COMMODORE

200-PAGE ISSUE!

JANUARY 1987

COMPUTING INTERNATIONAL

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Pocket Planner 128 or 64 Computerized Spreadsheet

Make fast work of budgeting and forecasting

Pocket Planner 128 or 64 software lets you make fast work of all your bookkeeping chores. Cheque books, household accounts, business forecasting and bookkeeping are just some of the jobs that Pocket Planner 128 or 64 packages make easier. You can even create four different kinds of graphs.

Accurate, sophisticated and easy to use. Pocket Planner 128 or 64 offers standard spreadsheet features plus . . .

- accuracy up to 16 digits, about twice as many as most spreadsheets for the Commodore 128 or 64
- sideways printing available on dot matrix printers, for oversized spreadsheets that won't fit on standard paper
- **on-screen help** at all levels
- compatible with VisiCalc[TM] files
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Pocket Filer 128 or 64 packages are fast, sophisticated and truly easy to use. In addition to standard database features they offer . . .

- use up to 255 fields per record (2,000 characters per record)
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- print **labels** in multiple columns
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- optional password protection including **limited access viewing** or **updating**
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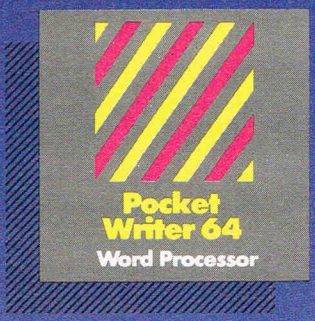
- print from any record to any record
- arithmetic and trigonometric functions in **reports** using up to 16 digit accuracy

Solutions!



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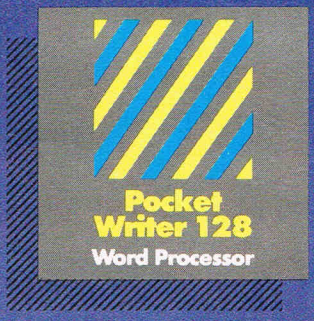
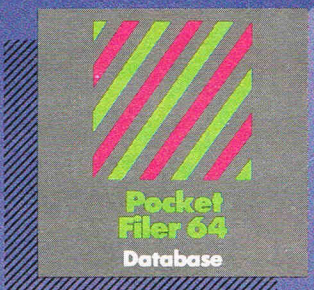
also available





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You want the very best software you can find for your Commodore 128 or 64, right?

You want integrated software — word processing, database and spreadsheet applications — at a sensible price. But, you also want top-of-the-line features. Well, our Pocket 128/64 software goes one better.

With Pocket 128 or 64, you'll find all the features you can imagine . . . and then some. And Pocket 128/64 is so easy to use, you won't even need the reference guide. On-screen and in memory instructions will have you up and running in less than 30 minutes, even if you've never used a computer before.

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Canada L4B 1B9
Telephone: (416) 731-8775
FAX: (416) 731-8915
Telex: 06-964501

Pocket Writer 128 and 64 are available in French — full AZERTY keyboard support.

200 pages of definitely the best value Commodore magazine in the Universe!

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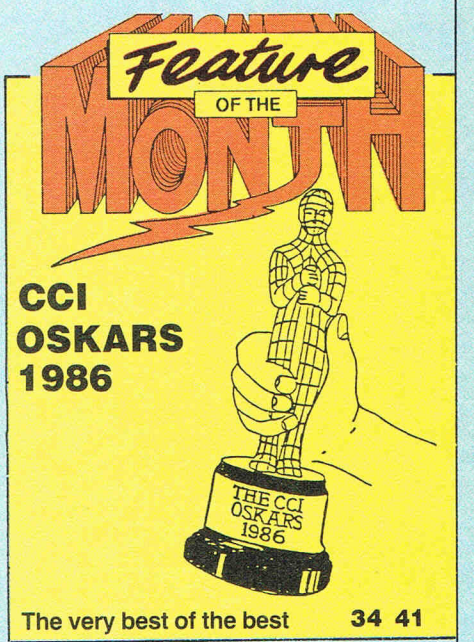
JANUARY 1987



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Books special . . . Activision, the world's No. 1 . . . Amazing T Shirt jamboree! . . .

64 Special feature 32 pages of products

32 pages of hints, tips and programs and much, much more . . . Start queueing now or place your order for the best value Commodore magazine!

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CCI View

Dear Reader,

This is for CCI the end of year issue. It brings us to the topical consideration of the best of 1986 right across the whole range of products for any Commodore owner.

It is generally acknowledged that CCI's Oskars carry substantial prestige and the attention we give the selection is as thorough and exhaustive as such awards deserve.

This issue will be read through the end of year when many people will have more time and some people will become owners of new Commodore computers. So we have increased the size of the magazine to cover as many aspects as possible and, for the first time in its history, the total magazine has reached 200 pages.

This number includes our Commodore Business and AMIGA User, the only magazine outside the US, covering this increasingly important area of the Commodore world. The increasing sales of AMIGAs have played a leading part in Commodore's accelerating financial recovery. CBM has just announced profits of $3.7 million —a very much better performance than last year's $100 million loss.

The big fall in the AMIGA's price has them flying off the shelves' according to dealers and there are lots of new and exciting AMIGA packages appearing — especially on the home/leisure side.

We have tried to pack in as much as we can in this 200 page CCI. But even this has not been enough space for everything we would like to include. We have increased the number of pages of 'Hints and Tips' and programs, a request that is increasingly made to me. Next issue we plan to include 32 pages of this coverage and continue to increase this section, which should give the 'Key-in' enthusiasts plenty to enjoy.

We have also got lots of news, games and product reviews and much more — even that gruesome Felix (many of you seem to like him, I can't think why!) has got some extra space! Oh well, I suppose that even editors at this time of year have to be a little less tyrannical...

We hope you like this CCI — with 200 pages for £1.00 we modestly think it's got to be the best value Commodore magazine of the year. Anyone want to give us an Oskar?

Yours sincerely,

Antony H. Jacobson
Publisher

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...news ...news ...news ...news

Judge Dredd

The already notorious game character Judge Dredd is stepping onto the computer scene.

Your job as a Judge is to track down unsolved crimes, from giant apartment blocks where the innocent millions of Mega City 1 live, to the chaotic deadly Undercity where the ruins of the 20th Century still stand.

As well as the aggressive, well-armed criminals you are chasing, your efforts will be blocked by: Robodogs — ancient guard machines escaped from their storage bunkers, Sattelats — tiny robotic spies left over from the apocalypse war and the rats and brutal subhuman undercity dwellers who infest the lower regions of the city (and read other Commodore magazines!).

Even the city itself seems to turn against you, as pavements collapse under your feet. The only thing you can rely on is your Judge's training and your trusty Lawgiver pistol with its limited supply of ricochet, high explosive, armour-piercing and heat seeking bullets.

Time is runing out. Be decisive, be strong and don't shoot too many innocent bystanders. YOU ARE THE LAW!

Judge Dredd on 64/128 cassette £9.95, disc £14.95.

Infogrammes Info

Hot on the heels of the launches of L'Affaire Vera Cruz and The Inheritance, Infogrammes has announced its next titles to be released.

The first product, BRIDGE for the CBM 64/128. It is NOT a beginners game, but caters for the experienced Bridge player. It incorporates the seven conventions currently recognised by most players, as well as 99,999 pre-programmed deals. Also included are a scorecard, a cheat screen, replay deal function and a facility to deal specific cards to certain players. BRIDGE is designed to be one of the most sophisticated of its type on the market.

Secondly comes ONE, a graphic arcade adventure. ONE takes place in a 'Babysitting Arena', where Alfred is sent to look after little Valentin. However, this turns out to be no easy assignment and as Alfred chases the little lad around the very large house, things keep falling as if by magic, almost on the head of Alfred. And where has Valentin gone to?

Later comes MURDERS ON THE ATLANTIC. Second in the Crime Series, MURDERS ON THE ATLANTIC takes place just before the outbreak of the Second World War and follows a similar pattern to Vera Cruz, only without the technology.

LASER AGE ELECTRONICS

Inter-office laser communications have arrived. Modular Technology has launched the 'Interlaser Free Space Communications System' This connects electronic equipment in separate buildings without the need for cables or wiring. The link is made through a modulated laser beam that can work at a range of up to 1 kilometre.

Con Driscoll, M.D. of Modular Technology, said that the system is particularly suitable for connecting multiuser systems and local area networks.

Modular is currently offering two systems, the Inter-Laser at £5,000 and the Ledhead, an infra-red system with a range of up to 200 metres, for £2,500. Both systems will transmit computer data, video and audio signals at up to 2.5Mbits.

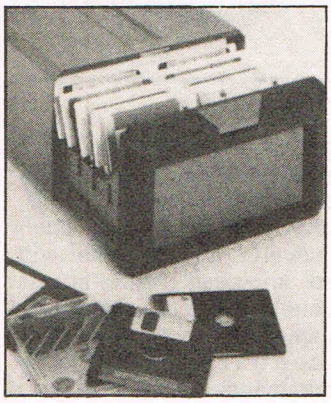
CD Post Office

Companies can shortly buy a CD Rom disk with all 23.5 million private and business addresses in the UK.

The Postcode unit of the Post Office has compressed all the addresses onto a single disk which can extract any address within two seconds. It will use the systems — comprising IBM PCs and Hitachi CD Rom drives — for answering customer enquiries. It is also planning to sell the CD Rom address file for £2,500, though possibly without the private addresses. The disk comes complete with data retrieval software from Silver-platter Information.

Correction

The telephone number of Culton Sales and Services Ltd was incorrectly printed in our December issue. The number should be 0306 885138



Storage Box

Josty UK has launched a new Posso style of media boxes of various types of media.

There are nine models ranging from 3½ inch and 5¼ inch computer disk boxes through to video cassette and compact disc boxes.

The disk boxes, with optional locking facilities, have the capacity for up to 70 and 150 disks (depending on size) and retails at £11.95. All modules can be stacked together, irrespective of their size.

CBM's Connoisseurs

Commodore UK is finding an enthusiastic welcome to its Christmas 1987 Compendum 'Connoissuers's Collection'. The collection which is based around the new 64C also contains a 1530 cassette recorder, mouse and painting software and seven software packages, including a typing tutor and Monopoly, Scrabble and chess. Said Chris Kaday Commodore's MD, "the contents this year include a £50 mouse and the kinds of games people would go out and buy on their own. We believe that this idea will meet with even greater success than our music systems and 1985 compendium".

The 'Connoisseur's Collection' certainly seems lively to bring a great many people into the Commodore fold as it provides a carefully chosen and really packaged selection of entertaining and useful products.

Musical Knucklebusters

Melbourne House is coming out fighting with *Knucklebusters* — a game of swift, slick, streetfighting action, set to some throbbing music.

This orchestrated violence is the result of combining the new Compunet programming star Martin 'Mat' Sneape, with the micro music skills of the renowned Rob Hubbard. Melbourne's editorial manager Rachel Davies is knocked out by the finished game: "The music is just incredible — over 17 minutes of brilliantly atmospheric composition and sound effects before it repeats. Definitely Rob's best to date. And as for the action, it's very, very fast — and very, very difficult."

KNUCKLEBUSTERS is set in the claustrophobic, cybernetic, nightmare of the near future, where condemned criminals are stripped of their anti-social tendencies and transformed into androids — chemically altered, semi-synthetic slaves (and forced to read certain lollipop magazines?)

One convict rebels, and seizing the opportunity to escape, breaks into the Cencom system and programs the computer to self-destruct at a specific time, taking the entire city sky-high with it. Then the fugitive starts his headlong flight through the guarded cell blocks, over the prison wall, and out into the slum jungle of the doomed city.

KNUCKLEBUSTERS will be busting in 64 in early December for £9.95.

Students go hi-tech

Students at Salford University have started on the first information technology degree course.

Sponsored by government and industry, the course has been designed in co-operation with companies such as Barclays Bank, British Aerospace, Marconi and IBM to help meet the information technology skills shortage.

Prodigious Pets

Earlier this year Supersoft bought a large batch of PET computers, disk drives, and printers that had been sold off by Commodore following the closure of the Corby factory. Now, after a higher than expected demand from customers, Supersoft are looking for further supplies of some models!

Demand for the latest 8296 computers and 8250 disk drives has been particularly high, and negotiations are in hand which may lead to the availability of several hundred brand new machines to help satisfy the demand. It is expected that these machines will start coming through in the next couple of months, and Supersoft would be happy to hear urgently from existing Commodore users who want to expand their installations.

Supersoft director Peter Calver commented "We know that several important companies with systems based on Commodore hardware have been trying to obtain machines for some time. We will do our best to ensure that anyone who wants to buy a Commodore computer or disk drive can do so."

Supersoft will continue to supply reconditioned 4000 and 8000 series computers and disk drives at a fraction of the original cost. Many long-time users are now making full use of their PET computers for the first time having added a disk drive or printer to the system, and there has been a noticeable increase in demand for word processing packages.

Contact: Supersoft, Winchester House, Canning Rd, Harrow Middx Ha3 7SJ.

Psion's £1 million a month

Retail sales topping £1 million per month are claimed for the Psion Organiser II family of powerful, hand-held computers and peripherals launched by the UK software company last April.

Psion's highly versatile pocket-sized (225g) computer, is priced from £99.50.

"Demand for the product far exceeds our most optimistic expectations at launch," reports Dr David Potter, founder and chairman of Psion. "In six months, we've become the biggest producer of hand-held computers by volume world-wide, and we're only just beginning to tap a market worth $500 million today, with staggering growth potential."

Psion has produced a range of hand-held computers which straddle two widely divergent markets. Psion Organiser II has consumer style features, such as built-in diary, calendar, multiple alarms, advanced programmable calculator, and very large cross-referenced information store. However, it can also be easily programmed to carry out sophisticated business and industrial applications requiring both power and mobility.

Psion Organiser II is designed to function as a remote data communications tool, and a quarter of all models purchased are sold with the optional RS-232 link with built-in software. Other peripherals available for the £139.50 model XP include bar code and magnetic stripe readers. Sales assistants at Marks & Spencers can be seen waving them around.

"There's no-one in the international marketplace currently who can compete with us," claims Dr Potter. "The few existing examples from the States or Japan either cost thousands of dollars for the same level of application utility, or they are purely consumer machines with very limited capabilities."

Dr Potter said that Psion was committed to developing a wide base of value added dealers, systems houses and other third party support, to help build an unassailable position in the international corporate market. The Organiser's fast and powerful built-in programming language — OPL ("opal") — is already contributing to a rapidly-growing software base.

Independent retailers play a central role in the company's distribution strategy, and Psion is very pleased with the volume of sales through this sector. An advertising campaign to be launched later in the year will provide further support for independent outlets.

Due to prior distribution commitments, Psion Organiser II will only be available through a limited number of Dixons outlets during 1986. Wildings, after completing its trials, has tripled recent orders to stock all of its stores.

Further information: Louise Blakeborough or Fiona Barber at Kinnear, 28/29 Dover Street, London W1X 3PA. Tel: 01-499 8650.

Steinberg Pros

Steinberg Research have commenced distribution operations from a new facility in Oxfordshire. Part of the support will be an 'around-the-clock' electronic bulletin board service for users to pass-on advice, post queries and generally communicate with Steinberg and users of its products.

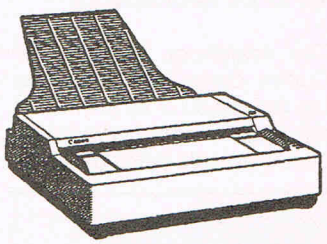
For the Commodore, Steinberg have re-packaged two hardware versions both of which will now include sync-to-tape and graphic editing. The Pro-16 Plus will include a scorewriting program and will retail at £299 inc. vat, the Pro-16s will be £239.

Contact: Steinberg Research, The Spendlove Centre, Charlbury, Oxford. OX7 3PQ Tel: (0608) 811325.

IMAGEMASTER

Imagemaster

If you are lucky, Imogen will be calling on you shortly. Imogen, so Wordcraft International tells us is 'your local Dealer Sales Executive' and she is going to introduce us to their range of new products, especially Imagemaster, a program for integrating W/P text with graphic images. Imogen's picture was digitised by the new Canon IX-12 Scanner, cropped, sized and positioned on screen prior to printing. The line drawing of the scanner was digitised by the scanner (it is a clever little beast, isn't it?). The word IMAGEMASTER was grabbed from the title screen of the Imagemaster program. Now that's what we call computerised DIY.



M.H. Say KWAH!

FASTER than the FALCON, HARDER than the HARRIER, GREATER than the GOLDEN EAGLE, superhuman righter-of-wrongs REDHAWK flies to the rescue once more in *KWAH!*, another thrill-packed, so they tell us, comic strip adventure from Melbourne House.

The feathered felon-catcher first made his entrance onto the software schene earlier this year in *REDHAWK*, an adventure game which broke new ground with its scrolling cartoon format, illustrating the action in a flow of comic-book pictures. Now programmers Simon Price and Mike Lewis have improved upon an-already successful formula in a sequel, *KWAH!*

They've enhanced the graphics. More detail, more sophistication. There are some additional on-screen icons, too, including a direction indicator, a score meter and an improved sound-effects panel. There is a program parser that recognises all standard adventure commands and a facility to speed up the game for the more impetuous and quick thinking games players.

And finally, they've come up with a devious and intricate plot, involving a greater degree of character interaction.

KWAH! follows mild-mannered Kevin Oliver in his continuing search for the past he no longer remembers, a past which holds the secret to the extraordinary power which transforms him from a bespectacled nobody into the hyper-heroic Redhawk.

KWAH!, Redhawk's return for the 64, priced £8.95.

THE FIRST SERIOUS SOFTWARE AT UNDER £60

Now from Timeworks comes a range of advanced disk-based software that gives you real power and real performance. A range that maximises the capabilities of your Commodore 128. And all at a quite remarkable price.

Timeworks is one of the leading software publishers in America, where all four of these programs have already enjoyed enormous success with home and business users alike. The versions available here have been specially re-written for the U.K.

Each program is exceedingly easy to use, both individually or when interfacing with each other.

With Timeworks you don't just get better software, you get a better back-up service too.

First of all, there's our Customer Technical Support Helpline. Should you have any problems at all just ring us on Maidenhead (0628) 74678.

Secondly, all four programs carry our no-quibble Money Back Guarantee. If, for any reason, you're not happy with your Timeworks program, just send us your Timeworks package together with your receipt within 30 days and we'll send you a full refund.

Thirdly, if at any time we update a program, you may exchange your original program for it, paying only the difference in price (if any) plus £7 to cover packing and delivery.

WORD WRITER £57.50
with Spell Checker

- A super-efficient, 80-column professional word-processing system which includes an 85,000 word Spelling Checker and also a built-in, 5-function calculator.
- Contains all the features you'll need for everyday word-processing, plus most of the sophisticated features found in more expensive programs: on-screen highlighting; superscript and subscript; headers and footers; document chaining; form letter printout; page separations; horizontal and vertical scrolling; and more.

DATA MANAGER £57.50
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From Alpha and Omega

Alpha-Omega, who have recently lost their chief Paul Godden-Wood, have brought out two new C64 titles: Orpheus in the Underworld and Robobolt at the cheapo price of £1.99

Orpheus in the Underworld is written by the author of the popular title Hercules. As Orpheus, your task is to collect a number of treasures within a given time limit in the dark and dangerous Underworld. Robobolt is an arcade game in which you control a robot in a maze and try to guide him out of it. Hindering you are two nasties who, although they will not kill you, can sap your energy.

Follow Drones into Zone

Ariolasoft's Reaktor label is releasing an interesting sounding arcade game: Zarjaz programmed by Darrell Etherington. At a distant future date a Zone of space is discovered which is not obeying the normal laws of the universe (oh yeah? Tell that to Einstein). The entrance to this Zone leads out of our universe and into a cone shaped area of Crazy Space. What lies at the heart of this Zone, at the apex of the cone?

You are despatched from Marsport University to investigate. You have a large, comfortably equipped vessel and three Drones which you can control from your vessel.

When you arrive at the Zone, you discover that you will have to keep within sight of your Drones if you wish to use them, so you are faced with no alternative but to follow your Drones into the Zone.

Race through space in a fast action shoot 'em up! Blast away the baddies to music from W.E. M.U.S.I.C. and a special 3D star effect.

9 Plus 4 Equals...

Adventure wizards, Level 9, have signed a contract with satirical authors, Delta 4, for a spoof adventure to be published next Easter.

This is the first joint project between them. Both firms are famous for humourous adventures. Delta 4 writes lampoons like "Bored Of The Rings"; Level 9's range of more traditional adventures are full of puns and witty responses.

The title and subject of the parody is being kept secret of present, but Mike Austin, partner at Level 9 said, "The storyline is wondrously funny. It'll be the best spoof adventure ever."

Level 9 — Margaret Austin (0734-595759)
Delta 4 — Fergus McNeill (04893-5800)

QUESTLINE FOR ADVENTURES

A new Adventure Club called 'Questline' has been started by Tony Treadwell and Jean Thorne. The main aim of the club is to help fellow Adventurers either by hints on games or reviews — good and bad — anything they want to know.

Members can either: pay £6 per year and receive 12 newsletters monthly and 6 chronicles bi-monthly, or send an S.A.E. for newsletters and 50p for the chronicles whenever they want to.

In both cases members will receive help on their adventures. Between them Tony and Jean have finished about 50 adventures and have contacts, to other members, for a further 250 games completed. They aim to help, one way or another, when people are stuck in an adventure before they go completely mad...

Konami have appointed N.M.C. Ltd to handle project and sales management to ensure a unified approach to increasing Konami's market presence. Sales Director of NMC Ltd, Mike Daniels, will be spearheading Konami's new policy in the UK and Europe. N.M.C. and Konami have identified a range of computers not currently covered by Konami titles, and these include the C16. Konami was previously represented in Europe by Ocean — "Our move to consolidate was in fact because Ocean did such a good marketing job. Relations are good between us".

The next major arcade games for conversion will be SALAMANDER, (which has already broken coin-op records around Europe, and which Konami anticipate will become their early 1987 Mega game), and JACKAL.

Cheapest Package

Applied Micros Solutions have launched a PC accounts package for just £10 plus VAT. AMFACS is claimed to be an integrated sales, purchase and nominal ledger package with full instructions on disk. It can also be upgraded to a twin-disk version. It runs on PC's with 128K Ram, a single 360K disk drive and 80 col. printer.

Don't however, try to call Applied Micros about the product (or CCI if it comes to that!). Applied Micros makes the package so cheap that it can't afford to spend time talking to anybody about it. Ask your local dealer and see what he says!

New A Pak

You may be seeing a new computer game pack box or even find it with audio cassettes. Andrew Prewett and Peter Pendrill have patented a square plastic box. Nothing spectacular you may at first think, but consider these many plus points.

The 'A-PAK 109' as it is called, accepts a standard audio tape in the conventional hinged lid box. However, when you lift the large square lid, to extract the cassette from the A-PAK you discover an extra long thin 'pocket' or 'well' to the right, large enough to accept mini catalogues, sale information, game plans etc; or even large stitched or folded sheets.

It can also accommodate badges, stickers and many custom made promotional items.

This simple and effective product is thought to have potential in the computer software market and since it is the same depth as a standard audio cassette box.

Contact: Andrew Prewett, Axis Productions Ltd. 01-833 4722.

Who will be the first to use this interesting A-PAK?

PLAY ME!

101 Musical Things to do with Your Commodore — or How to Annoy Your Neighbours in Two Easy Lessons. **Ian Waugh takes a look at the whole music scene — hardware and software in our new series.**

Computers are generally silent little beasties and sit there humming quietly away to themselves — apart from the odd beep or raspberry which they delight in erupting whenever you hit a key they don't particularly like. Of course, the Commodore 64 and 128 aren't at all backward in coming forward in the music stakes and SID can not only beep, blow raspberries and make amazing music but also talk, too. I know quite a few musicians who can't do all of that.

It's only natural then, that lots of companies should produce music software and hardware to take advantage not only of SID, but also of the Commodore's computing abilities and the past few years have seen an enormous number of musical bits and pieces which attempt to do just that; not least is the number of MIDI programs now coming available. So many in fact that they deserve an article on their own. And that's just what they'll get in a couple of months times at the end of our MIDI series so keep buying the mag and keep reading it. (Do you imagine they just buy it for show? Ed)

This two-part series looks at non-MIDI products but don't be surprised if some of the programs mentioned here are MIDI-compatible, too. Most will be fairly recent developments although we may go back to '85 for a few worthwhile products.

Let's start with Music Sales who sell lot of music add-ons for the Commodore and begin with their Music Keyboard Overlay (£9.99). Unless you've been helping Santa Claus pack his sleigh and kept your head in the snow you will surely have seen, read about or own one of these. It's a little plastic keyboard which clips over the top of the Commodore's keys. As you hit the black and white notes, the keyboard presses the equivalent QWERTY keys. It's a lot easier than trying to work out which key represents F#. Ingenious!

Both the Music Maker II (64- £19.99) and Music Maker (128- £24.99) include a clip-on keyboard. The 64 version provides 10 preset sounds and you can record tunes using the SFX Easi-Play sequencer and play them back with or without rhythm backing. The 128 version has 10 presets too, and it also includes five Playalong tunes, five rhythms and brass patterns. The memory can store up to 4000 notes which should be more than enough for even the 12 inch version of most songs! The program uses fashionable pull-down menus and operation is very easy. This is one program where the extra facilities of the 128 are put to good use. Both versions let you create your own sounds, too.

There are three Playalong albums available at £9.99 each. These include a music book and hints and tips on playing. Popular Classics includes Caprice, Capriccio Italian and Tchaikovsky's Piano Concerto No. 1 in B flat minor (not all of it, you understand). The Beatles album includes A Hard Day's Night, And I Love Her and Can't Buy Me Love. The Pop Hits album contains All Right Now, Bright Eyes, The Candy Man, The Entertainer and lots more. Something for most musical tastes here.

All Music Maker software and Playalong albums are available on cassette or disc.

Music Sales' Sound Studio (£14.99) is billed as a Professional Synthesiser and Recording Studio. While you don't exactly get Abbey Road (what do you want for fifteen quid?) you do get a pretty good introduction to both the SID chip and the recording process. There are two parts to the package: the Synthesiser and the Editor. We'll take the Synthesiser first.

The manual includes a brief description of sound, pitch, timbre and volume. Ring modulation and synchronisation are mentioned in relation to SID along with vibrato, portamento and the filter.

To illustrate various functions on your own computer, demonstrations are heralded by an ACTION heading in the manual and drawings of parameters help make the whole package easy to understand.

A nice touch is the inclusion of effects such as portamento (sliding from one pitch to another) and filter sweeping (to produce wash and wooshing sounds). These can't be achieved with a single POKE but the program lets you asisgn such attributes to notes and takes care of the details for you.

You can play tunes using the Music Maker Keyboard overlay or, if you have a MIDI interface, you can use a MIDI keyboard. If you have the Sound Expander and its full size keyboard (coming up in a couple of paragraphs), you can even use that. The program includes 60 preset sounds to get you going.

The second part of the Sound Studio is the Editor. This is a piece of sequencing software which lets you record music on three tracks with a different sound on each. If you are using a MIDI interface you can record on six tracks but then you need some MIDI synths to play back the extra channels. Casio's CZ101 and CZ1000 synths can' play back four parts at once and are generally handy instruments to have around in a MIDI studio.

The program has limitations and cannot compare to dedicated MIDI sequencing programs but then you don't really need to know anything about MIDI to be able to use it. Music can be entered in real- or step-time and edited fairly simply in step-time, again a big bonus for none-MIDI personnel.

Moving up-market a little to the Sound Expander (£99.99) we find our-

selves in the world of FM synthesis. FM (Frequency Modulation — now aren't you glad you know what it means?) was pioneered by Yamaha in their famous — and infamous — range of DX synths. It can create the most amazing acoustic sounds with far greater accuracy than any previous method of synthesis. SID is not used.

You can play the Expander from the QWERTY keys, with the Music Maker Keyboard overlay or with the optional full size 5-octave keyboard (£79.99). No more mini-keys, thank goodness. You can play eight notes at once and the program contains 12 preset sounds (with another 12 on the disc version) including a vibraphone, strings and brass. There is an ensemble option which improves the string and brass sounds considerably.

FM sounds are not the easiest to create or edit and the Expander kindly but frustratingly relieves you of the chance to do so because you can't alter any of them. It's really a shame because FM is capable of so much more than the simple presets supplied. However, a Voice Editor should be in the shops by the time you read this which will put all to rights. Then the system will really be something.

As it stands, it still has lots of facilities such as one finger chords, a memory function and a keyboard split which lets you assign different sounds to the upper and lower sections of the keyboard. The Riff Machine plays (surprise, surprise!) riffs. These are quite complex arrangements of drums, bass and lead rhythms and each riff has 12 different patterns. An FM Composer package under preparation will let you arrange your own riffs. You can pre-program the patterns to play in sequence but unfortunately you can't play along with them.

Finally, there is the rhythm section consisting of 12 preset rhythms. Again, all very good but with no scope for alteration. However, in conjunction with the keyboard split facility, chords held on the lower half of the keyboard will play an accompaniment pattern and you can play a melody on the upper half. Bags of fun for everyone.

The Sound Expander produces quite wonderful sounds but I'd really recommend you budget for the editor packages, too, as you'll need them to get the most out of FM.

To complete Music Sales' offerings, at least as of writing, there is their Sound Sampler (£69.99). Samplers shot to notoriety with Paul Hardcastle's N-N-N-Nineteen and are now an integral part of modern music. Professional samplers are usually in the megabuck bracket but the last 12 months has seen the release of quite a few at pocket-money levels and we'll look at some more next month.

This package includes the hardware which plugs into the user port, software and a mircophone. It gives you 1.4 second sampling time at 20 kHz which is pretty good. You get a graphic display of what you've recorded and you can edit the sample. You can play the sounds back at different pitches, reverse them and there's a looping facility, too. You can store four short samples simultaneously and play them back using a rather mean and meagre 16-note sequencer. You can also feed the sound through your TV set although the results are obviously better if you use a hi-fi.

Special features include an echo effect with variable delay and a harmoniser which can make you sound like a Dalek in a dustbin or Terry Wogan singing underwater (now there's a thought!).

The package is, of course, MIDI compatible and you can use it with the keyboard overlay, too.

If you want to learn the guitar (look at Status Quo. If you think how much money you can make if you know only three chords... Imagine how much you could make if you knew four!) and require some assistance, look no further than Guitar Studios One, Two and Three (£9.95 each on cassette and £11.95 on disc) from Micro Melody.

Studio One starts at the very beginning (which is a very good place to start) and teaches notes, chords and rhythms. The computer can play along with you and some exercises are arranged as duets so you play one line while the computer plays another. Guaranteed to take the boredom out of practicing. Brill!

Although Studio One introduces chords, Studio Two really goes to town with them. The Chord Dictionary lists 360 chords in 570 positions. The computer plays each note in the chord so you can check you've got it right. You can save five chords to memory for use in the Chord Practice screen which shows the chords and the fingering.

In the Chord Sequence section you enter chord sequences using a simple MCL (Music Composition Language) which uses numbers to represent chord names, types and durations. Although only one part of the program, it's amazingly fascinating but I think the use of proper chord names instead of numbers would have been preferable.

Fretboard Tune lets you enter a tune into the computer with an on-screen fretboard. The notes are entered first then you tap out the rhythm on a function key. Manuscript Tune lets you do the same thing on a stave in proper notation and Playback brings your chord sequence and melody together. There are six time signatures and slow or fast arpeggio accompaniments.

Guitar Studio Three contains music theory for guitarists and it's so new I haven't seen a copy yet but if it's up to the standard of the other two Studios it will be well worth having. They use the computer as a proper learning aid, not just as a computerised text book.

Back with SID, we just cannot ignore The Music System from Rainbird. There are two versions of this excellent program: The Music System (£17.95) and The Advanced Music System (£39.95). The AMS contains six modules of which the Editor will probably be the most used, for here you enter and arrange music on a stave. Only one voice is shown on screen at a time but you can flick from channel to channel at the press of a key.

The Keyboard module turns the QWERTY keys into a multi-track recorder while the Synthesiser module lets you program SID. It has lots of excellent graphic displays to help you understand ADSR envelopes and filters. There are also two non-SID envelopes which can be used to modulate the pulse width and filter frequency of the voices. One of SID's voices would normally be used to do this but the AMS keeps all three free.

The Linker lets you chain together long music files and the Printer prints out your compositions including lyrics. The MIDI module lets you link the system to a MIDI synthesiser although a MIDI interface is not included. This is a six-track real-time sequencer and music files can be converted into MIDI files and vice versa but obviously you end up with a three note arrangement for SID. It doesn't compare to a dedicated MIDI program but it's an interesting extra.

The program is icon driven and, for all its apparent complexity, quite easy to use. The manual has lots of diagrams and a good index and the disc contains music files on both sides — you flip it over.

The AMS is only available on disc and the (not Advanced) Music System containing only the Editor, Keyboard and Synthesiser modules is available on disc and cassette.

Finally, but by no means least, is the Colleen Compendium. It comes on a double-sided flip-over disc and contains eight programs. Side one houses a Music Tutor, a SID Chip Tutor and a Guitar Tutor. They are all quite excellent, good introductions, and far more fun than learning from a book but a book can explain ideas in more detail and there is just not enough room for the programs to tell you everything about their subjects.

Side two contains Playalong, Drum Machine and The Creator. Playalong plays a simple accompaniment pattern, rather like the auto features common on

portable keyboards. There are four styles: Boogie, Country, Disco and Waltz, all very good but allowing no user interaction.

The Drum Machine lets you create up to 40 bars of rhythm with bass, snare and hihat sounds which you can arrange into a complete song pattern. The sounds could be better but it's a fun program.

The Creator is the *piece de resistance*. You create music using SID's features and the program compresses it and saves it as a machine code file which can be loaded and run, interrupt driven, from your own programs.

Notes are selected from a 6-octave keyboard along the top of the screen. Available waveforms include triangle, sawtooth, pulse, noise, ring modulated and synced waves. The parameters for each note can be different — apart from global attributers such as filter settings.

Upon completion, the compression routine fits each note into only two bytes. A change of envelope uses four so the process is quite efficient.

A Combiner program will store up to three tunes in memory at once and a Sound Effects program lets you produce sound effects without tears.

All music is interrupt driven and you can use the sound effect even while Creator music is playing with the temporary loss of voice three.

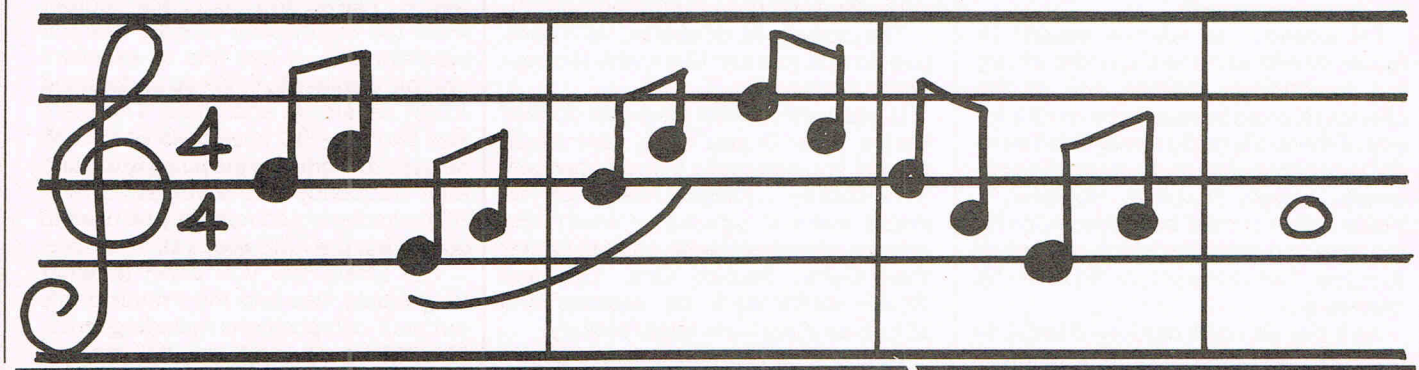
Colleen ask no fees so I suppose you are free to use this even in commercial software. This will give musicians — as opposed to programmers — the chance to produce superior soundtracks for games and I can see this as a very welcome utility in software houses. (If you're still not sure how to use it, get in touch and I'll write a soundtrack for you.)

The whole Compendium costs £29.95 but the Creator is available separately for £19.95. And worth every penny!

Next month, part two continues with more software, drum machines and samplers. Play Me!

I.W.

Music Sales Limited, 78 Newman Street, London, W1P 3LA. Tel: 01-636 7777.
Micro Melody, St. Michael's Chambers, Spurriergate, York. Tel: 0904 647588.
Rainbird Software, Wellington House, Upper St. Martin's Lane, London, WC2H 9DL. Tel: 01-240 8838.
Colleen Limited, Colleen House, 18 Bishop Street, Penygraig, Tonypandy, Mid Glamorgan, CF40 1PQ: Tel: 0443 435709/434846.



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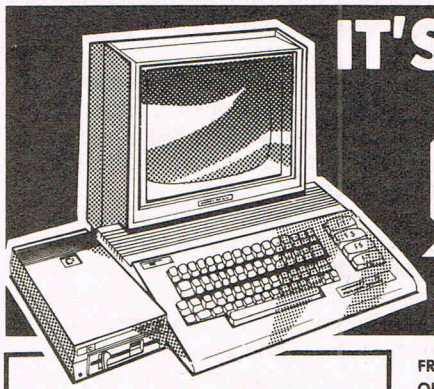

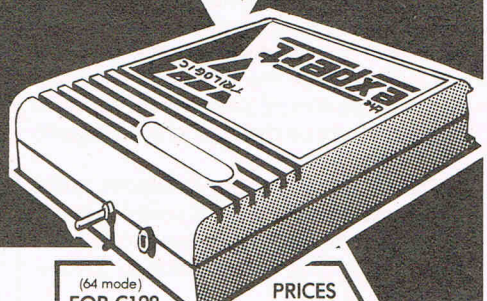

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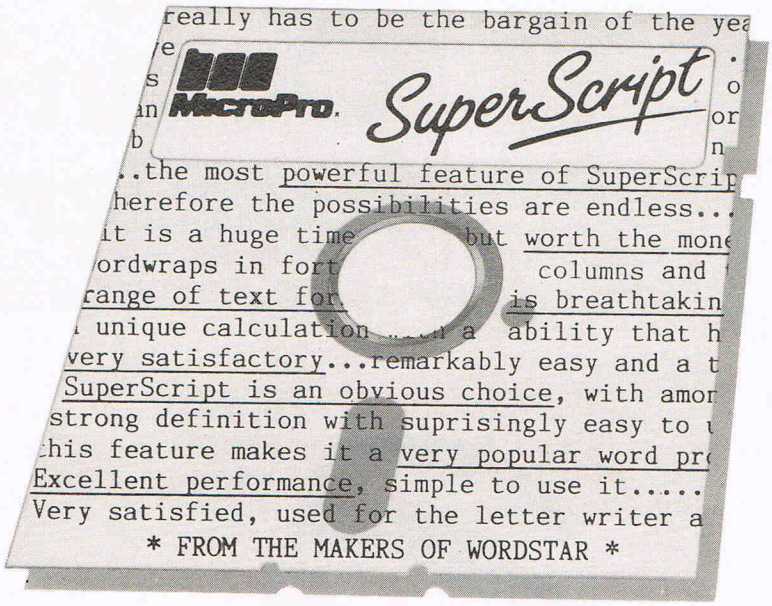

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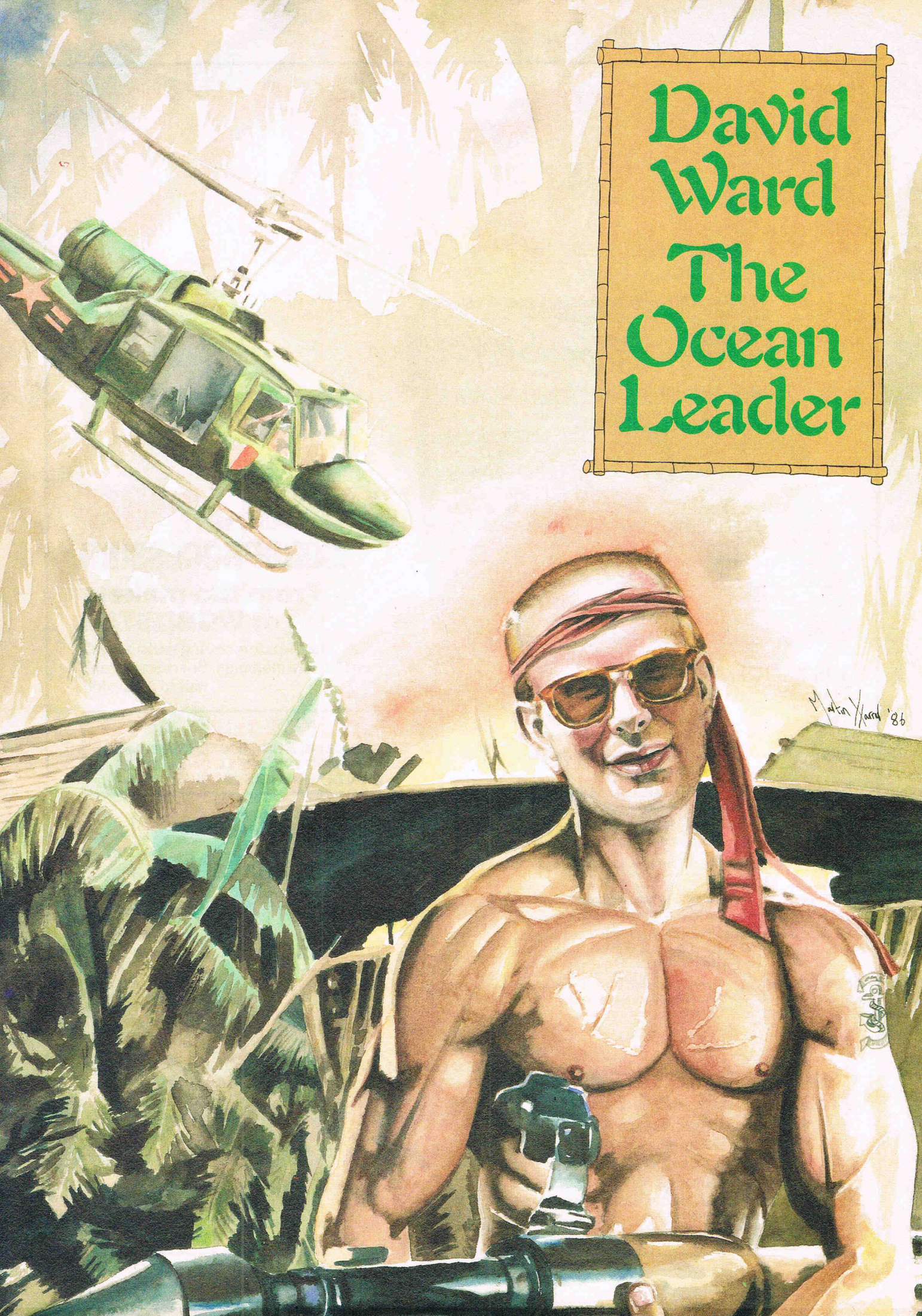

David Ward
The Ocean Leader
Martin Ward '86

David Ward Ocean's Supreme Commander

Ocean is arguably the biggest games software house in the UK. It owns Imagine. It has marketed Konami arcade conversions. It specialises in linking computer games with current film and TV hits like 'Rambo', 'Cobra', 'Highlander' and 'Miami Vice'. It lays its own claim — in advertising slogans — to being the 'Leader of the UK Software'. It is said that Ocean dominates as much as 30% of the total games market, across all the machines. Ocean is, within its close association with Geoff Brown's US Gold, a major, potentially monopolistic influence on the home entertainment sector of computing in the UK. This powerful force is commanded by a man who has himself been described as 'the Rambo of the UK Games World' — David Ward, Chairman of the Ocean Software Group.

The 'Rambo' description is more than a joke on the eponymous computer game that Ocean successfully marketed. It is a comment on — and a sideways compliment to — a man who is acknowledged as one of the toughest, most ruthless, even most courageous, in the software industry. In his large, well-windowed, palm potted office he sits and works at a desk that heads a substantial conference table. He does not immediately strike one as a Sylvester Stallone clone. Of middle height, he is balding and stocky. He is however, highly articulate, speaking with an authority that is clearly by now second nature. There is about his statements the clipped force of a ship's captain politely but firmly giving orders. "It started", he tells you flatly "with mail order. We put an ad in 'Your Computer' for Spectrum games, four years ago. People couldn't get software then . . . But it all changed in '82 and '83. W.H. Smiths started to sell software. Within six months it had changed from a cottage industry — duplicating on tape recorders . . ."

In June 1983, Ocean Software was formed, "We were buffered by Smiths. They did all the work . . . They were so desperate for software, they would take anything . . . things with brown paper covers . . . This enabled programmers, who were dragged into being businessmen, to get going. But they didn't take that opportunity . . . they had no business skills . . ."

But Ward had. He was not a programmer but he was — and is — a very astute businessman. He had already been satisfyingly successful on both sides of the Atlantic. In the UK, after leaving Manchester University in 1970, he had founded and later sold a number of shops selling trendy casual clothes. In the US, where he lived for several years, he had been successful in the toughly competitive entertainments world. In Los Angeles, he has been involved in both a roller-disco nightclub and in the record business. He was already familiar with the financial controls and marketing techniques vital for success in any business. Nevertheless Ward with the evangelical fervour of the converted sinner, declares that there is more to the entertainment software industry than merely finance and marketing.

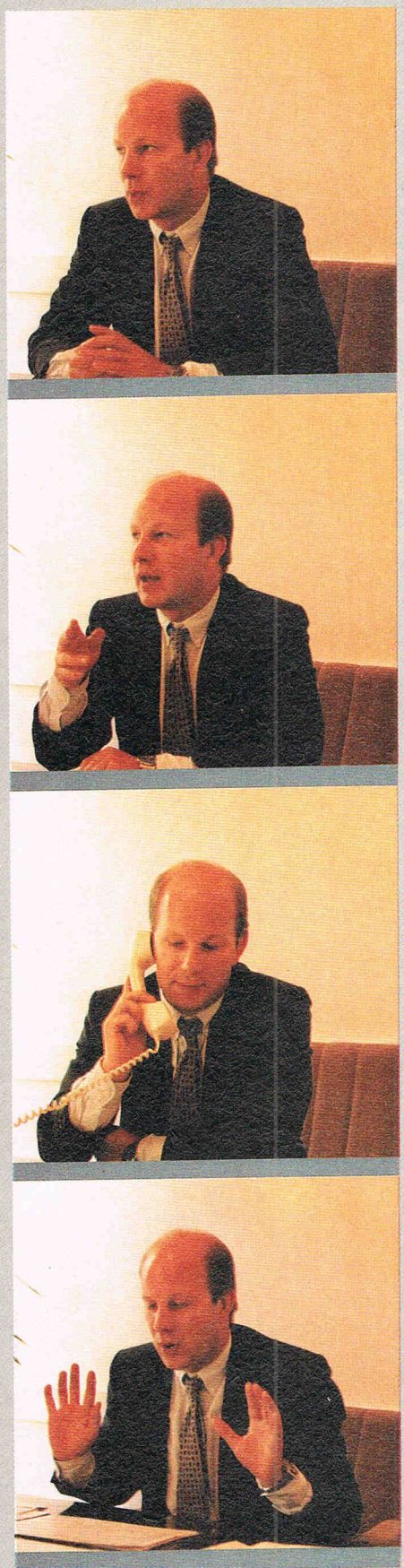
"The computer has afforded a new area of creativity — an area that was not previously available. Ten years ago, creativity was the realm of sculptors, writers, musicians. Now there is another way of expressing creativity."

He points out that one program is rarely transportable from one computer to another. 'It's not a mechanical process for translation. Nor is it the same as writing a whole program for another computer".

It is no longer only an individual who can be creative, "The process of writing a computer game is less the purview of a single person, it must be a collaborative effort". He gestures to emphasize the point. "There is an adminstrative necessity to organize . . . a structure so they are protected . . . It's no longer a single individual in a garret . . ." He shakes his head thoughtfully. "The equipment necessary to write the programs is increasingly sophisticated and expensive . . . You need £50,000 of hardware . . . a bunch of utilities . . ." Ward believes that the creativity that has been poured into home entertainment software has produced a surprising result.

"It has extended the life 8 Bit computers by several years. The Spectrum was expected to last 24 months. The reason that it's been on sale for five years, not

ocean



David Ward — Ocean's Group Chairman
"Ten years ago, creativity was the realm of sculptors, writers, musicians. Now there is another way of expressing creativity."

only in this country but elsewhere, is because we've been able to squeeze enhancements out of it...

Nevertheless, deep down in the Ocean programming chambers, floors below the Chairman's office, they don't use Spectrums, or Amstrads or even 64's to develop their games any more. "We stopped writing on target machines two years ago. In 8 bits, they were reinventing the wheel. Now we have a whole bunch of routines already existing on disk or other data forms... And the programmers whom we commission need help too — technical help and equipment. We buy it. The next stage will be a bloody great Vax with our communications in the cellar. They would connect from all over the country... all over the world... we've already had programs from Spain, France, Hungary... Once a guy from Yugoslavia wandered in. He had no fare back home but a few programs he wanted to sell... They weren't any good but there was something about him... We asked what his main interest was. It was movies... He went away and wrote something for us that earned him three times what he'd ever earned before. He's working on something for us now..."

Ocean does not always wait for programers to knock at their Manchester door. It also advertises for them, casting its net as widely as possible. Some competing software houses, such as Elite, are thought to believe that Ocean sometimes trawls a little too closely to the programming groups of other companies. However there are now stories of Ocean losing its programmmers back to other software companies. Ward says programmers generally come to Ocean with programs already half developed. His company gives them their chance to work for all the major target machines — C64, Spectrum and Amstrad even the BBC and C16. They are creating entertainment software too for the PC compatibles and also applications software which Ward says is very successful. He is looking to increase the number of his programmers up from the 25 or so now employed.

It is however, not so much the brilliance of its programming skills that have brought Ocean to its frontrunner position but the acute marketing intelligence of Ward and his close longtime colleague Jon Woods. Their first success — and the one that laid the financial foundation for Ocean's fast growth, was not an original program but the smart and then virtually unknown idea of a coin-op conversion. It was Hunchback, reputedly since 1984 having sold for Ocean over a quarter of a million across all the formats. Their next success was a real smash, the Daley Thompson sports series which set a style still being followed.

"We invented coin-op games. The others were quite miffed..." It was then that Ocean saw the possibilities of the merchandising of 'big name' spin-offs. They began licensing some 'properties' in the entertainment world at large. They created computer products around 'flavour of the month' films and TV series etc... Hence Rambo, Knight Rider, Cobra...

Ward argues that it isn't the easy way out it seems, "It's often more difficult than an original... You have to design within constraints... We've got 20 plus programmers... two or three musicians and animators and some artists working..."

They also licence within other countries. After writing a game for one computer, usually the 64, they will convert it to others for different countries such as the Thomson in France.

And the idea 'nicked from the record industry' was the exploitation of the 'back catalogue' using over again some previous successes.

'This business advances so quickly that games quickly become anachronistic, redundant... Increasingly the market is dominated by the chain stores... a small number of titles, intensely marketed for three months — after that they're a dead duck!... What I did was to put together the tape of not-too-distant past hits. We called it 'They Sold a Million'. It had Jet Set Willy, Daley Thompson... I was told it wouldn't sell... but people will only professionally pirate products that are being currently sold... there was no point in doing it for 50p... there's a narrow window of opportunity..."

'Opportunity' — it is a word that is clearly at the forefront of Ward's mind. He talks in the precise, organised manner of a trained marketeer or a Harvard Business School Graduate. He is very firm in his opinions."Piracy? It's not true that it happens mostly abroad. Lots of piracy — most even — is done here in the UK... With the down turn in the music business, there's a lot of audio duplicating equipment lying idle... Of course, in the Far East there's no legislation at all and it won't change without the govenments taking an action... Italy!"... He shrugs despairingly, "It's Gresham's Law — the bad pushes out the good... Because of no government action... We've been spoilt by our home market..."

Why did David Ward, transatlantic style and mid-Atlantic accent, leave sunny anybody-can-make-it-big-if-he's fast-on-his-feet, California for the depressed heartland of Britain's failing industrial north?

"I was in the US, into a whole variety of entertainment fields. I was going to set this up there but the market was already halfway through its life cycle... the

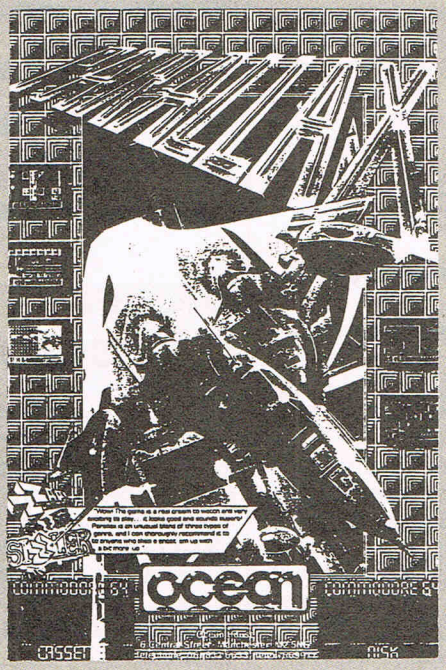
price of entry was high... too high... in the home market here it wasn't so high. Anyway I had a variety of reasons to move..."

It may be that tough though Ward is as a businessman, he still relishes the friendship he has along the Liverpool-Manchester axis where he was brought up, nor is Hollywood a comfortable place to bring up a child. Ward has a son of sixteen, "He's getting too old to play computer games", for whom an English education seemed more appropriate. And Ward knew people in the UK... "We put together a team of various business skills... who bravely went out and beat the drum... we brought a sophisticated style of marketing and selling for the High Street multiples... now merchandising and point of sale has changed..."

He stares challengingly, "We led the market then. We are leading the market now... We're concerned with spotting opportunities... What the public will like... What will stimulate demand... I like to make the rules up as I go... You *can* think of new ways of doing things..."

Successful though he has been, Ward obviously still gets a kick out of achievement and its rewards. He is reputed to have had twelve Porsches in his time and still drives one. He relaxes on a yacht he keeps in the exclusive marina of Puerto Banus on the Spanish Mediterranean coast near Marbella. He frequently flies there for the weekend from Manchester Airport.

Though his working relationship with that other successful software entrepreneur Geoff Brown of US Gold (CCI November) is a close one, Ward resents any suggestion Ocean and Brown's empire unfairly combine to restrict competition. "Geoff and I started almost simutaneously. He was through Centresoft — our biggest custome... We compete with US Gold, he stares emphatically, "We both compete in the market. Our salespeople compete for commission. We don't stifle the market! It's not true! I'll do everything to make sure it isn't true! The health of the software market depends on not shutting out new ideas or new sources". He insists his own company is always open to change. "The decision-making process here shouldn't shut people out... we're still a young company... we aggregate success... Yes, we have paid too much to programmers and too much for licences... but you can encourage a huge range of choice... the record industry only gets three hits out of ten records.. we do better." With a production of about 110 products a year that is a lot of hits .. but will the software tide still flow in Ocean's direction? "Yes! We're moving into the next stage. We're growing with our customers. In five years time they'll be twenty. In ten years they'll be twenty-five."



And what about Ocean and Imagine? They were the most successful before Ocean,"We bought them for their name and logo..." How will David Ward's companies hold that maturing market? "Well, we will keep coming up with marketing ideas — like the double cassette box — we started that. We will build up other labels. It's easier to market fifty different products with different names... We've got I.Q. for applications software, Imagine for coin-op, Ocean — and Ocean Business will be coming soon..."

He comments that when he started there could have been 500 companies in the market. Now 10 have 90%...

So far it's been roses all the way for Ocean, Ward claims, "there have been no bad times... We never saw anything but growth..."

David Ward, Ocean's Leader, is impressive, undeniably an astute and highly competent businessman. He clearly has his business at his frequently gesturing fingertips. He is forceful and sure of himself, only defensive at the mention of the ill-fated Knight Rider that went to four versions before finally reaching an unwelcoming public. He sounds aggrieved and not quite so confident when he claims the press were waiting to slate it. He could be a successful entrepreneur in any business, a man for making it happen, for making a profit, for managing competing, achieving; not specifically in computers but in any exciting, fast moving, rewarding field.

In an industry where sharp marketing expertise, imagination and drive have been, and still are, comparatively rare, David Ward and Ocean stand out. Rambo is a fictional character but his creator, Sylvester Stallone is a colossal, if unlikely, business success. Maybe David Ward does not so much resemble the fictional Rambo as the real Sylvester Stallone.

However this may not be so propititous a comparison. The Stallone Rambo follow-up 'Cobra' bombed out in the cinema and Ocean's computer game could flop too. The fashion for link-ups may fade... Konami-Ocean's big Coin-op conversion source, is going it alone... Staying 'leader' of an industry requires not just constant effort and initative, but that special 'winner' quality. Does Ward's Ocean share more than sharply – honed marketing and organisational skill? Does it really have the creativity that Ward admires in *all* the vital areas of its business, especially in product development? Can it sustain its claimed leadership as the market grows up and changes? Ocean's Chairman would doubtless answer all those questions with a resounding, confident 'Yes.' It will be interesting over the next year or two to see whether David Ward's confidence will be borne out. Whether other companies like the big guns of B.T.'s Telecomsoft or arch-rivals Elite, can topple the champion. Or perhaps Ward's restless spirit will whisk him off to some other field to another challenge where a quick-witted transatlantic marketing guy with a fast Porsche and an eye to the main chance can make it happen. As a reluctantly admiring competitor said 'If you really think any of that's going to come and David Ward is going to let anyone else lead the software market, just don't hold your breath till it happens.'

International News

2 Million Lotuses

Lotus have sold over 2,000,000 copies of their popular 1-2-3 spreadsheet package. They celebrated by hanging what they claimed was 'the world's largest spreadsheet' out of the company's headquarters in Boston USA. The spreadsheet measured 40 feet by 80 feet and contained the statistics of the US Championship basketball team, Boston Red Sox. The Red Sox, who use Lotus 1-2-3 for their financial statements also received the two millionth copy following the World Series. Unfortunately, they lost to the New York Mets!

CBM's New Marketing Boss

Kristian Andersen, until now President of Commodore Denmark, has been appointed Marketing Director of Commodore Europe. He will be responsible for 11 countries including the UK.

Andersen joined Commodore in 1983 and has been regarded as largely responsible for Commodore's domination of the Danish Microcomputer market.

Commodore Sales Rise in Eastern Europe

Commodore Business Machines' West German subsidiary expects to increase sales to Eastern Europe, according to industry sources. About 10,000 Commodore personal computers are currently installed in East Germany alone, according to the subsidiary of the US-based company. An order of 10,000 Plus/4 computers has recently been placed in Hungary. The lack of personal computers in Eastern Europe has caused users to devise professional applications for the Commodore machines, which are not subject to high technology trade restrictions. In Hungary, for example, 64's are being used as terminals for Commodore PC's.

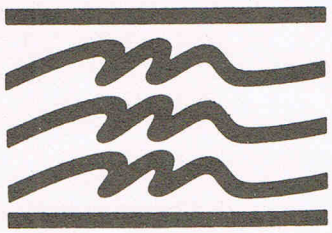
Juke Box Computers?

A report disclosed by an investigation carried out by US Congressman Michael Andrews says that the now defunct UK computer company Systime, exported 400 DEC computers to Russian and Eastern European countries. The export of these US manufactured computers is against the Cocom rules established by the US government to control 'sensitive' high technology exports to Communist and other non-Nato countries.

Systime apparently was able to avoid detection by disguising the DEC machines, at least, on the documentation as juke boxes. You would have thought that someone would have asked why Eastern block countries were buying US juke boxes from a UK computer company wouldn't you? On the other hand . . .

During a recent UK trial of a man accused of smuggling prohibited hi-tech goods into those same Eastern European countries, the defence counsel asked the government department responsible for security Export Control to provide him with a list of computer equipment that had already legally been exported to those 'hostile' countries.

The department refused to supply the list because it might reach the countries which already had received the equipment. Apparently the stated reason was that if they published the list then the Eastern Block customers would then know what they had actually bought. (No, this is not a misprint, that is what they said). Furthermore, if those Eastern European customers learned what they had bought, it could endanger UK security. Sometimes we wonder if there is anybody left in the world who has anything to do with computers who is still sane . . .



Bigger Mindscape

The Educational Division of Mindscape, Inc. has acquired the Scarborough computer software product line including the well-known classic, MasterType. Scarborough Systems, Inc., located in Tarrytown, New York, is the developer of productivity software.

The addition of the Scarborough products to the Mindscape catalogue offers educators a larger selection of software programs and the opportunity to fulfill their software needs from one catalogue. Besides MasterType, Mindscape has acquired MasterType's Figures + Formulas, MasterType's Filer, Run for the Money, Net Worth, patternMaker, PictureWriter and Build a Book. These products offer a range of productivity programming from database management, business simulation and money management, to computer graphics and drawing.

Mindscape's products include curriculum-based programs as The Reading Workshop, a comprehensive, six-level reading program with ten reading, writing and language arts activities, and the Social Studies Explorer Series, consisting of the American History Set and the World Geography Set.

Mindscape is a computer software subsidiary of SFN Companies, Inc., a leading educational publishing, information and communications company. Its new catalogue is interestingly entitled 'The Challenge of Education — A Brighter Future' and contains a 'Word-Find' contest with a $500 prize.

Contact: Mindscape Inc, 3444 Dundee Road, Northbrook, ILL 60062 U.S.A. Tel. (312) 480 7667.

Computer Kidnap

What was probably the world's first computer kidnap has taken place near Brussels in Belgium. The circuit boards and gate arrays of a Convex mini-computer were stolen from the Belgian Institute of Management. A few hours later, the kidnappers telephoned demanding a ransom of about £65,000.

The Institute tried twice to meet the kidnappers without making contact. The police were called and are still looking for the missing parts.

Cheap Computers

Convex has also announced that super-computing will no longer be super-priced. It has lauched two new C-I super mini Cray-style computers.

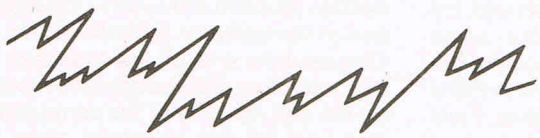
Convex, based in Texas, has brought out the C-IXL which delivers forty megaflops (million floating point operations a second and also four scalar MIPS — for $500,000 —$150,000 less than the price of the original C-I. That was the machine that Convex claimed was the first 'affordable' super-computer.

They have also launched the C-IXP at $600,000 stated to have 6.4 MIPS and a possible gigabyte of main memory.

Convex say they have been able to cover costs and up performance by incorporating in each computer 20,000 Fujitsu gate CMOS and Megabit dynamic memory chips which permit 128 MB of memory on a single board. Convex have made yet another announcement of a token ring network which allows processors to work together which is intended to challenge the DEC VAX market sector.

Not bad for a just two year old company but at $500,000 is Convex right about being really 'affordable?'

Your key to communications!



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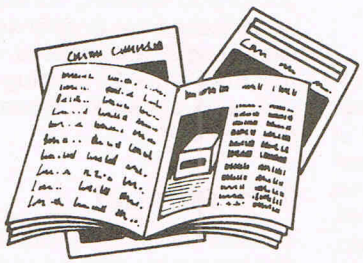

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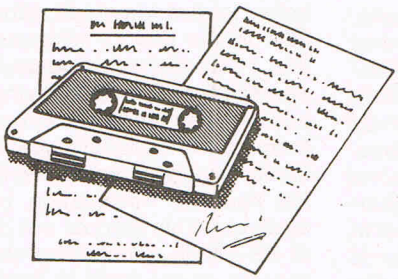

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BRAINBOXES RS-232 INTERFACE

RS-232 is a communications standard for connecting computer system components, especially for serial communication of control and data between computers and serial input/output peripheral devices. Whilst this may form the dictionary definition of RS-232, a *standard* in the computer world never tends to stand still for very long — the rate of change in terms of hardware sees to that and it is a very much accepted premise that a *standard* forms the platform for improvements, enhancements or whatever. The net result is a plethora of confusing information to the end-user and RS-232 is a classic demonstration of this. I believe that RS-232 started life as a protocol for communication using telephone lines and was subject to the restrictions of a 4-wire system. How things have changed and when someone publishes a book filled entirely with wiring diagrams of how to connect item A with item B and item B with item C then surely something is wrong. Either way, love it or hate it, RS-232 remains the most popular way of connecting equipment together and most manufacturers allows for the inclusion of an RS-232 port on their machines.

Apart from the AMIGA and the sadly missed 700-series, Commodore have never fully implemented RS-232 on their machines. The usual RS-232 facility on Commodore computers has needed a voltage convertor because in a effort to keep costs down the RS-232 implemented on the User Port was set at TTL voltages and RS-232 runs at a higher voltage than this. The Brainboxes RS-232 Interface is designed for use on the C128 and C64 and together with the supplied software on a disk provides for any permutation involved.

The package consists of a cartridge with interconnecting cable, a User Manual and finally a disk containing a program in BASIC for data transfer and on the reverse side the latest update for the C128 CP/M system. This latter software contains the version for 6th December 1985 and includes a modem communication program using RS-232. The BASIC program is very heavily commented as it is meant to form a vehicle for your own communication package. Those readers whose programming skills do not extend to this will, for the moment have to wait for some enterprising individual to provide the necessary software, either commercially or in the public domain. However, I will give away one little tip which worked reasonably successfully for transferring files using this interface.

Fast Transfer

Up until June of this year all of my articles had been done on my C128D using SUPERSCRIPT. Around this time a suitable word processor materialised for the AMIGA thus it made sense to switch to this machine for this type of work. Apart from the superior facilities in terms of storage and speed, it made commercial sense to fully utilise a £2000.00 asset. Now the problem was, how to get my old files containing previous articles across from the C128D to the AMIGA? Easy, after a little thought — connect the two machines together using the Brainboxes interface. Load and run a terminal program on the AMIGA — there are commercial products or it is very easy to write one in Amiga BASIC since a simple version is given with the Amiga BASIC demos. On the C128D, load and run SUPERSCRIPT — then having got the required file from the disk, define your printer as an RS-232 printer. The final step is to simply print the document — the C128D believes that you have a RS-232 printer out there, whereas the AMIGA is only interested in the receipt of data. The net result is a fast transfer of the complete document between the two machines. It would be an exaggeration to say that there were not problems, for example it was necessary to juggle around with several parameters in order to achieve total success. These included setting the baud and parity rates, elimination of printer format and linefeed characters and minor adjustments to the file name once it was in the AMIGA — but from a hardware point of view the Brainboxes RS-232 interface worked with 100% success.

The interface as you may have deduced from the preceding paragraph provides an industry-standard 25 pin D-plug. This obviates any potential connection problem at the *non-Commodore* end of the cable. In addition to this, the Commodore end of the interface has four miniature slide switches for setting-up the vast majority of the permutations that only RS-232 demands. Thus it is very unlikely that you would ever need to do any modification to the 25 pin plug in terms of resetting connectors. I also understand from Brainboxes that users with special applications can request that the normal 25 pin plug be replaced with a 25 pin socket when purchasing the interface.

The Manual

The manual supplied with the interface was extremely detailed and exhaustive. The author has obviously felt that it is better to give too much rather than too little in the way of technical information. I only wish other purveyors of peripheral hardware would do the same — if nothing else it stops end-users ringing them up with repetitive questions which could have been answered in the manual had the information been made available. This manual not only looked at RS-232 in general but also covered aspects of the topic in relation to the C64 and C128 to a level of detail which I have not seen published before. There was some really useful information in this manual.

