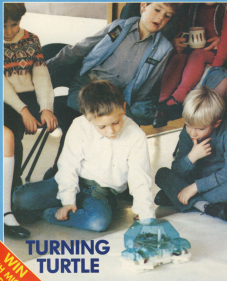


Commodore **HORIZONS**

The independent Commodore magazine

75p June 1984

COMMODORE SHOW PREVIEW • PLAY APOCALYPSE
GETTING TO GRIPS WITH BASIC COMMANDS



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TURTLE**

**WIN
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GRAFPAD DESIGN
TABLET**

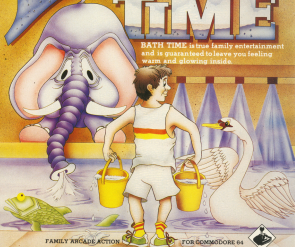
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Commodore HORIZONS

THE COMMODORE MAGAZINE

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EDITORIAL

IN OLD TIMES it was disputed how many angels could stand on the head of a pin. Modern equivalents include the possibility that a monkey, if left alone for long enough with a typewriter, could produce the works of Shakespeare. We don't know what kind of keyboard could take that amount of battering, but we do suspect that the same monkey is responsible for translating many of the Japanese computer manuals into English. It also looks as though it had a hand in translating some of the press releases Commodore handed out at the recent Hannover trade fair.

The Hannover show is the biggest in Europe — there's even a bus service to take you round the halls. And Commodore was there in force with three models from the range announced earlier this year in the US (the 66, 116 and 264) and two more specialist machines, an IBM PC clone and a 28600-based multi-user system running under a Unix operating system. Also along for the ride was the above-mentioned monkey, collaborating these machines with some Fabrice if disputed press releases. Originally written in German, these releases present an entertaining view of Commodore's activities. For example, we all know that micro manufacturers don't always get products out on time — one release doubts this problem with the handy phrase "one of these models will already be available."

Commodore may have lost out in UK schools but it's done better in West Germany. In fact it's done so well there that "an incalculable number of Commodore computers (4... has been purchased by schools", but Commodore wants to sell more, so it has donated 360 micros to German schools — "these donations are just welcome to serve as triggers". Some aids are also available for "terminating models", although schoolchildren with less initial interests should be reassured to learn that the various Commodore manuals are all "translation" (we never thought otherwise, honest).

The translation sometimes gives Commodore an unexpected degree of modesty — the 64 has "nearly become a legend" while the new IBM clone can "be considered by a rather large number of customers". But at other times it seems lost for superlatives — Commodore is "by its own statement... the only in the microcomputer field" (you can't help but wonder what the missing word is). Some phrases, however, lose nothing at all in translation — the old favourite "extremely favourable price/performance ratio" comes over clear as a bell.

The role of the new bottom end micros gets a little confused. We appreciate that it can be difficult distinguishing between a micro and a minicomputer, but the translation is being a bit optimistic in referring to the 18 and 19 as "mini" — particularly when the photograph of the 18 looks incredibly like a Commodore 64. The bigger summary model, the 264, is more straightforwardly described but is aimed at a very specialised market, the elusive "home and workshop" user. The new Unix machine is unsurprisingly called the CBM 28600, but is surprisingly described as a "micro mainframe". Ah well, it's all interesting stuff even if a little puzzling, and we have to admit that we'd do a worse job translating from English into German. For the moment too it can remain a matter for joy — the serious business will start when the machines make it to the market.

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Galactic replies

YOUR REVIEW of our Games Designer cassette for the Vic 20 in the April issue *Commodore Magazine* has been brought to my attention.

While accepting that reviewers certainly have the right to express their personal opinion, I feel that it is better for you to make reasonable precautions to ensure that reviews in your journal are factually accurate and truly representative of the product. In this regard there are certain facts which should be made clear:

a) Galactic Software did not leap on the bandwagon. Our Games Designer for the Vic 20 was released last Autumn at the same time as Quiksilver's Games Designer for the Spectrum. Our program had been many months in preparation prior to release. As also, I understand, had Quiksilver's. By your review has obviously missed the point of the Games Designer. The sample games included are included as a base on which

the user can build. To allow creativity and originality to be developed it is necessary that the samples are not complex.

For your review to simply make a judgement of the games and leave his article on that is not fairly representative of the Games Designer.

You might be interested to know that when people have a different reaction to this program. We have many letters from satisfied users. Enthusiasts who are really delighted that they can be creative and original. These people didn't just play the sample games and make instant, incorrect assumptions.

Commodore UK have retained the program and concluded it to be of sufficient interest to be supplied to their customers on quite a large scale.

The IBM 64 version of our Games Designer is due for imminent release. It is to be launched by a very large publishing group. As your review hopes, it is indeed a step up from the Vic 20 version. However, I feel that the Vic 20 version is a useful and viable program in its own right, considering the IBM limitations.

To conclude, even allowing for personal opinions, I believe your review did not give a fair

representation of the product.

Jon Dooling
Managing Director
Galactic Software

Sharp practice

HAVING recently purchased a 64, with which I am very pleased, I must confess to being somewhat disappointed by the apparent cheap practice of loading games software boxes. Understandably, the majority of games are first made available to Spectrum users, and subsequently transferred for use on other machines.

One would assume therefore that with the 64's superior colour, graphics and sound the resultant program would be at least as good as, if not better than, the original.

Unfortunately, it seems that the reverse happens. Games which receive rave reviews are then hastily transferred to the 64, resulting in an inferior version.

Having got that off my chest, can you tell me if there's any truth in the rumour that Microsoft's superb Flight Simulator for the IBM PC is being translated for the 64? J J Malholme
Widlington

SECRETONE says it has no plans to translate the Flight Simulator, but there are eight simulation programs for the 64 available from Super Productions of 14 The Oval, Bournemouth, Hants, from Aches Software, and shortly from Androg.

Superior 64

I MUST first congratulate you on a first class magazine and some excellent reviews, especially those on disk drives in the February issue.

Having had my 64 for just three months I am still learning how to operate it to its full capacity. Before my 64 I owned a 48K ZX Spectrum for nine months. If any readers, especially Vic 20 users, are thinking of switching to the Spectrum,

my advice is — don't. There is some good software for the Spectrum but the majority is rubbish.

I saw well over 300 games while I had mine, but about 90% weren't worth the tape they were recorded on. The only thing I miss desperately is a Cricket game. Is there one for the 64?

A Young
Sandwiched

Return of the Juki

I SHOULD be 64 intending to use it in my business, for games, and for word processing. I also bought a Juki printer, which performed perfectly with the firm's computers. However, when using it with EasyScript, the Commodore give-away with the disk system, it would sometimes fill the spaces between letters with random symbols.

When I tried ViaWrite the Juki always filled the spaces with random symbols. Commodore finally admitted to me that they had been having problems, and that a team was working with Juki to sort it out.

Eventually Visa Software advised me to contact Microsoft of Iborham Wood and ask for advice. They suggested I strip out the resistors R24 to R26, which are near the Commodore part. The early Juki seemingly overheats, but that should fix it.

With trepidation I snipped out the resistors — and the Juki now works perfectly, but I still find my hand shaking when I think of it.

If any other readers have the same problem I can't guarantee the repair — but the proof of the tale is that this letter was written on ViaWrite using the Juki and CDM 64.

Mike French
Shepley
Yorkshire

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 1LD



Lower prices promised

A NEW GAMES software company is set to shake up the industry with its pricing policy. Mastertronic, formed by four video wholesalers, is releasing its first batch of games at £1.95, with ten titles for Commodore machines.

Despite the low prices, all the games are said to have been written by established software houses.

Mastertronic spokesman Alan Sheenan commented: "Obviously we intend to make money through high levels of sales. We'll be selling through supermarkets, games, newsagents, hi-fi and video dealers and multiple stores.

"We believe that software generally is overpriced, and as a new company on the scene we are able to keep our prices low in a way established companies can't."

Alan explained that the international success of CBM micro means that Mastertronic would be able to sell worldwide. "This is another way in which we'll be able to keep our prices down," he added.

Twenty-one titles were launched in early April, eight of which are for the 64, and two for the Vic 20. Four of these have already been reissued under different names, but the others are original.

Titles for the 64 include Duck Shoot, Squirm, Bionic Granny and B&B. Known Vic titles include Vegas Jackpot, Phantom Attack and Star Hunt.

From the beginning of May, Mastertronic plans to release one game per week. Future plans include educational programs, and adventure and board games which will probably be priced at £1.99.

In contrast Imagine has decided to cancel a planned drop in price for its games from £3.50 to £3.95.

CBM on show



Commodore's IBM-compatible machine — based on the Intel 8000 chip.

THE SHAPE of Commodore's new home computer range is beginning to emerge as the UK launch draws closer.

The bottom-end model with a rubber keyboard has been dropped while another machine, the 16, will come in the 64's familiar housing.

The machine, with 128 of RAM, runs Basic 3.5, as does the 264 which offers 64K — the Vic and 64 use Basic 2. The 264 comes in the newly designed casing shown in our March issue.

Final details on UK pricing and availability are expected in May.

Commodore's two new

business machines — one IBM compatible and the other running a Unix operating system — are not expected to be available in the UK until the beginning of next year. Both machines were on show at the recent Hannover Fair, the largest computer show in Europe.

The long-rumoured Unix machine, running the Colosseum operating system and based on the 28000 chip, is aimed at the market for distributed processing. The Hannover model only supports two terminals, but "in future stages eight or more terminals can be connected".

As well as jumping on the

Unix bandwagon, the CBM 28000 joins the cat race — it features a mouse connection.

IBM compatibility is the other obvious market trend at the moment, and Commodore has a foothold there now with its PC. Based on the Intel 8008 chip, this is a portable machine resulting from a licensing agreement with Canadian company Brevco-Comcon. Commodore adds that "a desktop version of this newcomer with a large screen" is expected later.

Also on show at Hannover were two new printers for the Vic and 64 — the DPS 1101 daisywheel and the seven colour dot matrix MCS 801.

Commodore ready to teach and play

COMMODORE'S latest releases include software and hardware for the 64 and Vic.

In the education field, a new series called BJ Bear will teach 3 to 5 year olds the basic skills necessary for reading, reasoning and mathematics.

The programs, Get Ready to Read, Get Ready for Numbers and Get Ready to Think, can be used with or without the new Magic Voice

speech synthesizer. Each program will cost £18.95 on tape or disk, and will include a manual for parents.

Another series, Talking Books, starts off with two packages entitled Magic Garden and Magic Toadbox. Each contains five stories, and is used with Magic Voice to teach children to read, write and learn.

There are several new

programs for the Vic 20, including a 100 level arcade game, Kipper Punch, and medieval mayhem in Sir Hero. For the expanded Vic there are three new titles, Magic Wizard, Nursery Song, and Stop Thief.

For the 64 there are Ball Room, a Western pioneer simulation, Wizard of War, a talking arcade game based on the Bally-Midway original; and Zork One and Two, a fantasy adventure based in an underground kingdom.

The price for Vic 20 quantities is £4.99, CBM 64 disks £11.95, and the Wizard of War cartridge is £8.95.

Latest serious software

THE LATEST business and utilities packages for the 64 include a numeric database system, a Pascal compiler and a home budget program.

Naxon Computing's Figure 64 is a numeric database with the ability to display data in a variety of graphic styles, including bar charts, line graphs, and pie charts, all with text and graphics mixed on the screen. The program includes calculation and statistical routines, as well as security lock-up options.

Figure 64 costs £85.25 on disk. Phone 940-0667 for details.

Oxford Computer Systems has announced a Pascal compiler for the 64. Pascal offers a number of advantages over Basic, not least of which is a speed increase of 5 to 10 times, and a wider range of data types and user-defined structures.

Contact OCS, Newington Road, Woodstock, Oxford, phone 0993-812780.

Kema Computers has implemented its Home Budget program on the 64. The program enables the home manager to keep track of finances by building up files of income and expenditures, including them in "what if" calculations.

Home Budget costs £9.95. Contact Kema at 12 Horse-chase Park, Pangbourne, Berkshire, phone 07356-4315.

Dataview's Wardcraft word processor is shortly to be made available for the 64, probably at around £86. The program is said to have been well received in its IBM PC and Appleton versions, and is being heavily promoted for export to Europe and Australasia. Contact Dataview, Postrees House, East Bay, Colchester, Essex, phone 0206-899034.

Lastly, a menu for Specific Software, whose business accounts program for the 64 and 512 is now announced in a previous edition of *Computer Weekly*. Specific can be found at 10 Fairlands Road, Stanbridge, West Midlands, phone 02845-73177.

Add-on spree hits thieves

THIS MONTH sees an unusual selection of Commodore compatible hardware coming on the market.

Micro-Security has announced the Sentinel burglar alarm system, which can be used with the 64 or 512. The system uses an L/D interface cartridge which plugs into the machine's user port.

To this is attached a closed circuit consisting of magnetic reed contact switches which can be attached to doors and windows. Also included is a control unit containing a power supply for an alarm bell, an internal buzzer and an activation switch.

The complete system costs £129.95, and the interface and software alone can be obtained for £44.81.

For further details of the system contact Micro-Security at PO Box 18, Harrow, Hampshire.

Grainage has launched a series of transparent PVC keyboard covers for micros, including one suitable for the 64 or 512. The cover is designed to stop dust and dirt causing keyboard malfunctions.

Grainage also markets a range of computer equipment bags, which should soon be available from specialist retailers. Contact Grainage at Unit 9, Bicester Court, Bicester Industrial Estate, Bedford, Northampton, phone 0681-156096.

A-Line Computer Systems has released a printer buffer for the Epson printer, which can be used with the CBM 64 via an IEEE interface.

The buffer will memorise data sent to it by the 64 at high speed, then send on the information to the printer at a rate the printer will accept. This keeps the computer free to perform other tasks.

A-Line claims that 12K of text, which would take 17 minutes to print without the buffer, can now be transmitted in just over a minute.

Prices for the E-Buffer vary according to memory size and type of interface used. For details contact A-Line at 1 Church Farm Lane, Wiltshire/Wiltshire, Littletonville, phone 053-734-488.

Lastly, Non Computer Products is working on a high-speed storage system based on the Philips mini digital cassette recorder.

The system, known as Ultra-Drive, is already available for the BBC and Dragon machines, and a 64 version is expected around July. The read/write speed of the system should be around 10 times faster than a conventional cassette recorder, and price will reportedly be approximately £80.

Graphics aid

BRITISH MICRO'S Grafpad graphics tablet, originally available for the BBC micros, is now compatible with the CBM 64.

At £123, the tablet is said to be suitable for either computer-aided design, education or artistic applications.

It consists of an etching drawing surface with a zero-centred area, and a stylus with a microswitch tip.

The drawing area is covered with a grid and processed by penplot. By loading the accompanying software, you can draw your own designs on the pad, which are reproduced on the screen. Outlines of maps or pictures can be traced, with a resolution of 128 x 256 pixels on an area of 240 x 192mm.

Designs can be saved to disk or tape, and copied to a suitable printer.

The Grafpad package comes with full linkage which



British Micro's Grafpad — from the BBC to the CBM 64.

enable it to be included in users' own programs. The full selection of 16 colours can be used, though only four at a time.

Text can be added to the finished design, and there are a wide range of drawing func-

tions including FILL, CIRCLE, ERASE and LINE.

For more details on the British Micro's Grafpad, contact British Micro, Penfold Works, Imperial Way, Watford, Herts, phone 0823-46221.

Games to all tastes

SEX AND VIOLENCE in the Commodore world is the latest batch of games releases — although other software houses have found inspiration elsewhere.

Aldus Data has announced a 64 version of the Atari program Strip Poker at £14.99 on disk, with a cassette version available soon.

In much the same vein, Twilight Software is offering Luvline, for the 64, at £6.95.

On to the violence, with PPO's Quark, a 3-D space simulation for the 64. At £7.95, Quark, which was developed by Andromeda Software (see May's Commodore Marketplace), features a full cockpit display with a takeoff routine, battle with enemy fighters above a rotating planet, and a landing sequence.

E-Tel, new to the software business, offers City Attack and Galaxy for the 64 at £9.99 each. City Attack features UFOs and ground troops trying to destroy your city, and Galaxy pits you against robo-crabs and alien fleets with only your trusty laser gun to defend you.

On a more peaceful note, CDS has announced the release of 64 Colossal Chess 1.0. Written by chess expert Martin Bryant, the program costs £9.95 on tape and £12.95 on disk. It offers many levels of play by controlling the machine's move time. There are many other features, including a clock display, tutorial aid and save routine.



Aldusmatic's latest disk game is Francis Freddie. Freddie is a telephone line engineer who has to avoid nasty Civvies while climbing poles to collect pots of gold. At £12.95, Freddie features "funny interludes and silly

bonuses", and a specially-composed soundtrack.

English Software is busy transferring successful Atari titles to the 64. The first will be Jet-Back Jack, at £7.95. Also promised are Stranded, a graphic adventure with more than 25 screens, and Soldier of Fortune, a fun arcade game.

