

YOUR

# COMMODORE

AN AMIGUS SPECIALIST PUBLICATION

AUGUST 1987 £1.00



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Based on the award-winning Car Wars board game by Steve Jackson.

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# DATA STATEMENTS

## Arcade Score

Imagine Software has released *Mag Max*, an arcade game for the C64, priced at £8.95 on cassette and £12.95 on disk.

The game is a conversion from a Nintendo coin-op machine and features the creation of the robot Mag Max and his life-saving mission.

The game is set on a once civilised planet, now ravaged by the Mechoids. Just before being annihilated, a team of scientists finishes the robot Max. However, the robot is split up with its body in a bunker and its vital components scattered around the planet. The player must collect all the pieces and reassemble against the enemy.

Starlight Software, the new label from Activision, was recently launched with the release of three titles. The new games are *Go-Go!*, *Starlight 2187* and *Devilscape*. There are two offers on the drawing board, *Red L&S* and *Spyfire*. All these releases are for the C64.

Martech is in the final stage of completing a new C64 title, *Mega-*



*Apocalyptic* programmed by Simon Nichol (above) with graphics by Bob Stevenson and music by Bob Hubbard.

*Martech* is now looking for skilled shoot 'em up artists to playtest the fast and furious new game. If you're interested you should write to Martech stating your scores in at least three of these classic shoot 'em ups: *Crazy Comets* (Martech), *Orbitron* (Hermann), *Delta* (Thalman) and *Prezone* (US Gold).

If you come up to scratch you will

be invited to a secret location to test the game and will get your name immortalised in the Galaxie Hall of Fame.

Granlin has released *Alien Evolution - the Story* set in the aftermath of a nuclear holocaust. The survivors are living in underground complexes and now after years of research have created an android, *Cyborg 64*, which should prove to be the answer to their prayers.

*Cyborg 64* must attempt to clear the Earth of the strange aliens which have made their home on the planet's surface since it was abandoned by the human race. However, the problem is great since when an alien is destroyed it can bevel ashes from its remains.

## Touchline

*Grease*: 6 Central Street, Mawleyville, BT2 5AS. Tel: 091 531 8018.

*Martech*: Mega-apocalyptic, Mawleyville, 6th Avenue, Ramsey Bldg, East Street, BT24 4EE. Tel: 0532 704216.

*Starlight*: 68 Long Lane, London WC2E 9EM. Tel: 0716 3411

*Granlin*: Alpha House, 10 Carver Street, Sheffield S7 4TS. Tel: 0747 751423.

## Amiga News

Triangle Television, the company which specialises in computer multi-media systems, has opened a new sales department exclusively dealing with Commodore Amiga systems.

Triangle's Peter Barrett said: "Our new department offers a complete range of facilities including Amiga sales, and a full range of software with a 24 hour mail order facility. We also offer a comprehensive Amiga Training programme for Audio Visual and business users and we have an exciting research and development section which is working on a new range of devices to exploit the full potential of the Amiga in the AV and Video environment."

Precision Software has slashed the price of the powerful *Superbase Personal* by a third.

*Superbase Personal* was launched

last autumn and since then 13,000 copies has been sold. The new low cost version was available at the Commodore Show in June. Previously £149.95, the package now costs £99.95 including VAT.

SSI has plans for four new games for the Amiga.

The titles to look out for are *Kangyape*, *Knights 260*, *Planetasy* and the new solo-playing adventure, *Phantoms III - the Wrath of Nihilensis*.

## Touchline

*Triangle*: 185 Broadwood Road, London SW19 5SD. Tel: 01 874 3418.

*Precision Software*: 6 Park Terrace, Worcester Park, Surrey KT4 5ZJ. Tel: 01 335 7166.

*SSI*: 15 Gold Close 2/7 Woodford Way, Redditch, Birmingham B9 7JX. Tel: 021 355 3388.

## Budget Games

Freight has recently launched two new games for Commodore owners, *Zephyr* is for the C64. The idea of the game is to fill 75 per cent of the screen by creating blocks of colour while avoiding fast moving white balls. The more action you fill the more points you score but as you progress on to higher levels there are more white balls whirling around to take a life away, and you only get four.

C64 owners will be delighted at finally getting their own version of the popular C64 title *Thrust*.

You are a dedicated member of the Resistance and are about to launch a big offensive against the Intergalactic Empire using captured warships. The problem is that the power supplies for the ships are still held in the Empire

storage plant and you have to retrieve them.

Both these Forbidden titles are on the Silver label and therefore are a mere £1.99.

Mastertronic also has two new releases, both for the C64.

*Frontier* is a fast shoot 'em up with 40 levels in which you must use your lethal Startron to blast your way through hordes of aliens before they reach the cross. This title costs £1.99.

*Outrigger*, the second C64 title from Mastertronic is £2.99. It is a Jeff Minter game in which you must blast away thousands of enemies while trying to learn up to 30 different types of ship formations.

#### Touchline

*Published:* 64 New Oxford Street, London WC1A 1PS. Tel: 01 379 8733.

*Manufactured:* 6-10 Paul Street, London EC2A 4DY. Tel: 01 377 6480.

#### Wargaming

Cascade games has released a Vietnam game based on the chess-topping Paul Hancock single of a couple of years ago, *Nitron*.

The game features a 19 year old soldier who must either try and avoid the draft or go and fight in Vietnam. If you try and avoid the draft the game becomes a text graphic adventure featuring the activities of the Peace Corps. If on the other hand you decide to go and fight, then you will be playing an arcade action game.

The game includes a soundtrack by Bob Hulbert and a coded version of the single.

PDS has released another wargames compilation, *Conflict II*. The new bumper pack features three games in the Great Battles of the Pacific theme.

*Conflict II* is for the C64 and the games included are: *Battle for Midway*, *Sea Area and Okinawa*. The last of these is a brand new title.

#### Adventure and Strategy

Virgin has released another game based on the interactive fiction books by Mark Smith and Jamie Thomson. The latest game in the series is *Jules - The Romantically Loner* and is the sequel to *The Way of the Tiger and Sturgeon*.

The player takes the role of Falcon, an agent of the Transpac Investigate and Monitoring Executive. The game is set in 3033 AD and there are eight different time zones to visit in order to collect important time artefacts. To complete the game the player must accomplish three missions.

Available on the C64/128, *Jules* is out on cassette at £9.95.

Fans of the *Ker* Trilogy from Incentive can now get all three adventures on disk for only £9.95. The trilogy comprises three separate adventures: *Downfall of Ker*, *People of Fear* and *The Final Mission*.

Orion has also released a game based on a popular book. *Tai-Pan* is set in the China of the 1840s and is based



Screen shot from the Spectrum version of "Tai-Pan"

on the novel of the same name by James Clavell.

Assuming the role of Dirk Struan who starts life as a porcelain trader, the player's objective is to become the Tai-Pan, a merchant prince of the Far East who accumulates riches beyond imagination.

*Tai-Pan* offers a variety of gameplay, either as a straight trading game, an arcade adventure or a shoot 'em up piracy operation.

It's available on Commodore cassette at £9.95 and disk at £12.95.



Screen shot from the Atari ST version of "Tai-Pan"

Activision has released a nuclear war game based on the American Star Wars defence policy. The player is in charge of the development and use of the SDI (Strategic Defense Initiative) system and their aim is to repel a Soviet nuclear attack. A comprehensive instruction booklet explains the principles behind Star Wars and details the types of weapons that such a system would have to deal with.

Written by Allen Steel, co-author of *Threats Europe*, *High Frontier* is available for the C64 on cassette at £9.99 and disk at £14.99.

#### Touchline

*Published:* 64 New Oxford Street, London WC1A 1PS. Tel: 01 379 8733.

*Manufactured:* 6-10 Paul Street, London EC2A 4DY. Tel: 01 377 6480.

*Published:* 23 Paul Street, London NW1 3PP. Tel: 01 491 1390.

#### Touchline

*Virgin Games:* 2-4 Vauxhall Yard, Pinnerville Road, London W11 2LJ. Tel: 01 737 8070.

*Incentive:* 2 Marvyn Avenue, Colford Park, Aldermaston, Berks RG7 4JW. Tel: 03356 77348.

*Orion:* 6 Central Street, Manchester M2 5BS. Tel: 061 832 6633.

## Tune Into Teletext

Microtext have announced the availability of their eagerly awaited tuner. A video is no longer required to receive Teletext like *Cafés* or *Oracle* on the Commodore 64/128.

The Microtext tuner is now available for use in the UK and has been designed specially for use with the Microtext Teletext adaptor; it uses an advanced tuning system - no more

fiddling with knobs as it tunes itself!

The system allows teletext pages to be saved to disk/tape or printed out and advanced users can access teletext from their own programs, providing endless possibilities. The teletext services hundreds of pages of up-to-the-minute information absolutely free.

The complete system consists of a

teletext adaptor, tuner, power supply, software on cassette (easily transferred to disk), connecting lead and a manual and costs £134.99 inc. p/p (plus £8.50 for 124d version).

### Facsimile

**Microtext:** 7 Strathclyde Close, Altonham, Hampshire PO9 5PH; Tel: 0765 202664.



## Get Lucky

The FA Cup Final at Wembley was a special occasion this year for Ian and Andrew Bagg. They were the winners of the Addictive/Prison *Football Manager* competition. The prize was a day out with Kevin Torrs, author of the game, at the FA Cup Final in which Coventry beat Tottenham Hotspur 3-2. Unfortunately, the Baggas are Spurs fans but they seem to have enjoyed their day despite the disappointing result.

Kevin Torrs said: "Although Spurs have achieved great success in Andrew's trying room, including the double, his first actual trip to Wembley didn't produce the scoreline he was looking for. I think, though, judging from the look on his face, that Andrew

enjoyed just being at Wembley for real."

Meanwhile on the TV, Rainbird's *Scrapble* has achieved national fame by being featured on Saturday morning's ITV children's program, *Get Fresh*. The game forms part of a competition called *Get Lucky* and there are three heats every morning in which *Scrapble* is played for 30 seconds. The competition continues until the end of August when the winners will carry off a Commodore Amiga system for their school.

### Facsimile

**Prison:** Eric J. Baird Road, Enfield, Middlesex EN1 1SE; Tel: 01 864 8180.

**Rainbird:** Day 1, Baird Road, Enfield, London N14 4PS; Tel: 01 240 8838.

## Communications

Comp-U-Card, the home computer shopping service, has announced a new online facility for Postal members.

New subscribers can dial up the Comp-U-Store at local telephone rates throughout the UK.

The service is part of a £1 million investment and as a further incentive, new members are being offered a three month free trial.

General manager, John Slater commented: "This additional service now offers our members faster, more direct access to our database of over 20,000 top name products, all guaranteed to be at the lowest available price. From May 1 a subscriber in John O'Grouts will be able to use the new system as economically as someone in our home town of Wincobur."

Compuart has announced the launch of *Profractor II*, its new multi-user space game. Commodore owners were first to give the game a try last month but owners of other computers only have to wait until the autumn. However owners of any micro can have a go in a limited single user demo version.

*Profractor II* is the biggest multi-user game ever written. It can handle up to 128 players at once and has up to 2000 locations, depending on the number of people playing.

*Profractor II* is multi-layered, it has exploration, trading, fighting and strategy and can be played on any of these levels.

## Touchline

**Comp-Ed-Cards** 1 Elm Court, Elm, Washou, Astoria 97103, Tel: 503 325 8035E.

**Computer 7-11** (Alameda Road, Lendale 98150) 644, Tel: 61 963 8886.

## Legal News

Software is once more making legal news with the setting up of the National Software Register.

Many people are confused about the law of copyright which is the only law currently in force which can protect the programmer's rights.

The NSR has been set up to establish evidence for programmer's when claiming copyright of a piece of software.

The law currently states that the moment a program is written then the copyright belongs to the author. The NSR will allow a programmer to gain a certificate of registration as soon as he sends a copy of his program to the register. On receipt of a program in hard format together with a standard fee, the NSR will make a copy for security purposes, storing the original and the copy in different locations. The author will receive a Certificate of Registration and the contents of the program will not be revealed except by permission of the author.

The Data Protection Act has recently come into force and despite a lot of publicity in the computer and the national press, many people are still uncertain as to what it can mean for them. A series of free booklets has been published by the Data Protection Registrar's office and these can be obtained by calling the number in Touchline.

## Touchline

**The National Software Register** 215 Chase Side, Exfield, Herts EN2 0RA, Tel: 07 367 8700.

**The Data Protection Registrar** Springfield House, Water Lane, Hildesley, Chichester SA9 3AT, Tel: 0823 323777.

## Technology and the Disabled

KPUG, the Independent Commodore Products Users Group, has recently appointed a Disability Liaison Officer, David Bate, to its National Committee.

David's brief is to provide assistance and advice to disabled computer users. One of his key functions is to advise disabled users what aids and adaptations are available, where they may be purchased, and how to obtain assistance from the DHSS or other organisations to procure them. To accomplish this David needs information from manufacturers and resellers of this type of equipment as well as feedback from users of these items.

Even people with a severe physical disability can use computers quite extensively and not least for things such as word processing and communications. Sometimes special keyboards or other input devices are required but in many cases only small aids are required which can make routine tasks like changing floppy disks or loading paper into a printer infinitely less frustrating.

If you (or your company) have items which may be of help to disabled computer users or if you have ever used any such devices please contact the KPUG Disability Liaison Officer, Mr. David Bate. Literature and free hand out information are always needed and welcome, but actual samples of an aid or adaptation are particularly useful as these may be evaluated in actual use. Any samples will be returned if requested.

This new KPUG aims to help the disabled help themselves. Any and all assistance will be greatly appreciated. It may be of interest that David is himself disabled and so has first hand knowledge of the problems faced by users like himself.

## Touchline

**KPUG Disability Liaison Officer** David Bate, 71 Bedford Road, Astoria, Herefordshire LN9 7BN.

## New Face at Commodore

Commodore Business Machines (UK) Ltd have recently appointed Steve Franklin to the position of General Manager to the Maidenhead based home and business personal computer company.

For the past two and a half years, Steve has been with Granada Business Centres as sales and marketing director and prior to this was national sales manager for the advanced systems division of Barn Knox.

Steve has had extensive experience in selling a vast range of IBM and compatible business systems, networks and peripherals. Combined with business and marketing flair, this will help to push the company's further towards into the business market place with the new Commodore Amiga A2000 and advanced PC series product ranges.

## Touchline

**Commodore Business Machines (UK) Ltd** Commodore House, The Southward, Gardner Road, Maidenhead, Berks SL6 7TA, Tel: 0628 7474.



Steve Franklin





# I.Q.

*If you hate slaying aliens and feel that you need something more intellectual to stimulate your grey matter then look over this selection of games.*

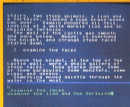
## BRIMSTONE

As adventure games become ever more sophisticated, it seems that calling them adventures just isn't good enough any longer. Infocom call their games interactive fiction, Broderbund have just released the electronic novel - or rather three of them. So just what do these games have to offer that warrants them being called something different?

Well to start with, they are all disk-based. This means that the stories can be bigger and better than tape-only games but it should be noted that American companies don't go in for text compression like, say, Level 9. But these again, these games take up three or four sides of disk.

Then there's the packaging. This is one area where the Yanks leave the Brits standing. You are just itching to take the boxes off the shelves and have a look inside them. As a bonus, it also makes the games that much harder to pirate. Backing up the disks is easy - indeed, they even suggest that you do so but it is not worth your while running off an extra copy for your friend as that, or the, needs all the extra bits and pieces in order to play. In the case of Electronic Novels, you get a 100 page hardback book containing details of storyline, illustrations, space for maps and summaries of the game's commands.

The games themselves are superbly constructed. The



descriptions are both lengthy and atmospheric. Smells and sounds abound, things that no illustration can ever depict. The puzzles too are both original and logical and succeed in drawing you into the story. The games feature an excellent and sophisticated parser and other characters in the plot exhibit a fair degree of independence.

A thesis in Obsolete Triangular Philology is enough to bore the pants off anyone and Jeremy Dodder is no exception. So one day, leaving aside all medical references

to Saint Blog, he inadvertently steals a manuscript all about Sir Gawain, one of King Arthur's Knights of the Round Table. Much more exciting although it does lead to Jeremy's arrest and imprisonment. However he has time to read the game to a leading software company, exchanging all software rights for an attempt to release him.

The year is 1317, the date, All Hallows. Gawain (i.e. you), is having trouble keeping his eyes open as Bedevere plucks at his hair. Quickly he drifts into a deep dream and awakes to God himself outside a castle. Getting in is no problem, but how does he get the magical suit of armour? He sees several people that he recognises, including Merlin Adam, his battle tutor, but there is something treacherous in the air and Gawain finds himself being tried by a court of demons.

Imprisoned in the same cell as a certain Javies (D'Arter), you manage to escape with the help of a bat-eared gargoyle. You are led to the entrance of the underworld with but twenty-four hours to make good your escape. If you are to succeed, you must first overcome such problems as the Green Knight, the White Apes and Magician Diska.

Bitstone leads you through the story, chapter by chapter. Likewise, the problems get that little bit harder as you progress so that you can get well and truly involved in the game before you get really stuck. G.R.H.

**Twinkle**

**Title:** *Beowulf Machine*; **OS:** - disk only **Supplier:** Beowulf/M/S Gold, **Costs:** £23, **Refined Waz:** £1100 **Age:** 16 **Price:** £24.99 **Originality:** 9/10 **Graphics:** 9/10 **Gameplay:** 9/10 **Value:** 9/10

## MINDWHEEL

The second electronic novel, *Mindwheel*, is a strange mixture of science fiction and fantasy. Civilisation in The Federated Nations is collapsing. Teenies are being ripped apart by packs of wild dogs. Biting and biting is the sport is rife. A link is discovered in a nerve gas stockpile. The apocalypse seems inevitable.

Only one man understands exactly what is going on. Doctor Virgil is looking for a volunteer to travel through time in order to retrieve the Wheel of Wisdom.

Doctor Virgil has been researching into neuro-matrix mind travel. By telepathically journeying through four different minds, you (for how could you fail to volunteer) can be transported to the Case Master, owner of The Wheel, at the very Dawn of Time.

You remember the Doctor throwing a switch in his laboratory, but your next awareness is that of being incense sage, accompanied by a backing group and in front of several thousand screaming fans. You are in the mind of Bobby Clemens, assassination rock star. A huge video screen above your head is showing close-ups of your death. A fan tries to climb up on stage and reach you but is deterred by a bulky bodyguard.

Although you have never been aware of any musical talent in your previous existence, the crowd obviously expect you to sing and, to your surprise, you soon find yourself playing the keyboards with words pouring out of your mouth. Not your own words, mind, but you are convinced of their significance to your future journey.

Barbette, a woman urges you to follow her, and you do so, up a winding staircase. A winged woman in a cage blocks your path and you have successfully answered a riddle. Only then are you free to enter a castle that lies beyond.

## AN ELECTRONIC NOVEL



The castle belongs to The Generalissimo, one of the more feared dictators of his time and the second of your four minds. Eventually executed for war crimes, his domain includes such problems as passing a guard, half of stone, half human, and answering yet another riddle. You go on to discover a tribe of animal-headed children.

There are yet two minds left for you to discover. A poet, composer of your culture's great epics and Dr Eva Foss, a sort of female Einstein who specialises in the manner of nature and was once a schoolmate of The Generalissimo... the plot of *Mindwheel* can best be summed up as weird, but the game is no less fascinating for that - even if I haven't got a clear what is going on. G.R.H.

**Twinkle**

**Title:** *Mindwheel Machine*; **OS:** - disk only **Supplier:** Beowulf/M/S Gold, **Costs:** £23, **Refined Waz:** £1100 **Age:** 16 **Price:** £24.99 **Originality:** 10/10 **Graphics:** 9/10 **Gameplay:** 9/10 **Value:** 9/10

## BREAKERS

The third of this month's Electronic Novels is uncharted science fiction. The planet Borg, hidden in the deep recesses of the outer tentacles of the Ring Nebula, is the home of the Las people. It is also a haven for evil.

Every sort of mind, criminal and drug seems to gravitate towards Borg at some stage in their career. The planet is

supposed to be a centre of intergalactic slave trading but this tends to be a cover for other criminal activities. Corruption is rife. Everybody is out to look after number one. As a Breaker, you fit admirably into the background.

There is a general air of panic around the bar when you are quietly getting drunk. The consultation Gabeo seems to be disappearing and tradition has it that when this happens, the planet will either be destroyed or saved. Are you interested or do you order another drink?