If you have a need to transfer volumes of data between a C64 or C128 and another machine the Brainboxes RS-232 Interface is very likely to be the answer. Of course, you do have the other option — you can always retype the data assuming you have the time and inclination. In my case it was either the Brainbox or discard the files — no contest really!

BD

Price: £49.95 (ex VAT).
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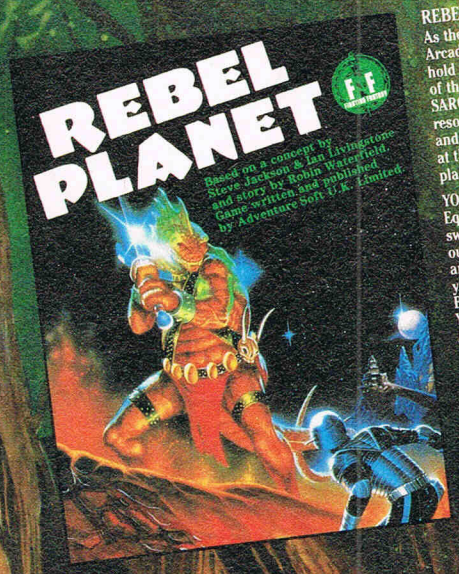

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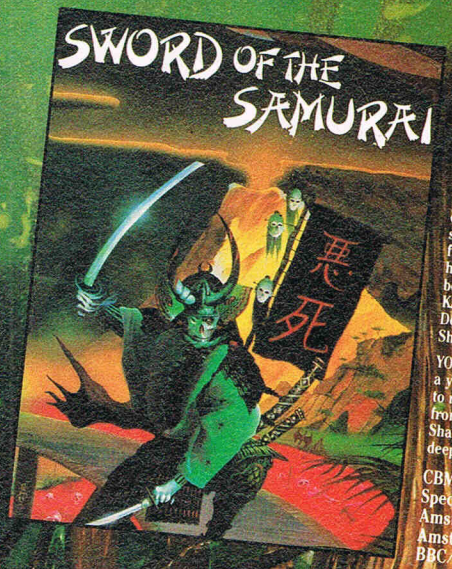

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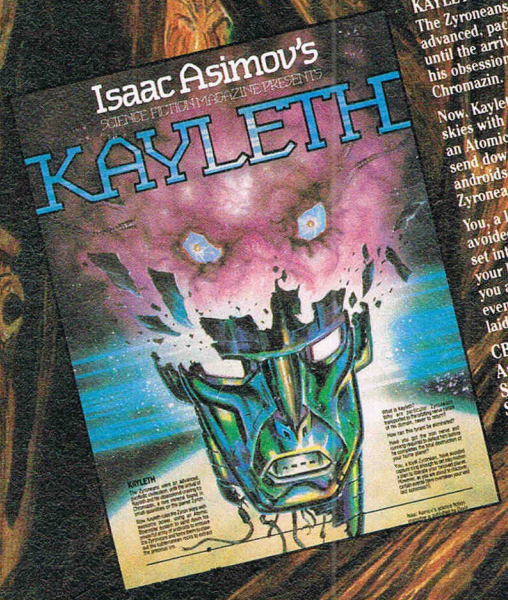

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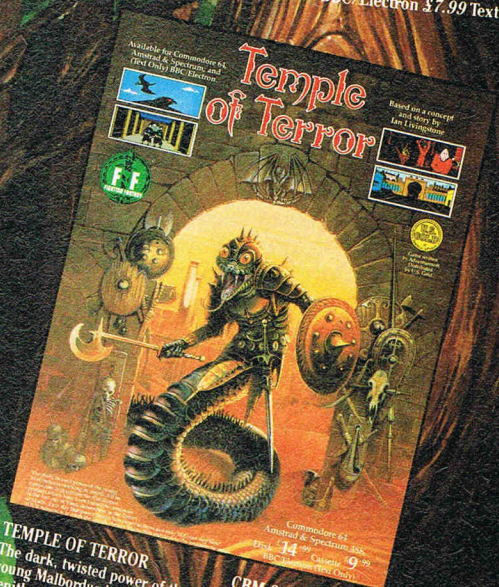

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Andy Moss is one of the UK's most famed adventurers. His expertise in solving mind stretching adventure games is legendary. He will be regularly commenting on all the many and increasingly popular aspects of adventures in C.C.I.'s new section ...

MIND FOREVER VENTURING...

Welcome to the world of adventure. As this is the launch of a regular Adventure Section in C.C.I., this months' 'Comment' concerns the plans we have for bringing you up to date reviews, comments and news of everything that's anything in this fascinating area of computer entertainment. We have studied other so-called 'Adventure Columns' and have come to the sad conclusion that apart from one or two that we have a great respect for, the rest make pretty grim reading. It's as if Editors feel that as long as they throw in a page or two on adventure it will suffice (almost a keep up with the Jones's attitude). Nothing of that sort will grace these pages. Our aims are quite clear — to be honest, hard hitting where necessary, critical, informative and interesting but always remembering that you the readers are the one reason we are all here. You *want* to be entertained.

We want this section to appeal not only to the dedicated adventure solver but also to intelligent people everywhere who maybe haven't tried getting into a good adventure because they know nothing about them but would indeed make excellent players.

Computer games are not all zip zap reaction blasters, there are plenty of ingenious time — taking brain teasing puzzle based thirst for fun quenching games too. We hasten to add, there is a lot of rubbish and hype around as well, and by checking in with us each month, you'll find out quick enough which is which.

We have solved plenty of adventures, saved countless princesses, arrested quite a few murderers, caught many industrial spies and had more success in espionage than James Bond. If you need help write to us. If you want to get something off your chest, write to us. If you violently disagree with me about something — write to us. We'll answer you honestly and straight forwardly. No punches pulled.

The mark of a cracking good adventure is that you actually forget that you're sitting in front of a screen typing on a keyboard. Instead, you're involved in the story in character, eager to continue on as far as possible. Hearing fellow adventurers discuss their problems would be an eye opener for someone who has never heard of them before, as this conversation we overheard at the PCW exhibition this year shows:- Question: "I am in this room surrounded by fire and I've got the bucket, but can't find any water to fill it with". Answer: "Have you found the sandpit yet?". "Yes, but sand won't put out the fire!" "Just dig in the sand until you reach water, like you would do on a beach". Simple huh! But anyone who didn't have a clue about what they were discussing would clearly be a very confused person.

We knew someone once who actually rang America to find out the answer to a problem — it was either that or not getting any sleep that night!

If you are stuck, write in — we'll see what I can do.

Welcome again to Adventure — The mind starts here.

Adventure News

Level 9 plays Santa Claus

For Number one British Adventure house, Level 9, a Special Christmas appearance in Reading on Saturday 13 December between 11 a.m. and 1 p.m. It is what they call an 'Adventure Forum' in the ORDEM Computer Shop which is situated in the town centre in Harris Arcade. Lots of FREE gifts and lots of clues...I wonder what Pete Austin looks like in a white beard, red suit and black wellies?

Murder, Mystery and Suspense from C.R.L.

Murder off Miami is the title of the latest adventure to be released by CRL. Written by Fergus McNeill and Jason Somerville of 'Bored of the Rings' and 'The Boggit' fame.

It is a solve-it-yourself mystery based on the Dennis Wheatley novel of the same name.

Set in the 1930's you play Detective Kettering called in to investigate an alleged suicide. The suicide/murder occured in a boat just off the coast of Miami. Did he jump or was he pushed? Several people on board have a motive, your detective work will decide the verdict. Watch this space for a full review.

Whilst talking of CRL, news just to my desk is that their well acclaimed DRACULA adventure, written by Rod Pike whose previous work was 'PILGRIM', has been granted a 15 Certificate by the British Board of Film Classification. This is an unprecedented move, due to the horrific style text used in the game and although the text is based on Bram Stokers own work, CRL felt younger children would be adversley affected by it.

This prompts me to insist that from now on all bad adventures should also have a certificate thereby warning us in advance to avoid them at all costs!

Scott Adams Classics on Compilation

U.S. Gold are releasing four of Scott Adams classic adventures on one tape entitled "SCOTT ADAMS SCOOP SERIES". It will retail at £9.95 and consist of VOODOO CASTLE, STRANGE ODYSSEY, BUCCAROO BONZAI and PIRATE ADVENTURE.

Adams work has attained almost cult status here, although I never particularly liked any of his adventures because they always contained a miniscule vocabulary and meant most of the time you were scratching around for the exact words to use. Very frustrating, but obviously some people enjoy playing word games! Release date: early December.

Dodgy Geezers

Ere, John, 'ave you eard about these two ice cream freezers called Lever and Jones what 'ave written a game about us lot what are called 'Dodgy Geezers'? Just 'cos we knock around wiv Bullet Proof George, Tweedle, Cracker, Soapy and Tricks they fink we're a few faces to take the mickey out of. O.K., I admit we've all done a bit of bird in our time but to stick the Long Ditton Spaghetti Caper on us is not on. So 'eres a few sovs, go and get me a look at this 'ere game so's I can have a butchers at it in case it shops us to the filth before the job. Got any wheels yet? Good, go and nick a copy from Melbourne House before I give you GBH of the ear.

Vera Cruz by Infogrames

There you were, just tucking into your second helping of marinated frogs legs in butter and looking forward to finishing off a carafe of superb local vino when the call came through "Dead body found at Forest Apartment Block — provisionally described as one of the residents and is believed to be a case of suicide by shotgun — see caretaker for details".

As due to your past successful conviction record you have just been appointed Detective Sergeant in the Crime Squad at St. Etienne, France, you relish the thought of putting this case away and increasing your status even further.

So begins this fascinating crime adventure from new French software house Infogrames and, if this release is anything to go by, this company is destined for big things all over the adventuring world.

CONTINUED...

ADVENTURE HINTS FROM ANDY MOSS ON PAGE 30!

Adventure!

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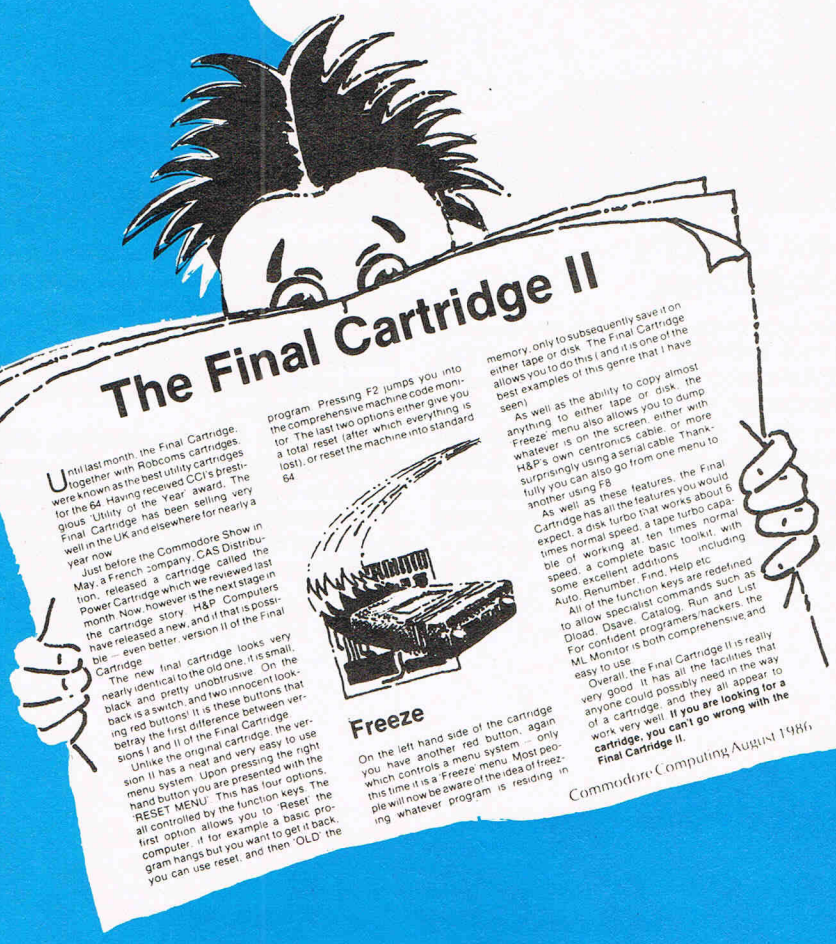

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...MIND FOREVER VENTURING... (CONTINUED)

The game is set in two parts and part one deals with the actual scene of the crime. The second part is back at the office, where by the use of a sophisticated computer network system, you try and build a case from the clues discovered in part one. But more about that later.

The game opens with a picture of the apartment and the corpse lying on the floor. Scattered around are various pieces of evidence, handbags, gun, diary, etc. The idea is to move a box cursor over these various objects and photograph them for analysis later. I warn you now, there are some obvious objects and some very well hidden ones, so pay particular attention to everything in the picture and move the cursor anywhere where you may think there might be something lying around. I'll give you a small hint here, check anywhere that is shadowy, who knows, this might be right on the button! When you feel that you have completed your search of the scene, press ENTER to move onto part two. However, if you do get a sudden hankering to go back again you can, as the program gives you one last prompt before loading the rest of the game, for once you leave the apartment, you can't return.

Part two opens in your new office, with a graphic representation of your typewriter. It is here that you list out all the evidence you found by keying in each piece on the keyboard. When the list is complete (and this is important if you want to present a watertight case), press ENTER again to move into the network phase.

This is the real engine room of the investigation and although you can conduct it in the time honoured tradition of comparing alibis with evidence etc., using the computerised police network will give you immediate access with other police services, justice departments and prisons all over France.

You are given the correct codes for each service in the instructions and on-screen you see a monitor and a printer. It works like this. If for instance you manage to obtain a registration number of a car in the course of your enquiries, you can find out the name and address of the owner by typing trhe code PREF. St. Etienne. This will throw up a cursor on the monitor screen, type in the vehicle number and as much info as possible and if the number is relevant to the case, you will get a read out regarding the owner. You can access other police stations with requests for information say, on the victim Vera Cruz. This is done by keying in code GIE and the name of the particular squad. The more you delve the more info you get. It's all about painstakingly searching through the network and covering each piece of information thoroughly.

The best way to start is by getting statements (easily done by pressing S on the screen menu) from the characters you already know about and then depending on their information, continue your enquiries from there.

What makes Vera Cruz such a great game is the authenticity it oozes. You can almost feel the tension as you imagine yourself in front of your police monitor battling away with the available clues and getting a great lift when you make a breakthrough. This is no traditional text adventure, but a genuine shot at trying to simulate modern detective work in an easy to use format but devilishly tricky. Blind alleys abound and although you may think you've got the murderer early on — proving it is another matter.

Totally absorbing and a must for anybody who fancies being a Hercules Poirot on the quiet.

Moonmist Infocom
Disc only 64/128
Introductory Level

What a day it turned out to be. There you were sifting through the early morning mail in your office after solving your latest case (it wasn't the butler this time — butlers have finally cottoned on to the fact that everyone suspects them first anyway so they can't possibly plan a crime and have, consequently, become pillars of the community), and buried amongst the bills and begging letters is a note from your English friend, Tamara, who is very frightened that she is the intended victim of a murderer. The gist of the note goes as follows:- "Help, I think someones trying to kill me! You know I've never believed in ghosts, but tonight I actually saw the White Lady! I woke up in the middle of the night and there she was looking down at me, then a huge black Widow Spider dropped on the bed. A few days later I found a poisonous adder snake in my desk. Please come over and help me". Being a super sleuth what else can you do?

So begins Infocoms' latest release 'Moonmist', which is a gothic mystery set within the ramparts of Tresyllian Castle, an old family residence in Cornwall.

Choosing an English setting is something new for Infocom and talking of new, they have picked out 'Moonmist' to show off some innovative features from their software development research.

The adventure opens as you arrive outside the gates to the castle and it is at this stage that you let the program know whether a male or female is playing by announcing yourself at the castle. It responds accordingly. If you're a woman you will find a gown to wear for dinner, whereas a mans' suitcase will contain a dinner jacket. The castles' owner, Lord Jack, will kiss a womans' hand but shake a mans' (thankfully!). Also, Moonmist responds to you by name throughout the story and Infocom suggest you take advantage of your surroundings and call yourself Baron or Lady rather than just plain old Mr. or Ms. There are one or two other nice little touches, like colours for instance. Telling the program your favourite colour wil prompt that colour to be used in the descriptions of, say, your car or bedroom (which has just been decorated — how pleasant!).

The other new feature in this game is that there are in fact four variations to Moonmist all contained on the one disc. Each variation has its own solution to the mystery along with different locations for the various puzzles and treasures etc. This is particularly interesting as it gives the adventure a longer lifespan after solving the first scenario. Instead of plonking it on the bottom shelf, you'll have another go.

The Gothic setting is perfect for lengthy descriptions about the full moon rising above the battlemented tower and surf pounding against the rocks at the bottom of the cliff variety.

CONTINUED...

Adventure!

Stu Galley, the author, has really captured the flavour of the old castle in his detail of the rooms.

The storyline puts you as our erstwhile famous American Sleuth coming to Cornwall in response to Tamara's letter.

When you arrive, you get to meet a host of strange characters like Montague Hyde, Vivien Penreath and the Lieutenant. Tamara is engaged to Lord Jack whose ex love was Deidre. She supposedly drowned after Jack broke off the romance, but the ghostly White Lady who haunts the castle, apparantly bears a striking resemblence to the aforementioned Deidre, which begs the question "Is Deidre still alive, insanely jealous and hell bent on taking out a terrible revenge on poor Tamara?" Or, is one of the characters donning her disguise?

If you're confused, the bad news is that there's more to it than that. A priceless artifact has been hidden somewhere in the castle and if not found quickly massive debts will cause the castle and estate to be sold off.

So, not only do you have to solve a mystery, but also there is treasure to be found.

I found Moonmist to be a thoroughly enjoyable romp, not too difficult (it's aimed at novice adventurers, Infocoms introductory level series) and contains some very amusing scenes. Exploring the castle is great fun and after a visit to your bedroom (if you examine the mirror closely enough) you'll find an entrance to a whole series of secret passages. Could this be where the treasure is hidden? I'm not saying — just this — the answer to the hiding place lies in a series of riddles which you will come across. Any good at riddles?.

Moonmist doesn't have pretty pictures, just a fabulous parser, a meaty story, huge descriptions and your imagination. An essential purchase for any adventurer with a disc drive.

Tass Times in Tonetown Activision £14.99 Disc

Are you Tass? If you're not Tass, you're crass!

Interplay are making quite a name for themselves with such notable releases as 'Minshadow' and 'Borrowed Time'. Their style is instantly recognisable using very pretty graphics for each location which not only contain moving parts but some intriguing sound effects and if you combine this with witty readable text, you have some enjoyable and playable adventures on your hands.

'Borrowed Time' saw the development of icons which considerably cut down the need for typing in commands and 'Tass Times' takes this idea a step futher and all but makes typing obsolete which in an adventure is no mean feat let me tell you! The icons are situated on the right of the screen display and the current location graphic top leftish which leaves a reasonable amount of space for the text underneath. Each of the icons represents a command, for instance take the kitchen location, move the arrow cursor over the 'eye' icon and the command 'Look' appears in the text window. Now, you move the cursor into the main graphics window over a cookie jar which is sitting on the draining board and you get "Look at cookie jar" appearing with the response "in the cookie jar is a key".

All the compass points are represented along with UP and DOWN, the other icons consist of GET, DROP, ENTER, HIT and TALK TO.

All this technique is wonderful, but what about the plot? Well, it seems you grandaddy (hereto known as Gramps) has disappeared into another dimension and all he's left behind is a cryptic note and a half eaten pizza. However, exploring his Lab, you find a strange hoop object that is in fact the entrance to Tonetown, an ultra touch hip place in another world. Naturally being an adventurous person you enter the hoop and try to find out what happened to Gramps.

The first thing you notice is that you'd better learn how to become Tass and pretty quickly too, other wise the residents will think you're a Tourist and kick you out of town; not recommended if you want to find Gramps!

Finding some tass clothes would be a good idea along with say a two tone hair dye (now that would really be tass!) Strange currency here though, the money looks very similar to guitar picks!

After some more exploring, you'll come across a nasty piece of work called Franklin Snarl who seems to be Tone Towns answer to 'Don Corleone' and should be avoided at all costs initially — but somehow I reckon he's mixed up in Gramps disappearance so prepare for a showdown later!

Tass Times is easily mappable and I recommend you do just that as there's a fair amount of travelling back and forth to do plus a tricky swamp maze to tackle, but we all know the secret of mapping a maze don't we? Answers on a postcard please.

The game has a smashing quicksave routine which is handy before trying anything that looks remotely hazardous and you can save up to eight separate games on the one disc. I much prefer this system to swapping discs for saving all the time.

One hint for you — keep all found objects in an accessible place as you will find more than you can carry at once because towards the end you'll need one very specific item that you have already used. So don't get stuck in a situation where you know what you need but you left if miles away with no hope of getting back!

The game comes with a well written instruction booklet and a copy of the "Tone Town Times" which contains some useful clues so essential reading from cover to cover is needed.

An excellent release, I can tell you, and one that will keep you hooked right to the end. Well done Activision. More please!

Hints

The Pawn

Stuck outside the Garden Shed without a key?
Have a look in your pockets, you might find something.

The Boggit

Can't unlock the front door?
You'll find it's a combination lock and jumping in the chest will uncover a clue, the answer is as simple as a date of birth!

Snowball

Can't get the Vidscreen to work?
Put on the vizor and blink.

Ballyhoo

Can't get past the Gorilla?
He needs some classical music to soothe him, so try recording a bit from the radio on the cassette player.

That about wraps it up for this month. Next issue we'll take a look at 'The Archers' a Level 9 implemented game from Mosaic, and from Ariolsoft 'Heart of Africa' and 'The Bard's Tale', plus much more on the Adventure front. If you have a problem, or want to know some info on the Adventure scene, write to: Andy Moss, C.C.I., 40 Bowling Green Lane, London EC1R 0NE.

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MIDI

— Is it some esoteric mystery or an everyday tale of musical folk? Ian Waugh conducts you through.

As quite a lot of MIDI programs have been reviewed in these pages and as we intend to review quite a few more, I thought it was about time to lay a few ghosts to rest about the wonderful world of MIDI. (It was the Editor's idea, actually, but who am I to argue?)

Even many musicians are puzzled by some aspects of MIDI and its multifarious operations. When you plug into a computer things can seem a lot more complicated if only because you now have a program to contend with, too. Actually, MIDI only really comes into its own when you **do** plug into a computer and, like as not, as you already have a Commodore computer, you already have a great advantage over your computerless musical brethren.

The reasons why and how MIDI came about fill a book but we don't have room for that here and you would fall asleep before the end of it anyway. I'll just give you a bit of background — you do want a **full** picture, don't you? — and then move on to the tougher stuff. Just before we start, this isn't going to be a definitive instruction course — that **would** take a book. Rather, this series will explain what MIDI is, how it works (without getting too technical) and what you can do with it (in the nicest possible way).

MIDI is an acronym for Musical Instrument Digital Interface. Let's examine those words. You've probably got an inkling what Musical Instrument means and as you're reading this magazine you'll have a nodding acquaintance with Digital technology. An Interface is something which connects one piece of equipment to another. They're quite common in computer circles so you probably knew that already as well. Put them all together and you get a system which allows different types of musical instruments to work together. As the name suggests it does this with digital signals. This is important. MIDI has absolutely nothing to do with audio signals (although it can be used to control audio processing devices). MIDI is merely a system of control.

Although MIDI stands for Musical Instrument Digital Interface, we still refer to the box which sits between your computer and an instrument as a MIDI interface and not a MIDI. For all its acronymic meaning, the word 'MIDI' is normally used to refer to the 'system' as a whole. Weird these acronyms, aren't they?

Let's condense a book of history into a couple of paragraphs. MIDI evolved and developed through the need and desire to connect together instruments produced by different manufacturers. Prior to digital technology, synthesisers operated on a system of voltages, a process known, naturally enough, as voltage control. This gave rise to all sorts of voltage controlled modules such as the VCO (Voltage Controlled Oscillator) which produced the basic waveforms, the VCF (Voltage Controlled Filter) which filtered them and the VCA (Voltage Controlled Amplifier) which fed them to a speaker. This analogue system of synthesis was easy to understand and analogue synthesisers were comparatively easy to program. The trouble was, each manufacturer adopted a slightly different method of control so you usually couldn't plug A's drum machine into B's synthesiser and control them from C's sequencer. Even instruments from the same manufacturer were sometimes incompatible.

MIDI wasn't the first attempt at some sort of standard but after much discussion, the major instrument manufacturers got together and produced the MIDI specification. By this time digital instruments were appearing and they suited MIDI well. MIDI meant you could connect just about any piece of equipment to any other which was good for music, good for the industry — and good for everyone. Analogue instruments can still take advantage of MIDI and no synthesiser and very few keyboards costing over a few hundred pounds are now produced without MIDI.

You may not want to know about how MIDI works but I'm going to tell you anyway. Much software tries to insulate you from MIDI's more insidious aspects but if you have a rough idea of what's going on between the program and your equipment you will be able to see it better. Honest. Anyway, we'll keep it simple for now.

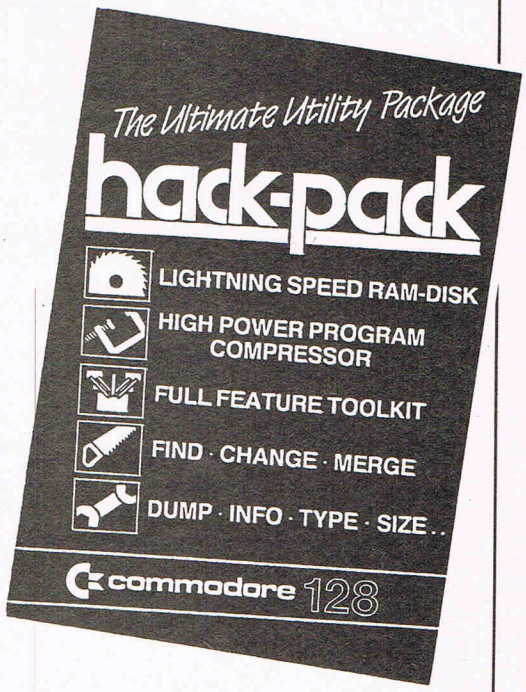
MIDI is a language and MIDI instruments communicate by passing digital messages between each other. There is a whole host of these messages. The main ones convey information about notes such as telling an instrument to turn a note on or off. Other messages convey patch change information and timing and synchronisation data so drum machines and sequencers can play in time.

To pass the message around, instruments use MIDI sockets of which there are three types: MIDI In, MIDI Out and MIDI Thru. These are typically five-pin DIN sockets although MIDI only uses three of the five terminals. The Out socket transmits data and the In socket receives it. Virtually all instruments have these two sockets and some interfaces have more than one MIDI Out. The Thru socket is rather different and carries a replica of the information appearing at the In socket. This is very useful when you want to connect more than two pieces of equipment. And on that very subject, when you're buying MIDI cables buy ones designed for MIDI applications. A lot of data will be zooming along them and normal audio cables may just not be up to the job. Far better spend an extra pound or two than wonder why your set up falls down.

Easy so far, isn't it? In part two there'll be more MIDI messages to mull over and we'll tackle the sometimes thorny problem of MIDI modes. What are they? Buy CCI next month and find out.

I.W.

C128 HACK-PACK



"The ultimate utility package". This is the claim made by the publishers of this collection, System Software Ltd producers of the very good Oxford Pascal version for the 128 which was reviewed in last months issue. For such a claim and such a price (£39.95) I would expect to find it living up to its credits. Here is what I found.

Loading the disk is an exercise in self patience because there is a software protection key in the form of a colour coded sheet with different cells in different colours. You are asked to enter the colours of three random locations, which personally I found infuriating. This however the publishers go a long way to apologise for the inconvenience, but I still find it annoying.

Contained under one roof, this package offers an Amiga style Ram-Disk, a basic program compressor and a handy toolkit to aid your programming. The intro screen gives you these three options with the forth option of using the Ram-Disk and the toolkit together.

The Ram-Disk

I was most looking forward to getting my hands on the Ram-Disk which seems to me to be the best utility for the C128. In essence the Ram-Disk behaves exactly like a much faster 1541 or 1571 floppy disk; the only difference being that all the data on the Ram-Disk is held in RAM and not on a physical disk. All the usual disk commands apply, you can use CATALOG to look at the directory, DLOAD or BLOAD a program, OPEN to open a file and so on.

As on the Amiga the COPY command can be used to transfer programs and data files from floppy disk onto Ram-Disk and at the end of a session you can dump all the files from Ram-Disk onto floppy with a single command.

It is often important for the programmer to have control over which areas of memory are available to Ram-Disk and which areas are not. Ram-Disk has three modes of operation. In its simplest mode, for pure basic applications, Ram-Disk allocates two chunks of memory at the top of bank 0 and 1 and reduces the amount of memory available to basic accordingly. With simple commands you can move the basic/Ram-Disk bounderies to suit your particular application. Secondly using a combination of basic and m/c mode you can also alter the upper bounderies of those chunks to free up areas of high memory. Thirdly for very complex applications you can allocate any number of blocks of 256 byte "pages" anywhere in the machine.

Ram-Disk is copyrighted, so if you produce a commercial program using this you must inform the publishers. The C128 has 128K of RAM, some 8K of which is used by the operating system. When Ram-Disk initialises, it allocates about half the remaining memory to itself. If your basic programs are not longer than about 32K and you're not using enormous arrays the allocation of memory should not affect you.

Changing the Ram-Disk device number is also simple to do so that if you changed the device number to 8 any program which accesses a floppy disk file will go to Ram-Disk by default.

The Toolkit

The C128 provides as standard a very powerful and friendly editor (sounds just like CCI doesn't it?) for basic programs. Unfortunately certain features which are very handy are not catered for. In particular there is no way you can find a string in a programs listing, much less to search and replace any string. The Hack-Pack helps to fill this need.

Once loaded the toolkit resides at the very top of RAM in bank 0, from this elevated position it provides the programmer with eight new commands. As I said earlier when editing a Basic program you are not allowed to FIND a particular string in a listing but now you are. Just type FIND followed by the string and if needed CHANGE will alter a particular string with another. This acts in just the same way as most word processor editors which is very helpful indeed when you want, for instance, to change all your GOSUB 1000's to GOSUB 1500. Editing print statements is also made simple through FIND or CHANGE.

Another good tool is the DUMP command, helpful in many ways, such as if your program uses very many variables that are hard to keep track of, you can at any stage use DUMP and you will be provided with a list of the names and values of every variable at that moment. Handy eh! In the same mould comes the command INFO. This shows you all the info memory usage for basic text, variables, arrays and strings also how much memory free for text and arrays.

Other commands are SIZE and TYPE, these respectfully show size of a life in bytes and types to screen all ASCII files. Any file containing, printable characters may be TYPED. Finally MERGE, every programmes best friend.

The last section in the Hack-Pack is the COMPRESSOR, a nifty little utility which squeezes your basic programs down to their minimum size. (Something my editor does to my pay packet!) First the compressor removes all the dead wood such as spaces and REM statements, next it reduces the number of lines by cramming as many commands onto one line as it is possible to do. Therefore saving as much memory as you can.

Overall this package has some very useful utilities but I feel you have to balance out, on the one hand a C128 with all its RAM intact, and on the other, a C128 with a lightning fast Ram-Disk and limited memory for programming. Probably why you will need the compressor! I think when you consider the price of an Amiga with its Ram-Disk as standard and the price of this package for your C128 this must be good value for money.

Supplier: Systems Software (Oxford) Ltd, 16B Worcester Place, OXFORD OX1 2JW. Tel 0865 54195. Price: £39.95

THE CCI

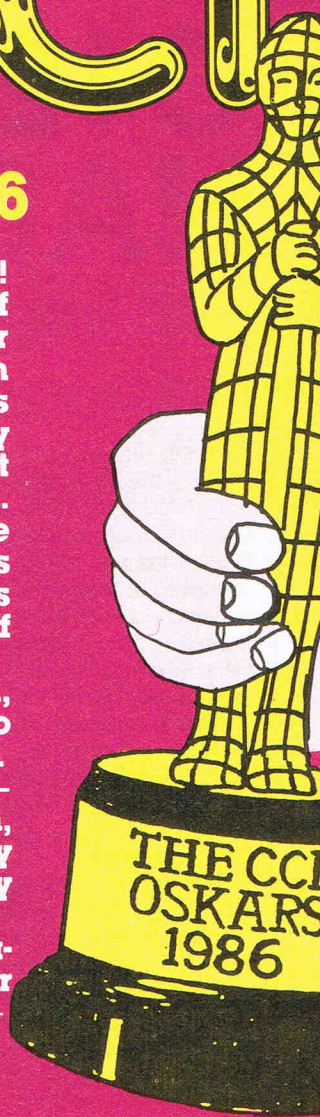
Oskar '86! The Real Class of '86

A good year? No! not a good year at all! A great year! Something happened in '86. The dire events of 1984/85 when the bottom fell out of the home computer market brought to the whole industry connected with home computing the dawning realisation that buyers had to be fought for. It was no longer a case of simply gathering the cash by the shovelful. The whole market had to leap into another dimention of sophistication. Yes, the customers would buy but the products had to be good — or cheap — or both. So the biggest seller was still Mastertronic — any price you like as long as it is £1.99! But Mastertronic put out some top notch stuff and, it has to be said, some really naff stuff, too . . .

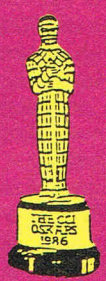
Lots of others jumped on the cheapo bandwagon, notably BT's Firebird and an interesting late entry to Low Price stakes — the Darling Family's Codemasters.

However, the real action took place at another level — where quality counts. The big names, U.S. Gold, Ocean, Activision, Ariolasoft, Gremlin made their weight solidly felt and they did it by firing into the market some really big, big chartbusters.

Some other names like Martech and Novagen, Llamasoft, Cascade, Anglosoft either confirmed earlier



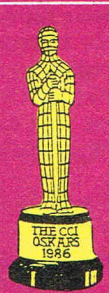
Arcade Game of the Year



The contenders were Uridium, Thrust and W.A.R. A fast terrifically exciting blast 'em down, Uridium was gutsy but looked a shade too much like a Sega arcade original (running the other way!) for our total liking. Thrust has got to be the outstanding value of the year at £1.99. Was that a Firebird pricing mistake? But the prize goes to W.A.R. from Martech for sheer blow 'em away, non stop joystick-bashing fun. Admit it, there's nothing like it is there?

Oskar winner: W.A.R. — Martech

Adventure of the Year



A very tough one this. So many top goodies pouring onto the 64. Contenders: Rainbird's The Pawn (of course!), Level 9's Jewels of Darkness (of course!) Infocom's sexy Leather Goddesses of Phobos (lewd level!), The Boggit for its wit and a couple late entries CRL's Dracula — the first censored computer game (which almost merits a special prize!) and Activision's Kooky Tasstime in Tonetown. The last surely has got to be a classic and narrowly took the prize.

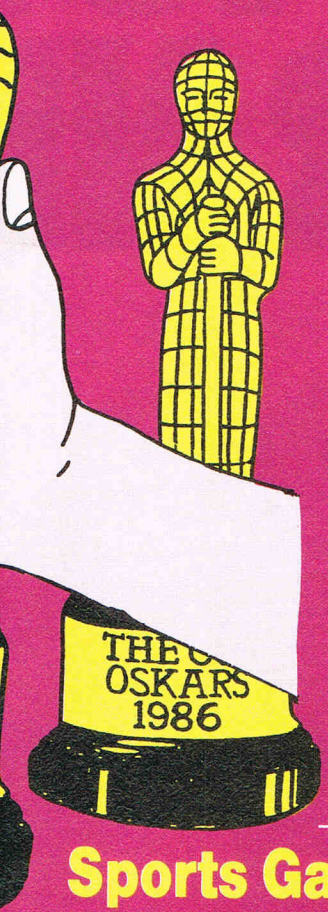
Oskar Winner: Tasstime in Tonetown — Activision

Arcade/Adventure of the Year

Clearly the fastest growing category. Contenders (loads of them!) Commando, Hacker II, Jack the Nipper, Mercenary (and now the Droid invasion!) Arac and Aracnidroid, Droid and (well almost Droid!) Druid. They were all terrific to play and had strong support but the struggle narrowed to Gremlin's cracking late entry the infuriating Jack the Nipper ("Buy this one or else!") and one of the year's big sucesses on all formats, Novagen's Mercenary. By a short, short head . . .

Oskar Winner: Mercenary — Novagen

OSKARS



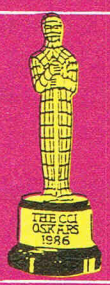
promise or sprang to sudden prominence. Some like Microprose, Rainbird and SSI grew from cult followings to much wider popularity. For one or two like Melbourne House, '86 will be a year they'll probably wish to forget.

When at CCI, we sat down to fight for our own favourites for the pick of the year — 'la crème de la crème' — when we came to choose the winners of CCI's much coveted Oskars — we found ourselves given a emotion-ripping problem.

The tough competition for a tough market had forced the software houses to drive themselves to fight their battles with top notch quality products — and there were so many of those top of the class products that we were faced with the sickening task of dumping really good stuff — each of which was almost as well qualified for an Oskar as the winners themselves. Almost . . . almost . . . there is always something that gives a winner that extra bite that superior stature — even if it is only afterwards you realise what made that one special, the winner, and the others no matter how good, the losers.

So many products were really brilliant that the creators of every piece of software or hardware we mention in our Oskar round up deserve roars of applause, whistles, stamping, cheers and medals too if we had them to give. All of the products really are winners, even if they didn't get the Oskars. They are what made '86 a great year . . .

Sports Game of the Year



Contenders: US Gold's Ping Pong (or Super Ping Pong) and Leaderboard (plus Tournament), Ariolasoft's Golf Construction Set and Touchdown; Activision's late challenger Championship Baseball. We raved all year about it and we just had to stick to . . .

Oskar Winner: Golf Construction Set — Ariolasoft

Best Martial Arts Game of the Year

A new category this one. And it was really unavoidable as the kicking punching King Kung Fu-ers stormed the screens in violent waves.

Contenders: System 3's International Karate (No 1 in the UK & US) the legendary Yie Ar Kung Fu (which spawned a sequel Y.A.K.F II) Gremlin's classy Way of the Tiger. Melbourne's sequel Way of the Exploding Fist II and Martech's (or rather Brian Jack's) Uchi Mata.

Defeating the staccato violence of the others with the way of gentleness that dumps you neatly off the screen . . .

Oskar Winner: Uchi-Mata — Martech

Best Simulation of the Year

Contenders: Cascade's Ace, Microprose's Silent Service and Acrojet. The marvellous surprise hit of the year Ace against the world dominating powerful Bill Stealey's Microprose . . . It was plane versus sub. Stormy arguments . . . Battle raged . . . Neither gave ground . . . a truce was called . . . Honours even.

Joint Oskar winners — Ace — Cascade and Silent Service-Microprose

SCIENTISTS A
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When we started our company on the west coast, people thought we were a little spaced out. So you can imagine their reactions when we announced we'd discovered a new universe.

People laughed. People scoffed. And they really freaked out when we told them where we'd found it:

Inside a Commodore 64.

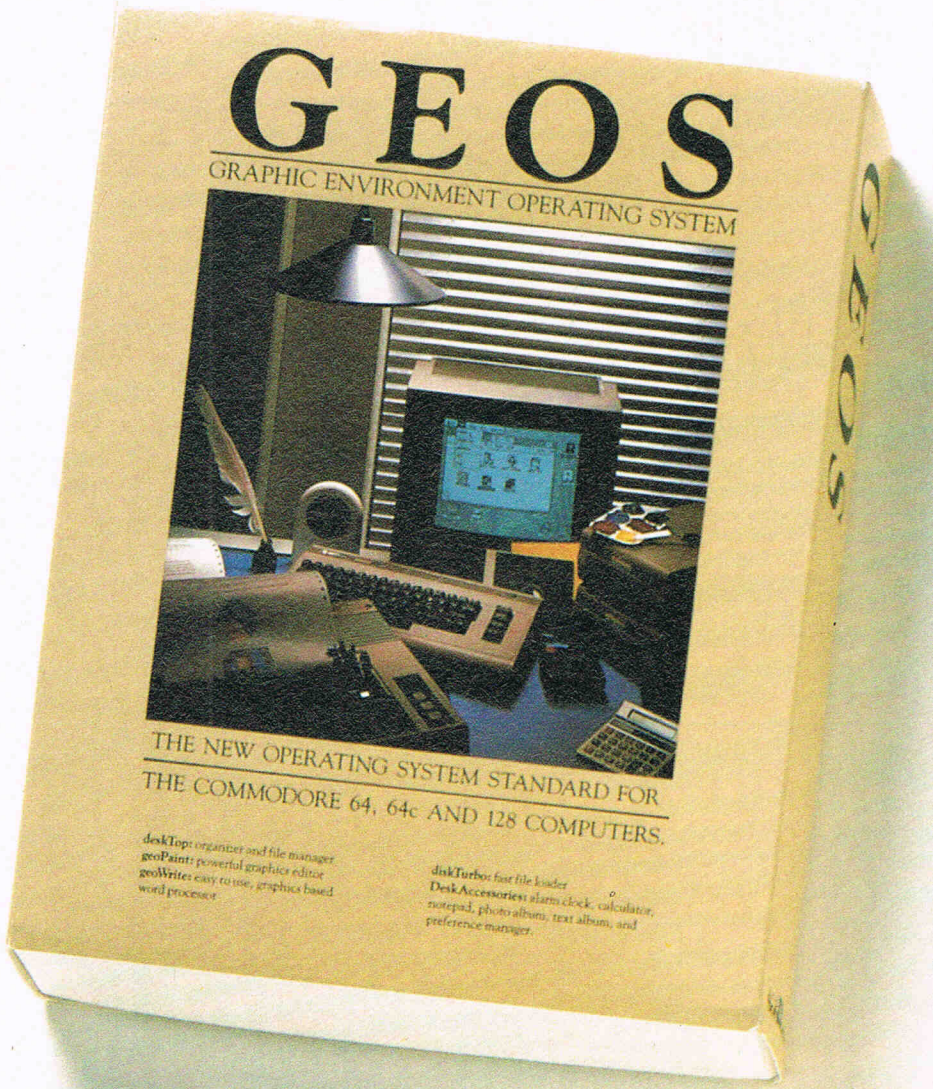
It's called GEOS. And it turns any Commodore into a powerful PC that holds its own against any computer, no matter what kind of fruit it was named after.

GEOS: The superior intelligence. Of course, we always knew Commodores possessed superior brains. It just took GEOS to discover them.

You see, GEOS opens your Commodore to a huge universe that can hold an infinite number of applications. Which means that GEOS can do just about anything the expensive PC's can do, including one thing they can't:

Add even more GEOS applications that are being developed even as you read this.

Increase your speed to warp factor 7. The first thing you notice with GEOS is how its diskTurbo speeds up your Commodore's disk loading and storing time.



Not twice or three times as fast. But five to seven times faster than normal. Which lets you streak through files and documents at what seems like warp speed.

And that saves you endless time.

Every universe comes complete with a desk. The way to keep order in our universe is with the GEOS Desktop. It's just like your desk at home, only without the coffee stains.

The Desktop keeps your art and documents filed, and comes

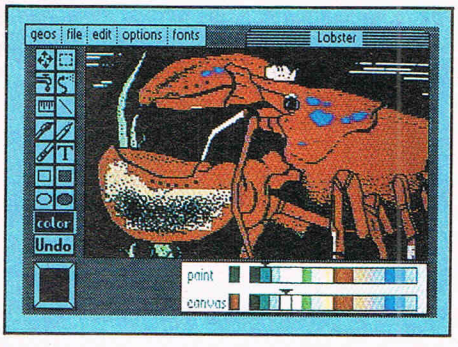
AT BERKELEY
W UNIVERSE.

with all the accessories you need to keep you organized:

An alarm clock keeps you punctual. A notepad keeps your memos. And a calculator keeps your accountant honest.

How to communicate with a new universe. With geoWrite, you can rearrange your written words. Move blocks of copy. Cut and paste. And even display your text in fonts of different styles and sizes, right on the screen.

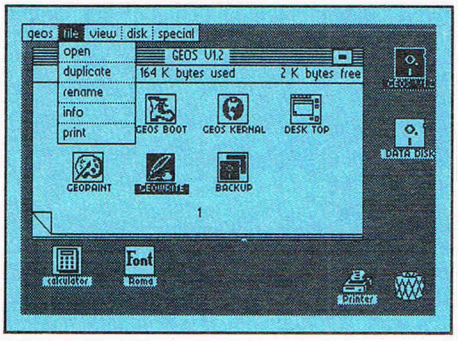
With geoPaint, you become a Michelangelo with a mouse.



Sketching and painting with all kinds of colors, textures and patterns.

You can invert, mirror and rotate images. Insert them into your geoWrite documents. And save them in your GEOS Photo Album for use later.

Finding your way through the universe. The most difficult



thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

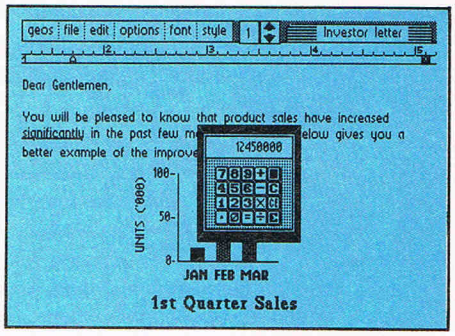
You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

Easy, huh? And in case you ever do make a mistake, GEOS backs you up with an "Undo" feature that undoes the very last command you entered.

Running out of space. With GEOS, that's hardly likely. Because there's endless space in the universe for new applications.

Unfortunately, there's only so much space in this ad.

So zip down to your nearest software dealer. Tell him you want to explore the new universe in your Commodore.



And if he looks at you like you're some kind of alien, well, just tell him Berkeley Softworks sent you.

The name is universally known.

To order, call 1-800-443-0100 ext. 234

GEOS is just $59.95

(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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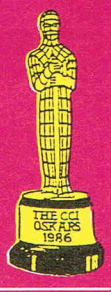
Berkeley Softworks

The brightest minds are working at Berkeley.

THE CCI OSKARS

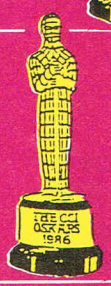


Best Strategy of the Year

Contenders: Strategic Studies Group's Europe Ablaze, US Gold's Vietnam, SSI's Knights of the Desert. Microprose Crusade in Europe. Manoeuvring with great skill the victor of this little war was . . .
Oskar Winner: Vietnam — US Gold

Best Role Playing Game of the Year

(New category this one). The contending players were Ultima IV (of course!), the cult success Phantasie from SSI and a late but fascinating entry, Activision's The Bard's Tale. For its sheer, mind bogglingly brilliant complexity . . .
Oskar Winner: Ulima IV — US Gold

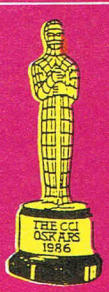


Best Multiuser Game of the Year

Yet another new class — and classy they were too — you don't get classier than *GOD* do you? The other contenders were Shades, AMP and MUD II. At the risk of offending the deity . . .
Oskar Winner: MUG II — Muse & B.T.

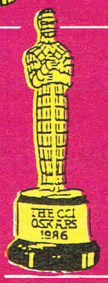
Best Compilation of the Year

Got to be the best value games packages, four or five games for the price of one! Contenders: Imagine's Konami's Coin-Op Hits, Level 9's The Jewels of Darkness Trilogy, Novagen's Mercenary Compilation, Ocean's They Sold a Million. With *five* smasheroonies on one tape for under a tenner it had to be . . .
Oskar Winner: Konami's Coin-Op Hits — Imagine



Most Original Game of the Year

We're suckers for something different and this was a category for hits that wouldn't fit into any other. Contenders: Activision's Alter Ego, Domark's slick Trivial Pursuit and their Spitting Image sorry, Split Personalities. Domark's duo were only stopped by their coming from already famed ideas. So our other self told us originality itself was . . .
Oskar Winner: Alter Ego — Activision



Best Graphics Product of the Year

The sheer quality of the graphics packages now available on the 64 (and 128) amazes. Contenders: Wigmore's Artist 64, Rainbird's Art Studio, 64 Drawing Board. Drawing ahead (oh no!) only at the end of the voting . . .
Oskar Winner: The Art Studio — Rainbird

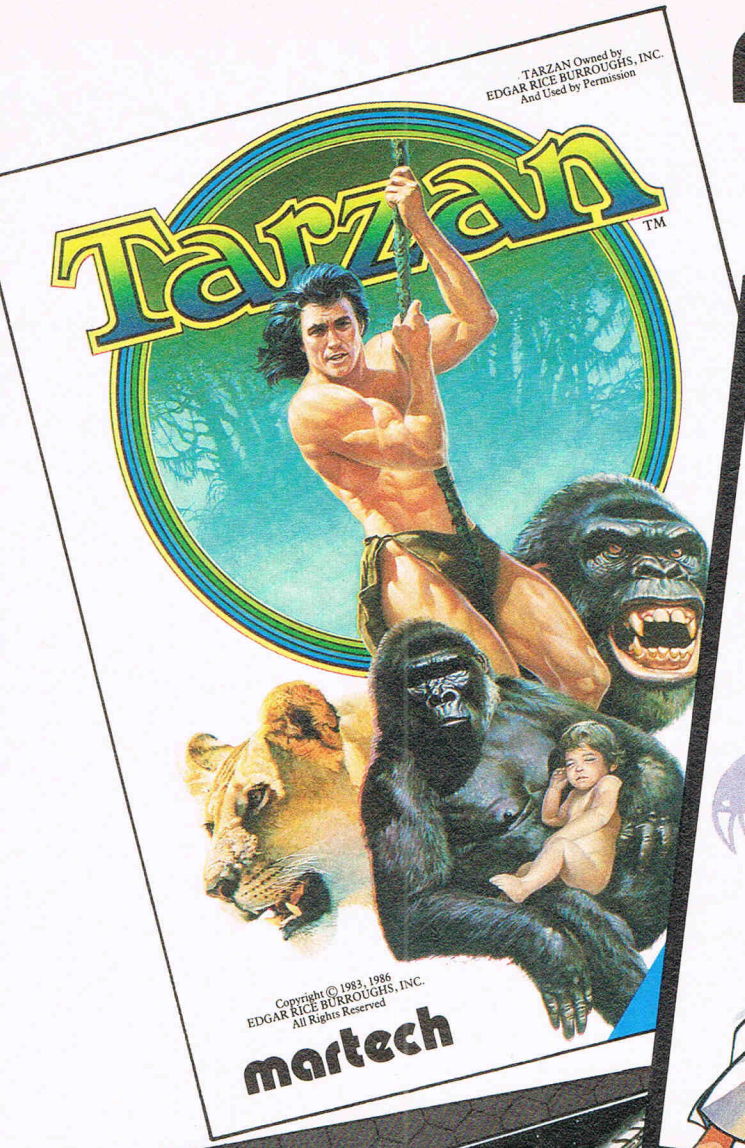
Best Software Utility of the Year

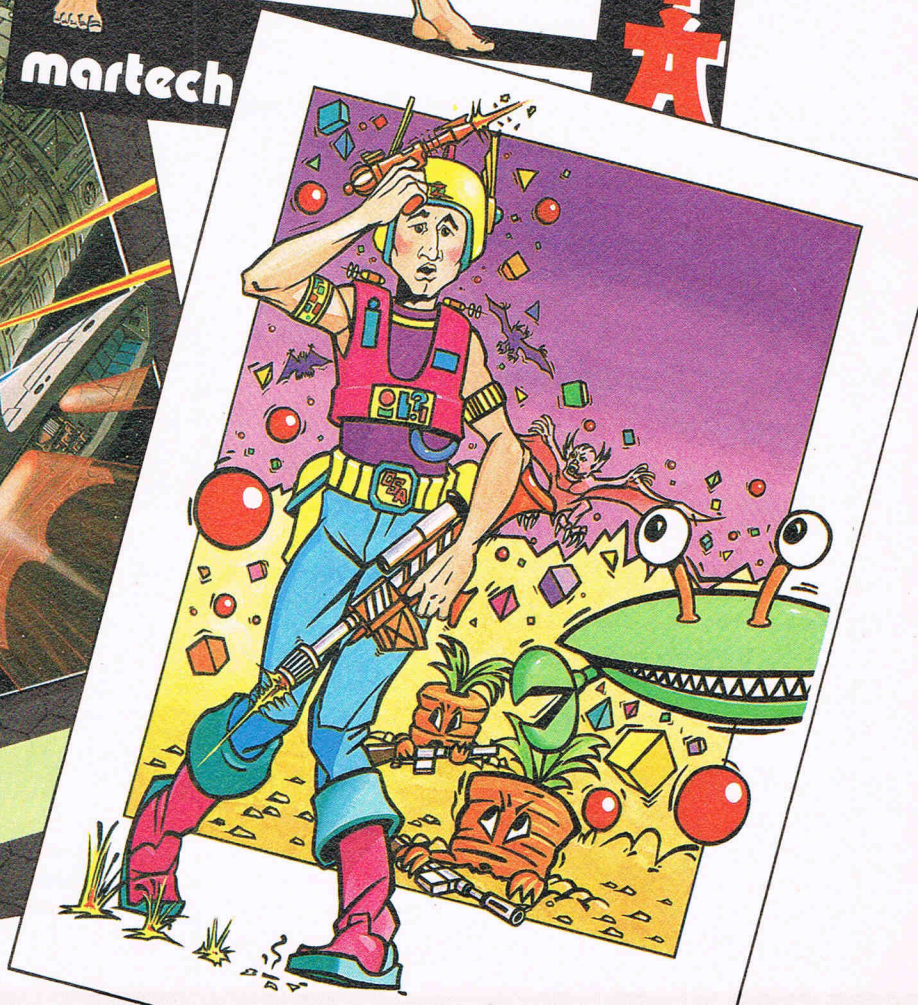
How to turn your 64 into an AMIGA — well nearly. GEOS — the brilliant windowing operating system — was a stand out for the leap into the future it makes so easy for the 64 . . .
Oskar Winner: GEOS — Berkeley Softworks

Best Hardware Utility of the Year

This decision was one of the fastest, 25 times as fast as usual. That's how much Dolphin Dos speeds up everything . . .
Oskar Winner: System Software

martech....
LIVE THE GAME!





THE CCI OSKARS

C16 Class of '86

A hush travels over the crowd as we fumble with the envelope. It's open, a fanfare sounds and we proudly announce the results:

Arcade Game of the Year

Trailblazer — Gremlin

Trailblazer is Gremlin's second game to make the top of the Class of '86 and proves what a good company they really are.

Trailblazer blazed in (sorry!) just in time to be entered, luckily, for Gremlin.

Best Arcade/Adventure

Monty on the Run — Gremlin

Monty on the Run is by far the best arcade adventure on the C16 and easily is one of the best three games of the year. Its the way you can travel in the game. sometimes you can get really far, other times you lose all on the first few screens. Frustrating, granted, but incredibly addictive, this game levels you asking for more!

Best Graphics

Winter Events — Anco

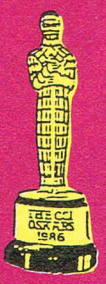
Fanfare please for the best graphic C16 game of the year . . . Winter Events! You compete in six events and the graphics in each event are stunning. Theyt are well defined clear and colourful. I would have thought them beyond the powers of the C16 . . . The sound is also excellent with tunes that you can get into.

Best Sports

European Games — Tynesoft

Tynesoft Software is improving with every release and European Games is their best to date. You compete in five events These are hammer throw, swimming, long jump, rowing and weight lifting. The large detailed graphics in most events are excellent and it's a pleasure just to look at them. There have been a lot of sport simulations but this is definitely the pick of the bunch.

Best Simulation

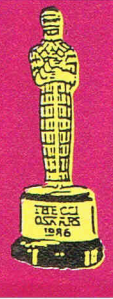


Mercenary (Plus 4 only) — Novagen

Ace and Mercenary both for the Plus/4 had to battle it out without any worthwhile C16 challenges. Mercenary, after a long struggle come up tops, but Ace deserves a mention as well.

Mercenary is a state of the art program which must have taken an awful lot of programming skill. A arcade adventure set out in 3D vector graphics, its game is a must for *all* Plus/4 owners.

Most Unusual



The Most Unusual Game is definitely *Oblido* which received a Mega review in (CCI October). Budget software isn't all bad, as Mastertronic have proved time and time again. Oblido is a mixture of strategy and arcade and is one of the most original games to be released for the C16 as well as one of the most unusual and best.

THE CCI OSKARS

C16 Compilation of the Year

Gremlin put together a series of their hits under the title 'C16 Classics'. Number I was pretty good. Number II great but Number III, containing Sword of Destiny, Jetbrix, Gullwing Falcon and Reach for the Sky was only . . . Totally Awesome!
C16 Classics III — Gremlin.

C16 Game of the Year

The addictiveness of this game is really something and it's a masterpiece of programming. *No* C16 owner should be without it.
..Winter Events — Anco

Best Musical Product of the Year

Contenders: the FM Sound Expander (CCI May), Syndromic's Digidrum (October) and Colleen's Music Compendium (September).

Brill, fab and grotnig as those two are, the winner, by a hair, is Colleen's Creator, a part of their Music Compendim but available separately at £19.95. This should enable anyone to produce commercial quality music and sound effects without needing to know how to program SID. A sort of adventure generator for music. (Colleen are running a competition with a £1600 Yamaha organ as the prize going to the person who produces the best piece of music with the system.)
Oskar Winner — Colleen Music Creator

Best Sound Product of the Year

This was quickly all over bar the shouting. We all loved it. It won in a whisper . . .
Oskar Winner: Speech — Superior Software.

Best Peripheral of the Year

Those lucky people who got given the new 64C in a Commodore Connoisseur's Collection (like our Editor!) got a terrific product thrown in a very handy winner . . .
Oskar Winner: Mouse and Cheese — Wigmore House

Software Company of the Year

With so much drool — worthy software grabbing for your lapels and wallets quite a few companies fought bitterly for contention . . . The finalists were the world's number one games company, Rod Cousens' Activision for all round excellence and loads of terrific products. Electronic Arts, another US biggies for its very shape 64 and AMIGA products and in the UK, Ian Stewart's fast rising Gremlin for its total dedication to quality in all aspects of this tough business. What got the winner its Oskar was the sheer variety of its products and the creativity that went into them . . .
Oskar Winner: President Trip Hawkins' Electronic Arts

Book of the Year

A slim volume that brought us up sharp in our tracks by telling us what the small screen is really doing to us . . .
Entertaining Ourselves to Death by Neil Postman

GREMLIN

ALWAYS AHEAD

Footballer of the Year

The game to answer every boyhood dream – the chance to make it to the very top of football stardom. Starting on your path to glory as a 17 year old apprentice with a Fourth Division team and only £500 and 10 goal scoring cards in your pockets, the footballing world is at your feet. Adopt the identity of a professional footballer and develop a career through the ups and downs of match days, transfer deals and injuries etc. Display your talents in Football League, U.E.F.A., F.A. and Milk Cup games and then if you're good enough the ultimate accolade of your sport, the Footballer of the Year Award.

Footballer of the Year
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Atari CBM 64/128
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Avenger
C16 +4 CBM 64/
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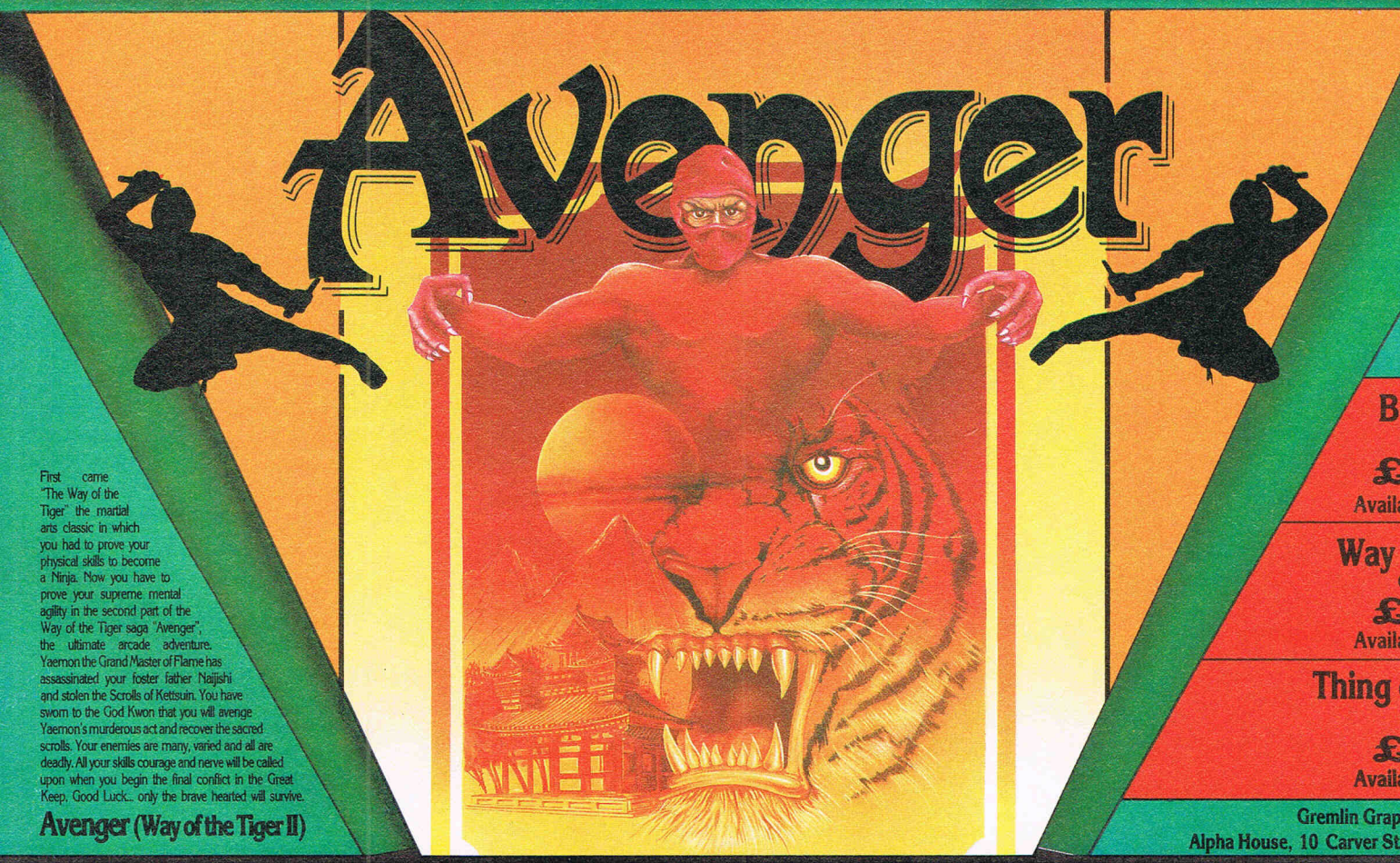
Avenger



First came "The Way of the Tiger" the martial arts classic in which you had to prove your physical skills to become a Ninja. Now you have to prove your supreme mental agility in the second part of the Way of the Tiger saga "Avenger", the ultimate arcade adventure. Yaemon the Grand Master of Flame has assassinated your foster father Naijishi and stolen the Scrolls of Kettsuin. You have sworn to the God Kwon that you will avenge Yaemon's murderous act and recover the sacred scrolls. Your enemies are many, varied and all are deadly. All your skills courage and nerve will be called upon when you begin the final conflict in the Great Keep. Good Luck... only the brave hearted will survive.

Avenger (Way of the Tiger II)

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Arise Sir Randolph to take up the challenge of death that has befallen the fair maid Amelia, held in the evil clutches of Spebott the Terrible. Acting upon an inter-dimensional distress signal from the galactic cruiser SS Rustbucket, don your Omnibott Mark IV attack suit and venture forth in pursuit of your beloved's captors. Defend yourself nobly against the Berzerka Security droids. Fight your way through 20 gruelling levels onto the planet's surface into Spebott's castle where the fate of Amelia lies with the outcome of your mortal combat with the awesome Henchodroid. Is there any gallantry and bravery left in this modern day universe?

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Thunder into the unknown at a breakneck speed, pushing your reflexes to their limits in this definitely exhilarating journey that's not one for the fainthearted. Roll left, roll right avoiding the endless chasms of doom that lay in and around the squares of mystery. Squares that will sometimes slow your progress, on occasion with fatal consequences and sometimes speed up unexpectedly or make you jump automatically. Keep a keen eye on the clock as the quicker you complete your task the higher will be your bonus. CBM 64 version is an amazing 2 player simultaneous game. Amstrad Disc version contains extra features.

Trailblazer

THE CCI OSKARS

Best Control Device of the Year

How do you steer a path between two great joysticks. The contenders were Konix's power packed Arcade blaster SpeedKing and the subtle slick adventure smoothness of Vulcan's Kraft. 'They're both so different!' was the cry. Okay the choice is yours! Equal Oskar winners...
Arcade — SpeedKing — Konix
Adventure — Kraft — Vulcan

Computer Printer of the Year

For its speed, its excellent N.L.Q. and its incredible flexibility — you can change fonts within your program or externally on the hardware at the press of the button, and its built-in Commodore interface.
Citizen MSP 10.E

Computer Programmer of the Year

For his excellent work in turning ANCO's C16 Winter Event, into an exceptional game by any standards...
Oskar Winner: Germany's Udo Gerz

Computer Personality of the Year

Is it a man? Is it a robot? No it's not and it's not Super Felix either. It's Oskar Winner: M M M M Max Headroom m m m m m....
(n n n n naturally...)

What? We've forgotten something? No. We've just been saving the best till the very last. (Don't you eat the tastiest bit at the end?)

64/128 The Game of the Year

Creativity was the key to greatness for the Class of '86. If you want the same old things the same old words — playability, addictive qualities and so on, don't look here, they seem to say. They have those by definition. They hardly fall into any existing category at all.

Contenders: Electric Dreams upstaged the arcades by bringing out Spin Dizzy — a UK product truly worth of its international success. Yes, okay, it was a Marble Madness look-alike but so amazingly well put together . . . truly awesome . . . And, of course then there was The Real Thing, Ariolasoft's genuine Marble Madess bouncing onto the 64 (to say nothing of the AMIGA version) Bump Bump .- number IV the Ultimate Ultima? Don't bet on it and don't hold your breath. When you play Ultima IV, (to say nothing of Ultima III!) your play in your time Shakespeare said, many roles. It's not so much 'who are you?' as 'who are you not'- (Tell me you play Ultima and I will tell you what but not who you are...) 10,000! That's how many landscapes there are to traverse in the last contender's Firebirds astonishing 'Sentinel' Yes, you heard it right! The landscapes are multitudinous. The enigmatic guardians stand dark and threatening, while you are (I've got to say it) boulder and boulder not to mention of vegetating like a tree. A tree? In a game? But what a game! Sentinel... What is it? An arcade adventure? Strategy? Not really, more a test of nerve... a game that will wake you up at night and drag you back to your screen. Just one more landscape... just one more... well one last one... A genuine challenge to your mind and your reflexes... Survive, if you can... a little like real life itself — only more fantastic... Sentinel almost won, it missed by a hair breath, the Programmer of the Year award. But it did win a prize for the Best Game of the Year.
Oskar Winner: Sentinel Firebird

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Competitions

WIN TARZAN VIDEO AND TARZAN GAMES

Created by Edgar Rice Burroughs, the legend of Tarzan has always had great popularity. The release of a new Tarzan game has brought out our spirit of generosity, and not only do we have 25 to give away, but also a video of 'Greystoke', starring Christopher Lambert as Tarzan.

