRINT"OVER WILL BE HIGHER OR LOWER THAN THE
320 PRINT"CARD LAST DISPLAYED. AT THE END OF THE
325 PRINT"FIRST LINE 200 IS ADDED TO YOUR SCORE
330 PRINT"AND AT THE END OF THE SECOND LINE YOUR
335 PRINT"TOTAL POINTS AND A SUITABLE COMMENT AS
340 PRINT"TO YOUR PERFORMANCE WILL BE DISPLAYED."
345 PRINT"REMEMBER:-IF YOUR POINTS ARE LESS THAN"
347 PRINT"10 THE GAME WILL END!!!"
350 PRINT"YOU START WITH 75 POINTS AND THE MINIMUM";
355 PRINT"BET IS 10 POINTS. YOU MAY CHANGE THE
360 PRINT"FIRST CARD IF YOU WISH TO."
365 PRINT"ENTER BET AS FOLLOWS :- ":PRINT"AMOUNT <SPACE> H OR L"
370 PRINT"EG. 50 L OR 125 H ETC."
375 PRINT"PRESS ANY KEY TO START":GOSUB5:PRINT"J":GOTO30
500 REM***MESSAGE PAD CLEAR***
505 PRINT" "
510 PRINT" "
515 PRINT" ";
520 RETURN
1000 REM***BLANK CARD DRAW***
1005 POKES,85:FORI=1TO5:POKES+I,64:NEXT:POKES+6,73
1010 FORI=1TO7:S=S+40:POKES,93:POKES+6,93:NEXT:S=S+40
1015 POKES,74:FORI=1TO5:POKES+I,64:NEXT:POKES+6,75
1020 S=S-320:RETURN
2000 REM***CARD DRAW DETAIL***
2005 IFD%(D)<14THENC(D)=14-D%(D):N=83:GOTO2025
2010 IFD%(D)<27THENC(D)=27-D%(D):N=88:GOTO2025
2015 IFD%(D)<40THENC(D)=40-D%(D):N=90:GOTO2025
2020 C(D)=53-D%(D):N=65
2025 C=C(D):C#=STR$(C)
2028 IFC<>2THENPOKES+41,N:POKES+285,N
2030 IFC>3ANDC<11THENPOKES+45,N:POKES+281,N
2035 IFC=3ORC=5ORC=7ORC=9THENPOKES+163,N
2040 IFC=6ORC=7THENPOKES+161,N:POKES+165,N
2045 IFC=8ORC=9ORC=10THENPOKES+121,N:POKES+125,N:POKES+201,N:POKES+205,N
2050 IFC=2ORC=10THENPOKES+83,N:POKES+243,N
2055 IFC>10ORC=1THENPOKES+202,102:POKES+242,102:POKES+245,102
2060 IFC>10THENPOKES+85,102
2065 IFC>11THENPOKES+82,102
2070 IFC=10RC>11THENPOKES+122,102:POKES+162,102:POKES+204,102
2075 IFC=10RC=11ORC=12THENPOKES+125,102:POKES+165,102
2080 IFC=10RC=12THENPOKES+83,102:POKES+84,102
2085 IFC=11ORC=12THENPOKES+243,102
2090 IFC=10RC=11THENPOKES+205,102
2095 IFC=1THENPOKES+203,102
2100 IFC=11THENPOKES+244,102
2105 IFC=13THENPOKES+124,102:POKES+163,102
2106 IFC=1THENM#="N ACE":C(D)=14:GOTO2112
2107 IFC=11THENM#=" JACK":GOTO2112
2108 IFC=12THENM#=" QUEEN":GOTO2112
2109 IFC=13THENM#=" KING":GOTO2112
2110 M#=C#:IFC=8THENM#="N"+C#
2112 RETURN
```

Screen Jotter & Dump to Disk

The idea for the program came to me whilst developing a program for storing student records on the PET and I wanted to enable staff not experienced in wordprocessors to plan screen layouts with the minimum of fuss.

The program will allow the user to create a screen display (or amend an existing display on disk) under program control using all the cursor control keys as normally allowed by the PET screen editing facilities, with no restrictions on any key pressed including the use of the return key without invoking 'syntax error' say for example when typing text in without a line number.

When the display has been created pressing 'shift space' followed by 'return' will save the screen contents to disk in drive 0 under the file name originally chosen by the user. To recall the display the following line of BASIC is incorporated into the user program at the appropriate point:

```
10000 dopen#5,'filename
```

```
":sys62294:dclose#5
```

If an existing screen display requires changing it can be recalled from disk using the enclosed program, the necessary changes made and then the display re-saved to disk under the same filename.

The program as written is for 40/80 column PETS - basic 4. The machine code segment which handles the screen layout is in data statements and on running the program these are poked into line number 20 behind the rem statement.

DO NOT change the program, in particular lines prior to and including line number 200, as this could change the position of memory locations important to the running of the program. DO NOT

be tempted to change parts of the program which you think could work better in another way eg: 'dsave'

"to 'dsave (f\$)' as when-

the basic pointers are changed to point to screen memory the basic interpreter cannot find f\$ because it is looking in the wrong place.

Some error checking for program entry has been incorporated into the program, but to be on the safe side, before running save it to disk and save your blood pressure rising at the same time if anything unforeseen has gone wrong.

In line number 10 there are 36 'stars,' in line number 200 there are 16 'blanks.'

Best of luck and happy programming!!!!

```
10 goto60000
20 rem "*****"
100 printcc$:sys(sy)::rem user screen layout routine
110 :
120 ::rem::save pointers to start and end of basic
130 j=40:fori=1070to1073:pokei,peek(j):j=j+1:next
140 ::
150 ::
160 ::rem fool pet into thinking program = screen memory
170 poke40,0:poke41,128:::rem start of screen
180 poke42,peek(1074):poke43,peek(1075):::rem end of screen
190 ::
200 dsave"          ">:: rem perform save to disk
210 ::rem          line numbers upto and including 200 must
220 ::rem          be typed in exactly as listing
230 ::
240 ::rem restore original basic pointers
250 poke40,peek(1070):poke41,peek(1071)
260 poke42,peek(1072):poke43,peek(1073)
270 ::
280 ::rem restore 'stars' into temporary store in line 20
290 :
300 fori=1070to1078:pokei,42:next
310 ::
320 ::rem restore 'blanks' into file name at line 200
330 fori=1387to1402:pokei,32:next:::rem 16 blanks
340 goto20000
350 ::
10000 cc$=cl$:::rem create new screen layout
10010 gosub40000:iff l$="."then21000
10020 ifer=63thengosub44000:ifz$="n"then10010
10030 gosub45030:goto100
10040 :
11000 cc$=ho$:::rem change existing layout
11010 gosub40000:iff l$="."then21000
11020 ifer=62thengosub46000:goto11010
```

BASIC PROGRAMMING

```
11030 gosub45030:goto100
11040 :
12000 cc$=hc$::rem change existing layout resave new name
12010 gosub40000:iff1$="."then21000
12020 ifer=62thengosub46000:goto12010
12030 gosub41000:ifnf$="."then21000
12040 ifer=63thengosub44000:ifz$="n"then12030
12050 gosub43010:fl$=nf$:gosub45030:goto100
12060 :
13000 cc$=cl$::rem view existing layout
13010 gosub40000:iff1$="."then21000
13020 ifer=62thengosub46000:goto13010
13030 gosub43010
13040 gosub50000:goto21000
13050 :
13060 :
19999 ::rem instructions
20000 printcl$tab(10)r1$"INSTRUCTIONS"cr$cr$
20010 print"When screen clears and flashing prompt
20020 print"appears type in your screen layout.
20030 printcd$"To save the screen to disk press
20040 print"shift space followed by return"
20050 printcd$"To start program press return"
20060 gosub50000:ifz$<>chr$(13)then20060
20070 :
20999 ::rem menu
21000 printcl$"***** MENU *****"cd$cr$
21010 print"1. Create new screen layout"cr$
21020 print"2. Change existing screen layout"cr$
21030 print"3. Change screen layout under new name"cr$
21040 print"4. View existing screen layout"cr$
21050 print"5. TERMINATE"cr$
21060 printcr$"Choose .... 1 - 5"
21070 gosub50000:ch=val(z$)
21080 printcl$:onchgoto10000,11000,12000,13000,30000:goto21000
21090 ::
30000 dc lose:end
30010 ::
40000 print"Name of file"q$;inputfl$:iff1$="."thenreturn
40010 cf$=fl$:gosub42010:fl$=cf$
40020 return
40030 ::
41000 printcr$"New file name"q$;inputnf$:ifnf$="."thenreturn
41010 cf$=nf$:gosub42010:nf$=cf$
41020 return
41030 ::
42000 ::rem padding name to 16
42010 cf$=left$(cf$+" ",16)::rem ensuring name not > 16
42020 ::rem check if file exists
42030 dopen#5,(cf$):er=ds:er$=ds$:dc lose
42040 ifer<>0ander<>62ander<>63thenprinter$:goto30000
42050 return
42060 ::
43000 ::rem recall existing screen display
43010 dopen#5,(fl$):sys62294:dc lose:return
43020 :
44000 printcd$r1$"File exists"r0$" Scratch y/n"
44010 gosub50000:ifz$<>"y"andz$<>"n"then44010
44020 ifz$="y"thenscratch(cf$)
44030 return
45000 ::rem poking file name into blanks after deave
45010 ::rem otherwise when pointers are changed basic
45020 ::rem will not find fl$
45030 j=1:k=1387:l=k+len(fl$)-1:fori=ktol
45040 pokei,asc(mid$(fl$,j,1)):j=j+1:next
45050 return
45060 :
46000 printcd$r1$"File does not exist"r0$
46010 return
```

BASIC PROGRAMMING