As there is not much of a game in the latter option, you immerse yourself in the role of hero yet again. The game begins with you trying to escape from the clutches of a Gak patrol that has just entered the bar. This is done with the aid of some friends although you are unsure as to how far you can trust them. You seek temporary refuge in the cellars below the bar.

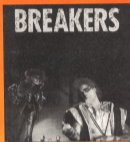
Have you find a strange red ball that seems reluctant to be picked up. There is also a newspaper cutting that should prove useful to you later on when you practice the ignoble arts of torture and interrogation. You soon discover that you are being followed by Naze Grey, although you don't have a clue why. Of more immediate concern to you is how much gold it costs to persuade a Gak to look the other way for a few minutes.

All these games work well because they are proper stories not a collection of loosely associated problems. The atmosphere within the game is expertly built up and the only major criticism that I can come up with is one that can't be

laid on Breakers itself. Everything is accessed from disk and, with the 1541 not being exactly renowned for its speed, playing the game doesn't exactly flow very smoothly. That apart though, all three Electronic Books are unreservedly recommended. C.R.H.

#### Touchline

*Title: Breakers Attack: C64 - disk only Supplier: Southland-USA Gold: Dorn 2/3, Redcat Way, Bham B6 2AL Price: £24.99 (Originals: 5/79) Graphics: N/A Playability: 5/10 Value: 5/10*



### ELECTION

It was inevitable that all the hype surrounding the General Election would spawn a computer game spin-off. It was also inevitable that it would be awful.

In this remarkably silly game you play either Member, Network, Gwing, Big Izan or the leader of the Idealist Party Daniel Pauls. The object of the game is to move your party leader on his head, anyway, around the game world, representing districts of a town in order to canvass for votes. You do this by asking for support or bribing with gifts or incentives (bread loaves, knight hoods, chains and gowns) in order to win 101 of the 199 votes available.

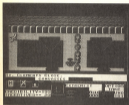
Once you've gained the support of one of the computer-controlled characters you can order them to either help you (i.e. follow you around), canvass another character on your behalf or stir another character or party leader. Stirring is essential if you're going to win the election as it weakens the target and they finally disappear leaving only a brown skin.

As the game proceeds you'll notice that even your own supporters will need convincing to keep them in line, that 101 votes is almost impossible to get, you'll be bored silly before you collect 50 votes—and the other party leaders come back alive when they've been destroyed.

Maybe by the next Election someone somewhere will have written a decent Election game. T.R.B.

**Touchline**

**Title:** Election. **Supplier:** Virgin. **3-D Peripherals:** Road London  
**RAM:** 255K. **Machine:** C64. **Price:** £9.95.  
**Originality:** 4/10. **Graphics:** 3/10. **Playability:** 6/10. **Value:**  
 5/10.

**TEMPLE OF TERROR**

The Fighting Fantasy books by Steve Jackson and Ian Livingstone are far and away the best-selling children's books in this country. It's therefore a natural progression to translate them to computer format.

The idea behind the books is that as you follow the story, you are often presented with a number of choices. Depending on your choice, you are referred to numbered paragraphs which in turn continue the story and lead to further choices. The action includes combat sequences which can be resolved by rolling dice.



Temple of Terror employs a fantasy setting in which you must search for five Dragons a relict which have lain hidden for centuries in the lost city of Valok. The reason for your quest is to prevent the dark elf, Malboncha, finding the

treasures first. It might complete his mastery of the dark arts...As is usual in this type of game, you are the only one who's hardly enough to rob them.

Frankly the game is dreadful. Little or no atmosphere is created. The graphics are nothing special. The parser is made by modern standards and there are several spelling mistakes which give the whole thing an amateurish feel.

What is worse is that US Gold expect you to fork out nearly ten quid for the game. Fine if it were worth it but object to paying more a budget price for this. Incidentally this is no reflection on Jackson and Livingstone. The books are excellent value for money. Go and buy a few of them instead.

G.R.H.

**Touchline**

**Title:** Temple of Terror Machine: C64  
**Supplier:** US Gold. **Units:** 2/2. **Medium:** Wp. **RAM:** 255  
**RAM:** 255K. **Price:** £9.95.  
**Originality:** 4/10. **Graphics:** 3/10. **Playability:** 4/10. **Value:**  
 3/10.

**THE SHADOWS OF MORDOR**

If you think hobbits are habit-forming and you have nightmares about orcs, halibogs and ring waiters then you'll have already noticed The Hobbit and the first part of Lord of the Rings. The Shadows of Mordor continues this epic tale in part two of the three game series.

As in part one you control hairy hobbit heroes Sam and Frodo as they continue their quest to destroy the ring of power that controls and enslaves all others. As the game begins Frodo and Sam have left their companions on an island in the middle of a lake and have secretly gone on alone to continue their quest. Their objective is to cross the desolate wastelands and survive the trek through the evil mountains that surround Sauron's homeland.

The Shadows of Mordor is a traditional adventure with a vocabulary of over 800 words. Unlike the first game and, indeed, The Hobbit, this game is mainly text with only a few crude graphic screens to illustrate Tolkien's Middle Earth. Consequently it relies heavily on its text descriptions and improved interaction with the other characters. Now you can give Sam a whole string of commands instead of entering them one at a time. Whether he carries them out or not is another matter and depends on his state of health and hunger. Similarly, you could take the role of Sam and order Frodo instead or if you're feeling brave you could control both directly and swap between them using the Become... command. Obviously, this adds dramatically to your problems and so it's best to allow the computer to take care of the other until you know your way around.

The game is supplied in a massive box containing the second book in the series that may provide some useful tips and, of course a map of the area. The game does differ from the book, but only to provide a better game rather than an Adrian Mole style multiple-choice story.

Unlike the first game that lacked dynamism because of the book's plot the action really does up as the end of the quest is at last in sight (although you'll have to wait until part three to have at last the chance to destroy The Ring in the Crack of Doom).

If you've played Lord of the Rings then you'll notice that the emphasis of this game is towards adventuring, which should please Tolkien fans. Perhaps the last part of Lord of the Rings will be text only?

T.H.

**Touchline**

**Title:** *The Master of Atlantis, Supplies: Macintosh/Softsource Name, 8-70 Paul Street, London WC2P 6NN  
**Machine:** C4d Price £12.99 - Disk £9.99 - Cassette  
**Originality:** 8/10 **Playability:** 7/10 **Graphics:** 4/10 **Value:** 7/10*

**BUREAUCRACY**

What could possibly go wrong? You've just landed a great job at the Happies corporation, moved to a new town, and are about to leave on a two week trip to Paris which is being paid for by your new employer. What could go wrong? Everything! Your bank refuses to accept your change of address form and won't send you another one, Happies has sent your tickets to your old address where the new owner has just discovered the dry rot and has decided to forward your post to the bank instead and you have to be at the airport this afternoon! This could only happen in a Douglas Adams story that just happens to be part of an Infocom adventure called *Bureaucracy*.

This dynamic combination has already produced the adventure version of the Hitchhiker's Guide to the Galaxy. This time you must battle through a sea of red tape.

The game disk is accompanied by the usual high quality Infocom packaging that includes a letter from Happies, the first issue of *Popular* magazine and an application form for the Rover credit card. This form is an example of the tedious but all-too-familiar Douglas Adams bureaucracy that you'll have to face in the game as it consists of an original and two carbon copies which have different questions and, more important, conditions of use. For example, on the original you agree to pay any charges against your account, but on the copies you agree not to use the card to buy anything and to let three men pose suits for anything anywhere leaving you to pay the bill!

Unfortunately, you can't start playing the game until you've filled in another on-screen registration form that prompts you for answers such as your name, address, girlfriend's name, job before the last one and previous girlfriend. This information is then used to 'personalise' the game and also cluster up your answer phone with messages to remind your blood pressure soaring. If your blood pressure gets too high then you lose the game as you blow your top. However, that's going to be more than solving the game and dealing with unwieldy salesmen, bank tellers that direct you to closed counters, people who answer in a language you can hear them when you phone, a fancy parrot, an old lady with a shotgun and a waitress in a restaurant who takes your order (burger, what type?, fries or jacket potatoes, salad, which dressing etc. etc.) then goes off duty leaving you to repeat the order - only to be brought the exact opposite.

This may sound amusing - and it is - but it's also incredibly funny and a challenging sequel to the legendary Hitchhiker's Guide. Unfortunately, as if part of the plot, the game is only available on machines supporting 128K so C4d owners can't play it. Now you've got no-one to turn to get an Amiga or a C128. If that fails find a friend with one, they'll need the help!

T.H.

**Touchline**

**Title:** *Bureaucracy, Supplies: Infocom (Distribution) Machine: C128 Price £14.99  
**Originality:** 8/10 **Graphics:** 8/10 **Playability:** 8/10 **Value:** 8/10*

**CARMEN SANDIEGO**

Here's your chance to do a bit of detective work and break up on geography at the same time. Carmen Sandiego is the leader of a gang of art thieves, international terrorists and general no-no-don'ts.

Your mission starts with a note from Interpol giving details of a recently important art treasure that has just been killed. Immediately jettisoned to the scene of the crime, you find that there are three possible places to investigate. These will give you clues as to the next stop on the thief's itinerary. Each investigation takes time though and you only have until the end of the week to catch up with your suspect. When you think that you know where he or she has flown to, you can go and catch a plane. Remember that plane searches and sleeping also eat away at your available hours.

As well as following your suspect, you also have to make a positive identification and get the necessary arrest warrant issued. As you investigate, you will pick up clues as to the personal habits of your adversary and these can be fed into the Interpol computer. For example, you may find that there are two men who have brown and black hair - but only one of them plays cricket.

The clues range from the simple to the impossible - but help is at hand. Accompanying the package is a *World Almanac* - nearly 1000 pages of closely packed information and it is from here that you are supposed to find out your answers. For example, which nation has stamps as its major export or even where Kigali or Montreal are. Your clues include currency, flags, industries, provinces and famous landmarks.

When you catch up with a thief, meaning you have a warrant, the criminal is arrested and your record updated. Solve enough cases and you earn promotions. The game is sleekly presented - all menu-driven with some nice cartoon graphics. My only real grumble is that extracting the information from the Yearbook is not particularly easy. Perhaps a database on disk could have been included instead. Even so, the format works well and should appeal to anyone revising for O-Level geography. Perhaps *Broderbund* may like to consider a 'Where in Britain...' series.

G.H.H.

**Touchline**

**Title:** *Where in the World is Carmen Sandiego? Machine: C4d, disk only. Supplies: Broderbund/MS Gold, Units 2/1, Watford Way, Watton 85 74X. Price: £29.99  
**Originality:** 8/10 **Graphics:** 7/10 **Playability:** 8/10 **Value:** 8/10*

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# Facing Up To Printers

*If you're bored with Commodore's own product, a printer interface may be what you need. We look at one of the options.*

*By Eric Doyle*

**G**ee whiz! I wish I could afford a printer but the thought of an extra \$90 or more for an interface really puts me off. Although Supra's G-Wiz is not dirt cheap it certainly saves on what you could be paying. After all what's \$30 on the cost of a printer?

Any serious computer user will always reach a point where they wish they had access to a printer. For many this means dishing out to buy one of the Commodore range of machines as soon as funds permit. A Commodore printer is like a Chinese meal, you soon wish you had ordered for something more filling and once again you wish you had a printer!

The answer is not to dash out to the shops but to sit and think for a while. Before long you realize that there are better printers on the market but how can they be hooked up to the C64? Nearly all of the possible candidates are parallel printers but the C64 only supports serial connection. The answer to this problem involves more expense: buy a serial/parallel interface.

The thought of more codes and switches could strike fear into the heart of the bravest programmer but the interface is probably one of the most user friendly pcd-ems available. G-Wiz is certainly that.

## Open the Box

The G-Wiz interface is a box measuring 142mm x 90mm x 25mm. Three cables from the main unit terminate in suitable connectors for the printer, the serial port on the C64 and a cassette port connector which taps off a power supply for the interface. Don't worry the power

connector still allows you to plug the cassette recorder in.

There are two basic modes for accessing your printer through this device. First and most famous is the transparent mode. In this case you can use the printer as a normal printer for use with software which has all of the necessary conversion software built in. It is also necessary for the correct operation of some advanced graphics modes which certain printers possess.

The second and more usual mode is IS25 emulation. This is an example of a double bluff. The C64 thinks it is talking to a Commodore VIC 1525 printer and the printer thinks it is talking to any old computer. The unit's in-built emulator translates the Commodore ASCII characters into Standard ASCII and the normal file opening and commands which are only addressable to a 1525 may be used. More than this, the special codes for specific printer features such as italic, condensed, underline and supersubscript modes can still be used.

The unit is designed to give compatibility with a wide range of printers: Star, Epson, Gaketa, Smith Corona Faxnet 80, Pro-Writer, NEC, Panasonic amongst others. The problem with such a solution is that the interface has to be that much more generic. Some printers need line feeds, other have three built in, you may want the printer as Device 4 or you may prefer Device 5. To combat this there is a bank of eight switches on the rear of the interface. A checklist of printers and corresponding switch settings is given on the unit itself as well as in the comprehensive 96 page manual.

## Peculiar Commands

Another advantage of the G-Wiz is its ability to convert the peculiar commands in PRINT statements into recognisable codes when printing was listings. For example, instead of a reversed beam for clearing the screen the listing would show the following [CLR]. In this way the interface solves a lot of the problems inherent with the standard Commodore printer's method of displaying listings.

The best test of an interface is whether you realize it's there or not. In tests I found that I could forget about the printer most of the time but the one time it needed attention I was glad of it! When using the Superscript word processor I was able to send the command 'LOCK' which means that the interface is effectively switched to transparent mode. This means that I can tell the program that I'm using a particular printer and use all of the facilities to produce a professional look to my documents.

The only problem with looking up the unit is that it can only be unlocked by unplugging the cassette interface and then plugging it back in. If the computer is powered up at the time, clumsy hands could cause a short and damage the computer. I would suggest that the first thing to do is to fit an on/off switch on the power supply cable to overcome this danger.

G-Wiz is a superb unit which does all that I need, the manual is not only clear but also includes hints and tips which I have not found anywhere else. At such a reasonable price it should prove a good investment for your current printer, and one you may upgrade to in the future.

□





# The Advanced Art Studio

*We look at the latest in computer art for the masses.*

*By Tony Hetherington*



There is a vast horde of CGA graphics packages and hardware add-ons. One of the best is Rainbow's recent Art Studio. This has now been extended to form the Advanced Art Studio and sold with the original in the same pack with two manuals and two tapes or disks.

The original Art Studio is an easy-to-use, pull-down menu driven package that allows you to draw shapes, select colours, define and alter windows and paint in a variety of user-definable brushes without taking your eyes off your screen.

Each option is accessed through a series of pull-down menus that are listed in a bar that occupies the top two lines of the screen (these lines can still be used as the screen can be scrolled down to reveal them).

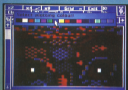
From the Shapes menu you can select for individual points, straight lines, rectangles, triangles, circles and arcs. The position and size of the shape is displayed before you commit it to screen. These shapes can then be magnified 1/4 or 8 times to add fine detail, filled with colour and mixed with some different text sizes that can be custom designed with a font editor.

Although the Art Studio is fast and easy to use it does have its limitations with the main one being the use of

colour. Although graphics can be drawn in high-resolution mode, pixel by pixel, colour can only be applied in an 8-bit or even one character at a time. It 'smudged' badly if two different ink colours are too close together. The results are highly detailed but bland. The Advanced Art Studio set out to put this right by operating in multi-colour mode in which up to three ink colours can share a 4 bit colour cell with a standard background colour.

Colours for inks are selected from the colour menu that can also be used to establish priorities should the three ink colour limit be exceeded. Then the top three colours in the priority list are displayed. You can also list colours in a second list that should be excluded from operations such as paint or clear. For example, if you draw a rough sketch in white and then mess up the rest of the drawing you could exclude white, then clear a window (that could be set to the full screen), and restore your original white outline.

As in the original Art Studio you can define the patterns that can form the Studio's brush tray with a lot more scope. In the Advanced Art Studio the brush can be as large as 12 x 16 pixels and contain three ink colours. These can then be used as a normal brush and modified by the exclusion command that can take out one or more colours and so



change the pattern. Of course, the same is also true of fill patterns that can be used to create a crossed scene from a single pattern in under a minute!

Once you've created your elements using brushes or shapes you can define them as a window and then save them to tape and disk to form a picture library. This can be used later to produce pictures from ready-made clip art.

Other minor changes include the fact that to change the fill and pattern menus to represent what they will do to your screen. You can also print out right to left and upwards as well as left to right and downwards. Unfortunately, not all the changes are for the best. Text can be written on the screen



in different sizes by changing the x and y ratios. However, the original Art Studio offered single, double and triple height and width characters so that there's no difference except that standard character set is more boring. Luckily, there's still a font editor so you can edit it back to the size it was before it was 'improved'.

Both versions of the Art Studio are quick and simple to use, can be customised to your own needs and represent excellent value under £25 for both.

#### TOUCHLINE

**Title:** Advanced OCP Art Studio. **Price:** £24.95. **Supplier:** Touchline. **Tel:** 01-261 261 261.

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# Diskit 6

*This disk special will enable you to speed up the rate at which you can copy files from disk to disk.*

*By Les Allen*

**T**his utility enables selected files of up to 255 blocks in length to be transferred between diskettes. The DESTINATION diskette must be formatted prior to use.

#### In Use

Boot up the utility, insert the SOURCE disk into the drive, press

RETURN and select Y or N to choose files to copy.

As many files as can be completely loaded into memory will be loaded. At the prompt insert the DESTINATION disk to save, repeating the process as many times as necessary.

Data transfer is at a speed of approximately six times normal load and save rates.