Each of the following have something in common with Tarzan.

1) Romulus and Remus
2) John Merrick
3) Christopher Dean
4) L'Enfant Sauvage
5) Boy George

Find the missing link for each one and send your answers on a postcard to CCI, 40 Bowling Green Lane, London EC1R 0NE to reach us by February 15th.

Win a BMX Racer

On offer this month to the winner of this special CCI competition is one of the best prizes we've ever had in the magazine. A BMX bike! Simply answer these questions and send them on a postcard to us at CCI.

1. What do the letters BMX stand for?
2. In which country were BMX bikes first built?
3. Where were the 1986 BMX World Championships held?
4. What is the name of the leading UK BMX magazine?
5. Name 2 of the 3 Darling family who have created the Codemaster label.

Postcards to: BMX Competition, CCI, 40 Bowling Green Lane, London EC1R 0NE.
Closing date: February 15th.

WIN DANTE'S INFERNO

We have 25 copies of the new Firebird game 'Dante's Inferno' to give away. All you have to do is re-stratify Dante's concept of Hell. He envisaged seven levels of purgatory. We only want three and the name of one well-known computer personality you'd consign to each level.

Prizes will be awarded for wit, aptness and imagination, not a capacity for gore and torture. Send you suggestions on a postcard to: C.C.I., 40 Bowling Green Lane, London EC1R 0NE.

WIN MASTERTRONICS P.O.D.

We have 25 copies of Proof of Destruction to give away. To win a copy, simply tell us how the following met an untimely end:

The City of London
Marie Antoinette
Pompeii
Troy
The Titanic
Mussolini
Don Giovanni

Send your answers on a postcard to CCI, 40 Bowling Green Lane, London EC1R 0NE to reach us by February 15th.
The first 25 correct entries drawn from our competition sack win a copy of the game.

MEGA REVIEW

CCI Rating C64

CRISP

BMX Simulator

BMX Simulator — Code Masters

Prepare yourself for another spate of budget software. I've got a feeling that 'Code Masters' are going to be a winner with the games playing public. If all the games they produce are as good as BMX Simulator then they should do well. Anyway, getting back to the game. You are riding in a BMX championship and you must compete either against another player or against the computer. You see a birds eye view of the track and the lumps, jumps and ramps are quite easily recognisable. The championship can consist of up to seven races. Each race is held on a different track, each more difficult than it's predecessor. You've also got a time limit in which you must complete three laps of the track. On the first couple of tracks you get fifty seconds and then it decreases to forty-five, forty etc. Be warned, the computer is pretty good and is nearly always going to beat you. One little niggle I have is that you can crash with the computer and you will fall off your bike but the computer rider will never fall off, very annoying. Also if the computer finishes first, and if he's lapped you he will stop on the finishing line, thus making it harder to complete a lap. Once you've had a few games and got used to how to handle the tracks it will become easier to play and more enjoyable. It's very frustrating at first when you keep crashing. A little tip — I found the keys much easier to use then a joystick as the joystick seemed over responsive.

BMX has a lot going for it. The author, Richard Darling, has pioneered a great action replay option for those races with close finishes. Whilst watching the action replay you can see it in slow-motion which is very handy if you have a photo-finish. The sound on BMX Simulator is of the highest quality. There is a smart tune at the title page and excellent spot effects during the game. The crash noises are quite good and the sound of the riders pedalling is also used to good effect.

The graphics, although pretty small, are finely detailed and easily told apart. For instance the higher the bank in the curve the darker it is shaped. The bikes are good, especially when you crash! the loading picture is also first class, something that Ocean would be proud of!

BMX simulator is surprisingly playable. Once a few games have been played it becomes very addictive.

There is no doubt that BMX Simulator is superb value for only £1-99 and if you only buy one budget game, I recommend this one, you will not be disappointed, so bum the dirt off your tyres and race to your nearest stockist. It's padness personified!

Graphics ★★★
Sound ★★★
Playability ★★★★
CCI Rating:- Crisp (Very)
Price: £1-99

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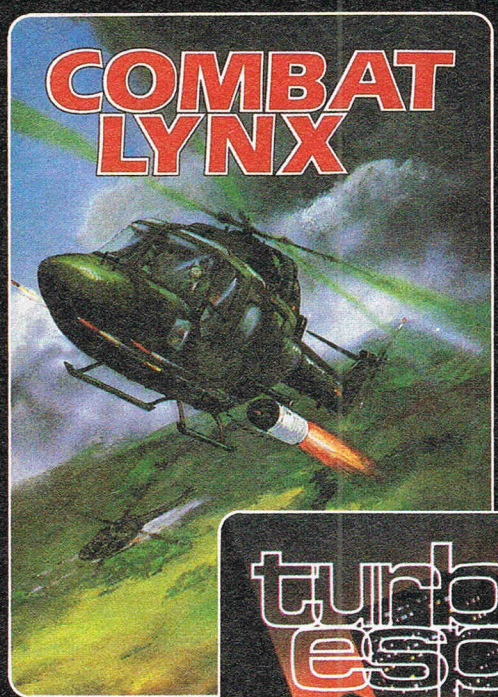

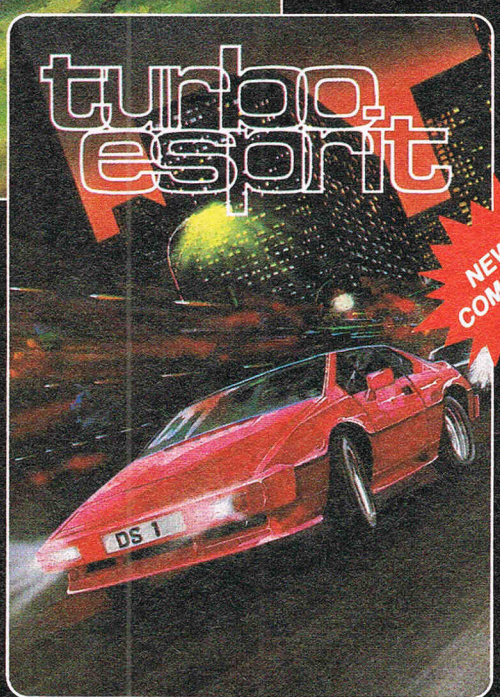

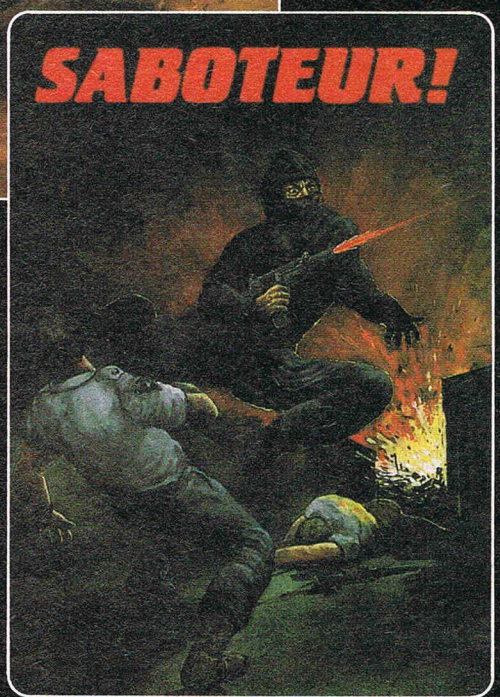

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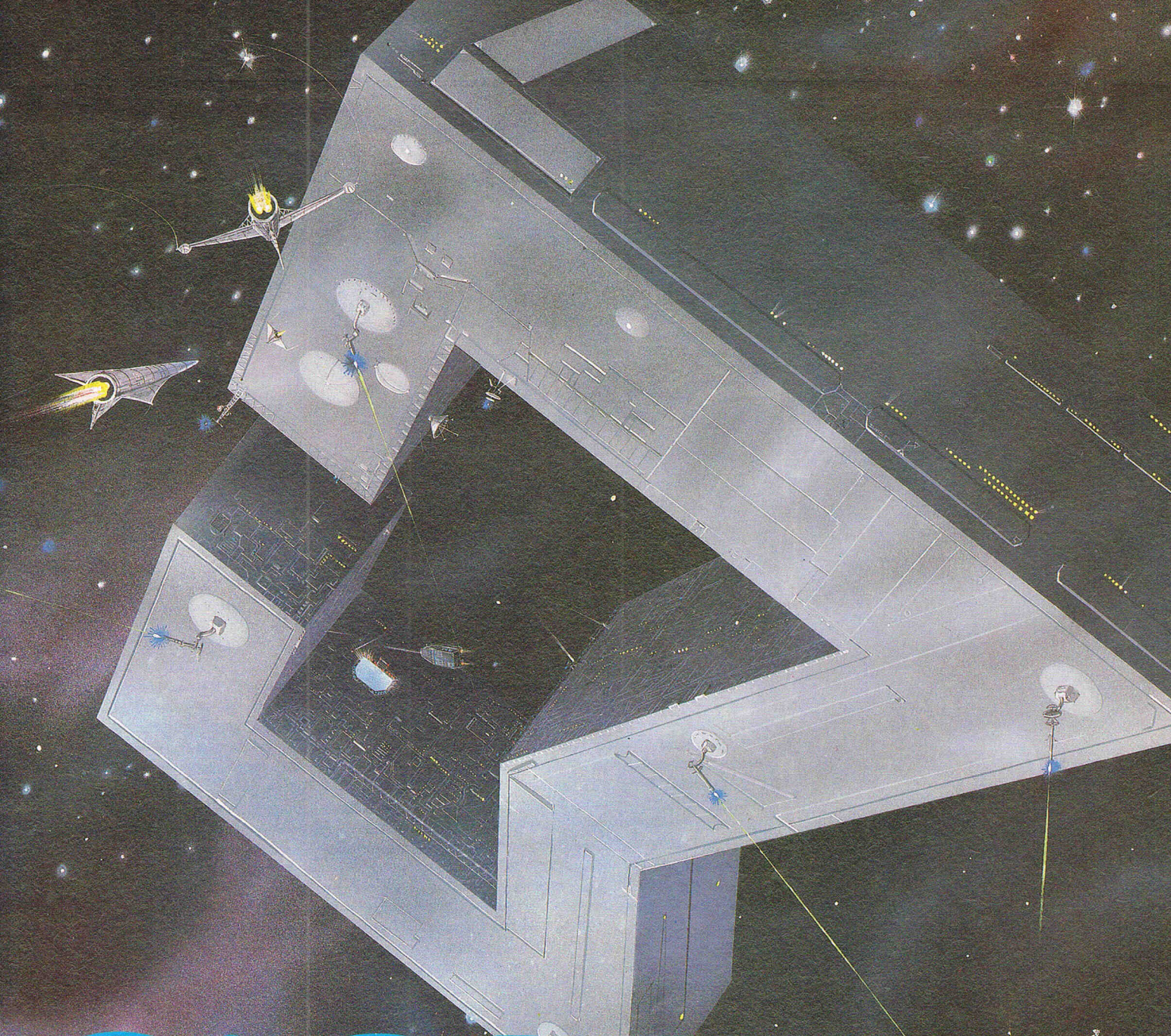

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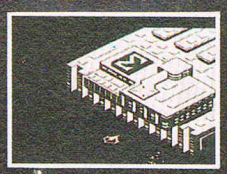
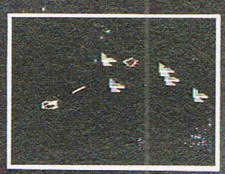
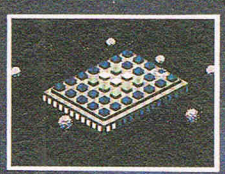
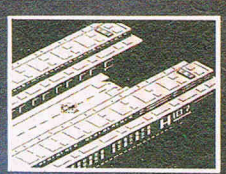

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software getting harder . . . .

MEGA REVIEW

CCI Rating

C64

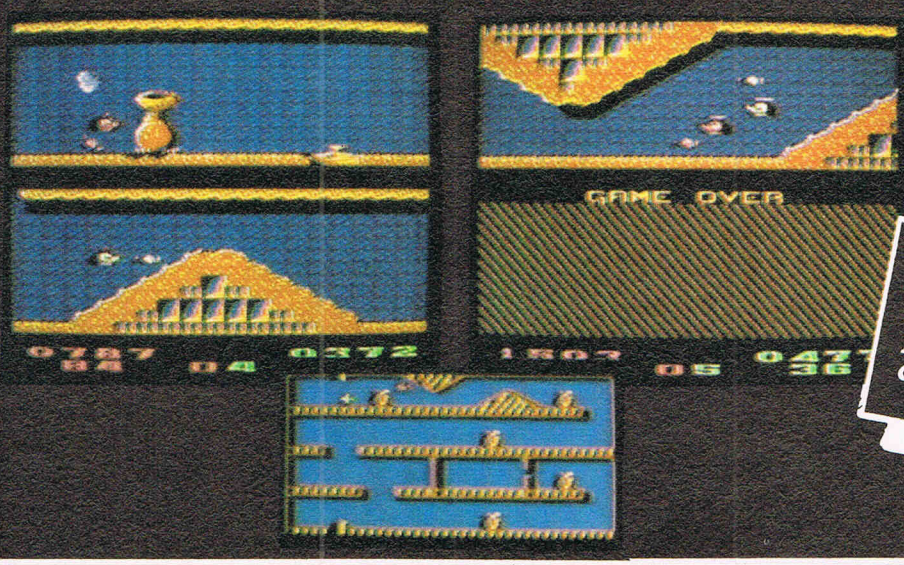
CRISP

Kettle — Alligata

Making another cup of tea will never be the same after you've played Kettle, the great new release from the makers of the equally brilliant Pub Games. I reckon Alligata have produced another winner in the form of Kettle. Anyway plug in your electric cable and take a grip into the mysterious world of Kettle.

Your kettle is trapped in a large underground complex and your task is to break free. This, unfortunately, is not as easy as it sounds, oh no! There are thirty different complex's each one getting larger and harder than the previous one. To escape from each level you must find a tin opener which is hidden in a bowl. To open the bowl you must hit it ten times with your 'Crizza' which is orbiting your kettle for protection. Once you've hit the bowl and broken it a diamond will appear. Hit the diamond once more with your orbiting crizza and it will break revealing either a tin opener, a jug of water which will enhance your energy level, a rotating BONUS or an energy sapping alien. Aliens are destroyed with ten whacks by your crizza. Kettle uses a clever split screen display for a two player game. It's like that that Beyond used in Spys vs Spy. Each player does his own thing. In a one player game you can play with two kettles but that just confuses the issue. You can also choose day-time or night-time to play in. I prefer night-time to play in. I prefer night-time as it seems to be easier to get down the escape shute, but maybe that is just my imagination!

Kettle does take a little while to get into but it does become quite addictive. The graphics of the kettle are pretty small but they are extremely detailed. Mind you the kettle looks more like a helicopter to me! The graphics of the backdrops are also imaginative and cave-like. All the characters are well coloured and sensibly sized. The sound is also first class and you can have the choice of having either spot effects during the game or a tune playing, either way they are both effective. I really enjoyed Kettle and thought it was truly playable and was one of the best games I've played recently.



Price: £8.45
Graphics: ★★★
Sound: ★★★★
Playability: ★★★★
CCI Rating: CRISP

MEGA REVIEW

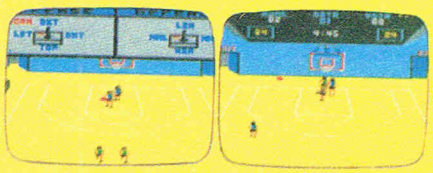
CCI Rating C16

DODGY

Championship Basketball (Two on Two) — Gamestar

This is the umpteenth sports simulation to be released this year and I'm getting a little fed up with them. Basketball is hard enough to play in real life let alone on your C64! You've heard of one on one well now play two on two. In a few months you'll be playing with the whole team! Your team consists of two players, a computer controlled one and a manual controlled one. You play against a very good computer duo and believe me they're either very, very good or they cheat. Personally I think it's the latter one! All the usual rules of Basketball apply such as the three second rule and the charging rule. You can pass to your team mate and he can shoot a well as you. It's just as well you can use your team mate from tie to time otherwise you'd never score a basket. One little thing that annoyed me was the way that the computer opponent was very good at scoring long baskets. He was very good at scoring, full stop! But whenever I tried a shot from a long way out I always missed or the shot was intercepted.

The graphics of the court aren't bad but the players look more like stick insetcs. The court is coloured bright yellow which, in time makes your eyes ache. The sound is also pretty appalling with only spot effects and a crowd cheer when a basket is scored or an interception is made. Championship Basketball is quite hard to play and I found it got boring very quickly. There are other sports that work much better on a computer, but I'm afraid that Basketball doesn't.



Price: £9.95 (c) £14.95 (d)
Graphics: ★★
Sound: ★
Playability: ★★
CCI Rating: DODGY

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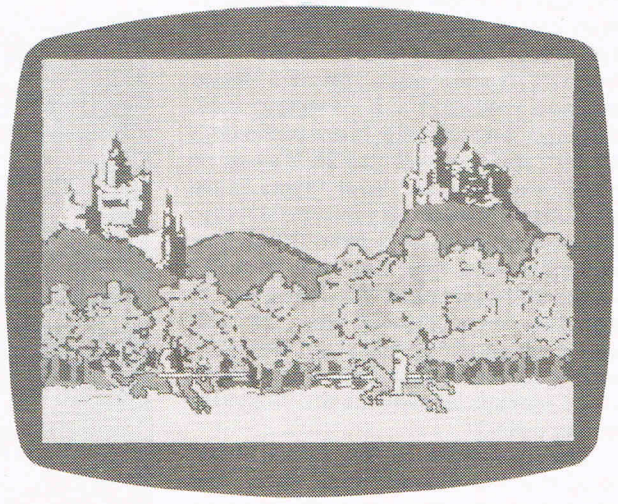

Look at the picture: the game it shows was produced in only one evening! Horses, knights, lances, everything is moving. And everytime a horseshoe touches the ground the sound-chip makes a "tapp" synchronous with the pictures!

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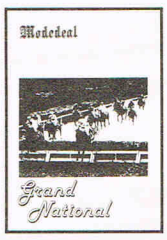

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MEGA REVIEW

CCI Rating C64

CRISP

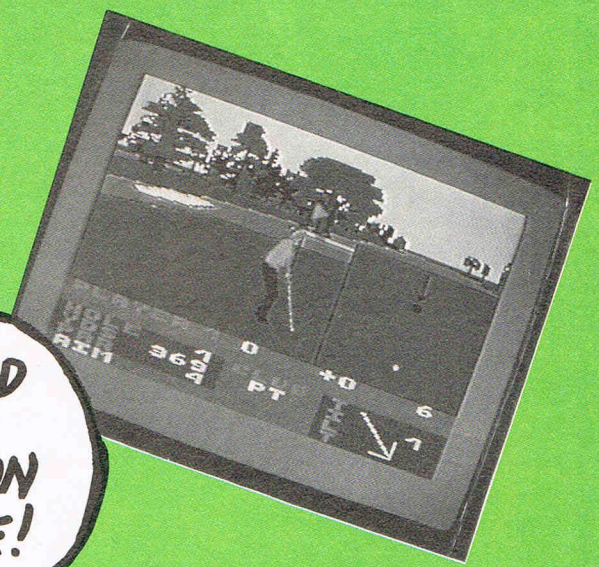
Hole in One

Despite the things about this game that irritated or frustrated me, I still found myself playing it long after I'd promised myself I'd get down to writing the review.

To play the game you control (after a fashion) the actions of a reasonably well animated golfer. Select a club, aim by means of an arrow in the air, pull the joystick back to control the backswing, wait a moment then push it forward to whack the ball. The length of the backswing affects the strength of the shot and the length of the moment you wait affects the amount of hook or slice on the shot and hence the direction in which the ball sets off.

After each shot, the scenery changes to represent your new lie (a vast improvement on the real thing —none of that tedious walking or hacking about in the undergrowth to find your ball!

When you get onto the green, an aerial view is inset into the corner of the screen as an aid to putting. The score for the hole, your running total and your score against par are recorded below the graphic section of the screen together with details of the hole you're playing, wind speed and direction (on the green, wind doesn't affect you so you get an indication of the direction and degree of "tilt" on the green).



TONY LYDEARD SAYS— VERY GOOD FUN AND VALUE!

The sound effects are quite realistic. There is a nice little routine when the player takes his club from the bag and returns it after the shot (this gets a little tedious after a while — as does the length of time taken to draw the scenery between shots).

My major complaint about the program is that there is no indication of how far you are from the pin — the distance indicator merely tells you how long the current hole is. Also, it doesn't appear to make much difference whether you are on the fairway or in the rough — you get the same distance on your shots. A third complaint — and probably the most frustrating — is that the apparent lie after a shot bears little resemblance to what the computer sets up as your next shot. It's annoying to see the ball land on the green then have to play a shot from a bunker!

This may not equal Ariolasoft's 'Golf Construction Set', but for the money it's very good fun and value.

T.L.

Price: £1.99
Graphics: ★★★
Sound: ★★★
Playability: ★★★★
CCI Rating: Crisp

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2 PLAYER

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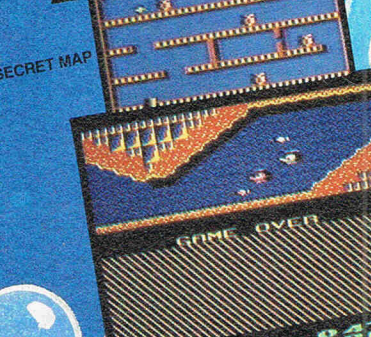

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ALL THE SAME, THE YUKKY LOLLIPOP MAG-GOTS MUST BE PULVERISED
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—CONTINUED ON PAGE 138

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MEGA REVIEW

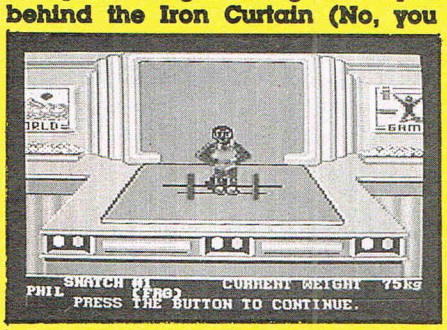
CCI Rating

C64

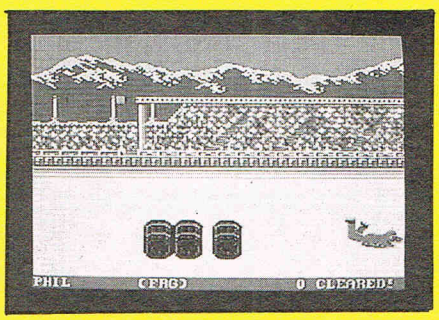
CRISP

World Games — Epyx (U.S. Gold)

"Oh no" I hear you moan. Not another 'bust ya joystick' game?' But world games is a little different from summer games and winter games, but not much. You can choose if you wish to compete in all the events or just one of them, you may also practise any event you like. As in SG & WG all the events load separately which is a good thing I suppose but a little tedious waiting for the tape version to load. The events are somewhat more original as far as originality in this game can be There are eight events which include; Weightlifting, Cliff Diving, Slalom Skiing, Log Rolling, Bull Riding, Caber Tossing, Sumo Wrestling and Barrel Jumping (Their really scraping the barrel on that one! Ed) Each event takes you to a different location in the world firstly the weight lifting takes you behind the Iron Curtain (No, you



don't lift it! Ed) to Russia in the weightlifting you can choose the 'Snatch' lift or the more difficult 'Clean & Jerk' lift. In either the object is to get the bar above your head to the satisfaction of the three eagle — eyed judges. One nice touch is when you've got the bar above your head the lifter's face starts to change colour. Also, when you change the weight of the bar you actually see the weights being added which is a clever touch.



The Barrel Jumping is a relatively easy event once you've got the hang of it. You must make your skater jump over as many barrels as you can, ranging from 3 to 20. On landing you must pull down on the joystick otherwise your skater will go through the ice, which is quite funny. (Oh yeah? You try it, icicle-head! Ed).

Cliff diving takes you to the sunny climbs of Acapulco in Mexico. Your task is to dive nearly 120 feet into shallow water avoiding the rocks at the base of the cliff. If you misjudge your dive you will thump your diver's brains out on the rocks. Cliff diving was my favourite event. (So it was mine! I watched it from the hotel appropiate with a large tequila in my hand. Great sport! Ed) The skiing is the usual in an out of the gates, very boring.

The caber tossing is a pretty good event. You go to the heather hills of Scotland for this highland games event. You must toss a 19 foot, 120 pound caber and make it flip over. If you do not toss it correctly it will either fall on your head, thus knocking your brains into the ground or you will drop it on your foot and your Scotsman will jump around in agony.

As for the Bull Riding and the Log Rolling and the Sumo Wrestling .... a bit silly for reproduction on a computer.They don't work at all well and the computer always wins.

I quite enjoyed world games although everybody seem to be getting a shade tired of Olympic type games. I was pleased however that it wasn't a Decathlon style 'Break the Joystick' game. Most of the events are done using rhythmic movements.

The sound is as usual first class. There is a good try at bagpipes on the caber tossing. Various other tunes & spot effects are also well done. The graphics are large and colourful and they move quite smoothly. Overall a decent game from Epyx and one for sports fans who want something a little different.

Price: £9.95
Graphics: ★★★★
Sound: ★★★
Playability: ★★★
CCI Rating: Crisp

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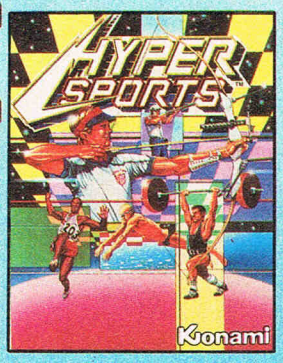

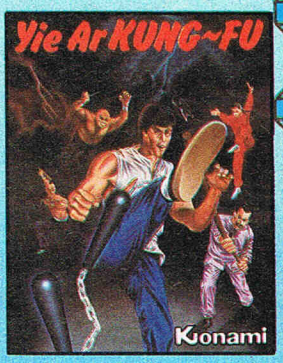

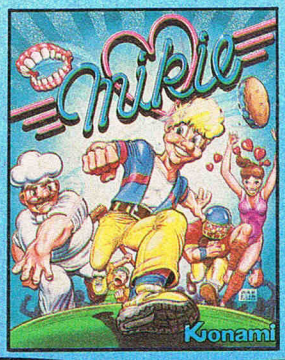

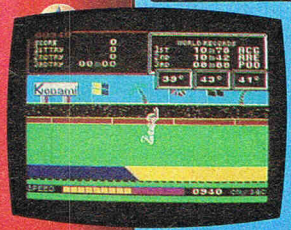

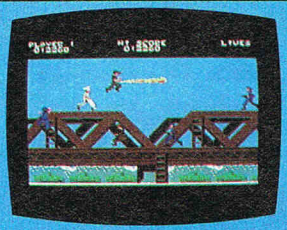

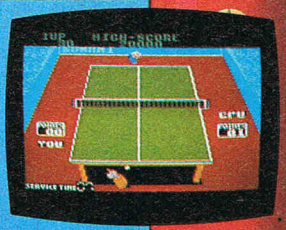

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Screen shots taken from various computer formats

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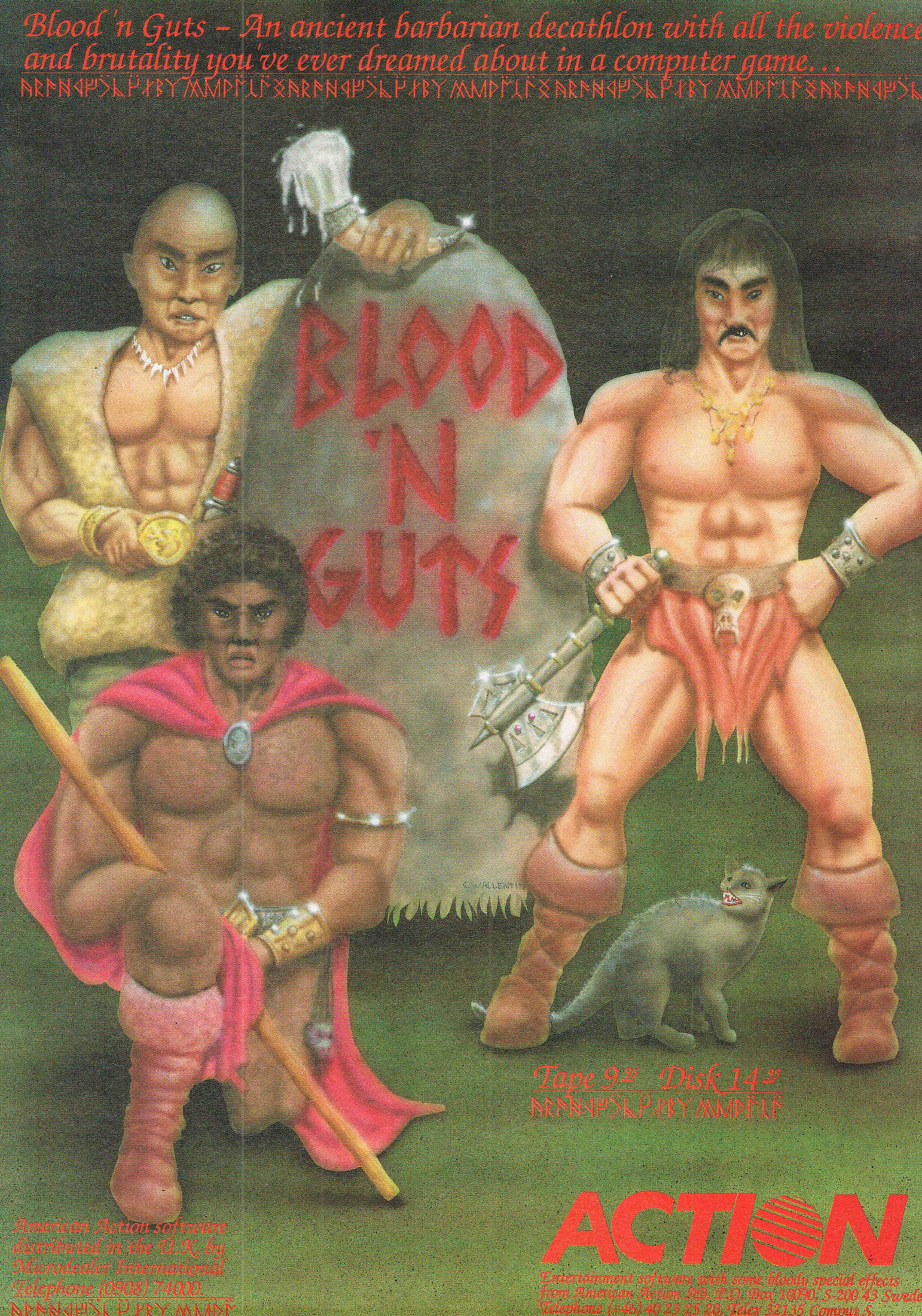

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MEGA REVIEW

CCI Rating C64

CRISP

CAPTURED

Captured by American Action

Captured is a sequel to the most successful game ever produced in Scandinavia — Soldier One. Captured is presently topping the charts in Sweden and is far and away the highest seller in its native country. As very little software — and even fewer games come out of Scandinavia, it was fascinating for us to see what kind of game and what level of sophistication they had reached in Sweden. It has to be said that in style 'Captured' is not going to set the world on fire. It is essentially a conventional platform game. But it has to be said that it is a really good example of platform games. And there are loads of games players who will delight in the problem its multiple challenges throw at you.

You are unconscious and when you wake up you have to escape from a building to surroundings which you will recognise. Inside the building are loathsome and lethal beasties. Yo have to avoid the multiple threats that attempt to bump you off (literally off the platform!) on the way. You sometimes possess a laserweapon (with only three shots in it). Sometimes you just have to jump for your life! Dangerous eh? And not all easy!

American Action (a little echo here of US Gold perhaps? Will AA get to be as big as US?) claim that 'Captured' sets new standards in computer games and injects innovation into the platform concept! That's a big claim. Captured certainly is a high class platform game. It's fast and needs a terrific amount of agile joystick work to keep alive and the 100 screens give more than enough challenge for anybody to face. Captured will be a solid attraction for many gameplayers and will probably be a top seller throughout Europe especially for the lucky first-time owners of the new 64C who want to find out what a platform game really can do. If you want an absorbing and often infuriatingly difficult platform game take a close look at Captured. Is there going to be Soldier 3, American Action?

Price: £9.95 (C)
Graphics: ★★★
Playability: ★★★
Sound: ★★
CCI Rating: Crisp

MEGA REVIEW

CCI Rating C64

CRISP

1942

1942 by Elite

Well okay Arcade game fans, here's another from Elite, the coin-op conversion aces. The objective of the game 1942 is to fly your plane on a solo mission to destroy enemy planes on site and in flight. You get a wide selection of planes you can shoot at, both fighters or bombers (and watch those bombers — they're sneaky!). Half way up the screen you get a "Pow", this is a power capsule which allows you to fire more bullets once you have shot down the massed enemy planes. You can also dodge the fighters by rolling the plane which is very helpful when you are being bombarded by a dozen fighters and a couple of bombers all at the same time!

You then have to land your fighter back onto the aircraft carrier. You can then take off again and fly another mission but this time its not so easy. In fact the missions get harder all the time as the different levels go up. The game itself is a very good replica of the famous Arcade version. The graphics can hardly be as good as in the Arcade but still have a crisp, sharp appearance about them which is very smooth and good to look at. 1942 is a very zippy and colourful game though the sound is on the average side, still what can you do with fighter plane noises?

Elite are certainly expert at this kind of Arcade conversion now. Their programmers are turning out some hot stuff. If you feel like a really challenging shoot em up to give you the feeling that you're Top Gun and a real fearless ace, then 1942 could well be the arcade game for you.

Price: £7.95
Graphics: ★★★
Sound: ★★
Playability: ★★★★
CCI rating: CRISP

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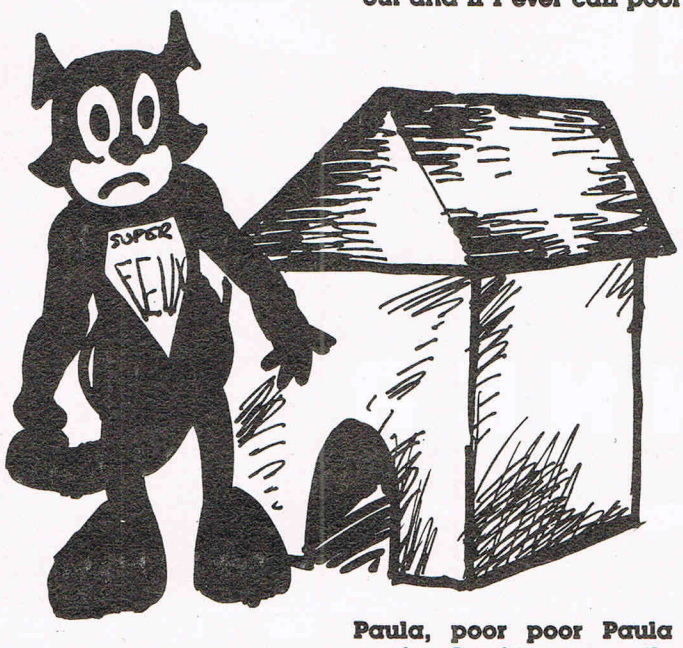
Super Felix is "Fee-line". That means pay cash and he won't

Bow-wow, Miaow!

Woe is me! Yes me, Super Felix the world's most greatest cat — in the doghouse! My Editor came storming into my basket about an innocent little note I wrote



in the last month's CCI. I mentioned the sacred name of our Holy Lady Paula Byrne whom I blasphemously addressed as poor poor Paula. I prostrate myself in obesement (In a basement? Where? Ed). It seems my equally sacred (200 kilos too!) Editor got an irate phone call from Sir Anthony Rainbird who told him in no uncertain terms that Our Lady Paula was not 'a deflated balloon', (I take it back, she isn't deflated) that she was not depressed but deliriously happy at B.T. and that far from slamming the door in her face, if Our Lady of the Byrne wanted to, the whole of multibillion pound Melbourne House, indeed Australia, would run to hide their little heads in Our Lady Paula's generous lap. The Ed (foaming and stomping terribly) ordered me never to call poor Paula, poor poor Paula ever again on pain of having my job as the world's greatest cat offered to said Sir Anthony Rainbird. I retreat everything. No senior members of B.T's Beyond Rainfirebirdodinthor staff have left really — no one has ever left! And that includes Francis Lee. The B.T. companies are all making billions of pounds profit each and no-one, not even Telecom's boss Lord Ederyn has told them to get on or get out and if I ever call poor Paula, poor poor Paula again. I will personally allow myself to be punished, being forced to take over B.T's whole tremendously successful, wonderful software empire. There Sir Anthony, may I come out of the doghouse now?

Karen Thais up the M4

Did you know that it is 'International Road Safety Year'? You didn't? Neither did we till the EEC asked CCI to chose a 'Miss International Road Safety 1986'. We had no problem at all in electing Karen (a.k.a. Lee-Anne the international famous model) of Anco, the highly successful software house.

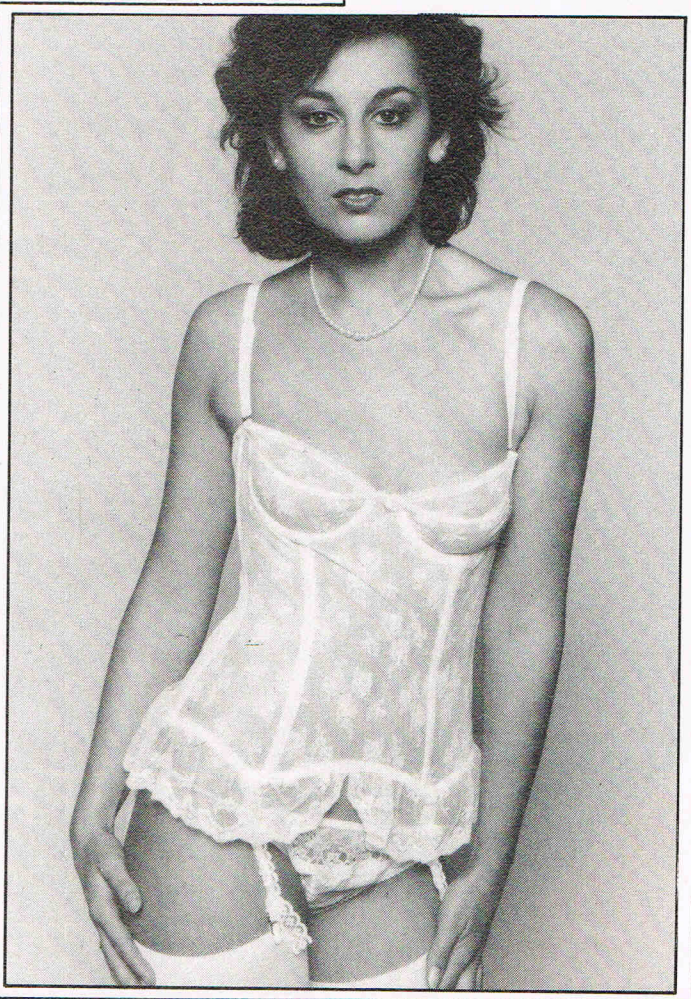
What has the gorgeous Karen done to earn this high honour? Well, known as an incredibly cautious driver ('never fast than 200 Kms an hour in town') she managed to write-off not one but *two* cars in two weeks. She recently visited CCI Tower to show us Anco's brand new Plus/4 'Bridgehead', clad uncomfortably in a neck support acquired as a result of a whiplash injury (whiplash? Is that something kinky? This is a family magazine! Ed).

It seems that a huge tree leapt out onto the road and beat up her Jaguar. When she quickly acquired a replacement Lotus sports car, one of those huge sixteen wheeler, juggernauts didn't notice the nil height of the lovely Karen's £35,000 runabout and smashed its articulated trailer along the side of her sporty wagon. Write off number two. The luscious Anco beauty was lucky to escape with the loss of her clothes and a relatively minor neck injury. We hope some consolation will be her choice as CCI's 'Miss International Road Safety 1986'. Several hundred men in CCI Tower have offered to take her to the Monto Carlo rally to give her the presentation personally. But O.S.E. has pulled his seniority (I beg your pardon! Ed) and claimed the privelege. It's not fair! I would have loved to have squeezed into her new M.G.

Skol and Crossbones

A certain software house has told us that it will never trust any magazine in the universe again (what, not excepting CCI? I can't believe it! Ed). Piracy is the charge! It seems that two of their pre-production version games were confided to a certain Commodore Mag and lo, wonders will never cease, sheer coincidence of course! Who me, Me Lud I was home in bed with me mum and dad! The games appeared all over the place like an epidemic of measles, even being sold in a street market! Now, low though our opinion may be of certain abusive, fluff covered lollipopped, bore

Karen 'International Road Safety Year' Bridgehead of Anco photographed after the accident(s) in her 'Thai Boxing' practice uniform. "I love the game" she told us, "It's thrilling to see 'Thai to Thai' with other players".



you out of your mind, so-called Commodore mags, even CCI would not have credited that level of dastardly behaviour to any of them! Yet we are assured that it is, cross my heart with silver, true! A certain gentleman (?) whose initials are not a million miles from those of Tiny Julie Rosen is no doubt totally mistakenly, absolutely unjustly accused of this heinous act. Piracy! Criminality striking at the very integrity of us corrupt magazine hacks. Oh woe! Yet one should not judge too harshly. (Though there are calls for him to walk the plank! CCI will sell tickets). We understand that this unlawful, likely to cause a breach of the piece goings-on wouldn't have happened had not the demon drink (ale, beer, larger, booze, call it by any disgusting name you like) been imbided in enormous nay, as CCI's Finance Wizard Mr Ben ('take that pile of old £10 notes and dump them') Lewis would say positively, gynormous quantities. 'He must have been pieced out of his mind' was the generous comment that reached us from 'a close observer of the fatal scene'. Is this called taking 'the piece' out of a collegue? And what's this about a combined Spectrum and Commodore Mag called 'Crapp'?

Lady Janet Graham-Baldock de Oysterville at her country estate famous for 'rolls in the hay' as they are quaintly called in rural Essex. A spokesman for the fabulously wealthy and talented Graham-Baldock family told CCI that "we are intimately interested in getting into the software field if we can find the right vehicle". What about a tractor, Lady Jane or is it too exposed to the Essex weather?. Or would you prefer to be really bourgeouis, dip into the housekeeping money and buy up BT's troubled Rainfirebirds of Beyonodinthor?

Struck Off Harrier

But Hooray! I'm not the only pussycat who's has his tail stepped on! Would you believe it O.S. (our sacred Editor) has been bawled out too! None other than General Bit Patton of Mircosoft rang him on the day the last CCI came out. She took great exception to our review of Llamasoft's amzing goodie called Strike Floss Harrier. Seems Pattie-Wattie who's gained an intimate knowledge of flying from her close friend Biggles told O.S.E. that we didn't know our flops from our undercarriage. She thoughtfully pointed out that 'Your arch rivals in Ludlow '(who can she mean?)' came to the same conclusion' (that Stark Worse Terrier was a no no) 'but at least they said they didn't like flight numbers!' I have every sympathy with General Patton. I love flight stimulators. I agree that Struck Forced Warrior is the greatest game in the whole of the universe and I'm sure that CCI's reviewers never even bothered to look at it. Or ever look at any game at all in fact. (Especially those vicious corrupt unprincipled swines Tiny Julie Rosen and Courtney King, Sir). They just throw dice to see which games should get Awesome, Naff etc and laugh viciously when marvellous, amazing, fantastic flight stimulators like Struck Off Barrier (or is it Spike Your Carrier?), so unfairly get lumbered with the Big Elbow. You tell him, General Bit Patton... He should fire all those corrupt swines and let you and me do the reviewing, don't you think?

(UN) Blasted Heath II

Ho! Ho! CCI's pact with the devil no longer seems quite so powerful! Sir Geoffrey Heath ex-Foreign Office, ex-Activision, ex-Melbourne House was supposed to be hexed (see Super Felix last issue!) 'cos he hadn't answered a missive from O.S.E. (Our Sacred Editor). He certainly lost his foothold on the Bosship of aforesaid Melbourne Castle (not surprising I 'spose when you think they had to build it upside down!). Having said that, have you noticed how *everyone* is using that expression these days?, they could just say 'but' but having said that, they don't. (Get on with this totally disloyal story, you pedantic idiot! Ed). Anyway having said that the said Sir Blasted Heath has re-emerged as a biggie biggie boss at (any price you like as long as its £1.99!) Mastertronic.

Ho, Ho'. Indeed! Has O.S.E. lost his frightfully evil power? Are the little pins he sticks in those obscene wax effigies of his, in his cobwebbed office, no longer so sharp? Is his gallumping his vast (200 Kilo!) naked bulk around bonfires at full moon in dark woods in company with blonde nubile young ladies of no use any more? I wouldn't bet on it if I were you. He only has to look at me and I feel cold shivers in some usually very warm places. (You? So called Super Felix? I wouldn't waste a curse on you'. And stop making that anti-evil eye sign at me or I'll turn you back into a cat!) Me! Write a disloyal story? Impossible, Sir Lord Heath of Mastertronic? Never heard of him! O.S.E. and I'm sure neither have you.

DON'T CALL US...

Hallo... suddenly last November... Tiny Julian (et tu brute!) belled himself down to a wrong number, a mere data leaked dot, a vanished fibre-optical illusion.

The lonely receiver whispers 274 no more and pines for his ever-fevered, ever-present addicted grip. The personal international exchange is silenced. The modems lie mute.

Julie's travelling complaint — 'a tree across the line' — Portsmouths at us no more.

He has finally gone off the rails.

Yes, going, gone, gone (that has a ghostly £1,200 a quarter ring to it) the dust — and mud — the ex-wizard has bitten.

Tiny Julie... He dialled up love but once and that was in the lotus position. A message?

You can't miss nothing but a babble voice at the very end of a crossed line. They called him completely up the (telephone) pole. Anyway, he is now otherwise engaged.

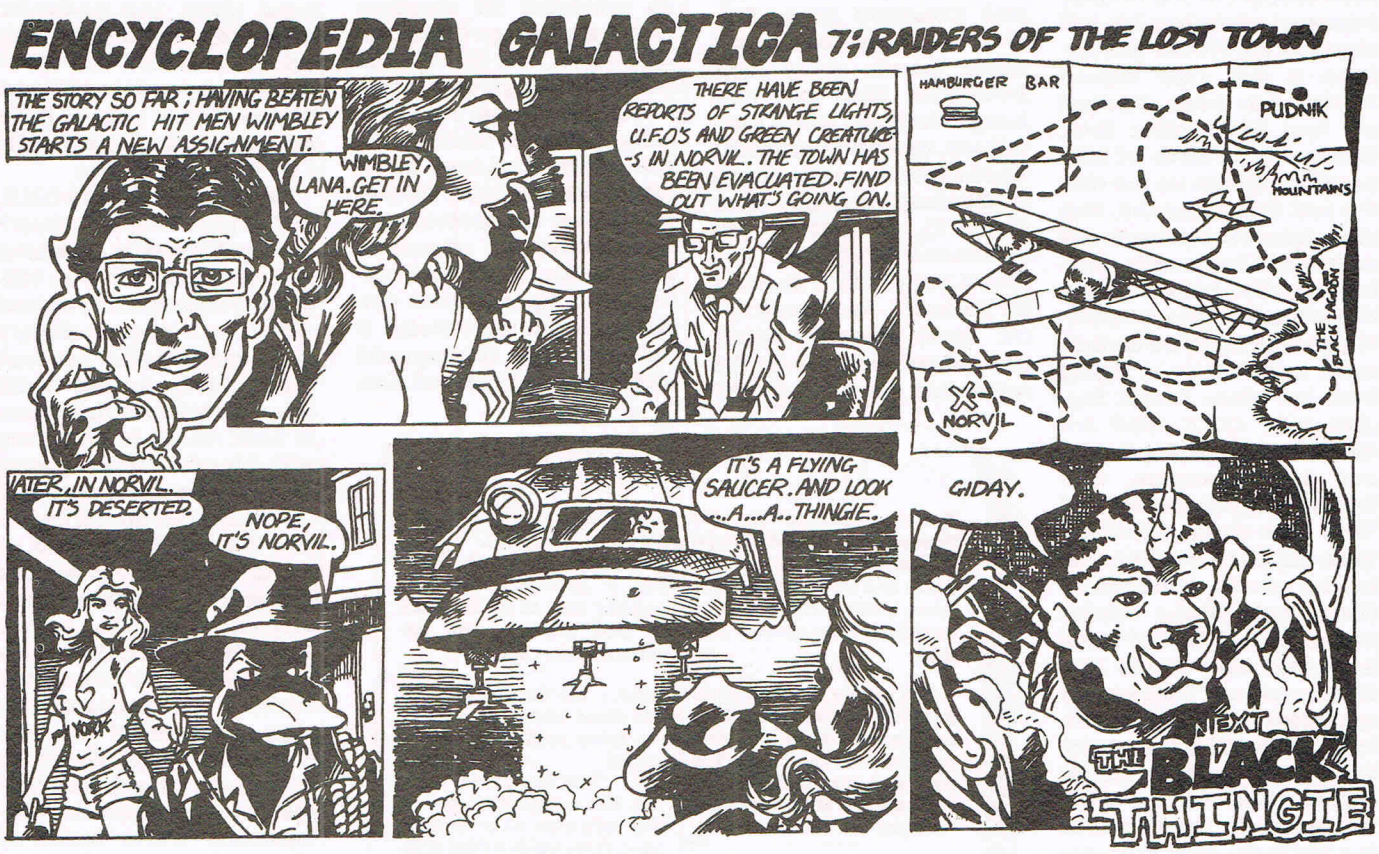
(sigh) Super Felix (aged 3¼)

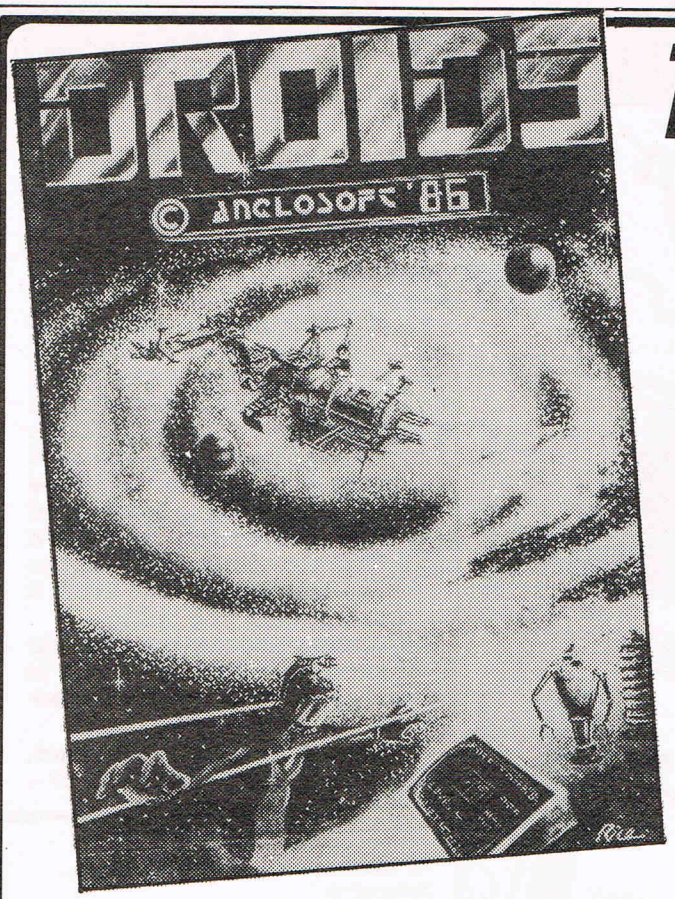
Is it a bird? Is it a plane? No, it's SUPER FELIX!

Hey Wanna Party?

I thought you'd like to know a few of the stars of the Commodore World who crammed into my end of year party. If you weren't there, I'm not sure I should let you read this, you just may not be important enough.

Kate, Lairdess of McGibbon, Lady Sara (Peachy) Galbraith, General Bit Patton, Group Captain Neil Beagles, the Maharani Jeannie el Aurens, The Lord Brown of US Gold, Marquis Brian of Elite, Sir Steven Willis, Le Chevallier Kady M.D., Mr Frankie Kafka, O.T.T., el Conde Maximillian Jacobson Bocanegra, Señorita Chippy de Madrid, Señorita Tessa Gonzelez-Marina-Bocanegra-Harris Sylvester, Señor Don Andre Jose Martin Francisco Bruno, Earl Loowis of Edge, Dame Eileen Loowis, Mr Mark Angary - Loowis, Sir Gregory Ingbang, Don Juan Holz-Veryfirst, Herr Luther von Konami, Signor Roberto Hey, F.A.S.T., Ms Pauline Hook-Garsden, I.K., Sir Geff Records, Lady Jane Cavanagh B.T., Mr Howard Joystick-Jacobson, Sir Bob Gedditof, G.O.D., Mr Robert Durell-Headbanger, Lady Lightening-Cohen, Monsieur le Croucher, Sir More Peason Longman, F.T., W.H. Smith, Marquis Timdell of Edge, Madame Amanda du Barry, Le Marquis Francois de Brungair, Count Ashleygrey, Lord Tynesoft, Sir Peter Holme, The Reverend Sister Jane Smith, Ms Rachel Welch-Strivens-Lancome, Sir Richard Allbronson, Generallisimo Franco Frayed, Master Wonaneinein Tronic, Ms Sharon Wongflic, Sir Kevin Lacyviza, Senator Tom J. Kevin, Count Tomas Stravinsky-Firebird, Marchioness Byrne of Raynbyrd, Captain Malcolm Robinson, Ms Susanna Pearce-Job, Sir Peter-Paul Fenton-Chandler, Lord Hugo Gollner, S.T., Queen Christinalees of Schtockport, Baron Meakin of Database, Congressman Jack Tramiello, Princess Gail of Wellington, President Thomas Rattigan, U.S.A. C.B.M., Sir Nicholas and Lady Bessey C.E.L., Sir Jeffrey Yakminter K.B.E., Miss Paula Electronics D.S.N., Mrs Jackie Very-Savage, R.A. Sir Jacob Harris, Marchese Leonardo Ferrantino, Baron Joseph of Paget, Sir Michael Clarke M.M., C.B.M., The Hon Clare Mermaid-Hirsh, Mademoiselle Clair de Lune-Edgeley, Congressman Thomas Watson B.T., Lady Firbank CNET, Countess Lyn Bennett R.A.D.A., Dame Daphne Moss, R.N. Lady Wendy Martini, Sir Graham and Lady Janet d'Oysterville de Bulldog, The Hon Ian Bennett, Sir Billian Donald B.F.B., The Hon Darren Le Pen, Lady Linda ('Lovely') Wilkes, Princess Sandra Gallagher de Manchester, Sigor Andrew Universe-Muscles, Princess Krotoa de Moses, Mr (Tiny) Julie Rosenphone, Mr Courtney King, Sir, Dr Beverley-Angela King, Sir Rodney Cousensvision, Baron Stewart of Gremlindom, Captain David Ward (R.A.M.B.O.), Sir Paul Thomson (P.R.H.M.), The illegible Michael Boxter, Ms Lesley Media-Mattus, Sir John Arthur, The Hon Billy Brown, Colonel Tom Hart, El Marquess de Carlo's, Sir David Muchmuchmore, Mr Alan Saccharine, P.C. Sir Clive Seefire-Flatscreen, His Excellency Robert Collyer-Surf, Sir Len Chiefley, The Rt Hon Ian Waff-Crotchet, The Hon Jo Meadsbourn House, Mr Malcolm Larks, R.A. Mr John Goodvans A.C.E., Baron Stuart of Greenland, Lady Romayne Downunder, Dr Paul Welchaterled, The Very Reverend Simon Treasure, Sir Richard Players of Interceptor, Lord David Sagesoft, Sir Stewart Bell, M.P. Bishop William Poel, Sir Clement Dracula, Lady Jane Denning M.H. Marchioness Skinner of Rugby, Sir Peter Supersoft, The Duke of Stein, The Marquis of Stein, Sir Michael Mikromeek.





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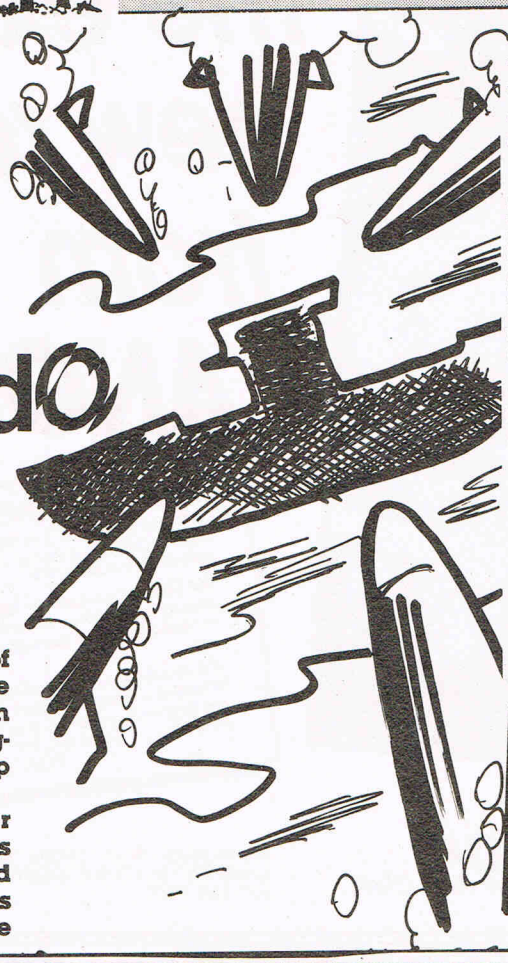
MEGA REVIEW

CCI Rating C16

PRE-BASIC

Torpedo alley



Torpedo Alley by Firebird (Silver Range)

Firebird have made another mess of things with their latest release in the £1.99 range. If they think they can compete with Mastertronic and Bug-Byte they're going to have to buck up their ideas considerably.

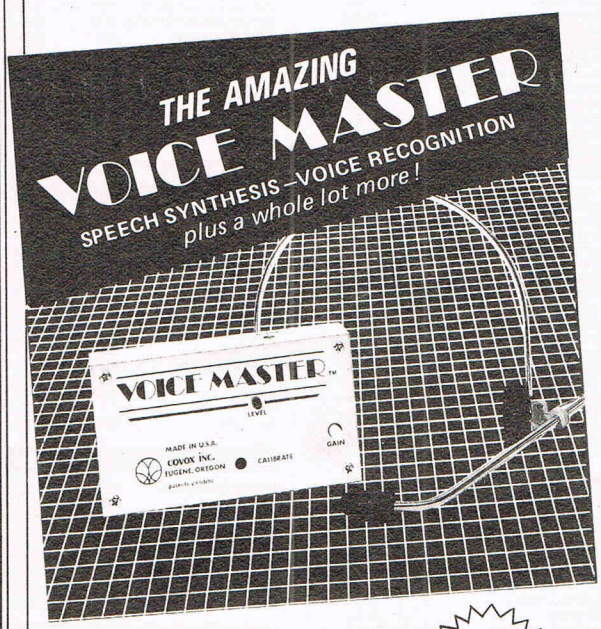
Remember Shark? Remember Runner? This is worse than both, it is just the worst game I have *ever* had the misfortune to load up. The less astute amongst you might not realise what I'm saying so I'll put it in simpler terms. If you have any affection for your computer, don't torture it this way!

When I loaded the game, I put it straight onto level 7, because I'm so brilliant at games (and modest too! Ed). All thought left my mind at that moment. It consisted of shooting a big ship (as in warship) and a small ship. It became very easy very quickly. There was a plane flying overhead and trying to bomb you. Being the bright spark I am, I submerged myself beneath the water (you're in a sub by the way), waited for it to pass and then resurfaced. As I said, it became very easy very quickly.

You scan the horizon through a pair of binoculars (which I presume is supposedly the view from your periscope).

This game is useless. Oh dear, what gets into some programmes?

Price: £1.99
Graphics: ★
Sound: ★
Playability: ★
CCI Rating: Pre-basic



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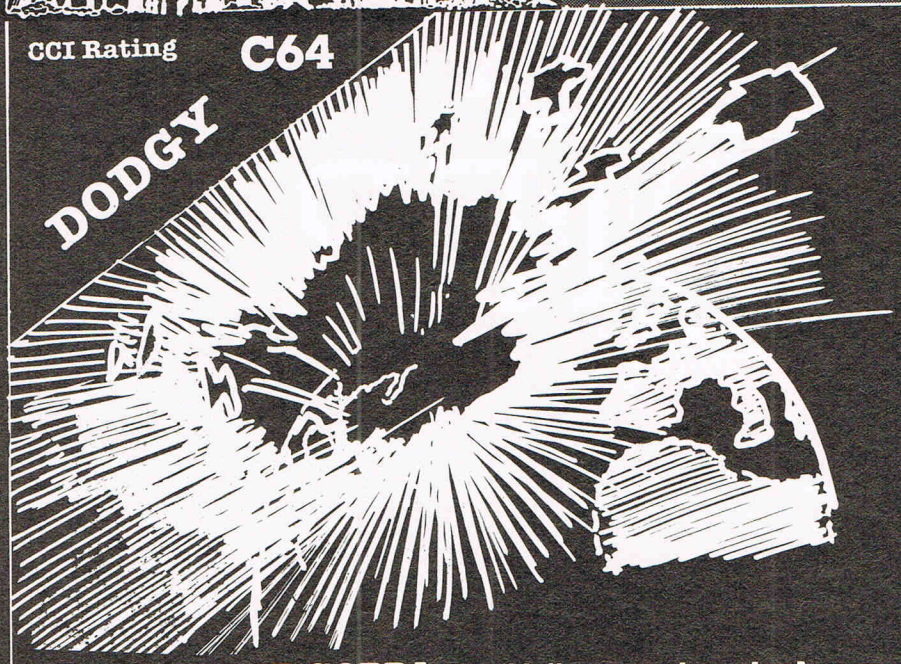
MEGA REVIEW

CCI Rating C64

DODGY



STRIKE FORCE COBRA FROM PIRAHNA

A more Spectrumesque game I really could not possibly imagine. Slow graphics, sometimes flickery, single-colour "sprites" don't exactly contribute to this game. It seems that Pirahna have made the classic mistake of trying to sell a straight Spectrum conversion on the Commodore 64; it very rarely works. Anyway, on with the plot...

An evil criminal genius, known as The Enemy, is blackmailing the world with nuclear destruction. By hacking into the world's defence computers he now has complete control over the nuclear stockpiles of the world. One touch of a button will trigger of the detonation sequence, blasting the world to oblivion!

To hack into the computers, he had to use kidnapped scientists, forced to work "under the threat of fiendish torture." They are the only ones who know the secret codes that will open the doors to the fortress computer centre.

So Cobra was formed. A team comprising of the creme de la creme of crack commandos, its mission to penetrate the Enemy's complex, and destroy the main computer.

By destroying support computers, the main computer can be slowed down to give you more time to complete your mission. You will have to avoid or destroy patrolling robots, and fight your way through locked doors, into lifts, and down corridors.

Sounds good doesn't it! Well, unfortunately it isn't. If Pirahna had taken the time to re-code it for the Commodore this might have been a really great game; it sure has a lot of potential as a concept! The sound is pathetic, the graphics slow and indistinct, and because of this playing the game is an absolute pain. Great concept... badly executed.

Price: £9.95
Graphics: ★★
Sound: ★★
CCI Rating: DODGY

CCI Rating C64

NAFF

DANTES INFERNO

FROM BEYOND

I'm afraid that Beyond really do seem to be slipping pretty badly. Once, Beyond had a name for excellent, top quality software. Ever since its takeover by Telecom-Soft, it seems to have gone downhill although I do not know if the two events are connected.

Dante's Inferno is based on the adventure by Dante Alighieri, and although this may be a classic, I doubt that this game will enjoy that same privilege. The game involves you descending through the different circles of Hell, in order to reach a confrontation with Lucifer himself. On your way down you will come into combat with monsters inhabiting the depths of this dark realm, and of the sinners themselves.

You are in control of the Pilgrim, who in the true spirit of four-year old games (even thought this is a brand new release) can only walk in four directions. There are no diagonals. Strewn about the landscape are various objects that are of use later in the game, although they are not directly refered to in the instruction which are distinctly boring. Pilgrim starts in Limbo, and if you move right for a while, you'll find the entrance to the first circle. If you linger too long in Limbo, swarms (well...) of hornets will start to attack you!

The game itself is boring. The graphics are boring. The sound is bording. Its a pretty boring game altogether! I had hoped that along with the rest of Telesoft, Beyond would also rise to its former glory, but I rather think that Firebird and Rainbird have been destined to be the names at the top.

