

Commodore **HORIZONS**

The independent Commodore magazine

75p December 1983/January 1984

WRITING SOFTWARE • NEW CARTRIDGES
PRINTER SURVEY • ROBOTS FOR THE 64

**IN SPACE
ON THE
64**



**WIN
A COMMODORE
DISK DRIVE
SYSTEM**

EXPLORE NEW FRONTIERS OF FUN WITH *Audiogenic*

From vintage classics like "AMOR" and "ALIEN BLITZ" to the latest classics like "KAKTUS" and "MOTOR MANIA".

From Machine Code Arcade Action through Graphical Adventure to Mind Bending Board Games - WE'VE GOT THE LOT!

THE BIGGEST RANGE EVER FOR VIC 20 and 64 - NOW ALSO DRAGON AND SPECTRUM
WRITE OR PHONE FOR FREE COLOUR CATALOGUE!

AUDIOGENIC, P.O. BOX 68, READING, BERKS. (0734) 586334



MORE THAN JUST A GAME...

Commodore HORIZONS

Editor
Graham Cunningham

News Editor
David Kelly

Software Editor
Graham Taylor

Editorial Secretary
Clea Cherry

Advertisement Manager
David Lake

Advertisement Executive
Jonny Kite

Administration
Theresa Lucy

Managing Editor
Duncan Scott

Publishing Director
Tony Ireland

Telephone Number
toll-departments
01-437 4341

Address
Commodore Horizons, 12-13 Lisle
Newport Street, London WC2E 8JL

Subscriptions
U.K. £10.00 for 12 issues, overseas
airmail (including US and Canada)
£16.00 for 12 issues, US and Canada
airmailed US\$17.95 for 12 issues.

Submitting articles
Commodore Horizons welcomes readers' contributions — either articles or program listings. Articles should be typed double-spaced with a wide margin. Programs should, wherever possible, be printed out on plain white paper, unscraped by a cassette. We cannot guarantee to return every article or program submitted, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.



Commodore Horizons is published monthly by Sunshine Books, New Press Ltd, Typesetting by 15-Step Ltd, 77 Farnborough Road, London EC1. Printed by Riverside Press Ltd, Thame Way, Watlington, Oxon. Distributed by BM Distribution, 16-18 Friary Gardens, London SW9 5HW (subscribers 01-274 0611, sales 01-26441). ISSN 0264-4866. Registered at the Post Office as a newspaper. © Sunshine Books 1983.

CONTENTS

Letters	5	Minifield	10
Hints for more services, the Vic 20's status clarified, plus for help, our review copyright wanted		A game for the unexpanded Vic 20 in which the player guides a "fish" through a field of hidden mines	
News	7	In Space on the 64	21
A laudable ending for an ambitious Alice project — among the latest information on new products, including responsive printing for the 64 and Vic 20 and a new programmable database and retrieval package		This month's star game	
Software Review	10	Profile	28
		Cliff Wellington, the person behind Commodore's software, interviewed	
Printers assessed	16	Business programming	33
A run-down on a selection of printers available, which can be used on any Commodore machine		How to write business software for the 64	
Market view	18	Software File	39
Our look at Commodore's position in the market place		Alan Amack is one of the war-related game writers here; contributed for the CBM 64 and Vic 20	
Robot power	45	Answer book	49
Dr John Billingsley explains how to find suitable and economic stepper motors when building robots and microscopy		This month you'll find answers to the eight most common questions asked of Commodore	
Competition	50	Competition	50
Commodore gives you the chance to win one of its disk drives		Commodore gives you the chance to win one of its disk drives	
Competition	50	Competition	50
Commodore gives you the chance to win one of its disk drives		Commodore gives you the chance to win one of its disk drives	

EDITORIAL

WELCOME TO THE FIRST issue of this new magazine for all users of Commodore's machines — whatever your machine, and whether you're a games addict or a serious user, you'll find something of interest inside. We'll be back on the 12th of January with a February issue — by which time you'll have had a chance to let us know what you think of the magazine. From then on Commodore Horizons will be published on the second Thursday of each month, so keep in touch. And we've got one particular topic in mind — read on...

Commodore is a survivor. As a computer company it is one of the few which has withstood the stiff winds of the price cutting war sweeping out the deadwood from the American computer industry. Commodore is sometimes blamed for the price cutting war; the company's policy is to cut its computer prices automatically in line with falling manufacturing costs — the greater the volume the cheaper the computer becomes, especially as a Commodore subsidiary, MOS Technology, makes many of the chips Commodore uses. It is good news for all of us that Commodore has now started to adopt its price cutting policy on computers to its software — many of the Commodore add-on equipment has been grossly overpriced for the past few years.

Despite the size of the Commodore market worldwide, however, there are a very few firms producing Commodore software. This is most noticeable when compared to the hundreds of small, innovative software companies producing original material for the Sinclair Spectrum computers. We think it is time that these software companies started producing software for the Commodore range of machines. Why not join us in a campaign to persuade some of the Spectrum software houses to start writing software for the Commodore Vic 20 and 64?

We will need to persuade them that a market exists for their wares, which means that they have to hear from you. Write to the Commodore Machine Software Campaign with your plans and once a month we will mail the full list of names and addresses to over 180 software companies which, as far as we know, do not produce software for Commodore computers. Let's see those letters rolling in. And tell us what sort of software you would like to see.

ANIK

AVAILABLE NOW

Leapin' Lancelot

£7.95

20 KINGSCROFT COURT
BELLINGHAM, NORFOLK NG19 1JF

CONTAINS: **TELEVISION POLYMER**
16mm PAPER (100 sheets)
16mm SCISSORS (1 pair)

AVAILABLE NOW
ON 0208 44
EPOCHS IN
0208 44000

ANIK

20 KINGSCROFT COURT
BELLINGHAM, NORFOLK NG19 1JF

YEP FOLKS — IT'S HERE

CALIFORNIA

GOLD RUSH

HOW TO DO PARAGLIDING

This happy Prospector Jake, (you are him!) one believe that you'll pay the claim with those darned jumps in boots! An a hollow! all over this territory. You get your hands on! Move from over Gold Field to another. I know, there means the stadium's honey! Must have been of 24-rob an! I mean rich seams of your Gold. All it needs to make this hope of order happy is that you help me pay every diggers last one of them claims.

Can YOU help Jake become rich, help him pay his claim, dig the mines, send the prospectors, and plant the dynamite for the right price? ... **YOU CAN!**

YEPPEE . . . Get your PAX by Shovels and the CALIFORNIA GOLD RUSH . . . **NOW!**

Amazing Arcade Action . . . Stunning Sound and Graphics Available NOW for Commodore 64, Spectrum 48, and Origen

£7.95 including P&P

SPECIAL OFFER **SPECIAL OFFER** **SPECIAL OFFER**

Order CALIFORNIA GOLD RUSH before September 22 and get a 10-game Cassette of terrific games . . . **FREE**

NOW AVAILABLE!

LEAPIN' LANCELOT Madcap Machine Magic to entice you GALACTIC SURVIVAL PAK! Every Astro-Futurist must have this! All you need is 100% to win! It's the only one of its kind!

ANIK

20 KINGSCROFT COURT
BELLINGHAM, NORFOLK NG19 1JF

YAHTZEE

YAHTZEE . . . This traditional dice is for one or more players and features superb graphics to enhance your enjoyment. YAHTZEE is Fascinating, Absorbing and Challenging.

SPECIAL OFFER

Order YAHTZEE today for only £7.95 incl. and get a 10-game cassette FREE

ANIK

20 KINGSCROFT COURT
BELLINGHAM, NORFOLK NG19 1JF

LET US HELP YOU WITH YOUR ORDER!
CALL NOW FOR YOUR REQUIREMENTS

NAME: _____
ADDRESS: _____
CITY: _____
POSTCODE: _____
TELEPHONE: _____

THE

ANIK

CHALLENGE

Are you game enough to play?

Interesting Games For Interesting People From Anik

Calling all pool players

I WOULD like some Vic 20 adventure games published because not many magazines have adventure games in them. Would it also be possible for someone to send in a sticker or pool program for the Vic?

Michael Cahill
Wickham
Wiltshire

WELL, WOULD IT? Keep reading the magazine and you'll find out if anybody has offered. As for adventures, we'll definitely be doing some reviews and programming articles soon.

Unusual Vic features

SO MUCH attention has been placed elsewhere on the limits of the Spectrum that some very unusual features of the Vic have been neglected.

Plugging a Vic 20 into a colour television and run this line:

**FOR I O D TO ENTAMENT
CHRIPPERG/NEXT**

While this is happening, eight letters page 000. Sometimes random green letters appear in the top right hand corner, where they normally is.

Another point is that the documentation for the

Superspacer cartridge is deficient. As extra commands, Graphic 4, will give almost all the RAM to the user, but will crash the computer if graphic 1, 2 or 3 hasn't been previously selected.

Other things not mentioned are the fact that Function keys can be programmed in a program, and that checks can be placed in a PRINT statement.

Stephen Lowthian
London NW6

Confusion reversed

I BELIEVE some users may be confused by the colour sign for control-3 (rod). This is shown in Personal Computing on the Vic 20 as the reversed oblique stroke (see page 115 — special symbols).

However, on our Vic 20 printing control-3 prints up a reversed 0 sign (control). This caused a lot of confusion when we were first learning to use our Vic as some programs use one symbol and some the other.

I hope this will be of some help to other first-time users.

Lesley Turner
London E16

Right royal request

I AM interested in obtaining a utility program to your magazine to help users with their home accounting. It runs on a Vic 20 with 16K RAM.

Before submitting the

program I wish to know how much you pay for programs and if you pay an outright price or a form of royalties on the amount of magazines sold.

R G Payne
Crayford
Kent

I'M AFRAID you're not going to get rich by contributing programs to Commodore. Horizons think instead of the glasses and privilege of appearing in print. We pay £2.00 for listings published in Software File, and up to £30 for our Star Game (and no, don't start thinking about royalties — our office Winks couldn't cope with the strain).

Simulation located

A RELIABLE version of simulated PRINT-AT uses the following VIC memory locations:

209-210:Printer 10 screen line
213:Position of cursor on above line
214:Row where cursor lives

The above is an extract from the Vic 20 programming reference guide.

My routine is as follows:
A = 240 - 0*240 = INT
A / 256 = C = A - 0*256
POKE 209,C:POKE 210,
B:POKE 213,A:POKE 214,
I & Post

Markus Harborough
Leeds

Cassette aggravation

MY VIC was purchased as a replacement for a ZX81. When I originally purchased the ZX81 I also bought a good quality cassette computer compatible to go with it, and that is the problem.

Recently it wrote to Commodore and duly received a letter informing me that if I took my cassette recorder to my local dealer I could have it modified. The manager of my local dealer informed me that it did not carry out this type of work and was only an agent.

They could forward my cassette recorder to Commodore but there would be a handling charge of about £30 plus the cost of the work to be carried out. At this

point I did say that other customers of his had expressed similar complaints. All that was needed in most cases, he said, was a cable with the appropriate plugs and fittings to enable the cassette recorder to be used with the Vic 20.

Have other Commodore users overcome this problem? If so, could they supply information where the parts can be purchased and how the work is carried out.

Timothy Wade
Aylesford
Canterbury

Interpreting the words

I HAVE been interested in micro-computers for well over a year now (even to the point of it becoming a mania sometimes) but to date have only "played" with those micro's in demo-rooms.

Now has come the time to buy one and after much deliberation I have decided on the Commodore 64, mainly for two reasons:

1. The built-in music synthesiser seems to be more advanced than in other micro's of same price.
2. The 64K RAM (it would cost me more to upgrade a Vic 20 to the same capacity, and besides that I hate the 32 x 32 screen display).

But in the COM 64 data sheet it states that "existing Vic and 48 volumes Pet Basic programs can be easily converted". I would like to know just what "easily" means. I saw Commodore do this and they said it's practically a complete re-write (this is not my idea of being easy).

One would think that Commodore would have designed a conversion cartridge to plug into the rear part of the 64 which would enable direct input of Vic software.

M A Wain
Slough
Bucks

This is the chance to air your views — send your tips, complaints and compliments to Letters Page, Commodore Horizons, 12-13 Little Newport Street, London WC2R 2JD



"I mean you didn't really expect your name was written in a ghostly floating red leather bound book of life, did you?"

METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

THE LLAMAS OF THE FUTURE HAVE APPROACHED THE CHALLENGE OF THE UNKNOWABLE AND THE UNLIMITED. THE LLAMAS OF THE PRESENT HAVE ACCEPTED THE CHALLENGE AND WILL FIGHT TO THE DEATH. THE LLAMAS OF THE FUTURE WILL BE THE LLAMAS OF THE PRESENT.



MA TRIS

THE MA TRIS IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

MA TRIS IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

NOVEN DUYER

THE NOVEN DUYER IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.



ABRACTOR

THE ABRACTOR IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

GRUBBLER

THE GRUBBLER IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

GRUBBLER IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.



Homescraft

AMERICAN GAMING SOFTWARE

48 MOUNT PLEASANT, TABLEY, WANTS, RICE SEN, TELEPHONE: TABLEY (27) 108 4475

LASER ZONE

THE LASER ZONE IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

LASER ZONE IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.



ATTACK OF THE MUTANT CAMELS

THE ATTACK OF THE MUTANT CAMELS IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

ATTACK OF THE MUTANT CAMELS IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS. IT IS THE MOST ADVANCED OF THE LLAMA BATTLE SYSTEMS.

All orders add 70p postage and packing

**A Portable
feast**

THE CBM 64 portable computer will go on sale in Britain before Christmas, according to Commodore UK's marketing manager, John Baxter.

First shown at the Chicago CES show in June, the 64's launch in the UK is now "imminent".

The 64 has 64K RAM and is based on the 8002-compatible 6810 chip. It has a built-in 3.5-inch colour monitor and single floppy-disk drive with 178K storage capacity. The detachable keyboard is of the full-size full-travel type.

The unit has cartridge, Centronics and monitor ports and is compatible with Commodore 64 software and peripherals, including the Multibus card.

A 288 cartridge/disk is planned for the 64 to make it CP/M compatible.

Languages planned include Pascal, Logo, Coral, Assembler and Pilot.

No UK price has yet been fixed but its US tag of \$999 would suggest a price of around the £300 mark. A review of the machine is scheduled for our next issue.

Commodore gets that tip-top feeling

COMMODORE now claims to be the top-selling UK home computer company.

A spokesman for Commodore said that reports from retailers indicate that "unit sales of the Commodore 64 and Vic 20 machines, measured sales of the Sinclair ZX Spectrum and Z801 models". Commodore's closest rivals.

"We have been British brand leader in sterling sales for some time, but now we are ahead in units, bringing us into line with the situation in the US," the spokesman added.

In the US it is now estimated that Commodore has captured

41% of the \$1.1 billion market for under-\$1,000 personal computers. In recent rival, Texas Instruments, is estimated to have a 20% share of the US market, with Times marketing the Sinclair machine only 9%.

In recent months, during a fierce US price-war, Commodore has broken ahead of its American rivals, many of whom — Atari, Texas and Mats — have reported heavy financial losses.

Indeed, so damaging has the price-cutting been to some that Mats had indicated a wish to withdraw from the home

computer market — and Atari announced in October losses of over \$400m for the third successive quarter.

Commodore, surprisingly under those circumstances, has announced record annual profits, up to \$94m on sales double-dig to over \$400m. Commodore chairman Jack Tramiel attributed the growth largely to "intensely strong demand for the 64".

In the UK Commodore has stepped up production of the 64 to try to ensure sufficient stocks for Christmas, but it already seems likely that demand may outstrip supply.

Precision offers database potential

Rose blossoms at Phoenix

SUPERBASE 64 is a new programmable database and information retrieval package for the Commodore 64 from Precision Software.

At its most straightforward Superbase 64 offers the user a menu-driven system within which individual record structures can be built up. The database can hold up to 13

files, each containing an unlimited number of records. Each record can contain up to 11,000 characters spread in up to 127 fields spread across four screens.

Within these constraints you can build up whatever record or file structure you wish.

However, with Superbase 64, you can go one step further. With the user-programmable interface part of the package you can adapt the database software to your own precise requirements using the Commodore 64 Basic in conjunction with 78 additional Superbase Basic commands. *See, find and so on.*

Says Precision's Peter Thomas: "You can build almost any specialist application you want. For example, if you want an accounting system you can build one with very little work."

In the next six months the company plans also to release a range of add-on software packs for Superbase 64, developed using the Basic extension — providing, to start with, stock control and accounting.

Superbase 64 is available on disk, complete with a 208-page manual, priced at £99.95.

PHOENIX Software is a new games company set up by Gerry Rose, one of the founders of the predominantly Vic 20 software house Basic.

The new company has an interesting idea — it will sell two-variable games containing both an arcade-style game and an adventure type program.

Before you can begin to tackle the adventure you must master the arcade game, giving you access to the loading code for the adventure. Also, clues for solving the adventure are revealed as the arcade game play progresses.

To begin with Phoenix has two titles for the Vic 20 and one for the Commodore 64.

In *Four Gates to Freedom* for the Vic you must first destroy the four gates which bar your way, before obtaining the statements of the planet Xalios to rescue 20 scientists trapped in suspended animation.

In *The Sorcerer's Apprentice* for the Commodore 64 you must temporarily stop the broom from sucking water. Then you venture into the sorcerer's castle in search of the spell to put paid to the broom once and for all.

All titles are priced at £9.95.



BY THE END of November Channel 4 software should have completed coverage of all 10 Mysterious Adventures from Digital Fantasy for the Commodore 64. The 10 titles are all traditional-style graphic adventures written by Brian Stewart: *The Golden Bats*, *Arrow of Death 1*, *Arrow of Death 2*, *The Time Machine*, *Cerberus*, *Feasibility Experiment*, *Escape From Pelor 1*, *The Wizard of Alroy*, *Pelorus* and *Andromeda* and *The Little Soldiers*. Each of the titles is priced at £9.95, available on cassette.

And now . . . Revenge of the Mutant Camels

JEFF MINTER of Commodore is working on a new game for the Commodore 64 — Revenge of the Mutant Camels.

If it you take the role of a mutant camel, fighting back against the camel's defeat in Jeff's previous arcade action, Attack of the Mutant Camels.

You have three mutant camels with which to win your way as far as possible through more than 40 attack waves.

Each screen has a different theme — in Revco and Roll-up you are attacked by luge builders and mutant cigarettes. In other screens you meet mutant mutant camels, a figure called Eugene burling sax and, worst of all, Mistic Minter.

Your camels can fire in eight



Jeff Minter: "The camels jump in a really ludicrous way"

directions and can jump. Says Jeff: "The camels jump in a really ludicrous way and when they sit down they look very silly. It's great."

The new 64 game should be

finished by mid-December — priced at \$30. Then Jeff will start work on his next Vc 26 game, the follow up to Megaplanets: Lunar Battle at the Edge of Time.

Cheaper printing

If YOU are looking for an impressive printer option then Seltzer Computers in Broomfield may have the answer.

For \$28.95, the company is offering an interface and power-supply that will enable the low-cost Sinclair thermal printer to be used with the Vc 20 or Commodore 64.

Software supplied with the interface converts the Commodore character set into the dots printed by the Sinclair ZX Printer and provides a number of control commands.

Seltzer will also supply the package complete with a ZX Printer for \$71.95.

Alice makes you wonder

ALICE in Wonderland is a new disk-based graphics adventure for the Commodore 64 that looks like setting the standard for future releases.

Following the story of the original Lewis Carroll book closely, the adventure takes the form of a sequence of sophisticated arcade-style games featuring an animated Alice figure.

What marks the game out are the cartoon-quality graphics and the continuous soundtrack of music.

Alice has been developed by a US software house and will be available in this country through Androgem. No date of arrival or price have yet been set.

Corby factory in full swing

PRODUCTION of the Vc 26 and Commodore 64 machines is now in full swing at Commodore's new plant in Corby, Northants.

Over 3,000 computers a day are coming off the production lines, only eight months after

Commodore announced its choice of Corby for the £20 million plant.

The new factory is the centre for European manufacturing of home and personal computers — one of four such sites worldwide — and machines

from Corby are exported to the rest of Europe, Scandinavia and Africa.

At present the Corby works employs 160 people, but Commodore is currently negotiating a loan from the European Coal and Steel Community to allow expansion in 1984. This would more than double the numbers employed and push the number of computers manufactured per year at the site over the 3 million mark.



COMODORE is certainly set to score points with British government — especially the Basketball. The English Basketball Association has granted a £70,000 two-year sponsorship from the company over the next two years. In the past Commodore has donated and sponsored a unique scoring program for the association which allowed information to appear instantly on the screen during TV transmission of games.

Stack promises all the fun of the fair

THE STACK Light Rifle is a new idea for the Vc 20 and Commodore 64.

The rifle, when connected to the computer running specially developed software, can be used to "shoot" targets on-screen.

The device detects a hit or a miss by comparing the time the trigger is pulled with the time the trigger takes from starting a scan to reach the point you are aiming at.

When the trigger reaches the point on the screen at which the rifle is aimed, light from the rifle activates a light-sensitive

cell inside the rifle barrel.

The rifle will only work with software written specially for it. So far Stack developed six titles: Bats and Cats, Crow Show, High Noon, Clonus Twofish, Escape from Avcatus and Big Game Safari.

The Stack Light Rifle will be available from mid-November and is supplied, complete with three games titles, at a price of £29.95.

If you think you've something worthwhile, call 01-407 4340 and let us know

Commodore brings out a mixed batch

COMMODORE Business Machines are more usually known for their hardware than their software, but this month sees the start of a determined campaign on their behalf to break into this lucrative market.

We've picked out some of their games for both the Vic 20 and Commodore 64, and to get the ball rolling we'll start with the 64 side of things, and the latterly named *MaggotMania*.

This Commodore 64 game is supplied on cassette, and although you have the option of using either a joystick or the keyboard to control the game's events, those of you with less than 20 fingers would do well to use a joystick.

Like so many other games this one falls into the category of variants on a theme, as it is nothing more than a poor impersonation of the arcade favourite *Centipede*.

Golden Defender

For those unfamiliar with the genre, Commodore (and *MaggotMania*) cast you in the role of defender of the garden, a sort of Buck Rogers meets David Bellamy, who has to fight off hordes of maggots, spiders and snails. The maggots are merely intent on eating you, and walk their way about the screen consuming off any flowers that happen to get in their way.

You, being a lesser creature, cannot cannon in the same way, as any collision on your part with a flower results in the loss of a life. Spiders enjoy similar luxury to the maggots, and they make occasional forays into the garden in the hope of bumping you off.

The snails aren't particularly dangerous, and provide you with a 1,000 point bonus should you hit one before it destroys too many flowers.

In action it's a more-or-less inspiring version of an arcade favourite, and on the 64 comes out looking more like a shoddy version of the rightly popular *Goldwren*. From that company reborn with *Llama*.

Your little creature is confined to the bottom few rows of the screen, and what some of the maggots inevitably get past you, they race about at breakneck speed in a frantic effort to collide with you and thus lose another of your lives.

Response from the joystick is quite reasonable, but overall the sound and use of graphics are merely hinting at the power of the 64, and are by no means using anything other than a fraction of the capabilities provided.

A poor game, considering what could have been done. Stick to the arcade, if you

SOFTWARE REVIEW

Pete Gerard takes a long, hard look at the software Commodore itself puts out



Just after a good one for the fish

like demolishing maggots, spiders and snails, a grotesque delight.

Paper Lander, a familiar-sounding title from the dawn of computer games turns out to be another flop. In its current guise, after appearing under names such as *Lunar Lander* in the early *Pot* days, a few appeared on the Vic 20.

Little outcrafter

The version produced for the 64 has hardly changed at all from the Vic version, and is as boring now as it was then. About as exciting as making toast.

The object of the game is to land a spacecraft on the surface of the planet Jupiter, a surface which has strange platforms on it, with bonus scores written on them. Carl Sagan, eat your heart out.

Using either joystick or keyboard, you have to manoeuvre your spacecraft left or right, and your only other control is over the thrust of the rockets.

A delicate hand on the controls is required in initial experiments with the game left me falling the NASA initiation test and taking giant leaps into outer space again. Jupiter seems a bit too big to miss altogether, but when your only control is a joystick, it's all too easy.