The program as listed must be typed in exactly as written and is not prior to running. Error trap routine is included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of \$0000 and when prompted relocates the working program to Basic (\$090) and saves to disk the program FAST FILE COPIER. TO

PROGRAM: FAST FILE BOOT	58	15 PRINTSPC\$(CODE\$(18)*"D-SP	1700+STR\$(000-00-7
18 10 W1=12788-40*(ACT\$(0)-0	62	22 PRINTSPC\$(CODE\$(18)*"S)SP	20 PRINTPC\$(CODE\$(5)*"READING
21 PRINTCODE\$(DATA\$(0)\$(14)*	10,00	25 PRINT" THIS ROUTINE REARS	MEMORY BLOCK ..." $\backslash$ PRINTPC\$(
22 10 FORI=1 TO FORI\$(4, 120-FORI	48	26 PRINT" THE DATA STATEMENT)"	28 10 FORI=1, 200 TO 1000-01+1000
120-FORI, 10-FORI\$(0), 10	42	25 PRINT" CONVERTS FROM HEX	-00-00+L8:1P01-00700010
10 PRINT	88	18 BINARY AND FORKUP"	10 1000-10000000 10
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	17	22 PRINT	14 PRINT"CODE FROM (0000 + 00
15 PRINTSPC\$(CODE\$(18)*"D-SP	62	22 PRINT" CODE BACK TO THE	010 DATA STATEMENT)" PRINTPC\$(
16 10 W1=12788-40*(ACT\$(0)-0	82	20 PRINT" WHICH IS WAS FOR	RELOCATED
17 PRINTCODE\$(DATA\$(0)\$(14)*	18	20 PRINT" VISIBLY GENERATED."	02 10 PRINT" BIT RETURN TO HAVE
120-FORI, 10-FORI\$(0), 10	14	10 PRINT:PRINT	COMPLETED PROGRAM"
10 PRINT	50	10 BEEP\$(0)	01 40 GETKEY\$:IFKEY\$="000015)TS
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	58	10 PRINT" WHICH IS WAS FOR	0000
15 PRINTSPC\$(CODE\$(18)*"D-SP	14	10 PRINT:PRINT	24 51 00000000
16 10 W1=12788-40*(ACT\$(0)-0	50	10 BEEP\$(0)	30 51 :
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 PRINT" WHICH IS WAS FOR	45 10 000000000000000000000000
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	0000000000000000000000000000
10 PRINT	58	10 BEEP\$(0)	24 01 :
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT" WHICH IS WAS FOR	45 DATA 00,00,00,00,00,00,00,01,
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	30,30,31,00,00,00,00,00,00
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
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15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
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120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
17 PRINTCODE\$(DATA\$(0)\$(14)*	58	10 BEEP\$(0)	
120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
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120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
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16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
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120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
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16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
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120-FORI, 10-FORI\$(0), 10	50	10 PRINT:PRINT	
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14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1=12788-40*(ACT\$(0)-0	50	10 PRINT:PRINT	
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10 PRINT	58	10 BEEP\$(0)	
14 PRINTSPC\$(CODE\$(18)*"D,S)SP	50	10 PRINT:PRINT	
15 PRINTSPC\$(CODE\$(18)*"D-SP	58	10 BEEP\$(0)	
16 10 W1			



00	BA	DA	EA	FA	GA	HA	IA	JA	KA	LA	MA	NA	OA	PA	QA	RA	SA	TA	UA	VA	WA	XA	YA	ZA
01	BB	DB	EB	FB	GB	HB	IB	JB	KB	LB	MB	NB	OB	PB	QB	RB	SB	TB	UB	VB	WB	XB	YB	ZB
02	BC	DC	EC	FC	GC	HC	IC	JC	KC	LC	MC	NC	OC	PC	QC	RC	SC	TC	UC	VC	WC	XC	YC	ZC
03	BD	DD	ED	FD	GD	HD	ID	JD	KD	LD	MD	ND	OD	PD	QD	RD	SD	TD	UD	VD	WD	XD	YD	ZD
04	BE	DE	EE	FE	GE	HE	IE	JE	KE	LE	ME	NE	OE	PE	QE	RE	SE	TE	UE	VE	WE	XE	YE	ZE
05	BF	DF	EF	FF	GF	HF	IF	JF	KF	LF	MF	NF	OF	PF	QF	RF	SF	TF	UF	VF	WF	XF	YF	ZF
06	CG	DG	EG	FG	GG	HG	IG	JG	KG	LG	MG	NG	OG	PG	QG	RG	SG	TG	UG	VG	WG	XG	YG	ZG
07	CH	DH	EH	FH	GH	HH	IH	JH	KH	LH	MH	NH	OH	PH	QH	RH	SH	TH	UH	VH	WH	XH	YH	ZH
08	CI	DI	EI	FI	GI	HI	II	JI	KI	LI	MI	NI	OI	PI	QI	RI	SI	TI	UI	VI	WI	XI	YI	ZI
09	CJ	DJ	EJ	FJ	GJ	HJ	IJ	JJ	KJ	LJ	MJ	NJ	OJ	PJ	QJ	RJ	SJ	TJ	UJ	VJ	WJ	XJ	YJ	ZJ
10	CK	DK	EK	FK	GK	HK	IK	JK	KK	LK	MK	NK	OK	PK	QK	RK	SK	TK	UK	VK	WK	XK	YK	ZK
11	CL	DL	EL	FL	GL	HL	IL	JL	KL	LL	ML	NL	OL	PL	QL	RL	SL	TL	UL	VL	WL	XL	YL	ZL
12	CM	DM	EM	FM	GM	HM	IM	JM	KM	LM	MM	NM	OM	PM	QM	RM	SM	TM	UM	VM	WM	XM	YM	ZM
13	CN	DN	EN	FN	GN	HN	IN	JN	KN	LN	MN	NN	ON	PN	QN	RN	SN	TN	UN	VN	WN	XN	YN	ZN
14	CO	DO	EO	FO	GO	HO	IO	JO	KO	LO	MO	NO	OO	PO	QO	RO	SO	TO	UO	VO	WO	XO	YO	ZO
15	CP	DP	EP	FP	GP	HP	IP	JP	KP	LP	MP	NP	OP	PP	QP	RP	SP	TP	UP	VP	WP	XP	YP	ZP
16	CQ	DQ	EQ	FQ	GQ	HQ	IQ	JQ	KQ	LQ	MQ	NQ	OQ	PQ	QQ	RQ	SQ	TQ	UQ	VQ	WQ	XQ	YQ	ZQ
17	CR	DR	ER	FR	GR	HR	IR	JR	KR	LR	MR	NR	OR	PR	QR	RR	SR	TR	UR	VR	WR	XR	YR	ZR
18	CS	DS	ES	FS	GS	HS	IS	JS	KS	LS	MS	NS	OS	PS	QS	RS	SS	TS	US	VS	WS	XS	YS	ZS
19	CT	DT	ET	FT	GT	HT	IT	JT	KT	LT	MT	NT	OT	PT	QT	RT	ST	TT	UT	VT	WT	XT	YT	ZT
20	CU	DU	EU	FU	GU	HU	IU	JU	KU	LU	MU	NU	OU	PU	QU	RU	SU	TU	UU	VU	WU	XU	YU	ZU
21	CV	DV	EV	FV	GV	HV	IV	JV	KV	LV	MV	NV	OV	PV	QV	RV	SV	TV	UV	VV	WV	XV	YV	ZV
22	CW	DW	EW	FW	GW	HW	IW	JW	KW	LW	MW	NW	OW	PW	QW	RW	SW	TW	UW	VW	WW	XW	YW	ZW
23	CX	DX	EX	FX	GX	HX	IX	JX	KX	LX	MX	NX	OX	PX	QX	RX	SX	TX	UX	VX	WX	XX	YX	ZX
24	CY	DY	EY	FY	GY	HY	IY	JY	KY	LY	MY	NY	OY	PY	QY	RY	SY	TY	UY	VY	WY	XY	YY	ZY
25	CA	DA	EA	FA	GA	HA	IA	JA	KA	LA	MA	NA	OA	PA	QA	RA	SA	TA	UA	VA	WA	XA	YA	ZA
26	CB	DB	EB	FB	GB	HB	IB	JB	KB	LB	MB	NB	OB	PB	QB	RB	SB	TB	UB	VB	WB	XB	YB	ZB
27	CC	DC	EC	FC	GC	HC	IC	JC	KC	LC	MC	NC	OC	PC	QC	RC	SC	TC	UC	VC	WC	XC	YC	ZC
28	CD	DD	ED	FD	GD	HD	ID	JD	KD	LD	MD	ND	OD	PD	QD	RD	SD	TD	UD	VD	WD	XD	YD	ZD
29	CE	DE	EE	FE	GE	HE	IE	JE	KE	LE	ME	NE	OE	PE	QE	RE	SE	TE	UE	VE	WE	XE	YE	ZE
30	CF	DF	EF	FF	GF	HF	IF	JF	KF	LF	MF	NF	OF	PF	QF	RF	SF	TF	UF	VF	WF	XF	YF	ZF
31	CG	DG	EG	FG	GG	HG	IG	JG	KG	LG	MG	NG	OG	PG	QG	RG	SG	TG	UG	VG	WG	XG	YG	ZG
32	CH	DH	EH	FH	GH	HH	IH	JH	KH	LH	MH	NH	OH	PH	QH	RH	SH	TH	UH	VH	WH	XH	YH	ZH
33	CI	DI	EI	FI	GI	HI	II	JI	KI	LI	MI	NI	OI	PI	QI	RI	SI	TI	UI	VI	WI	XI	YI	ZI
34	CJ	DJ	EJ	FJ	GJ	HJ	IJ	JJ	KJ	LJ	MJ	NJ	OJ	PJ	QJ	RJ	SJ	TJ	UJ	VJ	WJ	XJ	YJ	ZJ
35	CK	DK	EK	FK	GK	HK	IK	JK	KK	LK	MK	NK	OK	PK	QK	RK	SK	TK	UK	VK	WK	XK	YK	ZK
36	CL	DL	EL	FL	GL	HL	IL	JL	KL	LL	ML	NL	OL	PL	QL	RL	SL	TL	UL	VL	WL	XL	YL	ZL
37	CM	DM	EM	FM	GM	HM	IM	JM	KM	LM	MM	NM	OM	PM	QM	RM	SM	TM	UM	VM	WM	XM	YM	ZM
38	CN	DN	EN	FN	GN	HN	IN	JN	KN	LN	MN	NN	ON	PN	QN	RN	SN	TN	UN	VN	WN	XN	YN	ZN
39	CO	DO	EO	FO	GO	HO	IO	JO	KO	LO	MO	NO	OO	PO	QO	RO	SO	TO	UO	VO	WO	XO	YO	ZO
40	CP	DP	EP	FP	GP	HP	IP	JP	KP	LP	MP	NP	OP	PP	QP	RP	SP	TP	UP	VP	WP	XP	YP	ZP
41	CQ	DQ	EQ	FQ	GQ	HQ	IQ	JQ	KQ	LQ	MQ	NQ	OQ	PQ	QQ	RQ	SQ	TQ	UQ	VQ	WQ	XQ	YQ	ZQ
42	CR	DR	ER	FR	GR	HR	IR	JR	KR	LR	MR	NR	OR	PR	QR	RR	SR	TR	UR	VR	WR	XR	YR	ZR
43	CS	DS	ES	FS	GS	HS	IS	JS	KS	LS	MS	NS	OS	PS	QS	RS	SS	TS	US	VS	WS	XS	YS	ZS
44	CT	DT	ET	FT	GT	HT	IT	JT	KT	LT	MT	NT	OT	PT	QT	RT	ST	TT	UT	VT	WT	XT	YT	ZT
45	CU	DU	EU	FU	GU	HU	IU	JU	KU	LU	MU	NU	OU	PU	QU	RU	SU	TU	UU	VU	WU	XU	YU	ZU
46	CV	DV	EV	FV	GV	HV	IV	JV	KV	LV	MV	NV	OV	PV	QV	RV	SV	TV	UV	VV	WV	XV	YV	ZV
47	CW	DW	EW	FW	GW	HW	IW	JW	KW	LW	MW	NW	OW	PW	QW	RW	SW	TW	UW	VW	WW	XW	YW	ZW
48	CX	DX	EX	FX	GX	HX	IX	JX	KX	LX	MX	NX	OX	PX	QX	RX	SX	TX	UX	VX	WX	XX	YX	ZX
49	CY	DY	EY	FY	GY	HY	IY	JY	KY	LY	MY	NY	OY	PY	QY	RY	SY	TY	UY	VY	WY	XY	YY	ZY
50	CA	DA	EA	FA	GA	HA	IA	JA	KA	LA	MA	NA	OA	PA	QA	RA	SA	TA	UA	VA	WA	XA	YA	ZA
51	CB	DB	EB	FB	GB	HB	IB	JB	KB	LB	MB	NB	OB	PB	QB	RB	SB	TB	UB	VB	WB	XB	YB	ZB
52	CC	DC	EC	FC	GC	HC	IC	JC	KC	LC	MC	NC	OC	PC	QC	RC	SC	TC	UC	VC	WC	XC	YC	ZC
53	CD	DD	ED	FD	GD	HD	ID	JD	KD	LD	MD	ND	OD	PD	QD	RD	SD	TD	UD	VD	WD	XD	YD	ZD
54	CE	DE	EE	FE	GE	HE	IE	JE	KE	LE	ME	NE	OE	PE	QE	RE	SE	TE	UE	VE	WE	XE	YE	ZE
55	CF	DF	EF	FF	GF	HF	IF	JF	KF	LF	MF	NF	OF	PF	QF	RF	SF	TF	UF	VF	WF	XF	YF	ZF
56	CG	DG	EG	FG	GG	HG	IG	JG	KG	LG	MG	NG	OG	PG	QG	RG	SG	TG	UG	VG	WG	XG	YG	ZG
57	CH	DH	EH	FH	GH	HH	IH	JH	KH	LH	MH	NH	OH	PH	QH	RH	SH	TH	UH	VH	WH	XH	YH	ZH
58	CI	DI	EI	FI	GI	HI	II	JI	KI	LI	MI	NI	OI	PI	QI	RI	SI	TI	UI	VI	WI	XI	YI	ZI
59	CJ	DJ	EJ	FJ	GJ	HJ	IJ	JJ	KJ	LJ	MJ	NJ	OJ	PJ	QJ	RJ	SJ	TJ	UJ	VJ	WJ	XJ	YJ	ZJ
60	CK	DK	EK	FK	GK	HK	IK	JK	KK	LK	MK	NK	OK	PK	QK	RK	SK	TK	UK	VK	WK	XK	YK	ZK
61	CL	DL	EL	FL	GL	HL	IL	JL	KL	LL	ML	NL	OL	PL	QL	RL	SL	TL	UL	VL	WL	XL	YL	ZL
62	CM	DM	EM	FM	GM	HM	IM	JM	KM	LM	MM	NM	OM	PM	QM	RM	SM	TM	UM	VM	WM	XM	YM	ZM
63	CN	DN	EN	FN	GN	HN	IN	JN	KN	LN	MN	NN	ON	PN	QN	RN	SN	TN	UN	VN	WN	XN	YN	ZN
64	CO	DO	EO	FO	GO	HO	IO	JO	KO	LO	MO	NO	OO	PO	QO	RO	SO	TO	UO	VO	WO	XO	YO	ZO
65	CP	DP	EP	FP	GP	HP	IP	JP	KP	LP	MP	NP	OP	PP	QP	RP	SP	TP	UP	VP	WP	XP	YP	ZP
66	CQ	DQ	EQ	FQ	GQ	HQ	IQ	JQ	KQ	LQ	MQ	NQ	OQ	PQ	QQ									





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## A500 NOW IN STOCK!

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### PRIM

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- Parity Logic

### TV-Test

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# Stop Press



Mice, icons, pointers and menus are all part of this package. Tony Hetherington investigates the latest in desktop publishing.

*The Amx Mouse package contains a three button mouse and a disk containing Stop Press packed full of fonts and graphics that allow you to produce professional looking newspapers, posters and leaflets using your C64.*

*The package uses the Wimp system (Windows, Icons, Menus and Pointers) that was pioneered on machines like the Mac, to allow you to easily mix text in a variety of different typefaces and run it around graphic*



*shapes such as rectangles, circles and triangles as well as a*

*bewildering library of clip art. To show that the system actually works I used the package to create this article.*

*Once the program has loaded the standard Stop Press screen appears with it's work area flanked by a list of function icons and*



*below the label windows that list the available options for a selected function. For example, if you select the files function the labels windows will contain the options to LOAD either an entire page, font or cutout artwork. The work area window displays a fraction of the page that you are*

working on and can be scrolled by selecting the up or down arrow functions or can be placed in a specific area by moving the window over the preview screen of the full page.

When you've selected the area you wish to work on you can use the other functions to create, paint and fill shapes created from lines, rectangles and circles, enter text in any of the 50 different fonts supplied with Stop Press, edit your efforts by cutting, pasting and stretching any defined window and print out



a window, the screen, or the full page on a variety of supported printers.

A Stop Press page is stored on disk as a bit pattern which can cause problems particularly when your entering text. Once you've entered a line it is "written" to the page and cannot be edited as you could in a normal word processor. This is

fine if you're only writing headlines or picture captions but for a sizable block of text, such as this



article, it is best to write it on a word processor (I used PaperClip) and then load the finished document into Stop Press and onto your page.

The text to be loaded in must be stored in PET ASCII and so you should check your word processor has this option. Most do, but it's best to check before you write the text. As the text is loaded from disk it will flow onto the screen until either you pause it or it fills the work area. When it's paused you can either scroll down and restart it straight away or change the font, letter size, margins or whether the text will

appear left, right or centre justified or will



*run in autoflow around any shape (Not many newspapers can do that!).*

*The text handler is only half the story as to produce a professional looking paper or leaflet it's best to mix the text with graphics that are either created by you or loaded in from Stop Press's 150k of clip art. Some examples of the animals, characters and objects included in this clip art library litter these pages as examples of how they can be mixed to produce some surprising results.*

*You can add to this library of artwork by*



*saving any defined window which could be either a graphic that you've created or an often used heading such as a newsletters title.*

*Finally, you can edit your creation by cutting and pasting blocks of it as well as magnifying any part of the page to alter a single pixel.*

*Although, Stop Press is sold with the AMX mouse it can also be used with the Commodore mouse*

*or a joystick and so Stop Press is also supplied separately at about half the standard price.*



*I have only one major criticism about the package and that involves the loading of new fonts and cut outs. These added graphics are essential but must be loaded by typing in the correct name (including capitals). There are directory options but you must then remember exactly what you want to load in. The result is somewhat unfriendly when compared to packages like Print Shop that allows you to load a clip art by selecting it from the directory.*

*Comparisons are bound to be made between Stop Press and programs such as Print Shop and Newsroom. Apart from the file handling routine I found that Stop Press offered more flexibility and variety.*

**AMX Mouse - £69.95.  
Stop Press (only) - £39.95**

# Is it the Thought that Counts?

*Does Broderbund Software's Thinking Cap idea processor offer significant advantages compared with the back of an envelope?*

*By Fin Fahey*

I have to admit to deep disdain of the 'idea processor' cult - it makes the brainies look rational. I've seen perfectly reasonable people turned into delving idea processor fanatics simply because someone's written a few bytes of code that dignify their stray wafflings into some semblance of creative thought.

I'm glad I've got that off my chest. In fact, it's really your grapes - the damn things just don't work for me. Perhaps I spend far too much time looking at a monitor screen - it's a positive relief to go off and scribble my crazed ideas on the back of bus tickets.

Those also have the added advantage of being easily losable, whereas idea processors enable you to save it all on disk, with the result that you may end up having to reread a sometime. Shudder.

## Not so Bad Really

In fact Thinking Cap is a pleasant inoffensive little program. Honestly, I'm not incapable of admiring this sort of software - it just doesn't help me generate ideas.

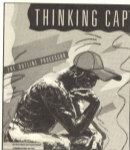
For those who haven't brushed up against the creature, an idea processor is a sort of structured notepad. It's used to set up an outline for a task such as a business plan, a speech or a magazine article.

You may enter your thoughts as topics in any order, and enter further thoughts as sub-topics of these, further ones as sub-sub-topics ad infinitum (or in this case to seven levels of depth). This means that you can start with a vague idea, and ladder it up as you move to deeper areas of detail. Happily, when you 'pan back' you find that you have a coherent plan laid out.

## Friendly Facilities

Thinking Cap provides plenty of friendly facilities for helping the process along. It's pop-up menu driven, with a Help menu which smooth-scrolls beautifully up from the foot of the screen.

Broderbund ingeniously lets you use the Shift Lock to lock the in place on the screen. A full range of editing facilities is provided, including the ability to Cut, Paste and Copy from a pop-up menu.



There are two main program modes. Brainstorm is really the entry mode. Overview lets you see your ideas as a whole and allows you finer discrimination with your cutting and pasting.

Unfortunately, the program is totally keyboard-driven. This is the sort of software that I feel could benefit from the mouse or joystick control, enabling you to make with the totally creative concepts while reclining languidly in your favourite armchair. Instead it's back to the dreary old function keys.

This may well be your cup of tea - after all if it makes you feel good, do it. Um - what else was I going to say? Where's that old envelope gone?

**Finalist**

**Think Thinking Cap. Suppliers: Precision Software, Machine City.**

# Screen Maker

*Designing the layout of a program screen can be a real pain. Speed things up with this useful utility.*

By Kevin Otton

**F**irst impressions count for a lot. If a program user is confronted with a messy-looking screen then their initial reaction may not be complimentary.

But getting screen layouts just right is a time-consuming process. Screen Maker enables you to design program screens easily and quickly, ensuring that the user gets a good first impression.

Screen Maker is just 980 bytes of machine code. It allows you to design a screen using all of the Commodore graphics and character symbols, as well as colours and reverse text. When the screen is finished Screen Maker converts your screen layout into PRINT statements that can be included in any Basic program.

The program is presented in Hex format. Type this in using the files Data Entry II programs that can be found elsewhere in this issue. Once completed you should SAVE the program to disk or tape with the name "SCREEN MAKER".

## Using the program

When you want to use the program in future, LOAD it back into the computer with:

LOAD "SCREEN MAKER", 8,1 for disk or...

LOAD "SCREEN MAKER", 1,1 for tape.

Once loaded you should type NEW. Then associate the program with SYS 49152, line number

where line number is the number of the first PRINT statement that you want to generate.

Screen Maker can only specify one screen at a time and will store any program already in Basic memory.

## Functions Available

While the program is in SCREEN mode the following functions are available:

- F1 Change border colours;
- F2 Change background colour;
- F3 Create Basic program;
- F4 Show Help screen;
- F5 Exit back to Basic;

The Help screen is shown when the program is started. Press the space bar to enter SCREEN mode.