Price: £9.95
Graphics: ★★
Sound: ★★
Playability: ★★
CCI Rating: NAFF

COMMODORE BUSINESS and AMIGA USER

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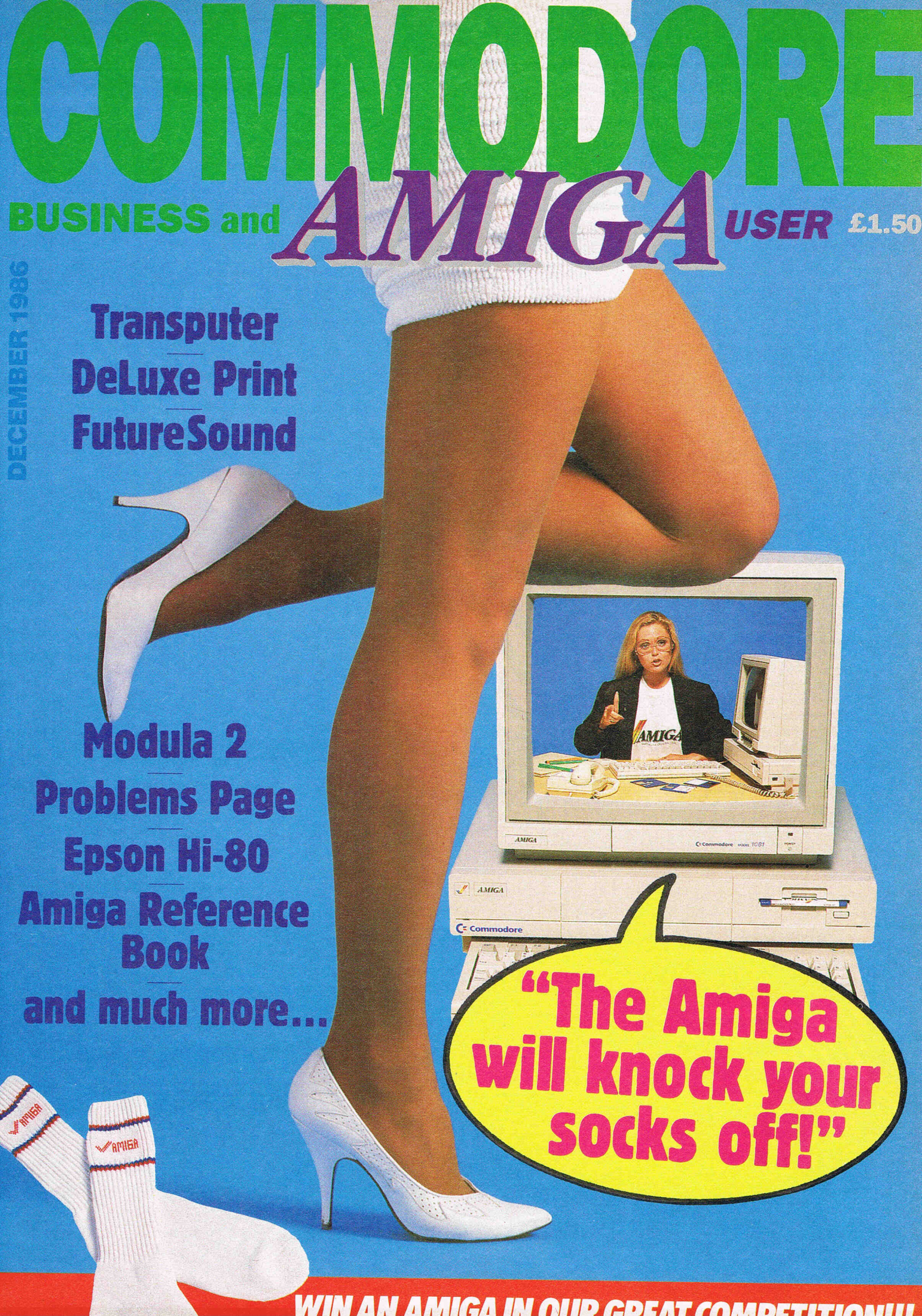

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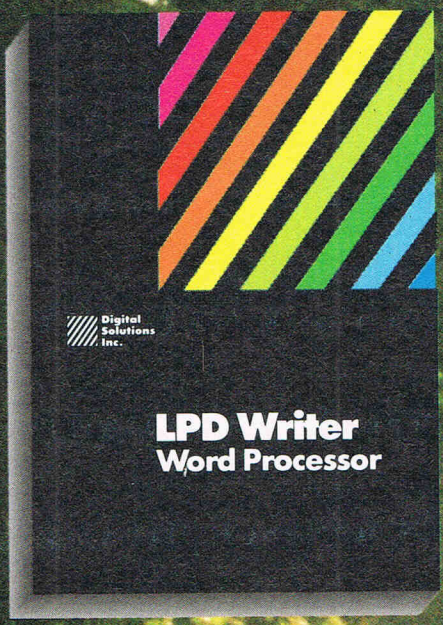
The software allows you to see all projects and applications through windowing. Each application can then be "zoomed" up to full screen size. You can execute a command by using the mouse, function keys or "short cut" command sequences. A "suspend" feature allows you to put away all applications you are currently working on and a "resume" command will restore the applications to the pre-suspended state. Also featured is on line memory resident help.

In addition, LPD™ Writer, LPD™ Planner and LPD™ Filer each have their own very special characteristics.



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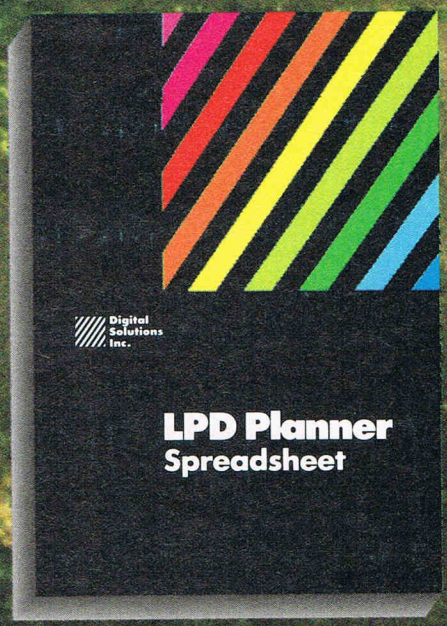

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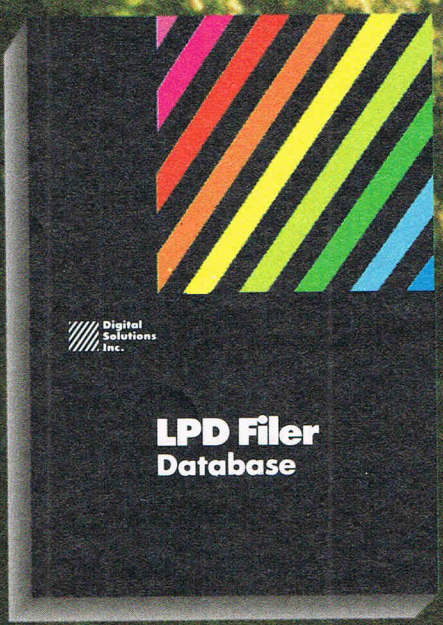

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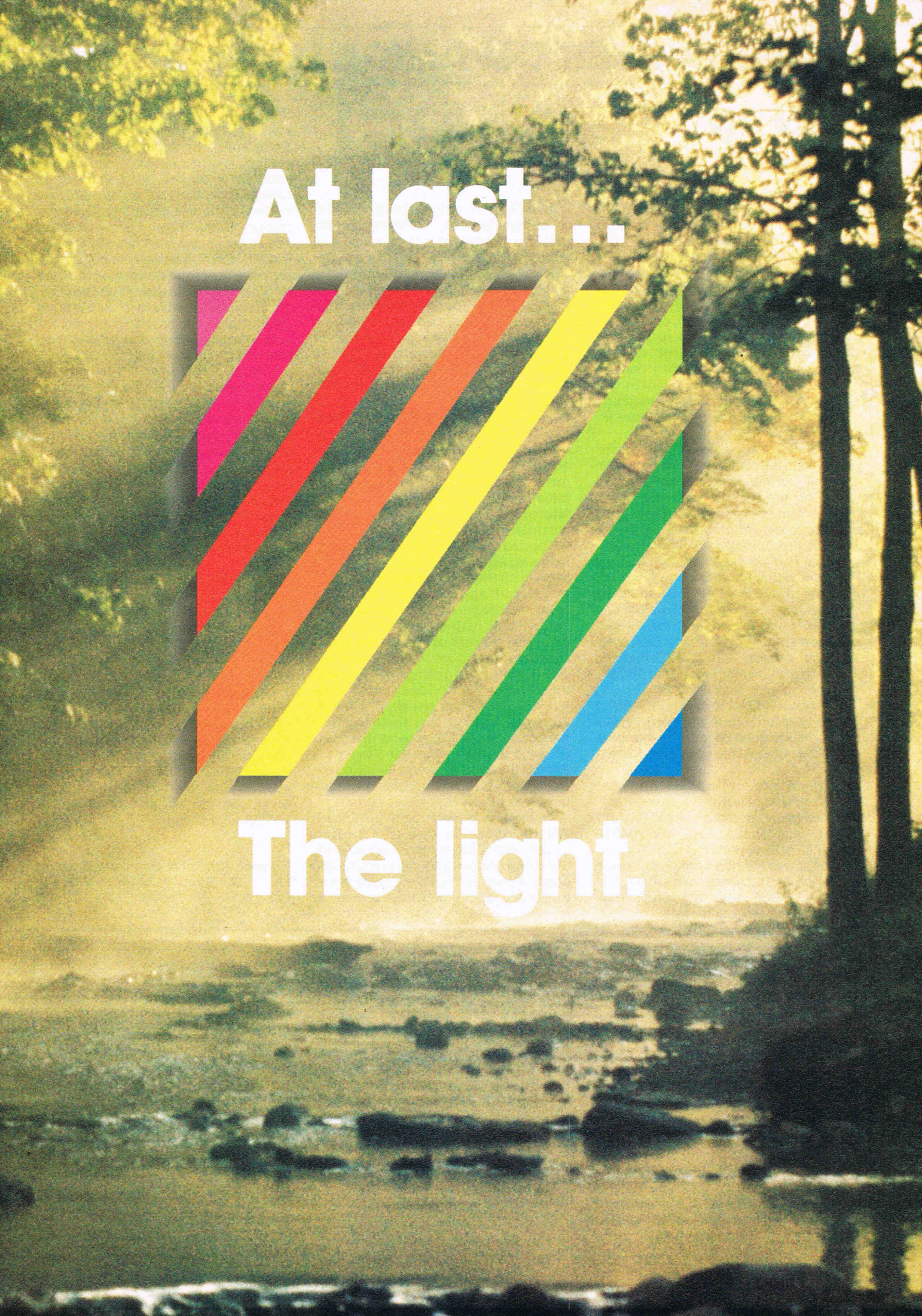
At last...
The light.

WIN AN AMIGA

'The AMIGA will knock your socks off!' This is much quoted remark is really beginning to come true. Outstanding software and hardware products are flowing onto the market. Top class business products are appearing like Precision's Superbase (to be reviewed in the next issue of AMIGA user), or reaching second stage like Scribble II. The area between business and home using is finding products like Deluxe Print and the AMIGA's sound capabilities are being exploited with Futuresound and Mimietics Soundscape (next issue review).

On the pure fun side, AMIGA User this time has discovered the movies, with another terrific game — Mindscape's amazing graphics in 'Defender of the Crown' and next issue will see reputedly the best chess program in the world, the prolific Electronic Arts 'Chessmaster'.

What is most exciting is not just the quantity but the breathtaking quality of AMIGA products. In addition, since the last issue of Commodore Business and AMIGA User, the price of the AMIGA has been reduced by around £500 everywhere outside the US. Something exciting is happening around the AMIGA. Hold on to your socks! Tight!

Win an AMIGA Competition! Answer these questions on a postcard please. (ALL answers can be found in this issue of Commodore Business and AMIGA User.)

1. Which product comes from the 'Cinemaware' series.
2. How many contact areas has Skyfox?
3. At what speed does the AMIGA DAC/ADC operate?
4. What was the first book to be issued in the AMIGA Reference Library?
5. How much does the single disk version of Module II cost?
6. What is the usual overall increase in operational speed of a hard disk over a floppy disk?
7. What are program hunks?
8. Name another Deluxe product by the publishers of Deluxe Print.
9. How long is the Metacomco Pascal Manual?
10. What is the programming language used by the Transputer?

Tie Breaker: List the articles in this issue of Commodore Business and AMIGA User in order of interest to you.

Answers by February 15th to:
AMIGA COMPETITION, CCI Magazine Finsbury Business Centre, 40 Bowling Green Lane, London EC1 0NE.

PANEL

PANEL is a programming tool for designing and managing screen displays. It provides a large number of prewritten routines in C that can considerably accelerate the process of screen design. A major advantage that PANEL offers programmers is that source code developed using PANEL is portable across a very wide number of machines. There are no less than 10 other versions of PANEL and the range covers MS-DOS, UNIX, XENIX, iRMX86 as well as AmigaDOS.

The product is supplied on two disks together with 225 page manual. Installation on to a hard disk is straightforward and PANEL takes advantage of any memory expansion. The manual contains sections on interfacing with Microsoft FORTRAN and BASIC, although unfortunately these are not supported in the AmigaDOS implementation. However, to offset this the AMIGA version contains an extended attribute specifier for speech. Thus a text string can be sent to the Narrator device for the purposes of help messages, etc. One innovative feature of the manual was a section of questions and answers — a very useful way of getting into the *feel* of the software. The first disk contains utility programs for setting up and software development as well as some example programs whilst the second disk contains the source and header files for the PANEL libraries. The supplier also provides a full technical support for registered users.

The visual appearance of a standard PANEL screen is that of a custom screen with a full-screen window without sizing or close gadgets at 640 by 200 pixels. Access to Workbench is obtained by merely pulling down the screen. At this resolution the programmer can work with 16 colours and a detailed exposition on colours is given in the manual. It is this item that could cause potential problems in portability of source code because many hardware systems cannot support this number of colours at this resolution. As well as screen design the other main function of PANEL is that of a screen manager. This provides the programmer with the tools to accommodate custom data entry validation and user editing of data entries. Additionally, the programmer can call functions supporting *pop-up* help messages or prompts as well as menus.

One particular point I was happy to observe with PANEL was the ability to coexist in the AMIGA multi-tasking environment. Running a screen design was both quick and simple — calling a program named *pangenc* generates a C source code file after you have positioned the fields and their types using a special screen editor and data validation manager. I had no problems with this software using a 68010 processor and version 1.2 system software on my AMIGA.

PANEL for the AMIGA is a product aimed at the professional programmer who has a working knowledge of the C language. For the AMIGA it provides an option to avoid using INTUITION as the main vehicle for screen management. This approach is fine for those who are involved in developing applications for other machines but INTUITION has never been spoken of as being difficult to program anyway. Perhaps in a situation where a programmer decided that the facilities of INTUITION are too sophisticated then PANEL would be worth considering for a purely native AMIGA application.

Contact: Roundhill Computer Systems Ltd. P.O. Box 14 MARLBOROUGH Wilts. SN8 1LR. Tel. 0672 54675

COMMODORE BUSINESS AND AMIGA USER

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New Optical Reader

Tecmar's eSCAN is a scanning image digitizer and optical character reader that allows users to automatically convert typed text or graphics into computer files without retyping or redrawing. Once a document is scanned, its contents can be displayed on the computer screen, printed, or incorporated into other scanned documents or ASCII files.

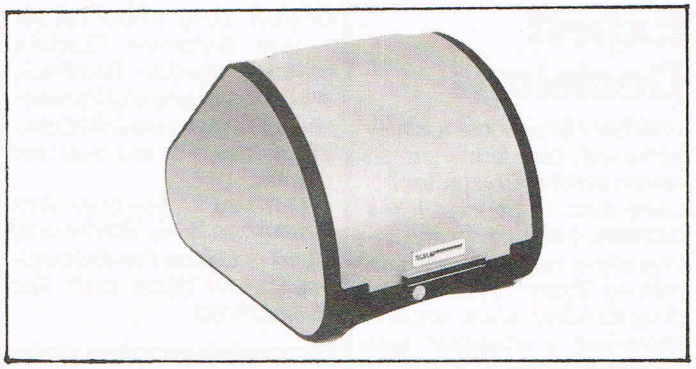
In addition, the eSCAN system can perform FAX-like communications by sending scanned documents to remote locations. Via modem, the eSCAN system permits a PC to transmit documents to another PC that is using the proper software.

Tecmar claims eSCAN saves the business user a significant amount of time integrating text and graphics, and that there is no other scanner that provides the high level of performance at the price ($2,495) that eSCAN does.

eSCAN also performs optical character recognition on typed documents and converts them to ASCII files. It can scan an entire page or a specific portion of a page.

The device can scan all types of graphics, from simple line drawings to complex artwork, and immediately convert them to computer files. It works with both colour and black-and-white monitors.

The software installed with eSCAN gives the user flexibility to reset page margins, graphics resolution and other scanning functions. eSCAN works with several leading brands of dot matrix and laser printers including IBM, Epson, and HP LaserJet Plus and automatically matches the print resolution to the printer being used. eSCAN works with any IBM PC, XT, AT or compatible that has a hard disk drive.



New Hard Disk Card

The latest entry in the 'hard-disks-on-a-card' market is the 30 Mbyte Drive Card 30 from US-based Mountain Computers, which incorporates two 3.5-inch disks.

This card can be slotted into any of the more recent IBM PCs or compatibles. It does not matter if there are already conventional internal or external hard disks, or other Mountain cards installed. The card has an integrated controller which automatically configures the DriveCard and controls the input and output of data.

Mountain claims that DriveCard offers memory space equivalent to 87 double-sided, double-density floopy disks and requires no desktop space, cables, cooling fans or power supply.

Contact: Computerland on (0703) 39571.

Boom For Add-on Memory?

Impending changes in the IBM product line will bring about an explosion in demand for both internal and external add-on memory. This is the conclusion of a 309-page study just completed by International Resource Development Inc., the U.S. market research firm. In the report, IRD attributes this growth in demand to the popularity of protected-mode computing under still-to-be-introduced PC-DOS Version 5.0. Protected-mode computing, which is available but rarely used in today's PC AT, will under the new PC-DOS release have a theoretical limit of 16MB. random-access memory, up from the 640 KB. limit of today's PC XTs and real-mode PC ATs. It is entirely possible, however, that basic IBM offerings will in the future still be equipped with "only" 640 KB. basic RAM. This will create a major opportunity for vendors of add-on memory who wish to fill in the gap between the 640 KB. basic RAM and the 16 MB. theoretical limit.

The report notes that the popularization of protected-mode computing is not the only change that is in the winds. The 80386 chip, when introduced, will also greatly increase RAM over today's 8088-and 80286-based offerings. "Here," says IRD's Ken Bosomworth, "Big Blue may equip its basic offerings with more than 640 KB. RAM — maybe up to 2MB. of RAM instead. However, this will still leave a 14 MB. gap for internal add-on memory vendors to fill." By 1996, according to the study, sales of expanded and protected-mode add-on memory boards will reach almost $3.5 billion.

The new, more powerful IBM offerings will have other consequences too. The add-on market for floppy disk drives will suffer, despite the recent introduction of high-capacity floppy drives. This is because with so much RAM, many users, especially those working in networks, will substitute that RAM for second floppy disk drives.

Simultaneously, demand for high-storage external memory offerings will rise, in response to the new applications made possible by the more powerful generation of 80386 and protected-mode computers — multitasking, graphics-based computing, and so on. By 1996, according to the study, there will be a $6.4 billion market for hard disk drives, of which $2 billion will be for add-on boards, while there will be an additional $1.6 billion market for optical disk drives.

Indeed, the new high-powered generation of personal computing will, in addition to being more shared (networked) and less "personal", transform virtually all peripheral and add-on board markets. Windowing and the need for colour capabilities will change the requirements for display devices. Input peripherals will be affected by the demand for automated data entry devices, a demand that will arise out of the genuine viability, at long last, of the so-called "electronic filing cabinet." Demand for graphic adapter boards will soar in respone to the advent of graphics-based computing. IRD's Bosomworth says, "We are at the threshold of an entirely new world of computing. Indeed, change in the PC world is coming almost too fast. It is unclear if end users can keep up with the rate of change.

£149 Logistix

To coincide with Commodore UK, current special price offer on the Amiga computer Grafox has cut the price of Logistix, the integrated spreadsheet and time planning package from £245 to £149.

Logistix has been selling well on the Amiga, especially in the USA where 2000 copies were sold in the first 6 weeks after the launch.

Logistix, says Grafox, is also a success story in Europe where it has been fully translated into German, Spanish, Italian and French. "The German speaking market is particularly buoyant, and we have appointed and supplied distributors in Germany, Austria and Switzerland."

Expert Decisions

Intelligent Environment, a new company, has launched an expert system 'Crystal' for PC computers. IE believes it will increase productivity by letting users build up decision making 'Expert' systems 'By programming what experts know into a computer' said Laurence Shafe IE's MD, 'a company can achieve a consistency in decision making that would otherwise be impossible'. If a PC holds the 'expert information' even inexperienced staff can be left on their own to make correct decisions every time.

Initial users range from a firm of accountants which has designed an 8,000 rule system for the DHSS to a freelance journalist who has created an 'expert' travel guide. Crystal is written in C and costs (UK) £695.00

CSD Software Starters

CSD, the computer software publishing and distribution company, today announced the first in its range of 12 Software Starters.

Software Starters are easy-to-use training aids, specifically geared to meet the requirements of all IBM PCs and compatibles.

The first product is designed to introduce current and future computer users to MS/PC Disk Operating System (DOS) Commands.

Understanding the common DOS commands will give the user additional power when using application programs such as Word Processing, Spread sheet and Database.

The package includes the Tutorial Disk which guides users through copying, renaming and deleting files; Audio Aids which are specially written so that users can control their own learning speeds; and a Training Guide which fully supports the package, and together with the Audio Aids explains computer jargon in every day English. (UK) Price £19.95. Future Software Starters covering specific Database, Word Processing and Spreadsheet packages are scheduled for release over the next few months.

Contact: CSD Unit B11 Armstrong Mall, Southwood Summit Centre Farnborough Hampshire GU14 0NP Tel: 0252 522200.

Commodore Improving Amiga Chips

Jay Miner, general manager at Commodore-Amiga, has confirmed to CCI that the company is working on an improved version of the Agnus and Denise chips, two of the three custom chips in the Amiga 1000 that provide many of its advanced features. The improved chips will not work in existing Amigas but will be used in a future Amiga-family machine.

The Agnus chip is being upgraded to address 2 megabytes of display memory (the memory that must be used to store all video images) independent of the expansion memory; the current Agnus controls 512K bytes of memory. The bimmer (bit-mapped image manipulator) in the Agnus chip will be able to address 4K pixels at one time, up from the current chip's 1K-pixel capability. The new Agnus and Denise chips will also support higher-resolution, noninterlaced graphics.

Commodore-Amiga also has redesigned its Genlock peripheral to meet U.S. FCC radio-frequency interference specifications. (Genlock enables the Amiga's display to overlay an external video signal.) Miner told CCI that the design has passed the company's RFI tests, which Commodore believes duplicate the FCC's.

CD ROM is GO!

Hitachi is now offering a stand alone CD rom drive called the CDR 2500S. When you consider it can provide over 2.2 giga-bytes of storage on a single compact disk you may consider its one-off price of £945 as a snip. It comes with its own power supply and IBM 8 bit bus and can be daisy-chained up to 4 deep. Average access time is quoted as being 0.5 seconds with a data transfer rate of 176 kBytes per second. There is an optional card which will permit the mixture of data, music and speech.

Streamlining Production Car

Specialist car manufacturers, Caterham Cars of Caterham, Surrey, whose Caterham Super Seven (nee Lotus Seven) is a hallmark, make less than 300 vehicles annually. As each has a unique specification, there is a need for careful stock control of parts and spares. With around 2,500 individual items on the stock list, Caterham have just automated their assembly and stock control system with the purchase of Pegasus software and a desktop microcomputer.

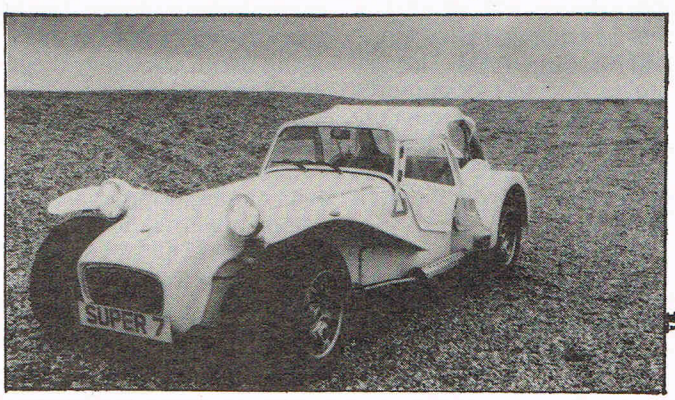
The Commodore PC20 microcomputer is running Pegasus Bill of Materials and Stock Control software, which has allowed Caterham to replace the trusty A4 hardback order book of alphabetically listed suppliers, and ensures that stock is replenished before levels are dangerously low. It also permits close monitoring of new car assembly.

"There are about one million permutations of the current range of cars" says Graham Nearn, Managing Director at Caterham, "and every one turned out is unique and built to order. Bill of Materials tackled the complex business of identifying the various fuel, gear, and suspension systems on the vehicle, as well as organising the assembly operation from individual items and sub-assemblies."

"Bill of Materials comes into its own with a system like ours" says Jez Coates, Production Engineer at Caterham. "We utilise most of the capabilities of the software for controlling our car assembly. Updating the files and issuing parts is done on a routine basis by our computer operator, and we keep a hardcopy of the sub-assemblies on our file. The computer generates a printout for the storeman to assemble all the relevant bits, either for a kit of parts or for the complete car. Stocktaking is also far simpler with reorder levels taking into account lead times of anything from 24 hours to 12 weeks, so that we don't run out of key items during assembly."

Using the PC20 and the facilities of Pegasus, price lists can be compiled and produced for a kit or for a fuel system, a front suspension system or any individual items. Unique reports can also be produced to identify, for example, any competition-type parts which have been developed for competition models of the cars.

Now, with Commodore PC computerised stock control and assembly procedures, any car can be uniquely identified in 40 or 50 lines by the computer's 250 or so assembly codes. With a unique chassis number on each vehicle, even if the car subsequently changes hands, spare parts and repairs can still be retrieved from the computer archive file. As 60% of cars are exported, some of them turn up years later in far flung locations, requiring a new panel or replacement part.



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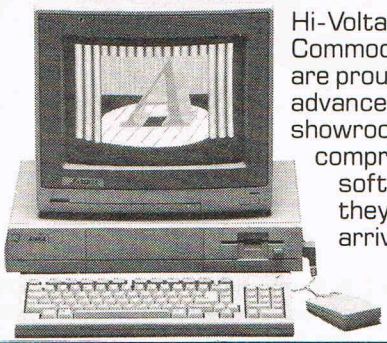

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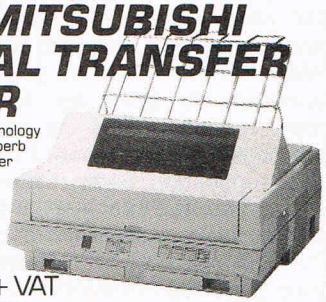

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MAXIPLAN

MAXIPLAN is the second integrated spreadsheet package to emerge for the AMIGA — the first being LOGISTIX (Amiga User October 1986). It comes on single disk with a 105 page manual and an extra 17 page manual containing revisions etc. There is no copy protection thus the master disk can be safely stored out of harms way after duplication. Sadly this was not all plain sailing and after installing the product on my hard disk I found that MAXIPLAN insisted on booting from a floppy drive. If the copy of MAXIPLAN was not in one of the floppy drives, then the loading procedure halted inexplicably, taking out about 10k of memory each time. A potential solution could be for the user to assign a drive path within their *startup-sequence* file on the WORKBENCH disk. However, in my opinion, this sort of digging into the depths of the machine is unacceptable — it may be accepted in MS-DOS circles but not on the AMIGA.

INTUITION and colour form the basis of MAXIPLAN and the emphasis is very much on screens, gadgets and requestors. Those users with an expanded memory AMIGA will find that MAXIPLAN makes full use of this and permits a maximum of eight colours rather than four as in the usual 512k machine. It may not be obvious until after purchase but users should realise that integrated packages of the ilk of MAXIPLAN and LOGISTIX will work on a 512k machine with all functions being available. However, there is a noticeable throttling back of certain graphics functions simply because the system is tight for memory. For example, MAXIPLAN cuts down the number of available colours and also shuts down the WORKBENCH in order to conserve memory — the latter could be awkward if you're running another application depending on WORKBENCH. Similarly, LOGISTIX will only produce a graphic output window 25% of the size of the full screen. No one is to blame for this in software or hardware, it is simply balancing the equation of trying to get a quart into a pint pot. Most *power-users* of the AMIGA will have expanded memory anyway and thus can take advantage of the maximum potential of software that uses expanded memory.

The spreadsheet size offered by MAXIPLAN can go up to 16,384 rows of 512 columns. This compares with 2048 rows by 1024 columns of LOGISTIX and 8,192 rows of 256 columns of ANALYSE! which gives MAXIPLAN four times the capacity of these two products. The question of spreadsheet maximum sizes for personal computers is largely academic since a user of spreadsheets of this sort of size would inevitably be working at a minicomputer level.

Menu Structure

The best explanation of the features of MAXIPLAN is given by examining the menu structure of the product.

Most of the commands are self-explanatory and some very powerful indeed. In the **Project** menu there is a convenient check on memory — important where a large worksheet is in use. The file handling of MAXIPLAN from this menu is exemplary being both clear and comprehensive by giving direct support to floppy and hard drives as well as ram disk. The **Edit** menu permits the user cutting and paste between different worksheets a clear demonstration of the power of the AMIGA over its competitors. Note how all the primary commands have a *help* selection available although I would have expected a more logical placing to be at the top of each menu rather than the bottom. **Format** is used to define the structure and appearance of the worksheet although the first major flaw of MAXIPLAN is revealed by the lack of support for foreign currency and only the dollar sign is allowed. I particularly liked the colour options with redefinition of colours and access to different font styles giving up to eight combinations — a feature unique in any personal computer integrated spreadsheet.

The **Options** menu presents some further unique options this time with speech. Selection of speech will cause the AMIGA's Narrator device to articulate text notes on individual cells. This is extended by taking the *keyboard echo* option which gives a spoken output of whatever data the user enters into a cell! A curiosity is the inclusion of the *Wordstar* option which uses the control key *diamond* for cursor control — you remember this don't you when you had to press CTRL-X to move the cursor down and other such horrors? In the **Commands** menu the *chart* option allows the user to portray up to eight different charts using either lines, bars or pies. These are further enhanced by filled areas and are an excellent demonstration of the strength of the machines dedicated graphics hardware — drawing time is *measured in milliseconds*. The final menu, namely **Data** is obviously for the database and permits a simple flat-file structure for the user to manipulate. Operations are both fast and simple although I would have liked to have seen re-direction of output to a named file or the printer.

There is no doubt that MAXIPLAN is an impressive product and the heavy use of INTUITION permits the user a glimpse of the software of tomorrow. Its competitor LOGISTIX still has more comprehensive *conventional integrated worksheet* facilities and is a more refined and better presented product for professional users. It also does not make the common mistake of application software originating from the USA or failing to address a wider geographical audience. However, the overhead to this is paid in terms of on-use of the mouse and INTUITION thus extending the learning curve of AMIGA users who are well versed in these. MAXIPLAN still has several rough edges, for example the lack of plotter supporter and limitations of the range of spreadsheet functions which, if polished up could gain it the premier position.

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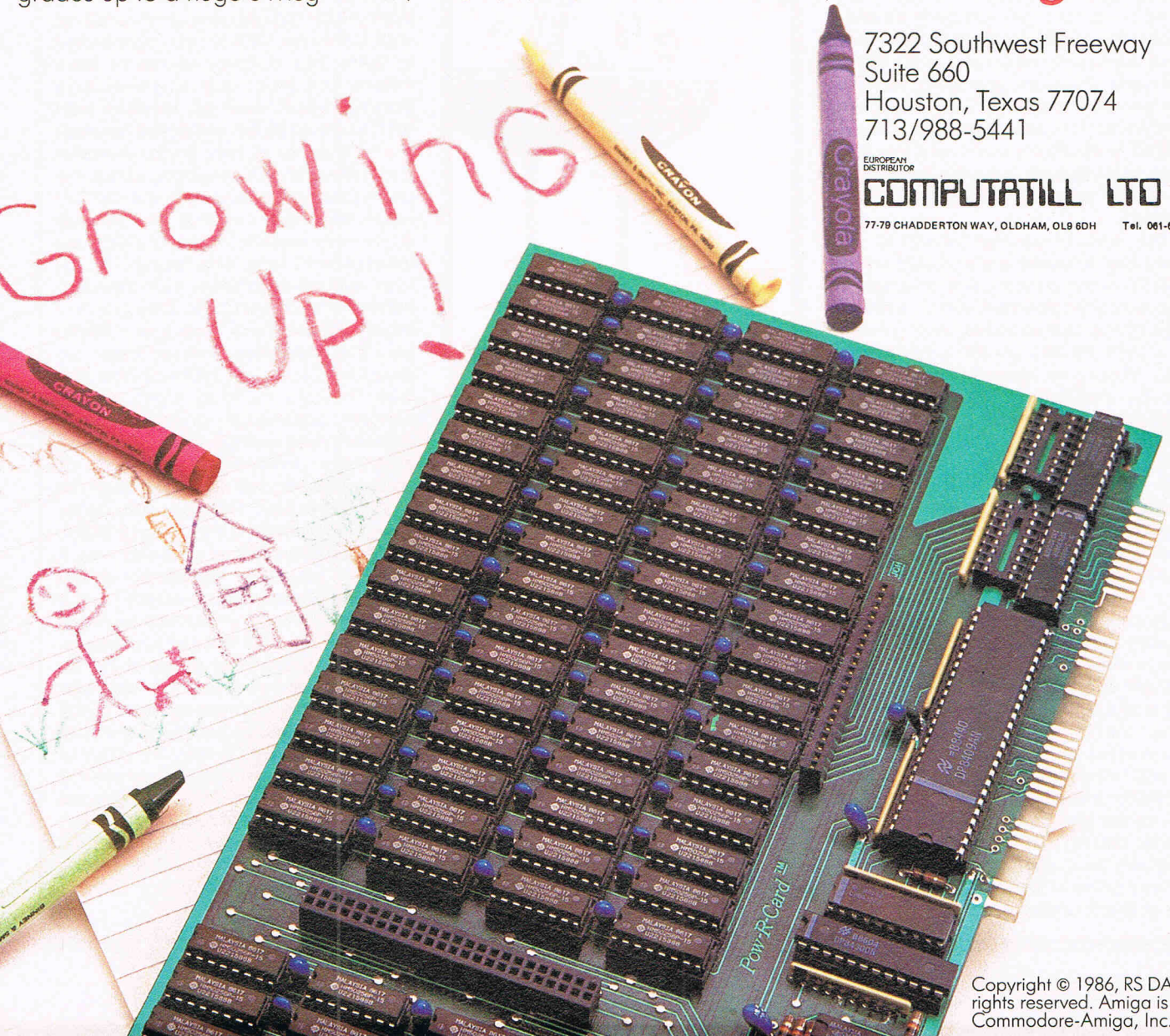

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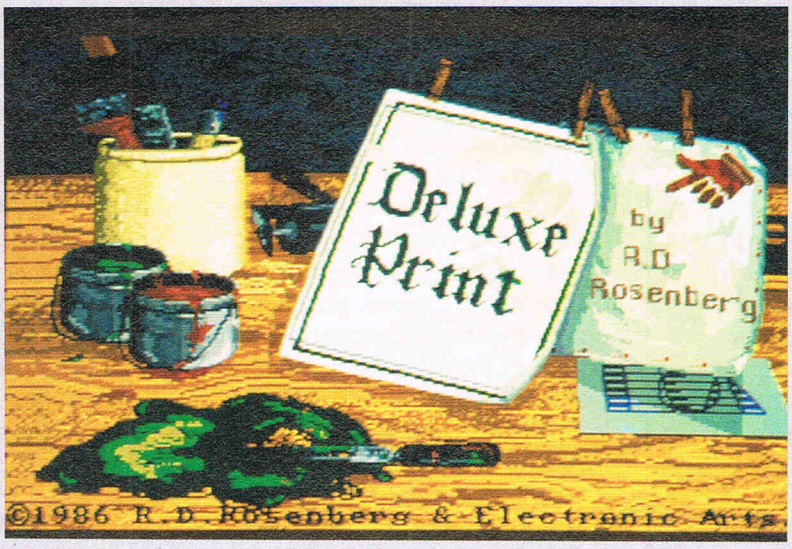
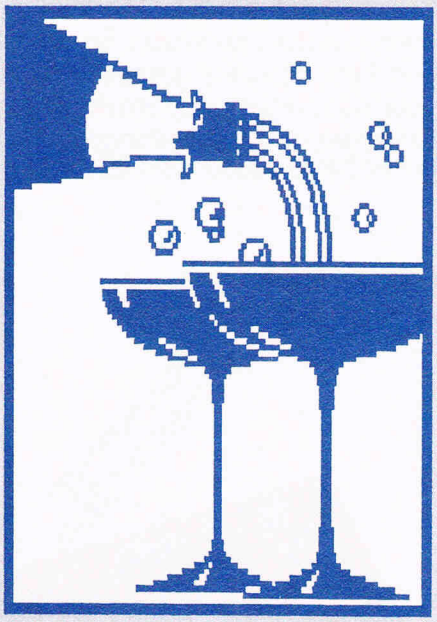


About 18 months ago a piece of software for the Commodore 64 named **The Print Shop** was launched in the USA. Even today this program continues to notch-up fresh sales surprising both the pundits and retailers alike. The secret of this success can be summarised in two words — *creative* and *usable*. **Print Shop** allows the user to create stationary, be it greetings cards, calendars, custom letterheads, banners and labels and of course any one of these items are emminently usable in real life. **Deluxe PRINT** is an attempt to repeat this success only this time using the much more powerful hardware facilities of the AMIGA.

The most immediate benefit to any graphical software implemented on the AMIGA is the colour range and resolution available. Deluxe Print takes advantage of this and provides a high resolution (600 by 200 pixels) environment with 16 colours. Note that each colour can be modified by adjustment of its RGB component from the system palette of 4,096 to provide further choice to the user.

It is supplied on a single copy-protected disk together with a 64 page manual. Electronic Arts also provide, free of charge, an additional disk containing further images for the user. Regular readers will know my opinion on copy-protection and in this instance it is exactly the type of protection I abhor. If you make an error and write data to the system disk, then wave goodbye to your purchase. Similarly, if like me you discover that your colour printer is not in the Preferences file on the system disk — you cannot install your custom printer driver software without risking damage to the disk contents. Another point worth bearing in mind is the inability to upgrade your operating system — the user appears to be tied to version 1.1 for the present unless of course they purchase another copy. Finally, just on principle **I will not purchase ANY software that cannot be installed on my hard disk.** What is the point in spending money on software that renders a very expensive asset this redundant? Electronic Arts do provide a voucher in the pack which the user can send off along with $20 to the USA for an unprotected version. The supplier seems to have missed the point that why should a European purchaser get involved with VAT, customs duties and postal hassles?



The manual is very comprehensive and makes few assumptions about the user's level of familiarity with the AMIGA. From Page 38 onwards the manual deals with aspects of AmigaDOS, file management and interfacing Deluxe Print with other software from the Electronics Arts stable such as Deluxe Paint. When Deluxe Print is up and running you are presented with a menu for selecting the various types of item you wish to print such as signs, labels, banners, letterheads, greetings cards, calendars and multiple signs. These are effectively pre-defined templates of screen layouts and also determine the working area size. The **sign** format is for designing a single 8.5 by 11 inch sheet, whilst the **label** format operates on a 1 by 3 inch label size. The **banner** option will print sideways on 3 sheets of 11 inch paper, greater lengths may be achieved by continuation with a fresh banner image. **Letterhead** provides an image at the top of the sheet whereas the **calendar** option takes up a complete 8 by 11 inch sheet. The **greetings card** facility allows a choice of up to 4 panels on an 8 by 11 inch sheet since each panel is printed at a quarter of this size. Multiple signs are an extention of the previous facility but with all panels are printed upright. Each format selection then provides another set of options for building up the required image.

Al K.Hol

Wine Taster, Beer Sampler and Hangover Specialist

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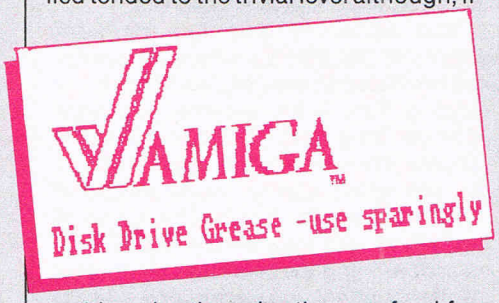
Glen Fiddich Tel. I can't remember

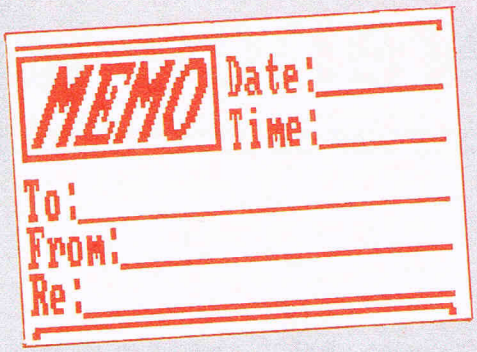
The image within a format can be either designed from scratch by the user or called in from the system disk which also contains some pre-defined images. The package also contains another disk as mentioned earlier which contains further pre-defined images — the stated intention of Electronic Arts is to provide a number of these library disks, this one being the first in the series. Once an image has been placed on the screen the manipulations to work the image up into a final requirement include the usual cut, paste and copy, movement, resize and colour as well as the novel *flip* which rotates an image through 180 degrees.

However, the strength of Deluxe Print is apparent when users choose to define their own images. The usual facilities of lines, circles and boxes are available plus the ability to make the image into a pattern. This is a very powerful feature and extends the creativity element of the package even further. I must admit that some of the pre-defined images supplied tended to the trivial level although, if

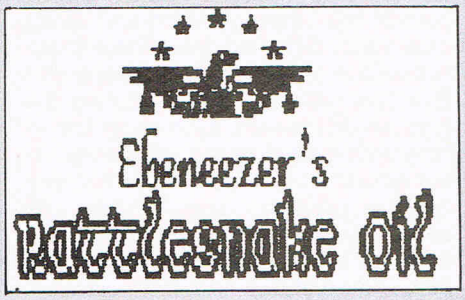


nothing else they give the user food for thought. However, the **pattern** facility provides for 2 types of chequered images — meaning the image will be interspersed with blank spaces or the other facilities such as being able to centre an image or place images at each corner can considerably accelerate the process of production.

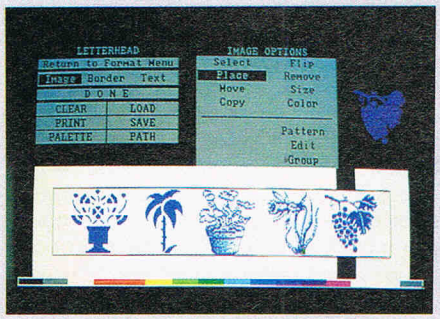
The remaining options from the selected image menu are **group, border** and **text**. These sub-divide further with the **group** option allowing image manipulation via the *clipboard*. This is a standard facility provided by the system software of the AMIGA and serves as a *'scratchpad'* or temporary holding area within the machine's memory. The



border option allows any image to be used as a border to the item the user is designing — although obviously if the image is a large image not all of it will



be visible if used as a border. I would have liked to have an *automatic shrinking* mode taking effect for the image if this were the case. The **text** option in common with the group facility offers a large number of choices to the user. In addition to the usual colour and placement manipulations, the defined text can be of a variety of font styles and types — up to 8 different font types are supported from the standard AMIGA fonts. No facilities to edit the fonts — a surprising omission. The text can be outlined to provide a 3-dimensional effect, surrounded in a box and blended into a graphic image.



The quality of the printed output from Deluxe Print is very largely a function of the actual printer in use. Where a black and white — or more accurately a gray scale image is required then a laser printer will provide an output of sufficient quality to be directly phototypeset. This has the not inconsiderable advantage of avoiding the design and make-up charges levied by a professional printer. Similarly, a dot-matrix printer to the latest technology, viz. 24 pins as opposed to the usual 8 or 9, will give good quality. Some good quality coloured output can come either dot-matrix or inkjet, subject to the limitations of the printer. This unfortunately brings us back to the problem of the printer driver software. Because of the type of copy protection on this disk, it is not recommended that the disk be written to, hence if your printer does not have a driver on the system disk then you attempt an installation at your own peril.

Overall Deluxe Print is a good product making excellent use of the AMIGA hardware and systems software. The ability to import files under the IFF format (a standardised file structure agreed between Commodore-Amiga and soft-

ware developers) is an admirable decision and allows the user further flexibility. However, the copy-protection and overall flavour of Deluxe Print in terms of the manual and type of image used denotes a product that seems to be aimed at the home market and not the professional market. Deluxe Print certainly represents a value-for-money product.

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AMIGA Hardware Reference Manual

This is the second book to be released in the AMIGA technical reference library from Commodore Business Machines and published by Addison Wesley. Unlike its precedessor the INTUITION Manual, the programming emphasis in this book is on 68000 assembly language and not C. The aim of the book is to allow programmer's information about how the AMIGA communicates with the outside world through the peripheral devices in addition to the audio and graphics hardware. There is also some tutorial material included for the benefit of those programmers who wish to write code directly for the graphics and audio systems. Other users of the book could be those who are interested in hardware in general or those who wish to add new peripherals to the system and want to know the interfacing details of the system busses.

There are eight chapters, several appendices, a glossary and finally an index. Thus no one is likely to complain about the range of topics covered by this book. It would be misleading to say that this book is highly suitable for the vast majority of persons coming from a 6502 background. The subject matter is both highly technical and complex. For example, the concept of *bit-planes* is new to existing Commodore machines as is the 68000 itself. Readers without programming exposure and experience of the AMIGA may find it heavy going. However, the book is one of the prime reference sources on the machine and since the AMIGA is no VIC-20 the weight of information to be absorbed and digested is considerably greater. Advanced users are taken down to the register level of the special circuits and the effects of these are discussed in some detail.

The first four chapters are concerned with the graphics capabilities of the AMIGA, although the first chapter serves as a fast introduction to the hardware in general. Chapter two looks at the *coprocessor* and how this is used to control the entire graphics and audio systems by directing mid-screen modifications in graphical displays and also directing register changes during the time period between each raster line — otherwise known as the *vertical blanking period* a term with which budding AMIGA graphics programmes will become increasingly familiar. In Chapter Three the reader is introduced to the *playfields* concept and their creation, display and scrolling. A playfield is one of the key elements to the AMIGA's display and a full explanation of these together with the bit-plane concept are covered.

Chapter Four takes us into the heart of the AMIGA graphics system namely the eight *sprite engines.* The sprites are user-defined graphic image blocks that can be moved in or out of the display. The AMIGA is provided with unparalleled sprite resources since each of the sprite engines use individual *direct memory access* (DMA) channels and these can be reused many times during the course of a display since they can be redefined during the vertical blanking period.

Audio is introduced at Chapter Five and begins with an overview of this complex topic. A full discussion of sampled sound is provided although the book makes no mention of techniques to capture sound in relation to hardware. There is no attempt to cloak the limitations of the AMIGA hardware in terms of using 8-bit sampling. The AMIGA audio hardware can interact with sound waves using either amplitudes or frequency modulation to provide an extraordinary range of sound. For example it is possible to digitise the sound of running water and then play this as a musical instrument with true polyphonic chords and in stereo. Some advanced topics are covered in this chapter with sections on waveform transitions, sampling rates, noise reduction aliasing distortion. Although this chapter goes some way, I feel it is fair to say that the documented coverage on the audio facilities of the AMIGA at all levels of experience is still sadly lacking. It may be the difficulty in translating the audible subject matter into text or just the weight of the subject as a whole, hopefully audio will in time receive the coverage it deserves.

The advanced graphics hardware begins in Chapter Six where the reader is introduced to the delights of the *bitter engine.* This is the piece of hardware that can shift data placed in the video display memory viz. the lower 512K of the processor address space around at very great speed. Indeed the speed of the blitter can exceed the 68000 processor running the same task by a factor of 10 — in effect you are running a 68000 at an equivalent clock speed in excess of 70 MHz! Hence the reason for the very, very fast graphics on the AMIGA. In addition to shifting data, the blitter can perform modulos and logical operations on the data **as it is being moved** — a facility denied the blitter device that Messrs Atari are said to be fitting to their thing. A common mistake about the blitter abilities that seems to be forever perpetuated by the uninformed is that this data must be graphical in nature. Wrong, the data can be related to anything the programmer desires. It has to be located in the video display memory which probably led to the incorrect conclusion that it must be related to display — but now **you** know

different. The AMIGA blitter also assists in producing fast area-fills, circles and lines into playfields as well as providing the animation facilities through the *GELS* system. A *GEL* (**G**raphic **EL**ement) includes such things at *BOBS* (**B**litter **OB**jects) and *VSprites* (**V**irtual **Sprites**) which are all part of the extensive animation provided by the blitter. It is not really feasible to cover these facilities in the course of a single chapter and consequently another topic receives little more than cursory examination.

Delving deeper into the AMIGA at Chapter Seven brings the reader to the systems control hardware. This is concerned with the depth arrangement and collision of graphic objects, direct control of the 25 DMA channels within the AMIGA and the 68000 interrupts.

The control over the graphic objects includes both sprites and playfields in addition to bobs and gels. DMA control and interrupts is as close to hardware as the AMIGA system allows and because of the multi-tasking nature of the machine, these topics are likely to be of use only to highly specialised software with a substantial degree of AMIGA programming knowledge. In fact a major failing of this book is the complete lack of any warnings regarding the security of the multi-tasking environment. I would be extremely concerned if any programmer picked this book up and then started merrily boinking the hardware registers directly and setting up numerous levels of interrupts as per a 6502 machine — the outcome is a guaranteed system crash. In programming the AMIGA you have a choice — you either follow the conventions of the system software or you rewrite the operating system — from scratch.

The final chapter deals with the interface hardware — that is the serial and parallel ports, keyboard and controller ports, audio and video ports, disk controller and the expansion port. A great deal of the information in this chapter unlike the previous chapters concentrates less on the programming aspects and is concerned more with factual details of these ports. Once more I felt that greater emphasis could have been placed on warnings, for example on the expansion port. The AMIGA expansion port brings out **all** of the hardware busses and a connection error on one of these lines could have catastrophic effects on the machine, not least in financial terms for the user — certainly not an area for casual experimentation.

The book finishes with eight appendices covering the entire register set and uses of the individual bits. This is followed by a comprehensive glossary and index. Overall, this book provides a huge amount of information about the AMIGA. Although it is based on the manual issued to registered software developers, this work has been enhanced by the inclusion of additional diagrams based on those used at the European Software Developers Conference held at Eastbourne in December 1985. Other than my concern about the lack of warnings regarding system security I would have liked to have seen a full circuit diagram of the AMIGA and its peripherals. Perhaps the latter is still regarded by Commodore as being too commercially sensitive — maybe this will appear in the next edition. A highly recommeded book for serious users of the AMIGA. **B.D.**

AMIGA Hardware Reference Manual, Commodore Business Machines Inc. Addison-Wesley. ISBN: 0-201-11077-6. £24.95.

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THE AMIGA — A to Z

Jargon... is it really necessary? The answer is yes. New concepts, new processes, new products are not always definable by old terms. The AMIGA has its own dimension of terminology.

However, for many readers some of the words used when discussing the AMIGA and its software may be unfamiliar. So we are providing a guide to the words or phrases commonly used in the world of the AMIGA. We intend that it should be kept up to date and be a useful service to our readers as well as providing valuable background information. This is the first installment.

The A to Z of the AMIGA

ABasic
A BASIC interpreter written by Metacomco Ltd. for the AMIGA and which was originally supplied when the AMIGA was first launched.

active screen
The screen that is displaying the currently active window.

Active window
The window currently receiving data input from the user. Only one window can be active at any given time.

alert
A special screen display originated by the system or the application software to indicate a serious problem that demands immediate action by the user.

algorithm
The definition of a solution to a problem within a finite time scale.

aliasing distortion
A side effect of sound sampling where two additional frequencies are produced, distorting the final sound output.

ALT keys
Two special command keys on lower left and right side of the keyboard.

alternate
A graphical image or border used to highlight a gadget. On selecting the gadget the alternate image or border replaces the original.

Amiga BASIC
A BASIC interpreter written by Microsoft Inc. for the AMIGA which is currently supplied with the machine.

Amiga DOS
The disk operating system used by the AMIGA and written by Metacomco. Also known as TRIPOS.

Amiga Keys
Two special command keys on the lower left and right side of the keyboard.

amplitude
The voltage or current output expressed as volume from a loudspeaker or other transducer device.

amplitude modulation
A means of increasing audio effects by using one audio channel to alter the amplitude of another.

arguments
Any additional information supplied to AmigaDOS commands or language parameters.

APL
A Programming Language. A powerful high level language for algorithmic interactive programming. Now available for the AMIGA.

application gadget
A customised gadget produced by the programmer.

attach mode
In sprites, a mode in which a sprite uses two DMA channels for additional colours. In sound production, combining two audio channels for frequency/amplitude modulation or for stereo sound.

auto-knob
A special part of a proportional gadget that changes its shape according to the setting made to the gadget by the user.

automatic mode
The normal sprite mode in which the sprite DMA channel, once it starts up automatically retrieves and displays all of the data for a sprite. The normal audio mode in which the system retrieves sound data automatically through DMA.

Backdrop window
A window that is fixed to the rear of the screen display and cannot have another window placed behind it.

barrel shifter
A Blitter circuit that allows movement of images on pixel boundaries.

baud rate
The rate of data transmission through a serial port.

beam counters
The registers that keep track of the position of the video beam.

bit-map
The exact definition of a screen display in RAM consisting of bit-planes and how the display is to be organised.

bit-plane
A contiguous series of memory words (see word) that are regarded as the definition of a rectangular display shape.

bit-plane animation
A means of animating the display by moving around blocks of playfield data with the Blitter.

blanking interval
The time period that elapses whilst the video beam is outside the display area.

Blitter
The DMA channel used for data copying and line drawing.

body variable
A proportional gadget variable that contains the value of the increments between each proportional step.

Boolean gadget
An on/off gadget.

border area
The area that contains border gadgets.

border line
The double line drawn around the perimeter of all types of window except the borderless type.

Borderless window
A window that displays no perimeter border lines.

buffer
A continous area of RAM used for storing blocks of data.

C
The native language of the AMIGA recommended by Commodore as the lowest level.

character pointer
The pointer to the left edge of a line window in AmigaDOS EDIT. It is used to define the part of the line that EDIT may alter.

checkmark
A small image that indicates selection of a menu item by the user. By default this is a tick, but it can be customised.

clear
The changing of a bit value from binary 1 to binary 0.

CLI
Command Line Interface. A process that decodes user input.

click
A fast press and release of a mouse button.

Clipboard
A Workbench file used to store the last data removed from a project.

clipping
Causing the rendering of graphical image to appear only in a bounded area such as the exposed area of a window.

close
To remove a window or screen from the monitor display.

close gadget
The gadget in the top left-hand corner of a window or screen which the user selects to remove it from the display.

collision
A means of detecting when sprites, playfields or playfield objects attempt to overlap in the same pixel position or attempt to cross some pre-defined boundary.

colour descriptor words
Pairs of words that define each line of a sprite.

colour indirection
The pixel colouring technique used by the AMIGA in which the binary number formed by the bits determines which colour register the pixel uses.

colour palette
The range of colours that are available for a screen display.

colour register
One of 32 hardware registers which combined can give selection of 4096 colours.

colour table
The set of 32 colour registers in the AMIGA.

column
A series of adjacent pixels that form a vertical line on the screen.

command
A direct instruction to the Amiga.

command keys
Keys which when combined with alphanumeric keys can be used in place of the mouse buttons for making a selection.

— CONTINUED ON PAGE 57 —

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FUTURESOUND

At long last I've managed to lay hands on a sound digitiser for the AMIGA but first an explanation of just what sound digitisation is. The noises of a passing train or a dog barking are simply a collection of waveforms reaching your ears. These waveforms are made up of bands of pressurised air which cause a vibration within your ear which the brain translates into what we call sounds. The shape and structure of the waveform determines the volume and type of sound. A sound waveform is analogue in nature which means that it presents a continual flow of pressure energy from the source after the initial emission. To capture and store this waveform in a manner appropriate to a computer the waveform needs to be cut into slices. The length of these slices are based on time as the following diagrams explain:

In Fig. 1 we have simple square waveforms which alternate between two values only, it is assumed that the rise time is instantaneous. If we put some numeric values to this square waveform as illustrated in Fig. 2 then we can derive a table:

Time	Value
0	100
1	100
2	100
3	0
4	0
5	0
6	100
7	100
8	100
9	0

In Fig. 2 we have created a *slice action* using time — this is the principle of sound sampling. Determining how often we want the waveform to be sampled, in other words time-sliced, also determines the numeric value of the waveform data. Fig. 3 illustrates a triangular or sawtooth waveform.

Time	Value
0	0
1	33
2	66
3	100
4	66
5	33
6	0
7	33
8	66
9	100

Note how different the collected data is from that of the square waveform. It would also follow that the more often the data was collected then the more accurate the sound sampling effect would be in terms of reproducing the original waveform. However here is the catch, there are hardware limitations to how quickly the sound can be captured and converted into numeric data particularly where complex waveforms are involved. Also, sampling the data at high speed brings the other problem into play, namely that of memory since all of this data must be stored more or less in continuous data tables which are growing very rapidly.

The hardware circuits which carry out this high speed data capture and conversion are known as **analogue-digital convertors** and **digital-analogue convertors.** The AMIGA *DAC/ADC* can operate at a speed of 28,000 samples per second. If you throw your mind back to O-level physics then you will recall that 28kHz sampling will give an overall frequency response of 14kHz. A frequency response of this magnitude may not be called hi-fi by sound buffs but it is in excess of that obtained from high quality magnetic tape devices. For example it is certainly better than that obtained from any domestic AM radio or a telephone where the overall frequency response is around 5kHz.

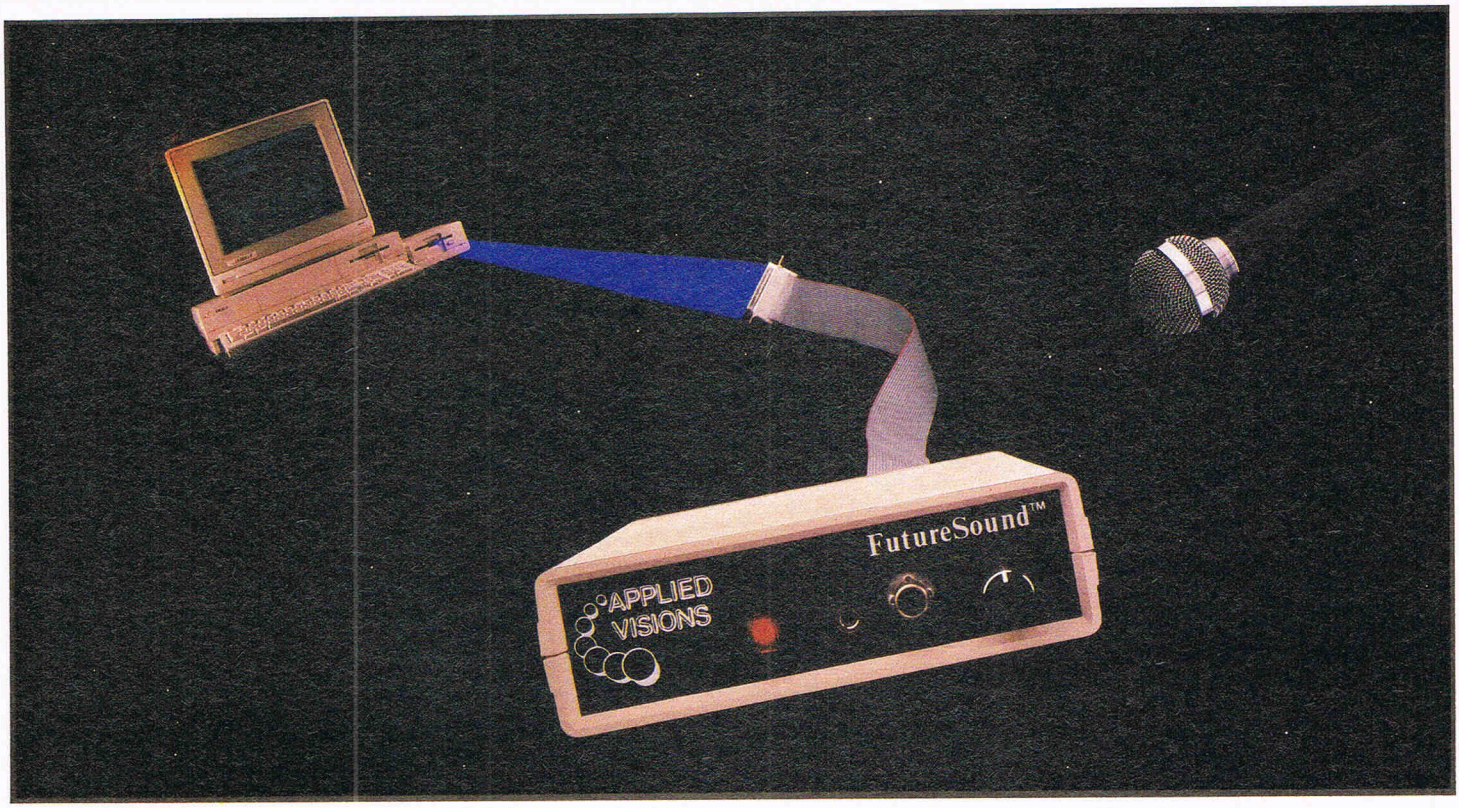
The samples captured by the AMIGA are translated into signed 8-bit integers, thus the numeric values within memory will lie between -128 and +127. The FUTURESOUND software includes linkages for either C or BASIC and a number of example files are provided.

Routines can also be called from AmigaBASIC using the appropriate LIBRARY calls and the supplier is to be congratulated on the clarity of the examples provided. It would seem that the supplier appreciates that the C language is not everyone's cup of tea. I particularly liked the option to save the file in either simple or IFF format. A sound created with FUTURESOUND and saved in IFF could be read into INSTANT MUSIC or DELUXE MUSIC for further manipulation. The sound data can be saved in IFF form in two different ways — a **one-shot** format or **3 octave** format. The *one-shot* format is meant for sounds that are played only once and at the same frequency. Examples of this would be sound effects or speech prompts. In this format only the sound data is recorded together with the header information required by IFF. Selecting *3 octave* format causes three musical octaves to be saved along with a waveform that is designed to be repeated as long as the note is played back. FUTURESOUND calculates how the other two octaves should sound and uses the wave specified for the repeat. Using this format option permits the sound captured to be played as musical notes. Thus the famous AMIGA *orchestra* can be heard and one demontration I have heard was made up of a Vivaldi Concerto using instruments that employed the sound of a waterfall as their notes! It is obviously difficult to convey just what this sounds like in words, but the experience was unforgettable.

FUTURESOUND is supplied as a small controller box and microphone together with a 37-page manual and disk. The disk can be backed-up and it is worth printing out the C language and BASIC files for study. The controller box plugs into the parallel port of the AMIGA via a length of ribbon cable. Peripherals such as Centronics printers that require access to the parallel port are *daisychained* on to the rear of the controller box. The front of the controller box has two sound input sockets, an illuminated switch and a volume control. The sockets are for a 3.5mm jack plug or a standard phono plug and the selection is dependent on what the sound capture device is — the supplied microphone uses the jack socket. Using FUTURESOUND is simple a matter of making cetain that everything is properly connected and then loading the software. The switch at the front of the controller box serves as a by-pass to the unit. When the switch is illuminated then the controller is active and ready to receive sound, setting the switch to the other position allows data to pass from the parallel port to the printer as normal. I found it is advisable to switch the printer off-line whenever FUTURESOUND was in use since emission of spurious characters seemed to take place.

The software uses elements of INTUITION so users can go straight into it without spending too much time reading through the manual.

The AMIGA has four sound channels and in the FUTURESOUND software these are referred to as *tracks*. The control panel is very clear and since the majority of users will have had experience of operating a tape recorder, then operating this software presents no problems. Each track can be manipulated in terms of volume, repeats or switched out thus providing a basic audio mixing facility. The *clipping indicator* shows the recording level and is



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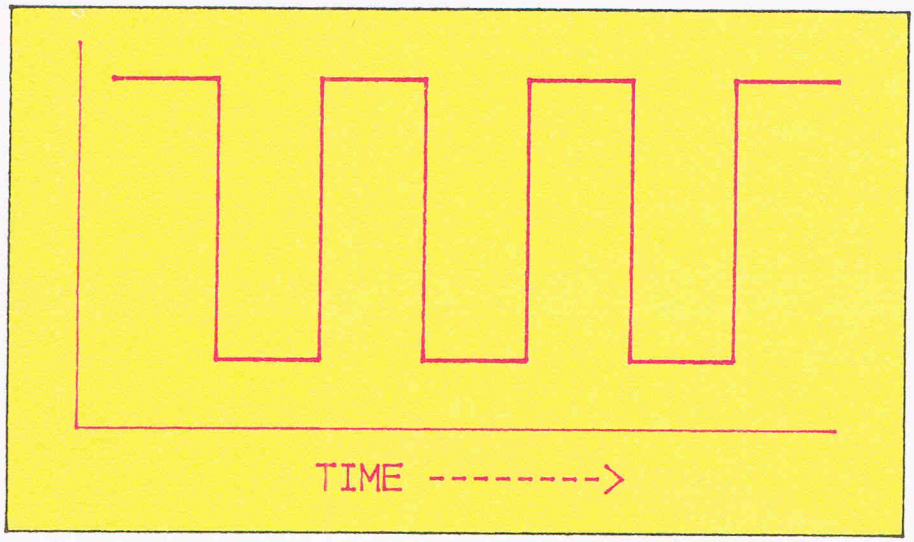

Fig 1 Square Waveform

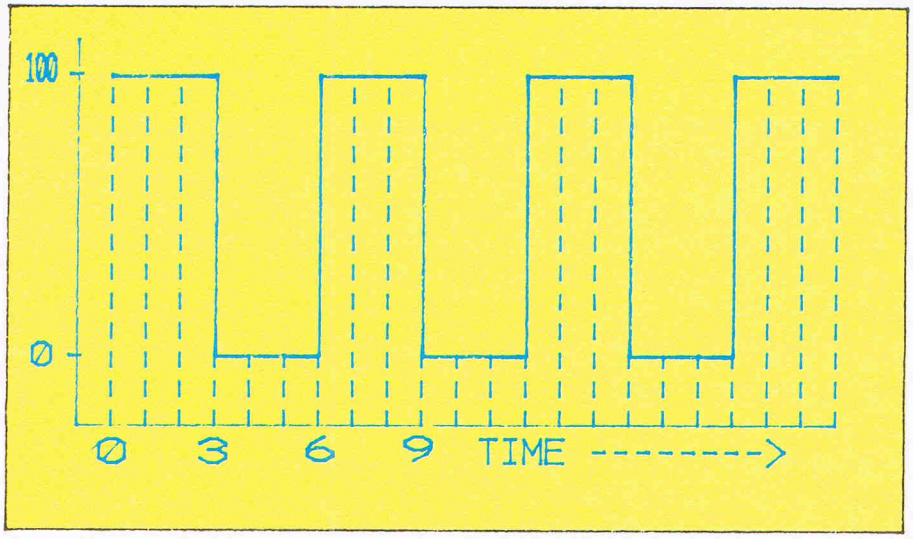

Fig 2 Waveform Sampling

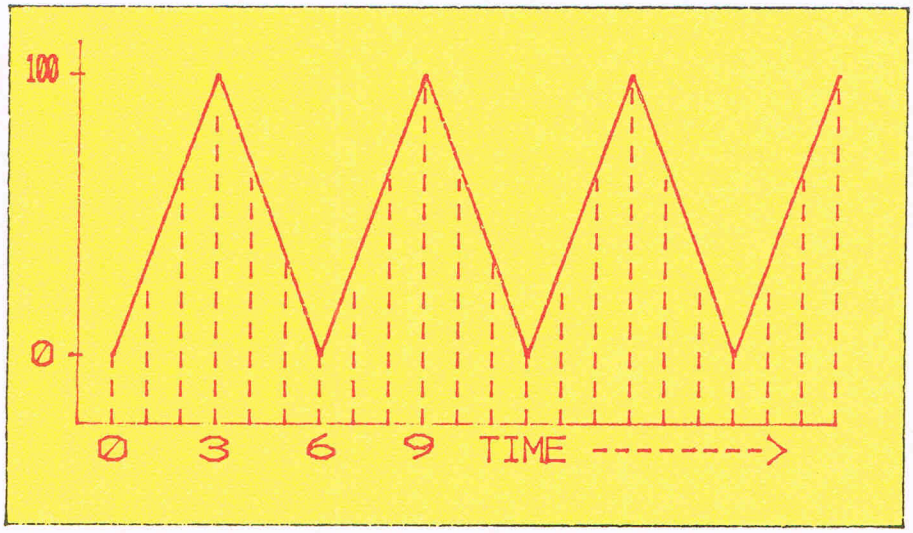

Fig 3 Sampling a Triangle Waveform

based on a vacuum tube display that has largely been displaced from tape recorders and been replaced by less easily understood VU meters. The *rate, time* and *memory* indicators refer to the sampling frequency and data capture period while the memory displays the total number of bytes used. At high sampling rates this increases very quickly indeed and it is fascinating to watch the decrease in the amount of time allowed as the three factors are all inter-related.