This game is boring. The initial screen shows three platforms on the surface of the planet, which give you either 2, 3 or 10 times bonuses for achieving a successful landing. When you near the top of one of these platforms the screen image expands, and a single platform fills up the entire playing area.

Unless you're an extremely fish hand at controlling the joystick, and manage to land at precisely the right speed, exactly in the middle of the platform, it's back to the launch pad as another ship hits the dust.

Once you have got the hang of it all, the game ceases to lose whatever minor interest it might once have held, as there are no additional bonuses, no speeding up of the action, and no changes. You just keep on landing on the planet, then going back for another go again.

The one virtue of this game is that it is supplied on a cartridge, so you won't waste several minutes waiting for it to load.

Land in the clouds

Clowns. At this stage, after ploughing through the first two games, this simply summed up my opinion of Commodore for looking to put them onto the market at all.

But *Clowns* did at least manage to rescue some of my faith in their ability to write computer games even if, like so many other games, this one is about as original as most of the music in the current top 20.

Clowns first appeared for the Commodore *Pot* back in 1979, and once more this new version for the Commodore 64 (supplied in cartridge format again) has added very little to the original game.

You control a little clown on a seesaw who has to balance it under another clown who has, kamikaze-style launched himself into space from one of the four platforms on the edge of the screen.

If you manage to position this see-saw correctly, the impact of the clown landing on it sends another clown sailing towards the top of the circus tent (obviously known as the top of the screen) where, *Yow!*-like, he has to nut one of a succession of balloons passing across the top.

There are three rows of balloons, in different colours just to show that the Commodore 64 has got colour, and clearing whole rows of balloons rewards you with various bonuses. Each balloon is also worth a few points, depending on its colour.

One thing that is noticeable about the packaging (judgy by its absence is a warning saying that this game requires the Commodore games paddles in order to play

it properly. No joystick controls, no keyboard controls, so unless you're one of the very few people who have a set of paddles, this will not be one of your most interesting games.

Once you do get started it is actually quite addictive, as your little chases lead about the screen, leaping up and down on the sea-sons and nudging all the balloons that they can find. The action gets faster as you progress, although you can get a satisfying high score by hardly moving at all, once the rhythm has built-up.

To conclude, quite fun, but ultimately one has to say that the 64 deserves better than this. And they should have said something about these paddles!

Join the rat race

Ratler Rat Race — a game about concerning perhaps? No, no, this one puts you in the guise of a blue rat, being chased by a horde of red rats, gobbling up cheese as you move around the screen, and attempting not to bump into any of the deadly cats the lark about.

The screen display is quite imaginative. The left-hand side of the screen shows only a part of the entire maze in which you find yourself. The right-hand side contains all the details of the scores, bonuses, lives left and so on, together with a miniature map of the whole maze, showing where all the cheeses are to be found.

Since your little blue rat requires a lot of cheese before he can progress to the next level, this comes in quite handy. Of course, one could say it is there to make the programmer's life easier when controlling sprites, but that would be unworkable.

Once again this comes in cartridge form, and this is much to be preferred to tapes or disks. It's much more reliable, and takes just seconds to install.

Using a joystick as your control, the action is fast and furious, as the chasing red rats (there on the first level) show an uncanny ability to find and chase after you. They can be put off the screen for a while by spraying a smoke screen behind you, but you've only got a limited amount of smoke, so be careful.

One of the lamps of cheese is a special one, which doubles the score you get for eating any other bit of cheese. At least, it does until you lose a life.

Getting through one level brings you to screen two with four rats after you. Getting

through this one brings you to the main speed run, where you have the entire time allowance (not very generous to say the least) before the super-sonic red rats come after you. When they start, you have no chance! They move at least twice as fast as you can, so you might as well desert the sinking ship and start another game immediately.

It is a good game, and certainly the best of Commodore's 64 bunch.

Face Arko could be the result of playing too many games in one day, but in real life it is a family entertainment game for the Commodore 64.

Back to cassette for this one, and after waiting nearly seven minutes for the game to load, you really appreciate cartridges.

The time spent waiting can be filled up by reading the marvellously comprehending information sheet supplied with the tape. This describes the action in words of few syllables, and in pencil you are told that the screen will fill with a hilarious collection of faces. After you're managed to control your hysterical laughter, which isn't too difficult, the game proper commences.

Once again the comment has to be made that, for a graphical machine, this program does little to show you any of the features available, as everything is done in suitably chunky graphics.

Memory test

A face will appear on the screen, and after five seconds disappear again. From memory you then have to recreate the screen face using a variety of commands.

Separate keys control the hair, eyes, nose and chin, and using a combination of the lot you have to redraw the earlier face. A good memory tester with the reviewing team frequently scoring less than half marks when producing the face. However, by the time you've drawn up half a dozen different graphics on the screen, the interest begins to wane, and the fingers lock themselves for something different to do.

A good game for the times amongst us, and, as a memory tester, it does have a role to play in the educational world. But first they would have to re-write the instructions, which really are quite dreadful, and perhaps do something about the graphics. They are reasonable, but the 64 could do better. Half marks for trying.

With Sea Well it is back to cartridges again, and just as well, otherwise a few

more minutes would have been wasted.

I dispute of software companies at times, and with this program being the result of a joint venture between Commodore and the electronic genius of Bally, responsible for many of our best arcade and pinball machines, there is really no excuse.

Quite simply this is appalling, and why anyone wasted money on getting it onto the market is beyond me. You are in charge of a naive submarine glued to the bottom of the sea and screen, handling a limited supply of torpedoes to shoot up at the ships passing above. Different sizes of ships score different points, and needless to say the smallest, fastest ships get you the greatest points.

Facilities needed

There is a time on the game although this can be changed if so required. Once again you have to use a set of paddles, as there are no options for keyboard or joystick control of either of the submarines in this two-player game.

I tried hard to find a redeeming feature in the game, I really did, but there just isn't one. All you have to do is sit at the bottom of the sea and launch torpedoes up at the never-ending parade of enemy ships above.

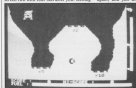
There is no radar control, no movement of your submarines, no decent sound effects, and better graphics were achieved on the earlier Commodore Pet version of the same game (and outside of course).

One could go on, but why bother? If this is Commodore's attempt to attack the software market, they're in for a long winter.

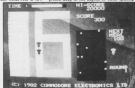
Commodore have also a series of arcade games for the Vic 20, some old, some new, but the over-riding impression of the games is that they are much better than Commodore's own games for the Commodore 64. Why, why, why?

Comix Ballerak, based on the arcade game of the same name, first appeared as a Pet game in 1980, written by one Derek Hipkin. Whether he is the author of this Vic version I don't know, but this is a faithful reproduction of that Pet version.

Supplied on cartridge, you can use either the keyboard or a joystick to control the action, and for once the keyboard is just as easy to use. You are a little spaceship at the bottom of the screen also can move left and right, and who has the job of guarding a prize deep in the depths of outer space.



Ratler Rat Race: needs a delicate touch on the controls



Face Arko: the action is fast and furious

4 In this prison are three offending aliens, and they are surrounded on all sides by rows and rows of bricks. But, there is a pathway—a corridor*—as hordes of other aliens are lined up in formation at the edges of the screen, intent on stopping it between your fire and sealing the bricks of the jail, one at a time.

As they move back and forth they are also firing at you, and your three Spear Invader type defenses soon begin to crumble under the onslaught.

Occasionally one of these aliens will go berserk, and while the rest stand still will run about like an alien possessed, scattering bricks at a rapid rate. A mysterious mother ship also appears from time to time at the top of the screen. High bonuses can be achieved by zapping this one into cosmic debris.

Everything goes along at a nice lick, and by the time you arrive at level three you more things begin to happen. Between levels the jail may or may not be rebuilt, depending on how many lives you've got left, and how many prisoners are still in the jail.

On the third level, an alien appears directly above you, and he can only be killed by shooting him at the edge of his body. By the fifth level, a suitable choice list of aliens is dancing about your ship, and when you eliminate all five of them, the entire lot reappear and start bobbing about again.

This is a superb game, with so much happening. Supplied on cartridge, it



Omega Invader: a superb game giving lots of action for your money

deserves a place in every game player's collection.

Omega Race is another fast action, destroys everything that moves and everything that doesn't space game for the Vic 20. Cartridge form again, and you'll need a joystick or a set of games paddles to play this one.

A nice opening feature is that you can change the background and foreground colours of the action. This could be very useful on some sets, as too many Vic games seem to appear in the strange combinations of colours that generally render something on the screen as being totally illegible.

If you get it wrong with Omega Race you're only yourself to blame. Once you start playing you really do have to destroy everything. In the centre of the screen is a rectangular block which you can't penetrate, and underneath that is sitting a horde of aliens, just waiting to get you.

Controlling your spaceship is, to say the

least, difficult. Once you've started moving in a given direction, stopping and changing direction is virtually impossible, and you just have to sit and wait while your ship blunders serenity around the screen, consuming off walls and the block until it finally comes to a rest. That's inertia for you.

While you blunder about, the aliens come after you, and there are a number of different types of nasties, each with their own little trick up their little alien sleeves.

This game is fun, and even if you do start blithely bumping into things, it should at least provide a few laughs along the way.

By the time you've worked out how to control the ship properly (30 games later), the game does begin to make more sense, and you can get on with the job of saving the universe. Zapping different aliens generates different scores, and everything, as usual, just goes faster and faster as it goes along from level to level. Another good action game for the Vic. ■



SUNSHINE

Mastercode Assembler for the Commodore 64

Full Commodore 64 Assembler/Disassembler
Only £14.95 inc VAT

Mastercode is a substantial and complex program, providing a host of features of use to anyone interested in machine-code programming on the Commodore 64. Despite its complexity, Mastercode is designed with the user in mind and is far easier to use than many assemblers/disassemblers.

Mastercode features:

- Machine code monitor
- File Editor
- Disassembler
- Assembler

People purchase Commodore 64 Mastercode Assembler in £14.95 inc VAT. Enclose cheque/postal order for £14.95 payable to Sunshine, 12/13 Littlewood Street, London WC2R 2LJ, or telephone your order through Access Mastercode on 01-437 4343

Name _____
Address _____

Signature _____



LOOK OUT FOR THE SUNSHINE RANGE IN W.H. SMITH'S, BOOTS, JOHN MENZIES, OTHER LEADING RETAIL CHAINS AND THROUGH OUR NATIONAL NETWORK OF BOOK SHOPS AND SPECIALIST STORES.

DEALER ENQUIRIES: 01-437 4343



Another devastating new game from the fabulous Postern range.

Defeat the flock of
marauding FIRE HAWKS.

Escape from the SNAKE PIT.

Ride the mighty SHADOWFAX.

Prepare to repel the enemy
in SIEGE.

Defend our planet from
destruction in 3 DEEP SPACE.


The colourful Postern range is available on a variety of scales. Write quantity of each game required in the boxes provided.

Game and Price	Spectrum	C&A/No. 20	B&C '87
Fire Hawks £1.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snake Pit £4.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shadowfax £2.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Siege £6.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Deep Space £7.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Total £ _____ or Amount _____ No. _____

Name _____

Address _____



POSTERN

POST TO: Postern Ltd., P.O. Box 2, Annersford, Chatterton, Glos GL54 5SR
 OR PHONE: 04534 20000 (04534) 444 (even 41534) (week 20745)
 Postern is always on the look out for any new games you might have developed.

PRODUCTS FROM

Oxford Computer Systems (Software) Ltd.

SPEED UP ANY BASIC PROGRAM WITH OUR COMPILERS

By 10-20 times. Speed increases, reduced program size.

BASIC COMPILERS

Fortepack Compiler for 4000-16000 series £125.00

Integer Basic Compiler for 3000-8000-16000 series £75.00

CROSS-COMPILERS FOR BASIC

Fortepack Compiler source on 8000 series to run on COM64 £125.00

8-64 Integer compiler compiling on 8000 series giving machine code executable on COM64 £125.00

B-Fort: Compiler source on 8000 series to run on 700/9-128 series £60.00

S-700: Integer compiler compiling on 8000 series giving machine code executable on 700/9-128 £60.00

GIVE YOUR VIC OR 64 FULL IEEE AND RS232

For a cartridge. Compatible with any software.

Interpac: Five-standing interface giving IEEE488 and RS232 capabilities to COM64/VIC20 £200.00

SPECIAL OFFER

Order five more Interpacs before 31st November 1983 and get a free Fortepack!

All prices are exclusive of VAT. There is also a small charge for post and packing. Dealer discounts are available on all products except the 700 cross-compiler.

Compilers are supplied via stocks. Interpac shipped 7 days in stock.

COMMODORE SOFTWARE

Many compilers for the Commodore and the 700/9-128 are available only from Commodore.

Oxford Computer Systems (Software) Ltd.
Hemel Hempstead, Bucks, HP1 1JL, England
Tel: (0494) 842700; Telex: 302107; Ref: 002.



VISA accepted

3D COMPUTERS

THE HOME COMPUTER SPECIALISTS

Easy Parking at all branches

With more branches than any other Commodore Home Computer specialist dealer we offer:

ONE-STOP SHOPPING

FOR YOUR



Call in at your local branch for friendly advice and service.

See a complete display of hardware and software to build up your micro system.

SOFTWARE

All the best offers from the top U.K. and U.S.A. software houses, plus:

LAGANSOFT DATABOFT
EPYX BROOKBANK
MICROEM BUBBIT
INTERCEPTOR SUPERSOFT
ONLINE ABRASCO

PERIPHERALS

DISKS
PRINTERS
JOYSTICKS
MONITORS
BAVICOLOUR
LIGHT PENS

LARGE RANGE OF BOOKS,
CASSETTES, CASSETTETS &
PRINTER PAPER ALWAYS IN
STOCK

TOLWORTH

790 Tolworth Place South,
Tolworth, Sutton,
Surrey KT8 9SD
Tel: 01-837 4317

BUTTON

30 Station Road,
Rehmet, Sutton,
Surrey SM2 6SS
Tel: 01-842 2534

EAING

114 Gurnebury Avenue,
Ealing, London W5 4HB
Tel: 01-882 5855

RICKMANSWORTH

Greystone Works,
The Green, Coaley Green,
Rickmansworth,
Herts. WD3 7MJ
Tel: (0823) 776250

MILTON KEYNES

Unit 1, Heathfield,
Rushy Bushes,
Milton Keynes MK12 6HF
Tel: (0895) 317902

LUTON

1 Manor Road,
Caddington, Luton,
Beds. LU1 4BB
Tel: (0582) 747104

All the pleasures of printing — and some of the pain

Pete Gerrard assesses the range of printers on offer for Commodore users, from daisywheels to dot matrix models — and offers some advice to insomniacs

ANY COMPUTER that takes itself as all seriously can be connected to a wide variety of printers, covering such diverse interfaces as IEEE, RS232 and Centronics.

However, earlier Commodore computers, before the company launched into the home market with the 26 and Commodore 64, were blessed with a peculiar version of an IEEE interface. While a smart purchase would give you the opportunity of linking up to many standard IEEE printers, it would also leave you £15 worse off. A little bit more expenditure could expand your world to include a veritable host of RS232 and Centronics printers, and we'll be taking a look at just some of the printers currently available later on in this article.

Slow, slow ...

Of course, you could always use Commodore's own printers, ranging from a (relatively) inexpensive dot matrix printer to a (not-so-relatively) expensive daisywheel

printer. The speed of the latter devices must have left many people thinking that they could type faster themselves.

Owners of Commodore 40k and Vtc 20k were in a less fortunate position, in that the interface provided on these two computers was compatible with nothing other than Commodore's own peripherals. The dot matrix printer issued by Commodore itself is not only incredibly expensive, but also very slow in operation, and very, very noisy.

Enterprising manufacturers, ever quick to make a fast buck or two, have produced a whole collection of interfaces which allow your humble home computer to connect up to all of the interfaces mentioned earlier. But beware, interface buyers, not every computer will work with every piece of software. Word processors, one of the primary reasons for acquiring a printer in the first place, are very fussy about which interface you use, so insist on seeing a working demonstration before buying.

The type of printer that you get will be largely determined by the work to which it will be put. If it's use is to be primarily private, producing letters and internal reports, the chances are that you'll be able to get away with buying nothing more than an ordinary dot matrix printer. The quality of the output won't be too great, but it will certainly be legible, and a good dot matrix should be able to whizz along at speeds well in excess of 300 characters a second.

... quick, quick ...

If the printed material is to be seen by anyone other than yourself, for instance, in a company using the printer as part of a word processing system, you'll probably have to spend rather more money and be prepared to put up with a slow, but high quality, daisywheel printer.

Some of the devices now available allow you to mix these two print types to a limited extent, in that they will normally act as a dot matrix printer, but can, with a



Some of the range at Triumph-Adler — which offers one of the cheapest daisywheel printers along with dot matrix models

Technique known as double striking (literally, printing the image twice), produce a reasonable impenetration of the type of output more commonly associated with a daisy-wheel printer. As ever, you pay your money and take your choice.

New printers, other than Commodore's own, will allow you to reproduce the graphics character sets found on the actual computer, although most of them will allow you to define characters and produce, for example, dot by dot copies of the screen. However, this requires some software to be written by you, the user, so we'll stick to straightforward printers, starting with the DREH 156, which can operate in either RS132 or Centronics modes.

Incidentally, all of the printers listed here can be used with any of the Commodore range of computers. You'll just have to get the interface appropriate to your own machine.

The DREH 156, which is distributed by Triumph Adler (27 Goswell Road, London EC2A), is a 120 character per second (abbreviated from now on to CPS) printer, with the ability to print bidirectionally. The number of characters printed per line is software selectable, and can range from 128 to 124, although this latter mode is the type that requires an extremely powerful magnifying glass.

... slow

All sorts of character sets are available with this printer, but at a price of £875, you may care to take a look at the slower, but cheaper, DREH 80-91. Again from Triumph Adler, this is down to 80 CPS and 1240. Apart from having only a 140 column line at maximum, the other real difference between this machine and its big brother, the DREH 156, is the print speed. ABC, of course, the price.

Cheaper still, at £498, is the Pack 6510 from Pack-Adda (Maidstone Road, Rochester, Kent ME1 10PH). This is a 120 CPS dot matrix printer, with a column width of up to 80 characters, which is switchable down to 12 columns, should you so desire it. There's quite a wide range of character sets available, and also a number of different print modes, including condensed and compressed. This can be linked up to either Centronics or RS132 interfaces.

The next lot of printers are by Epson (Dorland House, 318 High Road, Wembley, Middlesex HA9 6UH). Epson has long been known for producing good, cheap, dot matrix printers, and its latest range of models have done nothing to harm that hard-earned reputation. Their one failing perhaps is the ludicrous combinations of letters they go under. Thus we get the RN-80-FT, which is closely related to the FX80, which in turn relates to the RN series of printers, and so on. Why can't they just have names?

Anyway, coming next, the aforementioned RN-80-FT is a 100 CPS printer with a variety of typefaces and sizes, supplied with a Centronics interface (although this can be converted into either IEEE or RS232 if required), and capable of taking either friction feed or tractor feed.

At just £205, this is worth considering, as it is slightly more expensive big brother the FX80. This costs £488, but has the ability to print at almost twice the speed (180 CPS), and produce near letter quality output, as it's possible to double strike everything. Out of all the printers looked at here, the FX80 has got to be a personal favourite. I've owned one for a number of months, and have yet to find a problem with it. The range of commands on the computer that's driving it? A fine printer, with an excellent manual.

Finally the latest dot matrix printer that is readily available for any Commodore computer is the DREH 250, again from Triumph Adler. This comes along at the amazing speed of 250 CPS, and comes complete with either an RS132 or a Centronics interface.

However, if the computer that you happen to own is a Vic 20 or a Commodore 64, these seem like pain in paying around £200 for a computer, and then another £1,499 for the printer to go with it. Personally, when the printer costs seven times as much as the computer, I feel that the time has come to go elsewhere. If you're extremely rich, obviously the DREH 250 has a lot to recommend it. If you're like the majority of us, it's either bankruptcy — or try the Epson FX-100. This is the latest and greatest dot matrix printer to come out of the Epson stable, if the specification sheets build true.

At £598, the FX-100 has everything that the FX80 has, including the 180 CPS print speed, optional interfaces of every kind, and superb graphical facilities, but it also has a much wider carriage. A stock little number, it should sell by the thousand.

Many companies seem to make a living out of impersonating Epson printers, and indeed the early Commodore printers for the Pet range of computers were out-does versions of Epson models. This is not a bad thing (imitation is the sincerest form of flattery), and all that, but should check whether the printer you're thinking of buying isn't already available from Epson, at a much cheaper price.

Small type

But we digress. When examining specification sheets for printers, obviously they will all try and charm you with a wonderful range of capabilities. Most printers, however, do have a failing somewhere along the line, and this is either not mentioned, printed in minuscule type, or disguised in some way.

The most common failing is in speed of printing, and a phrase often used by manufacturers to hide a slow print speed is the term lines per minute, instead of characters per second. By using LPM instead of CPS they can still put down a large number, and hope that most people won't think it to be a slow printer. While 35 LPM sounds quite good, remember that a line is typically 80 characters across, and that 80 times 35 equals 4,800 characters per minute (73 CPS). This is not quite as fast as it first sounded.

All this is by way of introducing the



One of the cheapest, from Epson, white.



Great alternatives after the Epson FX-100, with the...



Double 1000's, double brother to the 100 CPS



Intex CX 80, which looks like an early Commodore printer, prints at the aforementioned 55 LPM (although to be fair it can print at 120 CPS in certain special cases, like printing line after line of the same character), and with a Commodore-compatible IEEE interface will not cost you back more than £241.

As a pure graphics printer it has many advantages over other conventional dot matrix printers, because it has a choice of seven different colours to print in, and a non-addressable pair facility. However, program listings in high resolution printed in seven different colours tend to look a little odd. Unless your need is a highly graphical one (in which case contact DV Computer Services, West Croft Industrial Estate, Manchester Old Road, Rhodes, Middleton, Great Manchester M24 9P3), we'll go back to ordinary printers, and look at a little number from Massachusetts Tally.



Massachusetts was at one time supplying Commodore with printers, although I believe that agreement was discontinued a while ago. Still, it is continuing to produce the MT80, which is a 6798 Commodore-compatible 80 CPS dot matrix printer. Massachusetts seems to have gone all-out to be compatible with anything else currently available, so the MT80 can handle all the Epson codes, as well as having a number of its own. Any one of a million different interfaces will, quite a few) can be hooked up to this one. It is also very quiet, a boon if you happen to be next to the thing all the time it's working.

Delayed

Not enough of dot matrix printers. One at least in the above collection should suit most people. As many people using Commodore computers for pleasure will probably also use them for business, so we'll turn our attention to some of the delayed printers currently available.

All of these will work with a Commodore 64 or Vix 20, provided that a suitable interface is connected by the Interpod — which comes from Oxford Computer Systems, Stratford Road, Woodstock, Oxford OX7 1AR. But as most of them cost upwards of a thousand pounds, they will probably be of more interest to the business user. Still, if you own one of the home models and fancy a little bit of letter quality printing, read on.



One thing that just about all delayed printers have in common is that they are silent. Thus their primary use would not be in producing program listings, but in printing out letters, reports, notices, etc. You don't buy a delayed printer to list out adventure programs.

Triumph Adler, unnumbered rather than talking about dot matrix printers, produces possibly the cheapest delayed, the TR22 170-B, which costs £725. This is not the fastest of printers, at just 37 CPS, but it is of a high quality, and it is also quiet. A maximum of 198 extremely small characters can be printed across a line, and with a whole range of optional interfaces, covering Centronics, Qbus and RS232, it should be able to link to just about anything.

Fast, at 55 CPS, but more expensive at £1,675, is the DPW 2025, from the same company. Millions of advanced features, including double print, bold print, underlining, printing up to 268 characters a line, and so on, make this a versatile and fast delayed printer. Not many models under 50 grand will print as fast as this one will.

Many-coloured dreams

A company down in Woking is producing a whole range of delayed models, including one at just £475. However, the Cortex D-14 won't win any prizes, as it produces its letter quality output at the year-industry rate of 33 CPS. Still, you can print in either red or black, and a large print buffer compensates somewhat for the slow speed by freeing the computer to get on with some more work while everything is being printed.