Five adventure games from Richard Sheppard are to be made available on disk, with installing taking place through the Boots chain as well as computer stores. Titles include Urban Uptown and Ship of the Line, and each disk costs £9.90.



Kuma has announced Palopic, a drawing facility costing £19.50 on cassette. Palopic allows a wide range of hi-res drawing facilities on the 64, including mirroring, copying and rotation of portions of the image.

Two releases which should cause a stir in the micro world are well under wraps at the time of writing. Imagine's "magazines", Psychopop and Backdraft, are being advertised as "much more than simple game cassettes", although there's little indication of what form the games will take.

Finally, the New Finalizer, which reportedly allows Sinclair Spectrum software to be run on the Commodore 64, is eagerly awaited. Retailers Video Vault advertised the program in April, in an apparent excess of enthusiasm for a product which has not yet been fully tested and debugged. We'll be reporting on the Finalizer as soon as it's available for review.

If you think you've
something newsworthy,
call 01-437 4340 and let
us know

NEW ORIGINAL GAMES FOR THE COMMODORE 64

■ **NIGHTMARE PARK** is in fact a compilation of 14 games. The task of the user is to gain as many points as possible traveling through an increasingly diabolical every level. The most exciting passages are described in a companion book, which allows you to price your hot-making Nightmare Park a suitable game for all ages. **PRICE £7.99**

■ **DOTS & BOXES** is an intelligent game where the user and the computer take turns in completing plays by drawing a line between two dots. The aim of the game is to win the most boxes while also minimizing the number of losses given away to the computer. **PRICE £6.95**

■ **HEXAPAWN** For strategic and persistent play. The essential knowledge, how to make strategic improvements, is written on the user's own 5 1/4 inch floppy disk. **PRICE £5.95**

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Games remain the same

Pete Gerrard tackles the dinosaurs and megabreaths

around an altar you've reached a score of 3,800 points.

Loss one of your three lives, and all the little pills that you'd grabbed down on that level reappear again, which I must admit is not a feature I remember from the original. It certainly makes it harder to play.

Apart from that it is simply a version of Pacman. Although the name has changed, the Game remains The Same. Lapis and The Game each cost £5.50.

To sum up Enigma Software so far, a bright start, but who on earth persuaded you to bring out a version of Pacmania? Stick to Lapis (how about The March for the next issue?)

Softek International Ltd, who modestly call themselves the Masters of the Game, have come up with something a little bit out of the ordinary for the 64. Calling it *Light* is bad enough for a start, but the plot? Well, you always wanted to see an arcade game set back in the time of the dinosaurs, didn't you?

In this £7.95 game you take on the role of Light, creature, prehistoric here and legend in his own right. Knowing that



Chinese Juggler: a real snook



Light — a prehistoric monster

the cold weather is a 'monster', Light decides to go out on a series of expeditions to seek up food.

Perry the Proctodactyl has fortunately left a large collection of his eggs lying around, and so your first goal in life is to start helping yourself to them. However, Perry is most too pleased about this little exercise, and responds by aiming sizeable chunks of rock at your head.

Still, armed with your trusty spear you manage to do quite well for a while, and tick up and down your pre-hold out park back to the cave with your booty.

Just when you thought it was safe to go back and hunt a Perry again, along come two of his friends, Rex the Tylosaur and Tril the Triconotops (very good graphics there), both with the aim of snapping you out. Since they are considerably bigger than you, and Perry is still aiming pieces of rock at you, your spear comes in for a fair amount of use.

You can only carry one spear at a time though, and when all three monsters are rampaging about the place life can get pretty hectic.

Light is a pretty good game, but it's perhaps not addictive enough. We would have better juggle games with interest.

Chinese Juggler is, in the story game, a program written as the result of a competition held in dim and distant foreign parts to see if anyone could come up with an original idea for a new computer game. The programmers were then presented with some computer kit and told to get on with it.

Magic

As with most good ideas, this one was really a very old one. You've seen people on television racing around like mad things trying to spin a number of plates at the top of long poles, but always seem to beed ultimately but rarely topple the plates off. Well, Chinese Juggler is an oriental version of that theme.

In this joystick only game, the screen on loading (and a read of the instructions if required), shows a collection of eight poles on which you (the Chinese Juggler) have to get eight plates spinning.

The plates are collected from a set of four tables at the bottom of the screen, and thankfully, since the first few games will see you lose enough plates to keep a Greek restaurant happy all night, there seems to be a never ending supply of plates available.

These plates come in a variety of different colours, but for the first level only you must manoeuvre your juggler to any old table and simply grab a plate.

Then, it's a quick jog to one of the poles and, providing the fellow is standing in the appropriate position, place the plate on the pole. As if by magic, the plate will start spinning immediately, and off you trot back for another one.

The plates do slow down eventually, and rather than fall off and lose the floor they just disappear.

On level two, after getting all eight spinning, the machine is a wee more choosy about what colour it wants the

BEING A follower of Monty Python's Piping Crows, the sight of a game for the Vic 20 actually called Lapis conjured up wonderful images of masked lunatics riding around everywhere in the eternal quest for Lapis. Also, this game, from Enigma Software of Liverpool, for a Vic with 8K expansion, has nothing to do with characters from Monty Python or indeed, as far as I could tell, very little to do with Lapis at all.

Lapis, according to the press release, is a character strong into action by the kidnapping of his girlfriend and her valuable jewellery by the evil Count Van Vic. Being a sensible fellow he decides to remove the jewellery before the girlfriend, and so the start of the game sees you outside the castle waiting to go in.

Between you and the jewellery and the girlfriend past a succession of obstacles under the control of the wicked Count, and the object of the game is to survive being chased around the screen by patrol cars, robots and guard dogs and recover all the jewels.

You always start one of your three lives for free if you achieve mega scores — I never did! at the bottom of the screen (and to your gateway van. In front of you is the maze which forms the castle, and along the first row of this maze pass a number of control cars. The longer you play the game, the more cars appear, and get control more robots and guard dogs which form the second and third hazards respectively.

Promising

Survive them and you have one more point on to keep just before you can get your hands on some of the jewellery. There are 1 items of jewellery to collect on each level (and through 3 levels of this and you usually get to see the girlfriend! She'd better be worth it, although bumping into a guard returns you to your van and any plunder back to where it came from.

Bump into a patrol car, and you're not only lose a life, but you also lose any previously acquired jewellery on that level.

The graphics are very good, in this keyboard or joystick game, although someone ought to mention to the programmer that some people do not like having a continuous tone playing throughout the game. Of course, there's always the volume control.

A promising start then, for a new company, but I'm afraid they're very badly let down over their next effort. Any company with the brains child to call one of their releases The Game is simply asking for trouble, although it does a little longer you into finding out what it's all about.

The good news is that it's not just another version of Space Invaders. The bad news is that it IS just another version of Pacman, complete with ghosts, power pills, and a maze to wander around it.

It has the virtue of working on the unexpanded Vic 20, and it also allows you to control the game via a joystick or keyboard. There are eight levels of play, ranging from suicidal to snail-like, and apparently you get a new maze to roam

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plates to be, so you'll either have to select a suitable colour from one of the tables, or do a spot of juggling.

By holding a plate and moving from left to right (or vice versa) the juggler throws a plate in the air, then turns around and catches it as it lands. With luck, it will change colour as it spins. Watch out for black plates though, since they always spin so high that they never come down again.

By the time you reach the highest level, the machine will only accept plates of one colour, and they don't seem to spin for quite so long either.

Graphically inventing the plates are really well done, but ultimately a little bit tedious, since you spend your time doing exactly the same thing. At 18.99, certainly worth looking at.

Humphry, you might fondly imagine, would be a game about a little chap who, armed only with a sword, has to go around placing milk off people's doorsteps, while avoiding angry dogs, neighbours, and other inhabitants of the street.

No milk today

But, life is never like you imagine it, and this game of Humphry for the Commodore 64, at 18.99 from Mr. Micro, goes more to the usual game Hexpert than it does to the Milk Marketing Board. If you haven't seen the game, a brief review.

You are in charge of a character (called, amusingly, Humphry) who has to keep about a set of what would appear to be building blocks. These are all the same colour at the start of the game, but by jumping onto them you make them change colour.

The object of the game is to change the colour of every block on the screen, while avoiding the bombs and any other hazards that the programmers might care to aim at you.

Unfortunately, this version only features bombs, and, again unlike the original, there are a mere fifteen squares to jump onto, which leads to a rather bare looking screen as which to play the game.

Control is by either the joystick or the keyboard, and for once it doesn't really matter which one you use. After you've cut through an advertisement for Mr. Micro, and listened to the very good musical soundtrack for a while, the game actually starts.

Presently, this game leaves me cold. Particularly when, on the very first level, I had just one block to fill and a bomb that was two squares away somehow managed to blow me up! And it didn't only happen the first time.

Negative level one, and level two has the bomb jumping around two squares at a time. Level three, and you then have two bombs after you, but will only fifteen blocks to fill.

There are much better versions of this sort of game available (*Amigo*, *Amigo2*, *Amigo3*), so I think this one is, as they say, voted a miss.

Hobbes Bill and the **GI-Gems** is an unusual little number, from one of the few companies (Virgin Games) who seem capable of responding to criticism of earlier

efforts and raising their standards accordingly.

As the copious accompanying notes inform us, this is written by the same chap as their earlier *Falcon Patrol*, a program that marked something of a turning point for Virgin themselves. People liked it!

This, whilst not an amazingly new idea, is delightfully presented, and there's some interesting use of both graphics and sound throughout.

There are three main levels to survive, and the basic plot covering all three is that you, the Hobbes Bill of the title, have to do battle with the horrible GI-Gems, to rescue your true love Gena. She has been kidnapped and hidden deep on level three, and to get to her a number of hazards must be overcome.

Cunning

On the first screen, the game would appear to be little more than a variation on a Pacman theme, since Bill has to trot around a maze gathering up and crushing an egg (just by running over them). The maze themselves change after you with a fair degree of cunning, and you have just four swords which you can pick up and kill the maze with. These swords, needless to say, disappear after a while.

Remove all the eggs and you're onto level two, much the same as the first, but without any swords. The only twist to the plot is that you must gather a couple of levels hidden inaccessibly in the corners of the maze, which opens up the doors in the centre of it.

Doing this allows you to grab the rest of hidden items (that's what it says here!), which will give you the strength to go on to level three.

Now there are no obvious holes anywhere in the maze, you simply have to hank your way through the walls and crush all the usual collection of ant eggs. Crush them all and you can crash through the final wall and rescue Gena!

If you manage this, you can then sit back for what seems to be an interminable age as



Humphry: chip off the old block



Hobbes Bill: scrubbed egg

Bill and Gena do a lively bit of rock and roll dancing on the screen. But, while Bill's not looking, one of these deadly ants sneaks out, and . . . it's back to level one again.

An interesting and entertaining game at 17.99, that certainly has some nice touches of humour. In particular Bill, when he leans a little to a GI-Gem, brags his head against the wall and pummels the air in frustration as he slowly collapses to the floor, still kicking.

Good fun, and a second triumph for young Steve Lee.

You know, there are many things that reviewers have to put up with in the course of a magazine article. Being presented with a countless number of boxes because it isn't back from the printers is one of them, and when given *Mega Hawk* (from 'Big G' in Chester), there was a total lack of instructions accompanying it.

But on reading this was found to matter not one jot. It works with a joystick (it might work with a keyboard as well, but who knows!), and the rules of this one are very, very simple. If it moves, destroy it, and if it doesn't, well, just destroy it anyway. You might gain some bonus points.

Megabeings

You are in control of the usual sophisticated spaceship, and on the first level of play there are a number of what one must assume are mega hawks flying above the screen at you. In a reasonable approximation of three dimensions, helped by the space corridor borrowed from *Star Wars*, these little blighters can also attack you from behind.

The movement of your ship is very quick as opposed to the joystick, and a realistic shadow glides across the bottom of the screen as you bob and weave to blast everything in sight.

After a while the mega hawks give up (only temporarily however), to be replaced by giant jumping mega men, who thankfully don't seem to stick around for very long.

The next level sees you deep in space, and here your spaceship can move all over the screen rather than staying near the bottom, as it did earlier on. Shooting down a number of quasars and asteroids allows you to survive for a reasonable amount of time and hit the third (or is it fourth?) level. Here the mega hawks come back, accompanied by mega kangaroos which hop about everywhere, mega birds of another type who fly at you and whom, it would appear, need to be shot a number of times before they squawk their last, and many other mega beings.

Surviving all this lot takes you back to the space corridor once more, with as many mega monsters as I've seen in a long time.

A fast action game, and at 18.99 it will give even the most jaded of arcade addicts a run for their money. All the things needed to make a good game are in there, including some deft touches with the graphics, and whereas 'Big G' are I still haven't seen that obscure cover! They deserve to do very well with this one. ■

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Is this the last program you need?

Trevor Doherty looks at The Last One, a program generator for non-programmers

THE BIGGEST drawback to The Last One is its reputation: it must rank as one of the more famous pieces of software around. The early advertising campaign followed up by a product which didn't appear when promised, is much more reminiscent of a hardware manufacturer (promising no name but several would fit the description) than a software house. That is all behind The Last One now, what we now have is a perfectly respectable, clever, useful piece of software which is now available for many computers including the Commodore 64.

Depicted simply, The Last One is the program that writes programs. You define your program in a series of steps in plain English, guided by the prompts on the screen. The Last One asks you further questions to obtain any further information it needs to complete the task then it automatically writes the program in Basic. The Basic program produced is perfectly ordinary Commodore Basic which can be listed, copied, edited, etc., as though you'd written it yourself.

Manual

The Last One comes attractively packaged as one disk and a nicely printed spiral bound A3 manual. The manual disk can be copied, but only five times; clever stuff that, the disk contains hidden identification and the licensing agreement is very specific about what would happen if booting copies are traced back to a licensee.

The manual is one of the very best you will ever access; it is clear, concise, extremely readable and it even takes a whole or two, included on the master disk is a "help" facility which provides a useful index of such facility which supplements the manual.

The Last One is not, and does not set out to be, a games designer, and therefore does not handle sprites, hi-res, music, and so on. It is intended to create programs which use textual input and output, thus it is useful for creating all sorts of business and technical programs, home record-keeping, club organisation and some types of educational programs.

Now I reckon that any reviewer who just works through a training example, and bases his opinion on that, could easily mislead on any real problems which may be encountered. So having familiarised myself with the training example, I set off to write a program which I had only the previous week failed to get working, writing from scratch in basic, in five hours! The good news is that using The Last One, I had it up and running in one and a half hours, and it

was a more robust and product, I also learned some things which are only learnt the hard way, through actual experience.

When I write a program in Basic (I'd describe my programming ability as "adequate") I tend to start off with a case of nerves, code that and get it working, and then start worrying about screen layouts, error trapping and all the "interface" required between the real user and the computer. The latter part, error trapping and so-on, usually ends up as 80% of the total task which takes ten times as long as I thought (though) it would. The Last One forces you to get all your ideas "up front" and put together a list of the operations required in the form of a plain English "flowchart". That's the hard part, particularly if you don't normally tackle programming in that way.

In effect you have to be the "systems designer", and The Last One is the programmer. The steps required to create a program are as follows:— first name the files and the format of the fields you want to use. You then construct the flowchart at the keyboard with the help of the "throwaway session menu".

Any branches in the program are then sorted out with the computer asking further questions. Screen designs are then completed, very easily using the facilities offered on the screen. Error trapping, questions like "Are you sure?" can be added. Screens, once designed, can be saved on disk separately to be used and modified as required later.

Any printer output is similarly designed allowing for page lengths, page numbering, etc. The Last One allows for ASCII printers as well as Commodore printers.

Modify

The Last One then writes the program which you can save on a fresh disk. You can then modify the program at any time in the future, using The Last One, if your needs for your program change.

The main difference between the 64 version and the more expensive for business machines (such as the Pet) as far as The Last One is concerned, is the use of a single disk drive and colour. The 64 version copies with both admirably, although having to swap disks every time you use the help facility becomes tedious.

As far as colour is concerned, you set the background, border and text colours using the "function" keys during screen design and they are then incorporated into the finished program.

The only facility which The Last One

does not touch is sound. You can add sound by including Basic coding as part of your procedure when creating your program, but it still means nice different "pokes" to produce one "bump", which is one of the 64's less endearing features.

The feature to modify a program sometime later after creation by The Last One is particularly powerful, and even allows you to modify the screen data file to, for example, allow new fields to be included, unreserved fields to be deleted and the size of other fields changed.

Two tips I can pass on:— firstly, the finished program does not cooperate happily with Commodore DOS on the 1541 disk drive. Secondly, when using The Last One on an SX-66 you must change the character colour using 17 before use— otherwise the background and characters are the same colour!

Manager

If you are a small business user at a home user who cannot find the software you need for a specialised task, The Last One is well worth a look. For example, a cheap bank manager program which I have struggled to cope with my home financial arrangements, which, whilst complex, are fairly typical these days. Using The Last One I can create a program which will cope with two bank accounts, standing orders, a credit card, savings, mortgage, loans, and so on, and which will suit my affairs exactly.