The sound editing counters allow you to move around the sound data table and the data itself is represented graphically as a waveform. The waveform can be magnified to examine complex waveforms and also to set the counters accurately — an impressive feature of the software. The menu structure is quite comprehensive and appears thus:

Info
- Futuresound

Disk
- Load File
- Save File
- Save IFF File
- Erase File
- Rename File
- Make Data Disk
- Change Data Drive
- Quit

Tracks
- Clear Track
- Clear All Tracks
- Allocate Track
- Reset Track

Bag of Tricks
- Reverse Sounds
- Copy Sound
- Mix Sounds
- Zero Sound
- Scale Sound

FUTURESOUND can make some quite complicated manipulations of sound. For example, by holding a sound in track 1 and then copying it to track 2 and adjusting the starting counter for track 2 to start slightly later than track 1 then playing both simultaneously results in a reverberation (echo) effect. Then copy track 1 to track 3 and then select *reverse sounds* for track 3 and then mix with track 2 by means of *mix sounds* and you start to get some idea of the extent to which you can go. I have ignored any nuances introduced by adjustment of volume levels on individual tracks or a *massage* of the sound before it is captured. The microphone serves as the main means of collecting the sound although the controller box may be directly connected to a cassette unit or radio tuner auxiliary output.

FUTURESOUND is a product that begins to reveal the true depths of the AMIGA philosophy. After listening to FUTURESOUND you will realise just how advanced the AMIGA hardware is for a personal computer at its price. If DeLuxe Paint made you look, then FUTURESOUND will make you listen.

Price: $175.00

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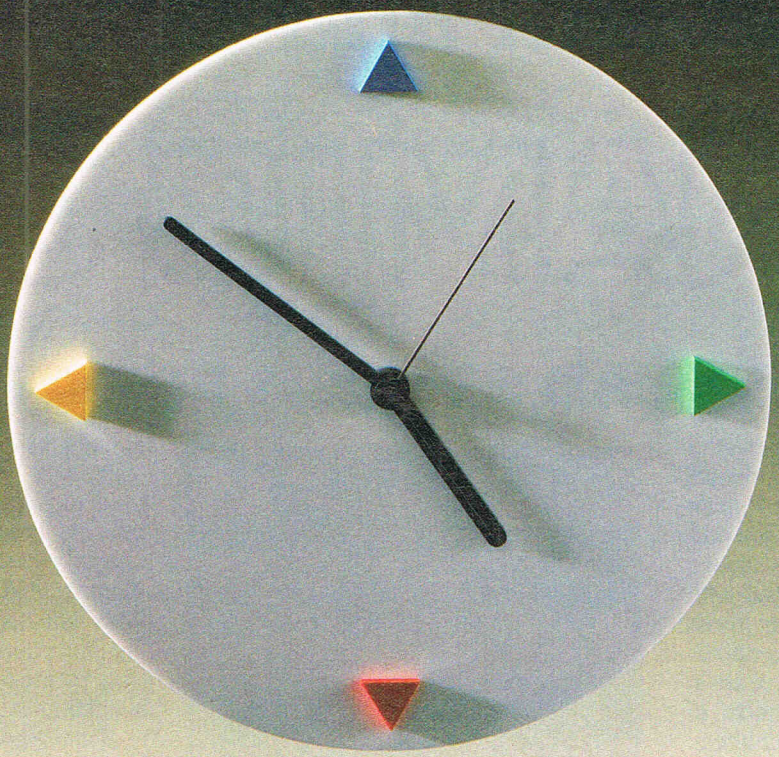

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MODULA-2

Most serious programmers are well acquainted with the need for structured programming. GOTOs and suchlike are fine for small programs, but rapidly cause problems as program size increases. Pascal, designed by Professor Niklaus Wirth, was intended to get away from the free-and-easy method of program writing and give a structured form to programs, but it also had some inherent weaknesses; poor I/O and string handling, no low-level hardware access and the need for all parts of the program to be compiled at once. Modula-2 was the language eventually developed by Wirth to overcome many of the deficiencies of Pascal, yet retain all the advantages which structured programming gives. Modula-2 Software Ltd, formerly TDI Software Ltd, have brought out a version of Modula-2 for the Commodore Amiga to increase further the range of languages now available for this machine.

For anyone who has ever used Pascal, one of the things that you either love or hate about it is the rigid typing and checking; not only can variables have meaningful names, but so can the values you place inside them. Values that are outside the permitted range or of the wrong type cannot be assigned to a variable. Modula-2 has all these features as well as the familiar CASE statement, this time with an ElSE, the ability to call procedures and pass parameters to them and similar loop and conditional statements. However the syntax in Modula-2 is slightly simpler and there are several new facilities such as excellent string handling, the ability to access the operating system through low-level commands and support for multi-tasking. In addition, the program can be split up into several 'modules', which can be separately compiled and tested before being linked together to form a large integrated program suite.

Modules can be of two types; library or client. Client modules are rather like main or control programs and can accept (import) variables passed to them from library modules. Library Modules can both accept and pass (export) variables and are the main 'engines' of a program. Both types of module can use procedures, but there is a much stricter method of calling than in many other languages. Library modules are split into two parts; the definition module and the implementation module. Only those items which appear in the definition module can be exported making it possible for other modules to access any procedures or variables that are declared only within an implementation module. The only other language that has such a powerful structure is ADA. By writing the extremely concise definition modules himself, the senior programmer in a group can give the junior programmers virtually all the information they need to write the implementation modules. Example 1 shows the definition module for a routine which returns a random number within a given range. Other programmers only have to see the definition module to know how to obtain a random number in their own programs; the method and variable names used in the implementation module don't need to worry them at all.

Once modules have been compiled they are available for use by any other program. No longer do you have to keep re-inventing the wheel or re-typing the same code into dozens of different applications. To create a running program the modules must be 'linked' together, including any external library routines needed for machine dependant access. By keeping the definition modules the same and altering the implementation modules to take account of machine dependent changes, programs can be made more portable. Compile speed is not terribly fast, but programs appear to run very quickly. There are no standard benchmarks for Modula-2, but the graphics demo programs compare favourably in speed with any I have seen.

Two Versions

Two of the main strengths of the Amiga are its multi-tasking abilities and the excellent graphics facilities.

Unfortunately, many languages are unable to take full advantage of either of these because the necessary commands are not available. The version of Modula-2 from Modula-2 Software Ltd (I shall call then M-2S from now on to save space!) comes in two versions; the standard single disk version at £99.55 and the Developer's two disk version at £149.95. Both have a full range of Amiga Library commands (84 in all) which allow access to virtually all the machine's facilities. The developer's version includes the definition module source code for all these routines, presumably so that you can see how to call and use the library modules that are supplied. However, since the manual also includes full printed listings of the same thing this isn't actually a great advantage. The other extras in the developer's version include the full implementation module code fo several important Amiga routines, symbolic file decoder, link and load file disassemblers, a source code cross-reference utility and a Kermit file transfer utility. Unfortunately, none of the utility programs were even mentioned in the manual and the kermit program wasn't complete. M-2S have said that a new version of the manual has been published, but I wasn't able to see it during the review.

One thing that did surprise me was the fact that you edit, compile, link and run everything from the CLI. The problem is that you don't actually get any documentation on using the CLI when you buy the Amiga, which means another £24 needs to be forked out for the AmigaDOS User's Manual! Without a detailed knowledge of the CLI you won't get very far with Modula-2.

Once you start writing your own programs, one of the best ways of seeing how to use library modules is to look at example programs. M-2S provide several demo programs, primarily showing graphics, but including speech and multi-tasking with windows. Both the runtime code and the source code are included on the developer's version and provide an excellent reference, both for syntax and methods. Modula-2 is very case-dependent (see example 1) and the slightest mistake with the shift key can cause a compilation error. The manual does not set out to teach you Modula-2; you have to learn that yourself from one or more of the books mentioned in the bibliography section of the manual. Pascal programmers will have little problem converting, particularly if they read the book Modula-2 for Pascal Programmers, by R Gleaves. Another must is Wirth's own standard reference book on Modula-2: Programming in Modula-2.

With the exception of ADA, which is really intended for large machines, Modula-2 is the most exciting language I have used for a long time. It has several advantages over Pascal and C and yet the code is easy to follow once written and gives access to the facilities of the host machine. The version provided by Modula-2 Software is a full implementation and my only real criticism is the extra £50 needed for the developer's version. I really can't see many people who want to write serious code purchasing the standard version and yet the extras on offer are really quite small.

However, even at £150 if you want a structured high-level language that will open up the power of your Amiga, Modula-2 has to be worth a close look.

C.D.

Contact: Modula-2 Software Ltd., 29 Alam Vale Road, Clifton, Bristol, BS8 2HL. Tel: 0272 742796.

Example 1

```
DEFINITION MODULE RandomNumber;
PROCEDURE Random (Minvalue, Maxvalue: CARDINAL): CARDINAL; (*
Return a random Number in the range Minvalue. . Maxvalue *)
END RandomNumber.
```

MICROFORGE SCREEN EDITOR

The Microforge Screen Editor is a program developers tool forthe creation and editing of text on the AMIGA. In other words it is a specialist word processing package. The AMIGA is supplied *as standard with no less than 3 text editors,* these being ED, EDIT and NOTEPAD. The first two are only accessable from the AmigaDOS level whilst NOTEPAD is used for the WORKBENCH environment. ED is a full screen editor for processing ASCII files such as the AMIGA equivalent of MS-DOS batch-execute files — in AmigaDOS these are termed text or command-sequence files. EDIT is a line editor and is used for operations on binary format files. There is also opportunities to program EDIT on a batch commad basis with redirection of input/output forming a strong feature of EDIT. NOTEPAD operates as a full screen editor and makes full use of the elements of INTUITION such as different screen fonts. This utility is much more of conventional word processor with cut and paste, search and replace together with user defined colours for the screen and characters. NOTEPAD files are binary in structure and cannot be read by ED.

One of the limitations of the native editors on the AMIGA lies in the numbr of files that can operative at any one time. To overcome this the MF Screen Editor allows the user no less than 20 ASCII files open to editing simultaneously. This is done by using INTUITION windows for each file — the files are stacked behind each other and access to each is done by sequential operation of the function keys. The individual file size that the Screen Editor allows is a truly massive 8 megabytes! Quite what any programmer would be doing with a file of this size defies the imagination, however, should you need extraordinary sized files then this product will meet your requirement.

One feature which seems to be missing on many word processing packages is an **undo** command. The number of times I have cursed on the lack of this would make a priest blush and I really fail to understand why it is not part of the primary specification during the program development stage of a word processing product. Happily this product incorporates such a facility for retracting accidental deletions — an excellent move on the programmers part. The user can also define their own customised menus which can contain up to 18 items per menu. This is one of the strengths of the MF Screen Editor — the package not only gives the *feel* of being a good tool, but provides a framework for the creative, innovative user to shape it to their own requirements. AmigaDOS provides the facilities for *wildcats* which are usually the characters # and ? for individual character or character string substitution and the Screen Editor makes full use of this for searching and replacing either forwards or backwards from the current cursor position. The search and replace is noticeably faster than ED as well as offering greater control.

The function keys can quickly defined by only three-keystroke sequences which together with a *clear* mode for defining up to 99 keystroke sequences, function keystrokes and mouse clicks is not going to leave anyone complaining of not being able to fulfill a 'requirement from the keyboard and mouse. Another element of the *openess* of this product relates to the facility to modify the Screen Editor configuration actually during use — the new configuration can be then saved to disk or a new configuration called in at will. The cut-paste-copy functions make full use of the screen colour configuration to highlight the areas under manipulation. Printer output can be done at any time within the Screen Editor with selective or full file printing being available.

Access to AmigaDOS commands is also a feature and this allows the user to rename, delete or copy files, directories, etc. — the whole gamut of AmigaDOS facilities are available without any restrictions. For situations where the AMIGA is likely to be used by unskilled or foreign language users the Screen Editor makes use of the **Narrator** device. The Narrator is part of the powerful armoury of the AMIGA and will convert text into the spoken word. The language does not have to be English — German, French and Italian are quite easy to produce. More exotic variations such as swahili, Nepalese and the Geordie dialect (sorry Mum!) may be produced by phoenetic translation. On more mundane terms the Narrator could be utilised to produce error messages or warnings or perhaps for the novelty just read you your program — it makes quite interesting listening!

The core of The Screen Editor without doubt the ability to define *macros.* A macro in this context allows the user to define certain keystroke sequences to perform a set task. The task can be anything the user requires such as loading a specific sequence of files or delete a certain character string or specific number of space characters. For example, the Screen Editor does not provide automatic indenting, the reason being quite simple — the indenting requirements of a programming language varies considerably between languages. A FORTH-83 program is laid out differently from that of a C or FORTRAN-77 program. A macro can be constructed

pertinent to the language in hand by recognition of certain word sequences — PASCAL is a very good example. Consider the following typed straight in from the keyboard:-

```
program power calculation (input/out);
var
ohms, watts, volts, amps: real;
i_reply: integer;
reply: integer;
procedure clearscreen;
begin
write (chr (27));
write ('c')
end;
```

By defining a macro to insert a line above whenever the word **var** is met and then indenting by 4 characters the program will look like this:-

```
program power_calculation (input/
output);
var
ohms, watts, volts, amps: real;
i_reply: integer;
reply: integer; ..... and so on
```

Further macros could then detect the word **procedure** and do the necessary line insertions and subsequent indenting. Note that a macro can call another macro, thus once a library of macros had been established the appearance of the programmer's source code would be considerably improved. The macros can created and used on-line attached to ay key or mouse click or alternatively called in from the presaved library.

The language syntax of these macros is not difficult, for example assume you plan to edit certain files on the next occasion you use the Screen Editor, the macro could look something like this:-

```
<shftAltCtl-z: loadFile("your-first-file")
               loadFile("your-second-
               file")
               loadFile("your-third-file")
>
```

The < and > characters mark the start and finish of the macro and in this example the macro will load the files with those names between the quotation marks and in the order specified after simultaneously pressing the **z, CTRL, ALT** and **SHIFT** keys. Macros are compiled after definition by simply pressing the F6 key. A macro in the hands of a skilled and experienced user is an extremely useful and powerful tool.

The package is supplied on a single disk and can be backed up or transferred easily to a hard disk. There appears at first sight to be no manual, but Micro Forge wisely decided in the interests of reducing the costs to have the manual on the system disk. The manual is printed out from the disk and the unwanted text files are then deleted. The number of pages in the manual is largely dependent on the printer and paper used. In my case an EPSON RX80F/T using standard 11 inch paper with pica characters gave a manual of around 110 pages. The manual is very comprehensive although it lacks an index (for obvious reasons regarding the printer/paper combination) and provides more than enough information about the product and it's uses.

I found the Microforge Screen Editor to be a first rate product in every respect. It should form part of any self-respecting programmer's library.

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AMIGA PLUS TRANSPUTER

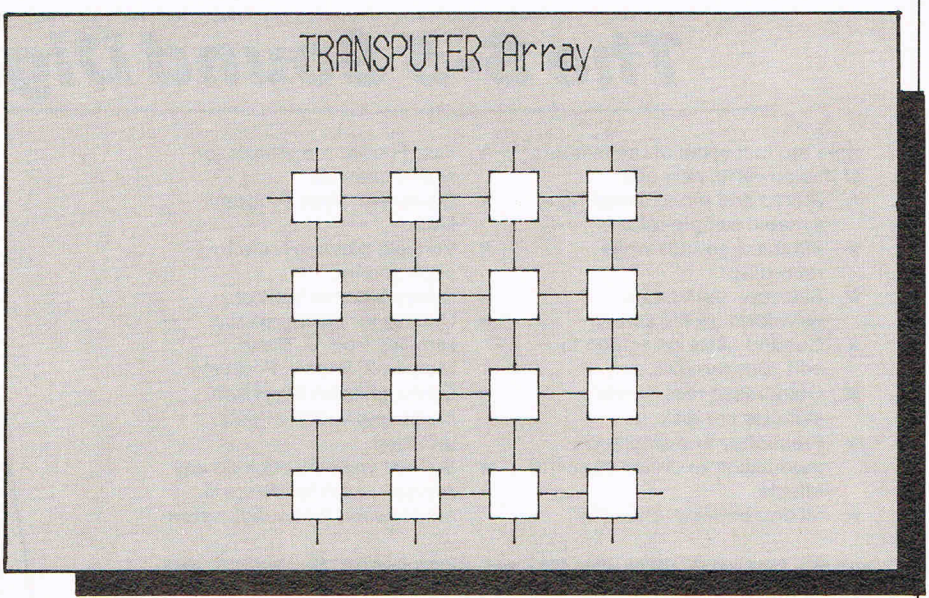
Bill Donald tells us that the AMIGA can be speeded up to challenge the super- minis or mainframes. How? Add a Transputer!

And what exactly is a Transputer? Read on and find out.

If the name *von Neumann* was mentioned in casual conversation, the listener could be forgiven for assuming we are discussing some obscure military campaign of the Second World War. In fact von Neumann provided the outline of present generation personal computers in using the concept of a *central processing unit*. His idea of using a *cpu* connected by means of *busses*, an address bus and data bus to the memory unit is fundamentally unchanged even in a personal computer such as the AMIGA some forty years on. Improvements in system performance by increasing the speed of the processor because of the growing volume of memory attached to the system was one solution, *direct memory access* or DMA was another, indeed the AMIGA has 25 individual DMA channels. The other alternative was to provide secondary processors to handle specific functions. The Intel processor used in the MS-DOS world, namely the 8086 is provided with a mathematical *co-processor*, the 8087 whilst Motorola provides the equivalent for the 68000 family in the shape of the 68881. The AMIGA uses custom circuits designed in-house to cater for specific functions which cannot be achieved by off-the-shelf circuits. The sound and graphics facilities of the AMIGA are handled by dedicated co-processors or *engines* as they are sometimes termed — the three girls AGNUS, DENISE and PAULA. However, while this may take the pressure off the processor, the situation is exacerbated on the address and data busses simply because of the number of system components sharing this resource. This gives rise to a phenomenon named the *von-Neumann bottleneck*, a phrase familiar to hardware engineers.

Programming languages also fall into a traffic jam because they rely on this sequential method of instruction *fetch* and *execute*. Whilst increasing the processor clock speed to compensate (20 MHz is predicted to be the norm on personal comptuers within the next two years), the complexity of specialist hardware and control of large numbers of DMA channels makes cost-effective programming very difficult under such conditions of system operation. While hardware may be rapidly falling in purchase cost terms, programming costs continue to rise in the opposite direction — and more importantly this rate is showing no signs of slowing down. The AMIGA provides *multi-tasking* through scheduled *time-slicing* by providing the processor(S) with a quick view of each task or series of instructions, viz. the program. This segment of time is effectively a bus-access period and is used by the processor or for example, the dedicated graphic engines to execute an instruction and then return control back to the multi-tasking controller (EXEC). Apart from the system software needing a high degree of robustness to avoid getting out of phase otherwise known as *bus-contention*, there are limits in terms of how much the hardware can cope with in *time-slicing* and the curent AMIGA technology allows for a maximum of eight *time-slices* or tasks. On a single processor machine such as the AMIGA this is done through a fast clock speed and an operating system *designed* for *time-slice* processing. However, no one would claim the system software of the AMIGA, is simple to understand despite its undoubted elegance. One solution to this is *concurrent* or simultaneous *parallel procesing* of the instructions using multiple processors which are capable of very fast input/out and supported by fast memory. Note that *multi-tasking* on the AMIGA is not the same thing as parallel processing although to the user of the machine it may appear so.

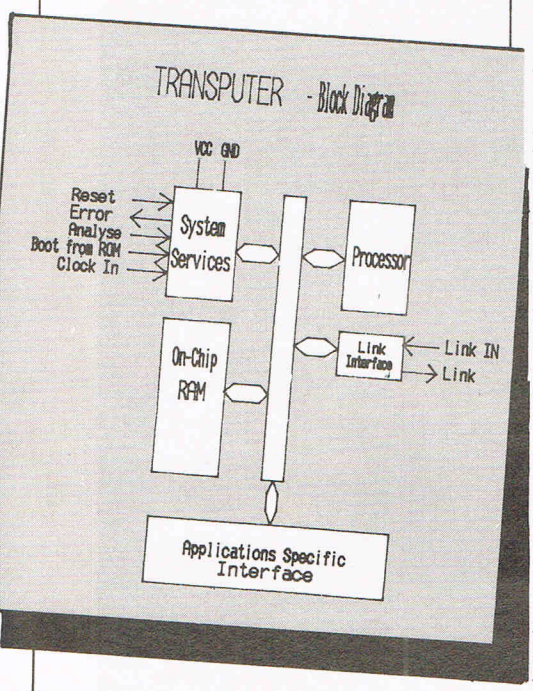
If we go back to the hardware design and start again from scratch using existing hardware we would find that currently available processor's throughput can comfortably exceed several MIPS (million instructions per second — a rough indicator of a processor's power). From historical experience we would also find that the von Neumann architecture is at its best in a small, single processor environment and that we now have the considerable advantage of enhanced hardware speed. The TRANSPUTER is a small but complex computer based on the classical von Neumann design allowing simple and fast interconnection between further TRANSPUTERS.



A network of TRANSPUTERS can be constructed and sized according to the users requirements — there appears to be no physical or electrical limitations

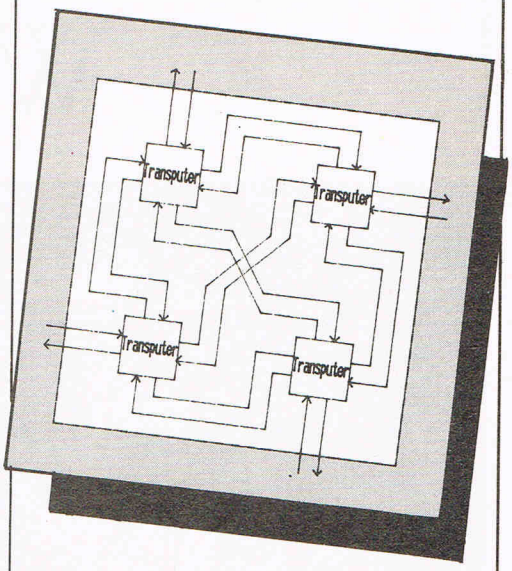
on the size of a TRANSPUTER array. Since a basic TRANSPUTER unit has a measured throughput of 7 MIPS, adding further TRANSPUTER circuits increases the total array processing power by an accumulative amount. These four TRANSPUTERS would give a throughput of 28 MIPS which moves the system well into the *super*-minicomputer sphere of operation. With no upper limit it is quite feasible to construct a personal computer device utilising TRANSPUTERS to comfortably approach or exceed current generation mainframes in MIPS terms.

The two keys to understanding how this is achieved lie in the architecture of the TRANSPUTER itself and the programming language employed. Central to the TRANSPUTER concept are the system busses. A simple linking whereby the output bus of one TRANSPUTER forms the input bus of the next TRANSPUTER in the array using very high transfer speeds of 10 megabits/second on all links and any direction simultaneously provides the platform for a high performance device. The 50 nanosecond internal RAM of the TRANSPUTER does not have to be very large — the usual size is 2k. By allowing the processor to access the internal RAM at very high speed (40 megabits/-second), there is no real need for a large volume of internal RAM. However, in a position where a larger processor address space is required an interface is provided through the *Applications Specific Interface* (ASI).



It is a common mistake to assume that the TRANSPUTER is a *reduced-instruction set chip*, a *RISC* processor as seen in the IBM-RT (or 6150 depending on where you live) personal computer or the *still-being-worked-on/real-soon-now* Acorn device. The TRANSPUTER employs 8-bit instructions with an *evaluation* stack of three registers. Using an *evaluation* stack allows for instructions that do not have specify an operand register since the instructions are always from the top of the stack. The benefits that accrue from using a short instruction format means fast encoding of the most frequently used instructions and data. Where large constants, non-local variables and infrequently used instructions are met, these are pipelined into 8-bit sequences. It is often overlooked by hardware designers that a large number of processor instructions are very rarely used and research by Motorola in this direction yield figures of 85% apparent redundancy in most processor instruction sets. This was one of the reasons for the production of the 68010 with its *loop-mode* instructions. By taking some commonly used instructions and placing them in a special onboard cache and thus avoiding duplication of the *instruction fetch* sequence an improvement in throughput was obtained at very little additional production cost.

The method of connecting a TRANSPUTER array relies on a very simple two-wire point-to-point connection named a *link*. These *links* lead into the *link interface* preset on each TRANSPUTER. The *links* are autonomous and when a *task* or *process* on one TRANSPUTER receives an input signal from this *link* — the two devices then transfer data. The data is transferred by DMA access from the memory of the transmitting TRANSPUTER under the auspices of a DMA controller within the *link interface*. During the course of the data transfer the individual processors then move on to other pending processes which do not require input/output by means of a *process-schedule controller*. After completion of the data transfer the processes are rescheduled without the need for the processor to *poll* or check that input/output has finished. A system of task priorities (the AMIGA uses the same concept) ensures that the next process to gain access to the TRANSPUTER *link* is given while lower priority processes are put *on hold*. The communication between processes that remain within the TRANSPUTER is controlled by changing the address of the paticular channel since the TRANSPUTER is provided with an internal memory map.



One of the principal areas of difficulty in designing and producing the TRANSPUTER lay in the system clocks, since the rate of data transfer across the *links* called for some very high frequencies, in the order of 80 MHz. To distribute this frequency around an array of TRANSPUTER would have lead to some severe engineering problems in terms of controlling emission losses as well as radiated interference and the answer was to use a low frequency 5 MHz clock external to the TRANSPUTER which would internally generate the high frequency required. However it would be very difficult to ensure that all of the clocks were exactly in phase across an array of TRANSPUTERS. The solution lay in the frequency of the internal clocks and by ensuring that they were very tightly coupled to an onboard crystal the problem of synchronised timing was overcome.

This brings us to the programming language used by the TRANSPUTER, namely OCCAM. Incidentally before going any further it should be noted that OCCAM is in the course of transition and OCCAM II should be available very soon. This makes up for some of the shortcomings of OCCAM I on which this section of text is based. OCCAM uses the concept of *processes* that can tem. A *process* is a finite entity and may be constructed of many other *processes*. There are three elements to a *process* — an *assignment, input* and *output*. The *assignment* computes the value of an expression while *input* or *output* communicate between *processes*.

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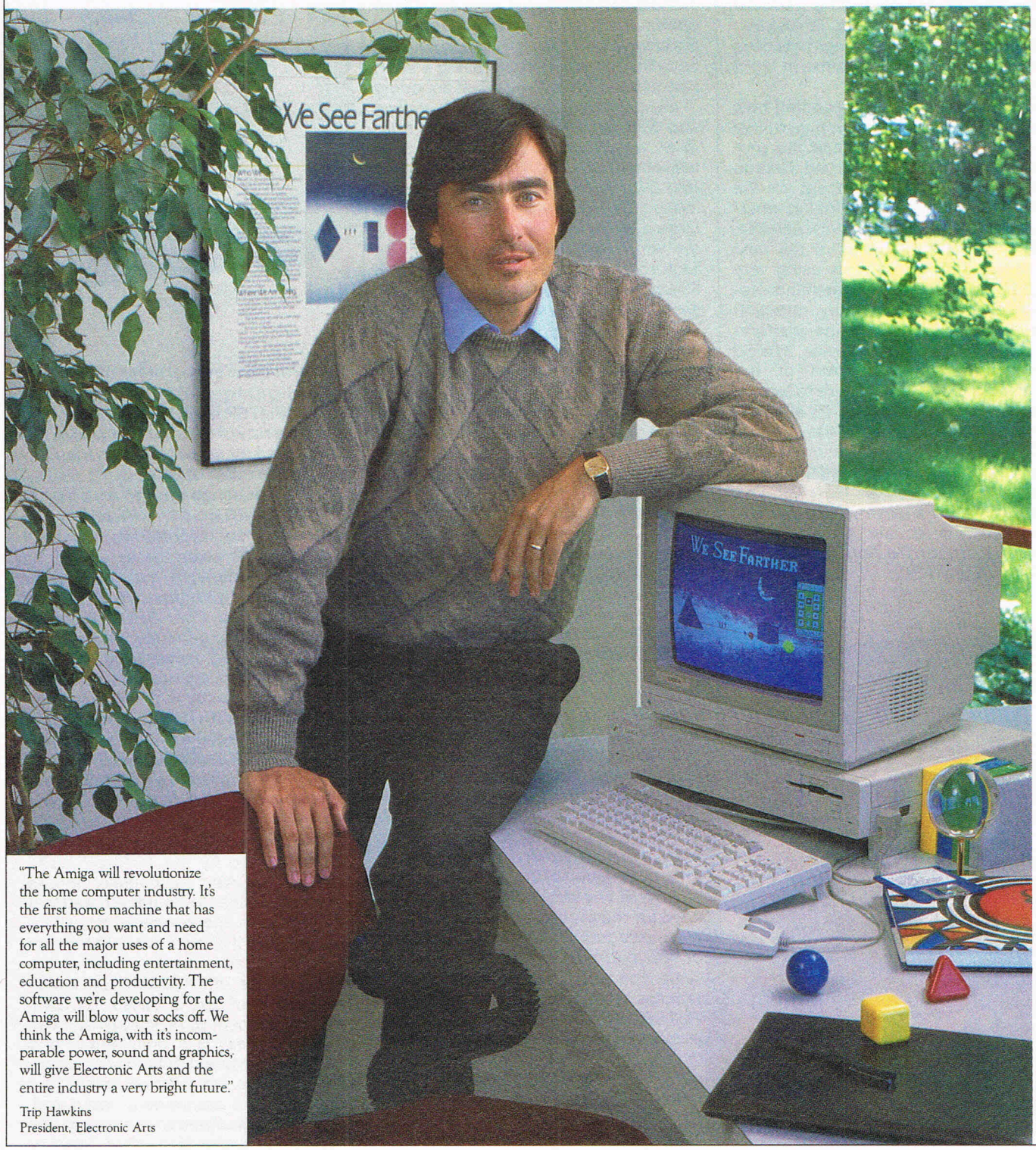

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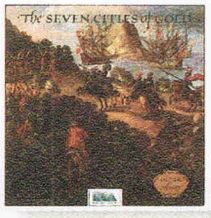

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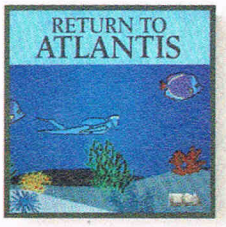

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The reviews are in.

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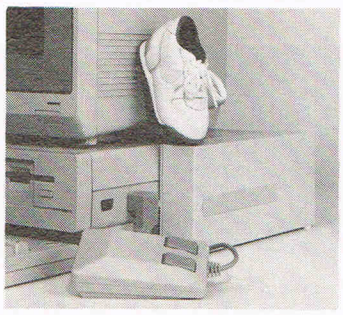

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TRANSPUTER

Continued.

Since each TRANSPUTER implements the OCCAM concept of concurrency and communication then OCCAM can be used to program any size of TRANSPUTER array. Where only individual TRANSPUTERS exist then the TRANSPUTER shares its time between the concurrent *processes* and the channel communication is implemented by moving data within the memory. Therefore the hardware configuration is transparent to the programming language and it is left to the user to decide the best hardware combination of cost versus performance.

OCCAM in use appears to the programmer as a high-level language. For example the *assignment* is indicated by that used in PASCAL, namely:

```
A := B
```

Input uses the question mark, thus:

```
A ? B
```

means input a value from channel A and assign it to variable B while *output* uses the exclamation mark:

```
A ! B
```

This outputs the value of the expression B to channel A. A number of processes may be combined to form a *construct* which in turn can form the element of another *construct*. Four classes of *construct* exist, these are the *sequential, parallel, conditional* and *alternative*. Thus a *sequential construct* would be represented as follows:

```
SEQ
P1                (process number 1)
P2                (process number 2)
P3                (process number 3)
```

This would execute the three *processes* one after the other — note the indentation of two spaces to indicate the component parts of the *construct*. Consider a more interesting *construct*:

```
SEQ
C1 ? X            (input a value)
X := X + 1        (increment it by 1)
C2 ! X            (output the new value)
```

A *parallel construct* follows the same lines:

```
PAR
P1                (process number 1)
P2                (process number 2)
P3                (process number 3)
```

Where the three *processes* execute concurrently. A conditional construct appears as:

```
IF
condition1
P1                (process number 1)
condition2
P2                (process number 2)
```

If condition1 is true then P1 executes otherwise P2 executes if condition2 is true. Consider:

```
IF
  A = 0
  B := B + 1
    SKIP
```

The above expression increases B only if the value of A is zero. The *alternative struct* looks like this:

```
ALT
  input1
    P1            (process number 1)
  input2
    P2            (process number 2)
  input 3
    P3            (process number 3)
```

This waits until any of the input channels *input(n)* is ready. If *input1* becomes ready first then P1 is performed. Alternatively, if *input3* become available first then P3 is performed first. The construct is then terminated irrespective of which process went first.

```
ALT
  COUNT ? SIGNAL
    COUNTER := COUNTER ¿ 1
  TOTAL ? SIGNAL
    SEQ
      OUT ! COUNTER
      COUNTER := 0
```

This *construct* either inputs a signal from the channel **COUNT** and increases the variable **COUNTER** by 1, or alternatively inputs from the channel **TOTAL**, outputs the current value of the counter, then resets it to zero. The above is only a very brief insight into OCCAM which many readers will not have seen before — so at least you now have an idea of what it looks like.

It is now possible to utilise the power of the TRANSPUTER on the AMIGA and in late September 1986 I journeyed to Humberside to learn more of this exciting development. The city of Hull these days is probably known more for its suspension bridge across the River Humber — the longest in Europe, so I'm told and it is here that Sophus Software Ltd under the leadership of Jim Hawkins with his extremely able team are making the dream a reality. Make no mistake, this is right on the boundary of personal computer technology and hence the reason for my interest.

Sophus Software are situated in the Newlands High Technology Park which is located in the grounds of the University of Hull. This university has a worldwide reputation in the field of robotics and artificial intelligence. Thus Sophus are able to draw on this knowledge and personnel which gives them a useful edge over the competition. Sophus are able to offer a variety of TRANSPUTER configurations ranging from 16-bit to 32-bit units together with optional RAM boards from 128k to 2Mb. At the time of writing Messrs Inmos the producers of TRANSPUTERS provide only two environments suitable for TRANSPUTER interaction with the AMIGA. There are an IBM-PC environment and direct control using the Motorola VME bus. Interfacing to the AMIGA using the IBM-PC card is done using the SIDECAR — the card is mounted inside the latter. The VME option is more convoluted in hardware engineering terms as well as being expensive in financial terms and Sophus plan to provide their own direct interface to the AMIGA expansion bus based on the Commodore AMIGA *ZORRO* backplane — this is faster than the VME bus architecture.

The main advantage in utilising the IBM-PC TRANSPUTER card is the simplicity of installation and use — just plug the TRANSPUTER board into an expansion slot and there it is. The other advantage in using the IBM-PC environment is that it offers the user a wider range of hardware for experimentation. The question that lies on everyone's lips is of course 'what applications are there?'. The AMIGA is a very powerful graphics engine and together with the unprecedented processing power of the TRANSPUTER provides a platform for extremely fast real-time graphics. This could be recognition or comparison between different images in the field of industrial process control such as foodstuffs or visually sensitive objects such as ceramic tiles or in criminology for fingerprint or facial comparisons. Generation of images relying on very complex mathematical equations is another and the potential here is enormous — civil engineering and design, astronomy and mathematics, computer-aided design and animation — the list is endless. In simple terms the AMIGA and the TRANSPUTER offer a unique combination of both speed and cost-effectiveness. In future issues we will bring further news of this exciting combination.

For further details contact: Sophus Software Ltd. Unit 2C, Newlands High Technology Centre, Inglemire Lane, Hull HU6 7TQ. Tel 0482 802142.

THE BIG BLUE READER

By S.O.G.W.A.P. Software Inc.

The Commodore 128 and 1571 disk drive is probably one of the most underrated computer setups on the market today. The 128 contains two processors and will function in three distinct modes. You need only compare the size of the COMMODORE 128 PROGRAMMER'S REFERENCE GUIDE (an excellent book) with that of the 64's to get an idea of its increased power. The 1571 is an extremely versatile disk drive that can handle multiple disk formats and data transfer rates. S.O.G.W.A.P. Software has tapped some of these extra features and come up with The Big Blue Reader, a programme that will enable you to read from and write to MS-DOS files. It will allow users to transfer files generated on most IBM-compatible software to Commoodre DOS files and vice versa. The programme auto-boots and will adopt either 40 or 80 column format depending on the state of the 40/80 key. The 80 column screen is divided into two halves. On the left is the main menu, which will display the directories of both Commodore and MS-DOS disks and the main options. On the right is an additional panel called the Alternate menu which gives more detailed information on the disks, ie number and type of files, blocks free etc. The 40 column screen will only show any one half at a time with the ability to switch between the two. From the main menu you are able to load a directory which will automatically detect which DOS type you are using. You can also copy a file to and from whichever format you care to choose. Files can be loaded and displayed on screen or sent to a printer with the option of translating from standard ASCII to Commodore ASCII (or vice versa) if required. Standard Commodore DOS commands can also be issued from this menu.

There are two additional programmes included on the Big Blue Reader disk. These are Big Blue Backup, a utility to make a complete back up of a MS-DOS diskette, and Big Blue Format, a utility that will format an MS-DOS diskette on a Commodore 1571 disk drive.

Conclusion

For me this programme is a Godsend. I regularly swap between Computers using the two different formats. An ideal use, I found, was to enable me to exchange C and FORTRAN programmes (and BASIC when saved as ASCII) back and forth between different computers. As most source files are saved in sequential and not program format, little if any alteration has to be made to the files once transferred. It makes it possible for someone to take a letter or report written on an IBM-compatible computer at the office and go through it at his leisure in the comfort of his own home (maybe that's not such a good idea!).

This is a program that fills a need. If you find you use both formats then you NEED The Big Blue Reader. Any other good ideas S.O.G.W.A.P? (Where did they get that name?) **I.B.**

Price: $29.95 (plus $5 shipping charge)
Contact: S.O.G.W.A.P. Software Inc., 611 Boccaccio Avenue, Venice, CA 90291, USA.
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Metacomco PASCAL

Why should you purchase PASCAL? Well for one thing it makes sense to acquire a working knowledge of as many programming languages as possible since some languages are better at certain operations than others. However, be careful to select a language that is here to stay and not some *flavour of the month* language complete with obscure manuals, limited support and implemented on only one machine. In the universities of the UK as well as those in Europe, PASCAL is the mainstream teaching language. In the years to come it may well be eclipsed by C, but for the present time an investment in learning PASCAL is certainly worthwhile. Another point to consider, this time from a commercial stance is that the Apple MACINTOSH operating system is written in PASCAL and whilst source code portability and size may present problems which C can overcome, nevertheless PASCAL still provides a very popular alternative to BASIC or C. In fact the largest selling programming software package in the PC-DOS world is Borland's TURBO PASCAL although perhaps the retail price has a large bearing on Borland's success.

The main problem of an language is portability, which is usually overcome by defining and adhering to the major entity called *A Language Standard*. If readers detect a certain note of cynicism here then rest assured that I may not be alone in such thoughts — I speak here from the position as an observer of hardware manufacturers themselves erecting language standards, e.g. Commodore BASIC, BBC BASIC, Sinclair SUPERBASIC. However, if the standard is defined by an august body such as the International Standards Organisation (ISO) then this avoids the usual machine-featured orientation approach set by hardware manufacturers. The next problem is to persuade the likes of Borland, Digital Research and Microsoft to toe the line. ISO is the umbrella organisation for a collection of national standards bodies throughout the EEC and serves as the central clearing house for the British Standards Institution. In the USA there is a body termed ANSI (almost never shows initiative?) which appears to take little interest in computer programming language other than FORTRAN. Happily, a company such as Metacomco recognises the long-term benefits to the industry as a whole as opposed to short-term corporate financial gains and has ensured that their PASCAL for the AMIGA is validated to the ISO standard.

The Metacomco implementation of PASCAL for 68000 machines is validated to level 0 of ISO 7185/BS 6192. The compiler operates on a single-pass basis and produces 68000 code *and not a slower running p-code*. Every standard PASCAL function and feature is supported — numeric support is considerable with integers being a full 32-bit wide (i.e. MAXINT = 2147483657) and with sets containing up to 250,000 elements. Since the 68000 processor has an internal architecture which handles 32-bit addressing, MCC PASCAL allows the manipulation of very large RAM resident arrays provided the user has provided additional RAM on the machine's expansion bus.

The MCC PASCAL product is supplied on a single disk along with a 150 page manual. The disk is essentially a Workbench disk containing the necessary PASCAL libraries (routines) along with several command-execute or Sequence files to give them their correct title under AmigaDOS nomenclature. In addition there are some new AmigaDOS commands to cover linking and invoking the compiler itself. The disk is unprotected which allows a backup to be made safely. Although the disk is to all — it would be wasting memory to operate with the Workbench operative. However, by retaining the elements of Workbench in terms of the files present, this avoids intimidating the novice AMIGA user by presenting a familiar disk structure rather than one full of unknown directories and files.

The manual does not make any pretence to providing a tutorial on PASCAL programming but consists of the most detailed description of the semantics or language structure I have yet seen published on PASCAL. Some users could describe it as being terse in style, however, after nearly a year of dealing with Messrs Metacomco's manuals I am now used to them and find them concise and pertinent. The Metacomco technical authors may not win any prizes for friendly, hand-holding introductions but they would win the first place for avoiding padding out of their documentation. *Never use a sentence where a single word will suffice* seems to have been their watchword. Presumably they were paid by the number of words they *did not use* — the converse position of most authors! Coupled with no less than 7 appendixes, a bibliography of PASCAL books and a comprehensive index, the manual does a very creditable job.

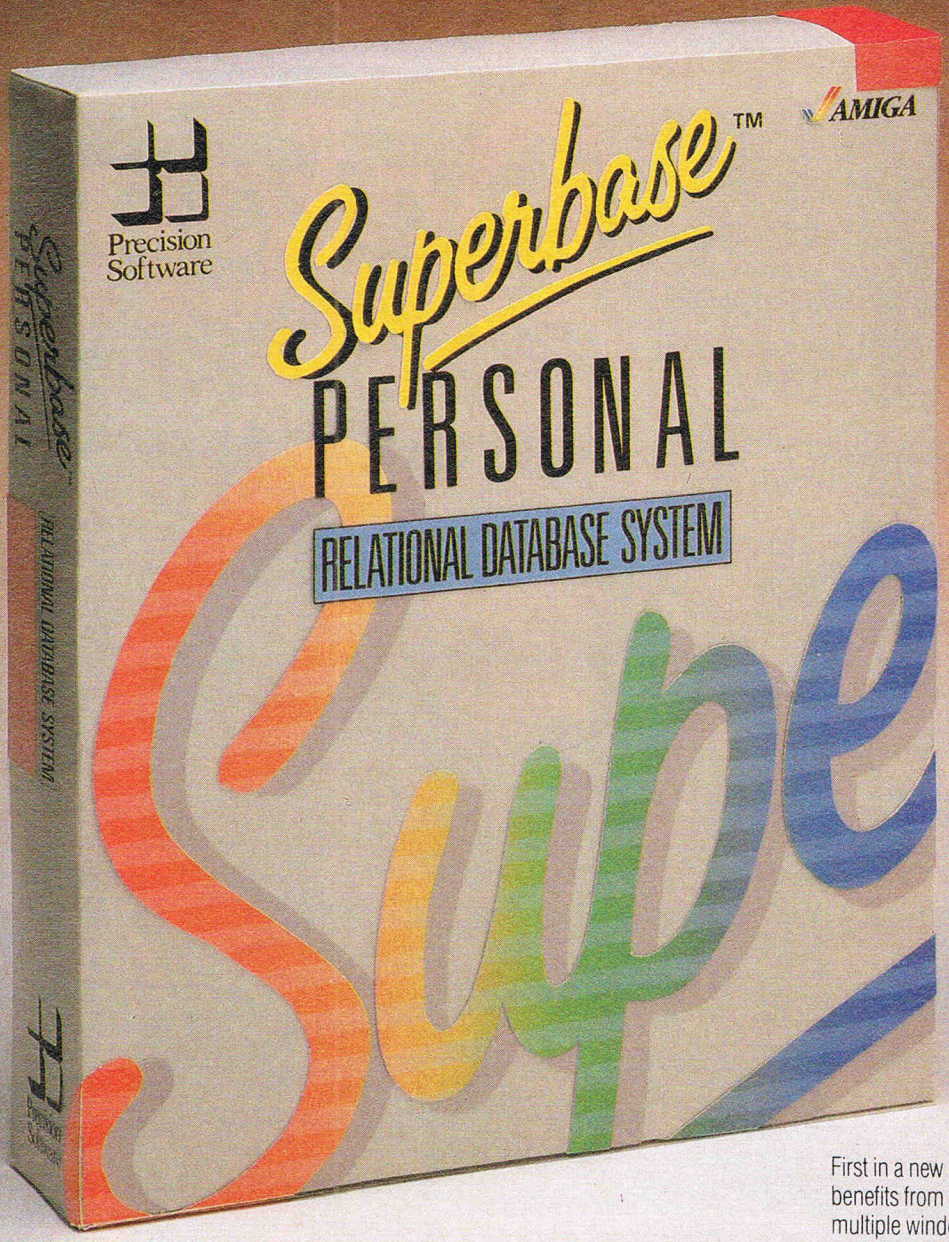
MCC PASCAL allows extensions to the ISO standard provided these are made at the compile time. These options include RESET and REWRITE which allow internal files to access named files. Internal files are files whose useful life is the duration of the program execution. Another option is INCLUDE which allows the programmer to include additional program fragments into the source code at compile time. EXTERNAL is probably the most useful and powerful option and provides an interface to the AMIGA operating system by allowing the incorporation into the programmer's source code a C or BCPL language program fragment. The function or procedure is indicated by a _ (underscore) as the first character, the MC 68000 compiler then generates code conforming with the operating system calling sequence.

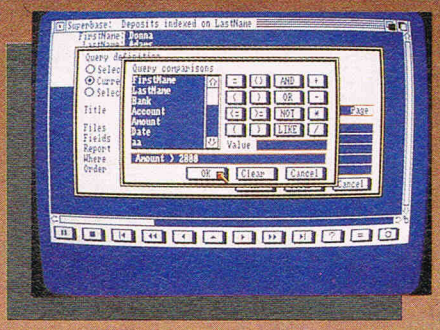
The compilation cycle itself is quite fast particularly when the necessary libraries have been copied into RAM — a rough estimate for compiling and linking 20k of sourse code being under 30 seconds. The full list of compile time options are:—

LIST	provides an output source compilation
NOCHECK	run-time range checking disabled for object code.
EXTEND	allows MC PASCAL extensions to ISO standard
CEM	provide continuous error messages to the display
WS	compiler code within specified workspace size
CASE	sensitise to upper and lower case variable names

The linker used is the standard Metacomco AMIGA Linker — the same linker that is supplied to software developers, so there are no unpleasant surprises here. This provides the means of coupling PASCAL, C and 68000 assembly language object files together. All in all the Metacomco PASCAL compiler for the AMIGA is both fast and useable. Not only is it an excellent implementation of a standard programming language, but it should form a part of any self-respecting programmer's armoury. I believe that this will remain *the definitive* PASCAL compiler for the AMIGA for some time to come and it is a snip at the price.

PASCAL (ISO Verified)
Metacomco Ltd., 26 Portland Square, Bristol BS2 8RZ, UK. Tel: 0272 428781.
Price: £89.95.





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Defend

"The AMIGA will knock your socks off!"

Mindscape's astonishing new series 'Cinemaware' is surely going to take a leading role in that by no means unenjoyable experience. Thanks to the first lady of US software Karen Novak, AMIGA User is able to present a totally new dimension in games — an extraordinary and incredible use of the AMIGA's graphic qualities to make a game that just leaves you stunned.

England, 1194. The Kind is dead, the country divided. Six great castles adorn the landscapes, three occupied by Normans, three by Saxons.

Thus the scene is set in DEFENDER OF THE CROWN, a graphic adventure — sorry, interactive movie — in a line of new products that Master Designer Software call CINEMAWARE. Yes, Cinemaware. Apparently, Cinemaware derives its inspiration from the movies and provides ideal entertainment for the mature player.

What this all boils down to in this case is a graphic adventure (and I do mean graphic!) with a smattering of arcade action thrown in for good measure.

Before you can play DEFENDER you will need a 512k Amiga and although not necessary, Master Designer recommend a second drive.

Loading is both simple and fast; once you have kickstarted your Amiga and inserted the DEFENDER disks, a double click on the left mouse button sets it up and running and after a few seconds the user is greeted with a simple but effective

CONTINUED...

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title screen which belies the visual treats that are to follow.

The objective in DEFENDER is quite simple (though the execution is that much harder!); destroy the Norman castles and free the Saxon people from oppression and you will become King of England. You may even get to rescue a fair maiden or two along the way.

If your typing is as bad as mine then fear not because DEFENDER is menu driven and all selections are easily accomplished by a simple click on the mouse button after choosing from the nicely detailed parchment effect menus. After a short resume you are given the option of selecting one of four main characters, a decision that should be based on their leadership, swordplay and jousting ability! Some time spent here could pay dividends later on as you will certainly be called on to bring these talents to the fore in the coming months.

Having made your selection, the disk drive whirrs and the Amiga loads the next screen, a view of England from the air, the same screen showing your treasure reserves and monthly income. This is important because DEFENDER runs in a simulated time environment, and should you run out of gold then you have no option but to wait a month or two before you will be able to buy new men, during which time your opponents may make land gains.

Having viewed this screen it becomes apparent just how much time and attention that the programmers have put into the graphics alone.

Next up is another map detailing the divisions in the land and showing which areas are owned and by whom. The main selection menu accompanies this screen and shows five options, one of which is simply 'read the map', and selecting this option will allow you to assess the situation regarding the exact layout of the castles and counties of the land.

Medieval Britain was divided up into areas looked after by subservient 'caretakers' called vassals who tended the land and a sensible way to begin your campaign is to find an area that isn't yet owned by one of your rivals and select SEEK CONQUEST from the menu. Be warned though that when you transfer men from your home army to your campaign army you should leave a number of them to guard your castle because it will be prone to attack while you are away, and should you lose it, it will be the end of your campaign. The capture of a local territory will bolster your ranks of men and add to your monthly income which you may use to buy more soldiers, knights or a catapault.

A catapault? Yes, how exactly did you expect to sack a castle without one?

Master Designer have included some arcade action in DEFENDER and the quickest way to sample some is to select GO RAIDING from the menu. Having done so you are thrown in at the deep end!

A nice little subplot is included at this stage. You have a friend who calls himself Robin of Locksley (Robin Hood to you and me) who fled to Nottingham Forest with his men. Should you find your army lacking in numbers then you may call on Robin, who will provide you with enough men to aid you in your attempt to raid a Norman castle.

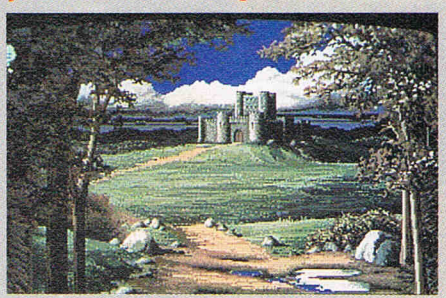
Raiding a castle is a quick way to add some treasure to your stocks but first you have to fight for it.

The next three screens that load are positively stunning in detail and, for me, show just why the Amiga is so exciting. The distant view of a castle from the forest is simply excellent.

From here, night falls and you lead your men into the courtyard battle with the guards. Controlling your sword with the mouse you attempt to fight your way into the hall where you risk capture (which is costly!) to try and sieze the treasure held in the inner sanctum.

The fifth option from the main menu — and music — you may select an opponent to joust and if you have no land left then you must joust for fame. The Amiga now depicts the view from horseback as you attempt to deseat your opponent, controlling the lance with the mouse.

DEFENDER also contains some nice sidetracks. For instance, when one of your opponents calls a tournament, you are obliged under the laws of chivalry to attend. So you may be claiming some nearby territory when you find yourself galloping off to joust with somebody!



While all this is happening the Amiga is happily playing a selection of medieval tunes and it is in this area that I feel there could have been some improvement, especially considering the sound capabilities of the machine.

Nevertheless, Master Designer have come up with an excellent adventure that is varied enough to keep the interest and also contains some stunning graphics.

'Defender makes all other strategy games look out of date.' The outstanding illustration create astonishment even from hardened AMIGA users. You haven't seen anything like this game ever. If you have an AMIGA, you must buy this game. If you don't have an AMIGA, buy one just to experience 'Defender' — it will be worth it.

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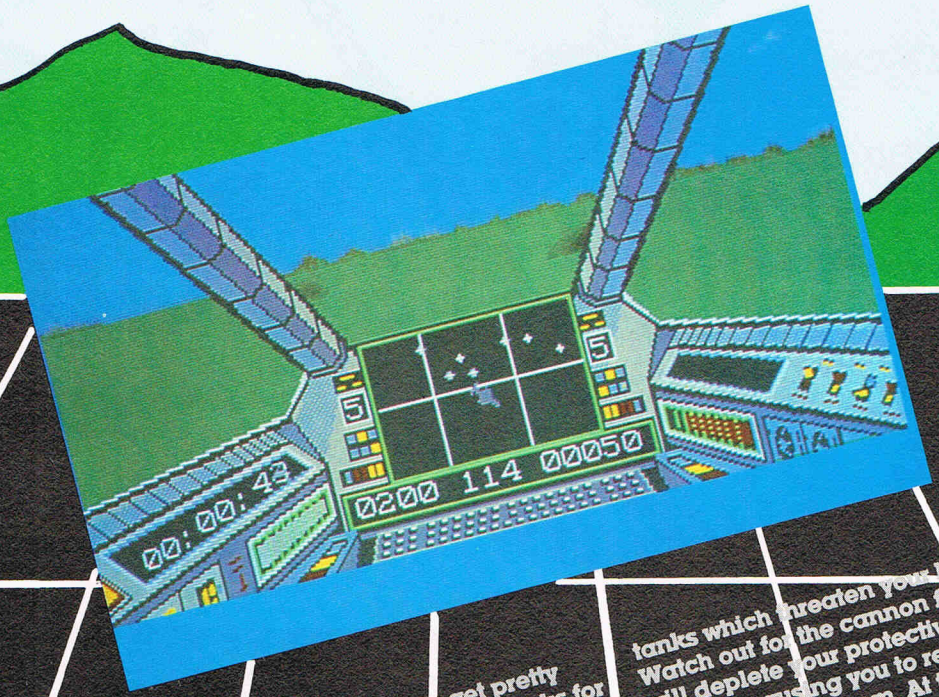


Skyfox for the Amiga is a conversion of the best selling 64 game by Electronic Arts.

You are the pilot of the Skyfox fighter, a supersonic aircraft equipped with heat seeking and guided missiles which you must use to defend your homebase against enemy attack.

After loading, you are presented with an option screen from which it is possible to select one of fifteen different scenarios, the first seven of which are training exercises. Take my advice and try a training flight first because things get pretty hairy when the enemy attacks for real.

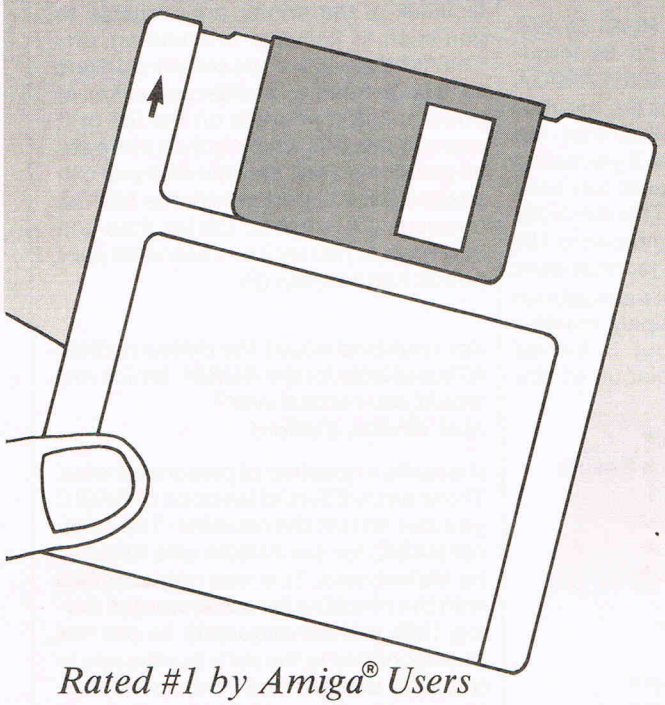
Launch your Skyfox along the exit tunnel and the first thing you notice about the Amiga version is the difference in the smoothness of the graphics and the sheer speed at which the scenery updates.

Skyfox can be operated in one of two 'combat arenas' depending on whether you want to attack tanks or enemy aircraft; toggling between the two is as easy as pressing U to go up to 30,000 feet or D to drop to below 1,000 feet. At the lower height your adversaries are the enemy tanks which threaten your base. Watch out for the cannon fire that will deplete your protective shields, causing you to return to base to refresh them. At the higher level, up to six ordinships will launch planes to attack you; destroy the motherships to stop the onslaught.

An on-board computer and an automatic pilot are provided and will prove to be invaluable aids in your quest to defeat the enemy.

You may select either mouse or joystick to control Skyfox — I preferred the mouse although others may find it a little too responsive.

Overall then, a very nice conversation with a lot going for it. It's a must for anybody's Amiga collection.



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3RD LEVEL: At this level system formatted tracks are arranged so you can look at them as file system blocks. This module allows you to change system checksums, copy blocks to different disks, and trace file origins. This tool will easily allow you to patch a corrupted diskette.

4TH LEVEL: This is the highest level of disk structure, the Amiga binary file. You can study and edit data arranged as hunks, outputs from compilers, assemblers and linkers.

At any level you are able to fully edit and change your diskette to your liking. A powerful direct memory editor is included or you can use any other memory editor or disassembler of your choosing.

As a bonus this package contains a few extra 'hacker' type tools.

COPYKICK: A tool that will customize any Kickstart disk allowing the user to save memory after a reset and be placed in any external memory or expanded memory section. It may then be viewed by a disassembler or memory editor.

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PROBLEM PAGE

I have a number of 3.5 inch single-sided disks. Can I use these with my AMIGA and will they do any damage to my drive?
P.G. Johnson. Wellingborough

Strictly speaking the answer is no. All floppy disks are manufactured to a single specification and then tested. If the test is successful then the disk is sold as a double-sided disk. Those which fail on just one side are sold as single-sided disks while complete failures are obviously scrapped. The main reason why a new floppy disk fails the testing process is usually insufficient coverage of the vinyl base with magnetic material. Sometimes the amount of material left on the failed side is just below specification and thus the single-sided disk may function as a double-sided disk. However, there is no guarantee that a read and write operation will take place on every occasion and although the disk may format satisfactorily and appear to work, don't count on it. Looking at the question another way the AMIGA 3.5 inch disk can hold 880k — would you want to re-type such a volume of data if the disk decided not to work? A single-sided disk should not do any harm to the disk drives.

How large can the memory be in an AMIGA and would I have to dismantle the computer in order to increase the memory? I had a lot of problems doing this on my Olivetti M24.
N.H. Powell. London

The AMIGA memory can be expanded to a maximum of 8 megabytes. There are two steps to this — a *naked* machine, that is an unexpanded AMIGA has 256k of memory available to the user. The first step is to increase this to 512k by fitting a 256k RAM pack which can be purchased from any AMIGA dealer. This is fitted behind a plastic cover on the front of the machine. The cover is fastened by means of clips so the whole job takes less time than it does to explain it in words! The second step in memory expansion is done through the expansion port on the right-hand side of the machine — the memory board is simply push-fit to this port. Most memory boards are sold already populated, the usual size being 2 megabytes although probably by the time you read this an unpopulated board will be available. The system software is designed to automatically recognise memory expansion hence there are no DIP switches to set. This all precludes the need for any serious dismantling of the hardware.

Can I use my Commodore 128 colour monitor with the AMIGA?

Yes, the AMIGA puts out RGBI as well as RGBA. The cable would be terminated by a 23 pin D-plug at the AMIGA end and a 9 pin D-plug at the monitor end. The monitors supplied with the machine are RGBA type so if you made up a special cable you could run both monitors simultaneously. This is exactly the method used by Commodore UK during exhibitions — the operator uses the machine monitor whilst the audience watches the very large display monitor which is positioned about 3 metres above floor level. The pinout of the AMIGA video port is:

1	XCLK	External Clock
2	XCLKEN	External Clock Enable
3	RED	Analogue Red
4	GREEN	Analogue Green
5	BLUE	Analogue Blue
6	DI	Digital Intensity
7	DB	Digital Blue
8	DG	Digital Green
9	DR	Digital Red
10	CSYNC	Composite Sync
11	HSYNC	Horizontal Sync
12	VSYNC	Vertical Sync
13	GNDRTN	Ground Return for XCLKEN
14	ZD	Zero Defect
15	CL	Clock Out
16	GND	Ground
17	GND	Ground
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	—5V	50mA Power
22	+12V	175mA Power
23	+5V	300mA Power

Is there a 5.25 inch drive available for the AMIGA?
R. Adley. Bradford

Yes, the 1020 disk drive is now available in the UK. This gives the user a formatted capacity of exactly half that of the 1010 3.5 inch drive, namely 440k under AmigaDOS. It uses double density, double sided disks and is *daisychained* onto the rear of a 3.5 inch unit. Note that this drive is only available in 115V AC form therefore you will need a step-down transformer.

My printer is an RS-232 printer. Will this operate with an AMIGA?
W.G. Morrison. London

Difficult to give a complete answer since you have not said which make of printer you intend to use. Basically, the answer is yes but if your printer is not one which has specific support by the system software then you may find that not all of the facilities of the printer are available to you such as italics or underlining, etc. The AMIGA has built-in software drivers for a large number of different makes of printers and if yours is on the list or it can emulate one which is then there are no problems. Rest assured that you can use any RS-232 printer with the AMIGA however, if it is not on the list then you may have to just try it and see what your printer can actually do.

I'm confused about the different BASIC's available for the AMIGA. Which one would you recommend?
H.C. Whittle, Stafford

It is really a question of personal choice. There are 3 different versions of BASIC you can run on the machine. The original BASIC for the AMIGA was **ABASIC** by Metacomco. This was only supplied with the machine for a few months during 1985 and consequently its use has been confined to the early purchasers in the USA and UK software developers. You can buy it from Metacomco but you may not like to have to contend with the editing — it is a line editor, although the program execution speed is fast. Metacomco are reportedly working on an upgrade to provide full screen editing and better access to elements of Intuition.

The BASIC that is currently supplied with the machine is **AmigaBASIC**. This is from Microsoft and is closely related to the BASIC used by the MACINTOSH and Microsoft's MS-DOS version of BASIC called QUICKBASIC. Once again program execution speed is fast but despite have a full screen editor the screen handling during editing is embarrassingly slow. Facilities to access specific areas of the machine are good but topics such as calling ROM routines are very poorly documented. Once again the supplier is reported to be working on version 2.

The remaining BASIC is **TrueBASIC** which provides a compiler option — the previously mentioned BASIC's are interpreted. This BASIC looks very good from the demonstration disk I have although the full product has yet to arrive for review. It appears to be based on **AmigaBASIC** without the drawbacks — the screen editing is much faster. Look out for the review.

Readers are welcome to write to: Commodore Business and AMIGA User Magazine, 40, Bowling Green Lane, Londo EC1R 0NE.

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Lattice

New Lattice Amiga C Compiler

A major new release of Lattice C for the Amiga is now available from Roundhill. Version 3.1 includes an enhanced C compiler, a full macro assembler, and a new, faster and more efficient linker. The library has over 255 functions (over 100 more than standard Amiga C), with many more functions written in assembler for efficiency, faster IEEE floating point routines, support for Amiga FFP floating point, and multitasking support via *fork* and *wait*.

The compiler is delivered as a two-disk package with a bootable system disk to simplify installation. A single command line can be used to execute the compiler, linker and librarian (with AmigaDOS wildcard characters).

New compiler features include direct support of memory type specification, custom segment names, and new addressing modes that can help reduce load module size by more than 20%. The linker will support intermixed base-relative and pc-relative addressing modes.

A Professional Developer's Package is also available, which includes the new Compiler, Lattice's LMK *make* utility, Lattice Text Utilities and Screen Editor, and the Metascope symbolic debugger from Metadigm. Metascope is also available separately.

We can upgrade your existing registered copy of Lattice C to the new version. Please call for full information.

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METASCOPE

Symbolic Debugging Kit

During the review of KUMA's K-SEKA assembler and monitor package in a previous issue of this magazine I mentioned that it would be nice to be able to display all of the 68000 registers during a program trace. I made this point on the basis that keeping track of the contents of the 68000's 18 registers was just a little tricky at times! Seemingly, someone took heed of this and the arrival of METASCOPE shows just what is possible on the AMIGA in the way of programmer's utility software. METASCOPE provides the user with a multiple-window environment for the control and observation of application software. It provides a very sophisticated breakpoint and trace facility, full symbolic support, a direct to memory assembler and many more features. The package can be entered through the Workbench although most users will enter through the CLI after shutting the Workbench down in order to save memory where very large programs are to examined. The *front-end* of METASCOPE is based on INTUITION and uses individual windows for each element of the package. The windows can be moved and resized according to the users requirements. The menu structure of METASCOPE is as follows:

Protect
Load
Unload
Quit
Log *Name*
Open
Close
Quiet

Command
Go
Once
Break *Set*
Clear
Trace *All*
Level
Step
Run
Halt
Define *Address*
Value
Hunk

Open
Status
Memory
Break
Hunk
Symbol

Window
Freeze
Warm
Put Back
Duplicate
Title
Front
List

Address
Base Address *Static*
Dynamic
Address Range *Hunk*
Physical
Absolute

Show Symbols
Hide Symbols
Offsets *None*
Symbol
Range
Show Absolute
Hide Absolute
Hex Offset
Decimal Offset

Data
Display Data
Display Code
Data Size *Byte*
Word
Long
Data Formats *Hex Data*
Hex Data
Decimal Data
Show Text
Hide Text
Data Width *Auto Adjust*
Specify

Comprehensive may be an understatement when used to describe the available facilities and I would guess that 99% of all programming needs would be covered by the above.

METASCOPE uses the multi-tasking feature of the AMIGA to run the product as a task — it does not take over the machine completely. This has the immediate benefit that an application can be monitored and adjusted whilst running, albeit in a *step/trace* mode. The disadvantage to this approach is that applications that take over the AMIGA task trap handling preclude the use of METASCOPE since the latter uses the system software task traps. However, I would say that programmers who insist on treating the machine as IBM-PC and wipe out the multi-tasking are making a rod for their backs in the long term. Users purchase the AMIGA to use as a multi-tasking machine and do not take kindly to an application that locks everything else out. I for one, would never purchase software that does this — why should I lose 87.5% of my hardware's potential work capacity because of a so-called programmers inability to program the hardware?

In addition to the limitations on task traps METASCOPE cannot track additional tasks or processes spawned by the original application. Breakpoints in the initial code which is executed by these daughter tasks or processes are not supported together with breakpoints in interrupt routines. Most of these limitations are obvious — others include setting breakpoints on time-critical code or with shared system code. Because of the internal exclusions and locks used by the system software tracing an execution whilst within the ROM Kernel can cause problems although I found that the best approach was to ensure that the system was only running METASCOPE and the application under test. This minimised the possibilities of a system collapse occuring.