The D-14 comes from Geneva Electronics (Fife Farm Road, Woking, Surrey GU24 1DW), as does the Diablo 620 800 at 2975. These two are fairly similar, printing at 29 CPS and 40 CPS respectively, and including various font sizes, character widths, margin controls, and so on. RS232 interfaces are available on both models, but the latter scores in its graphic abilities, as it incorporates Diablo's Hylight vector plotting — useful for all those business programs that chart out bar charts and histograms at the drop of a byte.

Many other delayed printers are available, including the Olympia E258 3000 80, from Intelligent Interfaces (435 Wood Street, Stratford-on-Avon, Warwickshire CV37 6JQ) at £1,136. Smith Corona is another commonly encountered name, and its extremely cheap (£349) 120 words a minute TP-1 model has already found a few friends. This can be obtained from Discus Trading Company, Danden House, 51 High Street, Epsom, Surrey TW20 42SA.

Finally, as a shade under £4.5, is the Rytewriter (at least a printer with a name), from the same Discus Trading Company. This seemingly covers with a Centronics interface, although you can get a Commodore-compatible IEEE interface fitted if desired. Although it has a slow print speed of just 8 to 12 CPS, it has one feature which is truly amazing at this price: it is also a typewriter, having a full standard keyboard fitted to it. Since it only weighs 21 pounds, it also becomes portable rather than transportable.

I've covered a reasonable range of printers, from the surprisingly cheap to the eyebrow-raising expensive, with print speeds going from mail's pace to hare's pace. The rest is up to you.

One final word of warning about going to buy a printer. They are expensive, usually costing more than the computer, so you've entitled to a little bit of extra help from the shop. Demand to see a working version of the set-up that you will be using, including all the interfaces and all the software, before parting with your hard-earned cash. Only that way will any last-minute problems come to light. ■

Cross the minefield at your own risk

ONE OF THE more commonly recommended ways of learning to program is by studying someone else's programs, and adopting any useful techniques that they might have used. We can follow that procedure by looking at a games program for the unexpurgated Vic 20.

The game is called Minefield, and the object of the game is to guide a little blob across a 9 by 10 square grid. Some of the squares on the grid have mines in them, and walking into such a square will result in instant destruction!

Busty radar

You are equipped with a busy radar that allows you to scan the immediate area around you. If there is a mine within one square of your present position, this information will be displayed at the top of the screen. However, it's up to you to determine which square the radar is indicating.

Getting successfully across the grid will send you onto the next level where there are even more hidden mines. And as it goes on, with more mines appearing all the time, until the inevitable happens and you meet your doom.

The program can be broken down into several main chunks, and the first 10 lines just clear the screen, tell you who is meant for the program, set the screen and handle colours, and then go into displaying the instructions on the screen before displaying an array M(0,1) in line 10. This array

PROGRAMMING

Pete Gennard steers Vic 20 owners through the minefield of programming

will hold the mine information.

Line 20 contains the level counter L, and the variable J, which determines your position on the screen relative to the start of the screen memory, which on the

unexpurgated Vic, starts at location 7688.

Lines 30 to 50 need some explanation as the primary used to produce the listing can't reproduce Vic graphic symbols. Line 30 consists of PRINTING within quotes a space, then shifted C, then a space, then shifted C, and so on, until you have 9 spaces and 9 shifted Cs. Line 31 is exactly the same as line 30.

Line 40 is PRINTING within quotes a shifted B, a space, a shifted B, a space, and so on, until you have 10 shifted Bs and 10 spaces. This draws the grid for the



```

1 PRINT"CLRN"
2 REM *****
3 REM * BY PETE GENNARD *
4 REM *****
5 POKE 76877,8:REM SET SCREEN AND BORDER
6 GOSUB 2000:REM RULES
10 DIM M(10,11):REM ARRAY FOR GRID
20 L=1:J=640
27 PRINT"CLRN,MT3"
28 FOR I=1 TO 10:REM PLOT GRID
30 REM SEE ACCOMPANYING ARTICLE FOR DRAWING OF GRID
40 REM POKE GRID DRAWING
50 NEXT I
60 REM END THE BOTTOM LINE OF THE GRID
95 IF OR=1 THEN RETURN:REM END OF GAME
96 POKE 7689:J,1:O:POKE 7689:J,4:O:Y=2:REM PUT YOU ON GRID
97 FOR I=1 TO 4:J=O:FOR L=1:5:FOR I=0:5:PRINT OR=1:5:O:O:MTA:O:1:REM GENERATE MINES
98 IF AND=AND=O:OR=O:AND=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O:OR=O
99 NEXT I
99 IF O=O:AND=O:1:THEN O=O:O
99 GOSUB 1500
99 O=J
99 SET PH=IF PH="":THEN O:REM MOVEMENT
70 IF PH="":THEN O:O:REM UP
75 IF PH="":THEN O:O:REM DOWN
  
```

Continued on page 26

TERMINAL SOFTWARE

commodore 64 games cassettes

SUPER SHRAMBLE!

Personal Computer News (15-21 Sept '83) gave **SUPER SHRAMBLE!** an overall rating of **NINETEEN OUT OF TWENTY** and described it as: "Well implemented with beautifully smooth scrolling and very nice graphics."



SUPER CRIDER

"... a compelling piece of frivolity that could give hours of fun," was the verdict of Personal Computer News (23-29 Sept '83).



SUPER SHRAMBLE!

"An excellent game" said Computer & Video Games magazine (Sept '83).

STELLAR DODGER

A game of skill and anticipation in which you must dodge your way through asteroids to complete your mission.



TERMINAL

The first 64 games cassette to have **SIMULTANEOUS TWO-PLAYER ACTION** - realistic sound effects too.

SUPER DOGFIGHT

HUNTER

A fast action game in which your pursuers gain in speed and intelligence as you master each successive screen.



VIC-20 games cassettes

Pinball Wizard
Scramble
Grider
Line-Up 4/Reversi

Get Lost!
Meteor Blaster
Terminal Invaders
Log Run

The Curse of the Werewolf
Rescue from Castle Dread
Magic Mirror
Nostalgia

PINBALL WIZARD

Experience **FAST** action and **REALISTIC** gravity as silver before. You can even use the jiggles to trap and hold the ball. **WUDGE** the table too - but not too much or it'll tilt!



TERMINAL

SELECTED PROGRAMS AVAILABLE AT



TERMINAL SOFTWARE
36 CREECH LANE, PO BOX 568, WESTPORT, MASS. 01981

PROVISED BY WHOLESALE DISTRIBUTORS
PCB BLACKBURN, **GameSoft**, WESTMINSTER
SoftMap, **ORACLE**

DEPOC
VICENT - ROSSIGNOL
WILLIAMS
BARIMA - ROTTERDAM

game into the screen.

Line 56 positions you on the grid, and places an asterisk in the top right hand corner of the grid: this is the spot that you're aiming for.

Lines 57 through 89 are generating the positions of the mines on the grid by producing random numbers in the range 0 through 9 for the X direction, 0 through 9 for the Y direction, and then storing these X,Y random numbers into our MIN(10) array by putting a value of 1 into the array where the co-ordinates meet. A 0 in the array means that there is no mine at that location.

Line 90 is a universal check to see if you've reached the top right hand corner of the grid. Lines 91 through 95 check for pressing of one of the four movement keys, and going to the ROMMsd subroutine to process moving up, down, left or right.

All of these moving routines are the same in that they start by checking for the validity of a move to ensure that you don't go over the borders of the grid. They then update your position on the grid and POKE your new position onto the screen using the I variable offset from the start of screen memory at 7680. Your old position is indicated by a dot on the screen, positioned using the variable Q.

Bomb search

The next step is to update your X or Y co-ordinates on the grid, before going to the bomb checking subroutine starting at line 1500. This checks the X and Y co-ordinates of all the surrounding squares for the presence of a bomb by using the original MIN(10) array and seeing if any of the surrounding X,Y co-ordinate squares contain a 1, or in other words a bomb.

Line 1502 checks to see if you're on a square with a bomb in it. If you are it's off to line 3000 and a message that tells you you're dead, before showing the offending bomb's position on the grid.

If you managed to reach the corner of the grid, the routine starting at line 5800 informs you of your success, updates the level counter L (so that we can have more bombs), and then resets all the bomb locations to 0, before going back to line 20 and coming up with some new bombs.

The main things to look at in the listing are the way that the grid is handled and the way that the surrounding squares are checked for the presence of a bomb. The use of the array MIN(10) to hold the bomb information and the use of the X and Y co-ordinates provides most of the brains in this short program.

Other things to see are generating random numbers (line 57), checking that the bomb is not placed on either the starting square, one of the squares next to it (in which case you could never start the game), and the end square, all of which is done in line 58, and the handling of key pressing in lines 94 to 95. You should also have a fun game at the end of it!

This is a special Vic 20 adaptation of the original Minesfield game for the Commodore 64, as published in Using the 64, author Pete Garsend, publishers Gerald Duckworth. ■

```
80 IFPR="A" THEN1400:GOTO LEFT
81 IFPR="D" THEN1400:GOTO RIGHT
90 GOTO 64
1000 IF J=0 THENMNO
1020 J=J-44:POKE7680+Q,44:POKE7680+J,102
1022 Y=Y-1
1028 GOSUB 1500
1040 GOTO640
1200 IF J=412 THENMNO
1220 J=J+44:POKE7680+Q,44:POKE7680+J,102
1222 Y=Y+1
1228 GOSUB 1500
1240 GOTO640
1400 IF INT(11-J-1)/22=(J-1)/22 THENMNO
1420 J=J+2:POKE 7680+Q,44:POKE 7680+J,102
1422 X=X-1
1428 GOSUB 1500
1440 GOTO 64
1500 DEF FN CHECK FOR BOMBS
1502 IF(A-2,Y-2)=1 THENBOMB
1510 R1=R+1
1511 IF(A-1,Y-1)=1 THENBOMB=R1+1
1512 IF(A-2,Y-2)=1 THENBOMB=R1+1
1513 IF(3 THENM1515
1514 IF(A-2,Y-2)=1 THENBOMB=R1+1
1515 R1=R
1516 IF(A-2,Y-1)=1 THENBOMB=R1+1
1517 IF(A-2,Y-2)=1 THENBOMB=R1+1
1519 IF(3 THENM1520
1519 IF(A-2,Y-3)=1 THENBOMB=R1+1
1520 R1=R-1:IF(3 THENM1570
1521 IF(A-2,Y-1)=1 THENBOMB=R1+1
1522 IF(A-2,Y-2)=1 THENBOMB=R1+1
1523 IF(3 THENM1570
1524 IF(A-2,Y-3)=1 THENBOMB=R1+1
1570 PRINT"HOME"R1:GOTO 150,AWAY"
1572 R1=0
1599 RETURN
1600 IF INT(11+5)/22=(J+5)/22 THENMNO
1620 J=J+2:POKE 7680+Q,44:POKE 7680+J,102
1622 X=X+1
1628 GOSUB 1500
1640 GOTO 64
1998 GETI:IF I=" " THENI=99
1999 END
2000 PRINT"CLR,WHY HELL COME TO FIND ME!"
2001 PRINT"EEIYOU HAVE TO FIND YOUR WAY ACROSS A MINE-"
2002 PRINT"FIELD, TO REACH SAFETYIN THE TOP RIGHT"
2003 PRINT"CORNER OF THE SCREEN"
2004 PRINT"EEIYOUR BASTY BROTHER ONLY OWNS MONEY THAT"
2005 PRINT"ARE THE BOMBING BOMBS - THESE CAREFULLY!"
2006 PRINT"EEIUSE 'A' TO MOVE LEFT, 'D' RIGHT, 'I' UP"
2007 PRINT"AND 'H' DOWN"
2008 PRINT"EEIPRESS 'SPACE' WHEN READY TO START"
2009 GETI:IF I=" " THENPRINT"RETURN"
2010 GOTO 2009
2040 PRINT"CLRIDESTROYED"
2042 PRINT"EEIPRESS 'SPACE' TO SEE THE BOMBS"
2044 GETI:IF I=" " THENM1000
2046 GOTO 2044
2048 END:GOSUB 27
2049 POKE 7680+J,102
2010 FORM=0TO10:F0R0=0TO11
2015 IF(A,R)=1 THENM=A*2+(R-1)*44+44:POKE 7680+R,55
2020 NEXT R,A
2040 PRINT"HOME"ANOTHER GAME (Y OR N)"
2042 GETI:IF I="Y" THENRUN
2050 IF I="N" THENPRINT"CLRHOME"END
2052 GOTO 2045
2060 DEF SUPPLIED A LEVEL: GOTO NEXT ONE
2062 PRINT"EEIYOU WERE LUCKY ON LEVEL "L
2065 FORI=0TO9:F0R0=0TO11:R1=J+40:NEXTI
2010 PRINT"EEIABOUT JUST PRESS 'SPACE' AND I'LL PUT YOU"
2050 PRINT"ON LEVEL "L+1
2052 GETI:IF I=" " THENPRINT"CLR"1:GOTO20
2040 GOTO2050
```

THE BEST 64 SOFTWARE

We offer the best software for the Commodore 64. Much of it comes from our own programmers, but we also market the best software we can find from other software companies. So if you want the best, take a look at our catalogue.

BUSINESS SOFTWARE

In our opinion the 64 is one of the most powerful business machines around. Don't be fooled by the price — just make the most of it! If you want a spreadsheet program that's powerful, but easy to use, try **BUCCALC 3**. At £89 plus VAT on tape or £71 plus VAT on disc it is much cheaper than comparable programs — and so easy to learn that you'll hardly need to use the excellent manual.

For your word processing needs we recommend **VIZAWRITE**. We can now offer **VIZAWRITE** in a cartridge at £39.95 including VAT (before text on tape or disc) or for disk users only we can offer **VIZAWRITE** and **VIZASPELL**, on one disk for just £28.95 including VAT.

PROGRAMMING AIDS

If you can't afford a disk unit — but find tape loading tedious, you need the **ARROW** cartridge which will **LOAD** or **SAVE** programs at 7 to 8 times normal speed (programs must first be **SAVED** using **ARROW**). A bargain at £28 plus VAT.

The **VICTREE** cartridge has over 48 programming aid commands (including a **REMEMBER** that works, advanced text/corrections, and **Basic 4** disk commands) all at a new low price of £49 plus VAT. Machine code programmers will probably be more interested in our **ZOOM** super monitor (£10 plus VAT on tape) or our **MK60 ASSEMBLER** cartridge, an easy-to-use full-featured assembler plus monitor for £58 plus VAT.

ARCADE & FANTASY GAMES

We stock some of the best games around. We reckon **STAR** is the best arcade game ever for the 64, but our **COSBY EDWARDS** can't be far behind. We beg to disagree with a recent reviewer about **KARTUS** — the graphics are very original, but if you want something really different try **3D-GLOOPER**, a sort of three-dimensional Pac-Man game. All these machine code arcade games cost £8.95 including VAT. At the same price you might prefer our new fantasy game with sprite graphics, **HALLS OF DEATH**.

SUPERSOFT

Winchester House, Canning Road, Weststone,
Harrow, Middlesex, HA3 7JL
Telephone: 01-861 1196

AMAZING 80-COLUMN BOARD!

We have two new boards to upgrade 40-column PCs to 80 columns — one is for small screen machines, the other for the **VAT 40**. So now the only machines that can't have 80 columns are the very early calculator style machines with built-in cassette decks.

Either board costs just £125, but we must know which machine you have at the time of ordering. Your computer must have **Basic 4.0** or be upgraded to **Basic 4.0** (the firm set now costs £58). If you need to be able to switch between 40 and 80 columns we can handle that too — for £10 you can buy an extra board that allows you to switch instantly without even opening the computer!

8032 BECOMES 8096

Our 64k expansion board for the 8032 turns it into an 8096 — yet it's less than half the size of the Commodore board! We're using the latest 64k dynamic Ram (as fitted in the 306 series) but they're utilizing 96 chips, hence the difference.

The 64k board costs £250. Anyone can fit it in a minute — no modifications to the computer are required. If you already have **VISCALC** we can upgrade it to the 96k version for just £25 (you could have 73k of data storage!).

WORD PROCESSOR OFFER

Few people would dispute that **MICROSCRIPT** is the best word processor for the 8032 and 8096 — but it appeared too late to make a real impact on the U.K. market. To make-up for that time we're going to make you an offer that you can't refuse.

Buy **MICROSCRIPT** before December 31st and get free either a second copy of **MICROSCRIPT**, a 64k memory expansion, or 58 column upgrade, or £25 worth of games software from our Catalogue. **MICROSCRIPT** is not just a disk, it has its own plug-in board with 46k of ROM and 2k of RAM — how about that for value!

IF YOU DON'T HAVE OUR PET/OSM CATALOGUE PHONE NOW FOR YOUR FREE COPY
POSTAGE FREE, BUT ADD 15% VAT

SUPERSOFT

Winchester House, Canning Road, Weststone,
Harrow, Middlesex, HA3 7JL
Telephone: 01-861 1196

STAR GAME

Let Allen's Bomber Run turn you and your craft loose in the 'wild blue yonder'



GO INTO SPACE ON YOUR 64

BOMBER RUN for the Commodore 64 is like an evolution graphics to construct a random cityscape and sprites to control the plane, bombs and clouds. The program gives the following options: joystick (port 2) or keyboard, skill level (1-5), and plane speed (fast-slow).

As the plane flies back and forth across the sky your bombs must destroy the city below to enable the plane to land, re-fuel and embark on another mission. After each successful landing your original flight path is restored and, when applicable, your skill level is automatically increased.

A score table routine is provided which lists the top 10 names against their scores. During this sequence the following options are available: fire button/space bar — return to game, F1 — change skill level, and F7 — quit game.

The program should be saved prior to running in proving F7 activates in-game mode (555 04740). The program also will run after 20 seconds.

The ROM statements included in the program listing should be helpful pointers in understanding how the program functions. Due to the lowering of memory that takes place during the program only 125 bytes remain free. Therefore, they should be ignored during programming. Here is a brief listing:

Please note that standard abbreviations for basic keywords must be used in order to satisfy some line lengths. These appear on pages 131 and 132 in the user manual.

There are some further notes: the tab key is used but not used for sprite generation. The pointer for protected memory is memory start/256, in PAGE 52, 12588-126. The co-ordinates of sprites are controlled thus:

- 10 for x = 0 to 241
- 20 poke VC + 2, x and 215
- 30 poke VC + 3, y
- 40 poke VC + 16, (x)/256 + 1
- 50 poke VC + 21, z
- 60 next

(This is a revised version of a program previously published in Popular Computing Week 1.)

```

4 DIMENSION BOMBER(2)
5 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
6 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
7 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
8 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
9 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
10 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
11 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
12 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
13 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
14 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
15 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
16 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
17 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
18 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
19 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
20 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
21 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
22 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
23 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
24 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
25 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
26 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
27 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
28 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
29 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
30 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
31 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
32 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
33 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
34 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
35 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
36 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
37 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
38 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
39 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
40 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
41 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
42 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
43 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
44 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
45 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
46 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
47 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
48 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
49 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
50 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
51 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
52 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
53 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
54 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
55 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
56 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
57 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
58 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
59 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
60 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
61 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
62 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
63 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
64 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
65 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
66 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
67 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
68 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
69 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
70 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
71 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
72 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
73 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
74 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
75 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
76 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
77 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
78 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
79 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
80 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
81 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
82 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
83 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
84 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
85 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
86 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
87 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
88 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
89 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
90 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
91 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
92 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
93 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
94 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
95 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
96 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
97 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
98 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
99 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
100 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15

```

— P 40

```

10 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
11 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
12 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
13 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
14 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
15 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
16 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
17 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
18 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
19 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
20 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
21 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
22 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
23 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
24 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
25 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
26 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
27 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
28 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
29 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
30 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
31 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
32 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
33 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
34 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
35 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
36 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
37 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
38 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
39 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
40 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
41 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
42 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
43 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
44 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
45 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
46 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
47 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
48 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
49 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
50 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
51 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
52 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
53 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
54 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
55 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
56 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
57 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
58 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
59 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
60 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
61 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
62 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
63 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
64 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
65 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
66 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
67 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
68 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
69 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
70 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
71 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
72 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
73 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
74 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
75 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
76 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
77 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
78 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
79 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
80 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
81 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
82 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
83 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
84 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
85 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
86 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
87 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
88 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
89 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
90 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
91 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
92 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
93 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
94 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
95 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
96 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
97 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
98 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
99 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15
100 BOMBER(1)=1:FOR I=1 TO 10:FOR J=1 TO 10:GOTO 15

```

1
2
3
4

— Continued on page 39

4 SPECIAL OFFER PACKAGES



1. Commodore 64
+ cassette deck + dust covers - also
if purchased separately these items would cost £378.95
OUR PRICE **£229.00**

3. Commodore 64
+ VIC 1541 disk drive
+ Box of 10 diskettes + dust covers. If purchased separately these items would cost £490.00.
OUR PRICE **£429.00**

2. Commodore 64 + cassette deck
+ Introduction to Basics Part 1 (Manual and 2 cassettes to take you through the first steps in computing) + DPM Data Base (Information Storage Programme) + 3 dust covers. If purchased separately these items would cost £313.00.
OUR PRICE **£257.00**

4. Businessman's Starter System
Comprises Commodore 64 + VIC 1541 disk drive
+ box of 10 diskettes + VIC 1525 Printer + Box of paper + 3 dust covers. If purchased separately these would cost £735.00.
OUR PRICE **£649.00**

COMMODORE 64 "GOODIES"

NEW 64 Printer VIC 1524 with cable	£199.00	d
NEW Printer/Floppy (4-colour)	£152.99	d
NEW LOW PRICE — Disk Drive VIC 1541 with cable	£210.00	d
Printer VIC 1525 with cable	£210.75	d
Book: Programmer's Reference Guide	£ 9.95	c
Easy Writer (Word processing package)	£ 75.00	b
DPM Data Base — Disk or Cassette (state which required)	£ 19.99	d
DPM Mail labels (Free labels to your specification)	£ 9.99	d
Catalogue (Dedicated filing system)	£ 14.50	d
Desktop (User oriented filing system)	£ 17.99	b
Journal (A financial diary with permanent display)	£ 19.50	b

Games & Manuals (Designed to teach 10/12 year olds basics)	£ 12.95	c
Sales Ledger	£ 75.00	b
Purchase Ledger	£ 75.00	b
Easy Book	£ 113.85	b
Attack of the Planet Gamels (Try and beat hostile Aliens)	£ 8.50	b
Master Plans (A thrilling cross country car race)	£ 8.95	b
Dust cover for VIC 1525	£ 2.95	d
Joystick	£ 6.95	b
Introduction to Basics Part 1 (see above)	£ 14.95	b

Many other titles in stock. Free list with first delivery. Or send S.A.S. for full list.

Commodore VIC 20
+ C20 cassette recorder + Introduction to Basics Part I (Manual and 2 cassettes to take you through the first steps in computing) + 1 cassette with four games + Only from Chromasonic, FREE DUST COVER normally sold for £2.95. If purchased separately these items would cost £249.99

VIC 20 SPECIAL OFFER PACKAGE



OUR PRICE £134.99	p&p code	
VIC 1524 Printer with cable	£202.75	d
VIC 1541 Disk Drive with cable	£210.00	d
16K RAM pack	£ 28.95	b
32K RAM pack	£ 47.95	b
Joystick	£ 6.99	b
4-slot motherboard	£ 33.15	c
Dust cover for VIC 20 or VIC 1525	£ 2.95	d

Light pen and free game	£ 28.75	c
Super Expander (High resolution cartridge with 32 K RAM)	£ 31.00	b
Programmer's Aid cartridge (Adds more than 20 commands)	£ 36.00	b
Machine Code Monitor (Gives you 4000 assembly language)	£ 36.00	b
C20 cassette unit with cable	£ 39.10	c
Target Chess (4 levels of play)	£ 23.00	b
Chop-It (Rescue your man and then return to base)	£ 24.95	b
VIC Programmer's Reference Guide	£ 9.99	b

Many other titles in stock. Free list with first delivery. Or send S.A.S. for full list, state which system required.