The Last One is undoubtedly a very clever piece of software, it is also an extremely useful one, but not one that every Commodore 64 user would want to rush out and buy. As a person who uses computers professionally as well as at home, this stands out to me, as one of the small bank of programs which started life running on large business machines, and has been converted now to run on what is essentially a home—small business computer, the 64, with no loss in facilities.

It is not instantly "easy to use" if it were The Last One couldn't be as powerful as it is, but once you have mastered a certain amount and gained confidence, complex programs can be tackled with ease.

The price of £97.50 seems high, but when you consider the essentially identical PET version is £199 and the IBM PC version is £200, it begins to look more sensible. There are, of course, other program generators around; The Last One sets the standard by which they are judged.

For further details contact DIAL Systems, Station Road, Ilminster, Somerset, phone 04623-4117. ■

Nuclear war for the Vic 20



GLOBAL THERMONUCLEAR WAR is a simulation for the Vic 20 with at least 8K expansion, written by Paul Heers of Ashford, Kent.

You are in control of a nuclear missile base in Washington DC. The news has just arrived that the USSR has declared war — you must retaliate as soon as possible, but

due to computer damage you must first try to guess a three digit personal code before your Battle Computer will open up.

Every time you guess wrong another Soviet missile hits a target in the free world.

Having entered your computer, you are faced with four choices: to set your radar,

launch a missile, receive a damage report or terminate the war. You only have 10 missiles to inflict most damage on the enemy (but he has coded you, but beware — saving your radar can emit signals which lead to an enemy attack, and not saving it before firing can have even worse consequences! ■

```

1  GOTO140
2  PR=10:POK=0079:LS
10  POK=0079:20:PRINT"0":
20  POK=0107
25  PRINT"###"          "###"
30  NEXT
31  PRINT"0":
35  POK=0107
40  PRINT"#####"
41  NEXT
42  PRINT"#####YOU ARE IN COMMAND OF A USSR NUCLEAR MISSILE BASE SITUATED IN
43  PRINT"#####WASHINGTON D.C."PRINT"##"      SET R KEY"
44  GOTO:DPK="":TR=##
45  POK=0079:40:PRINT"#####"
46  PRINT"#####"
47  PRINT"#####"
48  PRINT"#####"
49  PRINT"#####THE USSR HAS#####DECLARED A #####FULL SCALE"
50  PRINT"#####NUCLEAR WAR.#####SAVE THE #####PEOPLE YOU"
51  PRINT"#####LAUNCH #####QUANTITATON".
52  PRINT"#####BEFORE THE #####CITIES#####DESTROYED"
54  PRINT"#####HIT R KEY TO CONTINUE.
55  GOTO:DPK="":TR=##
56  PRINT"0":POK=0079:6:PRINT"0"
57  FOR I=10:100:POK=0079:INT(POK-LIN(20):L20:FOR J=10:10:PRINT"#####R
58  PRINT"#####"
59  POK=100:000:PRINT"#####"
62  FOR K=10:000:PRINT"#####"

```

```

63 PRINT"***"
64 PRINT"HELL MISSILES READY FORRYTRACK."
65 PRINT"ABELL SYSTEM HAS O.K."
66 PRINT" MESSAGE 1"
67 GET#(F#="")*THE#00
68 GOTO#1
69 FOR=INT(1000/100)+1000
70 PRINT"ENTER THE 3 DISCT     ** PERSONNEL CODE*- "
71 PRINT"*****-#-#-"
72 PRINT"###":INT(PC#)
73 IFPC#>=274000GOTO#2
74 IFPC#>=274000GOTO#3
75 IFPC#>=274000GOTO#4
76 PRINT"*****CODE TOO LOW* FOR#=(701000-HEX)
77 GOTO#5
78 PRINT"*****CODE TOO HIGH* FOR#=(701000+HEX)
79 GOTO#6
80 PRINT" : POKE36877-20;POKE36877-240;POKE36876-170;FOR#=(702000-HEX);POKE36877
;POKE36876-0;FOR#=0
81 FOR#=(702000+HEX);POKE36875-100;POKE36875-0
82 PRINT" NUCLEAR WARFARE           *COMPUTER HOW OPERN*
83 PRINT"MISSILES READY"
84 IFPC#<=400PRINT"MISSISSILE READY"
85 PRINT###-----OPTONS
86 PRINT"###SET KEYS
87 PRINT"###LAUNCH
88 PRINT"###DEATH REPORT"
89 PRINT"###END"
91 PRINT"ENTER INSTRUCTION"
92 GET#(F#="")*THE#00
93 IF#="1"*THE#000
94 IF#="2"*THE#000
95 IF#="3"*THE#000
96 IF#="4"*THE#000
97 GOTO#6
98 FOR
100 PRINT"*****MISSILE LAUNCHED*#*+1*FOR#=(701000+HEX)
101 FORJ=0TO0:FORK=100TO200:REP=POKE36876-J:FORI=1TO0:HEXJ=J:POKE36875-0
102 FORJ=(701000+HEXJ):-J
103 POKE36877-100
104 J=0
105 POKE36877-200;FORI=(701000+J)-301;POKEI-1;HEXJ=POKE36877-0
106 PRINT" : POKE36876-42;PRINT"MISSILE HAS DESTROYED *R#E# :
108 IF#="0"THE#000200
109 FORI=0TO0:REP#(I)-HEXJ-REP#(I)
110 DATAFRANCE,ENGLAND,AUSTRALIA,CHINA,SPAIN,GERMANY
111 I=INT(0#000+I*#01)
112 REP#(I)
113 PRINT#
114 GET#INT(0#000/10+00)+0
115 REP#(0#+I)
116 PRINT"*****PEOPLE KILLED *# " "00" "MILLION"
117 PRINT"*****PEOPLE KILLED 50 PER *# " "00" "MILLION"
118 PRINT"*****HOT SPACE"
119 GET#(F#="")*THE#21
120 IF#="0"*THE#012
121 IF#="1"THE#010
122 POKE36876-0;GOTO#8
123 POKE36876-127;IF#="0"THE#010
124 REP#INT(0#000/1+00)+1;REP#(0)
125 IF#="0"THE#010
126 POKE36876-127;PRINT"*****RARE BOMB"
127 PRINT"*****LATEST COMP REPORT"
128 FORJ=1TO4:FORK=0TO10:FORI=0TO0:HEXJ=HEXJ+K:HEXK=HEXK+I:POKE36876+K;
FORI=0TO0:HEXK=HEXK+I;
129 FORJ=1TO0:HEXJ=POKE36876-0;FORI=1TO00:HEXK=J
130 REP#(0;PRINT" : POKE36876-20;GOTO#2
131 POKE36876-0
132 PRINT"***** RED ALERT
"
133 GOTO#10
134 GOTO#0
135 IF#="0"THE#0TO400:IF#="0"THE#0100
136 PRINT" : POKE36876-0;PRINT" MISSILE LAUNCHED.-"REP#(0)
137 PRINT"###
138 GOTO#0
139 PRINT"***** THE MISSILE HAS DESTROYED *
140 REP#(1)
141 IFI=1;REP#PRINT"BLADDERGISTK"
142 IFI=2;REP#PRINT"BEROLGSK"
143 IFI=3;REP#PRINT"BOLOGK"
144 IFI=4;REP#PRINT"BOUMGSK
145 IFI=5;REP#PRINT"BOLOGSK

```

Continued on page 33

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413 IPRT=HTHEPRINT"OVERYLOVE"
414 IPRT=THEPRINT"STPOK"
415 IPRT=HTHEPRINT"BYRLOVE"
416 IPRT=OHEPRINT"MOLOCOBOD"
417 IPRT=(HTHEPRINT"HTMLEDHAGE"
418 RSD=HTDND(1000001)
419 PRINT"### IT WAS KILLED          ## THIS IS HILLION"
420 RSD=RSD+100
421 PRINT"##### HIT SPACE"
422 GETR: PRN="THEH425
423 IPR=" "THE400
424 GOTO425
425 FOR=]100:FOR36079.42:PRINT"##" FOR36079.05:GOTO450:IPR=HTH400
426 FOR=]100:FOR36079.220:FOR4+10000:HECT FOR36079.0:FOR=]1000:HECTJ.1
427 PRINT"##### NO DESTINATION     ##### HIT SET"
=====
450 PRINT"#####YOU HAVE DESTROYED   # "HYROHO"
451 PRINT"#####YOU HAVE KILLED"
452 IPRT=HTDND(1000)
453 PRINT"#####ILLION PEOPLE"
454 GETR: PRN="THEH450
455 IPR=" "THE400
456 GOTO450
457 FOR=]100:FOR36079.42:PRINT"##" DEATH REPORT"
458 PRINT"#####"HTH425
459 PRINT"#####"HTH425
460 IPRT=HTDND(1000)
461 IPRT=HTDND(1000)
462 IPRT=HTDND(1000)
463 IPRT=HTDND(1000)
464 PRINT"#####YOU ARE IN TOTAL # "CONTROL OF THE USER
BY"
425 PRINT"#####"
426 PRINT"#####THE USER HAVE GIVEN IN#####TTTTTTTTTTTTTTTTTTTT"
427 GOTO464
428 GOTO464
429 FOR36079.110:GOTO470
430 FOR36079.110:PRINT"##" NO MISSILES LEFT"
431 IPRT=HTDND(1000)
432 IPRT=HTDND(1000)
433 PRINT"#####YOU HAVE KILLED MORE #PEOPLE THAN THE USER ## THE USER OKE IN
434 PRINT"#####YOU CAN TAKE OVER WEAPONS LEFT OF THE USER." GOTO464
435 PRINT"#####YOU HAVE REACHED A # # STRATEGY"
436 PRINT"#####THE USER FORCE TO TRY ##NO REACH A PEACEFULL SETTLEMENT." GOTO464
437 PRINT"#####THE USER HAVE KILLED #MORE PEOPLE THAN YOU"
438 PRINT"#####YOU ASK TO GIVE INFO THE USER ? (Y/N)"
439 GETR: IPR="THEH722
440 IPR="THEH722
441 IPR="THEH722
442 GOTO442
443 RSD=HTDND(1000)
444 IPR="THEH425
445 PRINT"#####FOR36079.93:PRINT"#####THE USER LEAVE YOU TO GO ON WITH BUILDING
#".
446 PRINT"UP YOUR COUNTRY ARM." GOTO464
447 PRINT"#####FOR36079.93:PRINT"### THE USER LAUNCH # # MISSILE AT YOU!"
448 FOR36079.25:FOR=]10000:FOR36079.1:FOR=]1000:HECTJ.1:FOR36079.0
449 PRINT"#####FOR36079.0:FOR=]10000:HECT:GOTO470
450 FOR36079.96:PRINT"#####THE USER COME IN AND B TIME OVER THE USR
451 PRINT" #YOU LOSE!" GOTO464
452 PRINT" #YOU HAVE SURVIVED"
453 PRINT"### YOU ASK TO PLAY # # AGAIN (Y/N)"
454 GETR: PRN="THEH400
455 IPR="THEH400
456 IPRT=HTDND(1000)
457 GOTO458
458 FOR36079.27:FOR36079.0:PRINT"###: #H
459 RSD=HTDND(1000)
460 IPRT=HTDND(1000)
461 FOR=]10000:FOR36079.L
462 CLV=HTDND(1000)
463 FOR36079.CLV
464 FOR=]10000:HECTJ:FOR36079.0
465 PRINT"#####".
466 FOR36079.42:FOR36079.220:FOR=]10000:HECTJ.1:FOR=]10000:HECT:FOR36079.0
467 RETURN

```

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Beginning in Basic

Kevin Bergin introduces and explains some of the most common Basic commands on the 64 and Vic 20

THIS MONTH a look at some of the commands offered by Commodore's Basic on the 64 and the Vic.

Firstly we'll deal with variables. The first thing to explain is the object of a variable. Any number or character can be assigned to a variable on all micros using Basic. It takes the form:

10 A = 5000, or

10 AS = "THIS IS A STRING"

When this statement is encountered by the 64 or the Vic, it assigns the value to the variable. A variable can be any length (remembering the Vic and 64 have limited line lengths), but they will only recognize the first two characters of the variable name. Therefore a variable named LONG will be recognized by the machines as L.O. The only reason for using longer variables is for easy reference. Remember though, the longer the variable the more memory used.

Any variable with the character 'S' after becomes a string variable. Other types of

variables are numeric, and those with a '%' sign after them, are integer variables. That is a variable which will always be treated as a whole number. The numeric variables always return a numeric value, whereas a string variable will return the contents between the quotes. Very useful for displaying and manipulating information. Try the following in direct mode (without any line numbers).

A = 500000 NUMERIC VARIABLE

>PRINT A;

AS = "NICE DAY" REM STRING VARIABLE

>PRINT AS;

PRINT A + A *

PRINT LEFTS (AS,4) REM NICE

PRINT RIGHTS (AS,1) REM DAY

So a collection of characters and various numbers can be assigned values in a program and then manipulated as needed. It is good practice to have sensible variable names e.g. SC for screen. They will be easily recognizable later. On the 64

and the Vic variables do not have to be declared before they are used, but will be initialized by the machines as 0 for a numeric variable and an undetermined string variable will be empty (a null string).

The PRINT command is one of the most powerful and flexible commands in Basic and is relatively easy to use. By using the PRINT command without any quotes, numeric and string values may be displayed, and with quotes a whole range of control characters may be used.

There are a whole range of functions that can be used with the PRINT command. Some of them are listed below along with a brief explanation:

PRINT LEFTS(string,n)

Using LEFTS, the leftmost part of a previously defined string can be displayed. Where 'n' is a number within the range of 0 to 255. This function takes the leftmost part of the string (specified by n) and prints it.

PRINT RIGHTS(string,n)

This function returns the rightmost part of a previously defined string. The part of the string returned is controlled by 'n'. PRINT MIDDLE(string,n1,n2)

The MIDS function is arguably the most powerful of the three. It returns a substring of a previously defined string. The parameter 'n1' is the start of the substring and the parameter 'n2' sets the length of the sub string.

There are many more commands that can be used with the PRINT command, for instance PEEK, SPK and POS. Consult your manual for details or buy one of the books that contain more detail on the Basic commands. Alternatively watch this space — there may well be more on Basic commands!