```
46020 :
50000 getz$:ifz$=""then50000
50010 return
50020 :
60000 c1$=chr$(147):cd$=chr$(17):b1$=chr$(32):le$=chr$(157)
60010 r1$=chr$(18):r0$=chr$(146):cr$=chr$(13)
60020 q$=b1$+b1$+b1$+chr$(46)+le$+le$+le$
60030 printc1$:fori=1to90:printb1$:;next:type=peek(216):printc1$
60040 sy=1043:p1=232:p2=131:iftype=2thenp1=208:p2=135
60050 poke59468,14
60060 ::
61000 ::rem checking that lines upto 200 are correct
61010 ifpeek(1384)*256+peek(1383)=200then61040
61020 printc1$r1$"error"r0$" in program entry"cr$
61030 print"check typing against listing":goto300000
61040 ifpeek(1402)=32andpeek(1387)=32then62020
61050 goto61020
62000 ::
62010 ::rem save top of screen pointers
62020 poke1074,p1:poke1075,p2
62030 ::
62040 ::rem poking machine code into line 20
62050 fori=1043to1068:reada:t=t+a:pokei,a:next
62060 ::
62070 ::rem checking data statements are correct
62080 ift=3820then20000
62090 ::
62100 ::rem restoring line 20 back to 'stars' if incorrect
62110 fori=1043to1068:pokei,42:next
62120 ::
62130 printc1$r1$"Data statements incorrect"r0$cr$
62140 print"Please check and re-run"
62150 goto300000
62160 ::
63500 ::type in the program exactly as printed
63510 ::particularly to line number 210, when the program
63520 ::has run all lines from these instructions can be
63530 ::deleted and the program resaved
63540 ::line #10 = 36 'stars', line # 200 = 16 'blanks'
63700 :
63720 data 169,14,133,86,198,86,32,207,255,197,86,208
63730 data 5,165,86,32,210,255,201,160,208,240,32,204,255,96
63740 ::
63790 ::::::::::: menu for lazy disk save & listing
63800 :::::::::::print:print"1. save on disk
63810 :::::::::::print"2. listing
63820 :::::::::::print"3. re-run
63830 :::::::::::print"4. terminate"
63840 :::::::::::gosub50000:onval(z$)goto63920,63930,63960
63850 dclose:end
63860 run
63900 ::::::::::: lazy disk save & listing :::::::::::
63910 :
63920 :::::::::::scratch"screensave":dsave"screensave":goto63800
63930 :::::::::::open7,4,7:print#7:c close7
63940 :::::::::::open4,4:print#4,chr$(147)chr$(1)"SCREEN SAVE"
63950 :::::::::::input"date":da$:print#4:print#4,"0.Milnes....."da$
63960 :::::::::::print#4:cmd4:list
63970 ::
63988 :::::::::::
63989 :d.milnes      january 25 1983      :
63990 :13 delmont close                        :
63991 :whitelee rd                             :
63992 :batley                                 :
63993 :west yorkshire                          :
63994 :::                                     :
63995 ::: basic 4.... 40/80 column pet      :
63996 :::                                     :
63997 :::::::::::

```

BASIC PROGRAMMING

High Resolution Printouts on the PET

"This month we have a useful article on Hires plotting by Anthony W. Bovill."

The program will plot up to five single-valued functions simultaneously, using separate programmed characters for each, and printed to the full resolution across the paper, i.e. to the nearest $\frac{1}{60}$ th of an inch. Alternatively, the program will plot one double valued function, i.e. one in which there are two values of 'y' for each value of 'x'.

The program requires the user to enter the relevant equations as a subroutine, using Y(1) to Y(5) for the ordinate values of s/v functions, or Y(0) and Y(1), for a d/v function. In either case the abscissa independent variable is X, and is assumed to change by equal increments, as defined by the programmed paper feed.

For graph plotting, entry is required of the following:

1. Initial and final values of X.
2. Either, a) the increment for X. or b) the number of points to be plotted.
3. Printer model - 2022 or 4022.
4. Paper feed in points per inch.

On being run the program lists the subroutine (so you know what is being

plotted). This is followed by a 'GOTO' which initiates the program proper.

The program computes all the Y values to find the upper value YU (greater than 0) and the lower value YL (less than 0). Having found the range in Y the program automatically selects the scale (out of seven) which ensures the plot spans not less than 65% of the full scale. It selects the appropriate scale factors and abscissa position and assembles the scale numbers (note that each scale can commence anywhere from minus full scale value, to 0).

The program prints out the scale factors for abscissa and ordinate, prints the scale, the initial value of X and then proceeds to plot. During plotting a '0' is placed at the origin, and after plotting, the final value of X is printed. If more than one s/v function is plotted, then the program prints the character designation for each Y(N), thus enabling each plot to be identified.

At the end of plotting, the option is provided of having a table of all the computed points printed.

```
150 A=PI/180
160 Y(2)=125*SIN(A):Y(3)=-70*SIN(3*A):Y(4)=40*SIN(5*A):Y(5)=-15*SIN(7*A)
170 Y(1)=Y(2)+Y(3)+Y(4)+Y(5)
190 RETURN
```

READY.

```
ABSCISSA SCALE - ONE DIVISION = 3 UNITS
                - ONE DIVISION = 1 PLOTTED POINT
```

```
MULTIPLY ORDINATE SCALE BY 100
```



BASIC PROGRAMMING



188

	Y(1) =	Y(2) = +	Y(3) = x	Y(4) = y	Y(5) = .
X	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)
+ .0000	+ .0000	+ .0000	+ .0000	+ .0000	+ .0000
+ 3.0000	+ .0056	+ .0654	- .1095	+ .1035	- .0537
+ 6.0000	+ .0139	+ .1306	- .2163	+ .2000	- .1003
+ 9.0000	+ .0269	+ .1955	- .3177	+ .2828	- .1336
+ 12.0000	+ .0456	+ .2598	- .4114	+ .3464	- .1491
+ 15.0000	+ .0700	+ .3235	- .4949	+ .3863	- .1448
+ 18.0000	+ .0986	+ .3862	- .5663	+ .4000	- .1213
+ 21.0000	+ .1289	+ .4479	- .6237	+ .3863	- .0816
+ 24.0000	+ .1579	+ .5084	- .6657	+ .3464	- .0311
+ 27.0000	+ .1824	+ .5674	- .6913	+ .2828	+ .0234
+ 30.0000	+ .2000	+ .6250	- .7000	+ .2000	+ .0749
+ 33.0000	+ .2095	+ .6807	- .6913	+ .1035	+ .1165

BASIC PROGRAMMING

+ 36.0000	+ .2116	+ .7347	- .6657	+ .0000	+ .1426
+ 39.0000	+ .2092	+ .7866	- .6237	- .1035	+ .1497
+ 42.0000	+ .2071	+ .8364	- .5663	- .2000	+ .1370
+ 45.0000	+ .2121	+ .8838	- .4949	- .2828	+ .1060
+ 48.0000	+ .2320	+ .9289	- .4114	- .3464	+ .0610
+ 51.0000	+ .2751	+ .9714	- .3177	- .3863	+ .0078
+ 54.0000	+ .3486	+1.0112	- .2163	- .4000	- .0463
+ 57.0000	+ .4580	+1.0483	- .1095	- .3863	- .0943
+ 60.0000	+ .6062	+1.0825	+ .0000	- .3464	- .1299
+ 63.0000	+ .7922	+1.1137	+ .1095	- .2828	- .1481
+ 66.0000	+1.0115	+1.1419	+ .2163	- .2000	- .1467

```

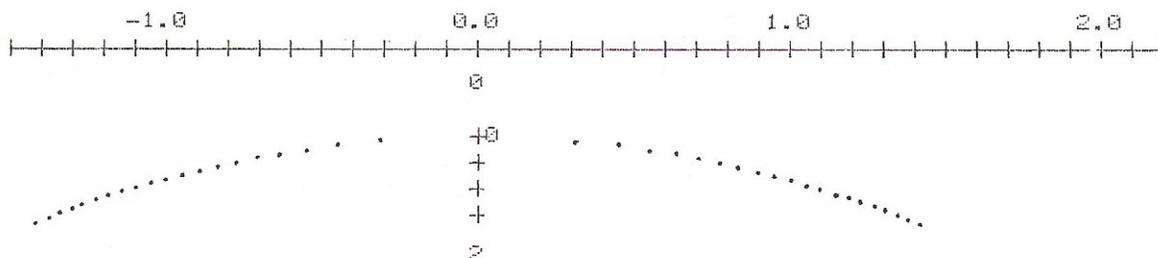
150 A=100*X
160 Y(1)=SQR(A)
170 Y(0)=-SQR(A)
190 RETURN

```

READY.

ABSCISSA SCALE - ONE DIVISION = .6 UNITS
 - ONE DIVISION = 6 PLOTTED POINTS

MULTIPLY ORDINATE SCALE BY 10



```

150 IF X=0 THEN Y(1)=.125:GOTO 190
160 Y(1)=.125*SIN(X)/X
190 RETURN

```

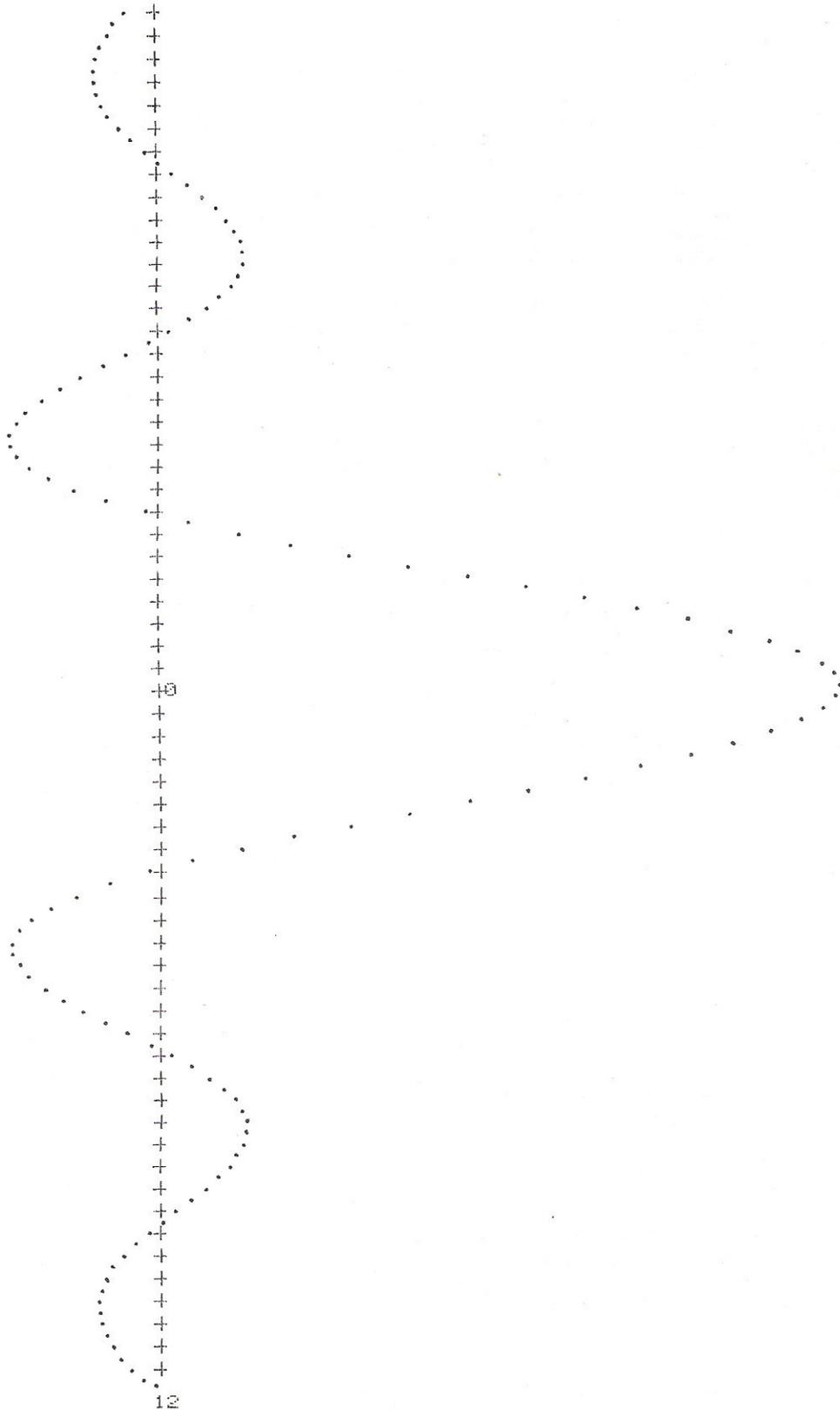
READY.

ABSCISSA SCALE - ONE DIVISION = .4 UNITS
 - ONE DIVISION = 2 PLOTTED POINTS

DIVIDE ORDINATE SCALE BY 10



BASIC PROGRAMMING



BASIC PROGRAMMING