Our Guarantee—2 full years for labour and parts on all Hardware. Prices correct at time of going to press.

CHROMASONIC PERSONAL COMPUTERS

48 Junction Road, Archway, London N19 5SD

TEL: 01-263 9493 or 5



- FREE ADVICE on all aspects of Personal Computers. No-obligation top-to-bottom.
- DELIVERY (on 24/7) Access or International. Dispatch usually within 24 hrs. Or next business day. Our charges show about 1 day.
- 100% Completely satisfied, return the goods to us (prepaid return air fare for a full refund including p&p. VAT included in all prices).

ACCUMULATOR DISCOUNT COUPONS

A Chromasonic special on Software

So easy if you're a software buyer that you can't resist it. Buy any 10 or more software titles for £100.00 and you'll get 10% off the next 10 software titles you buy. Or more. See our software special on page 20.

780 *****
 781 *****
 782 *****
 783 *****
 784 *****
 785 *****
 786 *****
 787 *****
 788 *****
 789 *****
 790 *****
 791 *****
 792 *****
 793 *****
 794 *****
 795 *****
 796 *****
 797 *****
 798 *****
 799 *****
 800 *****
 801 *****
 802 *****
 803 *****
 804 *****
 805 *****
 806 *****
 807 *****
 808 *****
 809 *****
 810 *****
 811 *****
 812 *****
 813 *****
 814 *****
 815 *****
 816 *****
 817 *****
 818 *****
 819 *****
 820 *****
 821 *****
 822 *****
 823 *****
 824 *****
 825 *****
 826 *****
 827 *****
 828 *****
 829 *****
 830 *****
 831 *****
 832 *****
 833 *****
 834 *****
 835 *****
 836 *****
 837 *****
 838 *****
 839 *****
 840 *****
 841 *****
 842 *****
 843 *****
 844 *****
 845 *****
 846 *****
 847 *****
 848 *****
 849 *****
 850 *****
 851 *****
 852 *****
 853 *****
 854 *****
 855 *****
 856 *****
 857 *****
 858 *****
 859 *****
 860 *****
 861 *****
 862 *****
 863 *****
 864 *****
 865 *****
 866 *****
 867 *****
 868 *****
 869 *****
 870 *****
 871 *****
 872 *****
 873 *****
 874 *****
 875 *****
 876 *****
 877 *****
 878 *****
 879 *****
 880 *****
 881 *****
 882 *****
 883 *****
 884 *****
 885 *****
 886 *****
 887 *****
 888 *****
 889 *****
 890 *****
 891 *****
 892 *****
 893 *****
 894 *****
 895 *****
 896 *****
 897 *****
 898 *****
 899 *****
 900 *****
 901 *****
 902 *****
 903 *****
 904 *****
 905 *****
 906 *****
 907 *****
 908 *****
 909 *****
 910 *****
 911 *****
 912 *****
 913 *****
 914 *****
 915 *****
 916 *****
 917 *****
 918 *****
 919 *****
 920 *****
 921 *****
 922 *****
 923 *****
 924 *****
 925 *****
 926 *****
 927 *****
 928 *****
 929 *****
 930 *****
 931 *****
 932 *****
 933 *****
 934 *****
 935 *****
 936 *****
 937 *****
 938 *****
 939 *****
 940 *****
 941 *****
 942 *****
 943 *****
 944 *****
 945 *****
 946 *****
 947 *****
 948 *****
 949 *****
 950 *****
 951 *****
 952 *****
 953 *****
 954 *****
 955 *****
 956 *****
 957 *****
 958 *****
 959 *****
 960 *****
 961 *****
 962 *****
 963 *****
 964 *****
 965 *****
 966 *****
 967 *****
 968 *****
 969 *****
 970 *****
 971 *****
 972 *****
 973 *****
 974 *****
 975 *****
 976 *****
 977 *****
 978 *****
 979 *****
 980 *****
 981 *****
 982 *****
 983 *****
 984 *****
 985 *****
 986 *****
 987 *****
 988 *****
 989 *****
 990 *****
 991 *****
 992 *****
 993 *****
 994 *****
 995 *****
 996 *****
 997 *****
 998 *****
 999 *****
 1000 *****



8-17

1001 *****
 1002 *****
 1003 *****
 1004 *****
 1005 *****
 1006 *****
 1007 *****
 1008 *****
 1009 *****
 1010 *****
 1011 *****
 1012 *****
 1013 *****
 1014 *****
 1015 *****
 1016 *****
 1017 *****
 1018 *****
 1019 *****
 1020 *****
 1021 *****
 1022 *****
 1023 *****
 1024 *****
 1025 *****
 1026 *****
 1027 *****
 1028 *****
 1029 *****
 1030 *****
 1031 *****
 1032 *****
 1033 *****
 1034 *****
 1035 *****
 1036 *****
 1037 *****
 1038 *****
 1039 *****
 1040 *****
 1041 *****
 1042 *****
 1043 *****
 1044 *****
 1045 *****
 1046 *****
 1047 *****
 1048 *****
 1049 *****
 1050 *****
 1051 *****
 1052 *****
 1053 *****
 1054 *****
 1055 *****
 1056 *****
 1057 *****
 1058 *****
 1059 *****
 1060 *****
 1061 *****
 1062 *****
 1063 *****
 1064 *****
 1065 *****
 1066 *****
 1067 *****
 1068 *****
 1069 *****
 1070 *****
 1071 *****
 1072 *****
 1073 *****
 1074 *****
 1075 *****
 1076 *****
 1077 *****
 1078 *****
 1079 *****
 1080 *****
 1081 *****
 1082 *****
 1083 *****
 1084 *****
 1085 *****
 1086 *****
 1087 *****
 1088 *****
 1089 *****
 1090 *****
 1091 *****
 1092 *****
 1093 *****
 1094 *****
 1095 *****
 1096 *****
 1097 *****
 1098 *****
 1099 *****
 1100 *****
 1101 *****
 1102 *****
 1103 *****
 1104 *****
 1105 *****
 1106 *****
 1107 *****
 1108 *****
 1109 *****
 1110 *****
 1111 *****
 1112 *****
 1113 *****
 1114 *****
 1115 *****
 1116 *****
 1117 *****
 1118 *****
 1119 *****
 1120 *****
 1121 *****
 1122 *****
 1123 *****
 1124 *****
 1125 *****
 1126 *****
 1127 *****
 1128 *****
 1129 *****
 1130 *****
 1131 *****
 1132 *****
 1133 *****
 1134 *****
 1135 *****
 1136 *****
 1137 *****
 1138 *****
 1139 *****
 1140 *****
 1141 *****
 1142 *****
 1143 *****
 1144 *****
 1145 *****
 1146 *****
 1147 *****
 1148 *****
 1149 *****
 1150 *****
 1151 *****
 1152 *****
 1153 *****
 1154 *****
 1155 *****
 1156 *****
 1157 *****
 1158 *****
 1159 *****
 1160 *****
 1161 *****
 1162 *****
 1163 *****
 1164 *****
 1165 *****
 1166 *****
 1167 *****
 1168 *****
 1169 *****
 1170 *****
 1171 *****
 1172 *****
 1173 *****
 1174 *****
 1175 *****
 1176 *****
 1177 *****
 1178 *****
 1179 *****
 1180 *****
 1181 *****
 1182 *****
 1183 *****
 1184 *****
 1185 *****
 1186 *****
 1187 *****
 1188 *****
 1189 *****
 1190 *****
 1191 *****
 1192 *****
 1193 *****
 1194 *****
 1195 *****
 1196 *****
 1197 *****
 1198 *****
 1199 *****
 1200 *****

DUCKWORTH HOME COMPUTING

The best books and software for the Vic and 64

Adventure games

A complete look at the fabulous world of adventure games, with full instructions for writing them, many sample scenarios and three complete listings. All three listings in each book available separately on cassette (£7.95).

Exploring Adventures on the 64 £6.95

Peter Gerrard

Exploring Adventures on the Vic £6.95

Peter Gerrard

Games (by Kevin Bergin)

15 new and exciting games, from arcade and car-racing games to educational and animation games. All 15 games in each book available separately on cassette (£7.95).

Commodore 64 Games £6.95

Kevin Bergin

Vic Games £6.95

Kevin Bergin

Games (by Nick Hampshire)

Collection of 50 games programs, with an in-depth description.

Vic Programs Nick Hampshire £6.95

User's guides

Using the 64 Peter Gerrard £9.95

Starts with a refresher course in Basic programming, and moves on through Machine Code to sprites, graphics and sound, and to peripherals. The heart of the book is an in-depth look at the chips that make the 64 work, including the 6581

Sound Interface Device and the 6566 Video Controller Chip and the 6510. Illustrated throughout with many example listings. An essential book for anyone who wants to

learn more about the 64, how it works and how to make it work for them.

Advanced Basic & Machine Code for the 64 Peter Gerrard £6.95

For the more serious user of the 64, with detailed instructions about programming in Machine Code, with sections on double precision arithmetic and animation, and special features.

Vic Revealed Nick Hampshire £9.95

Advanced Basic & Machine Code for

the Vic Peter Gerrard £6.95

The Beginner's Guide to Computers and Computing Peter Gerrard £6.95

Twelve Simple Electronic Projects for

the Vic Peter Gerrard £6.95

The Microcomputer User's Book of
Tape-Recording Mike Salem £2.95

Pocket handbooks

All the vital information - Basic memory maps, Basic keywords, memory storing subroutines, Machine Code keywords, hexadecimal to decimal and/or binary, octal converter, peripheral addressing, etc.

Pocket Handbook for the 64 £2.95

Peter Gerrard

Pocket Handbook for the Vic £2.95

Peter Gerrard

Graphics & sound

Vic Graphics Nick Hampshire £6.95


64 Graphics Kevin Bergin £6.95

Will You Still Love Me When I'm 64

Peter Gerrard £6.95

Sprites & Sound on the 64 £6.95

Peter Gerrard

 Duckworth
The Old Piano Factory
43 Gloucester Crescent
London NW1 7DY

first the books...

Available now from all good computer stores and bookshops

For further information write in for a leaflet

and now th

UTILITIES

Extended Basic for the CBM-64

Saves time and adds great scope to your machine with useful and powerful commands to the 64's Basic. No more need for all those Pokes and Preks before you can use the 64's amazing graphics, sounds and other facilities!

The commands added include: GR (graphic mode), PLOT (plots a point), DRAW (draws from specified points), TYPE (for normal or large characters in Hi-res). Also colour commands for the screen border and characters.

Sprite commands include OSprite (to colour sprites), SMOVE (to move sprites) COLLIDE and SHAPE. Also commands for the SID chip, SOUND, FILTER, PLAY and VOLUME. Extended Basic commands cover the Joystick, Paddles and Light Pen, as well as the usual commands like RENUMBER, OLD and FIND.

Comes with an extensive manual for using the package and examples of most commands. The package is written entirely in Machine Code and in no way interferes with the 64 or user's programs.

An essential utility for the 64! (£18.50)



Duckworth
The Old Piano Factory
43 Gloucester Crescent
London NW1 7DY



Bug Computers
Dizengoff Centre
Tel Aviv
Israel

64 Editor Assembler

This package includes an Editor which accepts the usual labels and automatically renumbers the source listing where insertions are made, and a two-pass Assembler which can be halted and restarted during assembly. Also includes a monitor for saving, loading and editing Code (£18.50).

64 Sprite and Character Editor

Fast and easy to handle, the most user-friendly package on the market, enabling you to create any sprite or character you wish. Comes with an extra 10K of memory, usable from Basic without disturbing the configuration of the 64 (£18.50).

For further information write in for a leaflet

A joint enterprise

All distribution through Duckworth Tel: 01-485 3484

me software

GAMES

Five new and exciting games for your 64 (all written in 6502 machine code, with all the speed and variety that any 64 could wish for).

Alpine Skiing £6.95

Superb graphics and three levels of play, as you speed down mountains and increase your skills to the applause of the crowd.

Space Maze Battle £6.95

Four mazes – but you will find it hard to get through the first, let alone the fourth. All the fun of the maze games with the added excitement of an arcade game as you battle with alien ships.

The Final War £6.95

An arcade game with only one level – but on that level there is an ever-increasing speed and sophistication of weapons.

As your score builds up the enemy becomes more evasive and the game more frustrating and addictive.

Just the Ticket £6.95

A car game for two players, with three objects: to beat your opponent's score, avoid the other cars and park your car without getting a ticket. Watch for the warden (and the cheering crowd).

F11-Destruct £6.95

Superb graphics and fast action with an increasing difficulty factor. The object is to level the city with your F11 as you descend: failure re-starts the game. If the city is levelled, a superb graphics display awaits you and the game continues to the next stage.

Available now from all good computer stores and bookshops



The department which has designs on you

Graham Cunningham talks to Gail Wellington — the lady leading Commodore's software charge

"SOFTWARE SELLS hardware" is a common enough cry these days. But just six months ago Commodore president Jack Tramiel admitted: "In the past, our emphasis was on computer hardware." He put Big Hariman in charge of developing software in the UK and added: "Today our philosophy has broadened." But the UK was already ahead of the States.

Twelve months earlier Gail Wellington had taken over as software products manager in Slough. As she says: "When I took over software was a small department, now there's 15 people here with more than 30 machines." And that department has designs on you.

In the run-up to Christmas Commodore is launching a range of packages covering games, business and education. Easy File, Fun Maths and Assembler Tutor will be out for the 64, backed up by the second part of Introduction to Basic, which has already sold well on the Vic. Other business packages include Easy Stock and Finance Planner. Games add-ons can include in Fair Adventure, Magnet Maths and Dancing Monsters, while Ski, Trap and Space Soccer, among others, are headed the way of Vic users.

None of this software is written in-house. As Gail says: "We'll look at anything anybody wants to send us." In fact Magnet Maths arrived through the post from 16-year-old Jason Fortkin. Commodore suggested a few improvements, Jason incorporated the revisions and the finished version is now on sale. Programs can arrive other ways. For example, Gail first met graphic designer Paul Jay through the users' group KPUG. Fair Adventure is a result of that meeting.

Assembler Tutor comes from Chris Hancock, an industrial training consultant, and Gail promises that this will be the one to ease the frustrations of Basic users perplexed by machine code. As she says: "A lot more people are becoming interested in machine code, partly to write better games and partly to understand more about the computer." Assembler Tutor aims to turn this interest into achievement, incorporating a question and answer format.

Sometimes two heads can be better than one when it comes to programming — and

among Commodore's software authors these two heads tend to belong to fathers and their sons. Space Soccer was written by John Collis, whose father is the man behind Introduction to Basic, while Future Finance comes from Fitzmaurice, a father and son team in Northern Ireland.

Fitzmaurice supports a philosophy close to Commodore's heart. Gail backs her president's aim of producing software for the masses — not for the classes. She explains that Fitzmaurice was "drilled to death when we brought the cost of software down — because it would make it available to more people". Gail wants to produce software that will appeal to a broad range of users — it should all be easy and fun to use, even if it's for the education or business markets. However, in case Jack Tramiel's ability to turn a good quote should mislead, she adds: "Of course, we'll still produce specialist software for particular applications."

Driving force

Gail thinks that Commodore's president is "an amazing person". He is the driving force behind the firm with "unwavering insistence for the market". She adds: "We see him at least every two or three months." But you hear from him a lot more often. Jack Tramiel pursues a management policy of "kick 'em or kiss 'em". If he thinks you're doing well, you'll get the praise — usually "if you're not doing what he expects, you'll hear about it".

And what the president expects is more software. "We intend to be a major force in the software business," he said earlier this year, and Gail is backing him all the way. She supports his aggressive approach, thinking that "it's not an unreasonable way to run a business", and adds some touches of her own. On her desk sits a card bearing the longest in-house message "if it ain't your idea" succeed, you're kind."

What this approach means for Commodore users is that a bank of new languages and adventures are on their way. More Scott Adams adventures will be available on the Vic, and some titles will be introduced on the 64. Users of both machines will also have a chance to play The Quest — a UK-produced lunch-time



Gail Wellington, Commodore's UK software product

manager already at Commodore. If you've got a 64 the choice will be even wider. Another UK game, Medusa's Lair, is on its way along with some celebrated American titles from Infocom, including Suspended, Deadline and the Zork trilogy. Strategy fans can look forward to a series of simulations starting with High Five (see Headlines this time, but a big-time business operator L. Rail Boss and Ocean Race — all for the 64).

As for languages, "the first implementation of Logo on any micro-computer" will be followed by a UK implementation of LOGO Pascal, Pascal, Fort, Prolog, Plan and a version of Cobol. As the list suggests Commodore has



Manager — thinking in terms of "in in England and then over there"

its eye on the education market, Gail likes "nothing things that have educational value" and thinks that the speech module due early next year for the 64 is "ideal for primary schools". A version for Vix users will follow later in the year, while talking books and programs are also on the way.

Users of the 64 have more to look forward to — gaining access to CP/M-based software. A 288 deal allowing this will "probably be available before Christmas" (the card is also needed to run the Cabot implementation). For 700 users the choice will be even wider: a CP/M-66 card has been finalized and MSDOS is being tested now. Specialized software on rival operating systems can then be used on

Commodore micros, although Gail adds that "native operating system software will still run faster".

There are no plans for a second processor option on the Vix, and CP/M-86 and MSDOS will not be implemented on the 64 because its CPU is fundamentally different to the 700's. However, 64 users will be getting Commodore's software answer to Apple's Lisa. The price of Magic Disk has not been decided yet, but Gail says "it will be in the range of all our other software". And the most expensive package she sells for the 64 costs £75.

Like Lisa, Magic Disk provides pointers on the screen (called icons) identifying different items on the menu. So by selecting

the typewriter icon you get word processing, the telephone gives you networking, the filing cabinet gives you the database, and so on . . . and so on. As with most of Commodore's software the package is aimed at the "average consumer" although Gail thinks small businesses would also find Magic Disk worth considering. The icons have already been designed and the software to drive them "is in advanced stages of development".

Obviously things have changed since software was only a background activity at Commodore. Gail is pleased with the results so far and "particularly pleased that the UK is contributing so much". Ironically, though, the voice that declares "I'm proud to be a part of the UK's success" has an American accent — a fact that surprises a lot of people when she visits Commodore in the States. However, all but the accent has been assimilated. She now thinks in terms of "in in England and then over there" and takes "great delight in going back to America and representing the UK software software".

Gripe

So how do you get Gail to represent you? The answer is to do as Jason Perkins did — send your tape or disk to Commodore in Slough. And don't worry about the quality of your coding, it's what your program achieves that's important. As Gail says: "We publish programs that would make teachers cry — if the graphics are good, the quality of the coding doesn't matter." Commodore is sent more than 1000 programs a month and accepts only about 5%. But every writer gets an evaluation sheet back with a detailed opinion of his submission. There's no need to send a printout, but don't forget to send instructions on how to use your program.

It is the successful 5% that are partly responsible for Commodore UK's software growth. The company operates worldwide ("I wouldn't like to pay our international phone bill," Gail comments) but the UK plays an important role in software development. In fact this month the UK is playing host to an international meeting of Commodore software managers to plan next year's strategy. The message is that "the UK is small but our software contribution is large".

Then the US will take much of the software developed in the UK, although there are differences in taste. Cartridges, particularly of "shoot-'em-up" games, are preferred in the States. Gail adds that there's more interest in games of strategy over here, but in less diplomatic matters, she stays mum about the difference in national psyche this suggests.

"Shoot-'em-up" or strategy, Commodore is in the software business for real now — how far will it get? Real micro manufacturer Atari is already transporting its games to run on Commodore machines, raising speculation that Commodore might do the same in reverse. "There's always a chance we'll do anything," Gail says. "You've got to immediate plans on this". As she adds: "My plate's full at the moment." ■

MR CHIP SOFTWARE

VIC 20 GAMES AND UTILITIES

JACKPOT

This is it, the ultimate Fruit Machine for the VIC with medals, hold and re-spin 100% machine code. "General Jackpot is a beautifully written simulation giving superb graphics, animation and use of colour. In fact, this program makes Commodore's Fruit Machine cartridge look unbelievably cheap and nasty." Home Computing Weekly No. 30 (9/7/83).....**£9.99**

KWAZZ KWAZZ

Accuracy and speed are required for this Shooting Gallery, superb use of colour and graphics in this new and challenging game from the author of *Aviation*. 100% machine code, joystick or keyboard control.....**£9.99**

PACMANIA

Choose your own game from the following options — difficulty 1-5, speed 1-5, size of maze 1-3, visible or invisible maze, still or moving power pills, define your own key controls, any combination, if this is your type of game, show this is the one for you, for the UK expand. VIC only.....**£9.99**

SNARE BITE

Guide your ever hungry snake round the screen, eating the flies and wasps, to stay alive you must avoid the deadly mushrooms, quick reactions are required for this biting game, keyboard control, for the unexpanded VIC.....**£9.99**

BUGGY (Spanish only)

This is a marvellous with a difference as you step on the screen while collecting purple boxes which give you both time and points, they disappear from beneath your feet. (DO NOT DESPAIR! "BUGGY" will randomly replace the screen but avoid bumping into him or its sudden death! An original competitive and challenging game.....**£9.99**

MINI-ROULETTE — PONTON — HI-LOW

Three great games of chance for the VIC, try to beat the computer, feature of fun, full colour, sound effects and more.....**£9.99**

DATABANK — create your own files and records on tape

.....**£7.99**

SUPER BANK MANAGER — A full feature version my money size, but needs UK expansion

.....**£7.99**

COMMODORE 64 GAMES AND UTILITIES

JACKPOT 64

As fun it's here, specially written for the 64, by the author of "JACKPOT" the ultimate Fruit Machine program for the VIC.....**£9.99**

WESTMINSTER

A game for up to four players, can you lead the party of your choice and win the general election, you tear the 60 constituency (const) having votes, when you can just like the real thing, this must be one of the first board type games specifically written for the computer. Why play on your own, have fun with your family and friends playing WESTMINSTER.....**£9.99**

RED ALERT

A game for 1-4 players, with sound and graphics. Make money in casinos, commit robbery, hide from the police, hire secret agents (some of whom can be treacherous), negotiate for weapons, find and attack the secret nuclear base to launch the missile, and watch the havoc and destruction caused. There is no coming back from "RED ALERT".....**£9.99**

WHILER DEALER

A game for two to twenty players, become a tycoon of the motor trade, you must obtain garages, tyres and engines to produce cars for sale. Form specifications, buy and exchange parts, buy dealerships, but be careful, you may become bankrupt and have to liquidate, find out what you are made of, have you got what it takes to become a WHILER DEALER.....**£9.99**

LUNAR RESCUE

Our new version, avoid the asteroid belt, to rescue the stranded scientist, then fight your way back to the mother ship, fast reactions are required to safely land and dock your lunar module.....**£9.99**

PONTON — ROULETTE — ACE'S HIGH — More powerful version, that make three great games of chance for the 64

.....**£9.99**

SHIPMEN

Contains a new or two-pass Assembly, Disassembly and Monitor. A programming aid for the development of machine code programs and routines on the C194164 112.5K.....**£9.99**

BANK MANAGER — As our Super Bank Manager, but for the 64

.....**£7.99**

New available on disc with added facilities.....**£19.99**

Full documentation with all utility programs.

Other software available for the VIC and Commodore 64, send for free brochure, including RABBIT SOFTWARE at £9.99 each.

PURCHASE LEADER

Easy to use, single entry, handles 400 invoices per month,

gross/net purchases, V.A.T.....**£14.99**

Disk Version.....**£17.99**

SALES LEADER: As above.....**£14.99**

.....**£17.99**



DEALER ENQUIRIES WELCOME

Send Cheques/PO's to:

MR CHIP SOFTWARE

Depo. HORIZONS, 1 NEVILLE PLACE
LLANDUDNO, GWYNEDD LL30 1BA.
Tel. 0482 49547

Wanted: High quality software, of all types, for export and UK distribution.

All programs now available on disc please allow £2.50

6823



SKI RUN
 All the excitement and skills of the alpine with downhill, slalom and giant slalom. The course is set here and there, the terrain level here and there. The course is set here and there. The terrain level here and there. The course is set here and there. The terrain level here and there.