PROGRAM SCREEN MAKE					
01 PRINT (CHR\$(0000));CHR\$(1111)	40	78,31,3041	120 DATA 200,200,200,200,4,1	67	0,100,1000
02 SCREEN MAKE	41	61,4,308,324,200,200,200,15,	61,4,308,324,200,200,200,15,	68	260 DATA 64,150,70,100,8,133
03 PRINT (CHR\$(0000));CHR\$(0000)	42	100,8,150,200	100,8,150,200	69	300,100,200,133,31,100,0,100
04 PRINT (CHR\$(0000));CHR\$(0000)	43	120 DATA 100,100,100,100,10,10	120 DATA 100,100,100,10,10,10	70	270 DATA 64,100,177,20,200,0
05 PRINT (CHR\$(0000));CHR\$(0000)	44	140 DATA 100,100,100,10,10,10	140 DATA 100,100,100,10,10,10	71	310,200,3,100,84,100,100,4
06 PRINT (CHR\$(0000));CHR\$(0000)	45	160 DATA 100,100,100,10,10,10	160 DATA 100,100,100,10,10,10	72	0,200,100,200
07 PRINT (CHR\$(0000));CHR\$(0000)	46	180 DATA 100,100,100,10,10,10	180 DATA 100,100,100,10,10,10	73	200 DATA 170,00,200,200,41,1
08 PRINT (CHR\$(0000));CHR\$(0000)	47	200 DATA 100,100,100,10,10,10	200 DATA 100,100,100,10,10,10	74	60,17,32,100,100,100,00,0,0
09 PRINT (CHR\$(0000));CHR\$(0000)	48	220 DATA 100,100,100,10,10,10	220 DATA 100,100,100,10,10,10	75	81,30,130,1000
10 PRINT (CHR\$(0000));CHR\$(0000)	49	240 DATA 100,100,100,10,10,10	240 DATA 100,100,100,10,10,10	76	200 DATA 00,300,31,100,0,0,0
11 PRINT (CHR\$(0000));CHR\$(0000)	50	260 DATA 100,100,100,10,10,10	260 DATA 100,100,100,10,10,10	77	30,100,32,100,20,100,0,0
12 PRINT (CHR\$(0000));CHR\$(0000)	51	280 DATA 100,100,100,10,10,10	280 DATA 100,100,100,10,10,10	78	1,100,0,1000
13 PRINT (CHR\$(0000));CHR\$(0000)	52	300 DATA 100,100,100,10,10,10	300 DATA 100,100,100,10,10,10	79	300 DATA 177,20,200,0,200,0
14 PRINT (CHR\$(0000));CHR\$(0000)	53	320 DATA 100,100,100,10,10,10	320 DATA 100,100,100,10,10,10	80	100,70,50,1000
15 PRINT (CHR\$(0000));CHR\$(0000)	54	340 DATA 100,100,100,10,10,10	340 DATA 100,100,100,10,10,10	81	200 DATA 00,100,100,0,100,
16 PRINT (CHR\$(0000));CHR\$(0000)	55	360 DATA 100,100,100,10,10,10	360 DATA 100,100,100,10,10,10	82	0,100,100,100
17 PRINT (CHR\$(0000));CHR\$(0000)	56	380 DATA 100,100,100,10,10,10	380 DATA 100,100,100,10,10,10	83	200 DATA 00,41,00,200,100,50,
18 PRINT (CHR\$(0000));CHR\$(0000)	57	400 DATA 100,100,100,10,10,10	400 DATA 100,100,100,10,10,10	84	100,100,177,20,100
19 PRINT (CHR\$(0000));CHR\$(0000)	58	420 DATA 100,100,100,10,10,10	420 DATA 100,100,100,10,10,10	85	300,100,100,100,100,100,100,
20 PRINT (CHR\$(0000));CHR\$(0000)	59	440 DATA 100,100,100,10,10,10	440 DATA 100,100,100,10,10,10	86	100,100,100,100,100,100,100,
21 PRINT (CHR\$(0000));CHR\$(0000)	60	460 DATA 100,100,100,10,10,10	460 DATA 100,100,100,10,10,10	87	100,100,100,100,100,100,100,
22 PRINT (CHR\$(0000));CHR\$(0000)	61	480 DATA 100,100,100,10,10,10	480 DATA 100,100,100,10,10,10	88	100,100,100,100,100,100,100,
23 PRINT (CHR\$(0000));CHR\$(0000)	62	500 DATA 100,100,100,10,10,10	500 DATA 100,100,100,10,10,10	89	100,100,100,100,100,100,100,
24 PRINT (CHR\$(0000));CHR\$(0000)	63	520 DATA 100,100,100,10,10,10	520 DATA 100,100,100,10,10,10	90	100,100,100,100,100,100,100,
25 PRINT (CHR\$(0000));CHR\$(0000)	64	540 DATA 100,100,100,10,10,10	540 DATA 100,100,100,10,10,10	91	100,100,100,100,100,100,100,
26 PRINT (CHR\$(0000));CHR\$(0000)	65	560 DATA 100,100,100,10,10,10	560 DATA 100,100,100,10,10,10	92	100,100,100,100,100,100,100,
27 PRINT (CHR\$(0000));CHR\$(0000)	66	580 DATA 100,100,100,10,10,10	580 DATA 100,100,100,10,10,10	93	100,100,100,100,100,100,100,
28 PRINT (CHR\$(0000));CHR\$(0000)	67	600 DATA 100,100,100,10,10,10	600 DATA 100,100,100,10,10,10	94	100,100,100,100,100,100,100,
29 PRINT (CHR\$(0000));CHR\$(0000)	68	620 DATA 100,100,100,10,10,10	620 DATA 100,100,100,10,10,10	95	100,100,100,100,100,100,100,
30 PRINT (CHR\$(0000));CHR\$(0000)	69	640 DATA 100,100,100,10,10,10	640 DATA 100,100,100,10,10,10	96	100,100,100,100,100,100,100,
31 PRINT (CHR\$(0000));CHR\$(0000)	70	660 DATA 100,100,100,10,10,10	660 DATA 100,100,100,10,10,10	97	100,100,100,100,100,100,100,
32 PRINT (CHR\$(0000));CHR\$(0000)	71	680 DATA 100,100,100,10,10,10	680 DATA 100,100,100,10,10,10	98	100,100,100,100,100,100,100,
33 PRINT (CHR\$(0000));CHR\$(0000)	72	700 DATA 100,100,100,10,10,10	700 DATA 100,100,100,10,10,10	99	100,100,100,100,100,100,100,
34 PRINT (CHR\$(0000));CHR\$(0000)	73	720 DATA 100,100,100,10,10,10	720 DATA 100,100,100,10,10,10	100	100,100,100,100,100,100,100,
35 PRINT (CHR\$(0000));CHR\$(0000)	74	740 DATA 100,100,100,10,10,10	740 DATA 100,100,100,10,10,10		
36 PRINT (CHR\$(0000));CHR\$(0000)	75	760 DATA 100,100,100,10,10,10	760 DATA 100,100,100,10,10,10		
37 PRINT (CHR\$(0000));CHR\$(0000)	76	780 DATA 100,100,100,10,10,10	780 DATA 100,100,100,10,10,10		
38 PRINT (CHR\$(0000));CHR\$(0000)	77	800 DATA 100,100,100,10,10,10	800 DATA 100,100,100,10,10,10		
39 PRINT (CHR\$(0000));CHR\$(0000)	78	820 DATA 100,100,100,10,10,10	820 DATA 100,100,100,10,10,10		
40 PRINT (CHR\$(0000));CHR\$(0000)	79	840 DATA 100,100,100,10,10,10	840 DATA 100,100,100,10,10,10		
41 PRINT (CHR\$(0000));CHR\$(0000)	80	860 DATA 100,100,100,10,10,10	860 DATA 100,100,100,10,10,10		
42 PRINT (CHR\$(0000));CHR\$(0000)	81	880 DATA 100,100,100,10,10,10	880 DATA 100,100,100,10,10,10		
43 PRINT (CHR\$(0000));CHR\$(0000)	82	900 DATA 100,100,100,10,10,10	900 DATA 100,100,100,10,10,10		
44 PRINT (CHR\$(0000));CHR\$(0000)	83	920 DATA 100,100,100,10,10,10	920 DATA 100,100,100,10,10,10		
45 PRINT (CHR\$(0000));CHR\$(0000)	84	940 DATA 100,100,100,10,10,10	940 DATA 100,100,100,10,10,10		
46 PRINT (CHR\$(0000));CHR\$(0000)	85	960 DATA 100,100,100,10,10,10	960 DATA 100,100,100,10,10,10		
47 PRINT (CHR\$(0000));CHR\$(0000)	86	980 DATA 100,100,100,10,10,10	980 DATA 100,100,100,10,10,10		

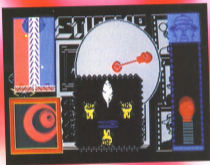




## GAME OF THE MONTH

## Stiffflip &amp; Co.

*Stiffflip & Co. is a game with a difference. Have Palace Software found the magic formula to give the adventure mass appeal?*



In the Spring a young man's fancy, lightly turns to thoughts of cricket, or to the famous misquotations of Tennyson would have us believe. Palace Software have taken this theory to heart and embedded the theme deep inside Stiffflip and Co. After all is not the Orb and Scissors of Stic symbolic of this most regal of national pastimes?

Although the main theme is set in the despic atmosphere of a banana republic, the traditional atmosphere of a test match best conjurs up the sense of fair play and positivity that the game demands. Well almost, in this game you must always remember that when the going gets tough, even the reflexes of your lip will curl with rage.

Palace are aware that adventures rarely top the software charts. As always, shoot-em-ups and arcade machine conversions seem to dominate. As a result of this, Stiffflip has been boosted up by the addition of cartoon strip graphics and a new style of brain-teaser game to lend the traction game fans into the more cerebrally stimulating world of

adventures. For my money, they have succeeded admirably.

Viccount Sebastian Stifflip and his three comrade epitomise all the qualities that prevailed when the Raj was raging and a nation took tea and cucumber sandwiches while awaiting the second innings of the World Wars. Beneath the veneer of sophisticated civility there were starrings in the Republic of Banarasia. Count Chamblion was the head of benign dictatorship which he described in the following way: "when a people ask for a right to vote, my answer is to be voted".

Dissatisfied with a mere corner of the globe, Chamblion had a masterpiece which would cause the total downfall and capitulation of the British Empire. His scientists were close to completion of a machine which would cause the world's trouble at its sheer simplicity. No, not the feared Roach Raygun of the SNAFU Corporation but the Rubbertoon Raygun which would restrain the starch in wingtips and stiff upper lips, weaken moral fibres and, worse of all

seriously affect the bounce of a cricket ball.

Stiffly's suspicions were aroused when the entire rubber strip of Banania went missing and we join his team at Banania's airport where they are greeted by General Marmoside with a demand for airport tax. This is the point at which you learn how easily the locals can be misled as the screen is peppered with bullets to each (incorrect) response to the General's demands. Eventually, you find the correct trigger and the adventure begins.

After a little searching you find several useful locations, not least of which is the local bar. The bartender is not very helpful but once you solve a fairly weighty problem he will help you all he can.

Each of the main characters can interact with the game by an ingenious icon system. To change the person currently under control you use the 'Walk...' icon. This causes a 'Marmoside' caption to appear and the selected team member appears in the location where you first left them. The



character can now be moved using a single pop-up icon menu or one of a multitude of actions may be performed.

The scenery is roaming with Chameleons' herds who seem to have a grudge against foreigners. These maneboured mental pigmies wander from location to location and will bite the unfortunate team member who crosses their path. If the character concerned is not under your immediate control, the relevant character icon gains a speech bubble with a plus for help. Speed is of the essence if the victim is to be saved. Quickly selecting that character you can swing into 'Biff' mode and the fight screen appears.

There are several elements to a fight but the first decision is whether to continue or accept the white feather of a coward and head for a safer place. It would be unkind to flee and the best option is to state they try using one of the other first options. The most effective of these is a quick jab below the belt but this is the mark of a brunder and can only be resorted to three times before the colossal empire steps in and sends your character back to the great partition in the sky.

This leaves the right uppercut and left hook as the only real alternatives. In both cases the power and accuracy of the punch is measured in the same way. A rotating boxing glove gradually increases its speed and power as you concentrate on keeping an erratically moving cross in the centre of the targeting screen. When you're quite ready a quick press on

the fire button releases an arrow which flies into the target and the blow is landed. The effectiveness is measured on a fatground-style 'Test Your Strength' icon at the top left of the screen.

Of course your opponent doesn't take this lying down. You have to watch the right hand side of the screen where the foe's reaction is monitored. As you concentrate on whacking him with the hardest punch you can create, a boxing glove on a spring balance even reacts to the crucial contact point. If the blow is landed before you can react, the punch is registered on your diminishing strength scale and you have to start building up your abashed punch from scratch.

Apart from indulging in banquets, Stiffly and Co. will meet many complex and subtle problems in their search for Chameleons. Each person has special capabilities which means working out who has the sharpest nails for untying ropes, who has specialist skills with equipment and who possesses the necessary tools for the job in hand.

Vincent Stiffly is the team leader through his military record shows him to be a devout coward. The Germans had won Richard - so had his counterpart Stiffly, the Yellow Baron.

Link is brother of the second member of the team, Colonel R. G. Bangle. It is rumoured that he was the recipient of the noble order of the Giff on many occasions when he was called to the Bar. He is also renowned for his belief that a salary provides a means to live beyond, and consequently his checkbooks are now printed on rubberised paper.

The only female agent is Palena Pimbenston who's not as straightforward as she may sound. Her experiences in the Giff Guides was good preparation for her later work with the savage tribes of Darknet Surrey. Palena is a tough customer but she never forgets her distinguished performance in the Guides where she survived the grueling department classes to become the first non-podiatrist recipient of an achievement badge.

Professor Braindeath's achievements in the field of amnesia research were long forgotten when he started research into producing a device to put the middle back into doughnuts. For the moment the work has been abandoned in favour of the Bananian expedition's promise of thrills, excitement and lots of yen. The professor's main claim to fame is that he has been clinically dead for the past ten years.

Palena have taken great pains to make this an adventure with a very broad appeal. It was backed from the beginning but only time will tell if they've been caught in the slip or if they've succeeded in making a good contact across the boundary of conventional adventure. Perhaps their intention shows through in three releases of Barbarian - the Ultimate Warrior which lacks any kind of lasting interest but has an immediate, if banal, appeal. Watch the demise of Barbarian but come home with Stiffly and Co. - the very best of British ingenuity and programming.

#### Verdict

**Title:** *Stiffly & Co. Suppliers* **Palena Suppliers**, 275 Piccadilly Road, London W1 8AL. Tel: 01-278 8731.  
**Developer:** *SP/15*. **Playability:** *3/10*. **Graphics:** *3/10*. **Value:** *3/10*.

# Screen Dump 64

*It's always useful to be able to get a hard copy of your on-screen masterpiece. Our Screen Dump program, gives you the opportunity to do just that.*

*By John Fletcher*

A screen dump facility is an exceptionally useful asset to any computer. This simple and easy to use program will add this capability to your Commodore 64/128.

This utility can be used within a Basic program or can be loaded in whenever you need it.

## Using the Program

When you wish to run Screen Dump 64, there are two parameters which must be entered.

The first is the starting point of your hi-res screen (usually 81928 2000), a number between zero and 65535 can be entered.

The second parameter is the inverse flag. If you enter zero then the picture will be in normal mode. Any number above zero and below 255 will set the picture in inverse mode.

For example, if you wish to dump a picture at memory location 24576 (86000) in normal mode, then you

should type in the following:

```
SYS 48132,24576.0
```

Always switch the printer off and on again before running Screen Dump 64 to clear the buffer. After printing, the cursor will appear. At this point, press RUN/STOP and Restore.

When the screen dump is running, the screen will begin to flash. After this, the printer will start.

## Demo Program

Included with the Screen Dump is a demonstration program which will draw a 3D perspective shape and dump it to the printer after it has been drawn.

Another handy routine is also included with the demo which will clear 32 pages of memory i.e. a hi-res screen. Instead of waiting for Basic to do this (which takes two or three minutes) this routine will do the job in

a split second.

One parameter is needed for this routine which again is the starting point of the hi-res screen.

For example, to clear a hi-res screen starting at 8192 (82000) use:

```
SYS 50008,8192
```

## Tips

If you wish to dump a character set to the printer and then load your characters into memory at, for instance, 12388(50000), then type:

```
SYS 48132,12388.0
```

Screen Dump 64 is meant to dump a hi-res mono screen to the printer, but if you choose your colours carefully, it is possible to dump multi-colour screens to the printer, getting three shades of grey.

If you wish to stop the screen dump at any time press RUN/STOP and Restore. □

### PROGRAM: CLEAR LOWER

00	2 REM *****	44	2 REM * CLEAR ROUTINE INTO H	*****	
	*****		IGHT.		
02	2 REM * THIS PROGRAM FORKS T	46	2 REM *****	00	10 BL=2 100=10 100=5000
	HE 01=002 *				0

```

18 20 FOR L=0 TO 81:GOTO:FOR D=
  0 TO 15:READ A:CH-C:G:R:POKE
  SA-L*16+D-A:REST B
45 30 READ A:IF A=0:PRINT
  "ERROR IN LINE":LN=L*16+D:GOTO
  48
  
```

```

48 40 REST 1:GOTO
33 50 DATA 30,201,176,31,130,17
  0,31,207,197,185,20,133,236,
  185,31,133,236
  
```

```

A4 40 DATA 212,240,0,162,32,149
  0,145,27,180,208,251,233,7
  1,212,208,212
65 50 DATA 348,0,8,0,0,0,0,8,8,
  0,0,8,0,0,0,8,244
  
```

## PROGRAM: SCREEN BUMP LOAD

```

A4 1 REM *****
*****
F1 2 REM * THIS PROGRAM POKES T
  HE CODE *
38 3 REM * FOR THE 044 SCREEN D
  BMP PAGE *
24 4 REM * 1070 NUMBERS.
*
60 5 REM *****
*****
2F 10 01-04 02-03 04-1413
*****
58 20 FOR L=0 TO 81:GOTO:FOR D=0
  TO 15:READ A:CH-C:G:R:POKE
  SA-L*16+D-A:REST B
45 30 READ A:IF A=0:PRINT
  "ERROR IN LINE":LN=L*16+D:GOTO
  48
  
```

```

48 40 REST 1:GOTO
64 50 DATA 30,255,176,32,205,18
  5,185,18,31,218,191,183,31,
  261,379,193,2425
23 60 DATA 182,249,193,189,21,1
  81,74,388,187,27,140,37,208,
  173,32,208,212
63 70 DATA 161,132,3,175,17,108
  141,132,3,32,139,193,31,64,
  192,32,1675
78 80 DATA 231,199,32,100,191,1
  75,132,3,148,32,208,173,113,
  1,245,18,192
4F 90 DATA 208,08,180,0,31,189,
  250,188,4,182,4,260,250,32,1
  88,230,2078
68 008 BATA 32,182,250,182,4,32
  181,133,188,11,32,208,207,7
  67,8,10,202
6A 118 BATA 200,230,32,210,193,
  86,32,118,193,168,11,32,208,
  235,32,194,2118
9F 128 BATA 208,31,171,200,189,
  
```

```

47 160 BATA 093,31,171,248,193,
  192,7,241,248,293,181,194,20
  8,135,86,86,2080
FK 170 BATA 173,248,193,8,128,0
  1,209,250,189,8,244,268,193,
  98,249,13,207
1K 180 BATA 30,200,250,160,16,0
  3,200,250,169,69,32,200,200,
  389,0,32,2145
2F 190 BATA 218,250,08,173,248,
  078,249,0,073,263,191,73,84,
  041,249,191,208
3F 200 DATA 28,110,198,197,34,2
  73,248,193,108,243,193,142,2
  48,193,86,188,2000
4F 310 DATA 3,181,134,8,180,140
  1,32,210,255,168,14,32,210,28
  5,168,0,192
2A 320 BATA 089,200,193,157,224
  1,132,214,40,208,263,84,84,
  1,138,8,208
3C 330 BATA 192,7,0,5,84,8,128,8
  7,192,8,8,11,84,11,138,27,89
  0
C1 340 BATA 192,19,8,23,84,16,1
  76,17,192,18,0,30,84,21,198,
  12,260
C2 350 BATA 192,13,0,23,84,28,1
  28,27,200,28,0,84,31,8,10,
  184
D8 360 DATA 0,8,8,0,0,0,8,0,0,0,0
  23,32,67,87,86,84,100
83 370 DATA 88,88,48,32,66,88,1
  28,78,71,18,32,18,32,68,63
  108
7A 380 BATA 82,88,99,78,30,78,2
  8,32,66,67,41,32,66,57,16,84
  80
C6 390 BATA 31,68,27,34,23,30,3
  1,28,28,88,19,18,17,22,28,8,
  386
  
```

## PROGRAM: BUMP PAGE

```

A4 100 PRINT "CLR?"
4F 110 FOR:GOTO,REST 1:GOTO:GOTO
  2
8C 120 FOR:GOTO,REST 1:GOTO:GOTO
  2
58 130 FOR:GOTO:FOR:GOTO:GOTO:G
  1:GOTO
8L 140
9L 150 REM *****
84 160 REM ** CLEAR SCREEN **
2C 170 REM ** STARTING AT **
MC 180 REM ** #192 (#192) **
81 190 REM *****
F1 200 :
8F 210 REM #0000,8192
88 220 :
18 230 REM *****
1E 240 REM ** BOMB OUT THE **
58 250 REM ** #0000 FOR **
8C 260 REM ** PLATING THE **
78 270 REM ** BEST FILE. **
  
```

```

44 280 REM *****
2F 290 :
1F 300 R=192:1480
2D 310 R=2:1907
8C 320 DEF F=112-0*000181*8*
  87*87*87
81 330 F=87*1-0*078180
4F 340 Y=3:187:180810000-0*0*0*
  173
48 350 F=87*87:0:0:0:1:87*87-5
78 360 2-F:8:8:08:187*87-7*87*1-
  1,2*87
98 370 87*87-87:87:87:0
89 380 0*87:21:87:87:8
78 390 8-8:8:87:1*87-18:18:12:7:3
  88 400 :
88 410 REM *****
8C 420 REM ** SCALE THE **
74 430 REM ** 20-00000000 **
44 440 REM ** 200 100*100 **
8C 450 REM ** THE FILEL OR **
77 460 REM ** THE SCREEN. **
  
```

```

8C 470 REM *****
C8 480 :
1E 490 REM-180:1870:00L-180:1870
6C 500 LINE-YARD:817-1-188871
9F 510 REM-8170-808*100-00L:80-
  LINE
C3 520 FOR:GOTO,REST 1:GOTO:GOTO:G
  1:1
2F 530 21-7
94 540 REST:REST
2C 550 :
81 560 REM *****
7F 570 REM ** SCREEN BUMP **
44 580 REM ** STARTING AT **
81 590 REM ** #192 (#2000) **
4F 600 REM *****
MC 610 :
C6 620 REM #0000,8192,0
  
```

**T**he Amiga A500 will certainly put the cat amongst the pigeons in the 40000 market. It's rather like a Rolls Royce being offered at a price slightly higher than the average family saloon. At £499 + VAT, the Amiga now competes favourably with the top end of the present home computer market. The only obstacle is the Atari ST and whether the home buyer will go for a saving of around £100. In many ways the Amiga is superior to the ST but, will people look beyond the pricing tag?