```
10 OPEN1,4:PRINT#1,"      A.W.B"TAB(22)"GRAPH PLOT 2"TAB(22)"19 JAN 1983"
20 A#="THIS PROGRAM PLOTS EITHER ONE DOUBLE-VALUED FUNCTION, OR UP TO FIVE"
22 B#="SINGLE-VALUED FUNCTIONS, OF ONE INDEPENDENT VARIABLE 'X', USING THE"
24 C#="LENGTH OF THE PAPER AS ABSCISSA AND THE WIDTH AS ORDINATE. PLOTTING"
26 D#="MAKES USE OF THE FULL RESOLUTION OF THE PRINTER, POSITIONING POINTS TO"
28 E#="1/60TH OF AN INCH."
30 F#="THE USER MUST ENTER THE FUNCTION(S) AS A SUBROUTINE, BEGINING ON LINE"
32 G#="150 AND ENDING WITH 'RETURN', ON LINE 190. FOR DOUBLE-VALUED FUNCTIONS"
34 H#=" 'Y' VALUES ARE ENTERED AS VARIABLES 'Y(0)' AND 'Y(1)', AND FOR SINGLE-"
36 I#="VALUED FUNCTIONS AS 'Y(1)' TO 'Y(5)'. AFTER ENTRY OF THE SUBROUTINE,"
38 J#="THE PROGRAM SHOULD BE RUN FROM LINE 200, FOLLOWED BY 'GO TO' LINE 210."
40 K#="THE PROGRAM CALLS FOR FIVE INPUTS, NAMELY THE TYPE OF PLOT, THE FIRST"
42 L#="AND LAST VALUES OF 'X', EITHER THE NUMBER OF POINTS TO BE PLOTTED OR"
44 M#="THE PLOTTING INTERVAL IN 'X' AND FINALLY, THE PAPER FEED IN POINTS"
46 N#="PER INCH."
48 O#="WHEN PLOTTING IS FINISHED THE USER HAS THE OPTIONS, EITHER OF PRINTING"
50 P#="OUT THE PLOTTED VALUES, OR OF PLOTTING NEWLY DEFINED FUNCTIONS."
52 S#="      ":T#=S#+S#
55 PRINT#1:PRINT#1:PRINT#1,S#+A#+T#+B#+T#+C#:PRINT#1,S#+D#+T#+E#:PRINT#1
60 PRINT#1,S#+F#+T#+G#+T#+H#:PRINT#1,S#+I#+T#+J#:PRINT#1:PRINT#1
70 PRINT#1,S#+K#+T#+L#+T#+M#:PRINT#1,S#+N#:PRINT#1:PRINT#1,S#+O#+T#+P#
80 PRINT#1:PRINT#1:PRINT#1:CLOSE1
90 INPUT"FOR SINGLE, OR FOR DOUBLE VALUED FUNCTIONS ";FT#
95 PRINT:IF FT#<"D" AND FT#<"S" THEN 90
110 AA#="FROM LINE 150 WRITE SUBROUTINE DEFINING 'Y(0)' AND 'Y(1)' "
115 BB#="FROM LINE 150 WRITE SUBROUTINE DEFINING 'Y(1)' TO 'Y(5)' "
120 CC#="AS FUNCTIONS OF 'X'. THEN 'RUN' FROM LINE 200, THEN FROM LINE 210."
125 DD#="150 Y(0)= A FUNCTION OF X;Y(1)= A FUNCTION OF X ?"
130 EE#="150 Y(1)= A FUNCTION OF X;Y(2)= A FUNCTION OF X, ETC ?"
135 IF FT#="D" THEN PRINT AA#+CC#:PRINT:PRINT DD#:PRINT"190 RETURN":STOP
140 IF FT#="S" THEN PRINT BB#+CC#:PRINT:PRINT EE#:PRINT"190 RETURN":STOP
150 IF X=0 THEN Y(1)=.125:GOTO 190
160 Y(1)=.125*SIN(X)/X
190 RETURN
195 REM **** PRINT SUBROUTINE ****
200 OPEN1,4:CMD1:LIST150-190
205 PRINT#1:CLOSE1
210 PRINT#1:CLOSE1
215 INPUT"FOR SINGLE, OR FOR DOUBLE-VALUED FUNCTIONS ";FT#
220 IF FT#="D" THEN N0=0:NY=1:GOTO 235
225 N0=1:INPUT"NUMBER OF FUNCTIONS (1 TO 5)";NY:PRINT
230 IF NY<1 OR NY>5 OR NY<>INT(NY) THEN 225
235 PRINT"ENTER INITIAL AND FINAL VALUES OF X":INPUT X1,X2:PRINT
240 XL=X1:XU=X2:IF X1>X2 THEN XL=X2:XU=X1
245 INPUT"FOR ENTRY OF NUMBER OF POINTS, OR FOR INTERVAL IN X ";AA#
250 PRINT:IF AA<1 AND AA>2 THEN GOTO 245
255 IF AA=1 THEN INPUT"ENTER NUMBER OF POINTS";N:PRINT:XI=(XU-XL)/N:GOTO 265
260 INPUT"ENTER INTERVAL IN 'X'";XI:PRINT:N=INT((XU-XL)/XI+.5)
265 INPUT"FOR 4022 PRINTER, OR FOR 2022 4 ";PT:PRINT
270 IF PT>2 AND PT<>4 THEN 265
280 INPUT"PAPER FEED IN POINTS/INCH - 4,6(NORMAL),8,9,12,16,24,36 ";PI
290 IL=144:IF PT=4 THEN IL=216
295 PRINT:PRINT"      ":PRINT
300 IF IL/PI>INT(IL/PI) OR PI<4 OR PI>36 THEN 280
302 Z=1:IF PI>9 AND PI<18 THEN Z=2
304 IF PI>12 AND PI<36 THEN Z=3
306 IF PI>24 THEN Z=6
310 DIM Y(NY,N),S(7,13),I(NY,5),J(NY,5)
315 REM **** SCALE NUMBERING DATA ****
320 DATA "-10 ","-8.0 ","-6.0 ","-4.0 ","-2.0 "," 0.0 "," 2.0 "," 4.0 "
330 DATA " 6.0 "," 8.0 "," 10 ","-6.0 ","-4.0 ","-2.0 "," 0.0 "," 2.0 "
340 DATA " 4.0 "," 6.0 ","-5.0 ","-4.0 ","-3.0 ","-2.0 ","-1.0 "," 0.0 "
350 DATA " 1.0 "," 2.0 "," 3.0 "," 4.0 "," 5.0 ","-3.0 ","-2.0 ","-1.0 "
360 DATA " 0.0 "," 1.0 "," 2.0 "," 3.0 ","-2.5 ","-2.0 ","-1.5 ","-1.0 "
370 DATA "-0.5 "," 0.0 "," 0.5 "," 1.0 "," 1.5 "," 2.0 "," 2.5 ","-1.5 "
380 DATA "-1.0 ","-0.5 "," 0.0 "," 0.5 "," 1.0 "," 1.5 ","-1.2 ","-1.0 "
390 DATA "-0.8 ","-0.6 ","-0.4 ","-0.2 "," 0.0 "," 0.2 "," 0.4 "," 0.6 "
400 DATA " 0.8 "," 1.0 "," 1.2 "
```

BASIC PROGRAMMING