Boom Software It will blow your mind



LOGGER MANIA
 Can you dodge the trees, jump over the logs, cut the trees and get the money? A horror feature with a horror theme. A horror feature with a horror theme. A horror feature with a horror theme. A horror feature with a horror theme.



SPACE RAIDER
 Upgrade in a 3D space shooter. Upgrade in a 3D space shooter. Upgrade in a 3D space shooter. Upgrade in a 3D space shooter. Upgrade in a 3D space shooter.



ANNIHILATOR II
 Defend your planet against a mighty alien invasion. An alien invasion. An alien invasion. An alien invasion. An alien invasion.

Post this coupon now to Boom Software
 2-4 Chichester Rents, Chancery Lane,
 London WC2A 1BS

Please send me the following:

Per Blue	£3.50	Annihilator II	£3.50
Logger Mania	£3.50	Space Raider	£3.50
Annihilator (VIC20)	£3.50	Ski Run	£3.50

Total of cheque/PO enclosed £

Payable to 'Boom Software'

Name _____

Address _____

Commodore 64
 and VIC 20

Design your own business program

THE FIRST QUESTION you have to ask yourself is whether a computer system would be beneficial to your business. On completion of my accounts system, I continued with the manual version for some months as a comparison. The first, most obvious fact to emerge was the saving in time. My normal five days a month were reduced by the computer to half a day, with a great deal more information than I had time to compile by the long hand method. I had often heard people say "The computer is wrong again" so I was naturally wary of my results, tending to double the computer's. If they differed to my "superior" long hand methods. After being proved wrong on every occasion, I have now come to the conclusion that computers are far more suited to producing accurate accounts, repeatedly.

Your own system?

The second question you have to ask is whether the time spent on designing and writing your own system is justified. If you require a system specific to your needs then the answer is yes, otherwise you may have to change your routine to suit a commercially produced package. There are other advantages in writing your own system, such as understanding the program in operation and being in a position to sort out problems which may be encountered. If you find you cannot spare the time required then you could consider employing someone to do it for you. There are numerous amateur programmers around who would be more than willing to put their knowledge to an applied task. Be prepared, however, to spend some time with your programmer as it is unlikely that you will convey sufficient information to him/her the first time round.

What you'll need

Initially the purchase of a Commodore-64 and the Commodore cassette recorder for storing programs and information would be adequate for a large number of business applications and a printer and/or a disk drive could follow if required. Obviously certain programs, such as word processing, would need a printer or at least access to one, and there are firms who will undertake to print your script. Therefore, bearing in mind those who will purchase a 64 and cassette recorder initially, the programs listed here will produce the necessary information on the screen. But provision has been made for each program to be expanded to include printer and disk drive routines at a later date if required.

The introduction of a computer system is

PROGRAMMING

An extract from Jim Holt's forthcoming book "Business Applications on the 64"

likely to enhance any business — consider that by entering into the computer such transactions, or a condensed coded version, since only, you will obtain a great deal of information at the end of the day, for example:

- Information to produce invoices and statements.
- A breakdown of customer's accounts.
- Complete information on all transactions to date, identifying VAT for instance, and also taking into account rates of stock held, outstanding accounts and orders, and even your own profit.
- Stock levels, updated in conjunction with customer accounts or direct sales and information on which items of stock should be re-ordered to bring the levels above a certain minimum.
- Analysis of stock movement over a specified period, facilitating planning and leading to a business being run more efficiently and economically.

In fact, any information you require is instantly available, being up-to-date and in any format you could wish at the touch of a button.

A good impression

Consider the impression you would make on your bank manager if he saw one day, concerned about your overdraft, and you were able to present him with an up to the minute financial state of your business, confirmed by a typed report, posted that same day.

There are many books on computing, but they tend to stick to the raw facts with little imagination as to application in everyday business. With this in mind, my real aim is to produce working programs in such a way that lack of programming experience is not a serious disadvantage. The programs listed can be used as they are, I have attempted to write them in as plain and logical a manner as possible. This means that some steps are more long-winded than needs be, but from my own experience, I feel it is essential to produce working programs first and there is nothing to hinder you from modifying the programs at a later date as your knowledge increases. I would be disappointed if I thought this work did not stimulate the reader into modifying the listings to suit his/her own

application — the only limitation is your own imagination.

Now down to some subroutines which will be of use in most business applications. (SPC indicates upper case space or shift key/space and it is important that this is adhered to. The blanks or spaces appearing in the program should be included using the space bar key only. Subroutine 1 deals with allocating arrays, setting up strings, program security, disk error channel, and checking for printer presence. The first five lines, although obviously not part of the subroutine, explain the codes used in the program for control characters in place of graphic symbols. Graphic symbols can only be achieved by dot matrix or thermal printers and not daisy-wheel printers. Note how neither the square brackets nor the code contained within should be included in a program, but the relevant control character inserted instead.

Setting the colour

In line 2 the two initial poke commands and chr\$(144) set the screen and border colours to two shades of gray with black letters which give reasonable contrast on a black and white TV set. Chr\$(144) puts the computer into lower case mode and chr\$(244) = upper case mode and alternatives to these are poke\$0172,23 and poke\$0173,23 respectively. It is worth noting as this point the number 128, is the difference between 144 and 142. This number added to or subtracted from character string codes will produce the opposite effect, i.e. chr\$(229) cursor right and chr\$(231) cursor left, the difference being 128. The last poke 235 enables all the keys to repeat with continuous pressure on a key.

In lines 3-6 the ch=1 variable is set to avoid the security routine lines 14-26 when returning from the program second time round. Chr\$(1) along with open 15,15 in line 8, engages the disk error channel but should be omitted in tape systems. The strings w1 and w2 in lines 4-5 will give a simple window/border effect when printed. This draws the eyes of the operator to a question and aids concentration. The addition of the program name is a constant reminder of the program running. By printing w2 the screen is cleared of all information and is useful in programming.

Padding out strings

Lines 8-9 set up the variable b\$ with 60 shift/spaces and are used for padding out strings. Line 10 allocates space in memory for subscripted arrays, but the numbers can be altered to suit a particular program. Line 11 is needed if a compiler is being used. ▶

ANIROG SOFTWARE

34 1/2" CREDIT CARD SALES HORLEY (0294) 081
 PAYMENT BY CHEQUE, P.O., ACCESS VISA
 8 HIGH STREET, HORLEY, SURREY.
 Overseas 50p post & packaging

TRADE ENQUIRIES WELCOME
 29, West Hill, Dartford, Kent. (0322) 925138

COMMODORE

KONG

KB / JS

£7.95

A 31 K ALL M/C PROGRAM WITH BRILLIANT ANIMATED GRAPHICS



1. KONG'S FRIENDS' LIVES AND BARRERS CAN BE DESTROYED BY THE BALLS IF YOU CAN JUMP UP AND GET IT.



2. JUMP OVER THE PEEL AS YOU RUN AWAY FROM THE COON. YOU WILL HAVE TO RUN TO THE END OF PEEL TO THE COON.



3. THE BALLS START UP AS BY THE LEFT AGAIN IN LINES A CONTROLLED BARREL OF GUNNERS.



4. KONG GETS ALL THE SUPPORTS BY SHOOTING THEM FROM THE AIR AND THE BRICKS COLLAPSE TO MAKE LIVES.

SKRAMBLE

J.S.

£7.95

PILOT YOUR SPACE CRAFT THROUGH THE SIX DEFENCE SECTORS AND DESTROY THE COMMAND MODULE OF THE COBRON EMPIRE. A 32 K ALL M/C BLOCKBUSTER.



1. DASHING MISSILES FURTE THROUGH THE



2. FIGHT COBRON BLAST AND SHIP



3. BURST THE FIREBALLS TOGETHER YOU MUST BRUSH THEM DOWN



4. CITY WITH HIGH RISE BUILDINGS



5. COLLIDE YOUR SHIP WITH COBRON THROUGH THE WALL



6. DESTROY THE BASE BEFORE YOU RUN OUT OF TIME

HEXPERT

J.S.

£7.95

THE FUN OF HEXAPERT IS TO PLAY AS ONE OF SEVERAL CHARACTERS AND TO JUMP OVER THEM TO KEEP THE PLATFORM. HAVING TO KEEP BALLS FROM GOING TO THE PLATFORM TO COLLECT THEM WITH SHOTS. GOING TO THE LEFT SIDE OF THE PLATFORM (SHOOTING) MUST HAVE THE SHOTS TO JUMP ON TO HAVE LIVES TO GET THEM. CAN YOU MAKE IT TO THE END? A 32 K ALL M/C GAME WITH BRILLIANT 3D GRAPHICS.



MOON BUGGY

3D TIME TREK

DUNGEONS

FROG RUN



EXPERIENCE ALL THE THRILLS OF THE ARCADE GAME AS YOUR PATROL CRAFT MANOEUVRES OVER THE GREAT POT HOLES.

J.S.

£7.95



A 3D STAR TREK GAME WITH REAL ARCADE ACTION BATTLE WITH THE ALIENS.

K.B. / J.S.

£6.95



ENTER THE REALMS OF FANTASY WITH SURFING UP ON SPINE GRASPING BATTLE WITH THE DRAGONS THE BREAKING RED DRAGON

K.B.

£9.95



A POPULAR ARCADE GAME Brought to life with brilliant animated graphics

K.B. / J.S.

£5.95

```

1 10 ***** L. 100 ***** 10.100
2 ***** (***** ) ***** (***** ) *****
3 ***** (***** ) ***** (***** ) *****
4 *****
5 *****
6 *****
7 *****
8 *****
9 *****
10 *****
11 *****
12 *****
13 *****
14 *****
15 *****
16 *****
17 *****
18 *****
19 *****
20 *****

```

Subroutine 1: allocate array, set up arrays, handle program security and check for printer presence

With compiled programs, to enable or disable the run/stop key, specific commands are necessary and are detailed in the compiler manual.

Line 13-20 deal with program security and require a known code (ask = 0000) to be entered before the program can be used.

Lines 21-34 are routines for obtaining one character at a time from the keyboard, thus creating the variable *code*, and they act as an alternative to the INPUT command. INPUT is a simple way of obtaining information, but offers no control over the characters typed in. If a comma or colon is part of the input, any information after these characters will be ignored. To prove the point try this simple program:

```

10 input "Type in information" all print
differ000
Type in available or available and on
pressing return, only the three as will be

```

printed out and a message ? ENTERA, KIBEREDA will appear on the screen. This means that ask = was only not set as 0000.

Using the same program press the space bar a few times followed by three Cs and press return. The result is ask = 000 + the leading spaces have also been ignored. Type in b followed by a number of spaces and then c and ask = b + blank spaces + c. If

In the table on this page, make use:
C/CN = Cursor Down C/Up = Cursor Up
C/R = Cursor Right C/L = Cursor Left
A/CN/CN = Cursor to Home Position
A/CN = Clear Screen A/PC = Shifted
Space A/PL = Reverse Field Off
A/PLC = Reverse Field On

holding down the shift key and pressing the space bar a few times followed by b all will = blank space + b. The golden rule, therefore, for variables which register a space as the first character, is that the space

```

10 enter?
20 *****
30 *****
40 *****
50 *****
60 *****
70 *****
80 *****
90 *****
100 *****
110 *****
120 *****
130 *****
140 *****
150 *****
160 *****
170 *****
180 *****
190 *****
200 *****

```

must be a shifted space. This rule also applies to information obtained by the GET statement. Line 32 operates by searching the keyboard buffer to see whether a key has been pressed and, if not, loops back to the beginning of line 22.

Obviously this security system, as it stands, is limited, as anyone with program experience could easily find the code by listing the program or typing in RUN 3 and by-passing the code input. One method of improving the system would be to make the code not installable when the program was listed and this can be done quite simply by changing line 20 as follows:

```

10 print ""code = "ask" then 21 print ""is
delete"
To include the 26 delete type print""
followed by moving the cursor back one
place, hold down the shift key and press the
ctrl/del key 26 times. Release shift key
```

```

10 *****
20 *****
30 *****
40 *****
50 *****
60 *****
70 *****
80 *****
90 *****
100 *****
110 *****
120 *****
130 *****
140 *****
150 *****
160 *****
170 *****
180 *****
190 *****
200 *****

```

```

10 print ""space type""
20 *****
30 *****
40 *****
50 *****
60 *****
70 *****
80 *****
90 *****
100 *****
110 *****
120 *****
130 *****
140 *****
150 *****
160 *****
170 *****
180 *****
190 *****
200 *****

```

Subroutine 2: deals with some of the more common questions encountered when writing doshops programs

4) and press ins/del key 26 times. On loading the program, line 23 now reads "print" only, in other words the important code word (data) has disappeared.

Plugged in

Lines 27-32 make up a routine which, basically, is asking whether a printer will be used in the program operation and if it is, will check whether the printer is plugged in or not. Various results are obtained and it is a matter of experimentation to establish the correct routine to suit. Factors affecting the routine are whether the printer is plugged directly into a computer or plugged into the back of the disk drive. In line 31 command open4 refers to open a channel on line 4 to device number 4. Device number 4 is the code which the computer recognizes as a "printer has to be accessed". ST or status byte provides a record of the status of the system after a peripheral such as a tape recorder or printer has been accessed. If all systems are correct the variable \$I1 is returned as zero. The 128 is the code for DEVICE NOT PRESENT and although a return of this error number should be intercepted, it can happen that the running program will stop and will have to be restarted from scratch. There is obviously little point in running a program dealing with complicated data analysis only to have the program end because the printer has not been plugged in. Far better to establish this point at the very beginning.

Line 9999 will end the program and close the disk error channel. CLOSE 13 will close

all other disk channels and should be included in a tape system.

Subroutine 2 is a simple routine dealing with common questions which are frequently referred to and can save valuable memory space and programming time. Lines 208-286 can be accessed either at line 200 or 302 depending on the type of question to be asked, as the operator has been requested to enter a data file name and gosub200 ensures that the operator checks the entry before continuing. Gosub202 would be referred to for a straight YES or NO answer to a question such as DO YOU WISH TO PROCEED? gosub202. Line 269 will not accept keyboard entries unless they are either y or n. Line 268 clears the screen, places the program name at the top and returns to the point after access.

Program pause

Lines 290-299 provide a halt in the running program to enable the operator to place a tape in the recorder or paper in the printer. Line 294 will only accept a SPACE BAR entry to continue. Numerous programs request PRESS ANY KEY to continue and this is not advisable. A colleague of mine included this statement routinely in his program until one day, during a demonstration of a program to a captive audience, the RUN/STOP key was entered and caused him some embarrassment. It is, therefore, advisable to always specify a key entry. The space bar is ideal in that it is at the bottom of the keyboard, is large and easily found by the operator. This is an example of making a

program interactive with the operator just as good screen display is important too.

Lines 220-229 deal with the automatic loading and running of a MENU program by signposting whether this is intended and if the answer is NO the command RUN1 is executed. Use of RUN1 in programs will probably be frowned upon by many programmers who will describe "sloppy programming technique". They are, of course, correct, but it's not as also very convenient in that all variables and arrays are cleared from memory and the program is restarted as if it had just been loaded. By signposting RUN1, the variable of 1 is set to one and the code entry sequence is bypassed.

Lines 223-228 deal with the mechanics of loading and running the menu program. CLR clears all variables from memory, the screen is cleared and load "menu" is printed on the screen followed by a four line gap and run is printed onto the screen. Note the sequence to print quotation marks as menu, in the use of CHR\$(24). The positive sign can be used instead of a quotation to allow the line to be printed to the screen in reverse.

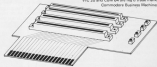
The effect created by the poles in line 225 is identical to typing load "menu" on the screen, pressing the return key, followed by run and return key as in direct mode. It is possible to use the load command in the program mode, is 3000 load "menu". However, problems can arise from this method if the program to be loaded is in fact longer than the original program. ■

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

- Home
- Computer
- Centre

ABC

29 Millerside, Crosby, Liverpool L23 9XJ



VIC 20 and CBM 64 are right hand marks Commodore Business Machines

- VIC 20 16K STANDARD RAM PACK — £28.95
- VIC 20 16K SWITCHABLE RAM PACK — £35.95
- VIC 20 32K SWITCHABLE RAM PACK — £42.95

- VIC 20 4 SLOT SWITCHABLE MOTHERBOARD — £28.95
- CBM 64 4 SLOT SWITCHABLE MOTHERBOARD — £28.95

Please allow up to 21 days for delivery. All prices include V.A.T., postage and packing.

If you wish to be added to our mailing list, please tick the appropriate box

PLEASE SEND ME

- VIC 20
- CBM 64
- BBC
- Lynx
- Oric
- Dragon 32
- T1024
- ZX Spectrum
- Electron
- Colour Genie

- Oric
- 16K Std. Ram Pack
- 16K Switchable Ram Pack
- 32K Switchable Ram Pack
- VIC 20 4 Slot Motherboard
- CBM 64 4 Slot Motherboard

Name _____
Address _____

I enclose Cheque/PO for £



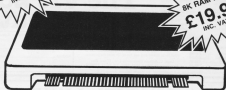
VIC-20 SEASONAL GIVEAWAY PRICES..

16K RAM PACK

£24.95
INC. VAT

8K RAM PACK

£19.95
INC. VAT



QUALITY PRODUCTS AT GIVEAWAY PRICES
IDEAL FOR THE SEASONAL GIFT
AND BACKED BY A
FULL 1 YEAR REPLACEMENT GUARANTEE

Post this coupon to:-

APPELTECH LIMITED

UNIT A3, HARRISON STREET, MEADOW BANK INDUSTRIAL ESTATE, ROTHERHAM,
SOUTH YORKSHIRE S61 1EE

Please send me	<input type="checkbox"/> 16K RAM PACKS @ £24.95	£	TOTAL
	<input type="checkbox"/> 8K RAM PACKS @ £19.95	£	
	postage & packing50	
	TOTAL	£	_____

I enclose cheque/P.O. for £.....

NAME _____

ADDRESS _____

Adman ELECTRONICS

Add on the Adman way

The Vic 20 really can speak... but only if you use an ADMAN SPEECH SYNTHESIZER. It's word power is endless as there is no set vocabulary. You operate it simply. The 44 characters of English speech are preprogrammed to fit and over 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 BBC and IBM Home Pack(s) and the ADMAN 3 FONT EXPANSION MODULE BOARD. With screen designs of the highest quality they are the best value for money around.

Available from Spectrum, Dismos and other major computer accessory shops.

Price per unit

IBM Home Pack	£22.95
IBM Home Pack	£25.95
MultiFonted	£19.95
Speech Synthesizer	£49.95

To find out more about these products, why not take a leaf from our speech synthesizer... go to your local dealer and ask for it (in post this occasion).

Dept. C, Adman Electronics Ltd., Ripon Way, Hemingley, N Yorks, YO1 3AU. Tel. 0825 148873

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

The Vic 20 speaks out!

Please send me information on Adman Vic 20 Accessories

Name

Address

£25

A QUALITY LIGHTPEN

inclusive.

Two different drawing programs provided free with each lightpen.

"SKETCH" and
"SHAPE-CREATE"

SUPERIOR PROGRAMS

- Tape storage of your work
- Good documentation
- User routines provided on tape and on printer

Please state VIC-20, BBC or DRAGON 32 when ordering.

Send cheque or P.O. for £25 to:

Datapen Microtechnology Limited,
Kingsclere Road,
Overton, Hants. RG25 3JB

Or send SAE for details. Now available from good computer shops.

SUPERIOR PERFORMANCE

- Insensitive to ambient lighting
- Responds to different colours
- Program accessible LED lamp readout
- Switch for program control




```

410 GOTO10170,440,460
420 POREB=105:PFORER=2+CC:R=0+5140
425 PORET=1:TO25:HEXTT
427 IFF=100:O500
430 GOTO170
440 POREB=175:65:PFORER=75+CC:R=0+6175
445 PORET=1:TO25:HEXTT
447 IFF=100:O500
450 GOTO170
460 POREB=195:65:PFORER=195+CC:R=0+9195
465 PORET=1:TO25:HEXTT
467 IFF=100:O500
470 GOTO170
500 PORE=0:R=0:SCORE=0
504 IFE=1:5TH:RFR:195:PFORER
505 IFFER=1:R=22:R=25:O1500
510 IFFER=1:R=22:O1500:O1700
515 IFR=20:R=6:R=6:O1700
520 POREB=32
530 R=0+20:PFORER=91:PFORER+CC:4
532 IFR=200:HEX=204:GOTO130
533 POREB=9:R=1:FORCT=1:TO25:HEXTT:R=0-1
540 GOTO220
600 RER=40:PLATE:DORE=0
601 POREB=0
610 POREB=32:PFORER=42:PFORER+CC:2
620 POREB=1:TO100:PFORER=125:HEXTT:PFORER=4:0
623 POREB=123:PFORER+CC:0
624 R=204
625 SC=SC+10
630 PRINT"### SCORE=";SC
640 DE=DE+1:GOTO170
700 RER=40:PLATE:DORE=0
701 POREB=0
710 POREB=32:R=PFORER+22:R=PFORER+R+2:R=PFORER+R+23
712 POREB=2:48:PFORER=46:PFORER=2:46:PFORER=2+CC:R=PFORER+CC:5:PFORER+2+CC:5
715 POREB=22:46:PFORER=23:77:PFORER=23:76:PFORER=22+CC:5:PFORER=21+CC:5:PFORER=23+CC
720 PORE=1:TO50:PFORER=175:HEXTT:PFORER=1:0
723 R=204
725 POREB=2:32:PFORER=32:PFORER=0:32
727 POREB=23:32:PFORER=23:32:PFORER=23:32
730 POREB=22:R=PFORER+22+CC:0
732 POREB=21:R=PFORER+23+CC:0
734 POREB=23:R=PFORER+23+CC:0
740 DE=DE+1:GOTO170

```

Apple Fall

A 64 game from Gary Turner and Andrew Wilson in *MicroByte*!
 A MINIMENTAL structure has been erected in Newton's forest, but it is doomed to be bombarded by apples falling from the sky. Consequently, in order to save the masterpiece from ruin destruction, a robot has been assigned to the job of catching the falling apples, thus preventing the structure from damage.

However, the robot must be quick enough to negotiate barriers and vault over gaps in order to catch the falling apple before it hits a platform. To help him in this task a transporter beam has been installed on both sides of the structure making his job easier and movement across the screen quicker.

Notes — should the robot touch the

sides of the screen or fall from the scaffolding his existence will be terminated, and it is possible he may become trapped in apples created by the falling apples. Also, once he has collected 18 apples (or lost he must deposit them in collecting baskets while the apples are still falling — so be quick.

The game is played using the joystick (it goes fast, and to make the robot jump, the fire button must be pressed in co-ordination with joystick movement). A comprehensive set of instructions is contained within the program which incorporates sound and user defined graphics, as well as the ability to change the difficulty of the game by altering the "22=1 to 7" variable in line 30 (1) to increase difficulty, 4 to make it easier — depending upon the player's preference.

It can be a frustrating game as the bars of time or good luck — you're going to need it!