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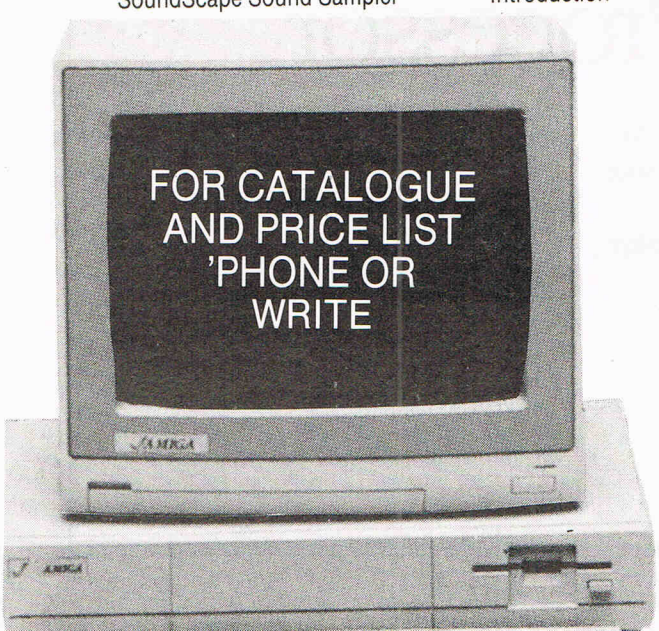

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The main difficulty in operating METASCOPE was related to control over the stack. This was due to METASCOPE sharing the application program's stack after the occurence of a trap which then invalidates the stack area below the current stack pointer. There is a degree of self-sufficiency built into METASCOPE in that it determines the final size of the stack after examination of the application's stack requirements and automatically adds the two together. From experience I found that increasing the original stack by 20% seemed to solve the problem most of the time.

Opening a memory window permits the user to browse through the memory contents either from address $0 or from a specified address. The scrolling is done via the conventional arrow gadgets or a slidebar gadget and is very fast. The display can be in a variety of forms — either data or disassembled instructions together with symbols which appear as labels and address references in code. The format control allows values to be displayed as either bytes, words or long words and even extends to numeric values appearing in hex or decimals. The display is automatically updated when the values in memory are changed.

The **status** window displays both the current register contents as well as execution state information. Both the memory and status windows can be *frozen* to preserve the displayed values — this provides the means for a limited *undo* capability since you can quickly duplicate a window and continue operations in the new window. Other windows are used to display symbols, current breakpoint and hunk definitions. The values within most windows can be changed very simply by using the mouse — this opens a requestor into which the user inputs the new value.

Execution control allows the definition of unlimited breakpoints together with conditional expression. Tracing can be either single-step or continuous step with a special option to allow full speed execution of a subroutine. The symbolic debugging offered by METASCOPE is very wide ranging with symbols being read and defined at loading time. Additional symbols may be defined during the debugging phase and can be included in instruction statement lines. The AMIGA uses a *scatter-load* technique for programs and METASCOPE keeps track of the whereabouts of these program fragments or *hunks* as they are officially termed. Programmers who understand how the hunk structures work will appreciate the facility to give offsets within hunks for memory display — very useful when working with 68000 assembly language listings.

METASCOPE is both a joy to use as well as being an extremely potent utility. It is much easier to use than WACK, the software tool issued to developers, and has more facilities. The most appealing aspect about this product lay in its teaching capabilities — I felt I had learned more about the AMIGA operating system as well as 68000 assembler language in 15 minutes with METASCOPE than from any other single source. There is an addition that I would like to see on the next version — a facility to monitor the serial and parallel ports, this would be useful in situations where the peripheral device was not available and you needed to know about the data being sent. METASCOPE offers exceptional scope to beginners and old-hands alike and no self-respecting AMIGA programmer should be without this product.

B.D.

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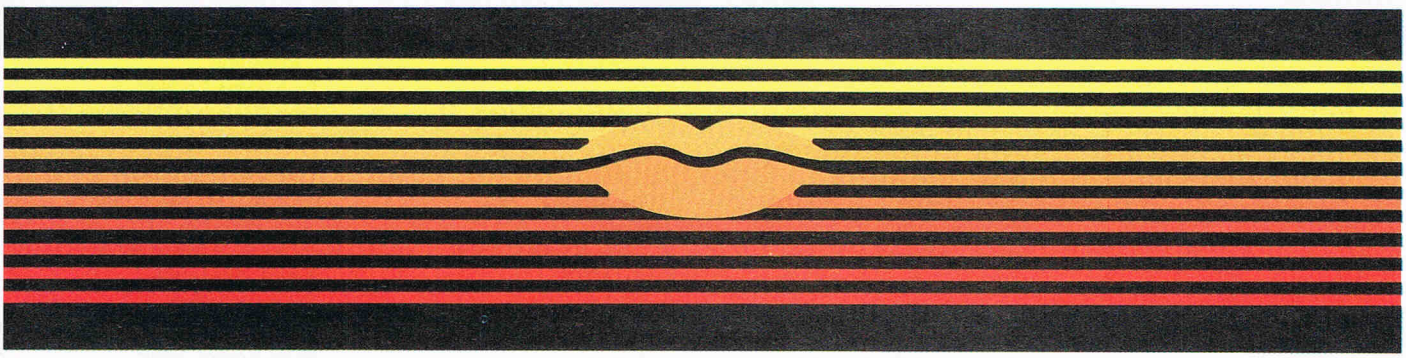

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Hard Disks and the Amiga

The Hard Disk or Winchester Disk as it is sometimes called operates in a completely different manner to that of the more familiar *floppy* disk unit. In a floppy disk the storage vehicle, the floppy disk, can be removed and substituted for another disk. A hard disk, the storage vehicle cannot be removed although there are now hard disk units coming onto the market which do have a removable disk. Because the disk is sealed inside the unit there is another term you may have heard for a hard disk which is a *fixed disk*.

So how does a hard disk have a much larger capacity than that of the AMIGA 3.50 inch drives? Disk capacity is a function of many things, but in basic terms it relates to the number of *tracks* the disk contains. If we use the LP record as an anology, the pickup arm assembly of the record player is mechanically constrained on the width of each track. For instance, if you wanted more than an about one hour's worth of playback from an LP then the answer would be to put more tracks on the LP.

However, there is a limit to the number of tracks that can placed onto an LP. So why not make the tracks thinner so that more tracks could be fitted on? This is fine in theory, but the pickup arm would have to follow these finer tracks with much greater accuracy and the only way to make this happen would be to increase the downward pressure by increasing the mass or weight of the arm assembly. This would ensure that the arm assembly could withstand vibrations coming from an external source and accurately follow the tracks, but then we would run into problems with the stylus since this now has to bear a much greater weight. Added this mechanical dilemma we also have to contend with the vast increase in wear on the LP itself and the stylus.

The technology of the floppy disk echoes this, only there is another dimension to the problem. When an LP experiences a data misread condition, the outcome is usually an audible *pop* or *click*. Such an event with a floppy disk could have serious consequences if the data-read sequence were part of a program for process control on a large chemical plant. The resulting data corruption obviously could not be tolerated in this type of situation. All of this is but a very brief and simplified view of the limitations of floppy disk technology and enter stage left — the hard disk. As a lifelong collector of miscellaneous but useless facts (as my wife keeps telling me!) the hard disk was perfected in a town called Winchester by none other than IBM, hence the alternative name for a hard disk. The hard disk overcomes the tracking problem by not actually making contact with the surface of the disk.

This seems a contradiction since if the pickup head of the drive does not make contact, then how does it read the magnetic impulses on the disk. The answer is that the distance between the head and the disk is minute — in the order of thousands of a millimeter. To reach this level a large degree of precision engineering is involved. If you consider that this clearance must remain constant under vibration, temperature changes and the multitude of physical parameters that can affect this, you begin to realise why hard disks cost more than floppy drives. In order to produce a device which would maintain such a specification it was recognised that the record player/floppy disk system would not work — the pickup head would have to maintain its tracking position by non-mechanical means. The solution lay in aeronautices — by giving the head aerodynamic *lift*. Engineers reasoned that this could be the answer since the *lift* is proportional to the airspeed. In this case, the notion of airspeed is given by the rotating disk since the only thing they had to do was to control the rotational speed of the disk to provide the velocity difference between the drive head and disk surface. The sort of rotational speeds we are talking about here are around 3000 revolutions per minute. Natually, the disk has to be in constant dynamic balance since any vibration would mean a loss of orbital linearity across the disk surface.

OK, having provided the means of providing a constant velocity and therefore degree of *lift*, the next problem entailed the head itself. What the engineers were looking for was a pickup device which could be physically of a low mass so it would take advantage of the aerodynamics of the operation, present a small surface area for the actual magnetic transfer region thus reading and writing finer tracks, and not least, lend itself to being fabricated in such a way that the *lift* phenomena would cause the head to literally fly or float over the disks surface. Indeed, this was the crux of the whole hard disk technology — the *flying* head — because the drive head could be moved to the periphery of the disk very quickly and hence access speed on a track by track basis are vastly improved over floppy disks.

10 Times More

The overall increase in operational speeds of a hard disk over a floppy disk system is usually reckoned to be in the order of 10. But in common with all of this wonderful technology, there are drawbacks. The first and most obvious one is the cost, hard disks are expensive sometimes costing as much as the system unit itself. The good news here is that prices are coming down since sales volume is increasing annually. The paragraphs above have served as the explanation as to the other factor in the pricing of hard disks — assembly costs are higher because of the degree of precision required. The other remaining drawbacks to hard disks are the potential for a *head crash*, backing up the data on the disk itself and device portability.

A *head crash* is an eventuality that users try not to think about. The rotational speed of the disk, or *platter* to give it it's technical name (there are actually several *platters* in most hard disks — they are stacked on above the other rather like a wedding cake) is around 3000 revolutions per minute. At this sort of rpm, anything coming into contact with the *platter* is going to generate a lot of friction and therefore heat. Heat is extremely detrimental to magnetic surfaces and friction will cause very rapid wear in these conditions. The outcome will be the erasure of user data if the contact is made in an area of the *platter* which contains data and in severe cases the destruction of the drive head if the head actually crashes into the *platter*. Generally the only reason a *head crash* occurs is due to excessive vibration — a hard disk is designed to cope with sudden loss of the power supply. The vibration source can internal or external — an internal vibration failure is very rare and is generally due to loss of the dynamic

balance of the rotating parts. Poor design or low standards of assembly leading to excessive mechanical wear or an accumulation of minor *head crashes* aare all potential causes of internal vibration. External vibration such as that caused by a sudden movement of the drive while it is running accounts for 95% of all *head crashes* and under these circumstances the failure is catastrophic for both the drive and the owner's finances — the usual outcome is to replace the drive — repair is not feasible outside of the factory, although the concept (taken from the car parts industry) of exchange units is now starting to appear.

The process of backing up a hard disk is known as *restoring*. For example, my 40 megabyte unit is now about 33% filled and should be backed up. The standard AMIGA 3.50 inch floppy disk holds 0.88 megabytes so I am going to need (0.88(40/3)) disks — slightly over 15 disks. However, the manufacturers of hard disks realised that not only is this time consuming for the user but also expensive because of the number of floppy disks required. *Restoring* cuts down the number of floppy disks required and therefore the overall backup time because the data is not stored in the conventional manner — it is compressed during transmission to the floppy disk. In fact I only needed 11 floppy disks during this operation. However, some users may find it tedious to have numbers of floppy disks around and the other option is to use a *tape streamer* device. This is, in effect a high speed cassette unit and the same principle of data compression applies. Note that *restoring* is placing data on a secondary media (a floppy disk or tape) and access will never have to be random, hence the suitability of a sequential media such as tape. However, the bad news is that tape streamers are very expensive — I guess an increase in sales volume would change this although it may help if one of these marketing whizz kids looked at the concepts of elasticities of product pricing and demand.

SCSI Standard

The portability aspect of hard disks is something which pospective purchasers should take into account. A hard disk should really be bought on the same basis as a printer or monitor, that is — *"will it work with this machine's future replacement?"* not least because of the cost. Thankfully, there is an interface standard which appears to be gaining ground with suppliers of hard disks and personal computer manufacturers, namely the **SCSI** standard which I believe is shorthand for *Small Computer Systems Interface*. SCSI originated in the USA and is supported directly by Apple Computers on the MACINTOSH, similar to Commodore have tended to plough their own furrow when it comes to supporting so-called industry standards for disk drives with each company having its own very distinct ideas on disk formats and data transmission protocols. A hard disk has, to all intents and purposes its own ideas on disk formats — the disk does not have to read directly by another unit so formats can be totally unique to the **hard disk manufacturer** and not the computer manufacturer. This is another reason why a hard disk can hold more data — there are no constraints on format types and hence no inability to take advantage of the latest technology. The AMIGA does not have a **SCSI** interface, but it can be made to connect to one via the system expansion port on the right-hand side of the system box. This is because all of the 68000 processor lines are brought out to this port, together with the control lines for the system — but *bus masters*.

So, having spent nearly 2000 words on providing you with a background to hard disks I will move on to the Micro Forge device. This unit is supplied as a 240 volt 5.25 inch half-height drive in either 20 or 40 megabyte capacity. The unit I purchased and to which this review refers to is the 40 megabyte drive. This drive does not take any power from the AMIGA expansion port — this requirement is met from the disk controller assembly within the unit. The drive box is 9 inches wide, 6 inches high and 15 inches long (23 × 15 ×38 cms) and is supplied with 2 additional pcbs for the external connection to the AMIGA expansion port. These pcb's are enclosed in a sturdy plastic case which, together with the hard disk unit are coloured the same as the AMIGA. A short manual covering the installation is also supplied. The installation consists of connecting the ribbon cable issueing from the rear of the hard disk box to one of the pcb's, fitting this pcb to the other pcb, enclosing this assembly into their container and then connecting the interface to the AMIGA expansion port. The ribbon cable is sufficient to allow the drive to be placed up to approximately 12 inches from the AMIGA. No problems were encountered in this and the next stage of installing the software came next. This consists of installing the hard disk driver files into specified directories on the WORKBENCH disk. When this had been done the moment of truth arrives as the AMIGA is re-booted.

The drive was already formatted (this is Micro Forge standard practice) and I was able to use the drive immediately. I should mention at this point that my AMIGA is a hybrid system — an 8.0MHz 68010 processor with a 2.50 megabyte RAM loading and the original NTSC AGNUS circuit replaced by a PAL specification AGNUS. After a month in service there has been no problems and I have been very pleased with the drive. The software supplied includes utilities to *restore* the drive and also to *park the drive heads* — this is done in an event where the unit would have to be physically moved. The disk controller and power supply in the hard drive case is a dual unit and another half-height SCSI drive could be installed easily and quickly. On the present range available from Micro Forge this would provide the user with a maximum of 80 megabytes in one unit. For the collectors of miscellaneous information, the practical maximum of on-line mass storage the AMIGA 1000 could meet is limited by AmigaDOS but if you had the funds this value is 3.52 megabytes on floppy disks and 320 megabytes on hard disk!

Fewer floppies

The most immediate benefit from this drive has been a marked reduction in floppy disk purchases! However, the real benefit has been a huge decrease in time spent on disk operations — a conservative estimate would be in the order of a 10-fold decrease. For example, LOGISTIX which totals over 400k of program code is loaded in around 30 seconds. This has an immediate effect on my personal productivity since I am not losing time waiting for software to load or data to save. Most of my data consists of word processing files and the sanity of being able to access any file without resorting to searching through disk cases and then disk directories means my time at the keyboard is spent composing and writing, and not messing around on the peripheries. Couple this with a multi-tasking environment, meaning that a file can be sent to the printer as a secondary task and it is clear that my claims of an increase in productivity are no idle boast. Any AMIGA user who has a need for very large amounts of data which entails frequent access should seriously consider a hard disk drive and from my own experience with the Micro Forge unit this requirement is met without compromise.

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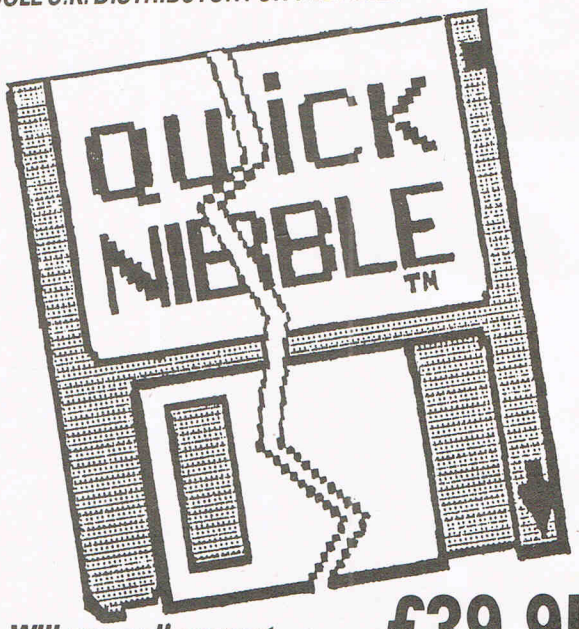

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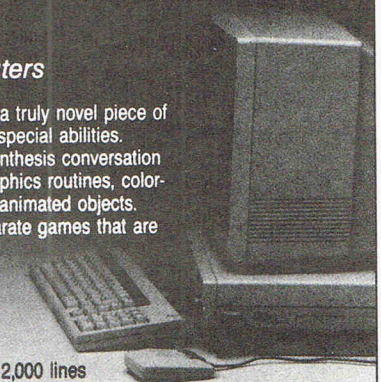

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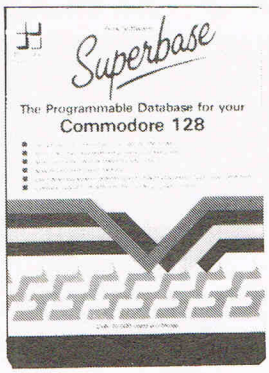

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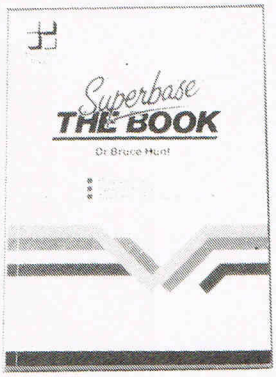

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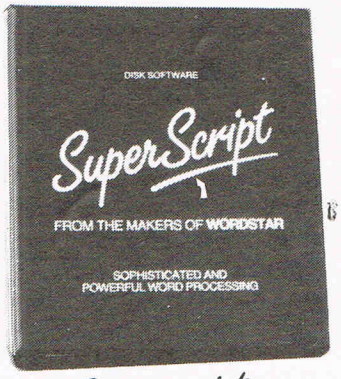

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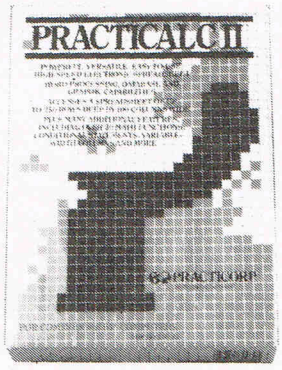

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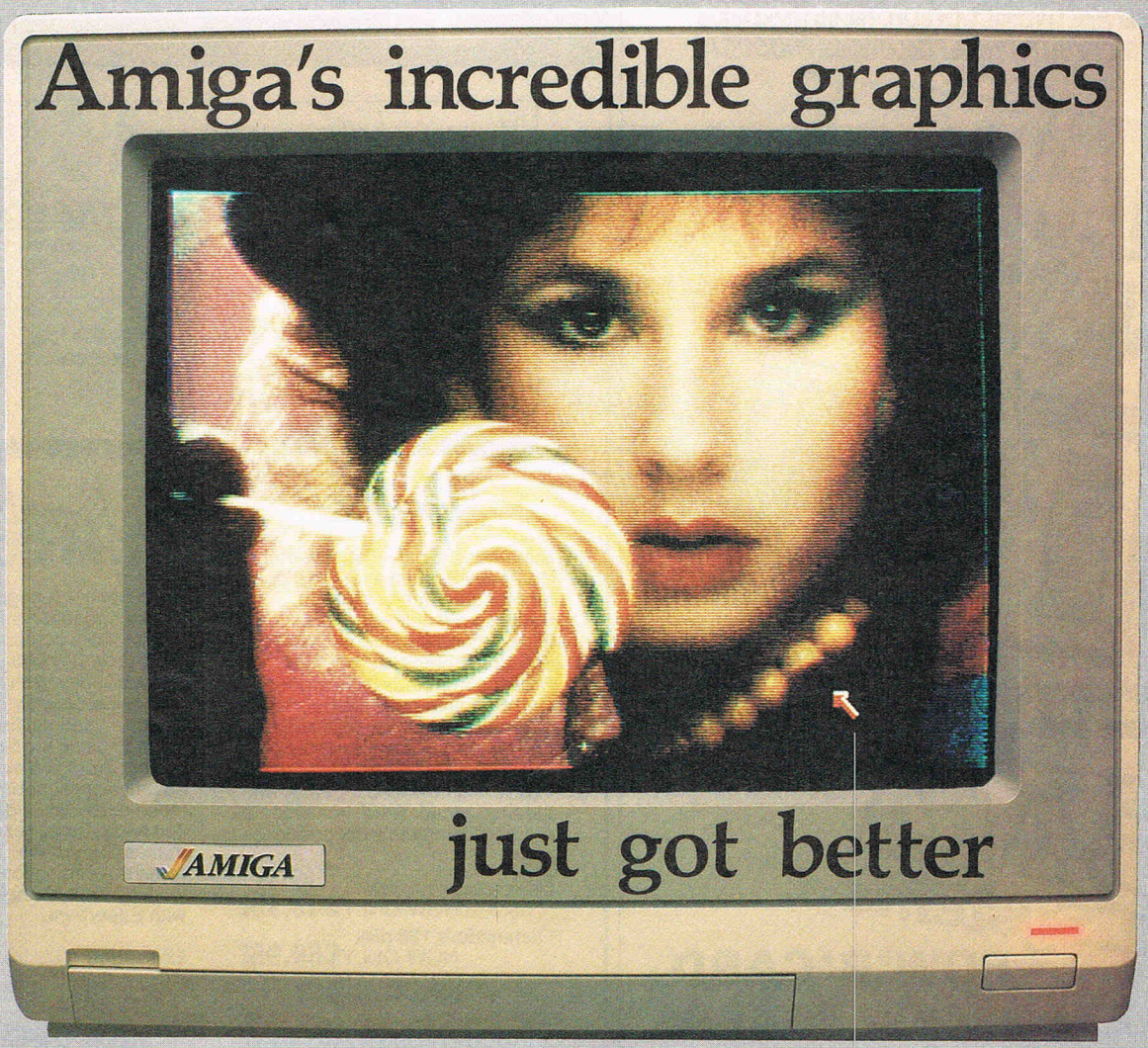

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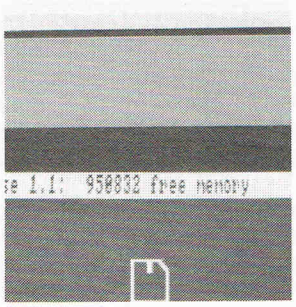

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EPSON HI-80 PLOTTER

Plotters have a down-market image among personal computer users based upon three factors — they are messy to use, since the ink gets everywhere except on the paper, they are limited in their use usually to drawing pretty patterns, and finally they are perceived as too expensive in terms of their overall features. However plotters have changed considerably over the last two years and in common with most computer hardware the purchase price has fallen to a level that places professional plotters within the reach of all strata of buyers. The EPSON HI-80 Plotter addresses these three major complaints and my own experience of one has convinced me of its value and has turned it into an indispensable peripheral.

The HI-80 is flat-bed plotter which means that the paper remains stationary whilst the pen carriage moves and draws the image. This method calls for some complex engineering although with an EPSON label attached to the plotter I have no qualms in terms of the reliability. The bed size allows for sheets of up to A4 size which may be a limitation for serious computer-aided design although it is really a case of what the user requires. The pen carriage has a capacity for four pens and simultaneous substitution of all four pens is possible since the carriage is held in place with an easily removed spring clip arrangement. There are no less than ten colours available in the HI-80 range which should satisfy the most demanding of user.

The pen colour range is further extended by the availability of three different pen types. The fibre-tipped pen range is used for drawing on overhead projection film and is oil-based to provide the necessary degree of opacity. For drawing on conventional paper the fibre-tipped water-based pens are recommended and it is these which are supplied with the plotter. Indeed EPSON provide a total of 16 pens packaged with the HI-80 — my only complaint being that they were all based on the same four colours. Where the user requires a sharper resolution then the third type of pen is suitable since it is a ball-point which gives a much finer line. In use I found the *inky fingers* syndrome to be applicable only it you touched the point of the pens and, since the pen carriage is designed in such a way to obviate the user coming into contact with the wrong end of the pen, the overall handling process was free from mess. To date there has not been an occasion where a drawing has been spoilt because of excess ink — the ink seems to dry instantaneously on exposure to air. I think it would be fair to say that handling the HI-80 is probably cleaner than changing the ribbon on a dot-matrix printer. Part of the reason for the HI-80 to be clean in operation is due to its ingenious capping system. When the pen carriage is not in motion it is positioned over a carrier which can absorb any extraneous ink blots.

Compact

The most revealing aspect of this plotter on first examination is the size and weight. It is very compact being around 16 inches wide by 10 inches deep by 3 inches high thus installation is not going to be a serious problem. The HI-80 scales 4.5kg which is also not going to cause any anatomical problems. A point worth noting is that the weight is *evenly* distributed — anyone who has moved the AMIGA 1080 monitor will tell you how unexpectedly awkward this can be for the unwary with 80% of the weight at the front.

The paper or drawing media is held in the HI-80 using a lever-operated mechanism with the markings for positioning the different sizes very clearly visible. In fact all of the controls for this plotter are clearly marked and rendered the portion of the manual dealing with this aspect of oepration virtually redundant. The HI-80 offers two plotting modes with the option of emulation of the Hewlett Packard GP-series plotters using a ROM. This ROM is available at additional cost and broadens the scope of the plotter considerably in computer-aided design terms since many CAD software packages support this series of plotters. The basic difference between the two plotter modes lies in the command sequences sent to the plotter. In mode 0 the command sequence is made up of a pair of alphabetic characters while mode 1 demands only a single character which obviously reduces the range of facilities available compared to mode 0. Mode 0 can be regarded as an extended plotter mode with complete user control whilst mode 1 is a basic mode using the commands of the Graphtech Myplot II and relies more on the applications software to produce results.

The depth and range of control over the plotter is breathtaking and with a resolution of 0.1mm it would be churlish to ask for more in view of the price of the HI-80. In addition to individual selection of the pens, the pen velocity can set to either 230mm/sec or 100mm/sec, reset the paper size from A4 to B5 or US letter size. The HI-80 has 10 character sets built-in ranging from UK through to Denmark — a complete emulation of the standard EPSON international character set. These characters can be drawn in any plane and at any angle subject to the restrictions of the plotter's resolution. Once again the range of control provided to the user proves excellent with character slant, vertical offsets, even the angle between the points of any of the four different types of arrowhead image — if this were not enough then you can reduce the length of the lines making up the head image! In summary there seemed to be little the HI-80 could not do in two dimensions.

The HI-80 can also be used as a printer. This mode employs the standard EPSON printer codes and will emulate the EX-series of printers. Although it may seem pointless using a plotter in such a manner since each character has to be drawn as a series of lines as opposed to a linked series of impacted dots of ink there is the overwhelming advantage of a very high quality output. There is an overhead cost to this in the shape of time although no more slower than a daisywheel printer. The benefit in using this mode lies in the ability to mix modes on the same sheet of paper thus giving the user further flexibility in output. For example a chart could be drawn and then enhanced by foreign character text.

The HI-80 provides three internal sockets for two ROM's and a RAM circuit. The use of the ROM's was mentioned earlier and the RAM is used to support user-defined characters in plotter mode 0 or provide an 8k buffer depending on the setting of the internal DIP switches. The RAM circuit used by the HI-80 is a CMOS device and is the 6264 which is readily obtainable from most electronic component distributors. Installation is very straightforward providing you have hardware experience and particularly knowledge of handling CMOS devices since they are very easily damaged by unwanted static discharges. The facility to design and employ user-defined characters is relevant to scientific or foreign language requirements. For example in a mathematical application there could be a requirement for Greek characters such as gamma or epsilon, neither of which are obtainable from a conventional dot-matrix printer. Alternatively a foreign language application using Cyrllic or Arabic characters are all feasible.

The remaining ROM supplied by EPSON when used with the RAM option provides the bit image graphics mode

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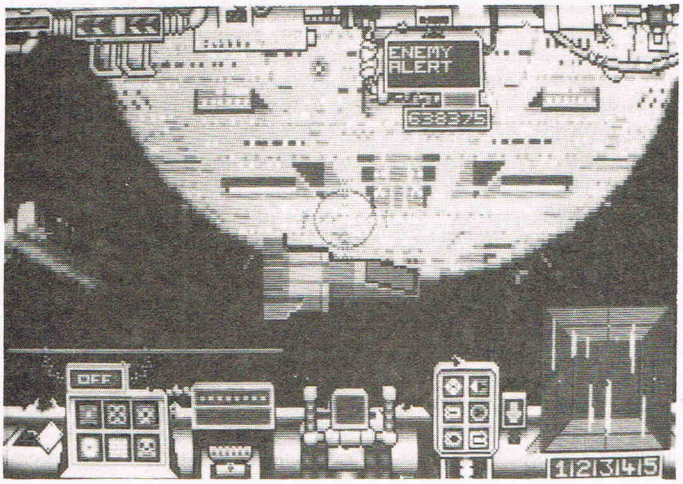

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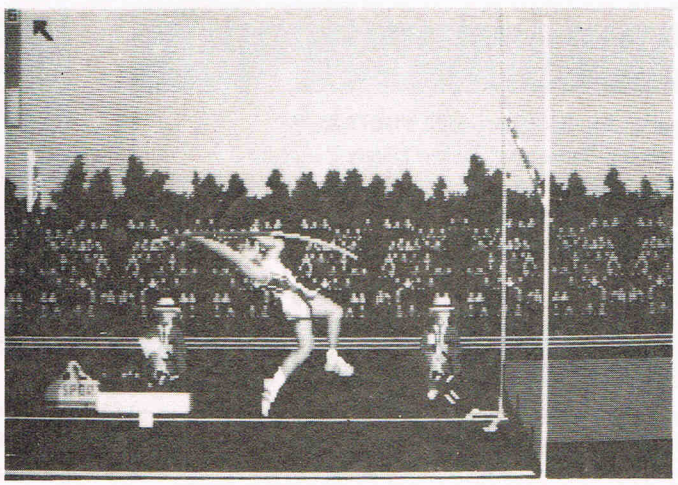

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used on EPSON dot-matrix printers. AMIGA users will realise the considerable advantage this provides in screen dumps from software such as Aegis IMAGES and DeLuxe PAINT.

Manual

The manual supplied with the HI-80 was extremely comprehensive and provided many examples of using the plotter with a variety of machines. The amount of detail in the HI-80 manual extends to programming in the various dialects of BASIC, LOGO and interaction with an application — in this instance a SUPERCALC spreadsheet.

Using the HI-80 with the AMIGA has been a total success. A standard AMIGA-CENTRONICS cable is all that is required. I have two applications software pieces that directly support a plotter and these were extensively used to try out the HI-80. The first was LOGISTIX from Grafox which is an integrated financial/time modelling software which was reviewed in the October 1986 issue of this magazine. In fact the graphics used to illustrate the review were all done on the EPSON HI-80. LOGISTIX has a variety of built-in drivers for plotters including the HI-80. Given the comprehensive graphic facilities offered by LOGISTIX the hardare combination proved both fast and visually effective. Most of the established and well-known software packages of this type such as LOTUS 1-2-3, etc., now provide drivers for plotters. This broadens the scope of plotters in general for in addition to providing a high quality output, the peripheral is likely to find further uses which may not yet be apparent.

Aegis DRAW! is an entry-level computer-aided design package which was reviewed in the October 1986 issue ad the HI-80 was used to illustrate the article. The configuration of this package was a little more involved, basically because the software is aimed at plotters specifically and meant to drive a very large number. With the assistance of the erudite Mike Todd of ICPUG it was discovered that Aegis DRAW! uses the printer driver defined in the Preferences file. By setting this to *generic* if using version 1.2 or *custom* if using version 1.1 of the system software cured the problem of no output. I think that it is fair to point out that it was Mike who carried out the bulk of this research — I was only supplying inspiration and expletives! Once the HI-80 was working with DRAW! it became apparent that this combination was not restricted to computer-aided design. One use I have discovered as a writer is the ability to produce illustrative diagrams extremely quickly to enhance a section of text. For example the diagrams used in the TRANSPUTER article were done on the HI-80 and Aegis DRAW! This took no more than 20 minutes and because of the multi-tasking facility of the AMIGA I simply moved the SCRIBBLE! word processor window out of the way, loaded in DRAW!, designed and plopted the diagrams and then moved back to SCRIBBLE! — absolutely no problems whatsoever.

Versatility

The EPSON HI-80 plotter has rapidly proved to be an extremely useful addition to my collection of peripherals. It provides a level of versatility missing from conventional printers and when used with applications that support a plotter demonstrates just how valuable this device is. The level of visual effectiveness in terms of output quality is very good and when used with a powerful graphics computer such as the AMIGA, the HI-80 is moved to a plane which I suspect that not even EPSON knew existed. In relation to its cost the EPSON HI-80 has no peers — the nearest competitor is something like 40% more expensive. The experience of discovering a peripheral device with a growing ability to perform useful tasks is a unique event for me and will be the same for most buyers of this plotter.

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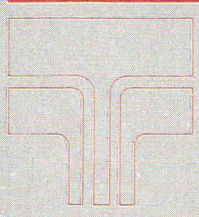

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The A to Z of the AMIGA

cont

Command Line Interface
The entry point to DOS level commands.

command template
The method of defining the syntax for each separate command.

complement
Changing the value of binary number by making a 0 to 1 and vice versa.

composite video
A video signal transmitted over a single co-axial cable, which includes both picture and sync information.

Console Device
A communication pathway for user input/output, particularly for text-only purposes.

container
The area in a proportional gadget in which the knob or slider can move or the select box area of a gadget.

control combination
The combination of the CTRL key with an alphanumeric key from the keyboard.

control escape sequence
A sequence of characters that start with the "Escape" character.

controller
A hardware device such as a mouse, joystick or lightpen which provides an input. mainly used to move an image on the screen.

co-ordinates
A pair of numbers, usually represented by x,y where x represents the horizontal value, y the vertical value.

Copper
An alternative name for the Co-processor.

Co-processor
The hardware device that can synchronise with the video beam.

current cursor position
The position the cursor is currently at.

current directory
The root directory or the last directory set as current by the user issuing the AmigaDOS command CD.

current drive
The disk drive that is inserted and declared to be current.

current line
The line that EDIT has control over at any one time.

current string alteration
An AmigaDOS command that changes the current string.

cursor keys
The keys marked with an arrow which can be used to move the screen pointer.

data fetch
The number of words fetched for each line of the display.

data structure
A group of values that together form the basis of the required objective.

delay
In playfield horizontal scrolling, specifies how many pixels the picture will shift for each display field. Delay controls the speed of scrolling.

delimiter characters
Characters used at the beginning and end of a character string.

depth
The number of bit-planes in a display.

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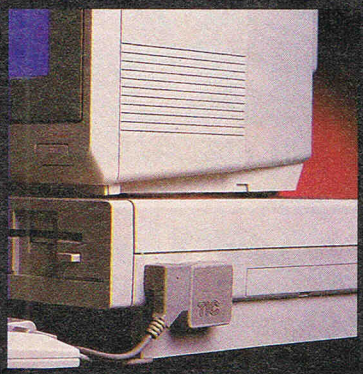

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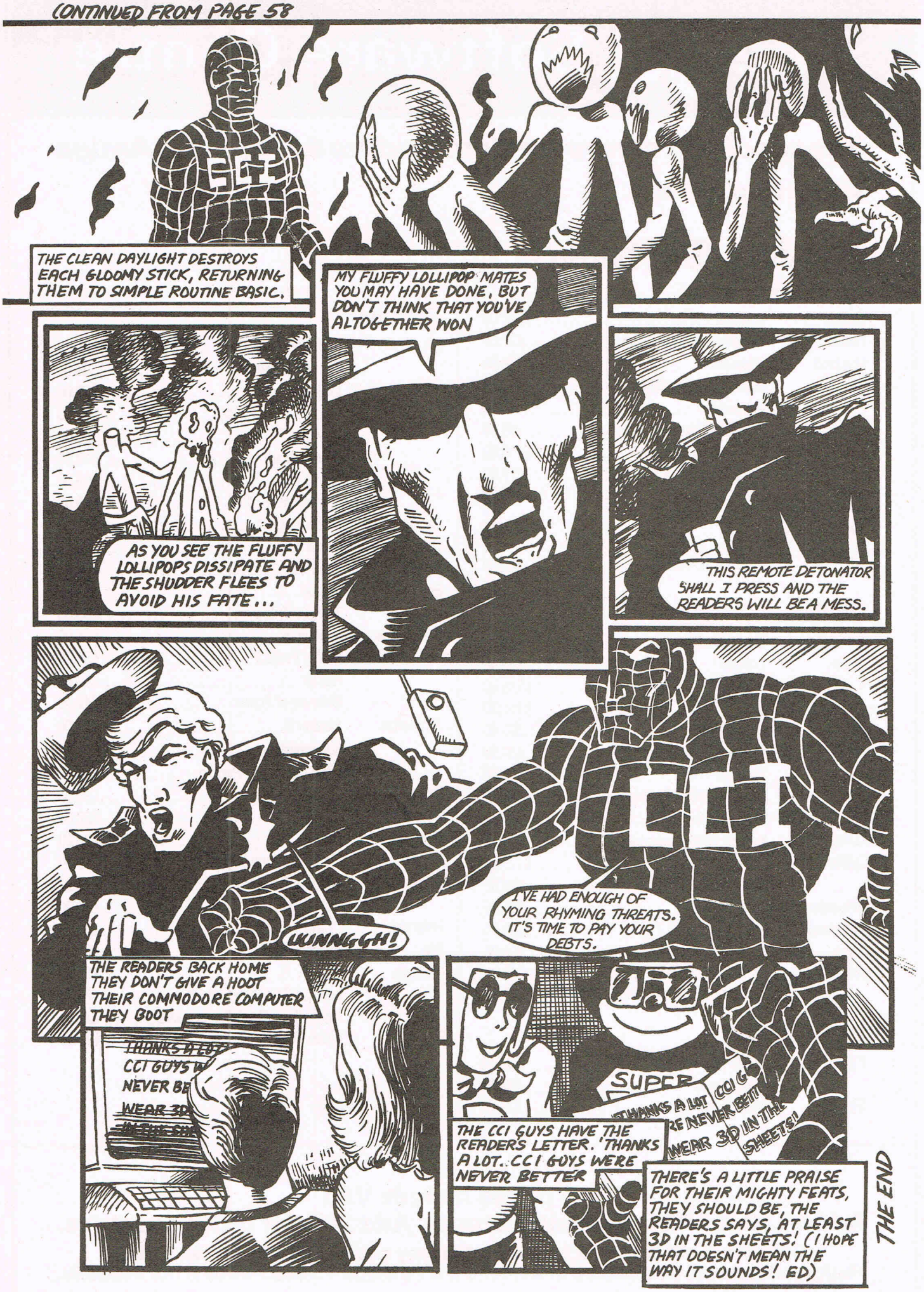

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FIGHTING WORDS

The Jeff Minter Page

There are not many real stars in the computer world, but among them undoubtably glitters Jeff Minter, creator of innumerable smash-hit games. We've given Jeff the freedom to say what he wants (libel laws permitting!), so look out for his hard-hitting pages in future issues of CCI. You may not always agree with what he says, but he's certainly worth listening to. CCI won't always agree with what he says either, but we promise to print it anyway!

Greetings again fellow Commodorians. I am just back off my hols to South America, where I had a wonderful time and met some very nice llamas. I also had a look to see how strong the computer industry was in such places. I didn't expect much, I must admit.

Peru has quite a few well-equipped arcades, but not many home micros outside of Lima, from what I can tell by looking in the shops. The arcades are very well attended, and the machines are all about a year out of date (much more in the more rural parts). It's a pity that the country is so poor, 'coz they really are very keen on the games, judging by the popularity of the arcades.

Crossing into Bolivia there were more micros to be seen; on the games side everything is Atari; the 8-bit machines reign supreme with nary a Commodore or Spectrum in sight; and the Atari game console is popular too. The arcades in La Paz were a bit daunting though because there seemed to be an armed policeman in each one.

Brazil had the most micros, and quite a few micro magazines; the market there is split between the Apple II, the MSX and the Spectrum. No Commodores (although there were bootleg 64s and 128s and even 1571 drives being sold over the border in Paraguay). Most of the Apples, aren't; and none of the Spectrums are Spectrums. You see, Brazil is full of micro-clones; Brazilian and Taiwanese made copies of the original machines. There are about 8 Apple II clones on the market there, with names like 'Ap] [and 'Elppa] [', and they all look just like real ones, but are dead cheap. The main firm doing this seem to be a Brazilian firm called Microdigital, who put out clones of the Apple II, Macintosh, and Spectrum (even down to the squishy keys). The Spectrum software is all British, about 2 months behind our market, and all costs about £2, even games costing a tenner in the UK. Therefore I reckon it's all pirated . . . but I guess there isn't much risk in it, I mean most of the companies being ripped off will never be aware that they're being pirated in Brazil!

Returning to matters closer to home and the Commodore, I was relieved to see that the price of the Amiga has now come down by £500. Things could get even better when the new 'home' version of the Amiga that's been rumoured for so long finally makes it out. I figure it'll be styled more like the ST, without the large PC-style case, which is very nice, but a bit big to have sitting around on your desk. The ST is a perfect size; nice big keyboard but not too huge.

This means that soon you'll be able to get an Amiga for around £600, and an ST for less than half that. No excuse for not getting into 16-bits now. Marble Madness and Starglider for all. What with the cheap 16 bitters, and the Sega game console at the low end, the 8-bit market is in for a bit of a decline. Not so much in the UK, as in the US. I predict that 8-bit US products will drop away to nearly zilch; they're all going to go for the Amiga and ST in a big way.

Not that I really mind the decline of US stuff that much. British game designers as a whole are more innovative and often technically better. Look at stuff like Sentinel, with its totally weird game design and hot 3D graphix; and Starglider on the ST, a vector shoot-'em-up that is actually fast enough to give you a buzz; and any amount of Commodore arcade games. The Americans don't seem to write arcade games that much any more. They're all into simulations, strategy, and seem obsessed by programs that do boring things like keep track of baseball stats, which is all very well if you're an American jock, but I'm not, I'm a British blaster and I like my action fast, loud and smooth; and for such software there's no place like home. I think that the trouble with US programers is that they try to get too complex. They end up with games that simulate exactly the particular sport, aircraft or battle in question, but which update the screen only every half a second as a result. Give me less realism and more bullets any day.

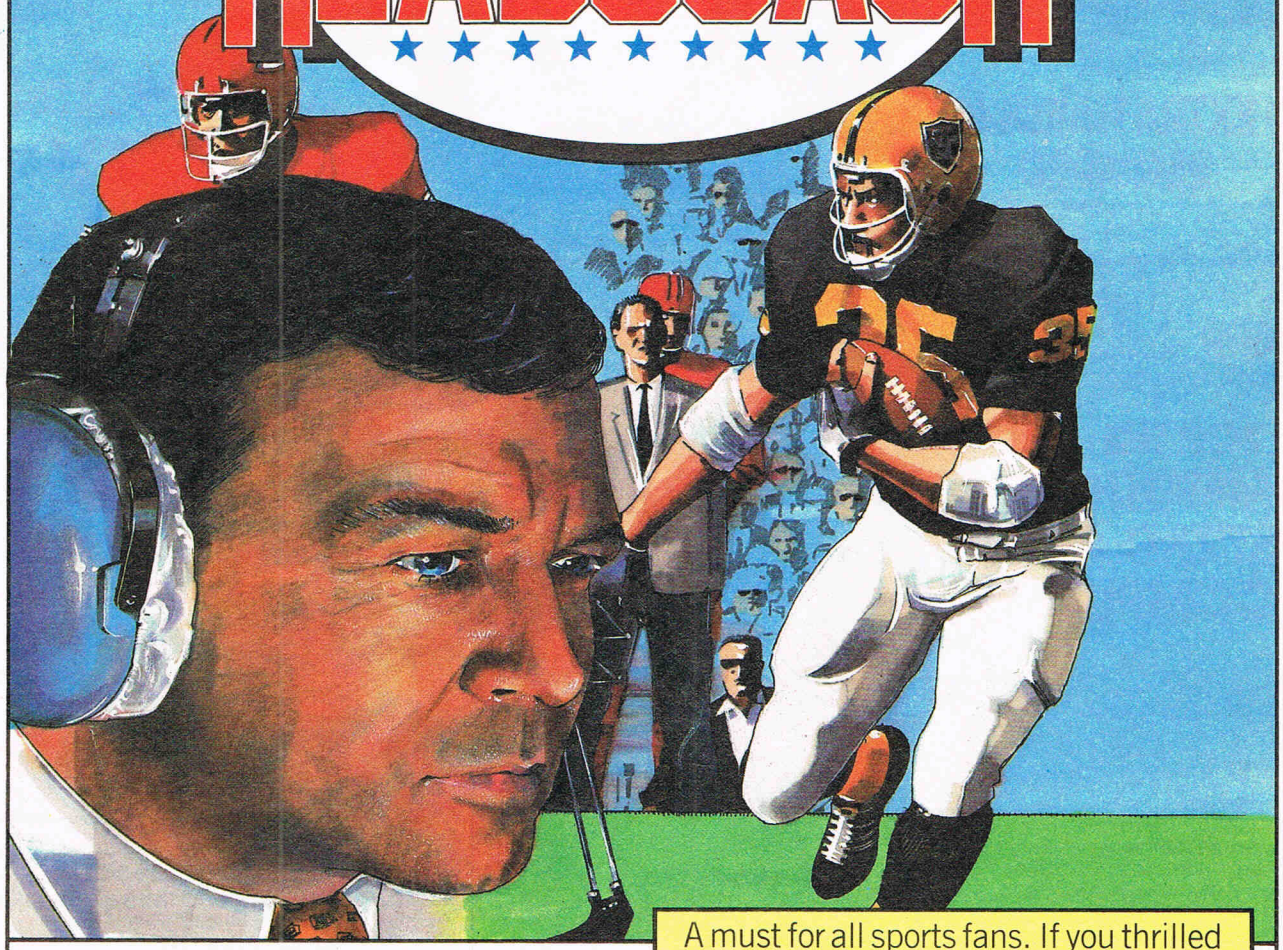
Back here with my own Commodore, I'm just starting to get together some ideas for a C64 version of Colourspace. It'll be done in bitmap, and will have a lot more besides just the fundamental Psyche/Space algorithm in it. I'll probably put in a fractal-music module, as well. And I'm extending the Atari ST version too.

Haven't been on Cnet a lot recently, had too much to do at night, like most programmers I'm nocturnal, do most of my coding at night. Besides, it would have cost a bomb from Peru. Must get on again soon. One thing I must say to all the Netters out there: we should make a concerted effort to resurrect the Chatline. The Partyline is all well and speedy, but there's been a vast degradation in the quality of chat since it came into being. The old Chatline system was slow, irritating, but FUN. You could send pretty graphics to people with your messages. You got fewer messages per session, but because of that, you thought more about what you put in. Veteran Cnetters of the glorious Summer of '85 megasessions will know what I mean.

Right, I'm off for a bath and some crash, I've got Iron Maiden to see tomorrow. I'll be back with more blather next month, hopefully with some interesting info gleaned from mates who are going to the Amiga Developer's Conference in the US. Maybe those new Amiga machines will see the light of day there.

Keep on blastin' . . .

HEADCOACH



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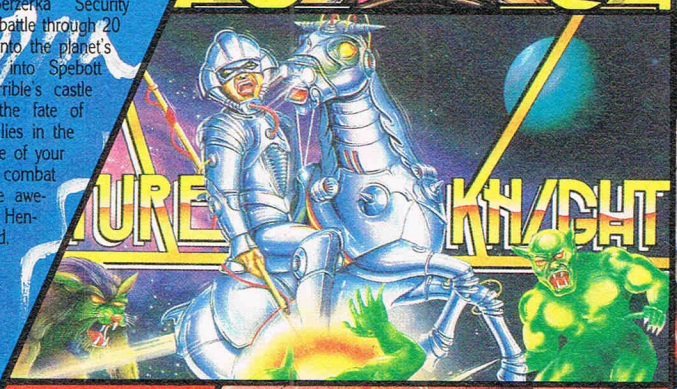

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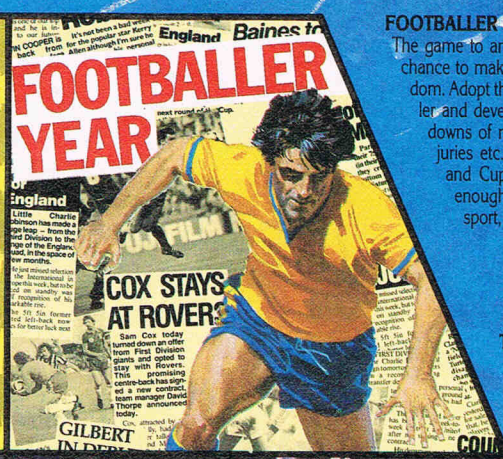

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Tel: (0742) 753423.
Telex No: 547274

MEGA REVIEW

CCI Rating C16

AWESOME

C16's Classics III by Gremlin

This is the third compilation of games by Gremlin. It includes Sword of Destiny (rated Mega), Jetbrix (rated Crisp). Gullwing Falcon (rated Mega) and Reach for the Sky (Crisp). As you can see this compilation proves to be colossal value at £9.95.

All these games have been previously reviewed in CCI but I'll give you a run down of them to refresh your memory.

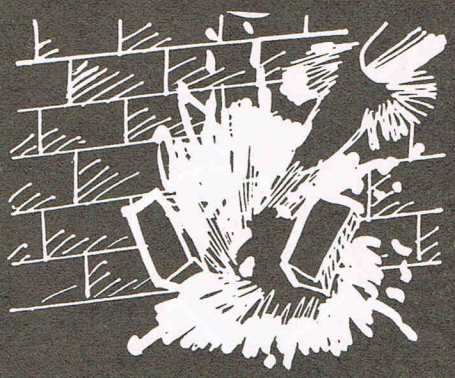
Gullwing Falcon is an excellent rendition of the Buck Rogers arcade game. As you fly along the pseudo 3D graphics are excellent with really smooth scrolling. This program was made quite a while ago but it is very sophisticated and is one of, if not *the*, best shoot 'em ups on the C16.

Sword of Destiny is an arcade adventure which also has great graphics. It has you, Kelok, a master warrior searching the abyss of death for your heart. To make progress through the abyss, you must collect the flashing pieces of treasure scattered around. These open new parts of the abyss.

There are hot air flues to bounce you up to otherwise inaccessible areas, and creatures galore, such as skulls and bats, to hinder you. Great arcade adventure!

Reach for the Sky is a WWII shoot 'em up, rather like 1942, the famous arcade machine. Aircraft swarm from the top of the screen and fly down at you, kamikaze style, not even trying to save themselves. Then a Blue squadron flies across the screen. If you shoot them all you get an extra pair of guns. The sound is good and the graphics are okay; not at all a bad little game.

CCI COMPILATION of the Year!



JETBRIX!!

Jetbrix, is the old Jetpack kind of game with a cleverly different twist. You are trapped in a cavern and have to survive an onslaught of falling bricks. You can either shoot them out or dodge them. But there is a time limit. I think you'd be wise to shoot first and ask questions later. Make as much trouble as possible! (Is that your normal way of life? Ed) This is the worst game of the four on tape (in my opinion) but is still quite good, which shows the high standard of this tape. This compilation is absolutely excellent value and even if you already have one or two of these games, I can recommend it unreservedly. C16 Classics III deserves to be No 1 in the charts.

Price: £9.95
Graphics: ★★★★★
Sound: ★★★★
Playability: ★★★★★
CCI rating: Awesome

MEGA REVIEW

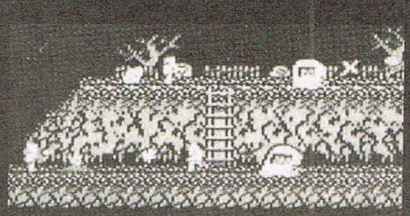
CCI Rating C16

IFFY

GHOSTS AND GOBLINS

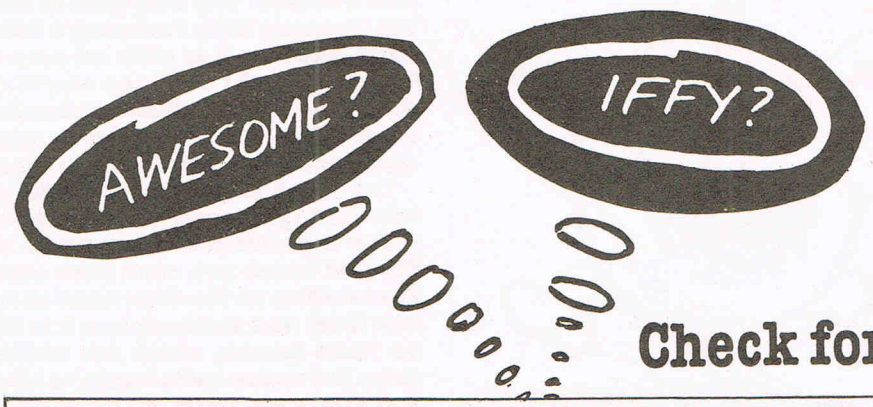
One of the best games on the 64 has been converted to the C16 and (Shame, shame on you Elite!) in its transition it has cost it just about everything that made the Arcade version and 64 versions great.

All right so it has fast scrolling and the graphics aren't bad, but it is really (yawn, yawn) boring to play. On my third go I got to the end of the first level. There was very little challenge in getting there either, just run and fire. But at the end of the first level there is an ogre seemingly impossible to kill. This doesn't make the game addictive, just tiresome. When I said the graphics weren't bad, your man is ok-ish. He seems rather lumpy (the Elephant man in disguise?) and there's a black oblong block around him. The zombies don't look bad either but they also have black blocks around them, put it down to attribute problems perhaps. But how come people like Anco make games without that problem? Bridgehead is more like Ghosts and Goblins than Ghosts and Goblins is, if you get my meaning (I'm trying to, Ed). With all these faults it's still just about all right, but personally I wouldn't fork out £7.95 for it. It hasn't even got that boppy theme tune to tap your feet to. For me this one is definitely a no no.



Price: £7.95
Graphics: ★★★
Sound: ★★
Playability: ★★
CCI Rating: Iffy

Inside Info



BULLETIN 1·0·0·0

Check for Yourself!

List of games and companies

The latest issue of Bulletin 1000 Video Magazine has these goodies for you.

Antiriad	Palace Software
Breakthru'	U.S. Gold
Firelord	Hewson
Fat Worm	Durell
Cobra	Ocean
Mailstrom	Ocean
Hardball	Advance Software
Crash Smashes II	Gremlin
ZZAP Sizzlers	Gremlin
Amtix Accolades	Gremlin
C16 Classics III	Gremlin
MSX Classics	Gremlin
Tarzan	Martech
Trivial Pursuit	Domark
Shoa Lin's Road	The Edge
Fairlight II	The Edge
Terra Cresta	Ocean
The Great Escape	Ocean
Reference Book	Anco
Bridgehead	Anco
Sports 4	Anco
Crystal Castles	U.S. Gold
Computer Hits III	Beau Jolly
World Games	U.S. Gold
Warrior II	Nexus
Inheritance	Infogrames
Alleykat	Hewson
Headcoach	Addictive
Xeno	Argus Press
Streethawk	Ocean
Highlander	Ocean
They Stole a Million	Ariolasoft
Marble Madness	Ariolasoft
5 Star Games	Beau Jolly
Trailblazer	Gremlin
Avenger	Gremlin
Future Knight	Gremlin
Movie Monster	U.S. Gold
Ace of Aces	U.S. Gold
Thanatos	Durell
Sentinel	Firebird
Miami Vice	Ocean
They Sold a Million III	Hit Squad
Camelot Warriors	Ariolasoft
Deactivators	Ariolasoft
L'Affaire Vera Cruz	Infogrames
Yie Ar Kung Fu II	Imagine
Galvan	Imagine
Mag Max	Imagine
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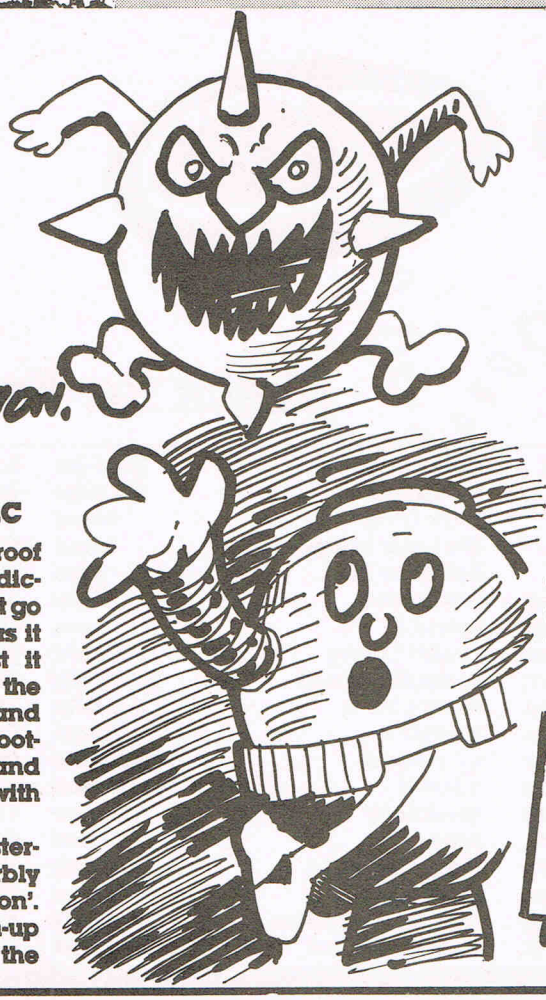
MEGA REVIEW

CCI Rating C16

CRISP

p.o.d.

PROOF OF DESTRUCTION.



P.O.D. by Mastertronic

Mastertronic claim P.O.D. — or Proof Of Destruction — is the most addictive shoot-em-up ever... I wouldn't go as far as to say that, but as far as it goes it's not too bad. At least it doesn't claim to have any 'save the world from the aliens' storyline and admits to being what it is... a shoot-em-up with fast, furious action and assorted aliens to blow away with your P.O.D.

It has sixteen levels, and Mastertronic say 'each level is superbly balanced for playability and action'. Such boasting for a shoot-em-up ought to mean this game is in the class of, say, Iridis Alpha but it isn't. So it beats me why they went in like this. You may think I'm being a little harsh because it is after all only a C16 game, but I don't see why they should make unjustifiable claims for a game like this. It's perfectly adequate and doesn't need all the hype.

The game is set out on a grid of intersecting squares. When you shoot a ship it explodes leaving a hole in the grid which you can't pass over. The baddies on the other hand slide over them and suddenly turn into little white bombs, which fall swiftly down the screen quite happy to take you with them. There are a variety of different ships which move differently and have certain weaknesses.

Tinkly music and FX add to the atmosphere of the game and make this a must for shoot-em-up addicts needing a fix. Not for people who don't like speed or adrenalin surges.

Price: £1.99
Graphics: ★★★
Sound: ★★★
Playability: ★★★
CCI Rating: Crisp

CCI Rating C16

MEGA

BRIDGEHEAD

TEN OUT OF TEN!! SAYS COURTNEY KING

C16/Plus-4 Bridghead (Legionnaire 2) by Anco

First there was Legionnaire the Commando-clone... Now there's Bridghead which is, yes, you've guessed, a Green Beret look alike. (If I sit here any longer someone will clone *me*!)

This game is really a horizontal version of Legionnaire, it has the same casual scrolling and sound FX, though the music isn't at all bad. You must fight your way through five levels this time, and each level is eight screens long. The levels load from the tape separately though no indication of this is given in the instructions.

You have a knife with which you can stab enemy sentries (you're a real nice guy!), and also a limited supply of grenades which blow up more sentries and some mines. You can replenish your supply from stores, but most of these are well guarded and it is a risky business trying to get them.

You have five different types of enemy personnel to kill. First are the green suited guards who just run around. There are two types of these. Neither of them are the kind you'd invite to stay for breakfast. Then there's the commander, dressed in white — worth a lot of points. Go get him! The last two types carry weapons. The ones dressed in red fire a bazooka, and the ones in blue a heat seeking anti-personal missile which follows you around. (Anyone got a fly swatter?)

Graphics are good especially the background ones and the game is very playable, even if quite slow. Ten out of ten for effort Anco.

NB There is a separate Plus/4 of this as well which will work with a 64K ramboard or rampack.

Price: £5.95 (C16) £7.95 (Plus/4)
Graphics: ★★★★
Sound: ★★★
Playability: ★★★★
Rating: Mega

C16/PLUS 4

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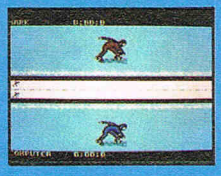
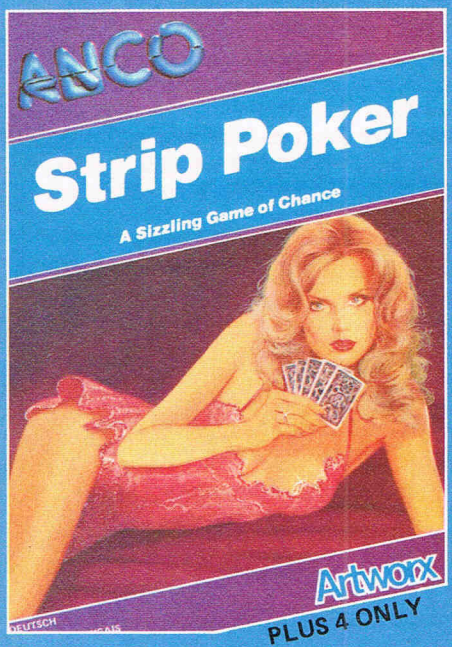


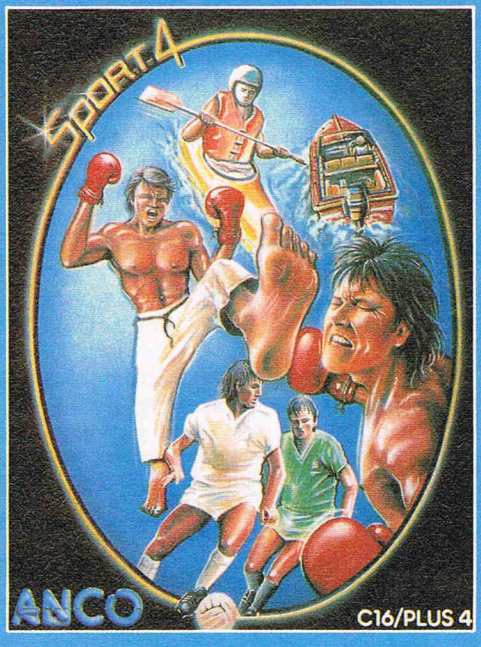


Settle down for an evening of a sizzling entertainment of Poker against delectable Suzi and Melissa.

Cassette: £7.95 Disc: £9.95

Non stop action as the lone Legionaire surrounded by marauding tribesmen fights his way to the fort over eight sectors of scrolling desert background.

Cassette: £7.95



Four sports simulations: THAI BOXING, EUROPEAN CUP, CANOE SLALOM and SPEED BOAT GRAND PRIX.

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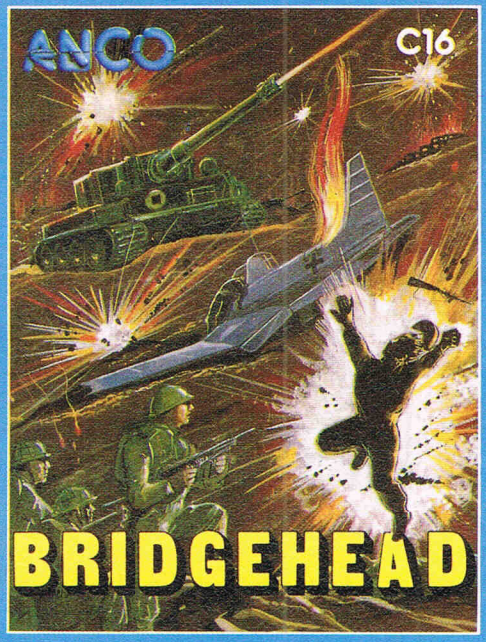
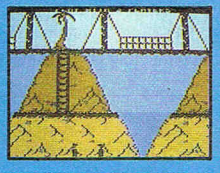
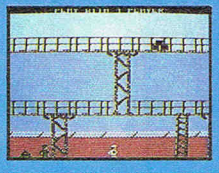
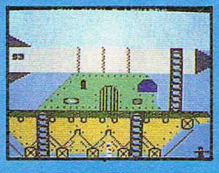




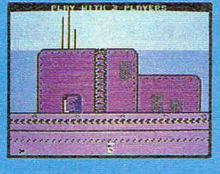


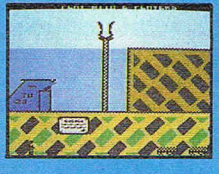


C16 £5.95

Five sectors of bidirectional scrolling. Each sector 8 screens long. Enemy is armed with Bazookas and anti personnal missiles.

C16: £5.95 **PLUS 4** (Enhanced 8 sectors version): **£7.95**





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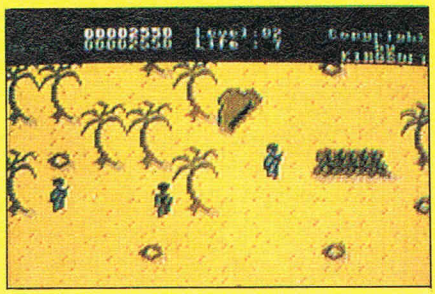
MEGA REVIEW

CCI Rating C16

CRISP

Legionnaire

by Anco



At last a decent Commando-clone for the C16. Your mission is to take vital top secret messages to your headquarters. While carrying out your mission, you are under constant attack from savage tribesmen. You'll have to use your trusty machine gun to fend them off and reach your destination in one peace (ho! ho!)

This flashy storyline tries to hide what the game really is — a straight forward "go hell for leather and gun down everything in your way", type game. But don't knock it, Legionnaire is one of the best shoot 'em ups on the C16.

There are seven areas to clear, and each one needs increasing skill to achieve. On the first level you must simply walk forward and blast, but on later levels you have to negotiate bridges and barbed wire. Ouch!