```

10 REM *** KEYWORD DEMONSTRATION PROGRAM
20 REM *** VARIABLES ** SET THEM BEFORE WE START
30 MESSAGE="LEFTS MIDS RIGHTS"
40 A = 5146 = "123 45678 91011 121314 151617 1819"
50 REM *** THE PRINT COMMAND HAS MANY FUNCTIONS
60 REM *** LOOP
70 FOR LOOP = 0 TO 30
80 PRINT "COUNT: LOOP=";
90 FOR DELAY = 1 TO 255:NEXT DELAY
100 A = A*2
110 NEXT LOOP
120 REM *** PRINT LOOP AND A TO SEE END RESULT
130 PRINT "COUNT: LOOP = "; LOOP; " A = "; A
140 REM *** SCREEN DISPLAY USING PRINT
150 PRINT "CLEARING SCREEN"
160 SCREEN 0
170 REM *** PRINTING STRINGS
180 REM *** START COUNT
190 FOR COUNT = 0 TO 25
200 REM *** CLEAR SCREEN ON EACH PASS
210 PRINT "CLR";
220 REM *** SET B ON EACH PASS
230 B = INT (RND(1)*LEN(AS))+1
240 REM *** PRINT THE STRING
250 PRINT LEFTS(AS,B)+LEFTS(MESSAGE,6)
260 PRINT RIGHTS(AS,B)+RIGHTS(MESSAGE,6)
270 PRINTMIDS(AS,B,1)+MIDS(MESSAGE,7,4)
280 REM *** COUNT TO 1000 BEFORE CONTINUING
290 SCREEN 0
300 REM *** BRANCH BACK TO START OF LOOP
310 NEXT COUNT
320 REM *** DELAY LOOP
330 SCREEN 0
340 PRINT "COUNT: LEFTS(AS,19); PRESS ANY KEY"
350 REM *** COLLECT KEY PRESS
360 GET KEYS:IF KEYS = "" THEN 340
370 REM *** SAMPLE OF CHR CODES
380 PRINT LEFTS(AS,26); "CLEAR SCREEN = CHR(147)"
390 FOR DELAY = 0 TO 555:NEXT DELAY
400 PRINT CHR(147)
410 PRINT LEFTS(AS,19); "BLK CLR:INVT:HI:VE L:AI:PE:IN:GR:3:BLK:3:CR:3:VE:L:3:BLK:3:LOC:BLK:UR"
420 SCREEN 0
430 REM *** POKE AND PEEK COMMANDS
440 PRINT "CLR" WE CAN USE THE POKE AND PEEK
450 PRINT "C C C" COMMANDS TO CHANGE THE SCREEN"
460 PRINT "C C C" DISPLAY, "
470 PRINT "C C C" WATCH THE SCREEN DISPLAY"

```

Continued on page 24

Most of the variables used in the program have been given "scruffy" names, for ease of use and understanding. Also to demonstrate the use of long variables, after entering and RUNNING the program, press the RUN-STOP key and enter PRINT MES <press return>. The characters returned belong to MESSAGE\$, thus only the first two characters were used for the variable by the machine.

Back in the program, the variables MESSAGE\$, A and AS are initialized by lines 30 and 40. Although it is good practice to set up variables at the start of a program, it is not essential. Line 70 is the start of a loop; the count will be from 0 to 50. The screen is cleared by line 80, and the current value of the loop plus the variable A is printed. The semi-colons in the program ensure that the next character is printed in the next screen position, rather than the next line down.

Delay

The statements on line 90 are a delay loop of 150 and line 100 increments 'A'. The NEXT statement on line 110 closes the loop. The name of the loop need not be present, but it is good presentation to include the name. Several FOR...NEXT loops may be closed with one NEXT, provided all the names are present. For example, with a statement like NEXT A,B,C three loops are closed.

The result left after a loop has been entered is often confusing. Line 120 displays the finishing value of LOOP and A. They are one larger than the count specified. This is because the loop is only closed on the pass that contains a number greater than the one specified in the opening FOR

statement. Line 150 simply prints a message. One line 160 a branch is made to a routine beginning at line 270. The routine that has been branched to will eventually continue at the statement after the GOSUB. Any GOSUB is closed with a RETURN statement which returns control to the calling routine.

Loops

There is another loop which is created from line 180. The variable name this time is COUNT; the loop starts from 0 and goes up to 20. The screen is cleared on each pass through the loop by line 210. The variable 'R' is set on each pass through the loop. This variable is different from the others, in that it is given a random value. The statement INT returns the integer (whole number) value. The statement LEN, will return the numeric length of a previously defined string.

Therefore on each pass the variable 'R' is reset, and just in case the value is zero, one is added to the result. The result placed in 'R' is used as an offset in lines 230, 260 and 270 to display information. The functions LEFT\$, RIGHT\$ and MID\$ are used in lines 250, 260 and 270 and on each pass through the loop they display a message. The statement on line 290 branches to a delay routine, and line 300 closes the loop.

Line 340 clears the screen and uses the LEFT\$ function to format a message on the screen. The GET command is used on line 360 to collect a key press. This command takes the format GET=variable<. On line 360 it is set to wait for any key press. A message is displayed by line 380 and line 390 is a delay

loop. The screen is cleared by line 400, but this time it is cleared using CHR\$(147). The CHR\$ codes are again listed in the manual and more advanced books. It is worthwhile studying them carefully. Below is a sample of the CHR\$ codes and their functions:

CHR\$(14), switches to lower case
CHR\$(143), switches to upper case
CHR\$(18), disables the shift key
CHR\$(19), enables the shift key
CHR\$(17), cursor down
CHR\$(140), cursor up
CHR\$(20), cursor right
CHR\$(177), cursor left
CHR\$(209), home's cursor
CHR\$(247), clear screen
CHR\$(261), reverse on
CHR\$(245), reverse off

On with the program again. Line 420 again branches to the delay loop, and lines 440 to 420 clear the screen and display information on the screen. Lines 230 to 260 set up a loop to reverse the character on the screen. This loop uses the two commands POKE and PEEK. The program is written for the 64, so Vic users will have to change the screen displays, which means changing the length of the lines and spaces between lines. Also the POKE and PEEK commands will have to be altered.

Line 530 sets 'SC' to the start of the screen memory. For Vic users line 530 should read:
530 SC = 5600

On line 540 a check is made for the current screen location and if it is less than << 128 it is POKE'd with the current value plus 128 (reverse 10) and a jump (GOTO) is made to line 560. If the check is not true and the screen location is greater >

```

400 PRINT"CS CS1 CHANGES, IT IS DONE
WITH"
410 PRINT"CS CS1 A LOOP AND ONLY THE FO
KE"
500 PRINT"CS CS1 AND PEEK COMMANDS."
510 PRINT"CS CS1 PRESS ANY KEY TO EXIT.
"
520 PRINT"CS CS1 HERE WE GO THEN!!!"
530 SC = 5624:REM *** START OF SCREEN M
EMORY
540 IF PEEK (SC) <128 THEN POKE SC,PEEK
(SC)+128:GOTO560
550 POKE SC,PEEK (SC)-128
560 GET KEYS:IF KEYS <> "" THENG20
570 SC = SC+1:IF SC = 2023 THEN SC = 10
24
580 GOTO540
590 GOTO570
600 REM *** MORE POKE AND PEEK WITH CO
LOUR CHANGES
610 PRINT"CL:R1 HOW ABOUT CHANGING THE
SCREEN?"
620 PRINT"CS:R1 AND BORDER COLOUR?"
630 PRINT"CS:R1 THIS ROUTINE CHANGES THE
SCREEN"
640 PRINT"CS:R1 AND BORDER COLOURS AND T
HE COLOUR"
650 PRINT"CS:R1 LOOP CHANGES THE COLOUR
LOOP."
660 PRINT"CS:R1 TO SEE THIS AGAIN PRESS
F1"
670 PRINT"CS:R1 TO EXIT THIS ROUTINE PRE
SS F3."
680 PRINT"CS:R1 THERE ARE MANY FUNCTIONS
POSSIBLE"
690 PRINT"CS:R1 USING THE POKE COMMAND.
THIS"
700 PRINT"CS:R1 IS JUST A SMALL EXAMPLE
TO GIVE"
710 PRINT"CS:R1 THE GENERAL IDEA!!!"
720 PRINT"CS:R1 PRESS 'F1' OR 'F3' ANY T
IME"
730 FOR LOOP = 0 TO 14
740 POKE 32288,LOOP
750 POKE 32291,LOOP+1
760 FOR COLOUR = 55294 TO 56295
770 POKE COLOUR,LOOP
780 NEXT COLOUR
790 GET KEYS:IF KEYS <> "" THENG20
800 NEXT LOOP
810 GET KEYS:IF KEYS <> "CF1" AND KEYS
<> "CF3" THENH20
820 IF KEYS <> "CF1" AND KEYS <> "CF3"
= THENH20
830 IF KEYS = "CF1" THENH10
840 IF KEYS <> "CF3" THENH20
850 POKE 32291,PEEK 32288,14:PRINT"CC
L:R1:BLU":G1:END
860 REM *** DELAY ROUTINE
870 FOR DELAY = 0 TO 1000
880 NEXT DELAY
890 RETURN

```


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4) than 128 the program goes to line 126. Line 126 puts back the original unsorted value by subtracting 128 from the current screen location using the FREE command. Line 158 checks for a key press. If a key is pressed then the routine is exited. Line 170 increments %C (screen location) and checks for the end of the screen; if the end of the screen has been reached %C is reset to the first screen location. For Vic users line 170 should read:
 170 %C = %C + 14# %C = 818 THEN
 %C = 1580

Line 180 is a jump back to start the routine again with the next screen location. The line length has been kept short, but the Vic will take 88 characters per line and the 64 will take 80 characters. You will also find that the statements may be tokenised allowing more characters per line. Tokenised characters will be displayed in full when listed. For details of the tokens see your manual.

Border

At this section of the program, lines 410 to 830 use the POKE command to change the border and screen colours, as well as the character colour. The first section, lines 410 to 730, displays information. Again Vic users will need to re-format this. Then on line 738 a loop counting from 0 to 64 is set up. Line 748 changes the border colour using the current value of "LOOP", and line 750 changes the screen colour also using the current value of "LOOP" plus 1.

Line 760 starts another loop (made of a loop. This is called "nesting"). GOSUB B is also to be used. The loops must be closed in order, so in our case the loop "COLOUR" must be closed first. The loop "COLOUR" is set from 3126 to 3629; this is the colour RAM. By changing this (values 0 to 15) we can change the colour of the characters on the screen. Line 770 POKEs the current value of the loop "COLOUR" with the current value of "LOOP". Line 780 does the loop "COLOUR".

Key press

A GET command is on line 790 to check for a key press. If a key is pressed the program jumps to line 830. Line 800 closes the loop "LOOP". Line 810 waits for another key press; this time it will only accept the F1 or F3 key. If the F3 key is pressed the routine is started again, a nd if the F1 key is pressed the program ends. Line 830 checks to see if the key press was the F1 key or the F3 key; if not a jump to line 800 is made.

At line 830 the routine is re-started if the F1 key was pressed, and line 840 jumps back to the check line if the key press was not F3 (and the program). Line 850 resets the machine. For Vic users line 830 should read:
 830POKE\$M79,27:PRINT "CLRDEL"
 8:END

The last routine from line 878 to line 890 is the delay routine called from GOSUB B within the program. Vic users

will need the routine from line 738 to 840 stored. Below is a listing for the Vic:
 730 FOR LOOP = 0 TO 128 STEP 14
 740 POKE