Program notes

10 GOTO line 700

- 20 Generates apple. Check number of apples collected
- 30-145 Allow man. Check to see if man has hit anything
- 150-180 Allow apple and update score
- 190 Sound produced when apple hits beam
- 200-210 Replacing character behind robot
- 240-260 Robot jumps left
- 270-290 Robot jumps right
- 300-310 Boulder when man deposits apple
- 400-460 Operation of transporter beam
- 470-500 End of game if 5 apples hit base of screen
- 500-590 End of game routine: explosion, score, another go (Y/N)
- 700-1160 Instructions
- 1300-1630 Define characters
- 1700-1910 Print structure on screen
- 1940 Set up variables
- 1990 Return game to line 30

The variables are as follows:

- M — Position of Robot
- G — Apple
- AP — Number of apples collected
- L1 — Number of apples having reached base of screen
- SC — Overall score
- A — Character to be placed behind
- value
- R — Column to be placed behind robot
- JV — Jumped value
- FR — Fire function value

```

10 GOSUB700
20 G=INT(1000+(3148*ND00)) : PRINT "R" " " : IFRF=18THEHP=10 : IFLI=4THEA=70
30 FORJ2=1TO2 : FOKER,6 : FOKER=CO,7 : JV=PEEK(54328) : FR=JV#616 : JV=15-(JV#615)
35 FOKES4296,15 : FOKES4277,190 : FOKES4276,17 : FOKES4275,16
40 IFJV<0THEF=FOKER,6 : FOKER=CO,5 : FOKES4273,20 : IFR=7OR#6THEF=FOKER,32
50 IFJV=4#40FR=18THEHP=1 : IFFPEEK(R)=60RPEEK(O)=1THEHP=H+4
60 IFJV=6#40FR=18THEHP=1 : IFFPEEK(O)=60RPEEK(O)=1THEHP=1
70 IFJV=1#40PEEK(N)=2THEHP=H-40
80 IFJV=2#40PEEK(N=40)+2THEHP=H+40
90 IFJV<0THEHP=PEEK(O,3)+1 : IFR<32THEHP=PEEK(O+CO)
100 IFJV=4#40FR<18THEHP=SUB3240
110 IFJV=6#40FR<18THEHP=SUB3270
120 IFFPEEK(N=40)+32THEF=FOKER,32 : N=H+40 : FOKER,6 : FOKER=CO,7 : GOTO120
130 IFR=5THEHP=SUB3300
135 IFR=1665OR#1662THEHP=SUB400
140 IFFPEEK(N=40)=60R#2THEHP=60
145 FOKES4273,8 : NEXTJ2
150 FOKES,32 : G=H+40 : IFFPEEK(O)=6THEHP=HP+1 : FOKES4273,40 : R=32 : FOKER,32 : GOTO20
160 IFFPEEK(O)<32THEF=FOKER,32 : FOKES=49,32 : GOSUB700 : GOTO20
170 IFR<1943THEHP,1,1 : I+1 : GOTO20
180 FOKES,7 : FOKES=CO,18 : PRINT "RSC" " " : "AP" " " : GOTO30
190 FOKES4296,15 : FOKES4277,190 : FOKES4276,33 : FOKES4275,190 : FOKES4273,10 : RETURN
200 R=PEEK(R)+3 : R=0 : IFR=32THEF=RETURN
210 R=PEEK(R+CO) : RETURN
240 IFFPEEK(N=41)=60RPEEK(N=41)=1THEF=RETURN
245 FOKER,6 : FOKER=CO,5 : N=H-41 : GOSUB200 : FOKER,6 : FOKER=CO,7
250 IFFPEEK(N=39)=60RPEEK(N=39)=1THEF=RETURN
260 FOKER,6 : FOKER=CO,8 : N=H+39 : GOSUB200 : FOKER,6 : FOKER=CO,7 : RETURN
270 IFFPEEK(N=39)=60RPEEK(N=39)=1THEF=RETURN
275 FOKER,6 : FOKER=CO,3 : N=H-39 : GOSUB200 : FOKER,6 : FOKER=CO,7
280 IFFPEEK(N=41)=60RPEEK(N=41)=1THEF=RETURN
290 FOKER,6 : FOKER=CO,3 : N=H+41 : GOSUB200 : FOKER,6 : FOKER=CO,7 : RETURN
300 IFR<1THEF=RETURN
310 FORI=1TO1000 : IFR=1TOR#AP=AP-1 : SC=SC+1 : NEXT : FOKES3280,11 : RETURN
400 IFR=1662THEHP=1661 : FOKE1665,8 : FOKE1664CO,8
410 IFR=1662THEHP=1666 : FOKE1662,8 : FOKE1662CO,8
420 FOKES4277,190 : FOKES4276,33 : FOKES4275,190
430 FORJ=1TO400STEP,5 : FOKES4273,2 : NEXTJ
440 FOKES4277,8 : FOKES4276,8 : FOKES4275,8 : FOKES4273,8
450 R=2 : J=0 : RETURN
470 PRINT "3" : FOKES3280,8 : FOKES3281,8 : FOKES3272,21
480 PRINT "*****" 5 APPLES HAVE REACHED THE
490 PRINT "R" BOTTOM OF THE SCREEN
495 FORI=1TO1000 : NEXTI
500 FOKES4277,190 : FOKES4276,129 : FOKES4275,190 : FOKES4273,6
510 FOR#=15TO65STEP,3 : FORJ=1TO20 : NEXTJ : FOKES4296,8 : NEXT#
520 FOKES4277,8 : FOKES4276,8 : FOKES4275,8 : FOKES4273,8
530 PRINT "3" : FOKES3280,8 : FOKES3281,8 : FOKES3272,21
540 PRINT "*****" YOU SPAVED "SC : 3"APPLES
550 PRINT "*****" ANOTHER GOO'YH"
560 GOTO#
570 IFR#="V"THEGOSUB1700 : GOTO20
580 IFR#="M"THEPRINT "3VE." : END
590 GOTO500
700 PRINT "3" : FOKES3280,8 : FOKES3281,8 : PRINT "R" 3 APPLE FALL"
710 PRINT "*****" THE OBJECT OF THE GAME IS TO PROTECT"
720 PRINT "YOUR CLIENTS SCRAPFOLDING FROM DAMAGE BY"
730 PRINT "HANDLING YOUR AUTOMATED APPLE CATCHER"
740 PRINT "BEHIND A C. AROUND THE STRUCTURE, POSITIONING"
750 PRINT "IT BENEATH THE FALLING APPLES ENABLING"
760 PRINT "IT TO COLLECT THEM."
770 PRINT "*****" ONCE YOUR ROBOT HAS COLLECTED ITS"
780 PRINT "50 APPLES CAPACITY (OR LESS) IT MUST"
790 PRINT "DEPOSIT THEM IN THE COLLECTING BASKET AT"
800 PRINT "THE TOP OF THE SCAFFOLDING ON EITHER"

```

```

810 PRINT"SIDE OF THE SCREEN, HOWEVER, SHOULD RAY"
820 PRINT"APPLES ESCAPE YOUR 'R.A.C.' AND HIT THE"
830 PRINT"SCAFFOLDING THEY WILL CAUSE EXTENSIVE"
840 PRINT"DAMAGE MAKING YOUR TASK EVEN HARDER."
845 PRINT:GOTO @HIT A KEY TO CONTINUE"
845 IFPEEK(197)=64THENGOTO
850 PRINT"CAN SHOULD THE SCAFFOLDING BE DAMAGED IN"
860 PRINT"SUCH A WAY THAT IT IS IMPOSSIBLE TO MOVE"
870 PRINT"FROM ONE SIDE TO THE OTHER ACROSS THE"
880 PRINT"STRUCTURE, YOU WILL BE FORCED TO USE"
890 PRINT"THE TRANSPORTER BEAM (R ■) WHICH WILL"
900 PRINT"TAKE YOU AROUND AT THE TWIN BEAM ON THE"
910 PRINT"OTHER SIDE OF THE STRUCTURE, YOU MAY MOVE"
920 PRINT"TO EITHER SIDE USING THIS METHOD."
940 PRINT"THE ANTI THEFT DEVICE SURROUNDING THE"
950 PRINT"SCAFFOLDING (GULCH) IS LETHAL TO YOUR"
960 PRINT"ROBOT SO IF HE FALLS THROUGH THE"
970 PRINT"SCAFFOLDING ONTO THE FLOOR, OR STRAYS TOO"
980 PRINT" FAR WHEN DEPOSITING HIS APPLES - SCRF!!!"
985 PRINT"WARNING! IF YOU APPLES HIT THE FLOOR THEN"
990 PRINT" SCRF!!!"
995 PRINT:GOTO @HIT A KEY TO CONTINUE"
1000 IFPEEK(197)=64THENGOTO
1010 PRINT"THE SCORE IS DISPLAYED IN THE TOP LEFT"
1020 PRINT"THIRD CORNER OF THE SCREEN ALONG WITH"
1030 PRINT"THE NUMBER OF APPLES YOUR ROBOT IS"
1040 PRINT"CARRYING-(SCORE LOAD):YOUR FINAL SCORE"
1050 PRINT"IS THE NUMBER OF APPLES DEPOSITED IN"
1060 PRINT"THE COLLECTING BASKETS DURING THE GAME."
1070 PRINT:GOTO @MOVEMENT"
1080 PRINT" USE JOYSTICK IN PORT 2 TO MOVE--"
1090 PRINT" UP:DOWN:LEFT:RIGHT."
1100 PRINT" THE FIRE BUTTON ENABLES THE ROBOT TO"
1110 PRINT"JUMP A ONE SPACE GAP IN WHICHEVER"
1120 PRINT"DIRECTION IT MAY BE TRAVELLING/PROVIDING"
1130 PRINT"THERE IS SUFFICIENT HEADROOM."
1140 PRINT:GOTO @GOOD LUCK!!"
1200 POKE16334, PEEK(16334)AND234:POKE1,PEEK(1)AND251
1210 FORI=0TO511:POKEI+12280,PEEK(I)+32240:NEXT
1220 POKE1,PEEK(1)OR4:POKE16334,PEEK(16334)OR1
1230 FORCHR=0TO0
1240 FORBYTE=0TO7:REAR:POKE12280+(9+CHR)+BYTE,H:HEXTRBYTE:HEXTOCHR
1250 DATA255,255,255,255,255,255,255,255
1260 DATA129,66,36,24,24,36,66,255
1270 DATA255,129,129,129,129,129,129,129
1280 DATA192,192,192,192,192,192,192,192
1290 DATA3,3,3,3,3,3,3,3
1300 DATA255,255,66,102,36,66,24,24
1310 DATA129,129,66,231,153,153,102,66
1320 DATA36,136,136,136,136,66,0
1330 DATA255,255,255,255,255,255,255,255
1340 PRINT:GOTO @HIT A KEY TO PLAY THIS ACE GAME"
1350 IFPEEK(197)=64THENGOTO
1360 POKE53272,29:PRINT"?" POKE53280,11:POKE53281,11:PRINT"####" :CO=54272
1370 PRINT"  "
1380 PRINT"  "
1390 PRINT"  "
1400 PRINT"  "
1410 PRINT"  "
1420 PRINT"  "
1430 PRINT"  "
1440 PRINT"  "
1450 PRINT"  "
1460 PRINT"  "
1470 PRINT"  "
1480 PRINT"  "
1490 PRINT"  "
1500 PRINT"  "
1510 PRINT"  "
1520 PRINT"  "
1530 PRINT"  "
1540 PRINT"  "
1550 PRINT"  "
1560 PRINT"  "
1570 PRINT"  "
1580 PRINT"  "
1590 PRINT"  "
1600 PRINT"  "
1610 PRINT"  "
1620 PRINT"  "
1630 PRINT"  "
1640 PRINT"  "
1650 PRINT"  "
1660 PRINT"  "
1670 PRINT"  "
1680 PRINT"  "
1690 PRINT"  "
1700 PRINT"  "
1710 PRINT"  "
1720 PRINT"  "
1730 PRINT"  "
1740 PRINT"  "
1750 PRINT"  "
1760 PRINT"  "
1770 PRINT"  "
1780 PRINT"  "
1790 PRINT"  "
1800 PRINT"  "
1810 PRINT"  "
1820 PRINT"  "
1830 PRINT"  "
1840 PRINT"  "
1850 PRINT"  "
1860 PRINT"  "
1870 PRINT"  "
1880 PRINT"  "
1890 PRINT"  "
1900 PRINT"  "
1910 PRINT"  "
1920 PRINT"  "
1930 PRINT"  "
1940 PRINT"  "
1950 PRINT"  "
1960 PRINT"  "
1970 PRINT"  "
1980 PRINT"  "
1990 PRINT"  "
2000 PRINT"  "
2010 PRINT"  "
2020 PRINT"  "
2030 PRINT"  "
2040 PRINT"  "
2050 PRINT"  "
2060 PRINT"  "
2070 PRINT"  "
2080 PRINT"  "
2090 PRINT"  "
2100 PRINT"  "
2110 PRINT"  "
2120 PRINT"  "
2130 PRINT"  "
2140 PRINT"  "
2150 PRINT"  "
2160 PRINT"  "
2170 PRINT"  "
2180 PRINT"  "
2190 PRINT"  "
2200 PRINT"  "
2210 PRINT"  "
2220 PRINT"  "
2230 PRINT"  "
2240 PRINT"  "
2250 PRINT"  "
2260 PRINT"  "
2270 PRINT"  "
2280 PRINT"  "
2290 PRINT"  "
2300 PRINT"  "
2310 PRINT"  "
2320 PRINT"  "
2330 PRINT"  "
2340 PRINT"  "
2350 PRINT"  "
2360 PRINT"  "
2370 PRINT"  "
2380 PRINT"  "
2390 PRINT"  "
2400 PRINT"  "
2410 PRINT"  "
2420 PRINT"  "
2430 PRINT"  "
2440 PRINT"  "
2450 PRINT"  "
2460 PRINT"  "
2470 PRINT"  "
2480 PRINT"  "
2490 PRINT"  "
2500 PRINT"  "
2510 PRINT"  "
2520 PRINT"  "
2530 PRINT"  "
2540 PRINT"  "
2550 PRINT"  "
2560 PRINT"  "
2570 PRINT"  "
2580 PRINT"  "
2590 PRINT"  "
2600 PRINT"  "
2610 PRINT"  "
2620 PRINT"  "
2630 PRINT"  "
2640 PRINT"  "
2650 PRINT"  "
2660 PRINT"  "
2670 PRINT"  "
2680 PRINT"  "
2690 PRINT"  "
2700 PRINT"  "
2710 PRINT"  "
2720 PRINT"  "
2730 PRINT"  "
2740 PRINT"  "
2750 PRINT"  "
2760 PRINT"  "
2770 PRINT"  "
2780 PRINT"  "
2790 PRINT"  "
2800 PRINT"  "
2810 PRINT"  "
2820 PRINT"  "
2830 PRINT"  "
2840 PRINT"  "
2850 PRINT"  "
2860 PRINT"  "
2870 PRINT"  "
2880 PRINT"  "
2890 PRINT"  "
2900 PRINT"  "
2910 PRINT"  "
2920 PRINT"  "
2930 PRINT"  "
2940 PRINT"  "
2950 PRINT"  "
2960 PRINT"  "
2970 PRINT"  "
2980 PRINT"  "
2990 PRINT"  "
3000 PRINT"  "
3010 PRINT"  "
3020 PRINT"  "
3030 PRINT"  "
3040 PRINT"  "
3050 PRINT"  "
3060 PRINT"  "
3070 PRINT"  "
3080 PRINT"  "
3090 PRINT"  "
3100 PRINT"  "
3110 PRINT"  "
3120 PRINT"  "
3130 PRINT"  "
3140 PRINT"  "
3150 PRINT"  "
3160 PRINT"  "
3170 PRINT"  "
3180 PRINT"  "
3190 PRINT"  "
3200 PRINT"  "
3210 PRINT"  "
3220 PRINT"  "
3230 PRINT"  "
3240 PRINT"  "
3250 PRINT"  "
3260 PRINT"  "
3270 PRINT"  "
3280 PRINT"  "
3290 PRINT"  "
3300 PRINT"  "
3310 PRINT"  "
3320 PRINT"  "
3330 PRINT"  "
3340 PRINT"  "
3350 PRINT"  "
3360 PRINT"  "
3370 PRINT"  "
3380 PRINT"  "
3390 PRINT"  "
3400 PRINT"  "
3410 PRINT"  "
3420 PRINT"  "
3430 PRINT"  "
3440 PRINT"  "
3450 PRINT"  "
3460 PRINT"  "
3470 PRINT"  "
3480 PRINT"  "
3490 PRINT"  "
3500 PRINT"  "
3510 PRINT"  "
3520 PRINT"  "
3530 PRINT"  "
3540 PRINT"  "
3550 PRINT"  "
3560 PRINT"  "
3570 PRINT"  "
3580 PRINT"  "
3590 PRINT"  "
3600 PRINT"  "
3610 PRINT"  "
3620 PRINT"  "
3630 PRINT"  "
3640 PRINT"  "
3650 PRINT"  "
3660 PRINT"  "
3670 PRINT"  "
3680 PRINT"  "
3690 PRINT"  "
3700 PRINT"  "
3710 PRINT"  "
3720 PRINT"  "
3730 PRINT"  "
3740 PRINT"  "
3750 PRINT"  "
3760 PRINT"  "
3770 PRINT"  "
3780 PRINT"  "
3790 PRINT"  "
3800 PRINT"  "
3810 PRINT"  "
3820 PRINT"  "
3830 PRINT"  "
3840 PRINT"  "
3850 PRINT"  "
3860 PRINT"  "
3870 PRINT"  "
3880 PRINT"  "
3890 PRINT"  "
3900 PRINT"  "
3910 PRINT"  "
3920 PRINT"  "
3930 PRINT"  "
3940 PRINT"  "
3950 PRINT"  "
3960 PRINT"  "
3970 PRINT"  "
3980 PRINT"  "
3990 PRINT"  "
4000 PRINT"  "
4010 PRINT"  "
4020 PRINT"  "
4030 PRINT"  "
4040 PRINT"  "
4050 PRINT"  "
4060 PRINT"  "
4070 PRINT"  "
4080 PRINT"  "
4090 PRINT"  "
4100 PRINT"  "
4110 PRINT"  "
4120 PRINT"  "
4130 PRINT"  "
4140 PRINT"  "
4150 PRINT"  "
4160 PRINT"  "
4170 PRINT"  "
4180 PRINT"  "
4190 PRINT"  "
4200 PRINT"  "
4210 PRINT"  "
4220 PRINT"  "
4230 PRINT"  "
4240 PRINT"  "
4250 PRINT"  "
4260 PRINT"  "
4270 PRINT"  "
4280 PRINT"  "
4290 PRINT"  "
4300 PRINT"  "
4310 PRINT"  "
4320 PRINT"  "
4330 PRINT"  "
4340 PRINT"  "
4350 PRINT"  "
4360 PRINT"  "
4370 PRINT"  "
4380 PRINT"  "
4390 PRINT"  "
4400 PRINT"  "
4410 PRINT"  "
4420 PRINT"  "
4430 PRINT"  "
4440 PRINT"  "
4450 PRINT"  "
4460 PRINT"  "
4470 PRINT"  "
4480 PRINT"  "
4490 PRINT"  "
4500 PRINT"  "
4510 PRINT"  "
4520 PRINT"  "
4530 PRINT"  "
4540 PRINT"  "
4550 PRINT"  "
4560 PRINT"  "
4570 PRINT"  "
4580 PRINT"  "
4590 PRINT"  "
4600 PRINT"  "
4610 PRINT"  "
4620 PRINT"  "
4630 PRINT"  "
4640 PRINT"  "
4650 PRINT"  "
4660 PRINT"  "
4670 PRINT"  "
4680 PRINT"  "
4690 PRINT"  "
4700 PRINT"  "
4710 PRINT"  "
4720 PRINT"  "
4730 PRINT"  "
4740 PRINT"  "
4750 PRINT"  "
4760 PRINT"  "
4770 PRINT"  "
4780 PRINT"  "
4790 PRINT"  "
4800 PRINT"  "
4810 PRINT"  "
4820 PRINT"  "
4830 PRINT"  "
4840 PRINT"  "
4850 PRINT"  "
4860 PRINT"  "
4870 PRINT"  "
4880 PRINT"  "
4890 PRINT"  "
4900 PRINT"  "
4910 PRINT"  "
4920 PRINT"  "
4930 PRINT"  "
4940 PRINT"  "
4950 PRINT"  "
4960 PRINT"  "
4970 PRINT"  "
4980 PRINT"  "
4990 PRINT"  "
5000 PRINT"  "
5010 PRINT"  "
5020 PRINT"  "
5030 PRINT"  "
5040 PRINT"  "
5050 PRINT"  "
5060 PRINT"  "
5070 PRINT"  "
5080 PRINT"  "
5090 PRINT"  "
5100 PRINT"  "
5110 PRINT"  "
5120 PRINT"  "
5130 PRINT"  "
5140 PRINT"  "
5150 PRINT"  "
5160 PRINT"  "
5170 PRINT"  "
5180 PRINT"  "
5190 PRINT"  "
5200 PRINT"  "
5210 PRINT"  "
5220 PRINT"  "
5230 PRINT"  "
5240 PRINT"  "
5250 PRINT"  "
5260 PRINT"  "
5270 PRINT"  "
5280 PRINT"  "
5290 PRINT"  "
5300 PRINT"  "
5310 PRINT"  "
5320 PRINT"  "
5330 PRINT"  "
5340 PRINT"  "
5350 PRINT"  "
5360 PRINT"  "
5370 PRINT"  "
5380 PRINT"  "
5390 PRINT"  "
5400 PRINT"  "
5410 PRINT"  "
5420 PRINT"  "
5430 PRINT"  "
5440 PRINT"  "
5450 PRINT"  "
5460 PRINT"  "
5470 PRINT"  "
5480 PRINT"  "
5490 PRINT"  "
5500 PRINT"  "
5510 PRINT"  "
5520 PRINT"  "
5530 PRINT"  "
5540 PRINT"  "
5550 PRINT"  "
5560 PRINT"  "
5570 PRINT"  "
5580 PRINT"  "
5590 PRINT"  "
5600 PRINT"  "
5610 PRINT"  "
5620 PRINT"  "
5630 PRINT"  "
5640 PRINT"  "
5650 PRINT"  "
5660 PRINT"  "
5670 PRINT"  "
5680 PRINT"  "
5690 PRINT"  "
5700 PRINT"  "
5710 PRINT"  "
5720 PRINT"  "
5730 PRINT"  "
5740 PRINT"  "
5750 PRINT"  "
5760 PRINT"  "
5770 PRINT"  "
5780 PRINT"  "
5790 PRINT"  "
5800 PRINT"  "
5810 PRINT"  "
5820 PRINT"  "
5830 PRINT"  "
5840 PRINT"  "
5850 PRINT"  "
5860 PRINT"  "
5870 PRINT"  "
5880 PRINT"  "
5890 PRINT"  "
5900 PRINT"  "
5910 PRINT"  "
5920 PRINT"  "
5930 PRINT"  "
5940 PRINT"  "
5950 PRINT"  "
5960 PRINT"  "
5970 PRINT"  "
5980 PRINT"  "
5990 PRINT"  "
6000 PRINT"  "
6010 PRINT"  "
6020 PRINT"  "
6030 PRINT"  "
6040 PRINT"  "
6050 PRINT"  "
6060 PRINT"  "
6070 PRINT"  "
6080 PRINT"  "
6090 PRINT"  "
6100 PRINT"  "
6110 PRINT"  "
6120 PRINT"  "
6130 PRINT"  "
6140 PRINT"  "
6150 PRINT"  "
6160 PRINT"  "
6170 PRINT"  "
6180 PRINT"  "
6190 PRINT"  "
6200 PRINT"  "
6210 PRINT"  "
6220 PRINT"  "
6230 PRINT"  "
6240 PRINT"  "
6250 PRINT"  "
6260 PRINT"  "
6270 PRINT"  "
6280 PRINT"  "
6290 PRINT"  "
6300 PRINT"  "
6310 PRINT"  "
6320 PRINT"  "
6330 PRINT"  "
6340 PRINT"  "
6350 PRINT"  "
6360 PRINT"  "
6370 PRINT"  "
6380 PRINT"  "
6390 PRINT"  "
6400 PRINT"  "
6410 PRINT"  "
6420 PRINT"  "
6430 PRINT"  "
6440 PRINT"  "
6450 PRINT"  "
6460 PRINT"  "
6470 PRINT"  "
6480 PRINT"  "
6490 PRINT"  "
6500 PRINT"  "
6510 PRINT"  "
6520 PRINT"  "
6530 PRINT"  "
6540 PRINT"  "
6550 PRINT"  "
6560 PRINT"  "
6570 PRINT"  "
6580 PRINT"  "
6590 PRINT"  "
6600 PRINT"  "
6610 PRINT"  "
6620 PRINT"  "
6630 PRINT"  "
6640 PRINT"  "
6650 PRINT"  "
6660 PRINT"  "
6670 PRINT"  "
6680 PRINT"  "
6690 PRINT"  "
6700 PRINT"  "
6710 PRINT"  "
6720 PRINT"  "
6730 PRINT"  "
6740 PRINT"  "
6750 PRINT"  "
6760 PRINT"  "
6770 PRINT"  "
6780 PRINT"  "
6790 PRINT"  "
6800 PRINT"  "
6810 PRINT"  "
6820 PRINT"  "
6830 PRINT"  "
6840 PRINT"  "
6850 PRINT"  "
6860 PRINT"  "
6870 PRINT"  "
6880 PRINT"  "
6890 PRINT"  "
6900 PRINT"  "
6910 PRINT"  "
6920 PRINT"  "
6930 PRINT"  "
6940 PRINT"  "
6950 PRINT"  "
6960 PRINT"  "
6970 PRINT"  "
6980 PRINT"  "
6990 PRINT"  "
7000 PRINT"  "
7010 PRINT"  "
7020 PRINT"  "
7030 PRINT"  "
7040 PRINT"  "
7050 PRINT"  "
7060 PRINT"  "
7070 PRINT"  "
7080 PRINT"  "
7090 PRINT"  "
7100 PRINT"  "
7110 PRINT"  "
7120 PRINT"  "
7130 PRINT"  "
7140 PRINT"  "
7150 PRINT"  "
7160 PRINT"  "
7170 PRINT"  "
7180 PRINT"  "
7190 PRINT"  "
7200 PRINT"  "
7210 PRINT"  "
7220 PRINT"  "
7230 PRINT"  "
7240 PRINT"  "
7250 PRINT"  "
7260 PRINT"  "
7270 PRINT"  "
7280 PRINT"  "
7290 PRINT"  "
7300 PRINT"  "
7310 PRINT"  "
7320 PRINT"  "
7330 PRINT"  "
7340 PRINT"  "
7350 PRINT"  "
7360 PRINT"  "
7370 PRINT"  "
7380 PRINT"  "
7390 PRINT"  "
7400 PRINT"  "
7410 PRINT"  "
7420 PRINT"  "
7430 PRINT"  "
7440 PRINT"  "
7450 PRINT"  "
7460 PRINT"  "
7470 PRINT"  "
7480 PRINT"  "
7490 PRINT"  "
7500 PRINT"  "
7510 PRINT"  "
7520 PRINT"  "
7530 PRINT"  "
7540 PRINT"  "
7550 PRINT"  "
7560 PRINT"  "
7570 PRINT"  "
7580 PRINT"  "
7590 PRINT"  "
7600 PRINT"  "
7610 PRINT"  "
7620 PRINT"  "
7630 PRINT"  "
7640 PRINT"  "
7650 PRINT"  "
7660 PRINT"  "
7670 PRINT"  "
7680 PRINT"  "
7690 PRINT"  "
7700 PRINT"  "
7710 PRINT"  "
7720 PRINT"  "
7730 PRINT"  "
7740 PRINT"  "
7750 PRINT"  "
7760 PRINT"  "
7770 PRINT"  "
7780 PRINT"  "
7790 PRINT"  "
7800 PRINT"  "
7810 PRINT"  "
7820 PRINT"  "
7830 PRINT"  "
7840 PRINT"  "
7850 PRINT"  "
7860 PRINT"  "
7870 PRINT"  "
7880 PRINT"  "
7890 PRINT"  "
7900 PRINT"  "
7910 PRINT"  "
7920 PRINT"  "
7930 PRINT"  "
7940 PRINT"  "
7950 PRINT"  "
7960 PRINT"  "
7970 PRINT"  "
7980 PRINT"  "
7990 PRINT"  "
8000 PRINT"  "
8010 PRINT"  "
8020 PRINT"  "
8030 PRINT"  "
8040 PRINT"  "
8050 PRINT"  "
8060 PRINT"  "
8070 PRINT"  "
8080 PRINT"  "
8090 PRINT"  "
8100 PRINT"  "
8110 PRINT"  "
8120 PRINT"  "
8130 PRINT"  "
8140 PRINT"  "
8150 PRINT"  "
8160 PRINT"  "
8170 PRINT"  "
8180 PRINT"  "
8190 PRINT"  "
8200 PRINT"  "
8210 PRINT"  "
8220 PRINT"  "
8230 PRINT"  "
8240 PRINT"  "
8250 PRINT"  "
8260 PRINT"  "
8270 PRINT"  "
8280 PRINT"  "
8290 PRINT"  "
8300 PRINT"  "
8310 PRINT"  "
8320 PRINT"  "
8330 PRINT"  "
8340 PRINT"  "
8350 PRINT"  "
8360 PRINT"  "
8370 PRINT"  "
8380 PRINT"  "
8390 PRINT"  "
8400 PRINT"  "
8410 PRINT"  "
8420 PRINT"  "
8430 PRINT"  "
8440 PRINT"  "
8450 PRINT"  "
8460 PRINT"  "
8470 PRINT"  "
8480 PRINT"  "
8490 PRINT"  "
8500 PRINT"  "
8510 PRINT"  "
8520 PRINT"  "
8530 PRINT"  "
8540 PRINT"  "
8550 PRINT"  "
8560 PRINT"  "
8570 PRINT"  "
8580 PRINT"  "
8590 PRINT"  "
8600 PRINT"  "
8610 PRINT"  "
8620 PRINT"  "
8630 PRINT"  "
8640 PRINT"  "
8650 PRINT"  "
8660 PRINT"  "
8670 PRINT"  "
8680 PRINT"  "
8690 PRINT"  "
8700 PRINT"  "
8710 PRINT"  "
8720 PRINT"  "
8730 PRINT"  "
8740 PRINT"  "
8750 PRINT"  "
8760 PRINT"  "
8770 PRINT"  "
8780 PRINT"  "
8790 PRINT"  "
8800 PRINT"  "
8810 PRINT"  "
8820 PRINT"  "
8830 PRINT"  "
8840 PRINT"  "
8850 PRINT"  "
8860 PRINT"  "
8870 PRINT"  "
8880 PRINT"  "
8890 PRINT"  "
8900 PRINT"  "
8910 PRINT"  "
8920 PRINT"  "
8930 PRINT"  "
8940 PRINT"  "
8950 PRINT"  "
8960 PRINT"  "
8970 PRINT"  "
8980 PRINT"  "
8990 PRINT"  "
9000 PRINT"  "
9010 PRINT"  "
9020 PRINT"  "
9030 PRINT"  "
9040 PRINT"  "
9050 PRINT"  "
9060 PRINT"  "
9070 PRINT"  "
9080 PRINT"  "
9090 PRINT"  "
9100 PRINT"  "
9110 PRINT"  "
9120 PRINT"  "
9130 PRINT"  "
9140 PRINT"  "
9150 PRINT"  "
9160 PRINT"  "
9170 PRINT"  "
9180 PRINT"  "
9190 PRINT"  "
9200 PRINT"  "
9210 PRINT"  "
9220 PRINT"  "
9230 PRINT"  "
9240 PRINT"  "
9250 PRINT"  "
9260 PRINT"  "
9270 PRINT"  "
9280 PRINT"  "
9290 PRINT"  "
9300 PRINT"  "
9310 PRINT"  "
9320 PRINT"  "
9330 PRINT"  "
9340 PRINT"  "
9350 PRINT"  "
9360 PRINT"  "
9370 PRINT"  "
9380 PRINT"  "
9390 PRINT"  "
9400 PRINT"  "
9410 PRINT"  "
9420 PRINT"  "
9430 PRINT"  "
9440 PRINT"  "
9450 PRINT"  "
9460 PRINT"  "
9470 PRINT"  "
9480 PRINT"  "
9490 PRINT"  "
9500 PRINT"  "
9510 PRINT"  "
9520 PRINT"  "
9530 PRINT"  "
9540 PRINT"  "
9550 PRINT"  "
9560 PRINT"  "
9570 PRINT"  "
9580 PRINT"  "
9590 PRINT"  "
9600 PRINT"  "
9610 PRINT"  "
9620 PRINT"  "
9630 PRINT"  "
9640 PRINT"  "
9650 PRINT"  "
9660 PRINT"  "
9670 PRINT"  "
9680 PRINT"  "
9690 PRINT"  "
9700 PRINT"  "
9710 PRINT"  "
9720 PRINT"  "
9730 PRINT"  "
9740 PRINT"  "
9750 PRINT"  "
9760 PRINT"  "
9770 PRINT"  "
9780 PRINT"  "
9790 PRINT"  "
9800 PRINT"  "
9810 PRINT"  "
9820 PRINT"  "
9830 PRINT"  "
9840 PRINT"  "
9850 PRINT"  "
9860 PRINT"  "
9870 PRINT"  "
9880 PRINT"  "
9890 PRINT"  "
9900 PRINT"  "
9910 PRINT"  "
9920 PRINT"  "
9930 PRINT"  "
9940 PRINT"  "
9950 PRINT"  "
9960 PRINT"  "
9970 PRINT"  "
9980 PRINT"  "
9990 PRINT"  "