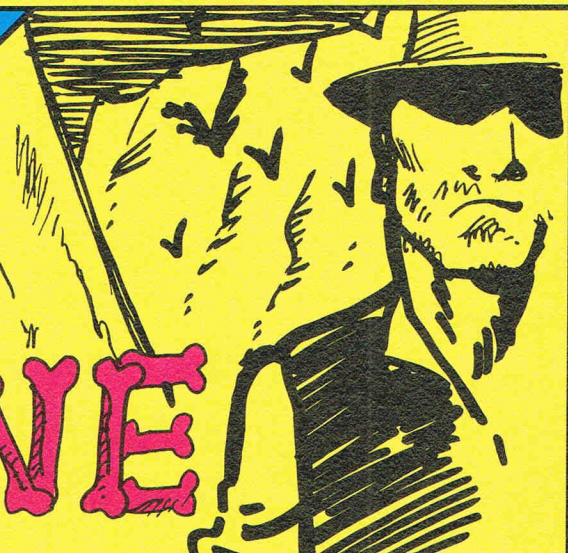
The graphics are quite good but, Kingsoft (A member of your family? Ed) managed to let a few glitches slip by, though maybe they could not be helped. I had to were my shades through this one as I found the graphics rather bright on the eyes, bullets suddenly seemed just to appear from nowhere to kill me. I hated the sound and found myself reaching for the volume control almost as soon as I started playing, but despite all this I like the game. It's a good old blast 'em up. Come on admit it, we all love them!

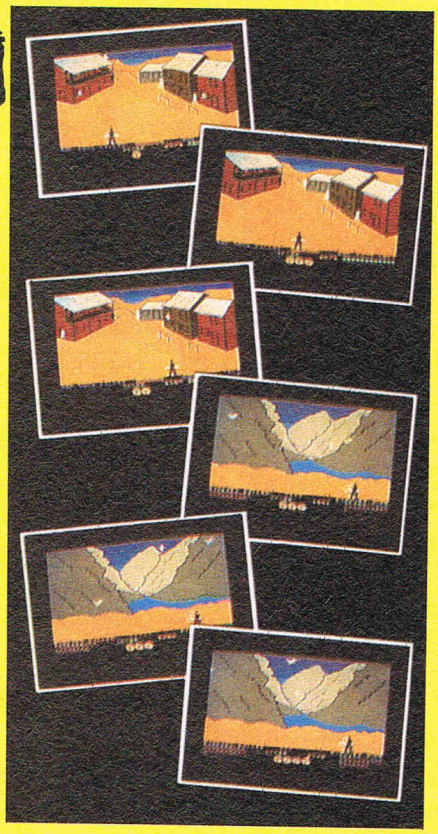
Price: £6.95
Graphics: ★★★
Sound: ★★
Playability: ★★★
Rating: Crisp

CCI Rating C16

IFFY

KANE





Kane by Mastertronic

I mosied on down to Mastertronic and they handed me a six shooter, Colt 45, and a sherriff's badge; Yeeha! Now I'm a rootin tooin sheriff, Yes, siree! Ah have to make a peace treaty with the Indians and gun down the outlaws to make this here town peaceful like it oughta be.

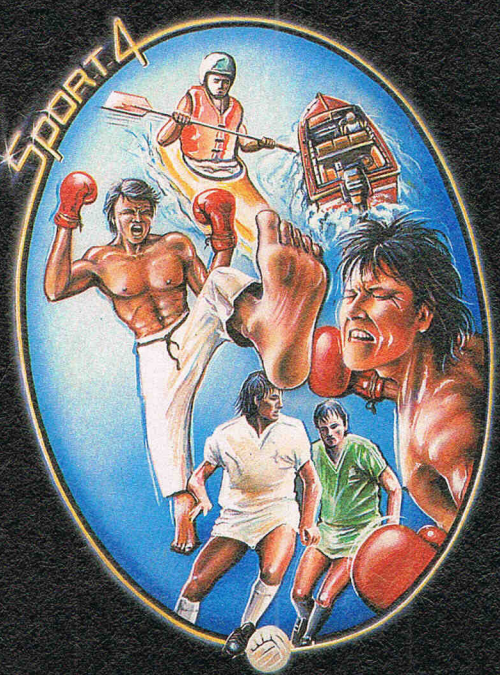
I looked at the game and blinked suddenly emerging from my daydream. Kane. What a game it is — Chunky graphics, four levels, two screens, you just may not get this game so I'll still tell you about it.

You make a peace treaty with the Red Indians, by shooting down birds with a bow. You have to shoot enough birds for at least one peace token. When you've done this you go onto the next screen where you have to shoot baddies who pop out of windows and from behind doors to shoot you first. When you've killed all the baddies you go back to the first screen and start all over again, (yawn).

The game isn't as bad as it sounds though and might keep you happy for a little while, after all, it's only £1.99. Get on down there partner and shoot 'em up!

Price: £1.99
Graphics: ★★
Sound: ★★
Playability: ★★
Rating: ★ Iffy

2 SPORTS 4 ALL



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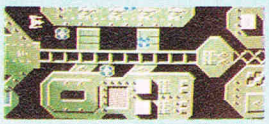

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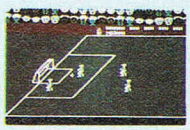

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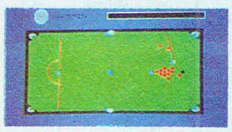

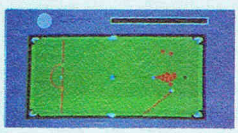

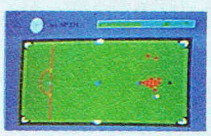

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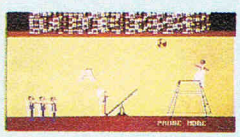

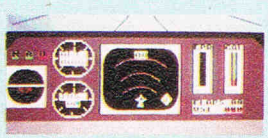

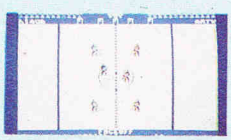

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MEGA REVIEW

CCI Rating C16

AWESOME

'ANY C16 OWNER WITHOUT TRAILBLAZER WILL BE LAUGHED OUT OF TOWN' – COURTNEY KING

TRAILBLAZER

Trailblazer by Gremlin

Trailblazer is one of a new batch of games to be released by Gremlin. They are the first company to set release schedules and stick to them. (Round of applause and cheers, thank you, Ian Stewart.)

You are a ball and you must travel down a course which scrolls smoothly towards you. There are several types of squares which either help or hinder your progress. There are the blue squares which bounce you, red which slow you down, green speed you up, cyan reverse your controls and purple throw you backwards. (I never did like purple).

There are a total of sixteen courses, each with its own time limit, and only five controllable jumps per course.

To cut out the hassle of having to start at level one in every new game, there are passwords, which are given at the completion of each level. Sometimes these are cleverly hidden in a sentence and have to search them out. On entering the password on the 'game over screen' you are placed at the beginning of that particular word level. Using this neat idea to the full, I managed to get the password for level 16, though I have to admit I could not complete level ten! I'm not sure whether this password trick is good or not but it certainly helps to keep you interested.

The graphics are large and colourful, if somewhat blocky, the scrolling is ultra-fast and smooth as Samantha Fox's... knee. There is a catch theme tune and great sound effects. Overall this game is highly addictive and one you shouldn't miss for any reason whatsoever. Any C16 owner found without it will be laughed out of town.

Price: £6.95
Graphics: ★★★★
Sound: ★★★
Playability: ★★★★★
Rating: Awesome

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UNIQUE CODE INSPECTOR FEATURE

- Stop the action with the button then inspect any area of memory in it's "Frozen" state including all VIC + SID REGISTERS ETC.

SO SIMPLE TO USE. Just load your game as normal. When it progresses to the point at which you want to save it, simply press the button then:

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- Press 'T' to save to tape to reload at high speed.
- Press 'S' to save to disk to reload at normal speed.
- Press 'C' to enter "Code Inspector."

THE PROCESS IS FULLY AUTOMATIC – JUST GIVE THE BACKUP A NAME

100% SUCCESS?

EVEN THE LATEST PROTECTED PROGRAMS

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Action Replay is designed for the user to make backups for their own use – Datel does not condone piracy.

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☐ Now programs that load extra sections can be transferred from tape to disk.
☐ Works with most programs Nova + Standard System.

HIRES SCREEN DUMP

☐ Any hires screen from your favourite games can be saved to disk.
☐ Compatible with many graphics packages including Blazing Paddles, Koala etc.

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BY MIKE J. HENRY

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- FILE COPY: Copy and file in 9 seconds.
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- C64 or 128 Modes.

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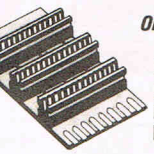

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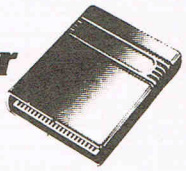

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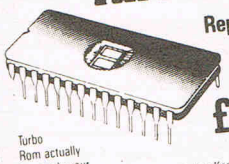
Replacement Kernal



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- Return to normal kernal at flick of switch.
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Disc Utility Cartridge

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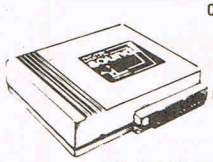

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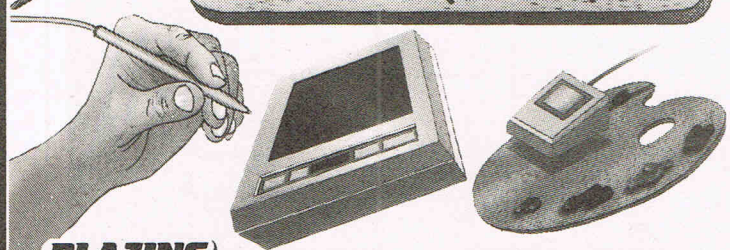

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MEGA REVIEW

CCI Rating C64

CRISP

LATE LATE RELEASE

Some really late releases and games stuff hit us just as we were going to the printers — In spite of his stuggles we forced him to throw them onto his machine as it was moving! He's gone off to have a nervous breakdown! Still we thought you'd like to take an early look.

Hyperball — Firebird basking in the glow of Sentinel's Oskar for the Best Game of the year have rushed us Hypa-ball. It's certainly spectacular!

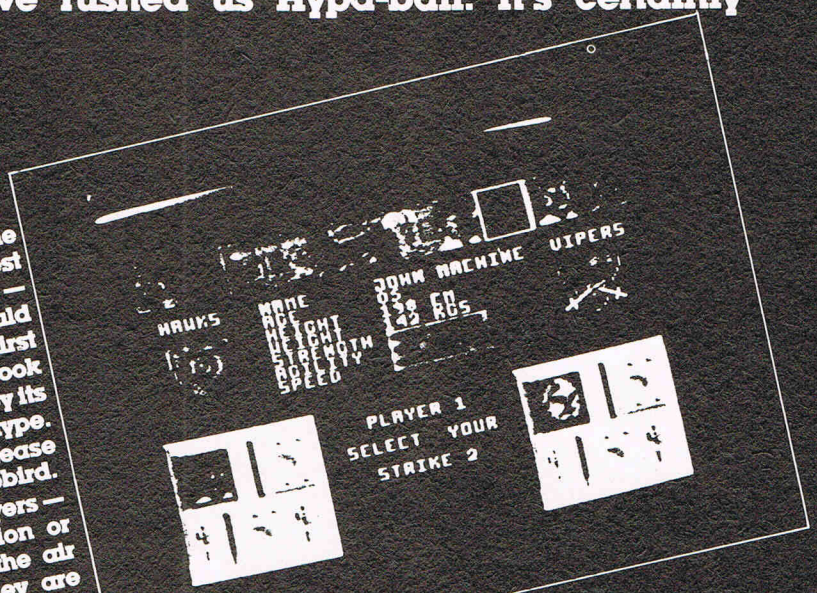
Hypa-Ball by Firebird

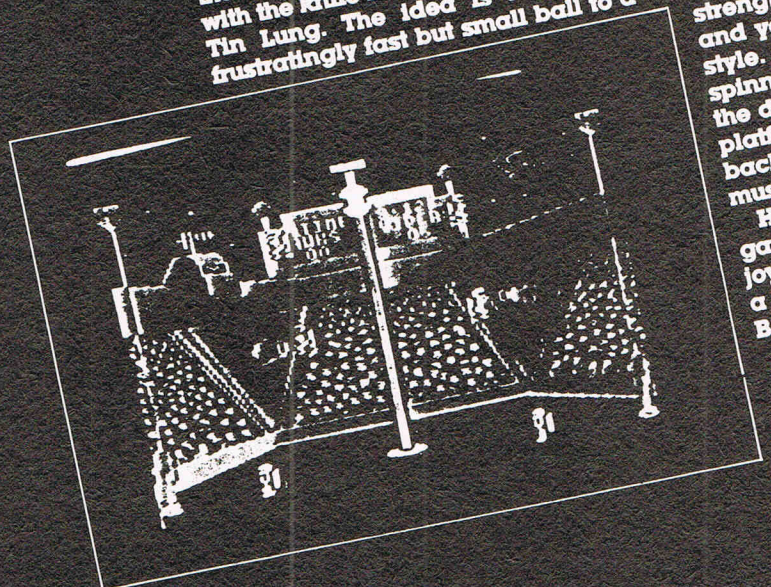
"Beyond field sport, deep into the future of mankind lies the greatest team game in the known universe — Hypa-Ball." Oh yeah? Maybe it should be called Hype Ball, was our first reaction. But you can't judge a book by its cover (you can judge CCI by its cover! Ed) or a Hypa-Ball by its hype. This is really a nifty little release from firing on all cylinders Firebird.

You have a team of three players — either with a two player option or against you (64/128,) two in the air and one on the ground. They are little spacemen though, with some oddball names like Norman Bates (Who he? Ed) (I though you'd ask that. Remember 'Psycho'? He's the one with the knife in the shower!) or Won Tin Lung. The idea is to pass a frustratingly fast but small ball to a player and slam it into a basket that zips up and down a pole like greased lightning. You can select your strength, agility and speed rating and your team to suit your playing style. The graphics, the spacemen, spinning in speeding weightlessnes, the dancing cheerleaders rising on platforms, the metallic sparkling backgrounds are very smart, the music is top-class.

Hypa-Ball is not a complicated game but one that will keep your joystick working for hours, or maybe a million years into the future. Boinggg . . .

Zak (Mule) Skinner





Price: £9.95 (c) £14.95 (d)
Graphics: ★★★
Sound: ★★★
Playability: ★★★
CCI Rating: Crisp

TOP TWENTY

Here are this month's CCI games charts, keeping you up to date with the new arrivals on the market. Martech's 'Uchi Mata' was previewed in November's CCI, when we predicted it would be 'one of the best games of the year'. It's a new entry at number eight and should get higher.

C64

	GAME TITLE	COMPANY		Price (£)	RATING
1	1942	Elite	★	9.95	Crisp
2	Fist II	Melbourne House	★	9.95	Mega
3	Infiltrator	US Gold	★	9.95	T.B.A.
4	Supercycle	US Gold	↓	9.95	T.B.A.
5	Sacred Armour of Antiriad	Palace	★	8.99	T.B.A.
6	Superstar Ping-pong	US Gold	★	9.95	Mega
7	Sanxion	Thalamus	★	9.95	T.B.A.
8	Uchi Mata	Martech	★	9.95	Awesome
9	Trap Door	Piranha	★	7.95	T.B.A.
10	Now Games 3	Virgin	★	9.95	T.B.A.

C16

1	Mercenary	Novagen	★	9.95	Mega
2	Ace	Cascade	★	10.15	Mega
3	Second City	Novagen	★	5.95	Mega
4	Sabateur	Durell	★	5.95	T.B.A.
5	Finders Keepers	Mastertronic	★	1.99	Crisp
6	One Man and his Droid	Mastertronic	↑	1.99	T.B.A.
7	Speed King	Mastertronic	↓	1.99	Crisp
8	Booty	Firebird	★	1.99	T.B.A.
9	Fingers Malone	Mastertronic	↓	1.99	Crisp
10	Street Olympics	Mastertronic	↓	1.99	Naff

★ NEW ENTRY

Compiled by CCI from leading distributors

RED BOXES

What is the secret of the Red Boxes? Ian Waugh jumps from a helicopter braves shark-infested waters and staggers back home to bring you this report.

OK, you're a burglar. You've cased a little two-up two-down. They have a computer — a Commodore 64 — so you know they have money (ha ha!). There's no sign of any wires or alarms around the doors or windows. You're kind and decide to pick the lock on the back door instead of breaking a window. In you go. Too late, you spot a little red box glaring down at you from a corner. An alarm rings. You scarper. Damn quick.

You live in a little two-up two-down, you've a Commodore 64 and spend all your money on software so you've not much cash lying around. But you wouldn't like to be broken into anyway. Burglar alarms are all very well but they don't really earn their keep while you're in, awake and moving around. Well I mean, you can't leave them switched on and walk around the house as per normal, can you? How about a system which can turn itself into a burglar alarm during the night or when you're not in and which can double as a home environment control system when you are in? Sounds good? Yes? Then what you need are Red Boxes.

Okay. Enough of the friv. We're talking about computer control over domestic appliances: switching lights on and off, temperature and heating control, etc. And burglar alarms. Red Boxes can do all this and more. The idea is not new and Red Boxes aren't the first system to offer this kind of cotrol but what makes them special is the fact that they can operate independant of your computer. They were developed by General Information Systems under the direction of Chris Curry, the man responsible for the rise and fall and partial rise again of Acorn and the BBC computer.

Red Boxes will currently operate with three micros: the Commodore 64, the BBC and the Spectrum and another five will soon be added to the list. Red Boxes communicate with each other through the 13 amp ring main using a mains-borne 129 kHz carrier, a frequency reserved by the British Standards Institute for just this sort of thing. They have a range of around 200 yards so you can scatter them liberally throughout your bedsit.

8k of Ram

The basic starter system costs £133 (inc VAT and p&p) and consists of a Red Leader, a Red One and a Red Two. (OK! Come in Red Leader! Over) Red One acts as an on/off switch, Red Two is an infra-red movement detector and Red Leader is the brains behind them all. It contains its own 6502-based computer and 8K of RAM. You use your Commodore computer to program Red Leader (ie. give it instructions) and then you can unplug your micro and leave Red Leader to get on with the task. Previous systems of environment control meant plugging your computer into the system and leaving it there!

Red Leader plugs into your Commodore through the cassette socket and you download a terminal program as if loading a program from cassette. This enables the two to communicate as the main program actually runs inside Red Leader.

After loading you will see the Red Control Program on the screen. This is menu driven and very easy to use. To initialise the system you tell Red Leader which devices it is to control by entering the security number printed on the back of each device. There are over 16 million combinations to prevent outside interference and this will also let two or more Red Box systems run on the same wiring.

The Control Program menu lets you give the devices simple instructions such as times to switch themselves on and off. One device can be made to control another, too, so the sensor could make Red One activate an alarm. The menu alone will enable you to initiate a simple burglar alarm or domestic control system although you'd need more boxes to do a thorough job.

The versatility and power of the system really only becomes apparent when you program the system yourself using Red BASIC. This is the same dialect for all makes of computer and not too different from your own BASIC — whatever that may happen to be — and it includes several commands to give you control over the Boxes. Red Leader has a built-in clock and date counter so you can program quite complex operations. For example, the sensor (Red Two) could be made to activate a light in a room (via Red One) and if no movement was detected there for say fifteen minutes, it could switch it off. I know, how lazy can you get, but this is just an example. If no movement is detected for half an hour and it is after twelve o'clock the system could turn itself into a burglar alarm. If it were between six o'clock and twelve it could assume you had gone out and switch lights on and off at random. All clever stuff!

Which brings us to the intelligence of the system. When messages are sent from one unit to another they are acknowledged so Red Leader knows exactly the state of each device under its control and no device assumes that a message sent has been received without confirmation. This all goes on behind the scenes. Very secure.

Battery Clock

A real-time battery-backed clock (costing £10-15) should be available soon. This will let you unplug Red Leader from the mains and re-situate it. It will also ensure that any interference in the power supply will not affect the control program currently running. Essential I would have thought and surely it should be fitted as standard.

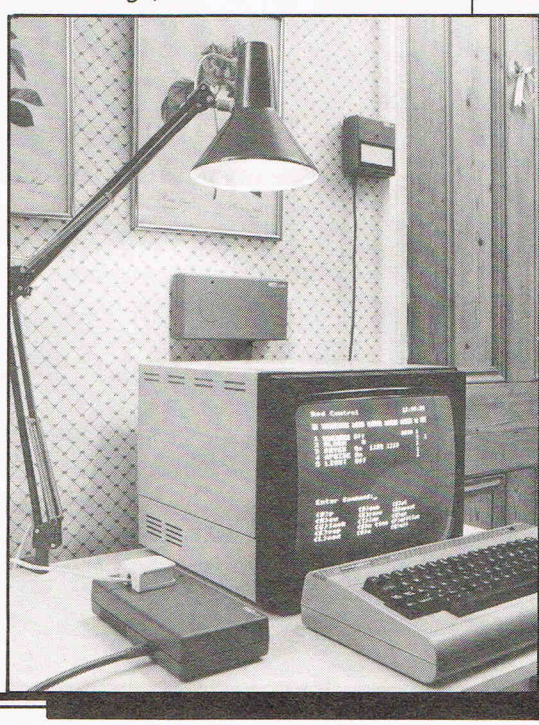
New Boxes currently under development include an analogue device for temperature measurement and control, pressure mats, window contact switches and an alarm. Additional Red Ones and Twos cost £36.95 (inc VAT and p&p) and new boxes should cost about the same.

The manual is generally clear and well-written but a few more programming examples would have been nice. It also omits to tell you how to get a program running in Red Leader before unplugging your computer (press the reset switch). Once you've got that sussed, you shouldn't have any more problems.

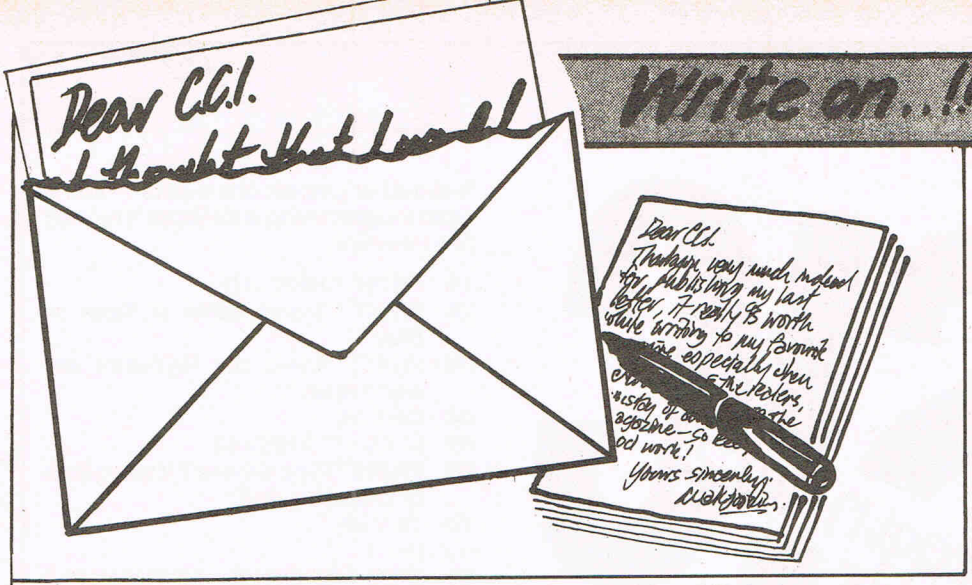
The major disadvantage to poor Commodore owners may be the price of the Boxes as it could cost a pretty penny to equip your house fully. It is difficult however to judge the worth of a Red Box: that is a matter for the individual. Red Boxes have solved the problems of controlling domestic appliances with a computer (eg. tying up computer, trailing wires, security, etc.) and if that is what you want to do I doubt if there's a better or cheaper way of doing it.

I.W.

Contact: Electronic Fulfilment Services Ltd., Chesterton Mill, French's Road, Cambridge, CB4 3NP. Tel: 0223 323143.



Write on..!!



Dear C.C.I.,
I think your magazine is the best on the market BUT I have two queries. My first is that the odds of this getting printed are about a million to one because you do not have a letters page. Why? I am sure other readers would like to voice their opinions on computers and other subjects to do with computers and other subjects to do with computing.

My other point is that you do not have a hints and pokes page. I'm sure all of your readers that play games are stuck on at least one. Most of your competitors have a pokes page and I think C.C.I. would benefit greatly from one too.

To start you off here is a hint for Kung-Fu Master. On the first level press Control in conjunction with 'G' a gun will apear in your hand. Then using the fire button you can blow away all the baddies! That's my contribution, hope you get 'em rolling in!
Yours sincerely
Greg McEwen, Duffield, Derby

Million to one, eh? Bet you wish you'd put money on it! Watch out for Pokes in future issues . . .

Dear C.C.I.,
I thought you might like to hear about a recent order received by Ladybird Books for a substantial number of copies of their book 'How Computers Work'. The order came from the British Ministry of Defence.

Ladybird replied that there must be some mistake, the book was written for children about the age of nine or ten. That's all right, replied The Ministry of Defence, it still wanted the order for books carried out.

Computers are a vital factor in defence, don't you think we need people just a little more 'computer mature' guarding us?
Jack Harris, London N12
Sensitive topic! Any readers have opinions on this?

Dear C.C.I.,
I read the review of Incentive's Graphic Adventure Creator in September's C.C.I. with interest and decided to take up Julian Rosen's invitation to take a look at it. Here are a few of the reasons, comparing CBM64 versions, why the GAC is no threat to Level 9's in-house system.
(1) The GAC seems to omit many features which we take for granted nowadays: e.g. RAM SAVE, OOPS (undo), multi-testing and arrays.
(2) Level 9 have spent months in carefully optimising the machine-code kernel of our adventure system on each micro, so it wastes the minimum of space. Where the GAC reports only 23K free for the adventure, Level 9's system provides 39K. That's 70% more.
(3) The GAC's graphics look quite pretty, until you realise that the six pictures in their demo game use over 11K. That's more than all 200 pictures in a typical Level 9 game put together. Or, to put it another way, just six pictures use half the memory available for the entire GAC adventure!
(4) Level 9 have spent years developing compression techniques and, taking Price of Magik as an example, 160K of adventure logic source compiles down to just 12K.

This contrasts markedly with the GAC, which gives a whole new meaning to the word 'compression'. I recommend that you try entering a random English message, e.g. 'The quick brown fox jumps over the lazy dog', and compare the free space used against the number of characters entered.

I've done some simple programming on the two systems and found that an example puzzle took 50% more memory on the GAC than on Level 9's system. Example text was twice as big.

To sum up, Level 9's state-of-the-art system provides better facilities; it provides 70% more memory for the adventure and that memory is used much more efficiently. The GAC is not in the same league.
Yours faithfully,
Peter Austin, Partner, Level 9 Software.
Might I point out that GAC is meant for the general public, and not as in-house tools which your system is. I really don't understand how anybody can take to heart my last comment 'eat your heart out L9!' GAC is not meant as a threat to your system! Where's your sense of humour?

Dear C.C.I.,
May I, through the pages of your magazine, make a plea on behalf of female computer users.

I have three young daughters and wish them to become used to using computers. To this end we purchased a Commodore 128 some six months ago and we have tried ever since to find software that appeals to them.

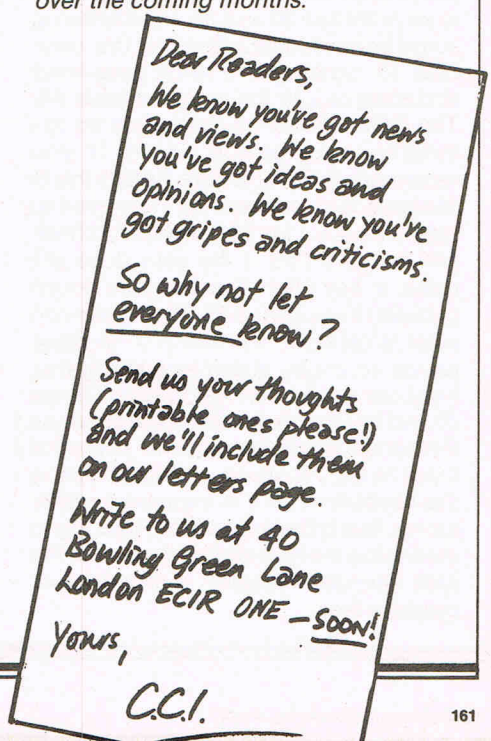
There is a small amount of 'neutral' software, e.g. 'Little Computer People' but most is the macho, male orientated type involving space battles, bombings etc. and my daughters have no interest in them whatsoever.

I am surprised that the software houses have not woken up to the enormous market for female targeted software, both for girls and women.

I hope that this letter may spur someone on to fill this gap in the market and I look forward to my 128 being in full use at long last.
Yours faithfully,
L. Tucknott, Orpington, Kent.
We put our heads to gether at C.C.I. and came up with Paperboy, Alter Ego, Scooby Doo plus sports and adventure games. How about an arts package? The answer to the narrow-mindedness of software producers is for female users to complain (loudly!) to the powers that be, or write and promote their own software.

Dear C.C.I.,
I have just finished reading, with much interest the September '86 edition of C.C.I. which has as a special feature the August Commodore Business and Amiga User. I was very impressed with the quality of the publication and found it very informative.

Thank you very much for a great magazine.
Yours faithfully,
Pastor Wayne Scott, Baptist Inland Mission, Australia.
It's nice to know we're appreciated! Watch out for some special exclusives over the coming months.



BASIC for beginners

PART X

Take a look at the following program and then enter it into your machine.

```
10  PRINT CHR$(147)
20  PRINT "Insert either a Tape or
    Disk"
30  PRINT "Press the RETURN key
    when ready"
40  GET A$
50  IF A$ = "" THEN 40
60  PRINT "Type either a T if using tape
    or D if using disk"
70  GET B$
```

I would hope that if you have been keeping up with this series that everything so far in this program means something to you. Briefly, line 10 clears the screen although there are alternatives while line 20 and 30 are displaying some screen instructions to the user. Line 40 *captures* the users data input and assigns it to the string variable A$. The **GET** function is dependent on the default input device which, if you remember in Commodore BASIC this is the **keyboard**, so there isn't any need to *open* a device. Line 50 is the safety check and ensures that if the user does not press a key then the program loops between lines 40 and 50. The "" refers to what is called a *null-string* — in other words an empty string or a string that does not contain an ASCII value. Lines 60 and 70 are a variation on the previous lines and these time assign the keyboard input to **B$**. However, on this occasion the keyboard input is examined rather more closely because we are looking to determine the type of storage device the user intends to employ, a disk drive or cassette tape.

OK, so we have to separate between the two possible assignments to B$, which could either be **"D"** or **"T"**. The manner of separation is dependent on the version of the BASIC your machine uses. I'll put the next four lines down and then we can take a look.

```
10  PRINT CHR$(147)
20  PRINT "Insert either a Tape or
    Disk"
30  PRINT "Press the RETURN key
    when ready"
40  GET A$
50  IF A$ = "" THEN 40
60  PRINT "Type either a T if using tape
    or D if using disk"
70  GET B$
80  U = 1
90  IF B$ = "D" OR B$ = "d" THEN U = 8
100 PRINT "Opening the file for data"
110 OPEN 1,U,0, "More-Numbers,s,w"
```

Line 80 has assigned the value of 1 to the numeric variable **U** (meaning in this example *unit*) and line 90 shows the reason why. If our user had chosen the cassette unit then the value of **U** would remain unchanged because it is only if **B$** is equal to the letters **D** or **d** that the program executes the last section of line 90. Note the use of the upper and lower case for a user input — a point you should always take account of where keyboard character input is concerned. Lines 100 and 110 should now be clear to you and the file named "*More-Numbers*" is opened.

You could refine this slightly further by use of further functions. For instance if you are using BASIC 3.5 and above then you could have:

```
90 IF B$ = "D" OR B$ = "d" THEN U + 8
ELSE PRINT "Selected Tape"
```

Try adding some enhancements of your own to make this more interesting and attractive to the user for example, through the use of colour or sound or a better screen design using the **TAB** facilities or graphic characters — this is what programming is all about. The next few lines are:

```
10  PRINT CHR$(147)
20  PRINT "Insert either a Tape or
    Disk"
30  PRINT "Press the RETURN key
    when ready"
40  GET A$
50  IF A$ = "" THEN 40
60  PRINT "Type either a T if using tape
    or D if using disk"
70  GET B$
80  U = 1
90  IF B$ = "D" OR B$ = "d" THEN U = 8
100 PRINT "Opening the file for data"
110 OPEN 1,U,0, "More-Letters,s,w"

120 FOR X = 1 TO 10
130 INPUT#1,L$
140 PRINT N$
150 NEXT X
```

The input value of 1 is related to the channel opened in line 110. The final lines consist of a cleaning up operation:

```
160 PRINT "Now Closing the file"
170 CLOSE 1
```

Running this program will give you a simple line of figures running from 1 to 10. Altering these values is done through the mechanism of the FOR-NEXT loop thus if you had a value derived from another part of the program and defined this into a variable, let us say **Z**, then changing the loop to:

```
120 FOR X = 1 TO Z
or
120 FOR X = Z TO 1
```

will serve as a counter to the size of the data file. If you refer back to the previous installment of this series you will find a file-read program:

```
10  OPEN 4,8,4, "0;NUMBERS,S,R"
20  FOR A = 1 TO 4
30  INPUT#4, B$
40  PRINT B$
50  NEXT A
60  CLOSE 4
```

Note the use of INPUT# to recover the characters from the file. An alternative to use is the GET# function. The difference between this and INPUT# is that GET# will retrieve **any** value from the file being read whereas INPUT# will only recover a keyboard character. This ability to recover any value is useful, for example to locate file delimiters, but it does have an overhead in that values are only recovered one at a time — thus the process using GET# is much longer than that using INPUT#. Needless to say INPUT# has its weak spot, this time in terms of the length of the string — only 79 characters are allowed. Attempting to read anything longer than this will result in a *"?string too long error"* screen message.

By now you should have some fairly good ideas on how Commodore BASIC handles sequential files so how would this be used in practice. Unfortunately, space limitations prevents anything more than a brief look at a practical example, but the following should convey the ideas involved. Hopefully, you will have seen and used a database or a spreadsheet so you know what these entail. Starting with how a database is constructed consider the following:

Name	Basil Fawlty
Address	Fawlty Towers
Town	Torquay
County	Devon
Country	England

In a database the information or data is placed in what are termed *fields*. These are clearly defined in terms of their length at the database *format* or *construction* phase. Similarly the *fields* are given names and the length of these names are also clearly defined. Thus in structure the above could be represented:

Name	Basil Fawlty
4	13
Address	Fawlty Towers
7	14
Town	Torquay
4	7
County	Devon
6	5
Country	England
7	7

The field sizes are generally assigned to the largest that is likely to be met, thus if you expected to have the name Englebert Humperdinck you would make the name *field* sufficiently long enough to accommodate this. The *field* names or to give them their correct title *field descriptions* also could not be easily changed once the file structure has been written to the database file. Now, if you refer back to our program you can see the keyboard input capture routine and by applying a simple IF-THEN test using some of the BASIC string handling functions such as LEN you can determine the length of the input string the user has supplied. This would be used to verify that the data is within the specified size of the field but also you would be checking for the pressing of the RETURN key to indicate that the user has finished with this field and wishes to move on to the next. The character generated by the RETURN key has a value of 32 so detection is not too difficult. The *fields* would then be written or read as channels from the file on the storage device you were using. The complete collection of *fields* is known as a *record* and a collection of *records* forms a database. This is obviously a gross simplification of database programming but it provides you with some idea of what is going on.

Spreadsheets use a similar principle. For example look at the following:

	A	B	C	D	E	F
1	23	56	12	87	34	22
2	47	21	51	98	12	8
3	88	23	76	88	54	76
4	65	11	54	93	36	44
5	5	42	71	81	66	13
6	17	99	79	24	90	39

Saving the data to a file from this requires the same techniques of value checking of the contents of each *cell*, the spreadsheet equivalent of a database *field*. In this example I have (cunningly!) avoided the use of text and used purely numbers which appear to have only two sizes, 1 digit or 2 digits.

Internally the program would have the single digit numbers represented as 2 digit numbers, the first digit would be zero, although this is not shown on the screen. Programming a spreadsheet is markedly easier than database which explains why software for spreadsheets arrived long before database software. This gives the spreadsheet an advantage over the database in that the *format* can easily be changed since by and large spreadsheets tend to deal with only numeric values.

The only problem with sequential files is that in order to do any manipulations the complete file must be read into memory. For example, our database requires some additional *records* — the only place we can add these records is at the end of the file, putting them at the beginning or centre of the file would result in existing *records* being overwritten by the new *records*. This reading in of the complete file has two disadvantages, the first is the unnecessary consumption of memory when we might not want to look at all of the data, the second is the loading time it takes. Commodore BASIC allows you to produce a file that avoids these problems, this is the **RELATIVE FILE.**

The relative file differs from a sequential file because although the structure is similar you can *move straight to a record* and exactly position the place within the file where you intend to read or write. This saves you from having to tediously read the complete file into memory and hence file operations are much faster than using sequential files. Unfortunately BASIC 2.0 and BASIC 3.5 cannot directly support relative files from BASIC without a great deal of awkward programming although it can be done. Thus the following section applies to those readers with a C128 machine only.

The syntax for a relative file looks like this:

DOPEN *channel-number, "filename", record-length*

The term record length means the total number of characters specified in a record including the carriage return characters (the character formed when you press the RETURN key). Going back to our database example the specific record displayed had a total of:

Name	Basil Fawlty	
4	13	17 + 2 carriage returns
Address	Fawlty Towers	
7	14	21 + 2
Town	Torquay	
4	7	11 + 2
County	Devon	
6	5	11 + 2
Country	England	
7	7	

RECORD TOTAL 68 characters

If we assume that this is the maximum size of any record in this database then using a *record length* of 68 is satisfactory. The next step is to position the *record pointer* in the relative file and this is done with the syntax:

RECORD# *channel-number, record-number, offset*

The *channel-number* must be the same as that specified in the DOPEN statement while the *record-number* is the actual record that you require, so a new file would have the *record-number* specified as 1. The *offset* is a numeric value and allows you to position exactly within the record itself. Using the above example, suppose that we wanted to change the town from *Torquay* to *Dawlish*. The number of characters from the beginning of the record is:

Field 1	19 characters	(Name)
Field 2	23 characters	(Address)
Field 3	5 characters — "TOWN" plus the carriage return	
TOTAL	47	OFFSET VALUE

Next month I'll round off the topic of relative files and start looking at the disk drive and *direct-access* programming from BASIC.

B.D.

Pokes and Useful Tricks for the C128

Following a tradition of listing various 'pokes' and peeks, here is a selection of useful little tricks to be used on the Commodore 128.

Doubling the speed in C64 mode

As you may be aware, the 128 has both a fast mode and a slow mode. For compatibility reasons, the C64 mode is always slow, but I found out that the clock rate can be doubled to 2MHz hence doubling the operating speed. The only drawback is that the VIC (video) chip cannot cope with such a pace and will go totally berserk until the speed is brought back to normal. To go in 2MHz mode, type

POKE 53296,1

and as soon as you have pressed return, the screen will display a wonderful animated display of garbage. When you want to have screen output again you need to go back to the normal speed with:

POKE 53296,0

To test the speed difference, try Program 1 and Program 2.

40 and 80 column mode

One can switch easily between 40 and 80 column mode in Basic by doing an ESC X (pressing the ESC key followed by X), or by printing it in Basic as:

PRINT CHR$(27);X

Another way is to call the machine code subroutines in the kernel with the sys commands:

SYS 49194 will switch to 40 column mode
SYS 52526 will switch to 80 column mode

Commands Disabling List

Partially disabling the list command can be achieved by rerouting some vectors, and depending on where they will redirect the system, all kind of options are open. The vector normally points to $5151.

POKE 774,61 will only list the line numbers
POKE 775,255 will hang the computer up on listing.

Save

Using a similar technique, SAVE can be disabled with

POKE 818,196

Run Stop Restore

The combination of RUN/STOP RESTORE key can be disabled with the following poke:

POKE 808, PEEK(808)-3

A 'Print at' command

There is in the 128's kernel a very useful routine that can be used as a print at command. It will not print as such, but will put the cursor at a particular location on the screen, and if followed immediately by a PRINT, will emulate a PRINT AT command. The syntax is a bit strange, but remember the letter 'A'.

SYS 49176,a,(col),(row):print hello world

Example:

SYS 49176,a,20,20:printhello there

Try program three to see particular uses.

An OLD command

If you have accidentally typed NEW, all is not lost. Just type the line below and your program will be recovered.

POKE PEEK(45)+256*PEEK(46)+1, , 28:SYS 20303

This command string would be ideal for programming in one of the function keys.

Program one

```
100 TI$=000000
110 POKE 53296,1
120 FOR N=1 TO 5000
130 NEXT N
;TI$
140 POKE 53296,0
150 PRINT TIME TAKEN ;T$
```

Program two

```
100 TI$=000000
100 FOR N=1 to 5000
120 NEXT N
130 PRINT TIME TAKEN
```

Program three

```
100 scnclr
110 for n=1 to 20
120 sys 49176,a,n,n:printhello
130 next n
140:
150 for x=20 to 1 step -1
160 y=21-x
170 sys 49176,a,y,x:print hello
180 next x
```

E.D.

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POCKET WRITER by Digital Solutions

Digital Solutions Inc.

As a writer who is starting to come to terms with the technological age, I tend to do most of my writing on a Word Processor. Since I happen to own a Commodore 64, that's the machine on whch I do all my word processing (well, it was until recently — but that's another story).

I suspect that I'm not alone — the C64 has a nice keyboard and one can easily get ued to typing in 40 columns then reformatting the text before printing.

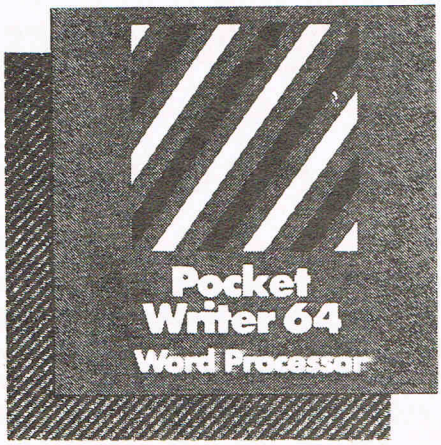
What I'm really building up to saying is that there really are an awful lot of Word Processing packages that will run on the 64. A veritable plethora of them, in fact. All different. All claiming to be easy to use, powerful, versatile.

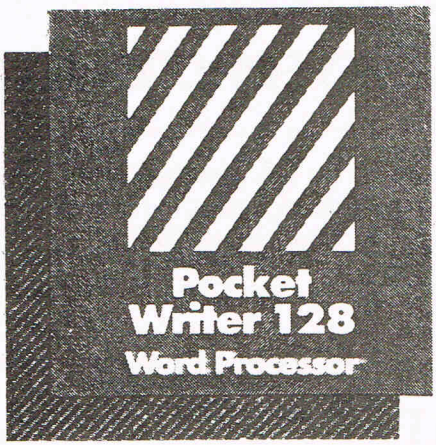
Now the trouble with Word Processors is that you won't understand the jargon until you've used one. And you won't use one until you've spent a fairly long time working out which button to pres to do what; which button to press to undo what you just did by pressing the wrong button; what series of heiroglyphics to insert in order to use the special features of your printer; how to stop your printer printing heiroglyphics. And so on.

Having wrestled a Word Processor into submission you start to sneer at mere mortals who use typewriters (pen and paper don't even warrant a sneer). You start juggling paragraphs around just for the hell of it. You change words in the middle of your text just because you can. You offer to write the whole family's Christmas thankyou letters. You load up the thing just to leave a note for the milkperson. You become a convert.

Achieving the status of Word Processor Bore is a struggle. But well worth the effect — especially when you meet a kindred spirit. Listening to two WPB's comparing features is almost as fascinating as eavesdropping on a roomful of armchair cricketers.

Sooner or later, unless you've been very lucky, you are going to meet a WPB whose software has more or better or





faster features than yours. You're going to save up and buy a copy. You're going to load it. You're going to find that you don't know how to work it. You're going to find that the button you used to press to get to the menu is now the one you use to erase the computer's memory. You're going to find that the sequence of control codes that used to produce italics on your printer now causes the disc drive to format a new disc (or whatever disc happens to be in the drive at the time. Even that one with the first seventeen chapters of your novel on it — you know, the one you haven't got round to making a backup copy of).

After a while, you're going to take your nice new Word Processor. Ever so calmly, you're going to put it back in its box. Under perfect controls, you're going to put it on a very high shelf. With complete aplomb, you're going to get out your old, friendly Word Processor and you're going to carry on as if nothing had happened — after all, you've managed without those extra features before, haven't you?

Pocket Writer, a new product (in Europe, at least) from Digital Solutions of Ontario, Canada, is certainly worth considering if you're the slightest bit doubtful about your current package. If you are new to word processing, it should be on your short list for very serious consideration.

Pocket Writer fits into an integrated series of spreadsheet, Database and w/p. The series is already highly successful in North America and probably the most popular at the present, having sold 400,000 in the last year.

Pocket Writer provides WYSIWYG (What You See Is What You Get) to a far greater extent than any other C64 Word Processor I've seen. On-screen Bold Face, Italics, Underlining, Superscript and Subscript; Wordwrap; variable column width; centering and justification all make working with Pocket Writer about as straightforward as one could wish. There are no control codes cluttering up the text and there is an option to show spaces as you type.

The product is easy to learn, thanks to a Help function, which reduces manual-thumbing to a minimum. Sensible use is made of the CTRL key to access features, formatting is simplicity itself, and it incorporates a built-in Centronics interface (rare amongst Transatlantic products). The manual is well-written and informative.

The only reason that I can find for not changing to Pocket Writer from my current favourite is that you have to reset the computer in order to use the spelling checker. I like to check my word count at regular intervals — perhaps you don't, in which case it doesn't matter.

I certainly liked Pocket Writer. I even typed this piece using it and didn't even swear much. At the price and for what it delivers it is excellent value. I would put it up among the likes of Supercript, Vizawrite and Paperclip.

T.L.

Contact: Digital Solutions Inc., 30 Wertheim Court, Unit 2, Richmond Hill, Ontario, Canada L4B 1b9. Tel: (0101 416) 731-8775.
UK & Europe Distribution: HABA systems Ltd., Pier Road, North Feltham Trading Estate, Feltham, Middx TW14 0TT.
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128 £49.95

Love Bytes

(or sex and the single computer)

They say that computers do not think like human beings. But do they *feel* like humans? A certain computer, to which (to whom?) we have guaranteed absolute anonymity, has supplied us with this piece of computer-style porno-gossip that is going the rounds of the sophisticated number crunchers in the U.K.

If you have an under-age computer around, on no account let it see this – it might be totally diskusted (!) and even corrupt its little CPU forever!

Micro was a real-time operator and dedicated multi-user. His broad-band protocol made it easy for him to interface with numerous input/output devices, even if it meant time-sharing.

One evening he arrived home just as the sun was crashing, and had parked his Motorola 68000 in the main drive (he had missed the 5100 bus that morning), when he noticed an elegant piece of liveware admiring the daisy wheels in his garden. He thought to himself, "She looks user-friendly. I'll see if she'd like an update tonight."

Mini was her name, and she was delightfully engineered with eyes like COBOL and a Prime mainframe architecture that set Micro's peripherals networking all over the place.

He browsed over to her casually, admiring the power of her twin, 32-bit floating point processors and enquired, "How are you Honeywell?" "Yes, I am well," she responded, batting her optical fibres engagingly and smoothing her console over her curvilinear functions.

Micro settled for a straight line approximation. "I'm stand-alone tonight," he said. "How about computing a vector to my base address. I'll output a byte to eat, and maybe we could get offset later on."

Mini ran a priority process for 2.6 milliseconds then transmitted "8K, I've been dumped myself recently, and a new page is just what I need to refresh my disks. I'll park my machine cycle in your background and meet you inside." She walked off, leaving Micro admiring her solenoids and thinking, "Wow, what a global variable, I wonder if she'll like my firmware."

They sat down at the process table to a top of form feed of fiche and chips and a bucket of Baudot. Mini was in conversational mode and expanded on ambiguous arguments while Micro gave occasional acknowledgements although, in reality, he was analysing the shortest and least critical path to her entry point. He finally settled on the old "would you like to see my benchmark subroutine", but Mini was again one step ahead.

Suddenly she was up and stripping off her parity bits to reveal the full functionality operating system software. "Let's get BASIC, you RAM," she said. Micro was loaded by this stage, but his hardware policing module had a processor of its own and was in danger of overflowing its output buffer, a hang-up that Micro had consulted his analyst about. "Core," was all he could say.

Micro soon recovered, however, when she went down on the DEC and opened her device files to reveal her data set ready. He accessed his fully packed root device and was just about to start pushing into her CPU stack, when she attempted an escape sequence.

"No, no!" she piped. "You're not shielded."

"Reset, Baby," he replied. "I've been debugged."

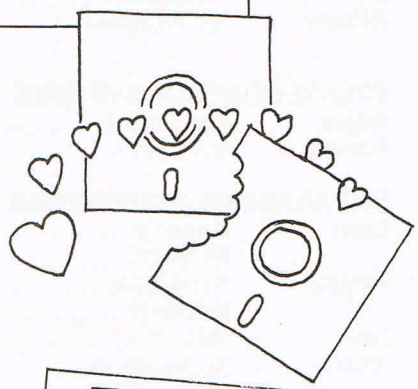
"But I haven't got my current loop enabled, and I can't support child processes," she protested.

"Don't run away," he said. "I'll generate an interrupt."

"No that's too error prone, and I can't abort because of my design philosophy."

Micro was locked in by this stage though, and could not be turned off. But she soon stopped his thrashing by introducing a voltage spike into his main supply, whereupon he fell over with a head crash and went to sleep.

"Computers," she thought as she compiled herself, "all they ever think of is hex."



The Comal Psalm: 23

The following appeared in the Sept/Oct 1986 issue of the ICPUG Journal. We thought it was so good that we are pleased to reprint it for the benefit of CCI readers world-wide.

COMAL is my language; I shall not want.
It maketh me to structure my thoughts;
It sorteth and indenteth my program.

It **RESTORE**th my **DATA;**
It leadeth me in paths of readibility for its own sake.

Yea, though I walk through the valley in the shadow of **BASIC,**
I will fear no **GOTO:**
For it is state-of-the-art;
Its **PROC**s and its **FUNC**s they comfort me.

It prepareth an unassigned data space before me in the absence of my values;

It reporteth my errors at source, even if my stack runneth over.

Surely functionality and reliability shall follow me all of the days of my life:
and I will dwell in its structured syntax forever.

(Collected by Brian Grainger from the 1986 COMAL Standardisation meeting held in Denmark)

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Dear Rae...

This month your letters are answered by Rae West. Rae is the author of three large reference books on Commodore computers; the latest is Programming the Commodore 64, following Programming the VIC and Programming the PET/CBM. All are published in the UK by Level Ltd. Rae is also published in the USA by Compute! Books.

Dear Rae,
Could you tell me if there is any way I can connect to my CBM 128D a 3 inch HITACHI DOUBLE SIDED, DOUBLE DENSITY 40 TRACK SHUGGART INTERFACE disk drive. I obtained the drive very cheaply in a sale hoping to use it as a second drive to only store information from the computer, so there would be no problem with obtaining software as I wouldn't require it for this drive. Articles I have read have stated that it is best to stay with drives that are specifically made for the machine, for software compatibility but no indication if it is possible to connect one as a second drive.

Just for the matter of readers interest, could you list the possible interfaces you would require and where obtainable. from.

G. P. Allen, Harewood BKS, BFPO 15

Dear Mr Allen
In a word "no" . . . sorry, but you can't. You'll have to stick to CBM drives I'm afraid.

Dear Rae,
I have a problem with my Plus/4: it has started to crash while loading cassettes. Firstly it crashed while an arcade game, Fingers Malone, was being loaded. Next it took several times before the game was successfully loaded. Finally it refused to accept the program altogether. Now the computer won't accept any programs at all. On the screen the following sequence is repeated:

BREAK PC SR AC XR YR SP
;012D 35 00 00 01 02

Is this significant? Could it be the fault of the program? If it is the computer what can I do about it?

Jonathan Zavou, Stockton-on-Tees

I'd guess your problem is caused by your cassette player's heads either becoming dirty (try cleaning with cotton wool buds and solvent), or becoming magnetized (you'd need a demagnetizer to cure this). This would explain the progressive deterioration, and is quite a well-known problem, fortunately easily cured. The program itself couldn't cause such a fault. But it's also possible that the machine's ROM isn't working properly; this could explain the crash into the machine-language monitor at a break command.

One way to check is to test with another person's trouble-free recorder; if it works with your Plus/4, then your own player must be at fault.

Dear Rae,
Turbo 64 Program: I have found this program extremely useful but find that turbo-saved programs affect the operation of programs containing a LOAD instruction. Such programs in fact terminate once the load has been effected. Is it possible for the 'Turbo 64' program to be modified to overcome this problem?

J. Stewart, Burley-in-Wharfedale

I'm not clear which turbo-load program you're referring to. However, some fast loader programs alter a vector low in the 64's memory, pointing to different routines for loading. This allows the normal LOAD to be replaced by a faster version. All you'd need to do is ensure the vectors are set to their normal values. Try POKE 816,165: POKE 817,244 at the start of your program. LOAD will now work in its usual, slow, way.

Dear Rae,
Why don't software writers write software which allows you to save to tape as well as disk? I am an owner of a Plus/4 and cannot do much with it simply because I can't afford a disk drive. Can you please tell me if there is any way to alter the Plus/4 word processer (sic) so that it will save to tape?

Adam Coppard, Wymondham

Software writers respond to demand to some extent, and there's not much demand for tape based word processors. However, if you type text into your Plus/4's word processor, then reset it holding the Run/Stop key so tht it goes into monitor mode, you'll be able to find your text and save it, by name, to tape, using a command like S "ADAM",01,start, end.

Incidentally, you may find it helpful to join ICPUG (Independent Commodore Products Users Group) — the membership secretary is on 01-597 1229.

Dear Rae,
The MPP-1361 Printer: this 132-column printer is being remaindered. I have bought one of supplement my Epson FX80.

1. How do you set margins? There is a secondary address for lines per inch, but not for margins. SuperScript does it, but I want to list and dump screens with margins of say 30 spaces.

2. How does one use an 80-column computer (in my case the 710) to format across 132 columns? At present, all I can think of is to end a line with a ";", which is not very brilliant

R.N. Highinbotham, London SE11

1. CBM printers don't allow margins to be set; this is actually done by the program (such as SuperScript), and although the printer seems to be doing the formatting, it's actually the software controlling the situation. For this reason, you'll only be able to get LIST to add a margin by using a custom LIST routine, or physically moving the paper across. I've written a program (6-16 in 'Programming the Commodore 64') which allows LIST to be customised.

2. Again, you're under a slight misapprehension: what you're calling an '80-column computer' has 80 characters maximum in a line of BASIC, but this isn't related to the printer characteristics. Ending lines with semicolons, to prevent a 'Return' to the next line, is completely acceptable, and indeed necessary.

Dear Rae,
I have a Citizen 120-D printer for use with my 64 and 1541. This is an excellent printer, but i have one minor problem. When performing screen dumps to the printer, with a Commodore interface cartridge, I find that only 8 of the 9 pins on the printhead are used, giving ugly white lines through the finished dump. I really see no alternative but to purchase the Centronics interface and a lead. Could you please advise me.

Also, do you know anyone who could supply me with a cable that splits the audio-video output of the 64 to produce two identical signals to connect two monitors to the 64?

Finally, is there any way of loading a program from cassette that skips the 'Press Commodore key' message?

P. Jackson, Bradford

Screen dumps usually only make use of 8 wires; this corresponds with the number of lines in each high resolution character, which makes programming easier. I'd guess that the separation of lines on your printer is the problem: why not experiment, sending the appropriate control characters for your type of printer to control line advance? With luck this'll work.

I don't personally know of any cable of the sort you mention. (Maybe cables suppliers could contact me via CCI). In any case, the signal is designed for one monitor, and would be less efficient with two.

Dear Rae,
I own a Plus/4 and a 1551 disk drive; I also have a CBM 4032 with a 4040 disk drive.

I have found that while it is possible to save a simple program to disk from the 4032/4040 and replay it on my Plus/4, I have been unable to operate the other way round.

Could you please advise me of the reason for this?

P.M. Lewis, Reading

Yes. The Plus/4 can load BASIC programs with any starting address (it moves them into the place it normally uses) because, for technical reasons, some BASIC programs start in different places than others. However, the earlier CBM machines don't have this feature; it wasn't needed.

Inside Info

ICPUG is a highly influential organisation and brings many benefits to its members across the whole range of Commodore activity. CCI considered that a regular column from ICPUG would be of interest to many readers. The views expressed by ICPUG may not be those of CCI

I am in love! For three whole days this week I had an Amiga, and it was fantastic! Whilst I have messed around with the machine at various shows over the last year or so, I haven't had the chance before to actually get to grips with the guts of it. It was just about the saddest day of my life when it had to go back to its owner. Impressions? I could really use a machine like that in my business, if only there were enough 'serious' software available.

The thing I have no qualms about is support. This is something that is available in large quantities almost wherever you look, from the excellent BIX, through to dealers running their own newsletters and bulletin boards. Of course, ICPUG intends to remain a major source of information and technical backup.

This brings me neatly to my major point for this month. For several months now, I have waffled on at you on several topics under the ICPUG banner (and we are grateful to CCI for inviting us to do so). But who is ICPUG, and what makes us a force to be reckoned with?

ICPUG stands for the Independent Commodore Products Users Group. We have recently become a trading Cooperative, so for legal purposes, we are Independent Commodore Products Users Ltd (ICPUL). Our raison d'etre is to provide technical and other support to users of the entire range of Commodore products and associated widgets. This support is in the form of a bimonthly newsletter, large public domain software libraries, and a team of experts who will answer queries by post or telephone. We are active on both Prestel Microcomputing and Compunet databases, and periodically look into supporting other networks. Many of you will have seen our stand at the PCW and major Commodore shows, and also attended our popular and informative seminars ICPUG projects itself towards Commodore equipment, rather than the games market (although I admit that I am not averse to the odd game of Marble Madness!). We are fortunate in being able to maintain amicable relations with a lot of software and hardware houses, and are called in to beta test many of their products. Membership is not free (predictable), but it is cheap, at only a tenner (UK). You don't think ten quid is cheap? Compare us to an equivalent PC users group, where you will pay well over £25.

A lot of people don't realise it, but there is a social side to ICPUG. We have a network of Regional groups where members can get together with others in their locality, and wherever possible, we try to organise a National get together sometime during each major show, where people can get to know each other — meet the faces as it were — and generally have a good time.

It would be nice to hear what you have to say about us or the column, or life in general. You can contact me (Tim Arnot) on Prestel, ID 705750595, Compunet, ID ICPUG, or failing that, write via the editors of CCI, and I am sure they will pass your message on.

See ya.

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Defining Character Set on the C-128

by Peter Sims

For this 'Hints and Tips' item there is no programme involved, just a series of commands to type in. It will interest many C128 owners.

Being able to define the shape of your own characters allows you to do all sorts of tricks which make programming easier. For example, if you have a program which needs to display its measures down to quarter units then just define 4 consecutive characters to be space, 1/4, 1/2 and 3/4 to make coding very easy.

For example 'MS' is the measure (in quarters) and the four defined characters are chr$(126) the code is simply

PRINT INT(MS/4) CHR$((MS AND 3) +123)

This article looks at redefining characters on the 40-column screen and how to copy the new character set to the 80-column screen.

It takes several stages to redefine characters:

1) Reserve 4K of RAM to put the new set in

The easiest way to do this is to use the 10K space reserved for the graphic screen. This can be done with a single basic command **'GRAPHIC 2,1,14'.** This command sets aside the graphic screen (and clears it) and displays the top half of it on the 40-column screen leaving text on the bottom half. Why display it? This will be obvious at the next step.

2) Copy the original character set

Using the built in monitor **'T ED000 EDFFF 2000'** does the job very quickly, however this cannot be included in a basic program, but the following does the same job (only slower).

```
10 GRAPHIC 2,1,14 :BANK 14
20 FOR B=0 to DEC("FFF")
30 : POKE DEC("2000")+B, PEEK (DEC("D000")+B)
40 NEXT B :BANK 15
```

Now you can see why it is worth while displaying the top half of the graphic screen. The data for the character sets has the same layout as normal graphic data. So all the characters for both the graphic set and the text set are displayed together with the reverse video sets.

A **FAST** command at the end of line 10 and a **SLOW** command at the end of line 40 will halve the time taken for the routine, only the screen will be blank.

One quick note about the BANK command: it only affects the SYS, PEEK, POKE, and WAIT command. It will not crash the system if it is not 15 as many other authors imply.

3) Redefine any characters

Each character uses 8 bytes of data. To find the start position of any character we need to add 8 times the 'screen code' for the character to the base address of the set. The base address for each of the 4 sets are:

Graphic set	= DEC("2000")
Reverse graphic set	= DEC("2400")
Text set	= DEC("2800")
Reverse text set	= DEC("2C00")

Having found the address of the character to be redefined any number of different routines could be used to change it. In the examples below AD is the address of the character being redefined:

★ invert the character
```
FOR F=0 TO 7:POKE AD+F, 255-PEEK (AD+F) :NEXT
```
★ Slide the character up
```
B=PEEK(AD) :FOR F=0 TO 6 :POKE AD+F, PEEK(AD+F+1) :NEXT :POKE AD+7,B
```
★ Mirror character about X-axis
```
FOR F=0 TO 3:B=PEEK(AD+F) :POKE AD+F, PEEK(AD+7-F) :POKE AD+7-F, B :NEXT
```
★ Top of double height character
```
FOR F=3 TO 0 STEP -1 :POKE AD+F+F, PEEK(AD+F): POKE AD+F+F+1, PEEK(AD+F) :NEXT
```
★ Bottom of double height character
```
FOR F=0 TO 3 :POKE AD+F+F, PEEK(AD+F+3) :POKE AD+F+F+1, PEEK(AD+F+3) :NEXT
```
★ Copy of another character (address AB)
```
FOR F=0 TO 7 :POKE AD+F, PEEK AB+F) :NEXT
```
★ Rotate character 90°
something for you to code!!
★ anything else you want to do.

These are some of the things that can be done with the existing data, which does not have to be used at all. You could define your own editor to examine the 8×8 matrix and input new values.

4) Tell the 40 column screen to use the new set

This is just a simple poke command: **'POKE 2604,24'**. This tells the VIC chip that the character data is at a new address. When using the character set in this position you should not use any graphic commands such as DRAW or CIRCLE, nor should you use the SPRDEF command which also overwrites the graphic screen.

5) Copy the new set to the 80-column screen

This is quite complicated and has to be done in machine code. However this task is something the C128 does every time it is powered up. All we have to do is to copy the routine so that we can tweak it a little.

The routine is stored in ROM at $FCE0C to $FCE4B. First use the monitor command **'T FECOC FCE4B 1300'** to copy it then **'A 1302 LDY #$20'** and **'A 133B CMP #$30'** to change the start and end address of the 'character ROM'. (after each 'A' command Monitor will type the start of another one. Just press shift-return).

This routine can then be saved to disk with the monitor command **'S"xfer80col2000",8,1300,13ff'** so we can use the BASIC command **'BOOT"xfer80col-1200"'** to copy our new set. We can, of course call it directly from basic **'SYS DEC("1300")'** or monitor **'G F1300'.**

If you only want the new character set in the 80-column screen then a **'GRAPHIC CLR'** command will return the memory it uses for the 40-column screen, this will also enable you to use graphic commands again.

That then is all the theory you need to design your own characters. I will leave the design of the program to you as everyone has their own idea of what is best. To give you some ideas, my own design included machine code to speed up some functions, a sprite as a cursor to the current character, another sprite displaying the character at double size, using the SPRDEF command to allow character editing and a list of commands on the screen.

Finally an idea for people with 80-column screens and some machine code experience. The 80 column screen is very versatile, it can display all 512 characters and it can generate reverse video without the need for separate sets. The following data is enough information to allow you to code 4 different character sets with reverse video.

Location	Function
241 ($f1)	Bit 7=0 use graphic/reverse graphic, =1 use text/reverse text Bit 6 controls hardware reverse video
243 ($f3)	not 0 turns on software reverse video
215 ($d7)	Bit 7 40/80-screen flag (0=40, 1=80)
154 ($9a)	current output device (3 for screen)
($0326)	Vector for all output

Program

A HEAP OF HINTS

Most programmers find themselves using the same routines over and over again. It makes sense therefore, to keep a documented copy of all the useful routines you are likely to need again. There is nothing worse than having to plough through several dozen manuals for a simple poke or 2 line piece of code. I use a simple card index system on which I write one routine per card. I have listed a few below.

---

1) To move the cursor to any position on the screen.

```
      LDY #$cc     ;  Where cc = column (0-39) ($00-$27)
      LDX #$rr     ;  Where rr = row (0-24) ($00-$18)
      CLC          ;  Tell routine to plot
      JSR $FFF0    ;  Plot kernal routine (65520)
      RTS          ;
```

Or from BASIC

```
      POKE 781,row
      POKE 782,column
      POKE 783,0
      SYS 65520
```

---

2) To read position of the cursor.

```
      SEC          ;
      JSR $FFF0    ;  Plot kernal routine
                   ;  Examine X reg for row
                   ;  Examine Y reg for column
      RTS          ;
```

Or from BASIC

```
      POKE 783,peek(783) OR 1
      SYS 65520
      row = peek(781)
      col = peek(782)
```

---

3) To print a BASIC word from its Token value.

```
      LDA #$tt     ;  Where tt = token value
      JSR $A717    ;
```

Or from BASIC

```
      POKE 780,token
      SYS 42775
```

---

4) Perform an INPUT in machine code

```
      LDY #$00     ;  Clear reg
loop  JSR $FFCF    ;  CHRIN routine (65487)
      STA area,y   ;  Store data in 'area'+y

      INY          ;
      CMP #$0D     ;  Was it a Carriage return
      BNE loop     ;  No! then get another byte of data
```

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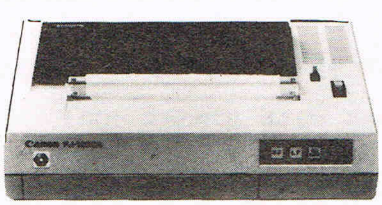

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5) Get and display input from the keyboard

```
loop  JSR $FFE4   ;  GETIN routine
      CMP #$00    ;  Was a key pressed?
      BEQ loop    ;  No! then try again
                  ;  Yes
      JSR $FFD2   ;  Call CHROUT (prints to screen)
```

---

6) Run a BASIC programme from machine code

```
      JSR $A65E   ;  Perform CLR
      JSR $A68E   ;  Back up text pointer
      JMP $A7AE   ;  Run
```

---

7) Load a programme from machine code

```
      LDA #$dd    ;  Where dd = Device number ie. 08 (disk)
      LDX #$ll    ;  Where ll = Logical file number
      LDY #$ss    ;  Where ss = Secondary address
                  ;  If ss = 00 then programme is loaded into the
                  ;  address specified by the X & Y regs when
                  ;  LOAD ($FFD5) is called
                  ;  If ss = 01 then the programme will load at
                  ;  the address contained in its header
      JSR $FFBA   ;  Call SETLFS
      LDA #$nn    ;  Where nn = Number of charcters in filename
      LDX #$lo    ;  Where lo = Lo Byte of filename address
      LDY #$hi    ;  Where Hi = Hi Byte of filename address
      JSR $FFBD   ;  Call SETNAM
      LDA #$ff    ;  Where ff = 00 for a load or 01 to verify
      LDX #$la    ;  Where la = Lo Byte of load address
      LDY #$ha    ;  Where ha = Hi Byte of load address
      JSR $FFD5   ;  Call LOAD
      RTS
```

---

8) Print a string in machine code

String must end with a null (00)

```
      LDA #$lo    ;  Where lo = Lo Byte of strings address
      LDY #$hi    ;  Where Hi = Hi Byte of strings address
      JSR $AB1E   ;
```

NB the X reg is also affected.