```
405 REM **** SET UP SCALE NUMBERING MATRIX ****
410 FOR J=1 TO 11:READ S$(1,J):NEXT:FOR J=1 TO 7:READ S$(2,J):NEXT
420 FOR J=1 TO 11:READ S$(3,J):NEXT:FOR J=1 TO 7:READ S$(4,J):NEXT
430 FOR J=1 TO 11:READ S$(5,J):NEXT:FOR J=1 TO 7:READ S$(6,J):NEXT
440 FOR J=1 TO 13:READ S$(7,J):NEXT
450 P1$="          ":P2$="          ":P3$="          ":O$(1)="MULTIPLY"
460 O$(2)="DIVIDE":E$(0)=" UNITY":E$(1)=" 10":E$(2)=" 100":E$(3)=" 1,000"
470 E$(4)=" 10,000":E$(5)=" 100,000":E$(6)=" 1 MILLION":E$(7)=" 10 MILLION"
480 E$(8)=" 100 MILLION":E$(9)=" 1,000 MILLION":PP$="PLOTTED POINT":U$="UNITS"
490 IF Z>1 THEN PP$=PP$+"S"
495 REM **** ASSEMBLE SCALE GRADUATIONS ****
500 OPEN#5,4,5:PRINT#5,CHR$(15)+CHR$(8)+CHR$(8)+CHR$(8)+CHR$(8)+CHR$(8):CLOSE#5
510 A$=CHR$(254):B$="  |":FOR J=1 TO 24:B$=B$+"-"+A$+"+":NEXT:S1$=B$+"-"+A$+"+"
520 B$="  |":FOR J=1 TO 36:B$=B$+"-"+A$+"+":NEXT:S2$=B$+"-"+A$+"+"
530 YL=0:YU=0:XZ=-1
535 REM **** COMPUTE 'Y' VALUES AND FIND UPPER AND LOWER LIMITS ****
540 FOR J=0 TO N:X=XL+J*XI:GOSUB 150
545 IF X>-1E-9 AND X<1E-9 THEN XZ=J
550 FOR Q=N0 TO NY:YQ(J)=Y(Q):IF Y(Q)>YU THEN YU=Y(Q)
560 IF Y(Q)<YL THEN YL=Y(Q)
565 REM **** FIND RANGE IN Y AND DECADE SCALE FACTOR ****
570 NEXT:NEXT:RA=YU-YL:YL=YL*(1+1E-8)
580 RM=ABS(RA):DF=1:RE=0:RS=1:IF INT(RA)=0 THEN RS=2
590 IF RM<=.96 AND RM<9.6 THEN GOTO 620
600 RE=RE+1:IF RM>=9.6 THEN RM=RM/10:DF=DF*10:GOTO 590
610 RM=RM*10:DF=DF/10:GOTO 590
615 REM **** PRINT SCALE FACTORS ****
620 IF XI*XZ=1 THEN U$="UNIT"
625 OPEN#1,4:PRINT#1,P1$+"ABSCISSA SCALE - ONE DIVISION ="XI*XZ/U$
630 PRINT#1,P1$+P2$+"- ONE DIVISION ="2:PP$:PRINT#1
635 PRINT#1,P1$+O$(RS)+" ORDINATE SCALE BY"E$(RE):PRINT#1:PRINT#1:CLOSE#1
640 REM **** SELECT SCALE AND CONSTANTS ****
645 IF RM>7 THEN F=1:G=15/2:S=1
650 IF RM<=7 AND RM>4.8 THEN F=2:G=10:S=1
660 IF RM<=4.8 AND RM>3.5 THEN F=3:G=15:S=2
670 IF RM<=3.5 AND RM>2.4 THEN F=4:G=20:S=2
680 IF RM<=2.4 AND RM>1.75 THEN F=5:G=30:S=4
690 IF RM<=1.75 AND RM>1.2 THEN F=6:G=40:S=4
700 IF RM<=1.2 THEN F=7:G=60:S=8
705 REM **** ASSEMBLE SCALE NUMBERING ****
710 A=ABS(YL*S/DF):B=1/2:C=5/2:D=5:E=0:J1=6:J2=10:F$="          ":P$=P1$:SC$=S1$:M=3
720 IF F/2=INT(F/2) THEN C=5:D=10:E=7:J1=4:J2=6:F$="          ":P$=P2$:SC$=S2$:M=2
730 IF F=7 THEN B=5/8:C=5/2:D=4:E=1:J1=7:J2=12:P$=P3$
740 H=INT(A*B):K=H:AS=INT(A*C):IF AS<A*C THEN AS=AS+1
750 L=AS-D*H:IF L>E THEN K=K+1
760 SA$="":FOR J=J1-H TO J2-K:SA$=SA$+S$(F,J)+P$:NEXT:SA$=SA$+S$(F,J)
770 IF L=0 THEN GOTO 790
780 SB$="":FOR J=1 TO L:SB$=SB$+F$:NEXT:SA$=SB$+SA$
785 REM **** PRINT NUMBERED SCALE AND FIRST VALUE OF X ****
790 OPEN#1,4:PRINT#1,SA$:PRINT#1,SC$:PRINT#1
800 CH=M*AS+1:M$="":FOR J=1 TO CH:M$=M$+" ":NEXT
805 REM **** SET PAPER FEED ****
810 PRINT#1,M$XL:PRINT#1:OPEN#6,4,6:PRINT#6,CHR$(IL/PI):CLOSE#6
815 REM **** PROGRAMMED CHARACTER DATA ****
820 X0$=CHR$(0):X8$=CHR$(8):X2$=CHR$(20):X3$=CHR$(28):XX$=X0$+X0$+X0$+X0$+X0$
830 A$(0)=X0$:A$(1)=X0$:A$(2)=X8$:A$(3)=X2$:A$(4)=X2$:A$(5)=X8$
840 B$(0)=X8$:B$(1)=X8$:B$(2)=X3$:B$(3)=X8$:B$(4)=X8$:B$(5)=X8$
850 C$(0)=X0$:C$(1)=X0$:C$(2)=X8$:C$(3)=X2$:C$(4)=X8$:C$(5)=X2$
855 REM **** SET UP PROG CHAR DATA MATRIX ****
860 FOR J=0 TO 5:FOR Q=N0 TO NY:I$(Q,J)="":NEXT
870 FOR T=0 TO 5:FOR Q=N0 TO NY:J$(Q,T)=X0$
```

BASIC PROGRAMMING

```

880 IF T=J-1 THEN J*(Q,T)=A*(Q)
890 IF T=J THEN J*(Q,T)=B*(Q)
900 IF T=J+1 THEN J*(Q,T)=C*(Q)
910 I*(Q,J)=I*(Q,J)+J*(Q,T):NEXT:NEXT:NEXT
915 REM **** PLOT POINTS ****
920 OPENS,4,5:FOR J=0 TO N
930 AX#="" :FOR Q=1 TO AS*M+2:AX#=AX#+ " ":NEXT:AX#=AX#+ "+"
935 REM **** PRINT X AXIS GRADUATIONS ****
940 IF X2=J THEN PRINT#1,AX#+ "0"CHR$(141);:GOTO 1000
950 IF Z=1 THEN PRINT#1,AX#CHR$(141);
960 IF Z=2 AND J/2=INT(J/2) THEN PRINT#1,AX#CHR$(141);
970 IF Z=3 AND J/3=INT(J/3) THEN PRINT#1,AX#CHR$(141);
980 IF Z=6 AND J/6=INT(J/6) THEN PRINT#1,AX#CHR$(141);
995 REM **** COMPUTE CHAR POSITION AND POINT POSITION WITHIN CHAR ****
1000 FOR Q=N0 TO NY
1010 Y=V*(Q,J)*G/DF:IY=INT(Y):CH=AS*M+IY+2:IC=INT((Y-IY)*6+.5)+3
1020 IF IC>6 THEN CH=CH+1:IC=IC-6
1030 CH#="" :FOR T=1 TO CH-1:CH#=CH#+ " ":NEXT
1040 IF Q<2 THEN 1070
1050 IF IC=0 THEN PRINT#5,XX#+A*(Q):PRINT#1,CH#+CHR$(254)CHR$(141);
1060 IF IC=5 THEN PRINT#5,C*(Q)+XX#:PRINT#1,CH#+ " "+CHR$(254)CHR$(141);
1070 PRINT#5,I*(Q,IC):PRINT#1,CH#+ " "+CHR$(254)CHR$(141);
1080 NEXT:PRINT#1:NEXT
1085 REM **** RESET PAPER FEED ****
1090 CLOSE5:OPENS,4,6:PRINT#6,CHR$(IL/6):CLOSE6
1095 REM **** PRINT LAST VALUE OF X ****
1100 PRINT#1:PRINT#1,M#XU:PRINT#1:PRINT#1
1110 IF NY<2 THEN 1160
1115 REM **** PRINT PLOT CHARACTER DESIGNATIONS ****
1120 OPENS,4,5:S#="" :SP#=""
1125 Y*(1)="Y(1)":Y*(2)="Y(2)":Y*(3)="Y(3)":Y*(4)="Y(4)":Y*(5)="Y(5)"
1130 FOR J=N0 TO NY:S#=S#+SP#
1140 PRINT#5,I*(J,2):PRINT#1,S#+Y*(J)+" = "CHR$(254)CHR$(141);:NEXT
1150 PRINT#1:PRINT#1
1160 PRINT#1:PRINT#1:PRINT#1:CLOSE1:CLOSE5
1200 INPUT "1 TO PRINT PLOTTED VALUES, OR 2 TO PLOT NEW FUNCTION(S) 2";A
A
1210 PRINT:IF AA<>1 AND AA<>2 THEN 1200
1220 IF AA=2 THEN 90
1230 FA#=""
A AAAA AAAA AAAA AAAA
1240 FB#="" S9999.9999 S9.9999 S9.9999 S9.9999 S9.9999
1250 FOR J=1 TO 5:A*(J)="" :NEXT :XX#="X":R#=CHR$(29):OPEN1,4,1:OPEN2,4,2
1260 IF N0=0 THEN A*(1)="Y(0)":A*(2)="Y(1)":GOTO 1280
1270 FOR J=N0 TO NY:A*(J)=Y*(J):NEXT
1280 PRINT#2,FA#:PRINT#1,XX#R#A*(1)R#A*(2)R#A*(3)R#A*(4)R#A*(5)
1290 PRINT#1:PRINT#2,FB#:CLOSE2:FOR J=1 TO 5:Y(J)=0:NEXT:BB=0
1300 FOR J=0 TO N:X=XL+J*XI
1310 IF N0=0 THEN Y(1)=YY(0,J)/DF:Y(2)=YY(1,J)/DF:GOTO 1330
1320 FOR T=N0 TO NY:Y(T)=YY(T,J)/DF:NEXT
1330 PRINT#1,X,Y(1),Y(2),Y(3),Y(4),Y(5)
1340 BB=BB+1:IF BB=4 THEN BB=0:PRINT#1
1350 NEXT:PRINT#1:CLOSE1
1360 OPEN 1,4:PRINT#1,P1#+0*(RS)+" "Y" VALUES BY"E*(RE):PRINT#1:PRINT#1:PRINT#1
1370 CLOSE1
READY.

```

BASIC PROGRAMMING



This month we have five programs for the VIC-20. Four of them are for the unexpanded machine, and the fifth requires 3K of expansion. But first, a small utility program for the 64.

Machine Code to Data

The listing below is for turning your machine code into decimal data statements. The program starts at line 60000 so that you may start the data anywhere below that number. Owners of the 40

column PRTs need only change line 61000 to:
61000 POKE 158,2: POKE 623,13: POKE 624,13
for the program to work on their machine.

```
60000 PRINT"CREATE DECIMAL DATA STMENTS FROM MCHCODE"  
60005 PRINT" *** CBM MODEL 64 ***"  
60010 INPUT"START LINE # ";S#:IFS#=" "THEN60010  
60020 INPUT"STEP ";T#:IFT#=" "THEN60020  
60030 INPUT"START ADDRESS DECIMAL ";B#:IFB#=" "THEN60030  
60040 INPUT"END ADDRESS DECIMAL ";E#:IFE#=" "THEN60040  
60050 S=VAL(S#):T=VAL(T#):B=VAL(B#):E=VAL(E#):F=B:L=F+6:PRINT"  
60060 POKE831,INT(E/256)  
60070 POKE832,E-INT(E/256)*256  
60080 POKE828,T:GOTO600500  
60090 T=PEEK(828)  
60100 S=PEEK(826)*256+PEEK(827)  
60110 L=PEEK(829)*256+PEEK(830)  
60120 E=PEEK(831)*256+PEEK(832)  
60130 IF L>E THEN 62000  
60140 F=L+1:L=L+7  
60150 PRINT"  
60500 PRINTS:  
60600 PRINT"DATA";  
60700 FORP=FTOL:PRINTMID$(STR$(PEEK(P)),2);",":NEXTP  
60800 PRINT"  
60900 PRINT"GOTO60090(TT)";  
61000 POKE 198,2:POKE631,13:POKE 632,13  
61100 S=S+T  
61200 POKE 826,INT(S/256)  
61300 POKE 827,S-INT(S/256)*256  
61400 POKE 829,INT(L/256)  
61500 POKE 830,L-INT(L/256)*256:END  
62000 END  
READY.
```

UFO TARGET

Shoot the ufo's down with the rockets on your base to gain points. Instructions are in the listing.