```

800%LOOP+=INSTR$M0%10
810REM THIS LINE IS NOT NEEDED ON THE VIC
820FOR COLOUR = 3126 TO 3629
830POKE COLOUR,LOOP
840NEXT COLOUR
850GET KEY$IF KEY$<"F3" THEN 820
860NEXT LOOP
870GET KEYS IF KEYS<"F1" AND KEYS<"F3" THEN 830

```

That is all for this month. The listing was printed on an Epson FX-80 as it produces a more readable listing. The control graphics were retained and replaced with substitutes. Below is a table:
 KDI = CURSOR DOWN
 KRI = CURSOR RIGHT
 KLI = CURSOR LEFT
 KUL = CURSOR UP
 SCL = SHIFT AND CLR = HOME
 HMB = CLR = HOME
 F1-F3 = FUNCTION KEYS
 BK = CTRL & 1
 WH = CTRL & 2
 RM = CTRL & 3
 CY = CTRL & 4
 PU = CTRL & 5
 NM = CTRL & 6
 BLU = CTRL & 7
 TEL = CTRL & 8
 LT BLU = LOAD & T

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Commodore HORIZONS

The independent Commodore magazine

June 1984

Welcome to the Commodore computer show

The only place for Commodore owners to be on the 7th, 8th and 9th of June is the Novotel Hotel in London (the Conard under a new name) — the venue for the Fifth International Commodore Computer Show. Situated in Finsbury Rd, W6, just along from Hammersmith underground station on the Piccadilly, District and Metropolitan lines, the hotel will be packed with exhibitors offering the latest software and hardware. Inside this preview you'll find information on who'll be there and what they'll be doing. A second show is being held at the Leeds Exhibition Centre on 27-29 September.

And to make a trip to the Novotel even more worthwhile Commodore is offering readers of this magazine who visit the show a chance to win one of its 1541 disk drive units. All you have to do is list in descending order the six products at the show you found the most interesting. Once you've done this fill in your name and address and then hand in the form at the Sunshine stand. The winner will be the person whose choice comes nearest to our own and whose reasons are the most convincing — although we're open to persuasion if your reasons are particularly good. The winner's name will be announced in our August issue.

Product	Reason for choice
1.....
2.....
3.....
4.....
5.....
6.....
Name	
Address	

COMMODORE
SHOW PREVIEW

What the people say!



"I have a recurring problem, my Dad is always playing EXTERMINATOR when I want to"
Craig Worsfield - Blackburn.

"Thank you for a game with no loading or playing problems, my son is very pleased with it"
Mrs Polchard, Llanwrstgwell.

"I would like to congratulate you on your excellent game for the Commodore 64 -
HUSTLER. I found this game very entertaining with brilliant sound and graphics" -
Stuart Adams, Ruxton.

"After purchasing my Commodore 64, I proceeded to purchase many software games for both me and my children. The 'Commodore' and the 'bubble' I find are very poor compared to yours. Can you please send me a brochure or a list or - better still - can you send me a few and enclose the bill." M. Stephenson, Sheffield.

"I have just purchased the Bubble Bus game EXTERMINATOR. I would like to congratulate you on a brilliant game. The sprite graphics are really good, non flicker - and smooth! Also the use of colour and sound is great." Alan Shephard.

"May I say I think HUSTLER is great" - Ian Ayles, New Pibolgo.

"I recently purchased your 'WORD WIZARD' cassette. I must congratulate you on a wonderful piece of software which represents excellent value for money. This is the third Bubble Bus cassette I have bought - the two others are 'HUSTLER' and 'EXTERMINATOR', both of which are also brilliant" - Mike Dezaan, Israel.

What the papers say!



HUSTLER

"Another Gem" Commodore Computing.

"Top rate game" Computer Choice.

"The graphics and colour are superb" Commodore User.

"To pool heads it's a must" Personal Computing Today.

"It's a must for the collection even if you're not a pool fanatic" Commodore Computing.

EXTERMINATOR

"The sheer speed of action keeps you more firmly pressed to the screen" Commodore User.

"The player will slumbe away from the Computer, his head reeling with wild sounds, only to be drawn back to get his next 'fix', for by now he will be so totally addicted only a power failure will be able to release him" Commodore Computing.

"Value for money 100%" 5 star rating Home Computing Weekly.

"Finger pressing good" Personal Computing Today.

KICK OFF

"Great fun. Addicts of the original Table Football game will find this comes well up to expectations" Personal Computer News.

"Anyone looking for something 'different' or fans of the actual game will appreciate this quality offering." "Excellent game" Commodore Horizons.

WIDOWS REVENGE

"Challenging and great fun to play" P. C. Games

"Whole new ball game!" "A good bet for all 64 owners" Commodore User.

FLYING FEATHERS

"Graphics excellent as is the sound track"

Popular Computing Weekly.

'Nuff Said!!

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SHOW PREVIEW

Company Adams/2
Stand J117

**Address 38 Newark Avenue,
Rockdale, Lancs**

Phone 0766 524894
ADAMS/2 is a distributor of software for the Commodore 64 and Vic 20, specialising in utility programs from Adams Software, USA. The range includes *Spotify 64*, which makes it easy to write sophisticated music on the 64 and *UltraSoft-64*, which makes it easy to write sophisticated music on the 64 and *UltraSoft-64*, which adds 59 powerful commands for hi-res graphics, turtle graphics, sprites and music files.

New languages available include *Zoom Pascal* for the CBM 64, which produces fast machine code programs that can run independently on any 64, *Try Forth* for the Vic and CBM 64 is not as old as it sounds, and you can play your own commands.

Company Adams Electronics
Stand J114

Address Alport Way, Alport Road, Harrogate, North Yorkshire

Phone 0423 63661
ADAMS Electronics is launching its new *Speech Synthesizer* for the Commodore 64. The unit is based on an allophone word construction and incorporates the 64 parts of speech. There can be used to construct any word in English and will work with most foreign languages.

Also on show are the *Adman Vic 20* range which includes a *Speech Synthesizer* with the same features as for the 64, a 12K and 6K RAM pack and a 3-port motherboard.

Company Anagram Systems
Stand 250

Address 664 Queen Street, Warrington, West Sussex

Phone 0811 29317
ANAGRAM is featuring business and home software.

On the business front are Anagram's Integrated Accounting System, version 4, and *Stock Master*, both available for either the 100 or 8000 series.

For the home computer Anagram is showing the new *Clack Book 64* program, the ideal accounting package for

the small business or self-employed person.

Company Arding
Stand 133, 134, 137 and 138

Address 29 West Hill, Dorking Road

Phone 03323 82173
ARDING is pleased to present its latest releases for the Commodore 64 and Vic 20.

Artika, a superb program for people of all ages and for building programmers, can be used to draw and colour in high resolution graphics using the keyboard. It comes complete with melody Maker, a comprehensive music synthesiser. Both pictures and music can be saved and used in your own program.

Aring also presents its first totally disk based multi-scenes adventure, *Temple Dreams*, a danger-ridden safari, combines action and adventure in one hugely entertaining game. In a lighter vein, the antics of *Prigs* as he tries to crush his enemies by moving ice cubes around the screen are amusing and form a very addictive game.

Company Applied Systems Knowledge
Stand 129

Address London House, 68 Upper Richmond Road, London SW77

Phone 07-874 6044
IF YOU'RE bored with just arcade games, have a look at ASK's latest range of educational games for the 64:

Number Painter — a maths game with a Pac-Man-like screen layout, but with far more challenge in its 12 levels. *Number Chase* — an exciting game based around a car race. *Words Words Words* — a program with a vocabulary of

over 100 words, all illustrated in high resolution graphics scenes that are animated.

Then there's *Facemaster* — a great range of faces to draw; *Let's Count* — a first counting program; *Mids and Sock* — a memory concentration game with over 70 different objects; and *Number Puzzle* — a thoughts and crosses type game of addition and subtraction where strategy is all important.

Company APS Microsystems
Stand 107

Address 6-8 Farnham Drive, Farnside, Brighton, Sussex

Phone 0473 620701
APS Microsystems is launching its Alpha 10 and Beta 5 removable cartridge mass storage systems, which hold respectively 20 megabyte and 10 megabyte of data on twin disk drives in either stacked or side-by-side configuration.

The system, which is new to Britain, works on the Bernoulli principle and gives the same access speed as a Winchester together with a phenomenal data transfer rate of megabyte a second.

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Company Avalogic
Stand 781 and 802

Address 29 Sutton Industrial Park, London Rd, Reading, Berks

Phone 0734 644646
AS THE leading independent supplier of software for Commodore machines, Avalogic is using the Commodore show to exhibit a new range of games encompassing in quality, graphics, sound and presentation.

Chief among these is the game you've all heard about — the amazing *Alco* in *Vidoland*.

Chief among these is the game you've all heard about — the amazing *Alco* in *Vidoland*.

Come and be amazed by the *Koolha Pad* — the latest graphics cabinet for the 64 with amazing software that gives you all sorts of facilities for drawing onto the screen in full 16-res colour.

Last, but definitely not least, on the business side *Avalogic* is launching *Swift* — its spreadsheet program for the 64 — with facilities tailored only by the likes of Lotus 1-2-3. *Magpie*, the state-of-the-art database system for the 64, will of course be there also.

Company Bubble Bus
Stand J18 and J17

Address 87 High St, Twickenham, Kent

Phone 0732 317060
BUBBLE BUS, SWIFT and stand. These are the three ingredients we're putting into our three new Commodore 64 games — exactly the same ingredients you can expect to get out of the games once you have played them.

Come to our stand and all will be revealed. These three games again reach our very high standards — we use the best techniques to produce real winners. Building away in the depths of our granary in darkest Kent our programmers have been completing these exciting games. They are the ultimate in 10 hit games, the first adventure game from Bubble Bus and a superb arcade action game. All with super graphics and super sounds.

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Company Commodore
Stand 000

Address 675 Aisle Avenue, Twickenham, Slough, Berks

Phone 0753 74117
COMMODORE itself is showing its latest products including the 16 and 264 home computers, along with previews of its new business micros, the Commodore PC and 28600, and the latest news on the Compaq database service.

Special guests are expected, for example Patrick Moore demonstrating his *Commodore Astronomy* program on the 64.

Games and competitions include a chance to test your skill at Commodore's latest business game — and to enter the Commodore International Art Computer Challenge.



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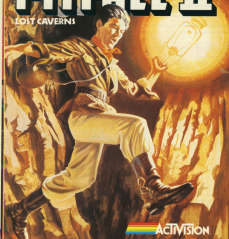
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SHOW PREVIEW

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COMPUTER Bookshops wholesale books and software to the retail trade and offers titles from approximately 40 major US and UK publishers besides being sole UK distributor for Sobe and CompuSoft Publishing.

Best selling books relevant to the Commodore 64 and Vic 20 are on display together with titles covering general books in microcomputing and other popular home computers.

Company Dataview

Stand B15
Address Redx House, East Street, Colchester
Phone 0266 358474

ONE OF the leading publishers of micro computer software, Dataview specialises in professional business programs. Its products have been bought by well over 50,000 users in Britain alone.

At the show Dataview is launching a new range of business packages to run on the Commodore 64, 5004 and 760 machines.

Company Eachworth

Stand A147
Address The Old Place Factory, 63 Gloucester Crescent, London NW7
Phone 01 487 1484

Eachworth is showing a wide range of books and software: games and utilities for the 64 and Vic machines, and best-selling books such as Using the Commodore 64.

Peter Gerrard, former editor of Commodore Computing International, is a regular contributor to Commodore Magazine, Popular Computing Weekly, Which Micro? and Software Review.

Kevin Beagle is a regular contributor to Personal Computer News, Commodore Magazine, Which Micro? and Popular Computing Weekly.

Company Galactic Software

Stand A129
Address Unit 7, Lancyfold Lane, Dordwich Ford,

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Phone 0400 2167
GALACTIC Software is showing the successful Games Designer program for the Vic.

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Company Granada Computer Books

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Company Hugo Products

Stand A146
Address Skipton Rd, Skipton, Wilt
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Company Moneyfold

Address Stamford House, South Place, High St., Epsom, London
Phone 01-447 4740

MONEYFOLD is showing its latest titles in the De Winton programming series for the range of IBM machines, Basic and machine code.

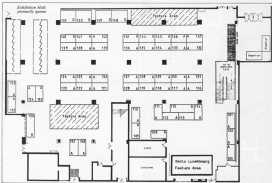
Launched at this show is the Honey Aid 2 utility package which extends the IBM Basic to provide a fully structured language.

Company KCPUG

Address 78 Brunsvater Road, Newbury Park, Oxford, Oxon
Phone 01-287 1129

KCPUG has two stands on the main exhibition floor opposite the bar.

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SHOW PREVIEW

include Brian Granger (Comet), Mike Todd (44 and Via), Mick Ross (database and general applications), John Hickmatt (planning) and Jack Cohen (membership and general).

ICPLUG is also contacting members daily in which visitors can ask questions of our panel of experts. This panel includes Jim Horsfield and those previously mentioned.

Lists of our free software library (public domain) are also available at the stand.

Company Clamart's Stand 4.170

Address 49 Mount Pleasant, Fallowley, Maccs.
Phone 0733 4470

ELAMASOFT is exhibiting its usual range of quality software for the Vic 20 and Commodore 64, and also its latest 64 game, Sleep in Space, in which the player controls interstellar space sleep.

If you are not already familiar with our unique style of games design, come along to stand 430 and meet the master crafts, space sleep and the megalactic games.

Company MAC2 Stand 434

Address 201 The Broadway, Wimbledon, London
Phone 01-249 8170

THIS year MAC2, the disk storage specialist, is exhibiting the established Saker disk-top storage system. Also on display is an exciting new development in floppy disk storage, Sakerisk, being launched at the show.

Company Melbourne House Stand 141-4

Address Castle Yard House, Castle Road, Richmond, Surrey

Phone 07 940 4061
MELBOURNE House is exhibiting its quality range of computer books and software for both the Commodore 64 and Vic 20 computers.

Software on show for the Commodore 64 includes the low-selling adventure game of 1983, The Hobbit, together with another old favourite in the form of the popular Horser character.

Melbourne House personnel are also available to answer any questions about

entertaining products including Sherlock Holmes, Muggy and the arcade favourite Postmanco.

Company Meriv Software Stand 117

Address Business and Technology Centre, Riverside Drive, Sevenoaks, Kent
Phone 0455 34054
MERIV SOFTWARE has now established itself as a reliable software house, producing good quality games for the Commodore 64.

Come to its stand and savour the delights of such favourites as Blue Moon, Crazy Caravan, Pixie Pats, and also come to see its stunning brand new games. Be one of the first to play the traditional, skilful and enjoyable game of tennis on your 64, with the 3D sports simulation Wimbledon 64.

Company Micro Power Stand 151 and 152

Address Northwood House, North St, Leeds
Phone 0511 428800

MICRO Power, market leader in games software for the BBC Micro and Electron, is now making major efforts to obtain a representative share of the Commodore 64 software market.

Press-launch publicity will have exceeded £20,000 by day one of the show. Micro Power regards this 7th International Commodore Show as the kick-off point for Phase 2 of its campaign — the launch of the first four titles in a range of top-quality arcade-style games.

Company Micro-Samples Stand 8

Address 8 Charlotte St West, Macclesfield, Cheshire
Phone 0625 623773

SOME OF the problems associated with obtaining account books and completing VAT returns can now be dealt with by the accounting system from Micro-Samples.

Specially designed for small business, the system operates on basic Commodore hardware — the 8011/8250 disk drive and 4021 printer — and is menu driven. Entries via the keyboard follow a similar format to that used in the already established Samples D system.

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ON THE
Commodore 64



Yes at last those fantastic top selling games for the Dragon are now available for your Commodore 64. Avoid those Marauding Moronians in "Cuthbert Goes Walkabout". Fight for survival in "Cuthbert in the Jungle" or plunder the Moronians planet in "Cuthbert in Space". These great games are a "must" for your software collection.

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DUCKWORTH HOME COMPUTING

All books written by Peter Conrad, former editor of Commodore Computing International, author of two top-selling adventure games for the Commodore 64, or by Kevin Beggs, both are regular contributors to Personal Computer World, Which Month? and Software Review.

SPRITES & SOUND ON THE COMMODORE 64

by Peter Conrad

A complete guide to using the extraordinary features of the Commodore 64, together with a full working explanation of the chips that make it possible: the 6581 Sound Interface Device and the 6587 Video Interface Chip, together with the processor that makes it all tick, the 6502.

Sections on programming your own custom instruments, producing sprite and programmable character animation, make this the guide for users of the Commodore 64 who want to get the most from the special features of their computer.

102pp

COMMODORE 64 GAMES

by Kevin Beggs

This is a collection of 21 exciting programs specially written for the Commodore 64, including *Chili Racin*, *An Attack*, *Demolish*, *Car Dodge*, *Track Battle*, and *Mountain*. An adventure game is also included as well as a program to enable you to derive your own version of *Basic* by re-defining keywords. Each program is accompanied by notes on its structure to enable you to modify or extend it.

102pp

Other titles in the series include *Using the 64*, *32 Simple Electronic Projects for the VIC*, *What You Can Do With the When I'm 64*, *Advanced Basic & Machine Code Programming on the VIC* and *Advanced Basic & Machine Code Programming on the 64*.

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SHOW PREVIEW

Company Mills Associates

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Address Wokingham Rd,
Monmouth, Gwent
Phone 0690 4677
MILLS Associates is
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supplier of maintenance
services for business system
computers, and provides a
comprehensive range of
services nationally through a
network of registered centres.

Company Microsoft

Stand 171
Address Millers Close,
London EC1
Phone 01-222 1947
MICROSOFT is the newly-
formed home computer
software division of Mirror
Group Newspapers,
publishers of the Daily
Mirror, Sunday Mirror and

Sunday People.

Launched in November
1983, Microsoft publishes a
number of well reviewed
Commodore 64 programs,
including *Cartas for the Cat*.
At the show Microsoft will
be featuring CBM 64 early-
learning games: *First Steps*
with the Mr Mrs, *Quick*
Thinking and two new early-
learning releases, *Count with*
Oliver and Lock Sharp.
The major new Microsoft
product at the show is *Geo-*
Sprite, a versatile way to use
Sprite Editor for the CBM 64
which is user driven and
controlled by joystick.

Company Miles O'Hare &
Associates
Stand 31
Address 31 Millstone Lane,
Leicester

Phone 0533 376733

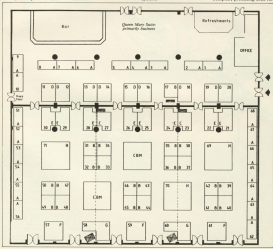
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Company Oxford Computer
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Stand 231

Address Herington Rd,
Woodstock, Oxford
Phone 0863 81700
OXFORD Computer Systems
is exhibiting the following
products at the show:
Fastprod for the 4000/5000
series PCs.
The *Integer Basic Compiler*
for the 4000/5000 PCs.
Fastprod — a cross-
compiling version of
Fastprod, producing code for
the Commodore 64.
N-66 — a cross-compiling
version of the *Integer Basic*
Compiler, producing code for
the Commodore 64.
B-Parl — a cross-compiling
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Available for Commodore at £12.99 and PC at £9.99

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METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME is a game of strategy & destruction. You'll be in control of a llama who can destroy anything & everything in her path. She can fly, she can shoot, she can breathe fire, she can breathe acid, she can breathe poison, she can breathe anything you can think of. She can breathe anything you can think of. She can breathe anything you can think of.

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ATTACK OF THE MUTANT CAMELS

ATTACK OF THE MUTANT CAMELS is a game of strategy & destruction. You'll be in control of a llama who can destroy anything & everything in her path. She can fly, she can shoot, she can breathe fire, she can breathe acid, she can breathe poison, she can breathe anything you can think of. She can breathe anything you can think of. She can breathe anything you can think of.

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GREYRUNNER is a game of strategy & destruction. You'll be in control of a llama who can destroy anything & everything in her path. She can fly, she can shoot, she can breathe fire, she can breathe acid, she can breathe poison, she can breathe anything you can think of. She can breathe anything you can think of. She can breathe anything you can think of.

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FLOWER BOYER is a game of strategy & destruction. You'll be in control of a llama who can destroy anything & everything in her path. She can fly, she can shoot, she can breathe fire, she can breathe acid, she can breathe poison, she can breathe anything you can think of. She can breathe anything you can think of. She can breathe anything you can think of.

Available for Commodore at £12.99 and PC at £9.99



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SHOW PREVIEW

the 700 series.

Interlog — a free-standing multiple interface for the Vic 20 and Commodore 64.
Driving Game — a 3D, sophisticated racetrack game running on the Commodore 64.

Company Precision Software Stand 140 and 69
Address 8 Park Terrace, Brunelton Park, Surrey
Phone 01 833 7560
SUPERBASE 64 is the complete information centred system for the Commodore 64. Superbase 64 is a serious software product with random user whenever a requirement to store, index, retrieve and report on lists of information arises — be it in the home or business.

Company Quick-Count Stand 660
Address 12 Noval Crescent, London NW9
Phone 01 262 5480
QUICK-COUNT'S much acclaimed Cash Tracker's Bookkeeping System for the Commodore 64 is its main exhibit.
Quick-Count is also demonstrating a Landlord Property Revenues program on the Commodore 64.

Company QuickSave Stand 150
Address Pulborough Park House, 11 Pulborough Road, Southampton, Hants
Phone (070) 26168

MILLEMA have passed and near the end of another Age emerge QuickSave. The evolution started in the principal course when QuickSave entered as a school of dreaming fish, now QuickSave exists in a different form.

In these technological days lives an electronic creature which stands out amongst its fellows, this is the Commodore 64, an animal legendary for the way in which it stores information and plays the most extraordinary games.

Now the QuickSave and Commodore play games together, amazing games, games to make the hairs stand out on the back of your neck in admiration. If you wish to be thrilled by action which surely could only have come from outside the solar system then visit QuickSave's remarkable stand.

Company Radio Luxembourg Address 18 Arlington Street, London W1
Phone 01-609 5947
THE RADIO station is having its own live stage show at the show. Luxembourg 200 Dave Rowland and Mike Wallis are in attendance.

The stand also features personality gigs, music, competitions and games.

Company Brook Address Brook Trading Estate, Deadbrook Lane, Altrincham, Warrs
Phone 0622 376200
ON display are its full range of products for the Vic 20 and Commodore 64, including the successful **Vision 66**, Switchable RAM, the **Vision Switchable Motherboard**, and the **Programmer Aid 6064** and **Cartridge**, which give the Vic 20 79 superb new commands.

Company Stone Computing Stand 17
Address 1 St Catherine's Drive, Leightonfield, Bovingde, North Hants
Phone 0407 59697
SANDON Computing is exhibiting its new **Figaro 64** numeric database system for the first time at the show.

Company Software For All Stand 167
Address 72 North St, Aylesford, Essex
Phone 0708 30723
SOFTWARE For All moved out of games software early in 1983, seeing the need for serious business software on the home market first.

The range since then has been expanded and at present consists of Stock Control, Invoicing Sales and Purchase Ledger available on both cassette and disk systems.

Company Swift Computer Services Stand A108/A110

Address 290-298 Derby Rd, South, Macclesfield
Phone 061 603 5517
COMPUTER accessory leader **Stack** is displaying its range of popular products for the Vic 20 and Commodore 64, including lightpens, drawing software, games, interfaces, utilities and the **Stack Light Rifle**.

Company Knowledge Address Brook Trading Estate, Deadbrook Lane, Altrincham, Warrs
Phone 0622 376200
ON display are its full range of products for the Vic 20 and Commodore 64, including the successful **Vision 66**, Switchable RAM, the **Vision Switchable Motherboard**, and the **Programmer Aid 6064** and **Cartridge**, which give the Vic 20 79 superb new commands.

Company Knowledge Stand 30
Address 22/23 Castle Street, London WC2
Phone 07 437 0563
THEIR is a special 21 show document on the latest **Smashline Commodore 64** book titles, and special subscription offers.

Back issues of **Commodore Magazine** are available from the stand. Staff from the magazine will be there to answer any questions you may have about the magazine or its contents.

Company SuperSoft Stand E55 and A740
Address Pinchester House, Canning Rd, Woodhouse, Macclesfield
Phone 01 847 1566

THE upstairs stand is showing **Pro** and **64** business programs, with downstairs devoted to games.

Company 3D Digital Design Stand 68
Address 18/19 Warren Street, London W1
Phone 01-347 7568
3D DIGITAL Design & Development, the renowned specialist in the field of microcomputer interfacing, is exhibiting working demonstrations of a number of its interface products.

Company Trish Stand 87
Address Four Tree House, Frogmore on the Green, Milton Keynes
Phone 0608 676636
CGI DISPLAY are the **Compton Personal Computer Desk**, the **Compton Workstation** and the **Compton Printer Stand**.

Company Vite Software Stand A107/108
Address 7 Merton Ave, Brighton, Gillingham, Kent
Phone 0681 817590
VITEA software are showing **Vitea Write**, **ViteaSpell** and the exciting new product **ViteaStar**.

Company Vulcan Electronics Address 700 Brent St, London NW9
Phone 01 261 6390
VULCAN Electronics is the country's leading distributor of home computer peripherals such as joysticks and interfaces.

STAFF effort has been made to ensure that the information in this show preview is accurate, the plans may have changed between preparation of the preview and the show itself. Our thanks go to the exhibitors who provide information — apologies if these we're missed.

The preview was compiled by **Commodore Horizons**, 12-13 Little Newport St, London WC2E 9JL (telephone 01-407-4943).
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64's general purpose interface system

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an ordered and instantly retrievable form. This means that you can quickly pick out individual or entire groups of related information to create lists, statements, labels or reports.

VisaStar is the ONLY program of its kind on the Commodore 64. Completely consistent with the VisiWrite word processor, VisaStar provides a totally comprehensive office system.

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(BAR NONE!)



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This brilliantly conceived program combines the best parts of wordle games with the best of educational games, making a real family game that anyone who can see the screen can participate in. You have to find the word that is hidden twice in the jumble of letters, then guide your lights over one of the occurrences of it.

The first to find it wins! You can play by yourself or in teams against the computer, or against other players. Three difficulty levels are included to suit young and old alike!



BONZO 64 £7.95

The best-selling game for the MC 64 is now available on the 64! Featuring the most intelligent and devious monsters you have ever tried to evade, the Bonzo, this game is a real joystick wroncher. Move Hero, the Kenderman up and down the ladders to pick up the boxes from the different levels.

But don't mean a Bonzo on the way!



Put these gems up on the air for the 64 and unexpended VIC! The Lizard city of Eridon is under attack from the ships of the Jovian empire. Their incessant bombing will reduce your city to a pile of rubble unless you can hold them off. You are the commander of the sole laser defence force. Your mission - hold out for as long as possible.

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BURNIN' RUBBER

Getting round the problems of maths in machine code

Mathematical calculations of any real complexity present great problems in machine code programs. *J R Goodenough* explains the principles of floating point arithmetic, and how ROM subroutines can help you out.

IF YOU HAVEN'T ever written programs in machine code, you will know how much faster such programs run compared with the equivalent written in Basic. However, you will also be aware of the drawbacks, especially if you need to do calculations which are more involved than adding and subtracting simple numbers. Even a simple task such as calculating the area of a circle is an enormous problem. But how easy is it to write $A = \pi \times R \times R$ in Basic? (If you're wondering why I didn't say $A = \pi \times R^2$, you should read an article on how to make your Basic programs run faster!).

For all but the simplest calculations, most computers use a method known as floating point arithmetic, and the Commodore 64 is no exception. In fact, Commodore's Basic goes rather overboard in this respect: even a simple integer addition such as $A\%+A\%=1$ is done in floating point, by converting the integer to floating point, then converting back again after the addition.

Large computers have special hardware to deal with floating point, but most minis perform these calculations using subroutines. In the Commodore 64, these subroutines are held in the Basic ROM, although some parts spill over into the monitor ROM. All we need to know is where the subroutines are, and how to call them, and there is nothing to stop us using them in our machine code programs.

Before I go into details of how to use these routines, it is helpful to understand what floating point arithmetic is, and why it is necessary. Experts can skip this bit.

Integer arithmetic can only deal with whole numbers, so we hit problems trying to calculate the area of one circle. As long as the radius, R , is a whole number we can calculate $R \times R$ without too much difficulty, but how do we deal with a 3.14159...? This is where floating point comes in. In a Basic program we can write π (the long way, without pressing shift-up-arrow) as 3.14159 or as 0.314159E1, or even as 314.159E-2. The "E" part is called the Exponent, and means "times 10 to the power of". Whichever way we choose to write the

number, it is always stored in the computer in the same way.

Assuming for a moment that the computer worked in decimal (which it doesn't of course — it makes explaining things easier), then it would choose an exponent which would make the rest of the number a fraction which is less than one, but without any extra zeros to the right of the decimal point. So 64.0 would be stored as 0.64E2, 0.0006 as 0.1E-3 and π as 0.314159E1. That's why it's called "floating point" — the decimal point floats up or down to make this fraction called the "mantissa", and the exponent is adjusted to suit.

Binary

Now we haven't got this far without knowing that computers work in binary, not decimal. The principle is the same, but instead of a decimal point a floating point number has a binary point, and an exponent which means "times 2 to the power of" instead of "times 10 to the power of". Binary fractions mean a bit peculiar at first, as we are so used to the decimal system. But it's really quite simple. In the same way as in decimal 0.1 means a tenth and 0.01 means a hundredth, so in binary 0.1 means a half and 0.01 means a quarter. (Experts would say "binary" instead of "decimal", but I'll go on using the term I've used all my life, unless the editor says differently!).

In the binary number 1101.1, which is 13% in decimal, it is stored as 0.1101 (that's the mantissa) with an exponent value of 4.

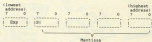
Commodore 64 Basic uses 3 bytes to store a number, the first byte holding the exponent, and the other 4 bytes, or 32 bits, the mantissa. Note that the number of bits, or "binary places", in the mantissa only affects the accuracy in which we can hold the number, not the size: 47.68 (previous example again) is the same size as 47.680000, but is less accurate.

Now for some final points to round off the complicated bit. To allow negative numbers, we need to find a spare bit in which to store the sign. A clever trick here — since the bit immediately to the right of the binary point is always a '1' (no extra zeros, remember, and the only other value in binary is '1'), this bit does not actually need to be stored in the number — instead it is used to hold the sign. A '0' in this position means positive, and a '1' means negative. When the floating point subroutines process a number, the sign bit is pulled out and stored in a separate location, and the missing '1' is put back so that the arithmetic works properly. Unlike integer numbers, negative floating point numbers are not stored in two's complement form — just the sign bit is changed.

Another point to note is that the exponent has 128 added to it, so that the value of the exponent byte is one 13% example is really 128+4, or 132. The only reason for this is that it makes things easier for the floating point routines.

Finally, a way of representing the number size is needed. By making the

Representation of a Floating Point Number



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ALPHA	100	100	100
ALPHA 2	100	100	100
ALPHA 3	100	100	100
ALPHA 4	100	100	100
ALPHA 5	100	100	100
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ALPHA 98	100	100	100
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Exponent smaller and smaller, we make the number smaller and smaller, but we can't actually get to zero, because of the bit hidden by the sign. So by convention, the number zero is represented by an exponent value of zero. The mantissa bytes are also usually zero, but this doesn't make any difference to the value.

Routines

Now for a description of the routines themselves. Obviously, if you bank out the Basic ROM you won't be able to access them, so if you normally use the BK section of RAM from \$A000 to \$BFFF in machine code programs you'll have to be careful.

All the floating point routines make use of the Floating Point Accumulator (FAC). This is held in the six bytes located between \$B4 and \$B6 in the zero page. The FAC holds numbers in a similar format to the floating point variables we've been talking about up till now, except that the sign is removed from the first byte of the mantissa (\$B5) and stored in a byte on its own (FACSIGN — \$B6).

Fortunately, we don't have to worry about this internal format. The only locations in the FAC that will concern us further are the exponent (FACEXP — \$B5), used to check for a zero result, and FACSIGN, used to check the sign.

Some of the floating point routines (like square root and cos) just do their thing on the existing contents of the FAC, and leave the result in the FAC. Others (like multiply) work with two numbers. In this case, one of them is the number already in the FAC, and the other is a variable or constant held in memory in the standard 1-byte format. With one exception, this is refetched by loading the A-register with the low byte of the address and the Y-register with the high byte. I'll refer to this as (A, Y) addressing from now on. So the instructions