So, what do you get for your money? The A500 is an Amiga in every sense and the inclusion of the boot program, Kickstart, in the ROM saves a few of the spring-peg headaches which were part and parcel of the earlier A1000. A few more of the tooling troubles inherent with the Workbench software have also been ironed out with Workbench II.

The amazing thing about A500 is its size and weight. Considering there is a built in disk drive, it is still a very light unit and takes up just slightly more space on my workstation than the C128. The finish is the new standard cream coloured plastic which seems to be Commodore's industry standard. At least this encourages cleanliness because the finish really does show every speck of grime.

### Cut-downs

Although the Amiga is at a cut-down price, there are no compromises on the features offered in the Amiga standard as set up by the A1000. I have tried every bit of software to hand and so far nothing has failed to load. Perhaps its time that software houses started to indicate memory requirements for their products because the future will bring bigger and better products which may not fit into the standard memory.

The rear of the machine is reserved for input and output ports. The only colour video output is for RGB monitors but a monochrome composite output has been tapped off for those who intend to use it for text based businessware on a green screen VDU. This is rather like running the aforementioned Rolls Royce on paraffin but a useful stopgap if Ford don't immediately stretch to a new monitor. There is a RF unit available to allow the use of the machine with a domestic TV set but, as with all 88

# Affordable



# leAmigas

*Is it the ultimate machine  
for the ultimate price?*

*By Eric Doyle*



columns systems, this is not the recommended method of viewing the Amiga and is only provided because of public demand for such refinements.

Up to four external disk drives can be controlled via the single disk output port. As with all Commodore drives, they are not the fastest of units and do tend to emit worrying grinding noises. One advantage of external drives is that you can take advantage of emulators (CP/M, PC-DOS etc). You are then free to use drives other than the usual 3.5 inch drives but I could find no simple way to select an external drive as the main drive which could give problems with some commercial software.

Printers, modems and all of the other paraphernalia of hi-tech living can be connected to either the parallel or serial connectors. As the range of add-ons increases I hope some enterprising outfit produce a motherboard to prevent all of the plugging and unplugging which I foresee in future years.

### Sound Capabilities

The Amiga's sound capabilities are first class and a MIDI interface will mean that the portable A500 may well be appearing on Top of the Pops before too long. To ensure the best fidelity there is a pair of stereo output sockets which can either connect to a stereo monitor or plug directly into your music system for even higher fidelity.

The final ports are possibly the ones which will take the heaviest wear and tear; the control ports. This is where trackballs, mouses and joysticks can be connected. There are two ports available which resemble the ports on the humble C64 so there will be no shortage of choice when selecting your control devices. The A500 package includes a mouse which is essential for interacting with the window operating system.

We have been praising the abilities of the Amiga in Your Amiga, our bi-monthly magazine within a magazine, so I recommend that you brush up on your back issues for greater detail. The first package I would recommend is Deluxe Paint II which will show off the graphics capability of your new machine to full advantage as well as providing hours of enjoyment. This must be the best art program currently available.



### Prices

The subject of software prices is also one to be considered. Most packages cost in excess of £20 which is not cheap though you do get your money's worth in terms of software development time. The big problem is that the software should not be bought 'blind'. At the moment most retailers are more than happy to give demonstrations but will this be the case as the Amiga becomes part of the hardware in more and more homes? Your Amiga will point you in the right direction but hands on experience is the greatest recommendation that a package can get so now is the time to befriend a local retailer.

Budget companies like Macrotronic, Code Masters and Firebird are waiting in the wings and there are strong rumours of games at £9. This would provide a fantastic boost to the hardware sales for home use. After all, what use is a state-of-the-art computer

at a popular price if the software is prohibitively expensive?

### Big Question

The big question which everyone is asking is, 'Will the Amiga become the Spectrum of the 16 bit era or will the ST take the launch.'

Certainly, the Atari ST has a slight advantage of price but what it lacks is the better chip. Well, there are the compromise bitter based Mega ST's appearing but the price will certainly equal, and probably exceed that of the A500. This is the sin of the market on the technical side. Ask any of the big names in programming and they will say that the Amiga opens up opportunities which the ST can only dream of. Atari seem to have more than their fair share of the popular press at the moment but I predict that by Christmas Amiga will be the word on everyone's lips.

A lot depends on pricing. The standard ST has the edge at the moment but the new head of Commodore UK has a positive attitude towards machine costing. Already there is talk of reducing the price of the C64 and I would not be surprised if a 66000 price war is declared between Atari and Commodore in the run up to the Christmas buying bonanza. A price tag of a meagre £500 could fall a little further but will Commodore risk opening retailers by reducing their profits?

The bank is for the 16 bit market and whoever gets their foot firmly in the door will benefit greatly from future benefits.

Even Atari realise this with their risky 16 bit project. The Atari/Commodore feud will be a hard fought battle but the Amiga is still THE machine and should win on merit but is this enough? I hope so. W





# The ICPUG Column

*We present the first column in a regular series by  
ICPUG - Britain's biggest independent Commodore user  
group.*

*By Tim Annet*

Since this is the first ICPUG column to appear in *Your Commodore*, it might be a good idea to start off by introducing ourselves. ICPUG (pronounced 'ick-pug') is an acronym for the Independent Commodore Products Users Group. With no self-styled Good Hands epithet of you who have seen our adverts in this and previous issues. Even better! Splendid! I am almost tempted not to say any more about ourselves, but as our Mr Spock so wisely once said 'The ignorance of the few outweighs the needs of the many.' So put your hands down, get comfortable, and I'll begin.

## How It all Began

ICPUG started out back in the dim mists of time when computers were big, drives were rare and 1K was a lot of memory! In those days (1979 actually) D80 would just about buy an 8K PET with built-in cassette (see, Annet had nothing new there!) and a 7" integral monitor. Some people in the south east corner of England got together

and formed the Independent PET User Group (IPUG), life was rosy, the group flourished and it had about 400 members.

Gradually, PETs got bigger, 8K gave way to 16K, which gave way in turn to 32K. Basic 2.0 was replaced by Basic 4.0. Then PETs got faster, developed a business keyboard and 80 column screen, got bigger again, memory soared to a massive 96K through the innovative technique of bank switching.

In 1982 a new computer arrived on the scene. It had a massive 1.5K of memory, the phone manual and surpassed Basic 2.0 and a huge 22 column screen. But it was in colour, and for a mere £289 it was a bargain. Yes, the VIC-20 was born. A year later and Commodore tried again, producing the best-selling 64. It had a 40 column screen, the same archaic Basic 2.0, high resolution graphics and sound that nobody could get at, but nearly 3 years later, and after one face lift, it is still one of the best 8-bit computers around.

## Where We Came In

ICPUG had a problem. Membership was now in the thousands, but the vast majority had VICs and 64s - not PETs. So a change of name was in order, and 'PET' was dropped in favour of 'Commodore Products', (essentially, CPUG in Canada, of which Joe Butterfield is a founding member, has stuck with the PET label throughout their history). ICPUG was born.

After that, Jack Tramiel left Commodore to buy Atari, and in his passing shot, launched the Plus/4 and C-16 into the world. The following year, in a desperate bid to make up for this disaster, Commodore finally brought out the machine it had originally intended to launch before - namely the 128.

During the bad times of 1985, employees left Commodore like rats from a sinking ship (except that rats usually leave voluntarily), and more than one manufacturing plant was closed down. Rumour and counter-

rumour abound; new machines; chapter II bankruptcy to us non-Americans)...until finally the revolutionary Amiga 500 arrived. A business computer that business didn't want and enthusiasts couldn't afford, but the potential was awesome. Commodore didn't go bust, although the Amiga had fierce competition in the form of the already available and cheaper Atari ST. And now? More Amigas and boards of even cheaper STs. The war continues.

**From Strength to Strength**

But what of ICPUG? Throughout this, ICPUG has just grown and grown, and this year, membership is expected to exceed the 4000 mark for the first time ever. For the statistically curious, that makes ICPUG the largest wholly-annual organisation in Europe. And with an annual turnover exceeding £50,000, it is not surprising that last year we elected to become a limited

liability co-operative. Yes, folks, the name has changed yet again, and ICPUG became KPLU - mainly thanks to some obscure law that says a 'group' must be a group of companies'. However we still trade under the name ICPUG.

Why the success? Well, our membership is based firmly on serious users' rather than 'games players' (not that we are averse to playing the odd game - far from it!). Our newsletter ('journal' really since it contains a similar amount of text to Your Commodore) is one of the most authoritative documents available on Commodore machines. It has been said that ICPUG reads to technical information like a horserace to trends.

This is undoubtedly true, and is a major reason for our success. Why? Because Commodore in their infinite wisdom have chosen to shed 99% of their technical staff, and now we are the only people who know anything about what they sell. So when Joe

Parter phoned Commodore with a query, who does he get put onto? That's right - us!

**Joining Up**

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# Contributions

*So you own a Commodore? So you've written some programs? So why haven't you sent these to us?*

Your Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in. How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send us to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced (i.e. there should be a blank line between each line of text). You should also leave a margin of about 30 characters around the text.

3) On the very first page you should put the following:

Name of the article  
Machine that it is for  
Any extras required - disk, printer etc.  
Your name  
Your address  
Your telephone number

4) The top of every page should have the following information on it:

Abbreviation of the article title  
Your name  
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J.Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English, it does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a back up chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots on-slab so don't worry about this too much.

14) Submissions of any length are welcome. If you have a few routines that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £300.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Prompt return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles.









# Knowledge Made Simple?

*XPER is a new package that finally brings the Expert System to the C64. Can it do anything for you?*

*By Fin Fahey*

**X**PER from Athena Software, is an "Expert System", aka "Knowledge-Based System", aka a "Miche" — named after the developer and guru of Knowledge Engineering, Edward Michie. It claims to be the first of its kind, available for the humble Commodore, but how useful will it be?

It is at least pleasant for C64/128 owners to be let in on such a widely respected form of software. Knowledge Engineering swings in and out of fashion and seems to regard its passionately partisan reactions.

Readers of the New Scientist may have noticed that monthly journal is in the throes of backlash against the whole idea. Considering the extravagant claims made by some of the most wild-eyed advocates of KBEs, this is at least understandable.

## What Is It?

So what is an Expert System and why the fuss? Well, in a sense it's a response to the usual world shortage of experts (if that's more? Too simple...) Just as an industrial robot is a device to repair, replace, and reuse the manual skills of its assembly line or craft member, so the Expert System seeks to do the same for some intellectual skills — those we generally think of as knowledge.

Any such system, such as XPER, holds knowledge in the form of a set of "rules" — the knowledge base contains abstracts that deal from their own fields of study or experience. The simplest example, which Athena use in their sample XPER knowledge base, may be that of zoology.

## Playing by the Rules

A trained zoologist will immediately be able to identify an unknown animal by applying a series of classificatory rules based on its appearance, behaviour or whatever. As these rules are applied one by one, the number of alternatives is

removed, eventually, with luck, to just one.

Which may seem obvious — after all, it's what many of us do all the time, for example while diagnosing a car fault, or debugging a program — "It's not this — so it must be that..."

The point, though, of the Expert System is that it may contain sets of rules so don't carry numbers, so it's just like having an unpaid expert on top of the machine. Which is a prospect that makes some experts, understandably, nervous.

## Great XPERations

So is XPER. XPER is definitely not expert itself. In fact, it's a device for setting up expert systems, which of course, will only be as good as the knowledge you've filled them with. You can think of it as a sort of structured database system. The designers haven't created any features, having included all sorts of ways for you to get at your knowledge.

They've also made the program about as user-friendly as a full-sized dingo with halitosis. There is some excuse for this, since this sort of system is usually seen on mainframe computers, for a big machine environment, one of use to generally be used on.

XPER does have Help routines. The first thing to do on accessing one of these is to reach for the manual to get some help interpreting the help. On doing this, you are faced with goals of English prose such as: "Disc or more attributes also tell us the relation between the feature and the object, which is the introduction of a feature and an object". Athena have also invented the novel new verb "impairing".

## But...

But, just to be thorough, in the end I found this to be a good solid piece of software underneath. In some ways it makes



change from systems that are all friendliness and no substance.

The user should be warned however that there's a lot of undergrowth to hack through first before getting any results.

Which brings us to what do you use XPER powered systems for? Apparently the package has already been used to set up knowledge bases in fields as various as tree identification, animal classification and car fault diagnosis, so if you have a special need there may be a system out there for you.

Alternatively, if you possess a priceless fund of hand-gleaned knowledge, the scope is there for you to create a lucrative system of your own — provided your skill is in demand.

Aid that's one final use — as a free introduction to the Knowledge-Based Systems, if it were so impossible XPER would be a valuable piece of educational software.

In conclusion, this is an admirable piece of software let down by its own user-hostility. It's worth buying out of sheer curiosity, but if you're strapped for cash, consider carefully whether you need an Expert system, much as you might worry over buying an Accounts package.

Tim Miller

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# WHODUNNITS

*If you're a supersleuth on the trail of murder, mystery and suspense - then look no further than your C64. We've rounded up a collection of cases to challenge the digital detective.*

*By Tony Hetherington*

The software houses have been remarkably slow to get on the trail and for years there were only a handful of adventure-style detective mysteries to solve, such as Sherlock (Melbourne House) which was a spin-off from The Hobbit. Suddenly, that has all changed with a surge of sleuthing software that's as varied as the victims.

## Killed Until Dead

**Supplier:** Avalon (US Gold)

**Price:** £8.99 (Cassette)



Last month's game of the month poses one of the toughest challenges to would-be hotel detectives - it begins at the Midnight Murder Club book-in, five fictional crime writers aim to turn their fictitious plots into real in order as they each stake their claim to be the world's greatest murderer!

By using your joystick-controlled files, surveillance cameras, notes and less subtle break-ins you aim to track down the killer before he or she strikes at midnight. Despite the simplicity of the game system each of the twenty-one cases is packed with mystery, intrigue, red herrings, twists and surprises that ensure you'll try and complete them all.

## Deadline

**Supplier:** Defiance (Activision)

**Price:** £14.99 (Disk only)



Marshall Robner is found dead inside a locked library. Beside him are his tablets - he was taking them for depression. The autopsy shows he died from an overdose. The police think it's an open-and-shut case of suicide but Robner's lawyer isn't convinced and has called you in to investigate.

When you open up the case file (game box) you find transcripts of the police interviews with the main suspects, a copy of the post mortem, a photograph of the scene of the crime and even a sample of tablets. This is typical of the quality of Defiance adventures in which you get absorbed in the atmosphere of the game even before you load it in.

Once the disk is loaded you have just twelve hours to solve the crime (if there was one) by sifting through the evidence, searching the massive house, questioning the suspects, deciding the importance of mysterious phone calls to the widow and gambling debts owed by the son and, of course, there's the will that was to be changed the very next day...





MacFungus mansion and solve the mystery before the killer strikes again.

The mansion isn't an easy place to solve a murder as it's riddled with secret passageways and packed with suspicious characters such as a butler, a mad professor, the cook, a maid and an arrogant daughter.

Simple joystick controls move you around the mansion and its many rooms. These are packed with objects to examine and use as well as food to eat, documents to read, and suspects to question. It's all done by pointing to the icons that appear at the bottom of the screen. By connecting the game's characters you can question them about the deceased Angus MacFungus, other characters and any objects you've found. Unlike the other games it's so important to explore the mansion, and find the secret passageways, as it is to question the suspects. The result is a playable re-creation of murder, sleuthing a exploration and more sleuthing when the killer strikes again.

### Murder Off Miami

Supplier: CBI.  
Price: £7.99 (Cassette)



Murder Off Miami is a three-part text and graphic adventure based on a Dennis Wheatley murder mystery. In this digital version you play Inspector Kenning who's been brought in to investigate yet another suspicious suicide. This time the victim is Bolitho Blaise who, when alive owned a company that controls half the soap market. Carlton Rockledge owns the company that controls the other half of the market and it was his boss that Blaise was on when he committed 'suicide'.

The game was written using an enhanced version of The Quill and I found it to be rather busy about the order in which you perform certain tasks. For example, Kenning can't pick up his magnifying glass before he receives the memo about Blaise.

The game consists of three parts that represent the three days of the investigation. They must be completed in order - you save the game position after each part so that you can load in the next.

### Murder on the Mississippi

Supplier: Activision  
Price: £74.99 (Disk)



Sir Charles Foxworth and his trusty manservant Reginald are enjoying a trip down the Mississippi when they stumble across a body and a murder to solve. With the blood still warm, our aristocrat and death sets out to search the cabins for clues and question the passengers about objects he has found, the victim, other characters, and themselves.

Through joystick control our heroes explore the riverboat and its cabins and question anybody they meet through joystick menus. From their testimony you can pick out crucial points for your notes. These notes form the foundation of your investigation and can be shown to other characters, such as the judge, to get their reactions and perhaps more clues.

Unfortunately, Sir Charles and his sidekick represent a stereotyped American view of the British and so the game's littered with 'I say, My Lord's' which can be irritating but if you manage to ignore them you'll enjoy the game.



# Making Music

*The Commodore 64's sound chip, SID, is among the best of its kind. Yet it's proverbially hard for the beginner to get to grips with. In the first installment of a new series*

*Peter Gerrard shows you how.*

*By Peter Gerrard*

**W**hether your Commodore 64 is new or old, you must all have read phrases like 'Your Commodore 64 computer is equipped with one of the most sophisticated electronic music synthesizers available on any computer'. You then look at a simple listing to produce just one note, and soon realise that sophistication is not equivalent to ease of use. A myriad of POKE instructions, no special BASIC keywords to make the task easier, and an awful lot of work required to make even the simplest of noises.