```
13 GOTO65  
14 VR=PEEK(648)*256:POKE36869,240  
15 KR=38400:IFVR<7680THENKR=37888  
16 VI=S*16+3:OF=KR-VR:PRINT"  
17 FORA=KR+22TOKR+22*23:POKEA,0:NEXT  
18 C=VR+22*20+14  
19 POKEVI+15,6+128+64+32+8:M=M+1  
20 POKE36879,110:PRINT"***** UFO TARGET *****"  
21 POKE36869,255:SE=SE+1:PRINT"
```

BASIC PROGRAMMING

```
" : SE ; "" ;
22 PRINT "*****";
23 PRINT "***** SCORE ="SC
24 A=VR+22*22+15
25 IF C<>8121 THEN GETA#: IFA#<>" AND B=0 THEN B=1 : POKE C+22, 32 : D=C : C=C-1 : K=1 : POKE 9*16+13, 3+13, 128+125 : L=16
26 IFA#="0" THEN POKE 56, PEEK(56)+2 : PRINT "C": POKE 36869, 240 : POKE 36879, 27 : END
27 IF K=1 THEN L=L-1 : POKE 9*16+13+14, L
28 IFL=0 THEN K=0 : POKE 9*16+13+13, 0
29 IF C=8121 AND B=0 THEN GOTO 18
30 IF B=0 THEN 35
31 POKE D, 32 : D=D-22
32 IF PEEK(D)=60 OR PEEK(D)=62 THEN GOSUB 47 : GOTO 25
33 IF D<VR+88 THEN B=0 : GOTO 35
34 POKE D+OF, 1 : POKE D, 30
35 IF H=0 THEN 44
36 IF H=0 THEN 25
37 POKE F, 32 : F=F+E : POKE F, 32
38 IF F=I THEN H=0 : GOTO 25
39 IF PEEK(F)=30 THEN GOSUB 47 : GOTO 25
40 POKE F+OF, 1 : POKE F+OF+E, 1
41 IF E=1 THEN POKE F, 60 : POKE F+E, 62 : GOTO 25
42 IF E=-1 THEN POKE F, 62 : POKE F+E, 60 : GOTO 25
43 GOTO 25
44 H=1
45 IF INT(RND(1)*2)=1 THEN E=-1 : F=VR+21+(INT(RND(1)*10)+6)*22 : I=F-21 : G=60 : GOTO 36
46 E=1 : F=VR+1+(INT(RND(1)*10)+6)*22 : I=F+20 : G=62 : GOTO 36
47 B=0 : H=0
48 SC=SC+1 : PRINT "***** SCORE ="SC
49 Q=INT(100*SC/M) : Q=Q/100 : Q#=STR$(Q) : Q#=RIGHT$(Q#, LEN(Q#)-1)
50 IF Q=INT(Q) THEN Q#=Q#+".00" : GOTO 52
51 IF 10*Q=INT(10*Q) THEN Q#=Q#+".0" : GOTO 52
52 PRINT " AVERAGE ="Q#
53 POKE F+OF, 1 : POKE F+OF+1, 2 : POKE F+OF-1, 2
54 POKE F+OF+22, 2 : POKE F+OF-22, 2
55 POKE F, 42 : POKE F+1, 31 : POKE F-1, 31 : POKE F+22, 31 : POKE F-22, 31
56 POKE 9*16+13+13, 128+35
57 FOR Y=1 TO 20
58 POKE 9*16+13+14, 15-INT(Y/1.33)
59 FOR P=1 TO 80 : NEXT : NEXT
60 POKE F, 32 : POKE F+1, 32 : POKE F-1, 32 : POKE F+22, 32 : POKE F-22, 32
61 POKE F+OF, 0 : POKE F+OF+1, 0 : POKE F+OF-1, 0
62 POKE F+OF+22, 0 : POKE F+OF-22, 0
63 POKE 9*16+13+13, 0
64 RETURN
65 POKE 36879, 110 : POKE 36869, 240 : PRINT "***** **UFO TARGET**"
66 PRINT "***** FIRE AT THE UFO'S
67 PRINT "BY USING THE SPACE
68 PRINT "BAR.
69 PRINT "000 = STOP
70 PRINT "000 HIT A KEY TO START." : GOTO 73
71 GETA#: IFA#="" THEN 71
72 GOTO 14
73 T=PEEK(52)*256+PEEK(51) : T=PEEK(T) : IFT=255 THEN 79
74 X=PEEK(56)-2 : POKE 52, X : POKE 56, X : POKE 51, PEEK(55) : CLR
75 CS=256#PEEK(52)+PEEK(51)
76 FOR I=CS TO CS+511 : POKE I, PEEK(I+32768-CS) : NEXT
77 FOR K=1 TO 5
78 READ X : FOR I=0 TO 7 : READ A : POKE X+I, A : NEXT : NEXT
79 POKE 36869, 255 : GOTO 71
80 DATA 7408, 24, 60, 60, 60, 60, 60, 60, 126
81 DATA 7664, 0, 240, 254, 255, 255, 254, 240, 0
82 DATA 7648, 0, 15, 127, 255, 255, 127, 15, 0
83 DATA 7168, 255, 191, 223, 239, 247, 251, 253, 255
84 DATA 7416, 255, 255, 255, 255, 255, 255, 255, 255
READY.
```

BASIC PROGRAMMING

VIC

LAWNMOWER

See how long it takes you to mow the VIC's lawn, but beware of weeds and rocks as they slow up the process. Instructions for moving are in the program.

```
100 REM***LAWNMOWER***
110 REM
120 REM
125 REM
130 POKE36879,8:GOSUB840:POKE36879,25
140 VR=PEEK(648)*256
150 KR=38400:IFVR<>7680THENKR=37888
160 OF=KR-VR
170 KL=0
180 WD=22
190 HA=36878
200 S=36876
210 G=9
220 FORI=1TO9:READK$(I):NEXT
230 DATAZ,X,C,A,S,D,O,W,E
240 M(1)=WD-1:M(2)=WD:M(3)=WD+1:M(4)=-1:M(5)=0:M(6)=1:M(7)=-WD-1:M(8)=-WD
250 M(9)=-WD+1
260 RA$="#####"
270 X=VR+460:A=5:POKEHA,15:POKEA,0
280 T1=TI
290 PRINT"PERCENT:"
300 PRINT"#####";
310 PRINT"#####";
320 PRINT"#####";
330 PRINT"#####";
340 PRINT"#####";
350 PRINT"#####";
360 PRINT"#####";
370 PRINT"#####";
380 PRINT"#####";
390 PRINT"#####";
400 PRINT"#####";
410 PRINT"#####";
420 PRINT"#####";
430 PRINT"#####";
440 PRINT"#####";
450 PRINT"#####";
460 PRINT"#####";
470 PRINT"#####";
480 PRINT"#####";
490 PRINT"#####";
500 PRINT"#####";
510 PRINT"#####";
520 Y=86
530 Z=PEEK(X+W):IFZ=32GOTO560
540 IFZ<>102THENA=5:GOTO570
550 POKES,255:P=P+1:IFRND(1)<.02THEN710
560 POKEX,32:POKEX+OF,KL:X=X+W
570 POKEX,Y:POKEX+OF,KL:B=A:W=0:GOSUB790:IFA=0THENA=B
580 IFY=86THENY=91:GOTO600
590 Y=86
600 PRINT"TAB(8)INT(P/212*100)";
610 POKES,100:POKES,0:IFP=213THEN630
620 W=M(A):GOTO530
```

BASIC PROGRAMMING

```
630 POKE X, 215: POKE X+OF, KL: FOR X=1 TO 250 STEP .5: POKES, X: NEXT: POKES, 0
640 PRINT "COMPLETED IN
650 T0=TI-T1: T0=INT(T0/60)
660 PRINT "T0" SECONDS.
670 PRINT "ANOTHER GO?
680 GETA$: IFA$="" THEN 680
690 IFA$="Y" THEN RUN
700 POKE HA, 0: PRINT "END": POKE 36879, 27: END
710 POKE X, 32: POKE X+OF, KL: X=X+W: BB$="STONE": IFRND(1)<.5 THEN BB$="NEEDS"
720 POKE HA, 15
730 FOR C=1 TO 10: POKES, 50: PRINT A$ BB$: POKE X, 214: POKE X+OF, KL: FOR KK=1 TO 150: NEXT
740 POKES, 200: PRINT A$
750 POKE X, 32: POKE X+OF, KL: FOR KK=1 TO 100: NEXT: NEXT: A=5: GO TO 570
760 FOR X=250 TO 1 STEP -4
770 POKES, X: NEXT: FOR X=150 TO 100 STEP -1: POKES, X: NEXT: PRINT A$
780 FOR X=1 TO 100: NEXT: RETURN
790 GETA$: A=0: FOR I=1 TO 9
800 IFA$=K$(I) THEN A=I: I=9
810 NEXT
820 RETURN
840 PRINT "VIC LAWNMOWER ***
850 PRINT "HI, DONT YOU FIND
860 PRINT "THAT YOUR LAWN
870 PRINT "NEEDS A CUT ?
880 PRINT "WELL GO AHEAD!
890 PRINT "YOU MOVE WITH :
895 PRINT "
900 PRINT " Q W E
905 PRINT " |
910 PRINT " \ /
920 PRINT " A-S-D
930 PRINT " / \
940 PRINT " |
950 PRINT " Z X C
960 PRINT "STOPS MOVEMENT
970 PRINT "IN ANY DIRECTION.
980 PRINT "HIT ANY KEY TO START.
1000 GETA$: IFA$="" THEN 1000
1010 PRINT "": RETURN
```

READY.

BASIC PROGRAMMING



BARRICADE

Instructions included within the program.

```
100
110
130 VR=7680
140 KR=38400
150 A3=506
160 POKE36879,42
170 PRINT"***** BARRICADE *****"
180 PRINT"YOU GET 5 BALLS."
190 PRINT"TRY TO TRAP EACH BALL"
200 PRINT"WITH AS FEW AS"
210 PRINT"POSSIBLE BARRICADES."
230 PRINT"WITH THE SPACE BAR"
240 PRINT"YOU CREATE A BARRICADE"
250 PRINT"BEHIND THE BALL."
260 PRINT"START WITH A SPACE."
270 GETA$: IFA#="" THEN270
280 A2=0: E=102: F=81: G=32: I=1: H=22: J=20
290 POKE36879,218
300 PRINT"*****";
310 FORII=1TO21: PRINT"*****";
320 PRINT"*****";
330 FORSS=1TO10: GETA#: NEXT: N=VR+97: C=0
340 P=I: GOSUB430: P=H: GOSUB430
350 P=-I: GOSUB430: P=-H: GOSUB430
360 IFX=NGOTO380
370 X=N: GOTO340
380 P=-I: GOSUB430: P=H: GOSUB430
390 P=I: GOSUB430: P=-H: GOSUB430
400 IFY>JGOTO490
410 IFX=NGOTO340
420 X=N: GOTO380
430 N=N+P: A=PEEK(N)
440 FORU=1TO25: NEXT
450 IFA=ETHENN=N-P: Y=Y+I: RETURN
460 POKE(N),F: POKEKR+(N-VR),2: POKE(N-P),G: Y=I: GETB#
470 IFB#<" " THENPOKE(N-P),E: POKEKR+(N-VR)-P,6: C=C+I
480 GOTO430
490 N=VR+INT((RND(1))*505): N1=PEEK(N)
500 IFN1=EGOTO490
510 IFN1=81GOTO490
520 A2=A2+1: IFA2<5 THENFORP=0TO9: GETY#: NEXTP: GOTO340
530 IFA3>C THENA3=C
540 POKE36879,42: PRINT"***** BARRICADE *****": PRINT"BEST SCORE IS";A3
550 PRINT"YOUR SCORE IS";C
560 PRINT"ANOTHER GO?(Y/N)"
570 FORI=1TO100: NEXT
580 GET A$: IFA#<"Y" ANDA#<"N" THENGOTO580
590 IFA#="Y" THEN160
600 POKE36879,27: PRINT"*****";
READY.
```

BASIC PROGRAMMING



BIORHYTHMS

Check up on your biorhythmic cycles with this program. You may compare your biorhythms with those of a friend, to see how compatible you are with them.