```
LDA #CONST
LDY #CONST
JSR FMUL
```

will multiply the existing contents of the FAC by the contents of the variable stored at address CONST, and leave the result in the FAC. If we want to take the square root of the result, an additional

```
JSR SQRT
```

is all that is needed. Of course, at the beginning of the assembly, we have to define the symbols FMUL and SQRT as the ROM addresses of these routines. These addresses, and their calling sequences, are given in the table.

Radius

Up till now I have not shown how to get memory variables, constant in and out of the FAC. There are two routines which I call FLD and FSTD which do this. FLD loads the FAC with the variable at (A, Y), while FSTD stores the contents of the FAC in the location addressed by (A, Y). Note that the low address byte must be loaded into X, not A. This is the one exception I mentioned earlier.

Now we have enough information to write that program to work out the area of

a circle, as in our first example. Let's assume the 1-byte floating point variable RADIUS contains just that, the constant π in a location called PI, and we want to store the result in the variable AREA.

```
LDX #RADIUS ; Load radius to FAC
LDY #RADIUS
JSR FLD
LDA #RADHUS ; square it
LDY #RADHUS
JSR FMUL
LDA #CON ; multiply by
LDY #PI
JSR FMUL
LDX #AREA ; store result
LDY #AREA
JSR FSTD
```

Now consider what happens if we write

```
LDA #CONST
LDY #CONST
JSR FLD ; load
LDA #DEF
LDY #DEF
JSR FSUB ; subtract
LDX #CONST
LDY #CONST
JSR FSTD ; store result
```

We get the result of ABC-DEF stored in GHI, right? Wrong! A peculiarity of the floating point subroutines FSUB (subtract) and FPLY (divide) is that they work the opposite way round to that which you would expect. What we really calculated in the last example was DEF-ABC. This is one to watch, though it doesn't really cause problems. Of course with addition and multiplication it doesn't matter which way round we do it.

If you want to check the result of a floating point operation, for example to de-

termine if it's zero, then you have to do an LDA, FACEXP first — the routines do not set the condition codes. Similarly a BIT FACEXP will not do what you expect, but you can use it to check the sign of the result.

Two routines are available to convert a signed (two's complement) integer to floating point and vice versa. By loading the high-order byte of an integer into A and the low-order byte into Y, and calling the routine FLOAT, the integer is converted to floating point in the FAC, overwriting the previous FAC contents.

Calling the routine INT converts the number in the FAC to an integer, with the high-order byte stored in A and the low-order byte in Y. Note that INT destroys the contents of the FAC, and that the number must be within range for an integer (i.e. between -32768 and +32767) or a conversion error will be given.

There are two routines to convert between floating point and ASCII characters. These are useful for input and output.

Convert

Finally, if you want to include floating point constants in your assembly language program, the following Basic program lets you type in a number and then prints out the five bytes it is stored as. Some useful constants are already available in the ROM — those are included in the table.

```
10 N=8:REM THIS MUST BE THE
16 N=FIRST STATEMENT
20 X=N+PI:PRINT X+150*PI:GOTO 30
30 INPUT "NUMBER" :N
40 FOR I=0 TO 4:PRINT
PI:GOTO 20
50 GOTO 30
```

Table of Floating Point ROM Routines

Name	Address	Operation	Description
FLD	\$B8A2	FAC = (A, Y)	Floating load
FSTD	\$B8B4	(A, Y) = FAC	Floating store
FADD	\$B8B7	FAC = (A, Y) + FAC	Floating add
FSUB	\$B8C0	FAC = (A, Y) - FAC	Floating subtract
FMUL	\$B8C3	FAC = (A, Y) * FAC	Floating multiply
FDIV	\$B8C6	FAC = (A, Y) / FAC	Floating divide
FLG2F	\$B8C9	FAC = FLD(A, Y, X)	Integer to floating point (note: A = high order integer Y = low order integer NOT an address)
INT	\$B8AA	Y, A = INT(FAC)	Floating point to integer (FAC destroyed, store in FLOAT)
SQR	\$B87F	FAC = SQR(FAC)	Square root
EXP	\$B88D	FAC = EXP(FAC)	e to the power of
LOG	\$B89A	FAC = LOG(FAC)	Natural logarithm
ATN	\$B89E	FAC = ATN(FAC)	Arctangent (result in radians)
COS	\$B8A4	FAC = COS(FAC)	Cosine (argument in radians)
SIN	\$B8A8	FAC = SIN(FAC)	Sine (argument in radians)
TAN	\$B8AC	FAC = TAN(FAC)	Tangent (argument in radians)
FLSTR	\$B8D0	Convert value in FAC to ASCII string in \$B8D0-\$B8D4, terminated with zero byte.	
STRFL	\$B8E0	Convert ASCII string to value in FAC. A = length of string \$C2, \$D5 = address of string.	

Some useful ROM constants

\$B8A8	PI
\$B8B0	CON
\$B8B8	PI*2
\$B8C8	PI*16
\$B8D0	\$B8D4
\$B8D4	\$B8D8
\$B8D8	1.0
\$B8E0	0.5
\$B8F0	0.2

Turtle and Logo team up



Anthony Glas tests Mallard's turtle with IBM's Logo

THERE ARE AROUND 2½ million computers in British homes. We've more micros per head of the population than any other country in the world. Most people bought their micros eager to learn programming, but now spend their time playing computer games. What happened to that initial enthusiasm? The answer is simple. It was destroyed by Basic.

Basic was created in the 1960s when computer power was expensive. It was designed to use very little memory. Unfortunately "easy for the computer" doesn't mean "easy for the user", as anyone who has tried to learn it will tell you. The complex mathematical systems involved in Basic programming are damaging to mental health. It appeals only to the mathematically inclined, and Basic's difficulties are accepted as being the difficulties of computer programming.

Basically

Because Basic only used a small amount of memory it appeared on the first micros. Over the years computers have become much cheaper. The computing power of a Commodore 64 would have cost hundreds of thousands of pounds 10 years ago, and millions of pounds 20 years ago. The original rationale behind Basic is no longer valid, yet we seem to be stuck with it. Most micros have it hard-wired into them and programmers are used to it.

Basic is often compared to the QWERTY keyboard. It would seem logical to put the keys that are used most on a typewriter in the centre of the keyboard, they were scattered at random. This is because on the first typewriters, keys that followed each other often jammed. To prevent this happening the most frequently used keys were separated. The technology soon advanced to render this layout obsolete, but by then typists were used to QWERTY and it was being taught to secretaries. So we got stuck with it, just as we seem to be stuck with Basic.

At the Massachusetts Institute of Technology, 11 years ago, a team working with Seymour Papert, educationalist and computer scientist, was taking a different approach to programming. They worked on the largest mainframes available to create a language that was powerful and yet easy to learn. They came up with Logo.

The recent availability of computer power has seen Logo move from the mainframes into the homes. Full implementations of the language are available for several popular micros, including the Commodore 64 which has one of the best from Commodore itself. Several "pseudo Logos", which are versions of Turtle Graphics, and not the full language, have also appeared. Where there is a full version of Logo available these should be avoided.

Logo has powerful accessible graphics capabilities, handles words and lists, performs mathematical functions, and creates music. Because it is so easy to get started, it is becoming standard in primary schools.

Children are introduced to Logo with a

little cybernetic creature called the "turtle" — a motorised robot. It is controlled from the keyboard using Logo. If you lift it up to discover its sex all you'll find is a felt tip pen embedded in its belly. This can be raised or lowered by the commands **PENUP** and **PENDOWN**. The turtle is moved forwards by the command **FORWARD** followed by a number to tell it how far to go, and back with **BACK** and a number. **RT** and a number turns the turtle that number of degrees to the right and **LT** and a number turns it to the left. These commands are usually abbreviated to **FD**, **PD**, **BD**, **RT**, and **LT**. Different versions of Logo have slight variations.

FD 100 sends the turtle forwards 100 units. **RT 120** turns it 120 degrees to the right. **FD 100**, **RT 120**, **FD 100** and **RT 120** draw a triangle. It could be written more simply as **REPEAT 3 (FD 100 RT 120)**.

The turtle could be taught to draw a triangle by typing:

```
TO TRIANGLE
  REPEAT 3 (FD 100 RT 120)
END
```

Whenever **TRIANGLE** is typed the turtle will draw a triangle side 100 units.

TRIANGLE could then be used in another procedure called **WHEEL**.