```

```

1870 PRINT "  #0  3  3  #00000000  #1  C:  #0  3"
1880 PRINT "  #00000000  #00000000  #00000  #00000"
1890 PRINT "  #00000000  C:  #0  #000000  #000000"
1900 PRINT "  C:  3  C:  3  C:  3"
1910 FOR I=1800 TO 1944 STEP 40: POKE I, 0: POKE I+40, 6: NEXT I
1920 FOR I=1860 TO 1960 STEP 40: POKE I, 0: POKE I+40, 6: NEXT I
1930 FOR I=1960 TO 2020: POKE I, 0: POKE I+40, 6: NEXT I
1940 B=32: R#0: SC#0: R=1828: L#0
1950 RETURN

```

Light Sound

```

10 REM LIGHT & SOUND
12 REM B. BARTON, 1983
14 GRAPHIC2
20 S1=36874: S2=36875: S3=36876:
  S4=36877: V=36878
30 POKE V,5
50 FOR P=1708
60 CO=INT(RND(1)*#15)
70 COLOR CO/2,6-CO,6
80 A=INT(RND(1)*#127)+50
90 B=INT(RND(1)*#127)+125
100 C=INT(RND(1)*#127)+125
110 D=INT(RND(1)*#127)+125
120 TD=INT(RND(1)*#988)+1
130 E=INT(RND(1)*#828)
140 F=INT(RND(1)*#1828)
150 G=INT(RND(1)*#1828)
160 H=INT(RND(1)*#1828)
170 POKES3,A
180 DR#42,E,FT08,HT0588,18237DE,F
190 FORT=1T0(TD):NEXTT
200 POKES2,B
210 POKES1,C
220 FORT=1T0(TD,5):NEXTT
230 IFTD<30THEN POKES4,B
240 IFCO=1THEN C=CIRCLE2,E,F,G,H
250 IFCO=6THEN GOSUB 3370
260 IFTD<60THEN GOSUB 410
270 IFTD<130THEN GOSUB 460
280 FORT=1T0(TD,2):NEXTT
290 POKES4,0:NEXTP
310 SOUND:
320 GOTO 50
  #30 FOR GR=18701828 STEP 50
340 DR#42,6,GR TO 1823,GR
350 NEXTGR
360 RETURN
370 FOR GR=18701828 STEP 50
380 DR#42,GR,6TOR,1823
390 NEXTGR
400 RETURN
410 FOR CR=18705000 STEP 50
420 C=CIRCLEOVER2,588,588,CR,CR
430 NEXTCR
440 POKES1,0: POKES2,0: POKES3,6: POKE14,0
450 RETURN
460 SO=INT(RND(1)*#1888)
470 IFRD<588THEN FOR OR=870588 STEP 28
480 IFRD<500THEN FOR OS=870588 STEP 28
490 DR#OVER2,500,500TOR,GR
500 NEXTOR
510 RETURN

```

From Richard Barlow in *Deephem* — for the Vic 20 with Super Expander

THIS PROGRAM generates music in four parts and full colour graphics in grids, circles, triangles, etc. The choice of graphics

shape is dependent upon the musical notes chosen and they are overlaid one upon the other in different colours.

The program is for the Vic 20 plus Super Expander.

Creating 3D graphics

For the Super Expanded Vic — from Mary Swales, *Computer 242*

ALTHOUGH SMALL, this program creates a 3D pattern on the Vic 20 high resolution screen.

— MARC—S INCLAIR —

```

@ GRAPHIC2:COLORS,6,1,1:FORA=870428STEP1
@B=SINH<A>/50)*100:CIRCLE2,512,B+500,A,
A:NEXT
1 END

```

Send us your Commodore programs, enclosing a cassette — and a printout on plain white paper if possible. Each listing must be accompanied by a typewritten introduction describing the program and explaining how it is constructed. We pay £5.00 for each bug-free listing published. We cannot guarantee to return every program submitted, so please keep a copy. If you want us to return your listing you must include a stamped, addressed envelope. If you have any problems with the programs, please write to the appropriate author. Software File.

Commodore Horizons, 12-13 Little Newport Street, London WC2E 8JD



The best books for the Commodore 64



The Working Commodore 64
A library of practical subroutines and programs.
"The style is easy to follow and informative" — *Personal Comp. News* August 1983
ISBN 0144002020



Commodore 64 Machine Code Master
A library of machine code routines. "At last a truly useful book for the machine code programmer — and it's easy to read as well!"
Popular Comp. News 23 August 1983
ISBN 0144002022



Commodore 64 Adventures
A blueprint for the construction and playing of Adventure programs based on a full text Adventure.
ISBN 0144002114



Graphic Art for the Commodore 64
New graphics facilities can be fully developed by using Turbo Graphics Techniques.
ISBN 0144002027



Business Applications for the Commodore 64
Learn how to write your own packages.
ISBN 0144002112



Mathematics on the Commodore 64
Mathematical routines for use in programs.
ISBN 0144002114

Look out for the Sunshine range in R.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores.

Dealer Enquiries 01-407 4363

Please contact:

- | | |
|---|---|
| <input type="checkbox"/> The Working Commodore 64 at £5.95 each | <input type="checkbox"/> Graphic Art for the Commodore 64 at £5.95 each |
| <input type="checkbox"/> Commodore 64 Machine Code Master at £6.95 each | <input type="checkbox"/> Business Applications at £5.95 each |
| <input type="checkbox"/> Commodore 64 Adventures at £5.95 each | <input type="checkbox"/> Mathematics on the Commodore 64 at £5.95 each |

Free home shopping postal order by £10 made payable to Sunshine Books, 12-13 City Newspaper St., London WC2E 9JF. Or telephone Access Mastercard on 01-407 4363.

Name _____
Address _____
Signature _____

We can normally deliver in 2 weeks

Solar SOFTWARE

31 Meadowcroft, Asquith,
Macclesfield M25 3UP
Tel: 062 254 8622

Quality arcade action games for the **COMMODORE 64**

CALLADONS The earth is being invaded by an alien force, the GALAXIONS have arrived from a dying planet, determined to destroy civilisation as we know it. They came in formation, swooping and diving towards the planet earth. You and you alone can save mankind from the terrifying destruction the aliens threaten us with.

100% Machine Code
3 Lives



Bonus ship at 10000
Progressive levels of play

£7.95

much man 64 A fantastic version of this popular arcade game.

100% Machine Code
3 Lives, Bonus fruit
Power pills



4 Very intelligent ghosts

£7.95

Robin to the Rescue In days of old when knights were bold and the sheriff was in power, to play this game guide Robin Hood to Marion locked up in the tower.

100% Machine Code
Sprite Graphics
3 Lives



12 Screens of arcade action

£7.95

All our games are available mail order P&F included from the above address. Orders sent by return post. Also available from all good computer shops.

Distribution, PROGRESSIVE London,
P.C.S. Dorwer, CENTRE SOFT West Midlands
ALPHA TAPES, Merseyside, TIGER, Cheshire,
CALISTO Birmingham, LIGHTNING, London,
LEISURESOFT, Northampton.

First steps on the road to robot building

The first few stages in constructing turtles and microworld may be inexpensive but not without the occasional stumbling block, as Dr John Billingsley explains

STEPPER MOTORS are a favorite actuator for obtaining motor output. Their drives involve only logic signals, with no need for digital-to-analog conversion. Until recently only precision "upper-class" motors were available as an outrageous price, but with the microcomputer and a requirement for low-cost peripherals there has come a demand for cheap stepper motors which the industry has been swift to fulfill. A suitable motor for turtles and microworld is the Philips 3215, distributed by Implex of Richmond at around £12.80.

Despite their apparent advantages, stepper motors are not without their problems. They have a firm restriction on their top speed, and the useful torque falls off dramatically as this is approached. Sudden speed changes, even at relatively low speeds, can stall the motor. Unfortunately, unless special sensors are added, the computer is unaware that the motor has slipped "out of step". All subsequent movements therefore take place with a position error, until a reset maneuver is made. Another drawback in a battery-driven system is power consumption: even when stationary a stepper draws as much power as under full load.

Down to work

Just how does a stepper motor work? The rotor is a permanent magnet, while the stator (the fixed case) has a number of electrical windings which when energized create a magnetic field. The field pulls the rotor into line, and by changing the selection of energized windings in a suitable sequence, the rotor is pulled round step by step. When the stepping stops, the rotor is held in position by the magnetic field.

The movement of the permanent-magnet rotor can be limited to the rotation of a magnetic compass — indeed you can use a compass in an experiment to demonstrate how a stepper motor operates. Obtain a cheap compass — the simple sort with a pointer rather than an ornate card will be best. Wind a coil of 50 turns of fine enameled-copper wire — 30-wg or finer — across the compass — obviously the way that *not* obscure the view of the needle. Connect a 47 ohm resistor in series with the

coil experimenting much easier if you connect the rear port to a "blue-black" terminal strip, as shown in Figure 2. You can now find N and ground on the compass strip.

When the voltage is applied, the needle should rotate and line up almost perpendicular to the coil, or along the axis of the coil. Reverse the applied voltage, and the needle will reverse. Could the coil, and hence the needle, be driven directly from two bits of the rear port? Unfortunately the current available from P80-7 is limited to about three milliamperes, and unless you are prepared to wind coils of several hundred turns this will not eliminate the effect on the needle of the earth's magnetic field. We must therefore use some amplification — so bad thing in preparing to drive genuine stepper motors. The simplest amplifier remains of just one resistor and one transistor per bit of output — four of each per motor. (Later on we can consider using a Darlington driver chip instead.) A good



Compass and coil



Use port to connector strip

general purpose PNP transistor is a 2N 707 (85 204 104), costing well under £1.00 per pack of five.

First connect just one transistor to your coil, driving it from P80 via a 1 kOhm resistor as shown in Figure 3. Connect the circuit and switch on. Nothing should happen to the compass at first. Set the output data register to all-bits-high by typing POKE 5677,255. Then configure bits 0-3 as outputs by typing POKE 5679,15. Still nothing should happen, because the output of P80 is high, and does not yet sink any current via the transistor base. Now type POKE 5677,255.1. This will take P80 to zero and current will flow into P80 from +5V through the transistor base and E. The transistor will be turned on, applying V from the transistor collector to the coil and resistor. The needle should leap into action. Turn the current off again with POKE 5677,255 before the resistor R1 starts cooking.

To reverse the needle, we must be able to pass current in the opposite direction. With a circuit as simple as this one, we cannot reverse the current in the wire, and so we need a second coil, wound directly over the top of the first. Wind a further 50 turns of wire, connecting one end to the resistor, and winding in a direction such that the two joined wires become the half-way point of the coil which now has 100 turns. Connect a coin of the transistor circuit, and drive it from P80, as in Figure 4.

Money

Now the commands POKE 5677,255.2 followed by POKE 5677,255.1 should drive the compass needle first one way north, up and then the other south. Another command POKE 5677,255.1 will switch off both arms of the coil, and the compass will be left to the mercy of the earth's field.

By moving about with a compass does not seem to have much to do with motors. But now the plan gets more exciting. Wind another twin coil, also of 50+50 turns, over and perpendicular to the first coil. Drive when the new coil is connected via two more transistors and drives from P80 to P80, the command POKE 5677,255.4 will cause the needle to point in the new direction. If the first coil caused the needle to point north or south, then the second coil causes the needle to point east or west. By switching on one of the 50-S coils and one of the 50-W coils together we can also obtain NE, SE, SW and NW (see Figure 5).

Speed and acceleration control

Enter and run the following program:

```

100 POKE 5677,255.4
110 POKE 5677,255.1
120 POKE 5677,255.1
130 POKE 5677,255.1
140 POKE 5677,255.1
150 POKE 5677,255.1
160 POKE 5677,255.1
170 POKE 5677,255.1
180 POKE 5677,255.1
190 POKE 5677,255.1
200 POKE 5677,255.1
210 POKE 5677,255.1
220 POKE 5677,255.1
230 POKE 5677,255.1
240 POKE 5677,255.1
250 POKE 5677,255.1
260 POKE 5677,255.1
270 POKE 5677,255.1
280 POKE 5677,255.1
290 POKE 5677,255.1
300 POKE 5677,255.1
310 POKE 5677,255.1
320 POKE 5677,255.1
330 POKE 5677,255.1
340 POKE 5677,255.1
350 POKE 5677,255.1
360 POKE 5677,255.1
370 POKE 5677,255.1
380 POKE 5677,255.1
390 POKE 5677,255.1
400 POKE 5677,255.1
410 POKE 5677,255.1
420 POKE 5677,255.1
430 POKE 5677,255.1
440 POKE 5677,255.1
450 POKE 5677,255.1
460 POKE 5677,255.1
470 POKE 5677,255.1
480 POKE 5677,255.1
490 POKE 5677,255.1
500 POKE 5677,255.1
510 POKE 5677,255.1
520 POKE 5677,255.1
530 POKE 5677,255.1
540 POKE 5677,255.1
550 POKE 5677,255.1
560 POKE 5677,255.1
570 POKE 5677,255.1
580 POKE 5677,255.1
590 POKE 5677,255.1
600 POKE 5677,255.1
610 POKE 5677,255.1
620 POKE 5677,255.1
630 POKE 5677,255.1
640 POKE 5677,255.1
650 POKE 5677,255.1
660 POKE 5677,255.1
670 POKE 5677,255.1
680 POKE 5677,255.1
690 POKE 5677,255.1
700 POKE 5677,255.1
710 POKE 5677,255.1
720 POKE 5677,255.1
730 POKE 5677,255.1
740 POKE 5677,255.1
750 POKE 5677,255.1
760 POKE 5677,255.1
770 POKE 5677,255.1
780 POKE 5677,255.1
790 POKE 5677,255.1
800 POKE 5677,255.1
810 POKE 5677,255.1
820 POKE 5677,255.1
830 POKE 5677,255.1
840 POKE 5677,255.1
850 POKE 5677,255.1
860 POKE 5677,255.1
870 POKE 5677,255.1
880 POKE 5677,255.1
890 POKE 5677,255.1
900 POKE 5677,255.1
910 POKE 5677,255.1
920 POKE 5677,255.1
930 POKE 5677,255.1
940 POKE 5677,255.1
950 POKE 5677,255.1
960 POKE 5677,255.1
970 POKE 5677,255.1
980 POKE 5677,255.1
990 POKE 5677,255.1

```

The compass needle should now rotate, if somewhat jerkily, acting as a stepper motor.

Now you can try a variety of numbers in line 280 to set the speed of the motor. You will find that if you aim too high, the

Ultrabasic-64

Are you trying to write programs for your COMMODORE 64 using one of the following?

- High resolution graphics
- Multicolor graphics
- Sprite graphics
- Sound effects
- Joystick, games paddle or lightpen
- Fast copy of graphics (scroll) to Commodore or Epson printer

Well, if you want a package which makes it also simple to use these features, then you need **ULTRABASIC-64**.

ULTRABASIC-64 acts as powerful commands for your COMMODORE 64. Commands for graphics and sound and sprites and games. No longer are you limited to one fixed function command: **PRINT** and **FORN** in BASIC. **ULTRABASIC-64** removes many of the rough edges of using the built-in BASIC.

If that isn't enough we've included **TURTLE** **GRAPHICS** commands which let you share with our friendly turtle. Just position him on your screen and let him go. He's sure to be fun.

£22.95 cassette £28.95 disc

Super Disk Utility-64

SUPER DISK UTILITY-64 provides the Commodore 64 user with several useful functions to make working with the 5.25 disk drive easy. Written entirely in machine code, **SUPER DISK UTILITY-64** provides four major functions:

- Copy disk 10 to disk using a single drive
 - Backup tape and/or make a disk copy
 - Update the disk's track availability map
 - Display your file directory
- You can copy the entire disk, selected tracks or named programs only, with a positive matching label. The program works by copying blocks from one disk to fill the Commodore memory and then writing the blocks to the new disk. The process is repeated as many times as necessary. This program is intended for all 5.25 disk users.