```
100 DIMA(12),X(3),J(3),CD(3,2),R(3),S(3):FORI=1TO12:READA(I):NEXT:DEFFNY(I)=28-
(I/4=INT(I/4))
102 P(1)=16:P(2)=5:P(3)=9:M$="JANFEBMARAPR MAYJUNJUL AUGSEP OCTNOVDEC":W$="MTWTFSS"
108 S(1)=36874:S(2)=36875:SP$=" " : F$="
0"
110 DEFFNS(I)=8*SIN((T/I-INT(T/I))*2*PI):DEFFNP(I)=8119-INT(I+11.5)*22+INT((Q+1)
/2)
150 S(3)=36876:POKE36879,27:PRINTCHR$(142)"
151 PRINTTAB(6)"BIORHYTHM"
156 PRINT" ";:GOSUB9070:PRINTF$;:GOSUB9070
157 PRINTF$"INSTRUCTIONS (Y/N)":GOSUB9060:PRINTCHR$(14):IFI$="N"THEN200
160 PRINT" GIVE DATE AS":PRINT" MONTH/DAY/YEAR"
175 PRINT"(8/13/57=AUG 13,1957)"
182 GOSUB9050:PRINT" AFTER GRAPH IS DRAWN PRESS FOR:"
185 PRINT" F1 START AGAIN":PRINT" F7 NEXT 20 DAYS"
186 PRINT" CRITICAL DAYS":PRINT" STOP":PRINT" COMPARE":GOSUB9
050
200 POKE36879,27:PRINT" DRAW FROM ":PRINT"(M/D/Y) ";:GOSUB1000:IFI1=0THEN2
00
210 M1=I1:D1=I2:Y1=I3:D0=D1:FORI=1TOM1-1:D0=D0+A(I):NEXT
215 D3=Y1*365+D0:FORI=1TOY1-1:D3=D3-(I/4=INT(I/4)):NEXT
220 I$="":PRINT" BIRTH DATE":GOSUB1000:IFI1=0THEN220
225 M=I1:FORI=1TOM-1:I2=I2+A(I):NEXT:GOSUB300:D=I2:Y=I3
270 PRINT" COMPARE (Y/N)":GOSUB9060:R=0:T3=0:IFI$="N"THEN300
280 R=1:PRINT" BIRTH DATE 2":GOSUB1000:IFI1=0THEN280
290 FORI=1TOI1-1:I2=I2+A(I):NEXT:T3=T:GOSUB800:GOSUB820
300 IFT<0ORT3<0THENPRINT" BEGINS FROM BIRTH DATE":GOSUB9050:GOTO200
400 PRINT" ON "MID$(M$,3*M1-2,3)D1","Y1+1900:PRINT" YOU HAVE LIVED":PRINT"
"TDAYS"
500 GOSUB9050:POKE36879,25:PRINT" LEFT$(F$,9):FORI=1TO20:PRINT"-":NEXTI
505 PRINTLEFT$(F$,19)" SP$:T2=M1
510 PRINTLEFT$(F$,19)" MID$(M$,3*M1-2,3)Y1+1900":PRINTLEFT$(F$,20);
600 FORI=1TO3:J(I)=0:R(I)=0:FORJ=0TO2:CD(I,J)=0:NEXTJ,I:FORQ=1TO40:IFQ/2=INT(Q/
2)THEN618
610 E=D3-1:E=INT(7*(E/7-INT(E/7))+.5)+1:E$=MID$(STR$(D1),2)
615 PRINT" MID$(W$,E,1)"LEFT$(E$,1)":IFLEN(E$)>1THENPRINT" RIGHT$(E$,
1);
617 PRINT" ";
618 POKE36878,9:FORI=1TO3:X=FNS(18+I*5):GOSUB820:R(I)=R(I)-(SGN(X)=SGN(FNS(18+I
*5)))*2.5:GOSUB820
619 IFX<.6ANDX>-.6THENC(D(I,J(I))=M1*100+D1:J(I)=J(I)+1
620 Z=PEEK(FNP(X)):IFZ=32ORZ=45ORZ=P(I)THENPOKEFNP(X),P(I):POKEFNP(X)+30720,I+4
GOTO630
625 POKEFNP(X),42
630 POKES(I),2*X+200:FORJ=0TO20:NEXT:POKES(I),0:NEXTI:D3=D3+.5:T=T+.5:T3=T3+.5:
D1=D1+.5
640 IFD1>=A(M1)+1THEND1=1:M1=M1+1:IFM1>12THENM1=1:Y1=Y1+1
645 NEXT0:POKE198,0
650 IFT2<M1ANDD1<1THENPRINTLEFT$(F$,19)" MID$(M$,3*M1-2,3)Y1+190
0"
655 PRINTF$" HIT F1,F7,K,S":IFR=1THENPRINT",C";
730 GOSUB9060:I=ASC(I$):IFI=133THEN200
735 IFI=83THENPRINT" ":POKE36879,27:END
745 IFI<67ORR=0THEN750
746 PRINT" OVERLAP":PRINT" PHYS:"R(1)"%":PRINT" EMOT:"R(2)"%":PRINT" INT : "R(3)"
%"
```

BASIC PROGRAMMING

```
747 GOTO655
750 IFI=136THEN400
780 IFI<>75THEN655
785 PRINT"CRITICAL DAYS":PRINT"
790 FORI=1TO3:FORJ=0TO2:IFCD(I,J)=0THEN794
791 K2=INT(CD(I,J)/100):K1=CD(I,J)-K2*100:K2=K2-1
792 PRINTLEFT$(F$,6+2*J)TAB((I-1)*7)MID$(B$,K2*3+1,3)STR$(INT(K1))
794 NEXTJ,I:GOTO655
800 T=0:IFY1=I3THEN810
805 FORI=I3+1TOY1-1:T=T-(I/4=INT(I/4)):NEXT:T=T-(I3/4=INT(I3/4)ANDI2>58)
810 T=T+(Y1-I3-1-(D0>=I2))*365-(D0>=I2)*(D0-I2)-(D0<I2)*(365-I2+D0):RETURN
820 K2=T:T=T3:T3=K2:RETURN
1000 I=4:INPUTI$:I1=VAL(LEFT$(I$,2)):IFMID$(I$,2,1)>"9"ORMID$(I$,2,1)<"0"THENI=
3
1005 I2=VAL(MID$(I$,1,2)):I3=VAL(RIGHT$(I$,2)):A(2)=FNV(I3):IFI1>12ORII<1THENI0
30
1020 IFI2>0ANDI2<=A(I1)THENRETURN
1030 PRINT"WRONG DATE":FORI=0TO1800:NEXT:PRINT" ":I1=0:RETURN
9050 PRINTF$:" HIT A KEY
9060 GETI$:IFI$=""THEN9060
9065 RETURN
9070 FORI=1TO21:PRINTMID$(" ",I+(I>8)*8+(I>16)*8,1)" ":NEXT:PRINT"
":
9080 RETURN
9100 DATA31,28,31,30,31,30,31,31,30,31,30,31
READY.
```

RACE CAR

A very good version of an arcade game. Instructions are again, included in the program. This game requires 3K of expansion.



```
5 PRINT" ":POKE45,212:POKE46,25:POKE47,212:POKE48,25:POKE49,212:POKE50,25:POKE51
,0:POKE52,28
6 POKE55,0:POKE56,28:POKE36869,255:DIMQL(2),D(2),C(2),CL(2),A(3):V=36878:S1=V-4
8 GOSUB1225
10 IFD>XXTHENXX=H
11 POKEV+1,27:PRINT"SCORE: "H"REC: "XX:H=0
12 POKE36869,249
15 PRINTTAB(5)"RACE CAR":PRINTTAB(2)"*****"
16 PRINT" ":PRINT"J TO MOVE INWARDS
17 PRINT"K TO MOVE OUTWARDS":PRINT"A TO ACCELERATE":PRINT"D TO SLOW DOWN
18 PRINT"WHIT ANY KEY TO START":PRINT"HIT N IF YOU DO NOT WANT ANOTHER GO
.
19 GETA$:IFR$=""THEN19
20 IFA$="N"THENGOTO1290
21 POKE36869,255
100 B$="<<<<<<<<<":C$="##%&":L$="":D$="":S3=V-1
110 CV=30720:D0=46:A5=42:O=1:T=22:MO=-1:MT=-22:A(1)=75:A(3)=74:C=3:R=1:Z7=10:Z1=
72:Y=3
120 PRINT" ":POKEV+1,40:POKEV,0:A$="":P=1:FORI=12TO4STEP-2:GOSUB1000:NE
XT:G=0
130 FORK=1TO2:PRINT"↑"SPC(7)"↑"SPC(7)"↑":NEXTK:PRINT"↑"
140 PRINT:P=3:FORI=4TO12STEP2:GOSUB1000:NEXT
142 W=7703:FORI=7TO1STEP-2:FORJ=WTOW+ISTEP2:POKEJ,46:POKEJ+I+6,46:NEXT:W=W+46:NE
XTI
144 W=7703:FORI=8TO2STEP-2:FORJ=WTOW+I*22STEP44:POKEJ,46:POKEJ+2*I+3,46:NEXT:W=W
+46:NEXTI
146 W=8121:FORI=8TO2STEP-2:FORJ=WTOW-I*22+22STEP-44:POKEJ,46:POKEJ+2*I+3,46:NEXT
:W=W-42:NEXTI
148 W=8121:FORI=7TO1STEP-2:FORJ=WTOW+ISTEP2:POKEJ,46:POKEJ+I+6,46:NEXT:W=W-42:NE
XTI:W=2:P=32:GOSUB1100
150 C(0)=40:C(W)=41:L(0)=7964:L(W)=8130:CL(0)=3:CL(W)=1:Z=202:FORK=1TO2:POKEL(K)
```

BASIC PROGRAMMING