```
TO WHEEL
  REPEAT 36 (TRIANGLE RT 10)
END
```

Two **WHEELS** could then be used in a procedure called **RECTANGLE**, along with **SET**, **FRAME** and **PEDALS**.

The first turtle appeared at MIT around 1970 and has been used to teach Logo to five year olds and Pascal to under-graduates. The first British turtle was the Edinburgh turtle. This is wired to the

computer and power source by an artificial cord and powered by two linear DC motors. A magnetic driver monitors the angular movement of the wheels as they turn. It is a descendant of a Mycroft turtle made by the artificial intelligence unit of Edinburgh University. The Mycroft turtle was controlled by a mainframe computer and was not very accurate. It was redesigned along the lines of the present day Edinburgh turtle.

Valiant

This month sees the launch of a new generation of turtles, the Valiant turtle. The Valiant turtle has come of age and severed the "umbilical" connection with "mother computer". It is remote-controlled. A compact little infra-red communication which plugs into the computer sends instructions to the turtle. The communication has a range of 1 metre and only needs to point roughly in the direction of the turtle. The absence of a cord dragging behind the turtle gives a great freedom of movement and means that the driver can fly very high accuracy.

The turtle is very attractive to look at. A great deal of thought has gone into the design. It has a clear green perspex plastic shell. Two red eyes light up to indicate when the power is on.

It is powered by an on-board stack of rechargeable nickel cadmium batteries. A battery charger is supplied with the turtle. It recharges overnight but has an "emergency" fast charge mode which will

give the turtle enough power to run for half an hour with only 15 minutes charging. A jack-plug from the charger fits neatly into a socket behind one of the wheels. When the batteries need recharging the turtle's eyes go out.

The pen used in the turtle is a standard Biro ball tip, found on the floor of any primary classroom in the country. The pen can be changed without removing the shell of the turtle, by simply pulling the old one out and pushing a new one in.

When you type PD 180 the Valiant turtle moves forwards 180cm. This gives it great potential for use in measurement. It can be reprogrammed to move in units of 1mm, 1mm or even an inch. It turns in degrees, but can be reprogrammed to turn in radians. It is also capable of drawing smooth arcs and circles.

The documentation with the turtle promises to be very good. There will be a technical manual with instructions on how to set up and run the hardware and software, and Valiant is considering publishing a "Turtles magazine" containing articles for teachers, parents and children. There will be games and activities for school and home, and articles explaining about Logo, along with stories, puzzles and competitions. Valiant hopes to put out the first magazine every three months. It's nice to see something being done for children in the documentation. Logo is designed for children, yet every manual I've seen has been written for adults.

The turtle sells for around £200, with a

£50 discount for schools. It seems expensive, but the price and quality of the competition make it a bargain for turtle lovers. For the price you get the turtle, communication and machine dependent interface cable, battery charger and batteries, robot adapters, pen, technical manual and Turtles magazine, and machine dependent software. If there is not a version of Logo currently available for your machine, but imagine if you have a Vic 20, then Valiant will be able to supply a software version of the Basic program Turtle Graphics.

Comment

Once I'd found my way around the hardware I found the turtle easy to set up and run. The only thing to comment is the communication, which fits into a port in the back of the computer. Logo is loaded in the normal way, and then an interface disk is loaded. This tells you when to switch on the turtle and the communication and away you go.

My main problem was finding enough large sheets of paper for the turtle to draw on. Valiant should consider marketing a "wide clear" plastic sheet for the turtle to draw on.

Watching the turtle with its glowing red eyes move silently across our living room carpet, programmed by my six year old son, I felt that the age of the robot was dawning at last. My children are growing up with computer programmable robots like I grew up with Dinky toys. ■

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colour mode, change colours using A, S and D.

When you have finished designing, press the leftwards arrow key and the data will be calculated. The menu will then allow you to list the data and end, display the sprite, or change the design. You can then incorporate the design in your programs.

```

1  REM##(SPRITE)#### MARK FROST 1984##
5  DIM% (70) :POKE53288,%:POKE53281,0
6  DIM% (518)
10 PRINT"Z"TAB(8)"MSPRITE DESIGNER IN.F3  ##"
20 PRINTSPC(8)"CURSOR CONTROLS MOVE 8Z X"
30 PRINTSPC(8)"Z=DRAW MODE"
40 PRINTSPC(8)"X=OH DRAW MODE"
50 PRINTSPC(8)"A, S, D, MULTICOLOUR KEYS"
55 PRINTSPC(8)"=CALCULATES DATA####"
60 INPUT "NORMAL OR MULTICOLOUR R/S":R
70 IF R="R" THEN G= "XXXXXXXXXXXXXXXXXXXXX" :S=1 :H=40 :B=1 :GOTO88
75 B=3
80 FORA=LTOB
90 INPUT"## COLOUR 1-15:CO#)
100 IF CO#<BORD(R)>15 THEN#B
105 NEXT
110 IF R="B" THEN G="XXXXXXXXXXXXX" :S=2 :DIML(270)
112 PRINT"Z"
115 FORA=LTO21
116 PRINTSPC(6)"Z"CO# NEXTA
200 B=1 :Z=55243 :X=1871 :Y=160 :D=76 :P=1863 :L=-1 :J=76 :H=76 :I=63 :S#="3248
210 PRINT"## SERIES1/SERIES2/SERIES3"
255 PRINT"R"TAB(33)"#####DRAW####"
256 PRINTTAB(33)"##=ERASE####"
257 PRINTTAB(33)"# DATA####"
260 IF R="B" THEN#D=122
270 IF PEEK(X+R)=32 THEN#311
275 IF PEEK(X+R)=181 THEN#311
280 IF CO#<1870ORCO#>1960 THEN#311
300 POKEX,B:CO#X+Z=2+M:POKEY,Y:POKEZ,B
305 IF R="B" THEN#POKEX-1,H:POKEZ-1,I:J=122
310 REM#####CONTROLS#####
311 GETA :IFA#="" THEN#311
315 H#B
320 IFR#="R" THENH=440
330 IFR#="T" THENH=440
340 IFR#="M" THENH=148
350 IFR#="B" THENH=-185
360 IFR#="Z" THENY=160 :D=168 :H=160 :B=C(1)
370 IFR#="C" THENY=160 :O=B :D=J :H=76 :GOTO388
380 IFR#="I" THEN#GOTO400
385 IFR#="+" THEN#405
390 GOTO270
395 REM#####MULTI-COLOUR CONTROLS####
400 IFR#="R" AND#=#G THEN#C(1)
401 IFR#="S" AND#=#G THEN#C(2)
402 IFR#="D" AND#=#G THEN#C(3)

```

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```

400 IFPR="+" THEN640
404 GOTO270
400 REM*****CALCULATING DATA*****
400 PRINT" PLEASE WAIT (CALCULATING DATA)":T=1
410 M=0:K=0
415 K=256
420 FORV=1TO9:G=H+V:F=PEEK(O)
430 IFV=160THENH(Y)=0:T=T+1:GOTO460
445 K=(V+0):K=K-0K/2:GOTO500
450 H=K-0K/2:K=(V)+K
500 NEXTV
510 H=H+0:MM=H+1:L=L+1
515 PRINT"DATA LEFT "I:]=I-1
520 R$(L)=R$(1)+H$(2)+H$(3)+H$(4)+H$(5)+H$(6)+H$(7)+H$(8)
535 IFL=64THEN955
540 IFN=3THENM=0:F=H+16
550 IFH="B"THEN730
565 GOTO415
580 L=0:PRINT"J"
590 IFL=63THENEND
600 PRINT"DATA",R$(L), R$(L+1), R$(L+2):L=L+3
610 GOTO590
640 REM *****MULTI-COLOUR DATA*****
700 PRINT" PLEASE WAIT (CALCULATING DATA)":T=1
710 P=53041:Q=H+0
720 R=256:N=0:R=0
740 FORV=1TO9:G=H+V
750 F=PEEK(O)+AND15
755 N=1602+(P-Q+V)
760 IFPEEK(X)=76THEN790
765 IFPEEK(X)=132THEN790
770 IF=C(1) THENN=0:N=1:GOTO785
775 IF=C(2) THENN=1:N=0:GOTO785
780 IF=C(3) THENN=1:N=1:GOTO785
785 Y(T)=K-0K/2:K=(V)+H*(K-0K/2)
790 H=0:N=0
810 K=K-0K/2:K=(V)+H*(K-0K/2)
820 V=V+1:K=(V)+H*(K
830 NEXTV
840 GOTO510
850 REM *****SPRITE TEST*****
860 POKE(2048),C(1)
870 PRINT"*****PRESS SPACE BAR TO END MOVEMENT":POKE2048,13
880 FORN=8TO63:R=R(N):POKE832+H,R
890 NEXTN
900 POKE8H+21,1
910 FORZ=0TO250:POKE8H+0,160:POKE8H+1,Z
911 GET#A:IFPR=" " THEN913
912 IFPR=" " THEN932
913 NEXTZ
940 FORX=0TO250:POKE8H+0,X:POKE8H+1,120:NEXTX:GOTO960
950 POKE8H+28,3:POKE8H+37,C(1):POKE8H+38,C(3):POKE8H+39,C(2):GOTO970
952 REM *****MENU*****
953 POKE8H+21,0
955 PRINT"3SPC(12)"*****MENU OF OPTIONS*****
960 PRINTTAB(4);"*SPRITE DATA AND END F1000"
970 PRINTTAB(4);"*DISPLAY SPRITE F3000"
980 PRINTTAB(4);"*CHANGE SPRITE DESIGN F5000CHOOSE? "
990 GET#A:IFPR=" " THEN1000
1000 IFPR=" " THEN990
1010 IFPR=" " ANDQ="3" THEN950
1020 IFPR=" " THEN950
1030 IFPR=" " THEN1040

```

```

1040 GOTO990
1043 PRINT"3"
1045 REM####CHANGE SPRITE DESIGN###
1050 FORR=1TO21
1060 PRINTSPC(6)*"PC":NEXTR
1065 IFFR="B"THEN1110
1070 FORR=1TO7
1080 F=YCR)-1071
1090 POKE1071+F,100:POKE55343+F,C(1):NEXT
1100 S=1:S=1:R=40:GOTO200
1110 REM##MULTI COLOUR DESIGN##
1110 FORR=1TO7
1200 F=YCR)-1071
1205 S=CLR)
1210 POKE1071+F,100:POKE55343+F,S
1220 POKE1071+(F+1),100:POKE55343+(F+1),S
1240 NEXT S=2:GOTO200
1270 REM####END###

```

Dec/hex

From *M/C Hart in Wagon, Locomotive*
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 well as on Basic 4 machines. The program
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 therefore loads the appropriate set of data
 statements.


```



10 REM #####
11 REM #
12 REM # UNIVERSAL DEC/HEX CONVERT #
13 REM #
14 REM # BY M. C. HART #
15 REM #
16 REM #####
17 :
18 :
19 :
20 REM MOST C64 DEC/HEX ROUTINES
21 REM PUBLISHED SO FAR UTILISE
22 REM THE PET MACHINE LANGUAGE
23 REM REPETITOR ROUTINES ABSENT IN
24 REM THE VIC/C64
25 :
26 REM THESE ROUTINES ARE CONSTRUCTED
27 REM SO THAT THEY ARE AS INTER-
28 REM CHANGEABLE AS POSSIBLE BETWEEN
29 REM THE VARIOUS C64 MACHINES IF
30 REM YOU DECIDE TO UPGRADE/ADAPT.
31 :
32 REM DATA IS INCLUDED FOR BASIC4/
33 REM BASIC5/VICE64 AND C-64 MACHINES.
34 REM PEEK(57343) DETERMINES THE MODEL.
35 REM AND THE PROGRAM SELECTS THE
36 REM APPROPRIATE DATA STATEMENTS.
37 REM SHIPPING OVER THOSE WHICH DO NOT
38 REM APPLY...
39 :
40 REM TO USE THIS TECHNIQUE EACH DATA
41 REM LINE MUST BE 39 ITEMS LONG
42 :


```



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```

40 REM: 100 CONVERSION HEX/DEC B/W
44 REM: 200 'SKIP' B/W
48 REM: 300 READ LINE B/W
49 :
50 REM      *****
51 :
52 REM SYS 600,----- COLD(HPPL:REM)
53 REM SYS 340,8----- COLD(DEC:HPPL)
54 :
100 REM      *****
101 :
102 PRINT:PRINT"LOADING...":PRINT
110 FOR A=0TO17:READ LA:PRINTLA,1:PLU(1)*A:THEM:GOSUB 150:POKE650+K,A:GOTO130
120 HT=PEEK(87340)
121 IF HT=127 OR HT=24 THEN GOSUB200:FORJ=1TO3:GOSUB200:NEXTJ:GOTO130
130 SPHT=70 THEN GOSUB300:GOSUB200:GOSUB200:GOSUB200:GOTO130
131 SPHT=300 THEN GOSUB200:GOSUB200:GOSUB200:GOSUB200:GOTO130
140 IF HT=80 THEN FORJ=1TO3:GOSUB200:NEXTJ:GOSUB300:GOTO130
150 NEXTA:PRINT:PRINT"FINISHED":END
160 :
165 :
150 REMHEX-DEC SUB-ROUTINE (GMSD)
155 B=0:FORJ=1TO4:R=RO:CLB=L:L=L-40:H=L:EA:ATL=H:IB=IBL:J1=1:G=H:L:HEMT:RETURN
160 :
200 REM SKIP
210 PRINT:FORI=1TO10:READ LB:PRINTLB," ":NEXTI:PRINT:PRINT:RETURN
220 :
230 REM READ A LINE
240 PRINT:FORI=0 TO 9:READ LA:PRINTLA,1:GOSUB 150:POKE650+K+1,LINEI*H+L:PRINT
250 PRINT:RETURN
500 DATA :
501 DATA 00,00,00,20,01,00,00,00,00,00,00
502 DATA 00,00,00,00,00,00,00,00,00,00,00
503 DATA 00,00,00,00,00,00,00,00,00,00,00
504 DATA 00,00,00,00,00,00,00,00,00,00,00
505 DATA 00,00,00,00,00,00,00,00,00,00,00
506 DATA 00,00,00,00,00,00,00,00,00,00,00
507 DATA 00,00,00,00,00,00,00,00,00,00,00
508 DATA 00,00,00,00,00,00,00,00,00,00,00
509 DATA 00,00,00,00,00,00,00,00,00,00,00
510 DATA 00,00,00,00,00,00,00,00,00,00,00
511 :
512 DATA :
513 DATA 00,00,00,00,00,00,00,00,00,00,00
514 DATA 00,00,00,00,00,00,00,00,00,00,00
515 DATA 00,00,00,00,00,00,00,00,00,00,00
516 DATA 00,00,00,00,00,00,00,00,00,00,00
517 DATA 00,00,00,00,00,00,00,00,00,00,00
518 DATA 00,00,00,00,00,00,00,00,00,00,00
519 :
520 DATA :
521 DATA 00,00,00,00,00,00,00,00,00,00,00
522 DATA 00,00,00,00,00,00,00,00,00,00,00
523 DATA 00,00,00,00,00,00,00,00,00,00,00
524 DATA 00,00,00,00,00,00,00,00,00,00,00
525 :
526 DATA :
527 DATA 00,00,00,00,00,00,00,00,00,00,00
528 DATA 00,00,00,00,00,00,00,00,00,00,00
529 DATA 00,00,00,00,00,00,00,00,00,00,00
530 DATA 00,00,00,00,00,00,00,00,00,00,00
531 :

```

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Controls for Player one are W, A, X,

D, and S for up, left, down, right and fire; controls for Player Two are P, L, .., and I.

When a player is shot he explodes, and the winner is indicated with a caption and a musical phrase.

```
1 A=7700:B=7727:C=7750:D=7749:E=7759
2 F=8010:G=8138:H=8137:I=8150:J=8151
3 POKE26876,15
4 PRINT"Z"(POKE26875,27
5 PRINT"#####GUNFIGHT"
6 PRINT"## THIS GAME NEEDS Z"
7 PRINT"## TO PLAY IT ALSO "
8 PRINT"## NEEDS A LOT OF SKILL."
9 PRINT"## BY NEIL THACKER"
10 PRINT"#####GET F1 TO GO ON"
40 GETIN:IFIN=CHR$(130)THENGOTO50
45 GOTO40
50 PRINT"Z"
55 PRINT"#####GUNFIGHT"
60 PRINT"### 1) 2)
65 PRINT"## M P
70 PRINT"## A S B L : "
75 PRINT"## X A
80 PRINT"## THE KEY IN THE MIDDLE"
85 PRINT"## IS FIRE, "
90 PRINT"#####GOOD LUCK, "
95 PRINT"#####GET F1 TO START"
100 GETIN:IFIN=CHR$(130)THENGOTO100
105 GOTO100
110 PRINT"Z"(POKE26875,130
114 P=7996
115 GETC
116 POKEP,162:P=P+3
117 DFF=7960THED=0T0114
118 DFF=8THED=0T0288
119 DFF=8THED=0T0288
120 POKEH,61:POKEB,162:POKEC,64:POKEE,161:POKEI,160
121 DFF=0THED=0T0288
122 DFF=0THED=0T0288
123 DFF=0THED=0T0288
124 DFF=0THED=0T0288
125 POKEF,61:POKEG,162:POKEH,64:POKEJ,161:POKEK,160
126 DFF=0THED=0T0288
127 DFF=0THED=0T0288
128 DFF=114THED=0T0288
129 DFF=114THED=0T0288
130 DFC="P"THED="P-1:B=B-1:C=C-1:D=D-1:E=E-1
131 DFC="D"THED="P-1:B=B+1:C=C+1:D=D+1:E=E+1
132 DFC="A"THED="P-22:B=B-22:C=C-22:D=D-22:E=E-22
133 DFC="S"THED="P+22:B=B+22:C=C+22:D=D+22:E=E+22
134 DFC="X"THED="P+22:B=B+22:C=C+22:D=D+22:E=E+22
135 DFC="I"THED="P+22:B=B+22:C=C+22:D=D+22:E=E+22
136 G=0
137 DFC="L"THED="P-1:C=C-1:H=H+1:I=I-1:J=J-1
138 DFC="J"THED="P+1:C=C+1:H=H+1:I=I+1:J=J+1
139 DFC="P"THED="P-22:C=C-22:H=H-22:I=I-22:J=J-22
140 DFC=".. "THED="P+22:C=C+22:H=H+22:I=I+22:J=J+22
141 G=1
142 DFC=" "THED="P+2288
143 PRINT"Z"(GOTO115
200 FORN=1TO10:POKE26877,223:NEXTN:POKE26877,0
205 POKE2,46
206 IF2=0<18THED=0T0115
207 POKEP,162
210 Z=Z+1
220 IFZ=7THED=0T0288
225 IFZ=8THED=0T0288
230 IFZ=9THED=0T0288
235 IFZ=10THED=0T0288
240 IFZ=11THED=0T0288
245 POKEH,61:POKEB,162:POKEC,64:POKEE,161:POKEI,160
250 POKEF,61:POKEG,162:POKEH,64:POKEJ,161:POKEK,160
255 PRINT"Z"(GOTO200
300 FORN=1TO5:POKE26877,223:NEXTN:POKE26877,0
305 POKE2,46
```