There are its bad points. But what of its good ones? What, probably, does the Commodore 64 give us for our money?

## The SID Chip

The quietly named SID (standing for 'Sound Interface Device') is indeed a very powerful custom-built chip. Most other computers with sound capabilities have something like an AY Sound Generator built into them and this, although it itself useful, cannot hope to compete with the excellence of something that was designed for a specific computer. AY chips are mass produced, and can be used by many different machines, but SID is a one-off and was built just for the Commodore 64. If you see SID, tell him!

## Voices

SID has the capability to control three separate musical 'voices'. That is, three distinct effects can be created and used to produce anything from a musical

concerto to discordant noise. One voice could be producing a sound rather like an accordion, another could be imitating a harp, while the third could be producing some kind of percussive effect. However, SID is not without its limits in this respect, since we have to play all three of these voices at precisely the same volume. We can control that volume without reaching for the volume control of the television or monitor (since the Commodore 64 is one of those rare home computers that produces its noise through an external rather than an internal device), but that volume must be the same for all three voices. Other factors, as we shall be seeing, must also remain constant across the three voices.

## Envelopes

Envelopes, as well as being something that you can post a letter in, also find a very useful home in the world of music, and the world of computer music in particular. The type of sound produced by any of the Commodore 64's voices is determined to a large extent by the musical envelope being used to create that sound. It affects the voice quality, and can be independently altered for any of the three voices.

The four factors controlling a musical envelope are referred to as Attack, Decay, Sustain and Release, or ADSR from now on. Attack tells us how long it takes a note to rise from zero volume to maximum volume. Decay refers to the length of time taken to fall from that peak volume to merely a half of that volume. Sustain then determines the length of time that the note is then played at half volume,

before Release tells us how long it takes the note to fall back into silence once more. ADSR collectively make up the envelope of a note, and as we've seen can be independently altered for any of the three voices.

## Waveforms

The waveform of a note is another factor in determining precisely what type of note is going to be played. On the Commodore 64 we have control over four distinct waveforms, and these are known as Triangle, Sawtooth, Pulse and White Noise. Typically, a triangular waveform can be used to produce a mellow sound, rather like a flute, while a sawtooth waveform, rich in harmonics, has a more vibrant tone, like a trumpet perhaps. Pulse waveforms are possibly the most interesting, since they can be used to produce anything from a dull, hollow tone to an almost nasal whine.

Finally, white noise waveforms are precisely what they say they are, and are usually used to produce sound effects ranging from something as straightforward as a wave lapping on a shore, or a snake hissing at its prey, to something more complicated, like the percussion section of a rock group. The group 'Ylvis' Underground were once described as playing music that sounded just like 'white noise'. How they would have liked the Commodore 64!

## Filters

Each of our three voices can have a totally different envelope, and can also be playing any one of the four

waveforms independently of the other voices. Similarly, each voice can either be filtered or not, but the effects of filtering are then the same for any voice that is being treated in this way. Filtering refers to the reduction of frequencies around a particular frequency, perhaps losing those above a certain level, or below a certain level, or perhaps passing those frequencies either within or outside of a band of frequencies. Four different types are available to us on the Commodore 64.

### Advanced Features

Two very advanced features are also available to us on the Commodore 64, and are not often encountered on relatively inexpensive home computers. The first of these is known as Ring Modulation, and despite its rather unusual title refers to nothing more complicated than modulating one voice with respect to another. In other words, if voice one were modulated with voice two, then anything that one voice would do would also be echoed, in some way, in the other voice. This is one of those things that is easier to demonstrate than it is to explain!

Synchronization is another step in the direction of a true synthesizer rather than an ordinary noise-making machine. As with ring modulation it is probably easier to grasp the concept by listening to something rather than reading about it, but basically it involves linking one voice with another so that, rather than modulating, or varying the frequency and volume of one voice with respect to another, we try and produce the same sound with two (or even three) voices. This one could produce a simple twelve bar riff with one voice and sync noise to with another voice, so that by merely altering one note in the second voice the twelve bar riff is instantly playing in a different key. We'll be taking a closer look at this sort of technique later.

### Conclusion

Well, the Commodore 64 is equipped with one of the most sophisticated electronic music synthesizers available on any computer. It's just one of the most complicated to use, that's all.

Throughout the rest of this supplement, however, we will be making life as a useful lot easier, and by traversing the gulf from a single note to a ten minute interrupt-driven

soundtrack and (almost) a true synthesizer we should manage to cover just about everything that the Commodore 64 is capable of doing by way of producing music.

The key to all of this is, of course, the SID chip and its contents, so we'll now take a look at those.

### SID Chip and Contents

The SID Chip, as we have already seen, is a purpose-built one, designed specifically for the Commodore 64. As such it takes up a reasonable amount of memory within the 64 without affecting anything that might really be of concern to you, the programmer. Its code is quite happily resident in ROM, it takes up none of the available RAM space, and the spare 4K of RAM (from \$C000 to \$CFFF) is more than enough to cope with the most sophisticated sound effects that we will be coming to later.

However, as far as programming the chip goes we have a mere 28 bytes to play with. Of these, only 25 are of any real concern to us, since four of them are what is termed **Read-Only**, and cannot be altered by simple PEEKing and POKEing. In fact, they cannot be altered at all, and although they are not without their uses for any of you who might happen to possess a potentiometer or an oscilloscope perhaps, we will ignore them for the rest of this supplement. As far as affecting 99% of all sound programs go, they are the Commodore 64's equivalent of certain England footballers: those to make up the numbers.

The other 25 bytes are, on the other hand, of great interest to us, and we will be dealing shortly with each of them in turn, since without a thorough knowledge of where they are and how they work we cannot begin to produce anything even vaguely useful. These 25 fall into the category of **Write-Only**, which means that we can alter them but not manage to see what is in the first place. This, as you might think, is something of a problem at times.

As the risk of offending readers who know all about selectively altering the contents of memory locations (since that is all we can do with those 25 bytes, or Control Registers) to give them their grander title, a few words of explanation.

### PEEKing and POKEing

Everyone is familiar with statements like POKE \$D332 or PRINT PEEK(\$D332) that is, put the value 32 into memory location \$D3, or print out the contents of memory location \$D3 respectively. However, as far as the 25 control registers of SID are concerned, PRINT PEEK (signature) produces nothing sensible. Try PRINT PEEK(\$4296), which is one of the registers in question, and see what happens. You will be told that register \$4296 contains a zero. So, alter it with POKE \$4296,23 and then try PEEKing it again. To all intents and purposes it still contains a zero, or a hint that is what the Commodore 64 wants you to think. It does, in reality, contain the value of 23, but we cannot find that out directly. Other methods have to be used, and by far the simplest of these is to keep track of a variable. If I say, so that we could POKE \$4296,11 and PRINT it to find out what is going on.

Unfortunately for us, some of these 25 control registers perform more than one task. Six of them do, in fact, and they are all of vital importance to us in our quest to produce something that would make Jon Michael James sit up and take notice, or Ron Hubbard for that matter. As far as these six registers are concerned then, a simple POKE command will not normally suffice. We must selectively alter the contents of a register, not just alter it willy-nilly. Consider the following example.

```
POKE $4296,15
```

```
POKE $4296,16
```

Although the value put into register \$4296 is different by just one in the two POKE statements, the effects that would be produced are vastly different, to say nothing of catastrophic under certain circumstances. What do we really mean, then, when we POKE \$4296,15?

The Commodore 64 is an 8-bit computer, which means that any byte memory location, control register, and so what you will, consists of 8 bits. As you probably also know, the maximum value that can be POKE'd into any one location is 255, and that is a direct result of it being an 8 bit computer. 84 is short for Binary digit, and is a smaller value that the computer can understand. The computer that is at work at their most efficient when everything is converted into binary digits. After all, a

computer is nothing but a collection of electronic circuits, and a circuit can be either on or off, nothing else, and so the binary system of counting is ideal for representing these two states. Binary uses only the numbers zero and one, so a zero would represent a circuit that was switched off, and a one, a circuit switched on. Since there are eight bits to the byte (and yet, four bits really are referred to as a nybble), we can think of a byte as looking like this:

```
128 64 32 16 8 4 2 1 0
7 6 5 4 3 2 1 0
```

Seven have eight bits (numbered from zero to seven) and each of those eight bits can be either on or off. The numbers above those bits refer to the value that each represents. Thus, if bit 7 were turned on and all the rest were turned off, then the byte would contain the value of 128. If bit 6 were turned on and the rest turned off, it would contain the value of 64, and so on. Now then, if bits 3, 2, 1 and 0 were turned on, and the rest turned off, what value would be in there?

Add up the numbers 8, 4, 2, 1, and 0 and you arrive at 15, as in POKE 54296,15 given earlier. If bit 4 were turned on, and the rest turned off, the byte would contain the value of 16. Again, as in POKE 54296,16. The rest is what has happened? By POKEing with 16 instead of 15 we have turned on a bit that was previously turned off, and turned off four bits that were previously turned on. If this were a register with just one purpose it wouldn't make any difference, but 54296 happens to be one of those with a dual purpose in life, as we shall be seeing shortly.

### Turning On

Consequently it is important, when allowing this and other dual-purpose registers, to make sure that what was turned on remains turned on (if necessary), and what gets turned off is indeed what we want to turn off. This is achieved using the commands AND and OR, which, as you may know, work like this:

```
100000
1100100
```

ANDing these two numbers together produces the result 0000000. In other words, wherever there is a 1 in the top row that corresponds with a 1 in the bottom row, we put down a another 1.

Anything else results in a zero. Thus bits 7 and 9 remain turned on, the others are turned off.

On the other hand, ORing these two numbers together produces an entirely different result, namely 1100110. In this case, wherever there is a 1 in the top row OR a 1 in the bottom row we put down a one. So, in this instance, bits 7, 3, 2 and 1 remain turned on, and we also turn on bits 6 and 5 (this is beginning to sound a bit psychedelic). The rest remains off.

By selectively altering various bits of a byte, then, we can happily work with dual-purpose registers and alter only that which we want to alter. A temple, but necessary, diversion, if we are to get the best out of the 25 available-color-control registers of the SID chip. And now, before we go any further, what do these registers do? The following diagram shows us that, and this is to be our Bible from now on. We can do nothing but alter the contents of those 25 registers, and without knowing where they are in memory we're not going to get very far. Don't worry yet if some of the terms used don't make a lot of sense, all will be revealed in the long run.

### First Steps

As can be seen from the diagram of the SID Control Registers, there are an awful lot of memory locations to worry about in the world of sound. However, to make life easier for us in these early stages we are only going to bother with eight of those 25 registers, and these eight are made up of seven for voice one, and the overall volume control for all three voices.

In order to produce a single note, which is all we'll be bothering with here, there are a number of steps to take. First of all, it's always best to clear out any extraneous values that may be stored in any of the 25 registers, and this can be achieved by using a simple FOR ... NEXT loop, like this perhaps:

```
5 FOR I=0 TO 24:POKE 54271+I,0:NEXT I
```

Then, it is always wise to declare a variable equal to one (base location), since remembering things like 'variable plus 1' is a lot easier than trying to recall all the different numbers like (54279). Use the variable V, and so the second line of

our program would be something like:

```
10 V=54271
```

Having done that, four simple steps are necessary in order to be able to produce a note. We'll now consider each of those steps in turn.

### Volume

If you look at the table of SID control registers, you'll see that the volume is governed by location (V+24). It is also one of those registers that is altered more than one function in life, but for now we are concerned only with turning the volume on. From the table, and our earlier discussion of bits within bytes, we will probably realize that the volume can range from zero through to 15, since the last four bits of the register are used to control the volume, and turning all four of those on gives us a value of (8+4+2+1), or 15.

A little bit of common sense serves to tell us that the maximum volume would relate to the maximum value, and so if we alter location (V+24) by POKEing it with a 15, we will achieve that maximum volume. It helps if you've got the television set turned properly and the volume turned on as well.

Consequently, the next line in our program would be something along the lines of:

```
15 POKE V+24,15
```

We must now turn our attention to the envelope, or ADSR shape, of the note that we're going to play.

### ADSR

Later on we'll be looking at this in much more detail, and with the aid of a graph showing precisely how the different ADSR settings, or envelope shapes, determine to a large extent the quality of the note being played.

For now, we will concern ourselves with two facts. The locations affecting ADSR for voice one are (V+5) and (V+6), and each of those locations is split into two halves, at register 4. The top half allows attack and sustain respectively, while the bottom half concerns itself with decay and release, in the order. So, when we alter the content of location (V+5) we are affecting both the attack and the decay rate. Harking back to our discussion of

## SID CONTROL REGISTERS

Base Location = 54272

Location	Bit Diagram	Base	Function
54272	0 1 1 1 1 0 0 0 0	0	Low frequency value
54273	0 1 1 1 1 0 0 0 1	+1	High frequency value
54274	0 1 1 1 1 0 0 1 0	+2	Low pulse width
54275	0 1 1 1 1 0 0 1 1	+3	High pulse width
54276	0 1 1 1 0 2 2 0 0	+4	Wavelength/Ring Mod/Synch
54277	2 2 2 2 0 1 0 0 0	+5	Attack/Decay
54278	2 2 2 2 0 1 0 0 1	+6	Sustain/Release
54279	0 1 1 1 1 0 0 0 0	+7	Low frequency value
54280	0 1 1 1 1 0 0 0 1	+8	High frequency value
54281	0 1 1 1 1 0 0 1 0	+9	Low pulse width
54282	0 1 1 1 1 0 0 1 1	+10	High pulse width
54283	0 1 1 1 0 2 2 0 0	+11	Wavelength/Ring Mod/Synch
54284	2 2 2 2 0 1 0 0 0	+12	Attack/Decay
54285	2 2 2 2 0 1 0 0 1	+13	Sustain/Release
54286	0 1 1 1 1 0 0 0 0	+14	Low frequency value
54287	0 1 1 1 1 0 0 0 1	+15	High frequency value
54288	0 1 1 1 1 0 0 1 0	+16	Low pulse width
54289	0 1 1 1 1 0 0 1 1	+17	High pulse width
54290	0 1 1 1 0 2 2 0 0	+18	Wavelength/Ring Mod/Synch
54291	2 2 2 2 0 1 0 0 0	+19	Attack/Decay
54292	2 2 2 2 0 1 0 0 1	+20	Sustain/Release
54293	0 0 0 0 0 0 1 0 0	+21	Low frequency
54294	0 0 0 0 0 0 1 0 1	+22	High frequency
54295	0 1 1 1 0 2 2 2 0	+23	Resonance/Filter
54296	0 2 2 2 1 1 1 1 1	+24	Filter type/Volume

'0' - bits we are not concerned with, or cannot use.

'1' - bits affected by first mentioned function.

'2' - bits affected by second mentioned function.

'3' - bits affected by third mentioned function.

Locations 54272-54278 affect voice one.

Locations 54279-54285 affect voice two.

Locations 54286-54292 affect voice three.

Locations 54293-54296 can affect all three voices.

bits and bytes again, we will see that four bits can give a value in the range 0 to 15, so it makes sense to think of both attack and decay as varying within that range.

However, how can we POKE two numbers with values between 0 and 15 into the same register? Well, think about it, and you'll see that the decay rate is indeed a value from 0 to 15 if it affects the lower four bits of the byte, while the attack rate is determined by the top four bits. Assuming then that we have an attack rate of somewhere between 0 and 15, then by multiplying that value by 16 we can arrive at the overall value to be stored in location (V+3). So, for an attack rate of 2 and a decay rate of 9, we would arrive at a final value of (2\*16 + 9), or 41.

Since the same principle applies to sustain and release as well, with sustain being multiplied by 16 and release just having a straightforward value, the next line of our program (assuming a sustain value of 1 and a release value of 5) would look like this:

```
20 POKE V+5,16+POKE V+6,21
```

The third step is to consider the wavelength of the note that we're going to play.

### Wavelength

We have already seen that there are four different types of wavelength available to us on the Commodore 64: triangle, sawtooth, pulse and white

noise. From the table of control registers you'll see that the wavelength is governed by location (V+4), and that this is yet another of those multi-purpose registers. Ignoring those bits that affect ring modulation and synchronization for now, and we arrive at the following nice table of values:

Wavelength	Value
Triangle	17
Sawtooth	33
Pulse	65
Noise	129

That is, by putting a value of 17 into location (V+4) we would set the wavelength of voice one to be that of a triangle. Putting a value of 33 in it would turn that voice off, although into noise just as effectively. In a similar way, we would put a 33 into location (V+4) and get a sawtooth waveform, or put a 32 there and turn it off again. Noise is just that, noisy, and although you're welcome to experiment we'll stick to something a little bit more musical for now.

The Pulse waveform is the most interesting, and requires two more locations to be brought into play, namely (V+2) and (V+3). These determine the width of the pulse, that is, the length of time it takes between two successive peaks of the waveform itself. (V+2) is the low value of the pulse width, and (V+3) is the high value, or to put it another way, if we had a value of 4 in location (V+2) and 25 in location (V+3) then the overall pulse width would be (4\*256 + 25), or 1049. Multiply the high value by 256 and then add the low values. See if you can figure out why that should be so, remembering that only numbers between 0 and 255 can be stored in a single byte.

Experiment with pulse waveforms by all means, altering the high and low values after you've set the waveform itself. For now we'll stick to a sawtooth waveform, and bearing in mind an important fact when producing music on the Commodore 64 (it is ALWAYS advisable to clear the waveform and then reset it before playing a note) we arrive at the next line in our program:

```
25 POKE V+4,16+POKE V+3,15
```

Finally, we need to play the note itself.

# Games Reviews

*If you've got a bit of spare cash then a game is as good a way as any to use it up. Here's a selection of some of the latest software on offer.*

## ENDURO RACER

**A**t the end of the Coin-op Conversions feature (Your Commodore July 87) I predicted that there were more conversions on their way. As if to prove my point Activision release its version of the Sega coin-op bike racing game.

The object of the game isn't to win a race but to complete five stages within set time limits. If you don't beat the clock your game will end.



The first stage is a simple track that's flanked by trees to warn off anyone trying to cut corners. Bike-racing horrors are rarer across the whole track and can be only stopped by a well-timed wheelie.

In the next stage giant boulders block your path, both on and off the track, and in stage three the track is surrounded by water so any mistake will end in a costly loss of time.

There are other bikes in the race but these seem to take no part in the game as you can happily ride through them without crashing or even slowing down.

Sadly this is another case where the C64 game is a direct copy of the original Spectrum game and wastes the C64's superior sound and graphics capabilities. A waste of a game that could have been a coin-op classic. **T.H.**

**Title:** Enduro Racer. **Supplier:** Activision, 25 Pond Street, Abingdon, London OX13 2PN. **Tel:** 071 1163. **Manufacturer:** C64 Price: £9.98. **Originality:** 3/10. **Playability:** 5/10. **Graphics:** 3/10. **Value:** 3/10.

## EAGLES



**T**he year is 2046 and the galactic three hundred year old war is now fought by genetically-created beings like you and me. Now you are once again ordered to scramble into the sky in your Eagle aircraft to defend the planet against alien attack.

The screen is split into two Defender-style game screens in which you and your partner must blast away at the terminators, killer squads, nasty patrols, warships, bombers, tanks and fireballs that have invaded every zone. As your skill improves you'll be able to collect the enemy message decoders that you must deliver to your underground base. Collect five of these and your ship will be equipped with a Devastator device which acts like a smart bomb-destroying all aliens on the screen.

The second ship can either be controlled by a human or computer opponent, that you compete with to get the most kills to win the honour to lead the squadron. If you're playing against the computer or a head to head opponent you must duel to death to prove your superiority. This seems unlikely - it's a little pointless to have Eagles fighting each other when there are hordes of aliens to be destroyed.

A poor game that falls short of Dawson's usual

standard.

**Title:** Eagles. **Supplier:** Pegasus Computers, 368 Alden Ponding Estate, Milton, Abingdon, Oxon OX14 4JY. **Tel:** 0223 812030. **Manufacturer:** C64 Price: £9.95 (Cassette) £12.95 (Disk). **Originality:** 3/10. **Playability:** 6/10. **Graphics:** 6/10. **Value:** 5/10.

## I BALL

Where's that smoke coming from? Oh no, it's my power supply burning up. You see I loaded up I Ball about five hours ago and I can't stop playing it.