```
+CV,CL(K)
151 POKEL(K),C(K):Q(K)=0:OL(K)=P:NEXT:F=0-(R>W)*W:D(O)=MT:D(W)=MO:S=0:M=-(R>W):I
FC<1THEN10
152 POKEV,Z7:FORK=MTOF:J=(INT(K/W)=K/W)+2:POKES1,Z:L=L(J):D=D(J):IFJ=0THEN160
155 Q=SGN(Q(O)-Q(W))+W:A=A(Q):ONQGOTO190,200,190
160 GETA#:A#=A#+":A=ASC(A#):IFA=65THENF=W-(R>Y)*W:M=0:Z=208
162 IFA=68THENF=0-(R>W)*W:M=-(R>W):Z=202
180 IFA<R(O)ANDR(O)>A(Y)THEN208
190 TL=L+(D=T)-(D=MT)-(D=O)*T+(D=MO)*T*((J=W)-(J=O))*((A=A(Y))-(A=A(O))):NL=W*
TL-L
191 N=PEEK(NL):IFPEEK(TL)<>PORN<>POR(PEEK(L+D)<>PANDPEEK(L+D)<>DO)THEN208
192 NL=NL+D:N=PEEK(NL):Q(J)=Q(J)-Q*((A=A(Y))-(A=A(O))):ON(N=DO)+WGO201,215
200 NL=L+D:N=PEEK(NL):IFN=PTHEN215
201 IFN<>DOTHEN208
202 IFJ=0THENH=H+5-(R>3)*5:GOSUB1050:POKES1,250:GOTO215
203 IFG>60ANDRND(0)>.5ANDR>1THENN=218
204 GOTO215
208 IFN=218THENPOKES1,240:H=H+25:GOSUB1050:GOTO215
209 IFN=C(Y-J)THEN215
212 D(J)=((D=O)*T+(D=MT)-(D=MO)*T-(D=T))*((J=W)-(J=O)):D=D(J):C(J)=81-C(J):GOTO2
08
215 IFN=C(Y-J)THENGOSUB1200:GOTO150
216 POKEL,OL(J):OL(J)=N:L(J)=NL:POKEL(J),C(J):POKEL(J)+CV,CL(J):NEXTK:IFG<Z1THEN
152
230 POKEV,15:PRINT"TBONUS":H=H+100:GOSUB1100:FORI=128TO255:POKES1,I:I=I:NEXT:R=R
+1
231 FORI=1TO99:POKES1,240:POKES1,220:NEXT:POKEV,0:GOTO120
1000 P1=(P-1)*2+1:PRINT"LEFT$(A$,12-I)MID$(C$,P,1)MID$(D$,P1,4)LEFT$(B$,I-4)"
";
1005 IFI=40RI=12THENPRINT"#####";
1010 PRINTLEFT$(B$,I-4)MID$(C$,P+1,1):IFI=12ANDP=3THENRETURN
1015 PRINTMID$(D$,P1,4):IFI=12THENPRINT"X":RETURN
1020 PRINT"LEFT$(A$,12-I):PRINT"LEFT$(A$,12-I):PRINTTAB(14)"LEFT$(A$,12-I)"":RETURN
1050 G=G+O:N=P
1100 PRINTL$="SPC(10)"+,-":PRINTL$="SPC(9)MID$(STR$(H),W):PRINTSPC(9)"("STR$(C
):RETURN
1200 POKEL(W),P:POKEL(O),AS:POKES3,Z:FORI=15TO0STEP-.1:POKEV,I:POKEL(O),AS
1220 POKEL(O),P:NEXT:POKEL(O),OL(O):POKEL(W),OL(W):POKES3,0:C=C-1:GOSUB1100:RETU
RN
1225 FORK=1TO13:READX:FORI=0TO7:READA:POKEX+I,A:NEXT:NEXT
1230 FORI=7552TO7631:POKEI,PEEK(I+25600):NEXT
1235 FORI=7176TO7383:POKEI,PEEK(I+25600):NEXT:RETURN
1260 DATA7488,90,90,90,24,24,90,90,90
1262 DATA7496,0,231,66,255,255,66,231,0
1264 DATA7408,8,8,8,8,8,8,8,8
1266 DATA7416,0,0,0,0,255,0,0,0
1268 DATA7448,0,0,0,0,15,8,8,8
1270 DATA7456,0,0,0,0,248,8,8,8
1272 DATA7472,8,8,8,8,248,0,0,0
1274 DATA7464,8,8,8,8,15,0,0,0
1276 DATA7520,238,170,174,172,234,0,0,0
1278 DATA7528,224,128,224,128,224,0,0,0
1282 DATA7512,238,136,232,40,238,0,0,0
1284 DATA7536,0,0,0,0,0,24,24,0
1286 DATA7424,0,0,0,0,0,0,0,0
1290 PRINT"X":POKE36879,27:POKE36869,240
```

READY.

BASIC PROGRAMMING

PET

Pet to Epson

Here is another program for dumping from a PET to an Epson printer. This version is for 80 column PETs.

To make effective use of the program, you will need any 80 column PET and an Epson MX printer capable of high resolution graphics.

The program performs basically two functions:

1. To dump any screen window currently set on the PET to the Epson.
2. To list any program currently in memory on the Epson. All cursor characters and graphics within quotes will print exactly as they would on the screen.

When the program is loaded, the following POKES and SYSs are effective: POKE117*256+9,X and/or POKE 117*256+6,Y where X and Y are:
X=0, Y=76 normal compressed printing (default)
X=0, Y=75 double width
X=1, Y=76 double width (emphasised)
X=1, Y=75 quadruple width
POKE 117*256+4,P alters the vertical pitch.

P represents the length of each feed in 72nds of an inch. P=8 will produce closed up lines as on the screen in upper case/graphics mode. P=12 will produce spaced out lines as in lower case/upper case mode. P=12 is the default setting. P can be any value in the range 1-85 inclusive, but if P is less than 8, lines will overlap.

SYS 117*256, NNN-MMM lists a program on the Epson.

Any program currently on the PET's memory will be listed from line NNN to line MMM on the Epson, just as it would be listed on the screen. If the NNN-MMM part is omitted, the whole program is listed. Printing will be at 80 characters per line maximum. Narrower printouts can be obtained by using POKE 213,n to alter right hand margin of the window.

SYS 118*256 dumps any screen window to the Epson.

If no window is set, the whole screen is dumped. (Locations 224, 225, 226 and 213 control the top, bottom left and right edges of the window.)

The program automatically detects

which mode the screen is in and will print characters accordingly. However, if you want graphics printouts with the lines closed up, you will have to perform the POKE to alter the vertical pitch as described above.

The STOP key will abort any screen dump or listing. Unfortunately, the printer file is not closed, so it will need to be closed manually with:

CLOSE 255

The window may also need resetting by pressing HOME twice.

If you want a program that does all the above, you must first type it in. Normally, this would involve entering the monitor, listing a screenfull of memory, modifying it, doing a checksum calculation (if you're lucky enough to have checksum results provided), checking it and debugging it. With the "epson print" program, this would have to be done 15 times!

With the aid of the small basic program provided, you will be able to enter the machine code much faster than normal. Before you key in the basic program, type the following line in direct mode:

POKE55,0: POKE53,117: CLR

This will reserve a space for "epson print."

Now key in the basic program and save it as "quick mem load." You will be able to use this program to help you key in other machine code programs.

You are now ready to key in "epson print," but first here is an explanation of its unusual format:

The left hand column is the address (in hex) reached so far. The right hand column is a running check sum total. The large central block is the main program in a modified hex format. Each line consists of about 56 normal hex characters except that all the alphabetic characters have been modified to two characters:

A=.1 B=.2 C=.3 D=.4 E=.5 F=.6

Examples:

23 = 23 (no change)

2A = 2.1

B7 = .27

DF = 4.6

The reason for this modification is so that the whole program can be conveniently entered using only the numeric keypad. With a little practice, you will be able to use the keypad without looking while you are reading each line. This results in a remarkable increase in speed when keying in machine code. You will find that when keying in ordinary machine code, it is surprisingly easy to mentally convert the alphabetic characters to their equivalents.

When you run the basic program, you will be asked for a start address. Type 7500 and press return. The screen will clear and you will be prompted for the data to start at \$7500. Key in the first line of the program and press return. When the program has converted the line and entered it to memory, a checksum of all lines so far will be printed at the right hand edge of the screen and you will be prompted for the next line. The new address will be calculated for you. If the checksum for that line is not the same as the one printed, you have made a mistake in that line. Press the up-arrow key followed by return and the cursor will return to the previous line for editing. When you have finished keying in the first block (up to line \$7717), press return alone to bomb-out of the basic program. Now, re-run the program and this time use 7800 from the start address.

When you have finished the second block, "epson dump" can be saved:

Enter the monitor with SYS 4 and type
.s"epson print,"08,7500,7800 to save on disk
or .s"epson print," 01,7500,7800 to save on tape.

The "epson print" program is now ready for use. In future, whenever you re-load the program, immediately key in the following line which will correct all basic's pointers: POKE52,0: POKE53,117: NEW

BASIC PROGRAMMING

\$7500	4.30.475800.31.24.3.1.1.1.1.1004.300.2.6207600.600920.65.2.5	1922
\$7515	9004.39.1.2.40.5.620.66.2820.13.25207600.600.3.39.1.2.40	4709
\$7529	.5020700020.66.28.40.486868.15110512.4006.19.6.685118512	7315
\$7540	.190085.5085.52.194.685.45.191885.512051.50.191.22066.62	10254
\$7556	.10018409.215.3.603.4.38.215.3.1.1.38.215.3.3512.4004.54	12889
\$756A	11.6002.202.384462083.3.6.1920.1446297.62066.62.3922.40	15362
\$7580	06.150949.6.68509.38.6011.215.3.4010.18.215.3.1.1.38.21	17946
\$7594	5.3865.3855.4.40374.3.6.6.2310.4.1.39.6.6.60.46240930.42	20710
\$75A8	.1.18446.10.208420.10.22841.6.10000.1.6010.3.1100.3.561.6	23000
\$75BD	.4002.5620.211.610.6630.61.38.211.630.1.12066.624.3.3775	25625
\$75D2	.15.4885.51.6006.15.36.4002.36.512000764.34075.1.1.1.1.1.1	28523
\$75E7	.1	30903
\$75F5	.1	33453
\$7605	.6.685.4285.43.190485.442063.65.12.6.620.6.5.67.198085.5.5	36907
\$761A	.190085.5.4.15.5085.5.6.15.5285.60.1200.54.5.6.60142032	39942
\$762E	76.58.40.66.15.5.418695085.5.4.15.5.5690085.5.560.1.44.3	42951
\$7642	.582902.600.2.197.385.62.190085.614.35.176.197885.62.19	45805
\$7657	0085.61.191.22066.62.19412066.62.1.404752066.6220.51.6.6	48543
\$766D	.14.45.21.5.4.3920.4007.34.52.60038810.6384.66.389838.55	51857
\$7682	.528.40775.19008.408750.507752.508750.507752.508750.507	53422
\$7699	752.50875.1.40975.60060.507752.50875.1200.2.405752066.62	55413
\$76B0	.58.5004.40.65.1.50975.14.60.190085.64.21.5.4.10002.303	58197
\$76C4	75.6004.10.6.6297.684.650.126.640.126.640.126.641865.61	60760
\$76D9	85.63.15.6465.6285.64.1000.21.6345.652066.62.5000.600320	64034
\$76EF	66.62.38.3008.40.5.4.56.60.14.60.34.66.60.2.390.2.1.14.52	67687
\$7702	84.60.190.42066.62.190.12066.62.56.5.6203276.14.5.6.34.51	70665
\$7717	.600.2900920.16.62.19.6.620.52.62604.36.176	72829

WHEN YOU REACH HERE, RE-START THE PROGRAM

\$7800	00384492.1.19.17200003.5509090503.5000082.6.59292926.300	2210
\$7818	00384482828244000082.6.5828244380000.6.592929282820000.6.5	4766
\$7832	9090908080000038448292925.30000.6.510101010.6.500000000	6664
\$784B	82.6.58200000004020282.6.3800000.6.510102844820000.6.502	8476
\$7863	020202020000.6.540303040.6.50000.6.540201008.6.500003844	9968
\$787B	828244380000.6.5909090906000003844828.1443.10000.6.59090	12338
\$7894	989462000064929292924.30000008080.6.580800000.6.3020202	14520
\$78AD	02.6.30000.5018060618.500000.6.504181804.6.50000.362810	16100
\$78C4	1028.36000000.50101.510.500000868.19292.12.32000000.6.5	18038
\$78DB	828282000000402010080402000000828282.6.50000000010207.6	19373
\$78F5	20100000081.32.1080808080000000000000000000000000.620000	19773
\$790F	000000.500000.5000000028.6.52828.6.5280000002454.6.55448	21419
\$7927	000062640810264600006.392926.1040.100000000204080000000	22493
\$7941	0000384482000000008244380000000005438.6.538540000001010	23567
\$795C	7.310100000000001060000000010101010100000000006060000	23838
\$7977	000002040810204000007.38.19292.127.30000002242.6.5020200	25162
\$7990	00468.18.1929262000044829292926.3000008182848.6.5080000	27048
\$79A9	.54.12.12.12948800003.3529292920.30000.30808.590.10.3000	29596
\$79C0	006.3929292926.3000060929292947800000000024000000000000	31234
\$79DB	01260000000010386.3.36828200002828282828282800008282.366.3	32717
\$79F5	3810000040808.190906000080808080808080800183.17.5.6.57.5	34155
\$7A0E	3.118000000.6.60000000010101010101010101010202020202020	34876
\$7A28	40404040404040400404040404040404040000.6.6000000000000000	35675
\$7A43	0000.6.600000808080403000000000000000.5010080808080810.50	36481
\$7A5D	000000.6.6010101010101010101010101010101010102040810204080	37253
\$7A78	.6.680	40179
\$7A8F	00020202020202020070.68.6.37.5.6.3.687000.6.600000000	41800
\$7AA6	000000000000030408088142241818244281003.3424242423.30000	42717
\$7AC1	103850.5.55038100000000000000.6.6000010387.3.6.57.3381008	44168
\$7AD9	080808.6.6080808.1.155.1.1550000000000000000.6.600000000	45236
\$7AF1	08101.5101.5102080.30.50.60.68.6.3.6.5.6.600000000000000	47177
\$7B07	00.6.6.6.6.6.6.6.6000000000.60.60.60.60.60.60.60.60.60.6808080	48701

Binary Key File search

This small program does a modified Binary Search on a Key Index File, and was valid records in ascending order and deleted records placed at random, the status of each deleted record being our old friend "π."