```

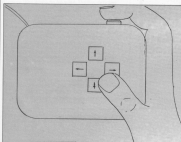
260 POKEP,182
261 G=0-1
262 IFG=1-18THE=00T0118
263 IFG=18THE=00T02680
264 IFG=8THE=00T04680
265 IFG=4THE=00T06680
266 IFG=2THE=00T08680
267 IFG=1THE=00T10680
268 FOREH,81:POKEH,182:POKEC,64:POKEE,181:POKEE,181
269 POKEF,81:POKEE,182:POKEH,64:POKEI,181:POKEJ,181
270 PRINT"CF:00T0888"
271
272 FOREH,81:POKEH,182:POKEC,64:POKEE,181:POKEE,181
273 POKEF,81:POKEE,182:POKEH,64:POKEI,181:POKEJ,181
274 F=F+22:G=G-1:AAA=1:J=1+23:J=J-23
275 IFJ<0ANDH=00T10680
276 PRINT"CF:00T0888"
277 FOREH,81:POKEH,182:POKEC,64:POKEE,181:POKEE,181
278 POKEF,81:POKEE,182:POKEH,64:POKEI,181:POKEJ,181
279 AAA=23:AAA=1:CCC+1:D=D+23:E=E-23
280 IFC<7ANDH=00T10680
281 PRINT"CF:00T0888"
282 FOREH,81:POKEH,182:POKEC,64:POKEE,181:POKEE,182
283 POKEH+64,23:POKEH+65,9:POKEH+66,14:POKEH+67,14:POKEH+68,5:POKEH+69,18
284 FORH=125T02485TEPS
285 IFH=248THE=00T06828
286 POKE36874,U
287 NEXTU
288 GOTO4815
289 FORF=248T01258TEP=8
290 POKE36874,F
291 IFF=125THE=00T03888
292 NEXTF
293 GOTO4838
294 FOREH,81:POKEH,182:POKEH,64:POKEI,182:POKEJ,181
295 FORH+64,23:POKEH+65,9:POKEH+66,14:POKEH+67,14:POKEH+68,5:POKEH+69,18
296 FORF=125T02485TEPS
297 IFF=248THE=00T02858
298 POKE36874,T
299 NEXTT
300 GOTO2888
301 FORF=248T01258TEP=3
302 IFR=125THE=00T03888
303 POKE36874,R
304 NEXTR
305 GOTO2858
306 PRINT"CF:POKE36874,8:POKE36879,18"
307 PRINT"#####DUNFIGHT"
308 PRINT"## 5000=SHOOTING."
309 PRINT"## FOR ANOTHER GAME HIT"
310 PRINT"8 F1"
311 PRINT"#####HILL THICKER"
312 GETH:DFH=C88+123)THE=888
313 GOTO3879
314 DATA17,488,212,488,223,488
315 DATA227,288,234,288,238,488
316 DATA227,288,234,288,238,488
317 DATA223,488,227,488,217,488
318 DATA13,688,-1

```

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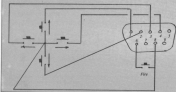
Build a joystick

J Whitfield explains how to construct one of the most useful games peripherals simply and cheaply



Pin	Function
1	Joy#0
2	Joy 1
3	Joy 2
4	Joy 3
5	Joy Y
6	Light pen
7	+5v
8	Ground
9	Joy X

Type one



THE FIRST peripherals all computer owners seem to want are a pair of joysticks. Many of the joysticks that are commercially available seem to be very vulnerable to damage, particularly by the younger members of a family. An alternative joystick can be constructed using very fine components, yet being both robust and reliable.

The Vic 20 and CIBBIT offer the choice of two different types of joysticks. For most game programs, a joystick comprising only of five switches is required. Four switches are set out to represent the four cardinal points of the compass, and the fifth switch is of course the fire button.

The second type of joystick has the directional switches replicated by two potentiometers, representing the "X" and "Y" axes. This system allows the computer to digitise each axis into 255 units, and store the values in location registers from where they can be read using the PEEK or LDA commands.

Components for type 1 are—
one standard ID socket with cover;
five push to make switches;
one metre of light 9 core cable;
and one container.

Components for type 2 are—
one standard ID socket with cover;
two linear 10kOhms slide potentiometers;
two 0.1uF, electrolytic capacitors;
one metre of light 9 core cable;
and one container.

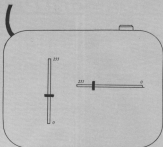
The container size may be dictated by the size of the other components, but remember it needs to feel comfortable in the hand. I used a tobacco tin. If you are unfamiliar with potentiometers, you will need to know a few points. Two main types are available, "log" and "lin". These terms refer to the way the resistance changes as the "wiper" is moved from one end of the potentiometer to the other. Log is best for logarithmic, and lin for linear. Linear pots are required for this project. If a "log" type is used, the result would be that instead of the joystick values changing from 0 to 255 in proportion to the amount the controls are moved, the values would change mainly at one end of the movement.

The number of pins or solder lugs on a slide pot could be 5, 4, 6 or 7. 3 pins are on a standard pot, one for each end of the resistance with the "wiper" between them. 5 pins indicates there are two pots in one case, of which only one is connected. See illustration. 4 or 7 pins means a wiper or each has to be provided, in this example it need not be connected.

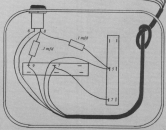
Now for a few helpful construction hints. Mount the controls in the base of the tin, the exact positions being determined by their size and your preference. Wire the components, taking great care to keep all exposed wires as short as possible to prevent any change of electrical shunting.

The small members in the illustration are the wiper's members shown at each connection, so join point 7 to socket 5, and so on.

Finally, check your wiring thoroughly before plugging the joystick into the computer! ■



Type two



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Image and reality

FOR AN American company, Commodore has a curious image problem. In Britain, they have for months enjoyed a purple patch. The 64 is owned here only by the much cheaper Spectrum, Commodore has received, for a foreign company, the rare accolade of a Queen's Award, and now there is the crowning glory, in PR terms, of Commodore choosing Corby for its 1,000 job, £20 million factory to make the Vio 20 and the 64.

But as chairman Irving Gould and new chief executive Marshall Smith enjoyed the pleasant after-glow of hitting the front pages of Britain's national newspapers and making the TV news, they were already working hard at shoring up Commodore's shaky reputation back home.

For in spite of having comfortably 60% of the US micro market, with no signs of consumer demand for the 64 abating, now accounting for half Commodore's sales, and with one of the five remaining rivals Coleco losing 15 million dollars in a single quarter and losing off 1,000 staff, Commodore has found it hard to find favour on Wall Street. Indeed, last October when Commodore lifted last quarter earnings a "mere" 80%, dealers promptly marked the share down five dollars, to 34½ dollars.

And there, give or take a dollar, they have stayed.

The financial community is not grumbling about Commodore's results, mind you. Second quarter earnings, up to last December, were more than doubled at 50.1 million dollars on sales of 631.4 million dollars, against 601.2 million dollars for the whole of the 1982-3 year.

But in recent months, there have been too many tactical one goals which contrast sharply with Commodore's

carefully-crafted British image. The departure of founder Jack Tramiel, if a steady stream, was far too abrupt and prompted reports of a boardroom rift, and a five dollar share tumble.

Although the appointment of a "professional" replacement in Marshall Smith, with a solid if unimpeached record at Thyssen-Bornemisza, has inspired confidence, the reverse could be said of a spate of resignations by top executives.

More worryingly, dealers have been far from happy at Commodore's reliance on mass distribution outlets like K-Mart, and indeed in December, a newly set-up Coordinating Committee for Commodore Dealers arose to dealers asking if they needed legal help.

Although they won't publicly admit it, privately the word from Commodore officials has been that with the six largest "mass merchandising" chains representing 80% of the group's sales, there was no need to worry about small dealers.

But now there's been a change of tack at Commodore. In March, Gould and Smith made a symbolic attempt to woo Wall Street with a mailing to over-100 100 analysts and dealers.

Gould has confessed: "This time, we'll try to do things properly the way they should have been done," said Smith. "We are very conscious that we need two channels of distribution — the mass-merchandising and a strong dealer organization".

Such humility will no doubt help the Commodore image in the US, but is far from disinterested. Although Commodore is likely to launch a cheap 100-dollar 16K micro in Britain, the whole emphasis in the future is on more up-market models, on the 264, and the portable to take on IBM.

Now while it may be all right to push Vio 20s out to the masses via K-Mart, it's not the best way to promote a portable, which is where these dealers out in the cold might just come in useful. Still, it's a step in the right direction.

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ANSWER BACK

Sprite pointers

WE'RE WORKING on 64 programs using relocatable characters and sprite data. Our problem is where to position the data to access it through sprite pointers (POKE 3000,x), without our Basic program overwriting the data.

Joe Moss and Paul Garrett
East Kent

THE 64 MEMORY is divided into 4 banks of 64K each. As any given time only one bank may be used for character and sprite data being accessed.

Your Basic memory requirements preclude use of banks 0 to 2, so you must program the 64 to use bank 3 + 6000 to 6FFF. There is 4K of RAM between 6000 and 6000 which can be used for your character and sprite data. You can also copy areas from 6000 to 6FFF any existing characters that you may require, but remember that the character ROM is only made available by poking it in. You will also need to reserve 1K of the 4K for a screen memory map.

The memory pointers for screen memory and character memory will also need changing. Details of setting up memory pointers are given in the Programmer's Reference Guide, page 100 to 104.

Monitor choice

I REQUIRE a machine code monitor for my 64, and have narrowed my choice down to the Radiopac Monitor and Horizon 64. Could you advise which is more powerful, and hence the better buy? They are both available with CBM printers, but does this include the 1520 printer + platter? Also, how much memory does the 64 lose when using hi-res graphics?

J S Fitzmaurice
Aberdeen
Cambria

I PERSONALLY use a free KMOD public domain monitor from the KCPUG library, which I find adequate for most purposes. I have not used either of the monitors you mention, but I hear that the Radiopac one has a slight edge.

The 1520 printer + platter has a driver monitor of 4, and 4, so should be available if this is altered. Set location 88A (decimal 186) to 4 in your machine code routine.

The hi-res on the 64 is available through bit-mapping of the screen. Each pixel requires a location in memory, and each character is 8 by 8 pixels. Since there are 64 lines of 25 characters the resolution is 528 = 256 + 64000 bits. As right bits to the byte, this means that you will lose up to 50Kbytes when using hi-res mode.

Cable trouble

THE WIRE in the DIN plug cable of my Vic 20 fell off the pins. Not knowing which colour cable led to which pin, I guessed and soldered these back on, but lost the sound on the computer.

Can you tell me which wire should have gone where, and whether a mistake might have led the sound?

Clay Murgely
Oxford

LOOKING into the DIN plug with the green upwards, the leftmost pin is audio (red), the next video high (black), the centre pin ground (green), the next video low (white), and the rightmost pin +5v (yellow). If necessary you can test with a multimeter, since lead colours may vary.

Stack attack

COULD YOU tell me anything about the Stack Light Rifle? I'm very interested in buying one, but would like to know more about it first.

Joe Davis
Hants/Hampstead
Ave

THE STACK LIGHT RIFLE is an extension of the idea of a light gun. It consists of a plastic gun with a 12 foot

cable. In the barrel is a photoconductive cell, which can detect light rays on the screen when the trigger is pressed. Three games are supplied on cassette with the NLE High Noon Shootout, The Charles Twelfth, and Gallery. Andrew Software also manufactures several games for the NLE, which plugs into the joystick port of the 64.

Contact Stack Computer Services, Dorby Road, Borely, Liverpool, phone 059-613-5511.

Disk query

I OWN a 64, and was recently loaned a CompuThink twin disk unit which has been used with a Pet. Is it possible to link this disk drive to the 64? And what disk operating system would be required?

R F Gregory
Caldesdale
TEC Programming for
Pet + CBM, by Martin West,
published by Level Ltd, PO
Box 438, Hampton, London.

Convert Basic

COULD YOU recommend any books which would advise me how to convert Basic programs for other computers to the Basic of the Commodore 64?

R P Lloyd
Southend
Essex

GET THE Programmer's Reference Guide for the 64, and in chapter 3 you will find a list of the commands available on the 64.

Comparing a similar list of keywords for another machine should tell you what the equivalent command is.

You will then have to write a routine to initiate the keywords, of course this program will be long.

Counting in code

I HAVE some queries regarding the use of assemblies and machines code on the 64. It seems to me that the only way I can set

up a loop which counts to more than 255, and which refers to memory locations as well, (e.g. when accessing the 8000 bytes of character memory for hi-res graphics) is to use indirect indirect addressing, for instance STA (a),X.

I don't see how any address can be referred to otherwise if the increment is less than 128. Am I correct? If so, how can I be sure that the next page address I use is free and not being used by the computer? R Scherrie
Chandler's Ford
Hants

TO MOVE large blocks of memory you cannot use a single index register, eight bits are not enough to store a number greater than 255. Since you need sixteen bits, the pointers to the memory to be moved must be stored in the memory. An example of an assembler source program to do this follows.

```
LEA d, Source low
STA d,Origin, store address of
data to be moved
LEA d, Source hi
STA d,Origin + 1
LEA d, To low
STA d,Origin, store
destination address of data
LEA d, To hi
LEA d, Blocks, how many
blocks
LDV d, 0; size
Loop 1;
LEA d,Origin,0; read byte
STA d,Newdest,0; transfer
byte
DEC d; update counter
BNE Loop 1; when Y back to
0 (i.e., after 256 bytes
transferred)
Loop 2; INC d,Origin + 1;
another block of source
INC Newdest + 1; another
block of destination
BNE; counter
BHI Exit; check for last
block
BNE; Loop 1; Y is 0
LEA d, remainder; for part
block at end to be moved
BNE; Loop 1; if more than
one
Exit BNE
```

If you need help with a technical query or problem write to:
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WC2R 2JG

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Win a British Micro Grafpad

Fony Roberts sets the problem



EVERYONE at the Bell Busk Micro Club had stopped playing with their individual micros to gather round Augustus, who was about to crack all records playing the club's own version of the popular micro game, Breakout.

In this version, the ball (on the screen display) can be "shot" in any direction, simply by specifying the block (there are all numbered) at which it should be aimed. As it hits a block, it always bounces off at an angle of 45 degrees from the surface, the block disappears, and a sound is made. If the ball hits the sides or top of the screen, the same thing happens — but the ball itself disappears if it touches the bottom of the screen. Augustus has managed to destroy all the blocks except those shown here with his first nine shots — with his last shot, he can destroy the rest, but which block should he aim at?

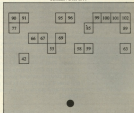
Simply give the number of the correct block, and complete the tie-breaker sentence in an apt, original and amusing manner in 15 words or less. This month's prize is the Grafpad from British Micro. The Grafpad enables you to produce graphic designs using the full capabilities of your 64, with the help of a stylus and a memo section. On the tie-breaker sentence is "I want to own a British Micro Grafpad because . . ."

The winners of our April competition are G. Benton of Kettering and David Wallis 3-D Silicon Fish from The Software.

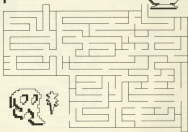
from Romford. They'll each receive an Adman Electronics Speech Synthesiser, together with a bonus package of two talking games: Twin Kingdoms Valley from Bug-Byte, and 3-D Silicon Fish from The Software.

Send your answers to Competition Corner, Commodore Magazine, 12-13 Little Newport Street, London WC2E 9LD — to arrive no later than the last working day in the month on the cover of this issue. The name of the winner, 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.

SCREEN DISPLAY



Melbourne House presents Horace



HORACE is a lovable little rogue who first appeared in a park on the Spectrum, picking the flowers and eating the keepers' lunches. Now Melbourne House is giving 20 of our readers a chance to win a copy of the Commodore del version of either Hungry

Horace or the follow-up Horace goes Skiing.

Just mark in Horace's path through the maze to the food and send the completed entry to us with your name and address attached. As a tie-breaker, complete the following sentence in less than 15

words: "I want to own a copy of Hungry Horace/ Horace goes Skiing (delete) an appropriate because . . ."

Your entries must arrive by the last working day in June and the winners will be announced in our August issue.

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