When I loaded I almost fainted - the speech is fantastic. A funny little voice says 'I Ball, I I I Ball'. This sounds wonderful. When you are killed the voice says 'Oh no!' and at the end of the game the voice says 'Game Over'. The music is also brilliant and very well thought out, which gives the game a very polished feel.

You control a renegade ball, on a mission to rescue his pals from the totally evil Terry Ball. Your pals, laser ball, eddy ball, glow ball and no ball are all scattered across 16 different defence zones and one pal can be found at the end of every fourth screen.



Reaching them is no easy task; there are solid obstacles and electric barriers that will vaporise you on contact, together with the millions of nasties that inhabit the defence zones. If you shoot a lot of these a power disk will appear (hint of Ninjas here) and when collected will give you extra weapons such as a Single Laser, which lets you fire sideways, a Turbo, which gives you extra speed, and a Buffet spray, which gives powerful fire support above and below you. Also available is the Molecular Bomb which nullifies all the electrical barriers (very useful). Another wicked weapon is the Rainbow Ripple Laser (sounds a bit like Salamander) which will blow the most confident Ted Pinner from Mars into a thousand blistering blisters.

Sound-wise this game is great, with good speech, good music and good spot effects. It is also strong on graphics with clear characters, no flicker, smooth scrolling and new effects produced by the weapons.

I could go on for ages about the great gameplay, fantastic take and sheer addictiveness of the game, but I won't.

Go and buy I Ball. If you don't you must be mad R.R.

**Title:** I Ball

**File:** 1 MB. **Supplier:** Firebird 64/67 New Oxford Street, London WC1A 0PS. **Feb 1987-0215.** **Machine:** C64. **Price:** £1.99. **Originality:** 8/10. **Playability:** 9/10. **Graphics:** 8/10. **Value:** 10/10.

## CHAMPIONSHIP BASEBALL

Championship Baseball is a re-visit of Gamemaster's previous attempt to capture the thrill of home runs, base hits and loaded bases and adds split-screen pitching as well as four divisions of opponents, and play-offs for the



championship position.

Your first task as coach is to select your batting line-up to face the first match. Make sure you've got some stable players sitting on the bench in case your star batsman bolts out or your pitcher starts giving away home runs.

As the game begins the screen shows a side-view-on view of the ball park with fielders spread around the bases and the outfield. When a ball is about to be pitched half the field is covered by a 3D batsman's view of the pitcher as he winds up to deliver change-ups and fast balls. Once the ball is hit the screen reverts back to the whole fielding screen.

The coach looks and plays like a patch stuck on to the original (poor) game. You're left wondering why the game wasn't totally rewritten to produce full 3D action. The pitch may have some merit in its claim to be the 'most realistic baseball simulation you can find'. I'm sticking to baseball. T.H.

**Title:** Championship Baseball

**File:** Championship Baseball. **Supplier:** Activision (Gamemaster), 23 Paul Street, Monmouth, London NW5 2PW. **Machine:** C64. **Price:** £9.99. **Telephone:** 431 1100. **Originality:** 5/10. **Playability:** 6/10. **Graphics:** 6/10. **Value:** 6/10.

## DINK!

Ever wondered how a magazine is put together? Well, here's your chance to see how the Editor and staff of Dink! fill the pages with jokes, features and competitions.

The game casts you as Uncle Pigg, the Party promoter of Dink! and you must play three sub-games to win bonus points that are used to fill the comic. You can complete the

sub-games as often as you like but after each game you'll have three hours closer to the deadline.

**Game One** is basically *Breakout* - your missile firing but must bounce Pete's Purple tank to destroy a series of brick walls while fighting off hordes of deadly aliens. In **Game Two** you steer Hubbishman through a series of zones in which you must fly over objects and under bridges while covering power. **Game Three** stars Tom Thing as he charges around a complex in his Tragnomobile, fights zombies and hulk trucks while he attempts to collect (shoot) bonus points, extra lives, and a score which represents the magnet's growing circulation.

As the pages build up you'll be able to read the adventures of these heroes as well as check your horoscope, read jokes and enter competitions - but I doubt you'll have the time.

Across the far side of the galaxy, the deadly Moose-faced Warlords of Thurgoo are about to invade the peace-loving Fried-Egg People of Nocrinia, but forget them as you'll be too busy playing this addictive game. **T.H.**



#### **Featureline**

**Title:** *The Virus*. **Supplier:** CRI Group PLC, CRI House, 9 Kings Lane, Carpenter's Road, London E3 2ND. **Tel:** 011 2618. **Machine:** C64. **Price:** £8.95 (Covered) £14.95 (Disk). **Originality:** 8/10. **Playability:** 8/10. **Graphics:** 8/10. **Fabric:** 9/10.

### **GERRY THE GERM**

I've heard of some duff titles but this takes biscuit. You play the part of a germ who has failed his stink plasma exam and, filled with indignation, he sets out to claim the title of 'Vicious Virus Of The Year', so off he goes to infect a body with his disease. To start off with he has to deprive the lungs of air then starve the brain, but while doing this he comes under attack from the red blood cells and white cells. So he then moves on to the kidneys. Here he must again dodge the white and red blood cells, and while he is doing all this he must collect four wacky kidney beans (wait for it) so he can go to the loo.

Next it's onto the stomach where he must grab a bottle of acid and dissolve the aspirin which blocks the exit to the next screen. Junk food is another problem, you must stop this entering the stomach just by touching it, and when all that's

been done (phew!) it's on to the pancreas. This is a sticky little screen and a bit stupid too. You must infect the medical supplies by eating (i.e. headbutting) them - daft isn't it? Again there are blood cells to be avoided, plus a ticket inspector complete with steam-engine. If you go to the engine you can cause a fight between the engineers and the driver by throwing coal at the latter...er...er... just what planet does this so-called human come from?

And now the one you've all been waiting for *The Heart*. The idea here is to cause a heart attack by deflating an artery into this poor organ. To deflate the artery just use the television (sic) but the arrow will kill you if you do not hit the TV. With all this done you are now eligible for a 'viralplasma degree'.

Well, I must admit this game is different but that doesn't always make for brilliant - does it? I find the plot is in bad taste and some of you may well agree. Gameplay is rather dull and slow and it can often get quite tedious. The music, supplied by Bob Hubbard, is brilliant, really jolly and bouncy. About seven tunes in one game can't be bad.

So should you go out and buy this game? On the grounds of cool music maybe, but the game leaves a lot to be desired. If you are bored and have two quid to spend it might prove entertaining - for a while. **K.R.**



#### **Featureline**

**Title:** *Gerry the Germ*. **Supplier:** Firebird, Wellington House Upper St. Martin Lane, London WC2M 0EM. **Machine:** C64. **Price:** £1.99. **Originality:** 7/10. **Playability:** 1/10. **Graphics:** 4/10. **Fabric:** 8/10.

### **MILK RACE**

**P**ut on your shorts, fill your water bottle (juicy, milk bottle) and jump on your 19-year niece, yes it's here - Marmite's Milk Race. Was it worth the wait?

Well I'm saying nothing yet. The idea is simple - just race through all the major cities of England - sounds simple doesn't it? As just one of the 84 Competitors in this year's Milk Race you'll need to summon up all your energy and stamina to maintain 1st position over all 13 stages of the race which you must do in order to win.

The game starts up with the title screen of a man pedaling

his bike up a hill accompanied by a soundtrack which also plays through the game. With a tap on the joystick button you are then presented with a map of England showing the route marked out and numbered. Tap the joystick again and a menu is thrown up on the screen which will let you choose a joystick or port two, redefine the keyboard or choose preset keys.

When this has been selected, it's on to the game, you start off in first gear and can change, if you wish up to 5th gear, depending on road conditions. The road is shown on a little graphic icon in the corner of the screen which rises and falls - when on level ground it falls straight. I thought this a good touch.



The game, however, can be quite frustrating - you will probably find yourself swearing at your computer as you are killed off without any warning by a hit-and-run car driver. This causes a time penalty which could result in the game ending, but practice makes perfect.

I quite enjoyed this game, the graphics are good, the sound is good and there are some very nice touches. For example when you ride past a spectator he will turn his head as you pass him - this gives a good feel and adds to the atmosphere.

For only £1.99 who can mean (Mary Whitehouse?) Go and get it before the shops sell out, quick. **K.R.**

#### Touchline

**Title:** *MAN Race* **Supplier:** Metrotech, 8-10 Pine Street, London EC2A 4DF. **Tel:** 01-777 6890. **Machine:** C64. **Originality:** 3/10. **Playability:** 2/10. **Graphics:** 3/10. **Value:** 10/10.

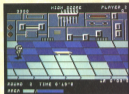
## METROXCROSS

I was horrified when I saw the adverts which came out for U.S. Gold's Metrocross. Why is it that I hear you shout?

Well remember Breakthru and Legend of Kage - yes, these are just a few of the dreadful games to come from this company. It seems that nearly every time they release a licensed game (film or arcade) they always make a pig's ear of it.

So you're sitting there now thinking I'm going to tell you what a load of old rubbish Metrocross is? Well you're wrong.

I love it, it's really addictive and fun to play. Although there is no story line to speak of as it's such a simple game, this is more than likely what makes it so playable. Anyone could play - even our editor (careful, sorry - Ed).



You are a little man competing in a fantastic race inside an extensive complex. There are also various traps including water holes which if fallen into, will lose you time as you struggle to get out. There there's the Electro Maze which sends you flying as you receive an electric shock. Again these will mean you causing loss of time. Next come the Hazards which must be avoided or jumped, otherwise you'll end up on the floor losing more time. Green Mats slow you down to a quarter of your normal speed, and other hazards include cold vans (no doubt a nasty bit of advertising) and rats which cling onto you and must be shaken off as they will slow you down.

On the helpful side there are quite a lot of things such as Springboards which will boost you a short distance a twice your normal speed. Green Cars speed you along no matter where you are on the screen, but these only last for a short time. Blue Cars can also be found flying around - if you jump on these the clock stops for two seconds (gasp).

When you register all the traps and make it to the final line you stop and take a rest. This is quite good as your legs puts its hands on its knees and puffs and blows (just like the arcade). Then it's on to the next round - there are 10 in all. I am very impressed with this excellent conversion. It plays well, the graphics are faithful, it's bit bloody, and the music is almost exact, I'm hooked, so what are you waiting for? Go and buy it now. **K.R.**

#### Touchline

**Title:** *Metrotech* **Suppliers:** U.S. Gold, Unit 2/3 Millers Way, Hatfield, Hertfordshire HX 74E. **Tel:** 077-356 2300. **Machine:** C64. **Price:** 19.99. **Originality:** 3/10. **Playability:** 9/10. **Graphics:** 2/10. **Value:** 8/10.

## FIRETRACK

Why is it that most shoot-em-ups are set in the 22nd century? Who cares - it's bad enough reviewing a game that is total rubbish and just another remake of an old game that was crap in the first place, without having to provide an



these things. Firtrack is a sprawling shoot-'em-up that covers three types of game. It contains four different worlds: Baseworld, Destroyworld, Inworld and Mallworld. The individual worlds are known to most people as the Firtracks and they're well known because of the pirates that inhabit them.

At first you think it's another routine mission to wipe out the pirates and their bases, then mission control informs you that somewhere in the Firtracks is a powerful source of energy known as the White Light. The light must be found so if it falls into the hands of the pirates it could mean total destruction of the surrounding planets! So you set up your best drop of Koxy-Lee and jump into your Hachfighter which zooms you off to save The Universe.



OK, first let's get the means out of the way. A really annoying 'beats it' in this game is the built-in auto-fire. Yes it fires by itself, although it doesn't destroy the gameplay too much. Right - that's my means out of the way, onto the graphics. They are nice, colourful and detailed, and the alien are well animated.

The different worlds are nice and big with a fair bit of variety thrown in for good measure. The end result is a playable and interesting game that doesn't leave a sour taste in the mouth. I think I might as well recommend this. CR? Well done, Electric Dreams - keep it up! **K.R.**

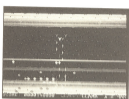
#### Touchline

**File:** Firtrack. **Suppliers:** Electric Dreams Terminal House, Fremont Tower, Southampton, Hampshire SO1 1PE. **Tel:** 0703 226694. **Machine:** C64. **Price:** £8.99. **Delphiability:** 6/10. **Playability:** 8/10. **Graphics:** 7/10. **Value:** 6/10.

#### VOIDRUNNER

It's been quite a while since Jeff Minter released a game, his last being Iridis Alpha. This was pretty good and contained his usual mind-blowing colours and totally weird game play.

Well, now Jeff's gone freelance and has written another psychedelic game, this one being a solid freesty shoot-'em-up. The blurb on the inlay card is very interesting but when you actually play the game it doesn't seem to tie in.



Years and years ago, back in the 22nd century, there was a famous conflict known to the people of Earth as the Devil Wars. Hundredths of alien attacked the Earth's power supply grids suspended in space, but they were so much for us and promptly fled. Then one day (about 100 years later), a great movement of droids is registered. The aliens are planning to take Earth. Of course this can't be allowed, so you are zoned off to the nearest spaceship and told to intercept every alien that flies. Some things are more easily said than done.

Your ship consists of one main ship with another three that follow your movements and fire when you do. The graphics are a bit dated and are made from character blocks, so you can imagine how small they are. Nevertheless this game has an addictive pull so it, though it doesn't last too long. It's easy to play and you can select the level you wish to start on. Another unusual feature is the way the ship changes formation as you go through the levels and the screen wrap around (upside-down etc).

This isn't to my taste, but if you are an out-and-out shoot-'em-up freak you might enjoy it, and it's only three quid. **K.R.**

#### Touchline

**File:** Touchrunner. **Suppliers:** Microtronic, 8-18 Paul Street, London. **Tel:** 01-277 4888. **Machine:** C64. **Price:** £2.99. **Originality:** 5/10. **Playability:** 6/10. **Graphics:** 4/10. **Value:** 5/10.

#### WIZHALL

Well, Dorian has some upsops with this game. I have to say this makes a change. Wizhall is quite weird. Don't get me wrong, I am not saying it's rubbish - I'd be lying. You play the part of the wizard who lives on a colourful planet somewhere in space. So there he is minding his own business and admiring the nice landscape, when someone steals his colour!

Well, the entire planet is now monochrome (yuck!) so being a proud wizard he creates a novel form of transport with powerful offensive weapons, but these need to be bought with credits (I knew it, Nemexis again).

Your Wizhall, as the vehicle is slower, bounces like a

normal ball. This makes it quite hard to control. Get a credit and you will be given three. Another credit gives you anti-gravity - this makes things much better as the ball will now only respond to the joystick instead of bouncing all over the place.

Weapons can now be activated and a Cat called up. The Cat is a small ball which has some lives, known as a Catalite (ironically). You can also select weapons for your Cat such as multiple firing and a laser. If you want to be real greedy you can hog them for the Winball. Other weapons include a power beam which will fire above and below your ball.

Next comes the Cat which is a bargain at three credits, then there's the laser, a steal at only four, then the wicked Multi-fire. This awesome gadget will reduce any alien to a smouldering ash pit, now the biggy, yes, The Smart Bomb. This will wipe out any greedy alien with ease, just wiggle the joystick (that's how you select all gadgets) and — POW! — all the enemies are vapourised. A bit pricey at a modest 7 credits is the ultimate in Michael technology, The Shield. This fit it baby will keep you and your Cat safe and sound — you can charge about without a worry as aliens burst on impact with you. Sadly, it doesn't last long.

When you're happy with your weapons you can start collecting the colours — to do this you will need a Cat. The colours look like little balls but when shot they release a drop of pigment which must be caught by the Cat before it hits the ground.



At the bottom of the screen are counters. These tell you how much colour you have — each drop of colour is added in. When these are full you are wiped off to the bonus stage. Here you can knock your score up easily and if you manage to last long enough you get the chance to get an extra Winball!

This game is brilliant. Stunning graphics, unbelievable music, compulsive gameplay and excellent presentation. Winball is sure to reach number one, no stone.

Well done Sensible Software and right on, Ozonix, for finding some talented programmers. Please keep it up.

Well don't just sit there reading. Sprint off and buy Winball. **E.B.**

#### Twinkle

Title: *Twinkle*. Supplier: Ozonix, 8 Central Street, Manchester M2 2NS. Tel: 061 812 9631. Price: £6.95 (Covered) £12.95 (Disk). Originality: 9/10 Graphics: 10/10 Playability: 10/10 Value: 10/10.

#### MAX TORQUE

**N**o, the title doesn't refer to Max Headroom's younger brother, but rather to a motorbike simulation from Bubble Bus.



There is the usual course, divided into sections, each of which must be completed within a time limit if you are to progress onto the next stage. One interesting touch, as the authors try to bring a touch of originality to a well worn subject, is that you can choose to control one of seven different rides. Each of these has its own particular skills and weaknesses as does the bike that they ride. In practice though, I failed to notice much of a difference between them but this could say more about the way that I drive rather than anything else.

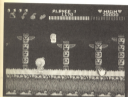
Controlling the bike is straightforward. Left, right, accelerate and brake with a choice of two gears plus a turbo boost. Your rear lights indicate whether you are braking or accelerating if you can't remember which way you are pushing the joystick. The graphics are large and clear and the game generally handles very well. Enjoyable if you don't already own a motorbike game but not offering anything special if you do. **G.B.H.**

#### Twoflower

Title: *Max Torque*. Machine: C64. Supplier: Bubble Bus Software, 87 High Street, Tonbridge, Kent, TN11 0EL. Price: £6.95 (Covered) £12.95 (Disk). Originality: 5/10 Graphics: 5/10 Playability: 5/10 Value: 5/10.

#### WONDERBOY

**O**h no, not another arcade conversion, this must be about the 321st this week. Those of you who have not been to the arcade will not have seen the brilliant game Wonderboy. The game plot tells of a youth and his girlfriend. One day whilst out walking in their wooded land an evil King called well, King kidnaps the girl and runs off with her.



So our brave little hero sets off to rescue her and defeat the evil King. This is not an easy task as you may guess.

Wonderboy consists of 7 lands, each land divided into 4 sections and each of these four sections consist of another 4 areas (think about it) so our hero has a long way to go before he can finally confront King.

You start off in the jungle, with snakes, rolling boulders, snakes, weaps and snails (yeah) all trying to kill you, then its on to the desert, where killer frogs (hah) and falling platforms must be negotiated. Backwards come in abundance, and very nice they are too.

Scattered around the playing area are various weapons concealed in eggs (eggs?) which have to be broken to find out what is inside. The first egg that you encounter contains a hammer which will give the snails a good thumping and send them flying. There are also skateboards to be had, but these are sometimes a hindrance as you can not stop dead when riding them.

As you progress through the game, fruit appears regularly and can be picked for bonus points, and if you happen to come across a mushroom this will change all the fruit to junk food (yummi) and give you more time (vitality) on the clock.

I enjoyed playing Wonderboy, and I'm still playing it. So take my advice and buy it. You won't regret it acquiring this excellent arcade conversion.

Three cheers for Activision.

K.B.

#### Zonblin

Name: Wonderboy, Supplier: Activision, 21 Pound Street, Hampstead, London, NW3 2PS. Tel: 01-421 1500.

Machine: C64. Price: £9.99 (Cassette). Originality: 3/10. Playability: 9/10. Graphics: 8/10. Value: 8/10.

#### SPELLSEEKER

**S**pellseeker is a 3-D maze game with a fantasy setting. The only storyline you are given to guide you is that you must seek out and destroy the evil sorcerer Azblax.

As you wander round the maze, you will find certain objects. Some of these will be found in empty rooms while others will be guarded by one of an assortment of monsters — goblins, witches, vampires and the like. Your only means of defence against these nasties is to cast a spell. Initially, you

can only use a 'blast' spell. More potent magics have to be found.

As well as monsters, there are locked and invisible doors, four different types of wall — both harmful and beneficial, traps and various. Controlling your character is a simple task; left, right and straight on for movement with two function keys being used to scroll through the list of available commands.

The first problem with this game is one of working out just where you are. This is because the game decides to drain everything as your character sees it, rather than how you see it sitting in front of the screen. The results of this are most confusing and just about render the game unplayable — unless you happen to be the sort of person who enjoys maze-mapping and can easily cope with minor images of rooms. Then there is the fact that nothing seems to happen. You can wander round for long periods of time without meeting anyone or anything. And when you do, the chances are that they will not have anything that you need.

All in all, a very tedious game, let down by some small bits of gameplay. Give it a miss.

G.R.H.