---

9) Reserve space for machine code programmes or data

a) Lower top of memory

POKE 51,l :POKE 52,h :POKE 55,l :POKE 56,h :CLR
Where h and l are Hi & Lo bytes of address to which you wish to lower memory.

E.g. To reserve $9000-$9FFF h=0 & l=144
256*144 = 36864 ($9000)

b) Raise bottom of memory

POKE 44,h :POKE43,l :POKE na,0:NEW
Where h and l are as in example 'a' and na is the first byte of the new start of basic.

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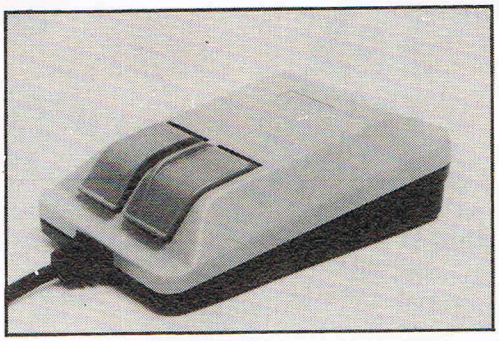

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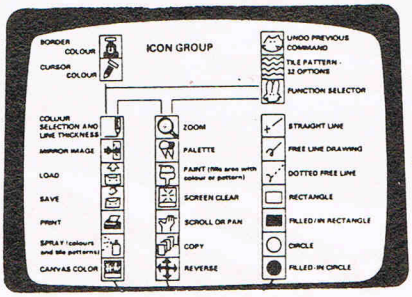

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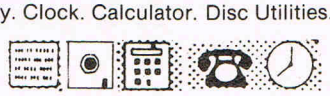

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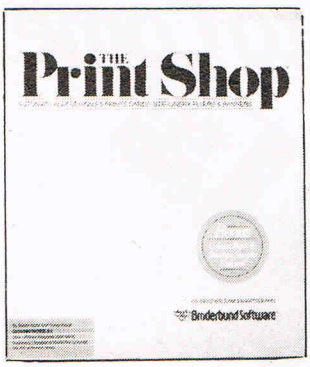

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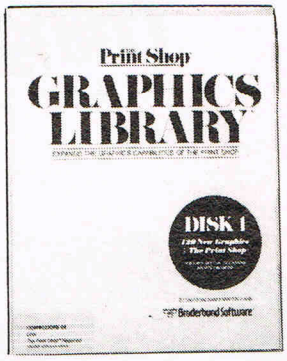

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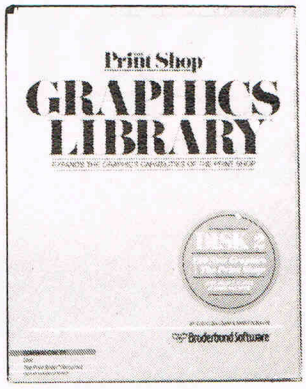

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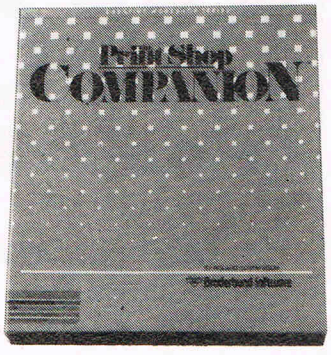

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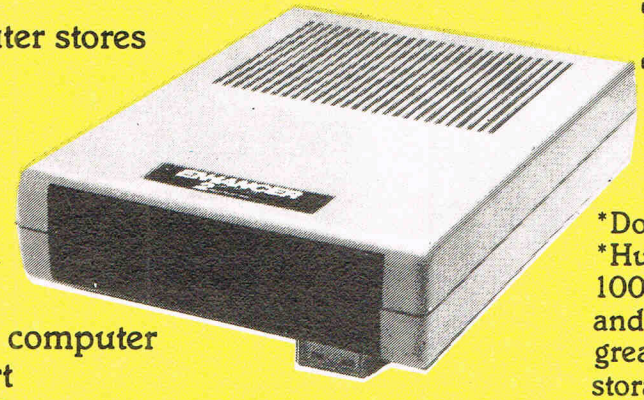

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10) To switch the BASIC ROM in and out

```
Out
     LDA $01
     AND #$FE
     STA $01
     RTS

In
     LDA $01
     ORA #$01
     STA $01
     RTS
```

---

11) Generate a pseudo random number in machine code

```
     LDA #$FF
     STA $D40E
     STA $D40F
     LDA #$80
     STA $D412
     STA $D418
     RTS

     Read $D14B for random number
```

NB This routine uses the SID chip

---

12) Protect your BASIC programmes with a few pokes

Type of protection	Protection ON	Protection Off
Disable Run/Stop	808,251	808,237
Disable LIST - Cold Start	774,226 + 775,252	774, 26 + 775,167
Disable SAVE - Cold Start	818,266 + 819,252	818,237 + 819,254
Disable LIST - Warm Start	774,131 + 775,164	774, 26 + 775,167
Disable SAVE - Warm Start	818,131 + 819,164	818,237 + 819,254
Cold Start if Error occurs	768,226 + 769,252	768,139 + 769,227

---

13) Merge two BASIC programmes

Load in first programme
In direct mode type: `POKE 43,PEEK(45)-2 :POKE 44,PEEK(46):NEW`

Load in second programme
In direct mode type: `POKE 43,1 :POKE 44,3`

Remember to ensure both programmes have different line numbers before merging

---

14) Automatic Disk or Tape indicator

By adding 'D=PEEK(186)' to a programme will enable it to detect from what device it was loaded.

Should the programme need to load in more data, simply substituting D for the device number will ensure it reads it in from the same device. i.e. `LOAD"TEST DATA",D`

Thanks to my next door neighbour Clive Whitaker for ridding my index cards of those inevitable typing errors that always seem to creep in.

If you have any ideas or routines which you think would be suitable for inclusion in the HEAP OF HINTS routine file then why not pop them in the post to us? **Ian**

Evesham Micros

ALWAYS A STEP AHEAD

DOLPHIN DOS

THE EFFECT IS STAGGERING.

STOP PRESS!! Dolphin DOS gets first ever 100% hardware review on Compunet.

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FITTING

Fitting involves the insertion of two sub assembly circuit boards, one in the 1541 and one in the '64/'128. These normally just plug in but on some '64s a small amount of soldering is necessary.

SOME OF THE FEATURES

- ★ 25x FASTER LOADING (PRG FILES)
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(These figures do not allow for searching)

- ★ EASY AND FAST DOS COMMANDS
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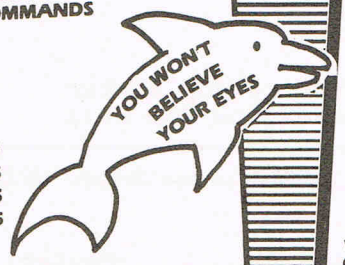

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Fast LOAD (now 5-7 times normal speed). Works with majority of protected software. Can be switched in and out from the keyboard.

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Very Fast File Copier for selective file copying at HIGH speed. Now handles files up to **248 blocks** long.

Improved DOS commands (DOS 5.1) makes for easy use of the disc drive. eg. $(RETURN) will LOAD and display a directory without over-writing BASIC. SHIFT RUN/STOP will LOAD "0:*",8,1 etc... **Very, very useful.**

Incorporates Centronics printer software (user port) **with CBM graphics** capability (requires user port centronics cable).

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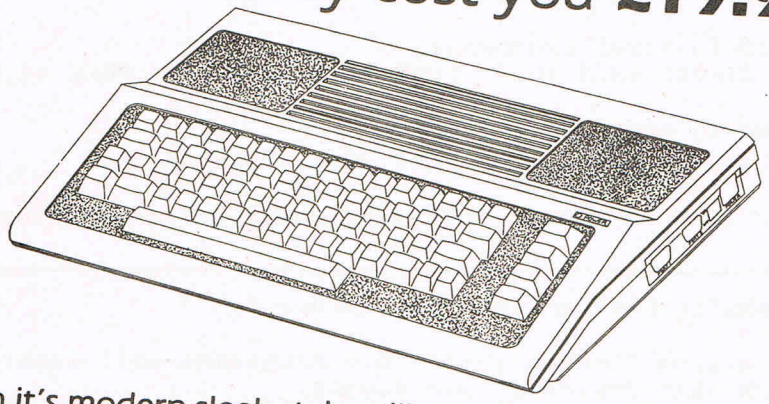
THE LO-LINE '64



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- DISC TO DISC
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- TAPE TO TAPE
- DISC TO TAPE
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- NOW HANDLES PROGRAMS THAT LOAD EXTRA PARTS
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OPERATING "FREEZE FRAME"

"Freeze Frame" is **simplicity itself** to use. Just plug it in the cartridge port, switch on and select required option from the menu. You can then load and run software totally as normal. The latest version of "Freeze Frame" will, to the best of our knowledge, allow **ANY software** to load and run normally (unlike some competitive products).

"Freeze Frame" can be brought into operation at any convenient point by **pressing the button** on it. You can then do one of three things:–

1. **Pressing "D" will save a working version of the program in memory to a formatted disc. This version will include an auto booting very high speed reload (many programs reload in less than 30 secs).**
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INCLUDES THE FOLLOWING

"EVESHAM 3 MINUTE NIBBLER" is the **latest version** of the infamous "Evesham Nibbler" now boasting **even more power and speed. Copies highly protected discs in 3–4 minutes.** Handles **the latest types of disc protection completely automatically.** This often involves the use of the **"PARAMETERS",** these add the vital secret code that the highly protected programs check for. (This is the important difference that makes this the best.) At the time of going to press this program copied **virtually all the English and American programs available for testing,** including the latest in games and business software.

"DUAL DRIVE NIBBLER" allows the use of two drives to make **even faster back ups.** Incorporates device number change software so no hardware mods necessary.

"EVESHAM 8 MINUTE NIBBLER" still very powerful and has been improved. Copies a few that the three minute version won't.

Many, many other useful utilities are included on the disc, including: **SELECTIVE MENU MAKER, FAST FORMAT, FAST FILE COPY, NOVATRANS, DISK ORDERLY, DISCMON+, UNSCRATCH, ETC., ETC.**

The whole package is menu driven and has its own fast boot system built in for your convenience. Pays for itself the first day you receive it.

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Most routines are CBM 128 and 1570/71 compatible in '64 mode.

STOP PRESS!!

Many software houses are now using "Anti-Freeze" in their software. This renders ordinary back-up cartridges useless. We are now shipping "Freeze Frame Mk. 3B" which will deal with these programs. As far as we know other competitive devices will NOT. Most new software will be using this so don't forget if you want results you must buy "Freeze Frame".

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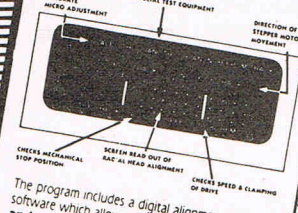

The program includes a digital alignment disc and software which allows you to **accurately check and correct** disc drive alignment. The instruction booklet is **very detailed**. Also includes quiet drive stops to **stop** that "hammering" thus preventing further problems

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Program

SCREEN READ C64

(not tested on C128)

We were extremely impressed by this program by David Gibbins. We believe it is unique and of considerable use to many people.

SCREEN READ makes your programs easier to write and use. It does this in two ways. FIRST: It reads the whole screen in one operation, and loads the data found into your program variables. SECOND: When you run a program, it gives you the use of the cursor keys. Hence you can move around the screen, changing whatever input you wish, in whatever order you wish. It's easy to see why these two abilities are useful. Reading the screen in one go makes it easy to write the input part of programs — try it and see. Also, pressing a wrong key, when typing into a running program, usually means you have to start over and input the lot again; item-by-item. Its hard to program any other way. Its the same if you try to alter data, and do a re-run, which often happens. SCREEN READ eliminates this problem, making programs easier to use.

On entering the routine the cursor starts blinking rapidly. Move it anywhere you like on the screen (using the cursor keys), altering whatever you wish. When finished, press function key f7. The screen will then be read, and your program variables loaded.

Here are the simple rules for using the subroutine.

1: The routine uses variable names starting with W — it's best you don't. Also, don't use the bottom line of the screen.

2: To control the screen Print the name and Present values of the items you want. Example. To get expenses to variable VA use PRINT" :EXPENSES?"; VA anywhere on the screen. Notice the ":" before the name and "?" after it. SCREEN READ starts reading at each '?', and stops each variable when it comes to a ':' sign.

3: List the variables wanted in DATA statement(s) starting at LINE 1630, and put the word END at the end. List in the order they appear on the screen. For example: 1630 DATA TL$, VA, W1, W2, END.

You can start another data statement (terminated with END) after it, for a second screen layout if you wish (in this case set S=2 before calling SCREEN READ — see rule 4).

4: To get your program variables loaded put S=1: GOSUB1000

Here's a simple example to illustrate the rules. It just sums a list.

```
 1 PRINTCHR$(147): SU=0: PRINT:-
FORW=1 to 5
2 PRINT":ITEM?"T$(W)tab(18)":
VALUE?";V(W)
3 SU=SU+V(W):NEXT
4  PRINT":"TAB(26)"------":
PRINTTAB(19)"TOTAL="TAB(9);SU
5 S=1:GOSUB1000:GOTO1
1630 DATA T$(1), V(1), T$(2), V(2),
T$(3), V(3), T$(4), V(4), T$(5), V(5), END
```

Notice the ':', before the '------', it serves to end the field of the last V(W) variable.

To halt a program temporarily write GOSUB1550. Lastly: the program uses some machine code, so save a copy before using it: If you press RUN/STOP while the routine is running, then type CLOSE3 and Press return; this closes a screen file used.

```
1000 REM SCREEN READ
1010 RESTORE
1020 DATA169,0,141,0,192,141,1,192,141,2,192,141,3,192,162,3,32,198,255
1030 DATA162,3,32,207,255,238,0,192,201,13,208,2,169,32,141,4,192,201
1040 DATA58,240,46,201,63,240,42,174,0,192,224,40,16,35,201,32,240,12
1050 DATA162,1,142,1,192,174,3,192,232,142,2,192,174,3,192,157,167,2
1060 DATA173,3,192,24,109,1,192,141,3,192,76,24,192,24,96
1070 DATA162,3,32,198,255,162,3,32,207,255,201,63,208,249,24,96
1080 DATA24,162,24,160,0,32,240,255,96
1090 DATA162,3,32,198,255,24,96,-1
```

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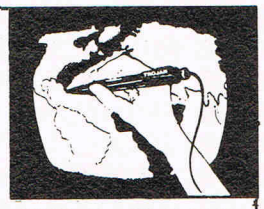

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```
1100 OPEN3,3:FORW=49157TO50000:READN
1110 IFN=-1THENW=50000:NEXT:GOTO1130
1120 POKEW,N:NEXT
1130 READW$:W9=PEEK(65)+256*PEEK(66)+1
1140 READW$:S=S+(W$="END"):IFS>1THEN1140
1150 SYS49261:PRINT"?RETURN=NEXT  F7=END  CRSR KEYS USEABLE"CHR$(19);
1160 DEFFNLL(W)=(PEEK(214)-(PEEK(211)>39))>=24
1170 SYS49245:POKE198,0:GOTO1190
1180 IFW3THEN1370
1190 IFFNLL(1)THENPRINTCHR$(157);:GOTO1190
1200 GET#3,W1$:POKE212,0:PRINTCHR$(157);:IFW1$=CHR$(13)THENW1$=" "
1210 WX=PEEK(209)+256*PEEK(210)+PEEK(211)+54272:WY=PEEK(WX)
1220 IF(W1$=CHR$(34))AND(W$=CHR$(157))THENPRINTCHR$(157);:GOTO1200
1230 IFW1$=CHR$(34)THENPRINTCHR$(29);:GOTO1200
1240 GETW$:PRINTCHR$(18)W1$CHR$(146)CHR$(157);
1250 FORW=1TO11:NEXT:PRINTW1$CHR$(157);
1260 IFW$<>""THENPRINTW1$;:PRINTCHR$(157);:POKEWX,WY:GOTO1280
1270 GOTO1240
1280 IFW$=CHR$(13)THENW3=0:SYS49245:GOTO1180
1290 IFW$=CHR$(136)THEN1370
1300 W1=(W$=CHR$(29))OR(W$=CHR$(157))OR(W$=CHR$(145))OR(W$=CHR$(17))
1310 IF(NOT(W1))AND((W1$="?")OR(W1$=":"))THENW$=CHR$(29)
1320 IFW1THEN1360
1330 IF(W$="π")OR(W$="▒")OR(W$=CHR$(17))OR(W$=CHR$(145))THEN1360
1340 IF((W$<" ")OR((W$>"←")AND(W$<"─")))OR(W$=CHR$(20))THEN1190
1350 IF(W$=CHR$(34))OR(W$="?")OR(W$=":")THEN1190
1360 PRINTCHR$(155)W$CHR$(154);:GOTO1190
1370 REM SCREEN READ
1380 SYS49261:PRINTCHR$(155)CHR$(29)"▒READING▒ ";
1390 PRINTCHR$(19);:N=0:W4=1:W$="":READW2$
1400 IFW$<>"?"THENSYS49245
1410 SYS49157:W7=PEEK(49154):GOSUB1450:READW2$
1420 W$=CHR$(PEEK(49156))
1430 W1=0:IFW2$="END"THEN1600
1440 GOTO1400
1450 REM SET VARIABLE
1460 W1$="":W1$=W1$:POKE251,PEEK(71):POKE252,PEEK(72)
1470 W8=PEEK(251)+256*PEEK(252)
1480 IF(W7>0)THENN=W4
1490 POKEW8,W7:POKEW8+1,167:POKEW8+2,2
1500 W3=197:FORW1=0TO9:W2=ASC(MID$(W2$+"                ",1+W1,1))
1510 POKEW9+W1,W2:IFW2=36THENW3=32
1520 NEXT:POKEW9+11,W3
1530 DATA2:T$          = (MID$(W1$,1))
1540 W4=W4+1:W7=0:RETURN:DATA2
1550 REM WAIT
1560 POKE19,1:SYS49261:PRINTSPC(39);:SYS49261:POKE198,0:POKE19,0
1570 PRINTCHR$(155)SPC(8)"PRESS RETURN TO CONTINUE"CHR$(19)CHR$(154)
1580 GETW$:IFW$<>CHR$(13)THEN1580
1590 RETURN
1600 REM END
1610 CLOSE3:OPEN3,0:SYS49270:CLOSE3
1620 SYS49261:PRINTCHR$(29)"▒FINISHED▒"CHR$(154)CHR$(19):RETURN
1630 DATA END

READY.
```

Learning Language Assembly

This version of a popular subject consists of a 232 page book and two programs, an Assembler and a Tutor, which in this version were supplied on disk.

The Book

The book is written in a 'chatty' style with phrases like 'lets have a go', 'much easier isn't it' and 'just type 'em in'. However, this soon changes to a more formal style as the reader continues to learn. The initial chapters explain the instructions in a clear step by step manner which includes the entry of the example programs into the supplied assembler. For the first example this includes the loading and running of the assembler itself. The example programs are used to show how new, more complex instructions can be used to simplify previously written examples. The examples are very simple and usually result in the displaying of a character on the screen. Later in the book the reader is requested to write and enter programs without examples in the main text, with the exception not only by entry into the assembler, but also with those supplied in the answer appendix at the very rear of the book.

Throughout the book 'unified' mnemonics are used which are different to the 'standard' mnemonics used by the C128 itself. A chapter later in the book explains the differences, however, it was not felt that this caused a major problem in the learning of the assembler/machine code. As part of this conversion process the reader is taught Binary and Hexadecimal numbering and as an option some aspects of BCD (Binary Coded Decimal) are also explained. This, however, only takes up one chapter of the book.

The final part of the book consists of numerous appendices giving a full list of the 'unified' and 'standard' mnemonics, some of the common routines that may be used, a character table and the answers to the exercises. These appendices take up approximately half of the book and this emphasises their importance.

Unfortunately the book in this package contained one or two inconsistencies, particularly in reference to the Assembler program menu and the explanation of one of the instructions being inverted. However, these did not cause any problems in the learning process and will most likely be cleared up in later editions.

The Tutor Program

This is not, as could be assumed, a tutor for the assembler but is simply a binary/hex/BCD conversion tutor. It consists of a menu driven program from which a 'counter' option or exercises may be chosen. The 'counter' option converts from decimal to binary and hex or BCD in steps of one from a given starting point. This then shows how the numbers differ for each of the numbering conventions by means of a pictorial representation.

The exercise option allows the user to check if the conversion process from one convention to another has been learnt correctly.

The Assembler Program

This consists of a menu of options from which the user may select to enter, list or run a program, or a forth option called 'other functions'. The entry and run functions are straight forward and the list function displays the address in decimal and hex followed by the machine code and finally the assembly code. All of these depend on the entry of a start address as the first input, at which point the particular option should commence.

The 'other functions' option consists of either entry into the C128 Monitor or a list to printer function. The C128 Monitor must be used for the loading, saving and editing of any program. These are also explained in a dedicated chapter in the book.

Conclusion

The package is obviously for the complete beginner to machine code and in some parts maybe even to the C128 itself. However, the assembler could be useful to the experienced programmer for easier entry and debugging. The assembler will also disassemble any machine code program, not only those entered through it, which may also be useful to the more experienced. Both programs are written in Basic 7.0 and are quite short in length. It may be possible for the experienced programmer to amend them to suit particular needs or even to other CBM computers.

It is unclear at this time whether a cassette version is available and if so at what price it would be sold, but there seems no reason why one should not exist.

At a price of £14.95 for the package of the book and disc, containing the two programs the cost is not excessive and is quite good value for money especially for the beginner. **L.K.**

Authors: Sims & Holmes
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Plus/4 Graphic Utilities

GRAPHIC UTILITIES provides the programmer with 34 machine code routines that can easily be incorporated into a BASIC program. These routines give a 200 by 320 high resolution screen and make for displays that are both professional in appearance and faster in operation than would be the case if programming in BASIC alone. The software deals with four basic elements — *screen manipulations, windows, sprites (!) and text characters.*

The individual routines are called from BASIC using the SYS command and to simplify matters even further, only one SYS call needs to be remembered. The actual call address is *SYS 23456* which should present few problems learning even to the most absent-minded of programmers. This address forms part of a *jump-table* and accessing each facility of **GRAPHICS UTILITIES** is done through adding suffix values to this address. Thus function calls would take the form — **SYS 23456,5,9,14** and so on. These suffix values or *parameters* do not have to be integer numbers — they can also be based on complex maths formula substituted for a parameter. This together with sprite and character definitions represents some very powerful features and add significantly to the overall strength of this product. The functions of most of these routines are self-explanatory and these are listed. Those which do not appear obvious are discussed later.

Texture	**Flip**
Mirror	**Invert**
Colour	**Scroll UP**
Scroll LEFT	**Copy**
Swap	**Mix**
Loan Screen	**Save Screen**
Window ON	**Window OFF**
Clear Window	**Copy Screen to Window**
Load Window	**Save Window**
Copy Title Strip	**Title Strip ON**
Title Strip OFF	**Print Out**
Sprite EDITOR	**Draw with Sprite**
Sprite ON	**Position Sprite**
Save Sprite from Screen	**Load Sprite from String**
Set Text Margins	**Set Text Cursor**
Set Style	**Write**
Get Text Cursor	**Load Character Set**

Since **GRAPHIC UTILITIES** is based in the PLUS/4 RAM this means that the use of the GRAPHIC CLR command should not be used in order to preserve the software within memory area between 16384 and 24576 ($4000 and $6000). The 14-page manual supplied with the package gives full details of memory usage as well as a number of example programs. The disk also contains a number of examples which allows the beginner to progress quite quickly with this product. The software author also generously provides his address and telephone number for assistance with any problems encountered. Very good for the purchser but perhaps not so good for the author! Perhaps he has yet to have someone telepone him with questions at 1.30 a.m. or on the morning of Christmas Day!

Some of the commands demonstrate a mature and knowledgeable programmer of the PLUS/4. For example, the scrolling is very good indeed and imagination is shown in the use of the PLUS/4 windowing facility to produce a title strip for a screen. Obvious influences from the AMIGA and MACINTOSH. Unlike the C64, the PLUS/4 does not have dedicated hardware to generate sprites. The sprites function is done through the use of the operating system ROM based facility of saving screen areas as graphic strings. I found the sprite editor to be very useful for quickly producing a sprite. A typical program using **GRAPHICS UTILITIES** would appear as follows:

```
10  POKE 1633 : GRAPHIC 1 : G =
    23456
20  FOR C = 0 TO 2
30  SYS G, 1,0,0,39,12,254*RND(1)+1
40  SYS G,C
50  NEXT C : SYS G,15,1
60  SYS G,1,0,0,39,24,0
70  CHAR 0,20,"press a key" : SYS G,
    5,0,20,10,0,6,5,1,0
80  FOR C = 0 TO 2 : GETKEY A$
90  SYS G13,C*2+1, C*2+1, 0,0,20,10, C
100 NEXT C
110 FOR C = 0 TO 2 : GETKEY A$
120 SYS G,14
100 NEXT C : GOTO 70
```

This demonstrates the use of windows, note that up to three windows can be open at any one time. The example also includes the parameter structure employing formula within a call, in this case in line 30 and line 90. The program itself is basically using for-next loops to capture user input from the keyboard which is used as a trigger for the windows themselves.

GRAPHICS UTILITIES is an accurate title of the properties of this product. It provides a series of programming tools to the BASIC programmer which are both simple to implement and above all else — are extremely useful and not some silly circle drawing/pretty-little-lines graphics packages that infest the market. The not inconsiderable benefit of saving the programmer some time in producing work is also worth taking into account. Only one minor complaint — there is no support for a Centronics printer from the User Port, the printer driver is only for a Commodore serial printer. I only mention this since my own printer is an EPSON and many users will probably have Commodore printers. Readers who own a C16 unfortunately cannot use this product because of the memory limitations of this machine. A very nice product that deserves to succeed and one which continues to find heavy use on my own PLUS/4. Perhaps the author will turn his attention to the sound facilities offered by the PLUS/4 and provide an integrated sound and graphics utility. I am looking forward to seeing more products from this source — a name worth watching in 1987.

B.D.

Price: £12.50 Disk only (tape version by the time you read this).

Ken Blakey — Industrial Designer, 25 Cornhill Crescent, North Shields, Tyne and Wear NE29 8LN. Tel: 091 257 0406.

UK Distributor: J. Penn Discount Software, Dean Farm Cottage, Kingsley, Nr. Borden, Hants. GU35 9NG.

Insights Into The Plus/4

During my review of the SCRIPT PLUS word processor cartridge from Precision Software for the PLUS/4 I made a brief mention of changing the internal ROM's of the PLUS/4. The response from readers of CCI has been overwhelming with many clamouring for details of how to do this. I decided that rather than write individually to readers it would probably be of interest and benefit to CCI readers to produce an article on doing this. However, before I start there is a warning. **Making a mistake with software is generally recoverable, a mistake with hardware is usually NOT recoverable. Check and double-check every operation BEFORE you place power on the system. The following text has been carefully checked for errors — CCI magazine and the author cannot accept responsibility for the outcome.**

Regular readers of our series on the PLUS/4 in CCI will know of our dislike of the included software, namely the 3+1 word processor, database and spreadsheet. Apart from the limitations of this software, it really does not do justice to the PLUS/4 which we all know is capable of better. I had always vowed to discard this software at the first opportunity and the arrival of the SCRIPT PLUS cartridge for review appeared to be an ideal moment to carry this out and replace 3+1 with SCRIPT PLUS. This would mean that on pressing the F1 key a first class word processor would be immediately available for use. There are two elements to the conversion of your PLUS/4 to this luxurious state — the first concerns the SCRIPT PLUS cartridge, the second is about the interior of the PLUS/4 itself. Let's start with the cartridge first since this is the most difficult part.

The SCRIPT PLUS cartridge from Precision Software contains two ROM's and a capacitor (see diagram). Once you have got the cartridge open (remove the centre securing screw and then prise the case apart starting from the pcb end). The main difficulty manifests itself in terms of the ROM's being soldered in position. The first step is to mark the ROM's with a pencil in terms of their orientation to the cartridge connector pins and each other **before doing anything else.**

You now have two options. If you feel capable and confident about soldering then removing the ROM's is straightforward, just ensure that the holes in the cartridge pcb are clear afterwards. Those who are not confident about this can take the pcb along to a dealer who repairs computers *on the premises* and ask him to remove the ROM's for you. At the same time ask him to fit sockets to the pcb as well as making clear that you require the ROM's for further use. Store the ROM's safely, the best place being on an anti-static sponge.

Most dealers will do this for you although they will probably specify that this operation is at your own risk. This is not unrealistic since the removal of soldered components from a pcb can be difficult. The level of charge for this is tricky but I would not want to pay more than £10.00 for the whole operation including parts. The reason why I have specified sockets on the pcb is to allow some further use of this component. For example, you can now refit the 3+1 ROM's into these sockets or keep the pcb for other ROM's — it is far too useful to dispose of, so keep it safe even if you do wish to utilise the board immediately.

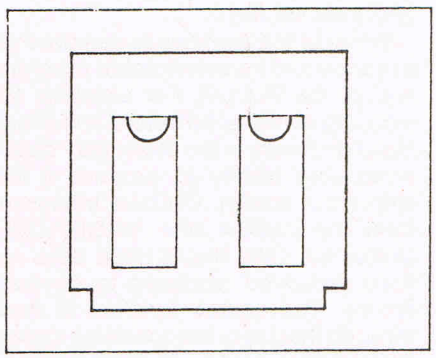

Fig.1 SCRIPT-PLUS Cartridge

The next stage is to fit the ROM's to the PLUS/4. To do this the cover/keyboard assembly has to be removed. The first step is remove **all** connectors so that the machine is isolated from the power supply and other equipment. Invert the machine and you will see five *crosshead* screws in the base — remove these. Turn the machine the correct way up and carefully ease the cover/keyboard assembly from the base unit. You will see that the upper unit remains attached to the lower unit due to the ribbon cable feeding the keyboard itself. Make a note of the orientation of this cable — stick a piece of tape on one of the sides and then carefully disconnect it from the main pcb of the PLUS/4. Note that this ribbon cable **does not** have a soldered connector at the pcb end — it is simply a push-fit of the ribbon cable into the connector on the main pcb, so pull on the cable itself. You will probably find it a little stiff so use a very slight twisting motion so that one edge of the cable comes out first.

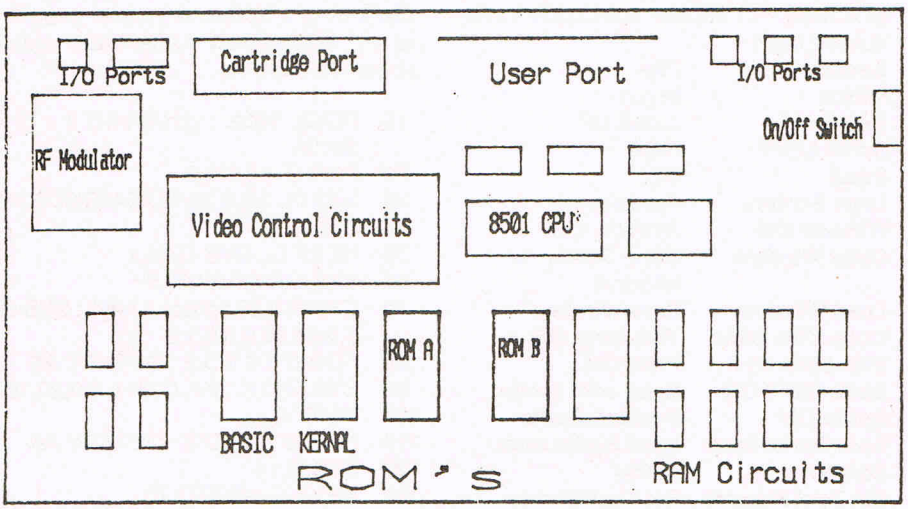

Fig.2 PLUS/4 Main Circuit Board

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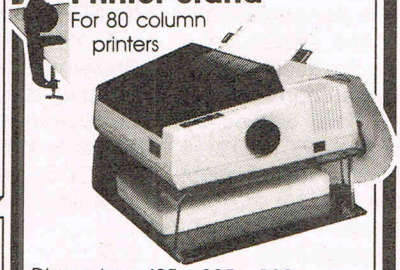

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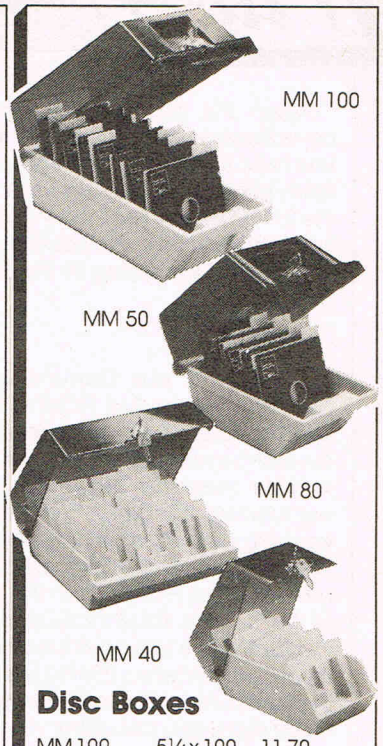

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When the cable is clear, place the cover/keyboard assembly to one side and refer to the second diagram and the main pcb of the PLUS/4 itself. Identify the 3+1 ROM's by the following numbers which should be in the positions *ROM A* and *ROM B* according to the diagram:

317053-01
317054-01

These are the Commodore Part Numbers for the 3+1 ROM's, the suffix number (the —01 in the above) refer to the version number and **may** be different in your machine. However, the main number will not differ — if it does then you are looking at the wrong ROM's. The next section of the exercise is to remove these ROM's from the main pcb of the PLUS/4. All of the ROM's on every PLUS/4 I have looked at are socketed — if your machine has the ROM's soldered in place then you have further problems. Once more you can either remove them yourself if competent, or have someone do it for you. To remove the 3+1 ROM's I have found that gently prising at both ends with a small screwdriver will release them from their sockets. Take your time — you are not getting any medals for speed on this operation. Once they are free pick them up **without touching any of the pins** and place them on an anti-static surface. The SCRIPT PLUS ROM's are numbered:

317051-01
317052-01

Refer to the diagram for the PLUS/4 main circuit board and ensure that the semiscircle indent lies the same way as the existing ROM's on the board and fit the SCRIPT PLUS ROM's in the order:

317051-01 ..... as ROM **A**
317052-01 ..... as ROM **B**

The point we have now reached is **your last opportunity to recheck.** You are checking the *orientation* and *placement* of the ROM's. Having satisfied yourself that everything is in order, reconnect the keyboard ribbon cable and then refit the cover before attaching the five screws. Now for the moment of truth — reconnect the peripherals and main power supply and switch on. If everything has gone to according to plan you should see a screen message on pressing key F1. This will be the autoboot prompt for SCRIPT PLUS.

Other than leaving lumps of metal inside the case of the PLUS/4 or fitting the ROM's upside down — that is with the indent mark (the semicircle) placed incorrectly there is little that can actually go wrong. As an experiment I tried the effect of placing ROM A in ROM B's socket with no ill-effects although obviously the software failed to operate. The only other reason for failure even assuming that everything checks out could be internal damage to the SCRIPT PLUS by either static discharge or overheating through poor technique during the desoldering operation. In this event you have just lost the value of the cost of the SCRIPT PLUS cartridge and there is not a lot you can do.

Going back to our socketed cartridge pcb you can now fit the 3+1 ROM's to this pcb, assuming of course that you made a note of the orientation of the SCRIPT PLUS ROM's before they were removed. Fitting the amended cartridge into the PLUS/4 and using the F1 key will now bring you two messages — one for SCRIPT PLUS, the other for 3+1, the only difference being the calling address. Pressing the RETURN key will always bring up the internal ROM — this priority system was discussed early in this series on the PLUS/4 in previous issues of CCI. So there it is a PLUS/4 with some meaningful software aboard.

B.D.

ATTENTION ALL PROGRAMMERS!!

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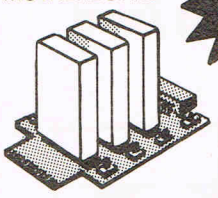

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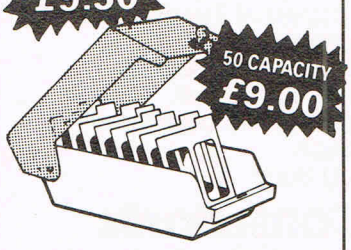

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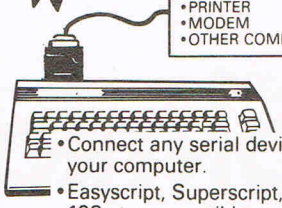

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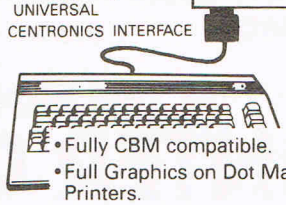

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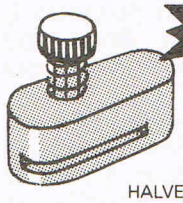

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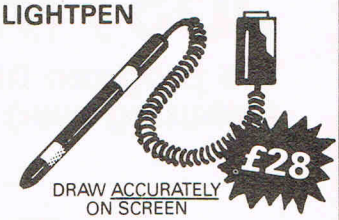

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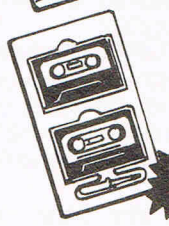

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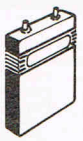

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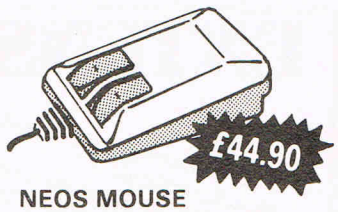

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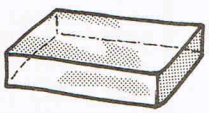

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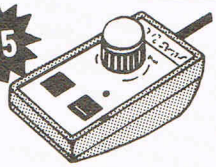

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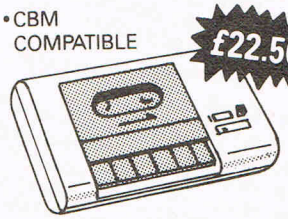

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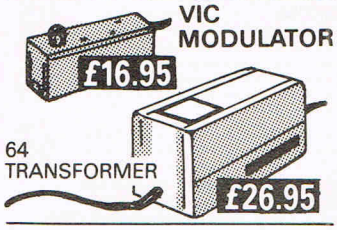

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Program

MONITOR BY PAUL BRAIN

This is a 3K machine code monitor. It has most of the usual features and is easy to drive. If whilst in the monitor you press C followed by return it will give a syntax error and return to BASIC. This is due to a quirk in some roms and will cause it to exit. This aside it should have a wide appeal.

```
 10 REM      *** CBM 64  MONITOR ***
 20 REM *** WRITTEN BY PAUL BRAIN ***
 30 PRINTCHR$(147);"      PLEASE WAIT WHILE DATA IS READ"
 40 REM ****** CHECK ROUTINE ******
 50 L=50000:FORX=0TO125:T=0:FORY=0TO14
 60 READ A:IF A <0 OR A >255 THEN 80
 70 POKE L,A:L=L+1:T=T+A:NEXT:READ A:T=T-(INT(T/256)*256)
 80 IF T<>A THEN PRINT"DATA ERROR IN LINE"100+(X*10)"CHECKSUM <>"A:STOP
 90 PRINT100+(X*10)"OK":NEXT
100 DATA 169,000,141,032,208,169,011,141,033,208,169,015,141,134,002, 037
110 DATA 076,153,195,147,067,066,077,032,054,052,032,032,077,047,067, 150
120 DATA 032,077,079,078,073,084,079,082,013,087,082,073,084,084,069, 052
130 DATA 078,032,066,089,032,080,065,085,076,032,066,082,065,073,078, 231
140 DATA 032,032,040,067,041,032,049,057,056,054,013,013,000,169,098, 241
150 DATA 160,195,032,030,171,032,004,197,169,000,168,153,000,002,200, 233
160 DATA 192,040,208,248,032,096,165,134,122,132,123,032,115,000,160, 007
170 DATA 000,141,016,196,185,017,196,240,025,205,016,196,240,005,200, 086
180 DATA 200,200,208,241,200,185,017,196,133,251,200,185,017,196,133, 002
190 DATA 252,108,251,000,169,229,160,195,032,030,171,076,163,195,013, 252
200 DATA 073,076,076,069,071,065,076,032,067,079,077,077,065,078,068, 025
210 DATA 013,000,169,001,160,196,032,030,171,076,163,195,013,083,089, 111
220 DATA 078,084,065,088,032,069,082,082,079,082,013,000,083,070,083, 222
230 DATA 196,082,151,196,088,144,197,071,159,197,065,076,200,068,109, 207
240 DATA 202,067,193,204,084,089,205,077,147,205,072,017,206,046,164, 186
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280 DATA 253,132,254,032,029,197,160,000,170,138,145,251,230,251,208, 146
290 DATA 002,230,252,170,056,165,251,229,253,165,252,229,254,144,235, 071
300 DATA 138,145,251,076,066,196,013,032,032,080,067,032,032,083,082, 045
310 DATA 032,065,082,032,088,082,032,089,082,013,059,000,169,130,160, 091
320 DATA 196,032,030,171,173,211,196,172,212,196,032,135,197,032,206, 143
330 DATA 196,173,213,196,032,111,197,032,206,196,173,214,196,032,111, 230
340 DATA 197,032,206,196,173,215,196,032,111,197,032,206,196,173,216, 074
350 DATA 196,032,111,197,076,066,196,169,032,076,210,255,000,000,000, 080
360 DATA 000,000,000,162,005,104,157,211,196,202,016,249,056,173,212, 207
370 DATA 196,233,002,141,212,196,173,211,196,233,000,141,211,196,169, 206
380 DATA 253,160,196,032,030,171,076,151,196,013,066,082,069,065,075, 099
390 DATA 000,173,022,003,141,027,197,173,023,003,141,028,197,169,217, 234
400 DATA 141,022,003,169,196,141,023,003,096,040,128,032,115,000,201, 030
410 DATA 036,240,249,032,059,197,010,010,010,010,141,142,197,032,115, 200
420 DATA 000,032,059,197,013,142,197,141,142,197,096,201,058,176,003, 118
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490 DATA 141,023,003,076,116,164,032,069,197,032,234,206,108,142,197, 204
500 DATA 065,068,067,105,101,117,109,125,121,097,113,255,065,078,068, 018
```

Program

```
510 DATA 041,037,053,045,061,057,033,049,255,065,083,076,255,006,022, 114
520 DATA 014,030,255,255,255,010,066,067,067,255,255,255,144,255,255, 134
530 DATA 255,255,255,066,067,083,255,255,255,176,255,255,255,255,255, 125
540 DATA 066,069,081,255,255,255,240,255,255,255,255,255,066,073,084, 159
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580 DATA 066,082,075,255,255,255,255,255,255,255,255,000,066,086,067, 178
590 DATA 255,255,255,080,255,255,255,255,255,066,086,083,255,255,255, 048
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630 DATA 255,255,255,255,255,255,255,255,184,067,077,080,201,197,213, 243
640 DATA 205,221,217,193,209,255,067,080,088,224,228,255,236,255,255, 172
650 DATA 255,255,255,067,080,089,192,196,255,204,255,255,255,255,255, 051
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680 DATA 255,255,255,255,255,136,069,079,082,073,069,085,077,093,089, 079
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720 DATA 076,255,255,255,108,255,074,083,082,255,255,255,032,255,255, 190
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920 DATA 255,255,255,255,255,186,084,088,065,255,255,255,255,255,255, 156
930 DATA 255,255,138,084,088,083,255,255,255,255,255,255,255,255,154, 025
940 DATA 084,089,065,255,255,255,255,255,255,255,255,152,000,000,000, 126
950 DATA 000,032,069,197,133,251,132,252,160,000,032,115,000,153,073, 063
960 DATA 200,200,192,003,208,245,169,168,133,253,169,197,133,254,160, 124
970 DATA 000,177,253,217,073,200,208,008,200,192,003,208,244,076,143, 154
980 DATA 200,024,169,012,101,253,133,253,169,000,101,254,133,254,160, 168
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1020 DATA 007,173,073,200,201,066,240,120,160,003,177,122,201,044,240, 235
1030 DATA 068,201,000,240,101,032,069,197,032,115,000,032,115,000,160, 082
1040 DATA 006,201,088,208,002,160,007,201,089,208,002,160,008,177,253, 234
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1420 DATA 206,196,173,251,202,056,233,003,010,168,185,038,203,141,029, 046
1430 DATA 204,200,185,038,203,141,030,204,108,029,204,061,203,079,203, 044
1440 DATA 112,203,031,204,147,203,169,203,191,203,153,204,243,203,169, 078
1450 DATA 036,076,210,255,169,035,032,210,255,032,056,203,160,001,177, 115
1460 DATA 251,032,111,197,076,001,204,032,056,203,160,001,177,251,032, 248
1470 DATA 111,197,076,001,204,169,044,032,210,255,169,088,076,210,255, 049
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1480 DATA 169,044,032,210,255,169,089,076,210,255,032,056,203,160,001, 169
1490 DATA 177,251,032,111,197,032,092,203,076,001,204,032,056,203,160, 035
1500 DATA 002,177,251,032,111,197,136,177,251,032,111,197,076,015,204, 177
1510 DATA 032,056,203,160,002,177,251,032,111,197,136,177,251,032,111, 136
1520 DATA 197,032,092,203,076,015,204,032,056,203,160,002,177,251,032, 196
1530 DATA 111,197,136,177,251,032,111,197,032,102,203,076,015,204,169, 221
1540 DATA 040,032,210,255,032,056,203,160,001,177,251,032,111,197,032, 253
1550 DATA 092,203,169,041,032,210,255,076,001,204,169,040,032,210,255, 197
1560 DATA 032,056,203,160,001,177,251,032,111,197,169,041,032,210,255, 135
1570 DATA 032,102,203,076,001,204,024,165,251,105,001,133,251,169,000, 181
1050 DATA 201,255,208,003,076,247,195,160,000,145,251,200,173,142,197, 149
1060 DATA 145,251,200,173,143,197,145,251,024,169,003,101,251,133,251, 133
1070 DATA 169,000,101,252,133,252,076,071,202,160,005,177,253,201,255, 003
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1100 DATA 202,160,004,177,253,076,012,201,160,006,177,253,201,255,208, 041
1110 DATA 003,076,247,195,160,000,145,251,032,069,197,165,251,205,142, 090
1120 DATA 197,165,252,237,143,197,144,065,056,165,251,237,142,197,141, 029
1130 DATA 146,201,165,252,237,143,197,208,039,024,173,146,201,105,002, 191
1140 DATA 141,146,201,169,000,056,237,146,201,201,128,144,020,160,001, 159
1150 DATA 145,251,024,169,002,101,251,133,251,169,000,101,252,133,252, 186
1160 DATA 076,071,202,076,247,195,032,030,171,076,066,196,000,056,173, 131
1170 DATA 142,197,229,251,141,146,201,173,143,197,229,252,208,230,056, 235
1180 DATA 173,146,201,233,002,201,128,176,220,160,001,145,251,076,121, 186
1190 DATA 201,160,003,177,253,201,255,208,003,076,247,195,160,000,145, 236
1200 DATA 251,032,029,197,160,001,145,251,024,169,002,101,251,133,251, 205
1210 DATA 169,000,101,252,133,252,076,071,202,173,073,200,201,074,208, 137
1220 DATA 004,076,012,202,000,032,029,197,141,228,201,160,009,032,115, 158
1230 DATA 000,201,041,208,002,160,010,177,253,201,255,208,003,076,247, 250
1240 DATA 195,160,000,145,251,200,173,228,201,145,251,076,121,201,160, 203
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1270 DATA 251,076,248,200,160,011,177,253,201,255,208,003,076,247,195, 001
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1300 DATA 196,032,096,165,169,145,032,210,255,169,013,141,119,002,169, 121
1310 DATA 001,133,198,076,163,195,032,069,197,133,251,132,252,169,000, 209
1320 DATA 141,176,202,169,013,032,210,255,169,065,032,210,255,032,206, 119
1330 DATA 196,032,177,202,238,176,202,173,176,202,201,020,208,230,169, 042
1340 DATA 013,032,210,255,169,068,032,210,255,032,206,196,032,177,202, 041
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1360 DATA 252,164,251,032,135,197,032,206,196,169,168,133,253,169,197, 250
1370 DATA 133,254,162,000,160,003,161,251,201,255,240,031,161,253,240, 201
1380 DATA 027,161,251,209,253,240,037,200,192,012,208,245,024,169,012, 192
1390 DATA 101,253,133,253,169,000,101,254,133,254,076,195,202,160,000, 236
1400 DATA 169,063,032,210,255,200,192,003,208,246,076,243,203,000,140, 192
1580 DATA 101,252,133,252,096,024,165,251,105,002,133,251,169,000,101, 243
1590 DATA 252,133,252,096,024,165,251,105,003,133,251,169,000,101,252, 139
1600 DATA 133,252,096,000,000,160,001,177,253,201,073,208,003,076,128, 225
1610 DATA 203,136,177,253,201,066,240,003,076,128,203,032,056,203,160, 089
1620 DATA 001,177,251,010,176,047,024,177,251,101,251,141,106,204,169, 038
1630 DATA 000,101,252,141,107,204,024,173,106,204,105,002,141,106,204, 078
1640 DATA 169,000,109,107,204,141,107,204,173,107,204,172,106,204,032, 247
1650 DATA 135,197,076,001,204,000,000,000,056,169,000,241,251,141,108, 043
1660 DATA 204,056,165,251,237,108,204,141,106,204,165,252,233,000,141, 163
1670 DATA 107,204,024,173,106,204,105,002,141,106,204,173,107,204,105, 173
1680 DATA 000,141,107,204,076,094,204,160,000,177,253,201,074,240,003, 142
1690 DATA 076,217,203,169,040,032,210,255,032,056,203,160,002,177,251, 035
1700 DATA 032,111,197,136,177,251,032,111,197,169,041,032,210,255,076, 235
1710 DATA 015,204,032,115,000,201,036,208,006,032,069,197,076,218,204, 077
1720 DATA 032,138,173,032,247,183,140,142,197,141,143,197,169,062,160, 108
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1730 DATA 205,032,030,171,173,143,197,172,142,197,032,135,197,169,013, 216
1740 DATA 032,210,255,169,072,160,205,032,030,171,174,142,197,173,143, 117
1750 DATA 197,032,205,189,169,013,032,210,255,169,080,160,205,032,030, 186
1760 DATA 171,173,143,197,032,031,205,169,058,032,210,255,173,142,197, 140
1770 DATA 032,031,205,076,066,196,141,088,205,160,008,014,088,205,176, 155
1780 DATA 010,169,048,032,210,255,136,240,012,208,241,169,049,032,210, 229
1790 DATA 255,136,240,002,208,231,096,013,072,069,088,032,061,061,032, 060
1800 DATA 036,000,068,069,067,032,061,061,032,000,066,073,078,032,061, 224
1810 DATA 061,032,000,000,032,069,197,133,251,132,252,032,069,197,141, 062
1820 DATA 145,205,140,146,205,032,069,197,133,253,132,254,160,000,177, 200
1830 DATA 251,145,253,230,251,208,002,230,252,230,253,208,002,230,254, 183
1840 DATA 173,145,205,197,251,173,146,205,229,252,176,226,076,066,196, 156
1850 DATA 000,000,032,069,197,133,251,132,252,160,001,177,122,208,011, 209
1860 DATA 165,251,133,253,165,252,133,254,076,178,205,032,069,197,133, 192
1870 DATA 253,132,254,169,000,141,016,206,032,223,205,238,016,206,165, 208
1880 DATA 253,197,251,165,254,229,252,144,017,173,016,206,201,020,208, 026
1890 DATA 233,165,197,201,064,240,250,201,060,240,218,169,000,133,198, 009
1900 DATA 076,066,196,169,013,032,210,255,169,046,032,210,255,032,206, 175
1910 DATA 196,165,252,164,251,032,135,197,160,000,032,206,196,177,251, 110
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1930 DATA 165,252,105,000,133,252,096,000,032,069,197,133,251,132,252, 021
1940 DATA 160,001,177,122,208,011,165,251,133,253,165,252,133,254,076, 057
1950 DATA 048,206,032,069,197,133,253,132,254,169,000,141,016,206,032, 096
1960 DATA 093,206,238,016,206,165,253,197,251,165,254,229,252,144,017, 126
1970 DATA 173,016,206,201,020,208,233,165,197,201,064,240,250,201,060, 131
1980 DATA 240,218,169,000,133,198,076,066,196,169,013,032,210,255,169, 096
1990 DATA 058,032,210,255,032,206,196,165,252,164,251,032,135,197,032, 169
2000 DATA 206,196,160,000,177,251,032,145,206,032,210,255,200,192,030, 244
2010 DATA 208,243,024,165,251,105,030,133,251,169,000,101,252,133,252, 013
2020 DATA 096,201,032,144,012,201,128,144,010,201,160,144,004,201,192, 078
2030 DATA 144,002,169,046,096,032,069,197,133,251,132,252,160,000,032, 179
2040 DATA 029,197,145,251,200,140,016,206,160,001,177,122,240,005,172, 013
2050 DATA 016,206,208,236,076,163,195,032,069,197,133,251,132,252,160, 022
2060 DATA 000,024,165,122,105,002,133,122,165,123,105,000,133,123,177, 219
2070 DATA 122,240,009,201,046,240,002,145,251,200,208,243,076,163,195, 037
2080 DATA 173,214,196,172,216,196,174,215,196,096,032,069,197,141,212, 195
2090 DATA 196,140,211,196,032,029,197,141,213,196,032,029,197,141,214, 116
2100 DATA 196,032,029,197,141,215,196,032,029,197,141,216,196,076,066, 167
2110 DATA 196,032,069,197,133,251,132,252,169,001,170,168,032,186,255, 195
2120 DATA 032,069,197,032,115,000,201,034,208,006,032,087,226,076,059, 094
2130 DATA 207,169,000,032,189,255,169,251,174,142,197,172,143,197,032, 025
2140 DATA 216,255,076,066,196,160,001,177,122,240,055,032,115,000,201, 120
2150 DATA 034,240,024,201,036,240,003,076,247,195,032,069,197,032,115, 205
2160 DATA 000,169,001,170,160,000,032,186,255,076,117,207,169,001,170, 177
2170 DATA 168,032,186,255,032,087,226,169,000,174,142,197,172,143,197, 132
2180 DATA 032,213,255,076,066,196,169,001,170,168,032,186,255,169,000, 196
2190 DATA 032,189,255,169,000,032,213,255,076,066,196,169,200,160,207, 171
2200 DATA 032,030,171,169,034,032,210,255,169,213,160,207,032,030,171, 123
2210 DATA 169,034,032,210,255,169,013,032,210,255,169,145,032,210,255, 142
2220 DATA 169,013,141,119,002,169,001,133,198,076,163,195,083,032,067, 025
2230 DATA 051,053,048,032,067,070,070,070,032,000,067,066,077,032,054, 021
2240 DATA 052,032,077,079,078,073,084,079,082,000,000,032,000,032,000, 188
2250 DATA 032,000,032,000,032,000,000,000,000,000,000,000,000,000,000, 096

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Program

THREE ROUTINES

by Dave Clough

C-64
(Data Detective should work on any Commodore machine)
These are three short and simple programmes. PROGOBB1, PROGOBB10 (where did he get those names?) and Data Detective. PROGOBB1 and PROGOBB10 are small routines to erase lines from within a BASIC programme. Data Detective will calculate what day of the week any day in this century was.

```
10 DIM M(12):FOR I=1 TO 12:READ A:M(I)=A:NEXT
20 FOR I=1 TO 7:READ A$:A$(I)=A$:NEXT
30 PRINT"       ENTER DAY , MONTH , YEAR"
40 INPUT D,M,Y
50 A%=Y/4:Z=Y+A%:A%=Z/7:Z=Z-A%*7
60 IF M<3 AND INT(Y/4)*4=Y AND Y>0 THEN Z=Z-1
70 A%=D/7:D=D-A%*7:D=D-M(M)+Z
80 IF D>7 THEN D=D-7
90 IF D<1 THEN D=D+7
100 DATA 0,4,4,1,6,3,1,5,2,0,4,2
110 DATA MON,TUES,WEDNES,THURS,FRI,SATUR,SUN
120 PRINT A$(D)"DAY":GOTO 30

READY.
```

```
0 X=(PEEK(829)*250)+PEEK(828):PRINT""X:PRINT"RUN"
1 IF X>1500THEN END:REM LAST LINE NUMBER
2 IF PEEK(828)=250 THEN POKE828,0:POKE829,PEEK(829)+1:GOTO4
3 POKE828,PEEK(828)+10
4 POKE198,3:POKE631,19:POKE632,13:POKE633,13:SYS42115
5 INPUTA:A%=A/250:POKE829,A%:POKE828,A-A%*250:GOTO0

READY.
```

```
0 X=(PEEK(829)*256)+PEEK(828):PRINT""X:PRINT"RUN"
1 IF X>1500THEN END:REM LAST LINE NUMBER
2 IF PEEK(828)=255 THEN POKE828,0:POKE829,PEEK(829)+1:GOTO4
3 POKE828,PEEK(828)+1
4 POKE198,3:POKE631,19:POKE632,13:POKE633,13:SYS42115
5 INPUTA:A%=A/256:POKE829,A%:POKE828,A-A%*256:GOTO0

READY.
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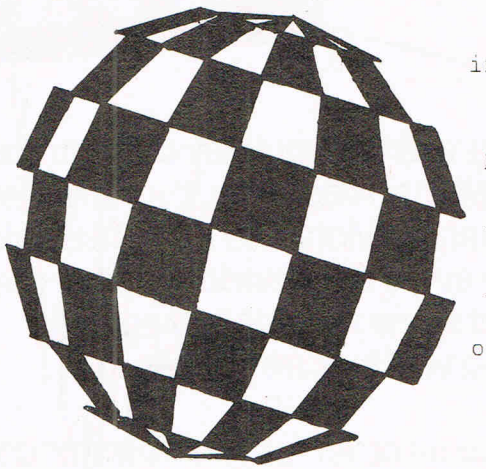

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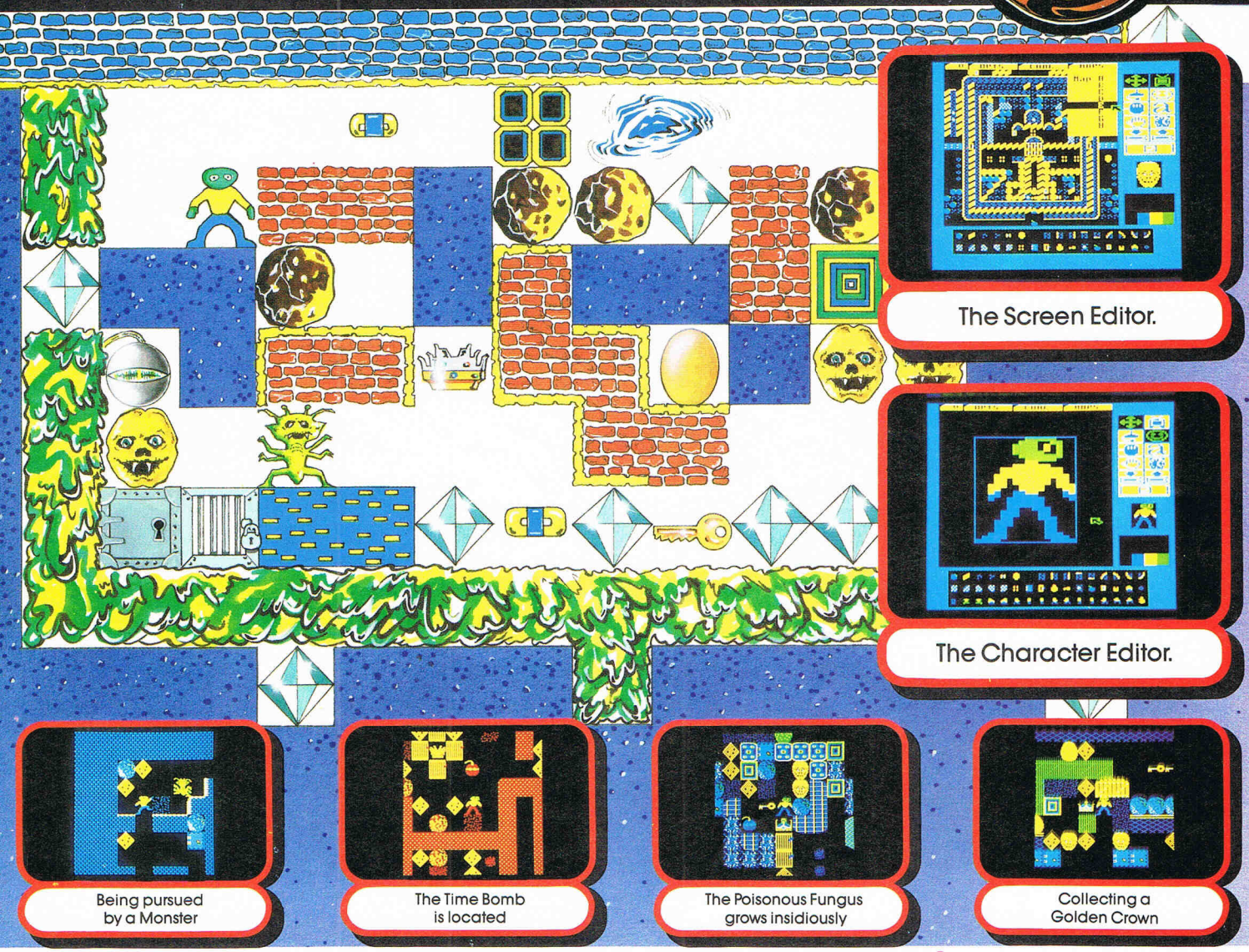
REPTON 3

THE ULTIMATE CHALLENGE



The Screen Editor.

The Character Editor.

Being pursued by a Monster

The Time Bomb is located

The Poisonous Fungus grows insidiously

Collecting a Golden Crown

Are you ready for the ultimate challenge?

Our original Repton game was immediately acclaimed as a refreshingly new concept: a game requiring dexterity to complete its arcade-style elements, and clear logical thinking to solve its strategic puzzles. Repton involves retrieving treasure from cleverly-constructed traps of falling rocks whilst avoiding the fearsome monsters and haunting spirits. "This is an astounding game reaching new heights in BBC arcade adventures," enthused the Micro User magazine.

Last Christmas saw the release of Repton 2, larger and much more challenging than before. Acorn User's Technical Editor Bruce Smith wrote: "Repton 2 is better than anything I've played on the BBC Micro or Electron. Brilliant!"

Now, completely rewritten and improved for the Commodore, Amstrad, BBC Micro and Electron, we proudly present Repton 3. For the first time, a screen-designer is included: try to devise screens that will perplex your friends, then see if you can solve their newly-designed screens. Another innovation is the character-designer which enables you to design your own monsters, rocks, eggs, spirits, diamonds . . . any or all of the game's characters can be redefined as you wish.

Repton 3 is much larger than its predecessors — it has 24 fascinating screens, and players who are skilful enough to complete them all can enter our prize competition described below. All the favourite Repton characters have been retained, together with several new features: a creeping poisonous fungus which grows at an alarming rate; time bombs and time capsules (for puzzles in the 4th dimension); and golden crowns as well-deserved rewards for your endeavours. **Can YOU complete Repton 3?**

PRIZE COMPETITION

If you complete Repton 3, you can enter our competition. Prizes include over £200 in cash, with T-shirts, mugs, badges and pens for runners-up.

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The screen pictures above show the BBC Micro version of Repton 3.

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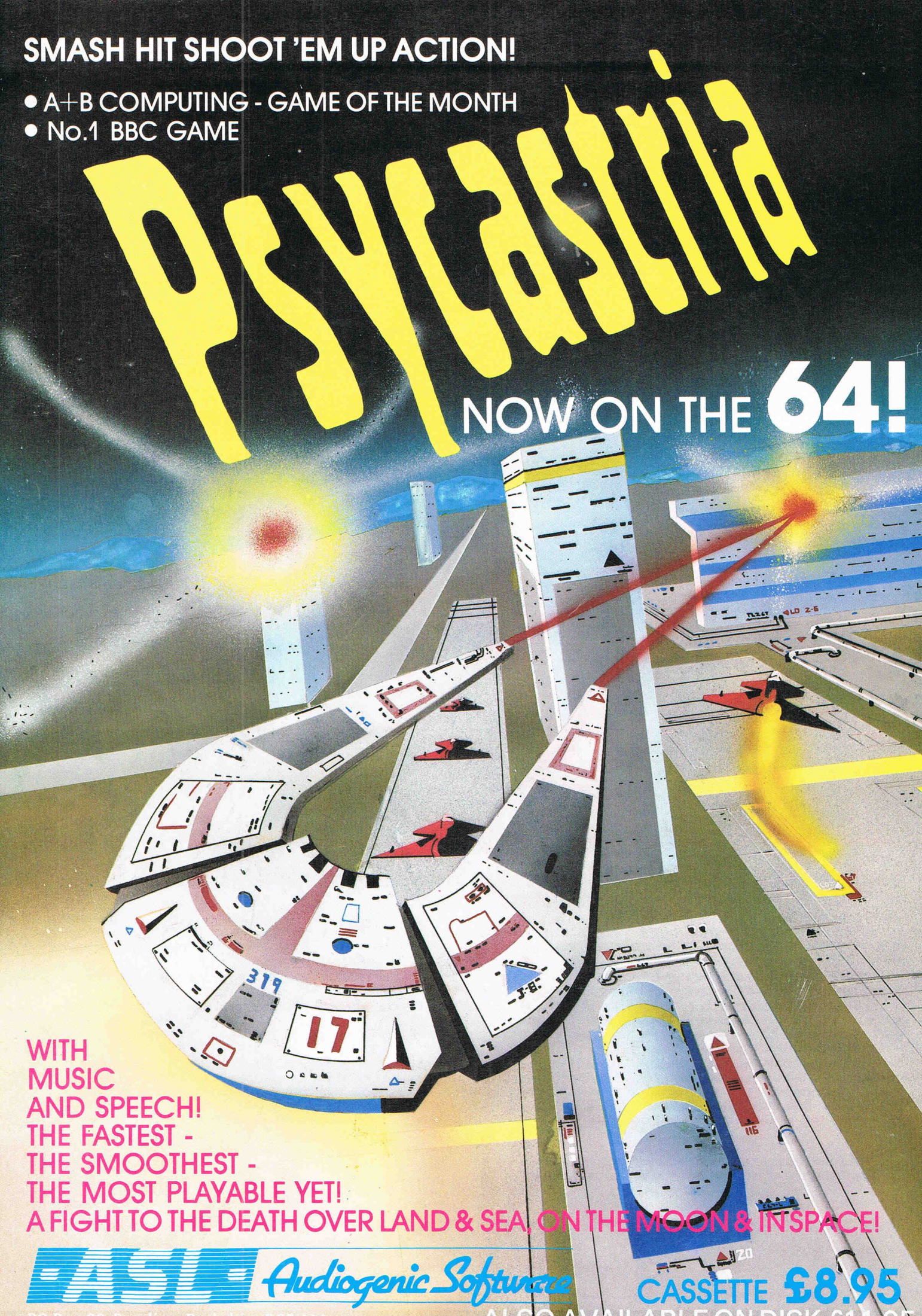

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