```
1 DOPEN#7,"BINARYTEST",D1:DIMG<100>:DIMX#<100>
2 L=2:R=101:X=R:T=0:NN=0
5 INPUT"KEY SOUGHT";S#
10 G=INT((L+R)/2):PRINTG,L,R:GOSUB30:N=N+1:G(N)=G
11 IFG(N)=G(N-1)ANDG(N)=RTHENGOTO200
12 IFLL=2THENGOTO200
15 IFG(N)=G(N-1)THENG=G-(T+1)
20 GOTO70
30 IFR<LTHENLL=2:GOTO60
40 IFG=2THENLL=LL+1:GOTO60
50 IFG>XTHENLL=2
60 RETURN
70 RECORD#7,(G):INPUT#7,X#:IFX#<>"π"THENNN=NN+1:X#(NN)=X#
80 IFX#="π"THENGOTO120
90 IFS#=X#THENGOTO220
100 IFS#<X#(NN)THENR=G-(T+1):T=0:GOTO10
110 IFS#>X#(NN)THENL=G+1:T=0:GOTO10
120 G=G+1:T=T+1
130 IFG>XTHENGOTO200
140 GOTO70
200 PRINTS#;" ** NOT FOUND**":LL=0:GOTO2
220 PRINTS#;" *** FOUND ***":LL=0:GOTO2
225 REM *****
230 REM *
235 REM * MODIFIED BINARY SEARCH BY J.RUBIN OCTOBER 82.
240 REM * VARIABLES
245 REM * S#....KEY SOUGHT
250 REM * G....RECORD NO. OF KEY
255 REM * L....INIT TO LOWEST VALID REC. NO. AT START OF SEARCH
260 REM * R....INIT TO HIGHEST VALID REC. NO. AT START OF SEARCH
265 REM *
270 REM * UPON RUNNING THE PROGRAM THE APPROPRIATE VALUES OF G,L AND R ARE
275 REM * PRINTED AT EACH STAGE OF THE SEARCH
280 REM *
285 REM *****
READY.
```


WordPro 3 Plus/64™

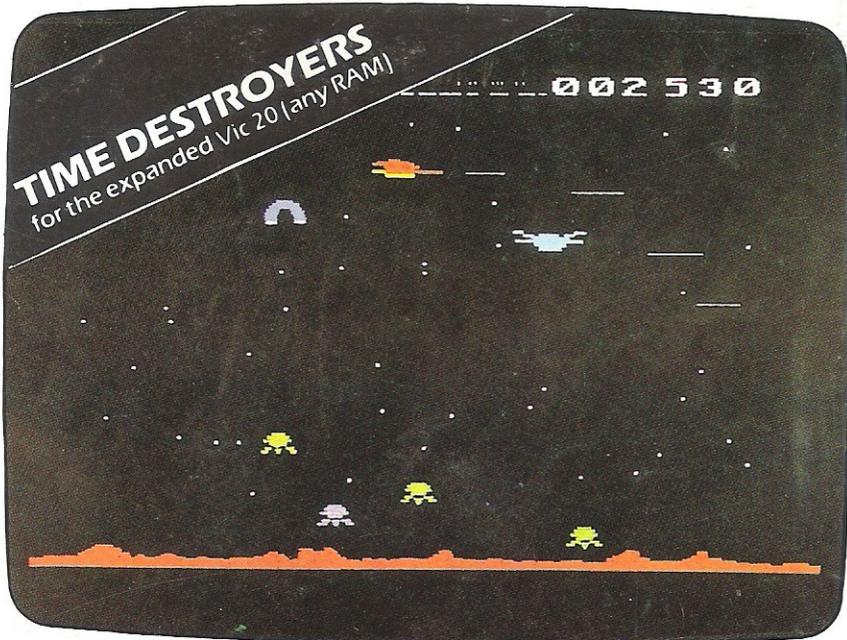
Word Processing for your Commodore 64

© 1982 Professional Software Inc.



Wego Computers Ltd.

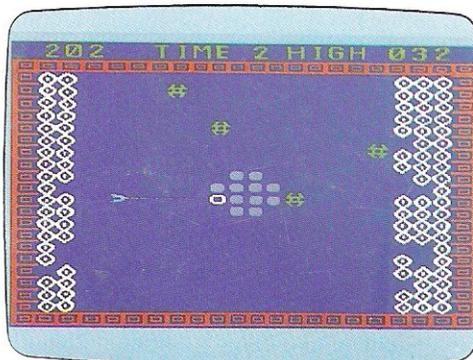
22a, High Street, Caterham, Surrey CR3 5UA Tel: Caterham 49235 Telex 296807 WEGO-G



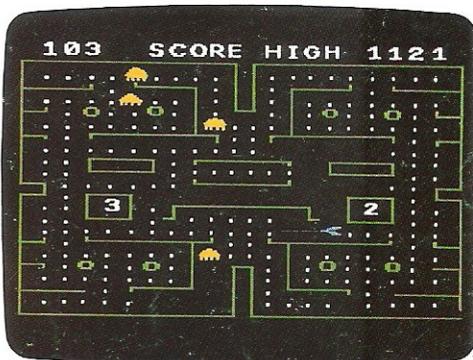
TIME DESTROYERS
for the expanded Vic 20 (any RAM)



MOONS OF JUPITER for the expanded Vic 20 (any RAM)



ATOM SMASHER for the unexpanded Vic 20



POWER BLASTER for the unexpanded Vic 20



SPACE FORTRESS for the unexpanded Vic 20

GAMES THAT ARE HARD TO BEAT

Why? Because every single Romik action game is professionally written in machine code to give you all the thrills and action of a fast-moving arcade game. Every one recorded on top quality tape, most of them playable either from the keyboard or with joysticks.

A lot of thought and development goes into every game – and we guarantee no bugs to drive you mad, no infuriating gaps to interrupt your fun.

Whether pitted against invaders from alien worlds, tracking hungry sharks or frantically stalling the melt-down of a nuclear reactor you can be sure that if it's a Romik game you'll have a battle on your hands. The kind of battle that leaves no room for mistakes or hesitation.

COMING SOON

Romik promise at least one new game every month, and soon there'll be Romik games for the Atari and Lynx computers.

FREE COMPETITIONS

Every action game purchased brings a free entry into the national competition to find the Supreme Champion, and free entry into the annual Romik Grand Master competition with its fantastic prizes.

TOP PRICES PAID!

We're always on the lookout for new, top quality machine code arcade games for any machine. If you have what you consider a marketable game, let us know. Nobody pays higher royalties than we do.

GAMES AVAILABLE NOW

Unexpanded VIC 20

Martian Raider	Shark Attack
Sea Invasion	Atom Smasher
Power Blaster	Space Attack
Space Fortress	Mind Twisters
Multisound Synthesiser	

Expanded VIC 20 (3K, 8K or 16K)

Time Destroyers	Moons of Jupiter
-----------------	------------------

BBC (Model A or B)

Birds of Prey	Atom Smasher
---------------	--------------

Dragon

Strategic Command

ALL THE ABOVE GAMES COST £9.99

ZX81

Super Nine – 9 1K games	£9.99
Galactic Trooper (16K)	£4.99

16K OR 48K SPECTRUM

Colour Clash	£7.99
Galactic Trooper	£5.99
3D Monster Maze	£6.99
Spectra Smash (plus Breakout)	£6.99
Shark Attack	£5.99

ROMIK SOFTWARE

For further details of all our games and a list of stockists complete the coupon and send it to:
Romik Software, 272 Argyll Avenue, Slough SL1 4HE



Please send me further details of your games and a list of stockists.

Name _____

Address _____

Age (if under 21) _____

I own a _____ computer