£22.95 on disc.

We have many more titles for the Commodore 64 and VIC 20 computers including games, utilities and books. Generous discounts are available and our mail order prices are hard to beat, and are postage free. Don't see for catalogue.

ADAMSOFT (Dept CH)

18 Norwich Avenue, Rushfields, Lancs OL11 5JZ

(mail order only)

Generous dealer discounts available. Inquiries tel. 04-788 8963 (daytime) or 0798-824524 (evenings/weekend)



FOR VIC-20

+ minimum of  K.

Just £4.95 inc. p & p

Cheques and PC's please to:

**HELANA,
65 CAMELOT HOUSE,
SALISBURY ROAD,
LONDON N9 9TE**

NAME

ADDRESS

ENCLOSURE: £4.95 inc. P & P.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

10.00	20.00	30.00	40.00
50.00	60.00	70.00	80.00
90.00	100.00	110.00	120.00
130.00	140.00	150.00	160.00
170.00	180.00	190.00	200.00

Please continue on a separate sheet if needed.

I make this..... words, at 20p per word so I owe you £.....

Name.....

Address.....

Telephone.....

Please cut out and send this form to: Classified Department, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LQ



Transistor driver



Modified transistor driver

Motor will not start. Try accelerating gradually by making the following changes:

```

1. 5V supply
2. 100K resistor to collector
3. 100K resistor to base
4. 100K resistor to 5V supply
5. 100K resistor to ground

```

Now the delay will reduce progressively until the top speed is reached. Try various values in line 230. The speed will climb very slowly, resting at the red. A smaller speed-up can be obtained with:

230 V = V*500

You are now experimenting with techniques which you will need when you graduate to a genuine stepper motor. Of course the program is still grossly incomplete, and is not easily versatile. Nevertheless the compass motor will already have taught you some of the pitfalls to look for:

1. Without drive, the motor does not retain its position.
2. Settling to a new position takes the form of a poorly damped oscillation. At certain stopping speeds, there is a resonance so that the oscillations build up — the motor then stalls.
3. Movement at low speeds is "jerky". This can be improved somewhat by dividing up on the applied steps, so that the sequence is N, NE, E, SE, S, SW, W, NW and back to N.
4. Sudden changes of speed will stall the motor.
5. There is no absolute position reference — everything depends on the motor keeping in step.

Now let us try to introduce some style into the software, so that it will be of more general use. The value which determines the coil polarities are best held in an array. I have a personal preference for putting all initialization data at the end of the program, so that it does not obscure listings of the functional part. Thus the program will start with GOTO 10000, and all definitions will start at line 10000.

LISTING 10000: THE COMPASS MOTOR DRIVER
 10000: THE COMPASS MOTOR DRIVER
 10000: THE COMPASS MOTOR DRIVER
 10000: THE COMPASS MOTOR DRIVER
 10000: THE COMPASS MOTOR DRIVER



Pre-wire



Simple power supply arrangement (from 252)

If the number of steps to move is held in variable M (distance), while the direction is held in K0 (rotation) as a ± 1 , and if the current position is held in M0, then an appropriate section of program to command the movement could be:

```

200 GOSUB 5000 : REM MOVE
DISTANCE, ROTATION, SPEED
WHERE THE SUBROUTINE HAS BEEN DEFINED AS:

```

The variable delay of line 5040 might appear a clumsy way to set the speed, but it is effective unless the value of SPEED is excessive. A more elegant technique is that of the binary-rate-multiplier. This is useful for coordinating the movements of several steppers, but because of an uneven stepping rate the top speed is reduced.

To complete this program, you can add:

and you have a demonstration program enabling you to command a motor from the keyboard. You should then be able to write a more elaborate program which builds an array of programmed moves and then executes them.

A second stepper motor can be added, driven from the P8A-P8F. This will enable you to make a plotter or a raster, but will be a bit insensitive for a robot. You will need to



Darlington driver

use some clever addressing techniques if up to eight motors are to be commanded from a single user port.

Beyond going into any more software detail, let us consider the electronic problems of interfacing one or more genuine stepper motors to the computer. The principles remain the same, but we must now be able to supply much greater currents. These are beyond the permitted drain which can be taken from the micro, and so a separate supply must be provided. You should be able to buy a 1 ampere supply, variable from + to -10 volts, for under £10.00. Even so, this is scarcely enough current — although an overload will merely "hold back" the output. The best answer may be to build the unregulated supply shown in Figure 6 which will give around three amps output at +7v and -7v. Many stepper motors will require 12 volts or more to give their best, and the present supply can be extended to give a simple 12 volt supply — just by using the -7v terminal as the negative connection and ignoring the positive terminal.

A far less risky alternative is to take your 10 in your hands and use a motor-car battery charger. This will probably give you up to four amps, but will need a large electrolytic capacitor — 10,000 microfarads or so. It will also give poor regulation, and will not working better than a four-amp fuse between your circuitry's well-being or destabilisation. Still, it's better than buying an endless supply of batteries, unless you can afford rechargeables.

The simple transistor will hardly have enough "bark" to drive a stepper motor from the user's circuit. However, you can buy Darlington transistors with much higher gain. They are in fact a pair of transistors in cascade, but have the disadvantage of a higher "base-emitter" voltage — they are less efficient in low voltage circuits. Nevertheless it is much more economic to buy multi-function chips than to buy individual transistors, and the RS 507-109 chip contains seven Darlings, complete with input resistors and protection diodes, for well under £2.00. However, Murphy's Law gets you because to drive two stepper motors you need eight outputs, not seven.

Incompleteness

Another complication is that these circuits are "dinky", not robust. The common points of the motor windings must therefore be connected to the positive supply, and the winding will be energized when the user port output bit is high, not low. The line of the computer program setting up the output patterns will have to be changed, to become:

1000 READ J(J) : REM J=1 to 8
 Moreover the program will have to poke 30579 with 15 or 125 as early as possible, so that zero will be output and the motor not be initialised under double its fan share of active currents.

With the change to the program described above, and with the circuit shown in Figure 7, you should be confident of your ability to drive stepping motors and should be ready to build a simple raster. ■

CROYDON COMPUTER CENTRE

NEW

CHEMIST LABELLING PACKAGE
(APPROVED BY P.S.G.B.) LISTS
AND PRINTS DRUG PRESCRIPTION
TO INDIVIDUAL REQUIREMENTS —
COMMODORE 64
PHONE FOR DETAILS

SOFTWARE FROM ALL THE BEST SUPPLIERS
PLUS VAST RANGE OF PERIPHERALS.

SEE AND BUY

OUR GREAT RANGE OF MACHINES

COMMODORE 64
VIC 20
BBC
ACORN ETC

Croydon Computer Centre
28a Bridgebank Road
Thornton Heath, Surrey CM8 7JW
Telephone 01489 1288

LOOKING FOR SPARE TIME EARNINGS?

Then why not sell software to your
friends and workmates.

There are probably hundreds of
micro users in your area looking for
software who are wary of mail order
and cannot find a local dealer. You
can become that local dealer.

We are looking for agents in all areas
to sell software for the Spectrum,
ZX81, VIC-20, CBM 64, BBC, Dragon,
Atari, Oric 1 and Lynx. All the latest
titles in stock. Write now for full
details or telephone if you prefer.

Joysticks, joystick interfaces and
Spectrum sound boosters along with
CBM 64, Spectrum and Lynx 48K
computers also available.

if you are interested in becoming a
Bytewell agent in time for the
predicted boom in sales this Xmas
then write or telephone now.

**BYTEWELL, 203, COURT ROAD,
BARRY, S. GLAMORGAN, CF6 7EW**
Telephone (0446) 742491

SOPHISTICATED GAMES FOR VIC 20

VIC CHECKIT - Action game of skill which tests all the major video board controls
programmable, full screenplay, action and game save facilities. Needs 10K expansion
RAM.

LEAGUE SOCCER - League championship game for 2 to 10 teams (video Assistant
Referee, full game commentary, transfers, suspensions, results, CBM 64, personal
games, save, team status, training programme).

THE GREAT ESCAPE - A VIC software which has the most
exciting and gripping action. Needs 10K expansion, 16K.

THE GREAT ESCAPE 2 - 7 extra games have been added to make the movie. Expansion
of main has more than 1000 on-line items. Features extensive game for 1 to 4 players
and includes advanced tactics video film. This software is memory expansion 16K,
16K expansion, 16K.

Four to Four - More exciting game about the most famous. Make your own
records and see them with the Star Printer and game save system. Needs 16
K expansion, 16K.

TOP FIGHT 4 - Features (as mentioned) a copy of THE RINGS, SOME 4 (also
known as COMBAT) and more. Two games coming from the company in the near future.
All good fun - nothing otherwise. Needs at least 16K expansion, 16K.

Available from
**SOPHISTICATED GAMES Dept. 100 07 Sussex Road,
Barnham, Avee BN9 6JG. Tel 01253 8801**
WRITE FOR DETAILS OF OUR FULL RANGE
We'll fax you a list. All games sold subject to our conditions of sale, which are
available on request.

DISPLAY AD INDEX

A	
Adamsco	40
Adman	39
Aids	4
Amiga	34
Apprentice	37
Asilogistic	Inside back cover
B	
Bacon	31
Bytewell	40
C	
CompuShare	23
Computer Personal Computers	40
Croydon Computer Centre	40
D	
Datapan	38
Dartmouth	26, 28, 27
E	
E.I.C.C.	30
Elvira	46
F	
Farnsworth	6
M	
Mr Chip	30
Mr Micro	Inside back cover
D	
Defind Computer Services	14
P	
Portman	13
P.S.S.	Outside back cover
R	
Rex Print Supplies	8
Rite	44
Sophisticated Games	48
Suzanne	37
T	
Templation	32
Terminal	18
TQ Computers	14

COMMODORE 64

CLWYD PERSONAL COMPUTERS

Unit 19, David Owen Precinct, Mold, CH7 1AP
Telephone: Mold 56842

Phone Orders Welcome on **0352-56842**

Please ring for details.

ANSWER BACK

Looking for a good book

COULD YOU please tell me whether it is possible to obtain a book about high-resolution graphics on the unexplicated or expanded (DR) *Vic 20*?

Also could you tell me if there is a book about machine code available and, if so, from where.

A *Crashbox* aficionado asks: Please AS YOU probably know there is a great range of books available covering most aspects of the *Vic 20*. Many of these, however, are hardly worth looking at, especially most of the games books.

For a start on programming in high resolution graphics it is probably best to try and work your way through the *Commodore Vic 20 Programmer's Reference Manual*.

When it comes to machine code programming the best book is probably Dr Watson's *Beginning Assembly Language Programming on the Vic 20*.

Calling Micronet

I WOULD like to know when and if there will be a modem forthcoming to allow the *Vic 20* to access the Micronet 800 service.

I understood the BBC and ZX Spectrum micros have had modems introduced, but have heard nothing about a *Vic 20* modem. Is the *Vic 20* screen display impossible to change to a *Prodat* compatible display? Will there only be a modem for the C128/42?

Please help,
Andrew Leahy
Camerton
Dorset

AT THE moment there are only plans to introduce a *CBM 64* version for Micronet 800. The feeling seems to be that the *Vic 20* is not going to be around much longer, at least not long enough to make it worth investing in the design and manufacture of a modem connection.

Old chestnuts roasted

WHERE'S THE expansion port on the Commodore 64?

UNLIKE the *Vic 20*, the Commodore 64 has 64K of RAM that cannot be increased. There is therefore no expansion port.

ARE THERE two different sorts of Commodore 64 on the market (there are two distinct colours and various namplates)?

YES, THERE are two sorts of Commodore 64, NTSC and PAL. The NTSC is the American version and the PAL the English version. The PAL version is the only one available in this country.

WHERE DO you connect the printer when the disk drive is being used?

THE PRINTER is connected directly into the serial port in the back of the disk drive unit.

WHEN TYPING in a program, why is it not possible to get reverse characters (i.e. Print 'CNTRL'/'RABCDE'?)

THE LETTERS "RABCDE" will only appear in reverse when the program is run.

THE POKE location in the centre of the screen when addressed should show a white ball (see user guide), why doesn't it?

THE COLOUR memory needs to be POKED with a colour different to that of the background colour before the ball becomes visible.

CAN YOU use a pre-recorded software for the 8000 series on the Commodore 64?

YOU CAN, but only if the programs don't refer to the screen and there are no machine code routines.

CAN YOU run *Vic 20* software on the Commodore 64?

Vic 20 software is not compatible with the Commodore 64. (In some circumstances if the program is in ordinary Basic and does not use POKE statements it will run.)

THE TANK = UFO program in the rear of the *Vic 20* user manual has a line 135 with 89 characters, why?

THE MAXIMUM allowed on one line is 4 x 22 = 88 characters, therefore you must abbreviate this line. This is made possible by either omitting all spaces or by using the character forms of the Basic key words, eg **Printed B** for the **PRINT** statement.

Do not, however, be too disappointed. Although Micronet is an admirable idea, and has many applications for a business user, it does have many disadvantages for the home user.

It is relatively expensive to set up the modem to become a subscriber to the service and to pay all the phone bills which go with regular access to the information. This is not as yet a great deal of useful material on the service and it is frustratingly slow to download any software. We also feel that many home users are not happy having their telephones barred from ordinary calls while they are using the system.

It is probably better to resign yourself to having to wait until a faster cable networking system can be used. This is likely, however, to be several years away.

Much more on memory

I HAVE yet to discover the full advantages of the 16K Ram pack for the *Vic 20*.

Other than the knowledge that its introduction releases the Basic, screen and colour, I

have yet to find a successful routine/program to enable 1.5K programs to be run using the 16K addition.

This is particularly frustrating as I am not able to expand conventional programs above the memory available. I am new to home computers but "experts" have advised me that all the problems referred to can be overcome. Could you please advise me.

T. Waldron
Quarry Bank
Fife, Highlands

I AM sure you do not need us to tell you that the main advantage of the 16K memory expansion is that you can run far longer and, hopefully, better programs. You will not, for example, find many adventure programs which will fit inside 1.5K.

Programs written in Basic alone do not need to be adapted to run on the expanded system. Although the Basic program needs to be relocated the system will handle it automatically.

As you rightly imply, problems only arise when you have 1.5K programs which POKE to the screen or colour areas. To make these programs run try typing in the following PEEKs before

loading the program. I have not tried this routine, but it comes from a good source — an article by Mike Todd on page 50 of the Spring '83 *Vicsoft* catalogue.

```
POKE 440,0 <control>  
POKE 442,18 <control>  
POKE 444,0 <control>  
POKE 446,86 <control>  
POKE 448,18 <control>  
SYS 4424 <control>
```

More than the Basics

I HOPE to buy a computer, probably a Commodore 64. One thing I would like to know is what is machine code?

Paul Pinner
Pinner
Middlesex

MACHINE code is essentially just a long list of numbers which are converted into binary by the computer.

If you need help with a technical query or problem write to:
Answer Back,
Commodore Magazine,
12-13 Little Newport
Street, London
WC2R 2JD

IT WAS a poor night at the Hill-Moist Mince Club. Only Algernon, Bertie, Cecil, Dredgah and Ernestine had turned up. They made the usual menu setting up their equipment.

The club room, Commodore Hall, was in fact, a dilapidated Sea-foam bar, with twelve tables arranged down one wall, a row of lockers on the wall at the end and various chairs, benches, ropes and so on scattered all around.

The only really bright spots in the room were the row of plugs connecting the various mimes to the power supply. Each was a different colour, matching the colour of the lead running to each mime. Five different screens were each glowing with the graphics of their respective owners' favourite game (all different of course). Except, that is, the 26 inch colour TV, which seemed to have become detached, as did the joystick in the debris on the floor.

When the fire connected their systems up, each machine

COMPETITION CORNER

Win a CBM disk drive

Commodore provides the prize. Terry Roberts the puzzle



was complete, each with its single peripheral (the joystick and a light pen, a voice box, some disk drives, and a printer). Can you find where the disconnected fits belong?

Here's some information that may help. The real lead

came to the Pet, the green plug powers the light-pen, Frogger is running on the machine connected to the yellow cable and the Spectrum is on the table next to the mimes on the blue lead.

There's a 26 inch screen

Send your answers to Competition Corner.

Commodore House, 20, 22 Little Newport Street, London WC2E 8BB — to arrive no later than the last working day in the month on the cover of this issue. The names of the winners and the solution to the puzzle, will be published in the issue after next. Entries will not be acknowledged and we cannot enter into correspondence on the result.

MARKET VIEW

Shake, rattle, and roll . . .

WHATEVER happened to the money-spinning computer industry that was never going to look back? In recent weeks, the industry's relationship with investors has come under increasing strain, but Commodore thinks it can stay ahead.

On the home computer front, Intel is no more, while Newhouse makes Grandy Business Systems, burdened by debts of nearly £1 million, searches for a saviour. The news at the heavyweight end of the market is no better. Atari, Texas Instruments, Intel, Victor Technology and Ferranti Systems have all failed to increase loans this year.

In the UK, ACT introduced the Activision at the PCW store to a fanfare of favourable reviews and advance orders. ACT shares presently fall 30p in two days.

Acorn badly attracted enough support to float 10% of the company's shares on

the Stock Exchange's Unlisted Securities Market at the minimum asking price. One stockbroker analyst could even say of this company which has a seemingly impossible pedigree:

"Fundamentally, Acorn are a disaster. There's a very real chance they will be lost in two years."

What lessons can be learnt from this shake-out in the industry? First, after a spell when small seemed beautiful — Acorn sales last year were 142 million against 1990's £31,800 — it looks as if big is better. Mighty IBM, after losing market share to rivals, is slaying mainframe competitors like Honeywell and Amstel, carrying off before it with the cheaper PC and sending investors through Apple's share price just with the threat of the Pentium.

If size is to be a guarantee of survival — although remember that Atari and Mattel turned huge profits into losses of hundreds of millions of dollars — then Commodore looks set to stay the course. Commodore itself believes "Essentially the number of computer producers will be reduced to a handful of companies" — and backs its survival with

assets of £18 million devoted to computer interests.

Confidence and assets like that enable Commodore to press ahead with plans to raise production at its Derby plant to three million units a year.

The second move from these troubled times is that grabbing a bigger slice of the market means accepting ever-shrinking profit margins and/or pricing costs ruthlessly. Many companies own-produced and couldn't cut prices to keep up with rivals, ones cheaply produced rivals — they ended up with piles of stock back at their warehouses, spelling hefty losses or bankruptcy.

Here again, Commodore looks well placed. In spite of the current difficulties facing the small computer market, it seems clear that consumer demand is still rising. Steve Greenberg, New York marketing consultant to Commodore, believes that two million home computers were sold in 1982. The 1983 figure will be nearer five million and Commodore expects to take 40%. Greenberg puts the world market at 30 million units by 1987.

Commodore chairman Jack Tramiel hopes to keep

connected to the Vic 20, King King is the game running next to the key flat-screen monitor and Frogger next to the monochromatic 14 inch television.

The cassette drive is connected to the Commodore 64, and the video box is on the middle machine.

The invaders game is not showing up too well on the monitor, but the Hobbes, which is running on the Cric, looks clear enough. The adventure game is huge, though, and needs disk drives all the time.

The left most machine is the Spectrum and the mires powered by the green plug sits to the right of that on the white one.

All the machines, peripherals, leads, plugs and TVs are in the same order. They might be in a mess, but not that much of a mess.

As a tie-breaker, complete the following sentence in less than 10 words: I want to add Commodore disk drives to my system because . . .

Commodore is front by following two principles: "We believe in high volume products and we pain our cost savings on — the answer the better." That philosophy has made deep inroads into Commodore prices at all levels of the computer market. At the lower end, the Vic 20 now costs £140 against last year's £194 while the price of the Commodore 64 has dropped from £200 to £129.

Dealers big and small — operating on 30% average discounts — are willing to sell the 64 below £200 and 150 buyers pay a mere £113. In theory, more is still to come.

But cutting margins to bare minimums may spell trouble for the firmly established Commodore — even Tramiel must accept that in an industry where companies are cutting their own as much as each other's throats, there are no winners.

Christmas in the UK will be crucial — Commodore hopes to sell 400,000 computers by Christmas backed by a hefty £20 million advertising budget. If rivals follow suit, it looks like being a happy Christmas for consumers, but how many computer firms will enjoy a prosperous New Year?

The Lightning Bolt Assembly \$99.00

From an early IBM-compatible system, the same feature set and user interface have been incorporated into this computer-like utility program for the CPC 466. The program offers a comprehensive menu of game control options, including a choice of joystick or keyboard control, a choice of screen resolution, and a choice of screen refresh rate. It also offers a choice of screen resolution and a choice of screen refresh rate. It also offers a choice of screen resolution and a choice of screen refresh rate.

Cray Golf \$99.00

Only golf is more popular for the IBM Spectrum than golf. It's the most popular and most exciting of all sports. The new software program Cray Golf offers you the most realistic and enjoyable golf experience ever. You'll be able to play on a virtual golf course that's as realistic as the real thing. You'll be able to play on a virtual golf course that's as realistic as the real thing.

Demig \$99.00

In this program you'll be able to play on a virtual golf course that's as realistic as the real thing. You'll be able to play on a virtual golf course that's as realistic as the real thing. You'll be able to play on a virtual golf course that's as realistic as the real thing.

Demig \$99.00

In this program you'll be able to play on a virtual golf course that's as realistic as the real thing. You'll be able to play on a virtual golf course that's as realistic as the real thing. You'll be able to play on a virtual golf course that's as realistic as the real thing.



No Shocks—Plenty of Surprises!

At Micro, we know computers you can trust. Programs that are as exciting when you load them as they look on your desk. Programs that are as powerful and refined. Programs that bring you the best thinking and excitement of console games with the special extra dimension of real mental challenges... all at the right price. Plus accessories and add-ons which extend the value of your computer. Ask for the Micro logo and you'll see your local dealer's name on your game, always good news. From Micro, please call 600 Parkington Drive, San Jose, CA 95128. Micro's 24-Hour Customer Service is available 24 hours a day. Micro Limited, 600 Parkington Drive, San Jose, CA 95128. 24-Hour Customer Service is available 24 hours a day.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.

For more information, call 600 Parkington Drive, San Jose, CA 95128.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.



Archie
\$99.00

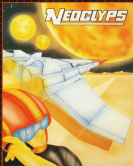
The Archie comic strip is one of the most popular in the world. Now you can play Archie and his friends in a computer game. Archie and his friends are in a computer game. Archie and his friends are in a computer game.





P.S.S. INTRODUCE THE FIRST OF MANY FOR THE COMMODORE 64

To launch our new range of Software we have selected the finest arcade action and adventure from the U.S.A. Canada and the U.K.



EASY TUTOR

For the computer programming novice, a no-frills tutorial in the basic language, comprehensive coverage from data statements, to loops and sub-routines, to arrays and matrices. Program examples with line by line explanations, multiple choice questions, "homework" assignments.

£7-95



COSMIC SPLIT

You are caught in a vicious jungle of your dreams. Each grade you are attacking you from all sides. Kill or they are dropping from the sky, and to top things off there's a vicious spider lurking in the back ground.

£7-95

METROBLITZ

The object of this game is to defend your city against an on-coming onslaught of alien ships. Six different types of alien bombard the planet's city with-our money, having no respect for their own lives.

£7-95

NEOGLYPHS

You are the 6666 GUY, free-stone fighter and renowned star pilot. The BAD GUY, as also can free-stone pilot who system have invaded NEOGLYPHS, one of your colonial planets. Being the good guy that you are, you are off to liberate the Common Folk of Neoglyphs from the oppression of the Bad Guys. The Bad Guys have populated Neoglyphs with several color beams which reveal your position to them.

£7-95



CRYSTALS OF ZONG

Your object is to encounter and use obstacles and computer systems intent on stopping you as you progress on your quest for the Crystals of Zong. Quick reactions will be necessary if you are to succeed then will guide you.

£7-95



MOBYDICK

The object of this game is to chase up information, destroy the hulk and catch the hulloping pilot, for its not all the whale.

£7-95