#### Spellseeker

Title: Spellseeker. Machine: C64. Supplier: English. Price: £2.99. Originality: 4/10. Graphics: 1/10. Gameplay: 1/10. Value: 2/10.

#### ZOLYX

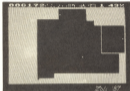
**O**ccasionally, a game comes along that it waltz a simple idea but is also so infamously addictive that you curse yourself for not having thought of it first. Such a game is Zolyx.

Derived from the 'Painter' type games popular a few years ago, the object of Zolyx is to shade in three quarters of the screen. No more, no less.

You control a cursor which starts off on the edge of the screen. As you move it into the playing area, so it leaves a trail behind it. If you can contact your cursor to safe territory — either the edge of the screen or a previously

overstuffed block, then the area that you have just defined is filled in.

Naturally, it isn't quite that easy. Small dots mark round the screen and background areas and if one of these touches your trail, a life is lost. Likewise if you go back on your own trail. If you trap one of the dots in an area, there is an impasse. The dot remains trapped but you don't fill in the area either. As you progress through the levels, so the number of dots increases. To help you out of a potential pickle, you can reverse the direction of the dots but only once on the first level, twice on the second level etc.



Graphically, the game is dreadful — the colour of the shading doesn't even change when you progress onto the next level. This just goes to show that great graphics aren't the be all and end all of a good game.

For only £1.98, Zodyx will appeal to any strategy fans who will, like me, spend hours working out whether it is better to go for a few large areas or lots of little ones. G.R.

#### Timekiller

*Video Zodyx, Machine C64, Suppliers Festival Sales, Wellington House, Upper St. Martin's Lane, London WC2N 6SE, Feb 05/179 6233, Originality 4/10, Graphics 2/10, Playability 8/10, Value 8/10.*

## BARBARIAN

And so it came to pass that the evil sorcerer Drax proclaimed that he would sack houses and doom on the Jewelled City unless the lovely page I girl... oops! I mean, the beautiful Princess Maria, was delivered to him.

So the helpless people of the Jewelled City gave in and delivered the princess to him, but being quite a nice guy he said 'I will deliver her back to you on one condition. That is that you can defeat all of my demons'.

Many warriors tried to kill the demons but failed, then from far over the hills came a male model bodied contract. Sorry, a Barbarian holding a huge broadsword. He was the only hope.

You play the part of the Barbarian trying to defeat the

evil demons and win back the Princess.

As you might guess, this is a sword combat game. There's a lot of moves and blocks available to the player. A few of the moves include The Web of Death, head bashing, kicks to the groin, kkkkkkkkkkk!, leg chops and the lethal neck chop, which will slice off your opponent's head with a sort-of-chopping-imp-swordy's-head-off sound (really grassy). The blood spurts out as the body chings to the ground with a thud and is dragged off by a gipping public.

There are two versions of Barbarian. Side one contains a two player I'm-gonna-kill-you practice game, the other contains the real thing in which you do battle with Drax's demons in order to save the princess from a fate worse than death (Duller!).

I enjoyed Barbarian very much, especially the blood and flying heads bit, and I'm sure that you kids will love it, in fact I'm positive. The two player game is the best part of the package as you can try to beat your Aunt Hilda — until she gives you a deadly neck chop.

All good dirty fun, with good graphics, music and sound effects, and very good gameplay. Stop hitting your gran with that plastic sword and get this game NOW! K.R.

#### Timekiller

*Video Barbarian, Price £6.99 (Cassette) £12.99 (Cassette), Suppliers: Palace Software, 271 Portsmouth Road, London SW, Feb 06/278 6759, Originality 6/10, Graphics 6/10, Playability 7/10, Value 6/10.*

## MAG MAX

After nearly a year of waiting, Imaginer have finally released Mag Max, and it looks like it was knocked up in a week. This is not the first time Imaginer have cocked up an arcade conversion, and taken a year to do a (remember M&A?).

Why, oh why, do they insist on doing arcade conversions that they can't handle? This game is dreadful and into its fat arcade version.

You play the part of a robot, with a bit of one as you are not fully built yet, so you have to find parts of your body which will give you extra firepower.

You traipse across a dash-looking planet surface, shooting at general bases. This bit makes me laugh, as there are huge pillars. For instance, sometimes the bases can't be shot — your bullets go straight through them but they still lie at you — and don't be surprised if you find yourself dying for no reason as this happens a lot.

The object of the game is to destroy a huge dragon that waits at the end of each level, which I managed with ease after a few attempts. The graphics are not so bad, but the glitches did annoy me a lot. Imagine there is no music but the title screen sound is great.

This is a bit of mixed bag, I'm afraid. It does have good points but these have little addictive pull. Personally I wasn't impressed, but my brother loved it. K.R.

#### Timekiller

*Name: Mag Max, Price £9.98, Machine: C64, Supplier: Imaginer, 8 Cornhill Street, Manchester M2 2NS, Feb 06/612 6616, Originality: 5/10, Graphics: 4/10, Playability: 6/10, Value: 5/10.*

# Universal Number Base Tutor

*Many people feel rather daunted when necessity forces them to start thinking in a number base other than 10. Help is at hand with our base tutor program.*

*By Michael Biddell*

## Program Breakdown

Line	Description
0	: Set border and paper colours.
2	: Dimension arrays for number conversion and answers to questions in quiz.
7	: Print menu.
9-100	: Convert decimal number to any base up to 16 by repeated division by the chosen base. Lines 88 to 131 are also configured as a subroutine used by other parts of the program.
1000-1120	: Convert any base to decimal. Lines 1070 to 1122 are configured as a subroutine.
1000-0900	: These lines set 10 questions on number base conversions. You are required to convert five numbers from any base into base 10 and five numbers from base 10 into a specified base.
5000-5000	: Print the Menu and get human response.
6500-6500	: Subroutine to check for illegal alphabetical entry in decimal input.
7000-7000	: Print congratulations for perfect score.
7500-7500	: Graphic illustration of number base conversion. Base 10 to any base.
8000-8100	: Convert any base to any base, using base 10 as the common currency. This calls the subroutines at lines 88 to 131 and 1070 to 1122 previously mentioned.
8500-8540	: Subroutine to check for keyboard entry error.
9000-9020	: Routine to check for validity of a number in a particular base.
9900-9900	: Colourful "Goodbye" for Quit.
9950-9970	: Allow only lower case entries from keyboard.
10000-10000	: Print random paper and border.
11000-12000	: Print random ink.
60010-60070	: Emulate 'print at'.
60070-60150	: Emulate 'ink'.
60150	: Prints "Inverse".
60160-60200	: Emulate 'border'.
60200-60300	: Emulate 'paper'.
60300-60470	: Emulate 'loop'.
60470-60500	: Emulate 'page'.

The number system used by most humans is in base 10, mainly because we're gifted with 10 fingers so our rudimentary intelligence latched on to this fact when we first started to count.

Computers, however, have no fingers and communicate using different number methods and this is where many people get confused, because converting from one base to another can seem rather complicated at first.

This is where our Universal Number Base Tutor can come to your aid. It is an educational program which will show you the best methods of converting from one base to another (up to hexadecimal) as well as providing practice and a quiz for you to test yourself.

### Aims

This educational program was designed with the following objectives:

1. Convert decimal (denary) to any base.
2. Convert any base to denary.
3. Convert any base to any base (up to 16).
4. Demonstrate clearly how number base conversion is carried out.
5. Test understanding.

All these objectives have been achieved in the program.

With the increasing need to understand number bases fully and the modern maths approach, the program may well find application in schools as well as at home.

It is written in pure Microsoft Basic, on a modular basis and should therefore be easy to understand.

Number Base Tutor was originally written for the Spectrum and many Commodore users will see in it a neat and simple way of converting Spectrum listings for use on the C64.

### Program Structure

The use of "ink", "paper", "print at" and "header" subroutines etc. has produced a very legible Commodore listing, in fact many special Commodore control characters, it is therefore especially easy to type in. These subroutines can be used in student own programs to produce neat colourful screen graphics effects.

```

PROGRAM: NUMBER BASE
F3 1 0000 SCOR=0000:PRG=0:00
   010 SCOR=PRG:PRINT:CORR(10)
F6 2 010(0),0100(10),0100(0)
   020 CORR(0):CORR(10):CORR(10)
   030 PRINT:CORR(10)
14 3 0-9:PRINT:CORR(10)
06 6 PRG=""
07 7 SCOR=0000
08 8 PRINT:CORR(10)
09 9 PRG=""
10 10 CORR
11 11 FOR J=1 TO 10:PRINT:CORR(10)
   010
12 12 SCOR=0000
13 13 Y=0:0-9:00-9:10-1:00000
   0000:PRINT:Y(10):PRG:NUMBER J
   010 DECIMAL:CONVERSION:END IF
14 14 INPUT CORR(10):CORR(10)=VAL
   000:PRG
17 05 PRINT:PRINT:PRINT:CORR,SC,
   010,01,01,01,01,01,01,01,01,01
   020,01,01,01
18 06 PRINT:PRINT:PRINT
19 07 PRINT:PRINT:PRINT:PRINT:CORR
   010,01,01,01,01,01,01,01,01,01
   020,01,01,01,01
20 08 INPUT CORR(10):CORR(10)=VAL
   000
24 04 IF 0=0 OR 0=10 THEN GOTO
   000
21 01 PRINT:PRINT:PRINT:PRINT:0-9:0
   00000000:PRINT:Y(10),01,01,01,01
   010
30 09 PRINT:PRINT:PRINT
31 10 SCOR=00
32 02 GOTO 100
33 03 FOR J=1 TO 10:PRINT:CORR(10)
   010
31 100 FOR J=0 TO 9:STEP 1
   010
32 101 IF 0=J THEN PRINT:CORR(10)
   010
33 102 RETURN
34 100 SCOR=0:00-9:00000000:PRG
   010:CORR,SC,01,01,01,01,01
   020:CORR(10):CORR(10),01,01,01,01,01
   030:CORR(10):CORR(10)
31 111 000000000000
32 100 FOR J=00:CORR(10):CORR(10)
   010
33 100 PRINT
34 100 FOR J=00:CORR(10):CORR(10):PRINT:
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PRINT 00, 01, 02, 03, ...

```

10 1000 PRINT:GOTO 2000:PRINT
11 1100 PRINT C TO CONTINUE.
12 1200 PRINT:GOTO 2000:PRINT
13 1300 IF 0=0 THEN GOTO 1
14 1400 GOTO 1100
15 1500 PRINT COS(1/2), SIN(1/2)
16 1600 PRINT COS(1/2), SIN(1/2)
17 1700 PRINT COS(1/2), SIN(1/2)
18 1800 PRINT COS(1/2), SIN(1/2)
19 1900 PRINT COS(1/2), SIN(1/2)
20 2000 PRINT COS(1/2), SIN(1/2)
21 2100 PRINT COS(1/2), SIN(1/2)
22 2200 PRINT COS(1/2), SIN(1/2)
23 2300 PRINT COS(1/2), SIN(1/2)
24 2400 PRINT COS(1/2), SIN(1/2)
25 2500 PRINT COS(1/2), SIN(1/2)
26 2600 PRINT COS(1/2), SIN(1/2)
27 2700 PRINT COS(1/2), SIN(1/2)
28 2800 PRINT COS(1/2), SIN(1/2)
29 2900 PRINT COS(1/2), SIN(1/2)
30 3000 PRINT COS(1/2), SIN(1/2)
31 3100 PRINT COS(1/2), SIN(1/2)
32 3200 PRINT COS(1/2), SIN(1/2)
33 3300 PRINT COS(1/2), SIN(1/2)
34 3400 PRINT COS(1/2), SIN(1/2)
35 3500 PRINT COS(1/2), SIN(1/2)
36 3600 PRINT COS(1/2), SIN(1/2)
37 3700 PRINT COS(1/2), SIN(1/2)
38 3800 PRINT COS(1/2), SIN(1/2)
39 3900 PRINT COS(1/2), SIN(1/2)
40 4000 PRINT COS(1/2), SIN(1/2)
41 4100 PRINT COS(1/2), SIN(1/2)
42 4200 PRINT COS(1/2), SIN(1/2)
43 4300 PRINT COS(1/2), SIN(1/2)
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48 4800 PRINT COS(1/2), SIN(1/2)
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50 5000 PRINT COS(1/2), SIN(1/2)
51 5100 PRINT COS(1/2), SIN(1/2)
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61 6100 PRINT COS(1/2), SIN(1/2)
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64 6400 PRINT COS(1/2), SIN(1/2)
65 6500 PRINT COS(1/2), SIN(1/2)
66 6600 PRINT COS(1/2), SIN(1/2)
67 6700 PRINT COS(1/2), SIN(1/2)
68 6800 PRINT COS(1/2), SIN(1/2)
69 6900 PRINT COS(1/2), SIN(1/2)
70 7000 PRINT COS(1/2), SIN(1/2)
71 7100 PRINT COS(1/2), SIN(1/2)
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79 7900 PRINT COS(1/2), SIN(1/2)
80 8000 PRINT COS(1/2), SIN(1/2)
81 8100 PRINT COS(1/2), SIN(1/2)
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86 8600 PRINT COS(1/2), SIN(1/2)
87 8700 PRINT COS(1/2), SIN(1/2)
88 8800 PRINT COS(1/2), SIN(1/2)
89 8900 PRINT COS(1/2), SIN(1/2)
90 9000 PRINT COS(1/2), SIN(1/2)
91 9100 PRINT COS(1/2), SIN(1/2)
92 9200 PRINT COS(1/2), SIN(1/2)
93 9300 PRINT COS(1/2), SIN(1/2)
94 9400 PRINT COS(1/2), SIN(1/2)
95 9500 PRINT COS(1/2), SIN(1/2)
96 9600 PRINT COS(1/2), SIN(1/2)
97 9700 PRINT COS(1/2), SIN(1/2)
98 9800 PRINT COS(1/2), SIN(1/2)
99 9900 PRINT COS(1/2), SIN(1/2)
100 1000 PRINT COS(1/2), SIN(1/2)

```



```

03 THEN Y=1:G=0:INK=0:COLOR=0
04 PRINT@B:PRINT@C:GOTO 17
05 THEN Y=1:G=0:INK=0:COLOR=0
06 PRINT@B:PRINT@C:GOTO 17
07 THEN Y=0:G=0:INK=0:COLOR=0
08 PRINT@B:PRINT@C:PRINT NUMBER IN
THIS ROOM."
09 THEN INPUT CH:GOTO 0800
10 THEN OPEN=C:LINK=C#0
11 THEN IF LINK=C#1:G THEN GOTO
7000
12 THEN AND=C#1:LINK=C#0
13 THEN GOTO 0870
14 THEN G=0:Y=1
15 THEN FOR #=0 TO 10
16 THEN Y=0:G=0:INK=0:COLOR=0
17 PRINT@B:PRINT@C:GOTO 17
18 THEN Y=0:G=0:INK=0:COLOR=0
19 PRINT@B:PRINT@C:GOTO 17
20 THEN G=0:Y=1
21 THEN FOR #=0 TO 10
22 THEN Y=0:G=0:INK=0:COLOR=0
23 PRINT@B:PRINT@C:PRINT"
CONTINUE C TO CONTINUE."
24 THEN G=0:Y=0:INK=0:COLOR=0
25 PRINT@B:GOTO 0870
26 THEN G=0:Y=1
27 THEN FOR #=0 TO 10
28 THEN Y=0:G=0:INK=0:COLOR=0
29 PRINT@B:PRINT@C:PRINT"
CONTINUE C TO CONTINUE."
30 THEN GOTO 0800:PRINT"ISPIR
TION K TO RETURN TO MENU."
31 THEN GOTO 0800
32 THEN IF OR=C#0 THEN GOTO 7000
33 THEN IF OR=C#1 THEN GOTO 8000
34 THEN GOTO 7000
35 THEN GOTO 7000
36 THEN STOP
37 THEN PRINT CORRECT?:GOTO 0
38 THEN GOTO 7000
39 THEN G=0:Y=0
40 THEN G=0:Y=0
41 THEN G=0:Y=0
42 THEN G=0:Y=0
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98 THEN G=0:Y=0
99 THEN G=0:Y=0
100 THEN G=0:Y=0

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# C16 Sprite

*Does your C16 lack a little something? Then add sprites with this useful utility.*

*By Frank Bingley*

When I first acquired a Commodore 16, I was impressed by the improvements made to Commodore basic. But it wasn't too long before I discerned an omission that Commodore had forgotten one important feature which 64 owner's had come to take for granted. It didn't support sprites!

For most serious applications and general computer use, the computer performed quite adequately. It was only when I came to games programming that this missing feature became something of a problem. The only way possible to move object blocks of any size around the screen was to incorporate the necessary characters into a string, along with complemented control characters. These strings were then gatted around using the handy CHAR command. This worked reasonably well, but suffered from screen scrolling problems and wiped out any other characters that got in the way!

These problems pronged me to write a machine code routine which would, to some extent, mimic the sprite facility on the 64. C16-SPRITE is an interrupt-driven routine with which it is possible to display a six character sprite anywhere on the screen. Certain points will instantly move the sprite around whilst others control which sprite data block is displayed as well as sprite to background priority. Other features are collision detection and selective priority (not found on the 64).

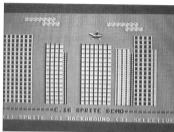
Along with notes on how to use this utility, I've included a short basic program which demonstrates how easy the system is. Equally good results

can be obtained by using this routine as part of a basic or machine code program. To effectively use C16-SPRITE, it will be necessary to know briefly how the routine works. A block of six characters (3 wide by 2 deep) will be displayed on the screen. Their position will be determined by two addresses which hold their X and Y co-ordinates. The actual characters (and colours) displayed will be held in a sprite block buffer, just above the

utility. Another address will hold the sprite block number. The sprite will be displayed either behind or in front of any other characters on the screen according to the contents of two other addresses. The system automatically remembers what characters and colours lie beneath the sprite, and replaces them when the sprite is moved or turned off.

Table 1 shows which addresses do what.

HEX	DEC	DESCRIPTION
83E04	15040	X Position
83E05	15041	Y Position
83E0D	15061	Sprite to background priority
83E0E	15062	Priority and character
83E0F	15063	Collision detection
83E22	15086	Sprite block pointer
83C60-83EE9	15360-16365	C16-SPRITE utility resides here
84F00-84FFF	16128-16383	Sprite data buffer
858 DEC ("8580")		Turn on sprite
858 DEC ("8587")		Turn off sprite



## Typing in C16 Sprites

Type in listing 1 as it appears and wait to type or click after correcting any errors. Now run the program. Next, with the data in place, enter the monitor and save a hard-disk version by typing:  
**S>C16 SPRITE.00,JC00,0009**  
 Remember to use 00 instead of 08 if using tape.

## How To Use C16 Sprite

Let's test the system. First protect the utility from being overwritten by Basic. To do this type:  
**POKE 92,47:POKE 96,47:C16**  
 Now load 'C16 SPRITE' by entering monitor and typing:  
**L>C16 SPRITE.00**  
 Tape users will need to position the tape at the beginning of the utility before this command.

Next, we need to form a sprite. Either the standard character set or user-defined graphics may be used, but for this exercise let's keep it simple! Our test sprite will be a red inverse block.

At this point, I will explain how the sprite data is stored in the buffer. The buffer is divided into 24 blocks, each containing 12 bytes. The first 6 bytes of each block are for character data, leaving the other 6 for character colour. So, to fill the first block with inverse spaces, type:  
**FOR A=0TO5 :POKE 86128+A,180:**

### NEXTA

86128 is the first address for the first block, whilst 180 is the screen code for a reverse space. Now we need to add the colour. To do this, type:  
**FOR A=0TO5 :POKE 86134+A,82:**

**MENTA**  
 This will colour all of the reverse spaces a medium red. Having placed the sprite data into position, it will be necessary to let the system know where it is. So, to set the sprite pointer to point to our sprite, type:  
**POKE 15965,0**

Finally, before we turn on the sprite, choose a position for it. For the X position, choose any value between 0 and 37. The Y position can be any value between 0 and 23. Addresses 15948 and 15949 are for the X and Y positions respectively, so choose values for X and Y and type:  
**POKE 15948,X:POKE 15949,Y**

Now for the moment of truth! Clear the screen and turn on the sprite. Type:

### SYS DECT0005)

If the above procedure has been followed correctly, then a red block will be displayed on the screen at your chosen position. If not, then turn off the sprite (**SYS DECT 0075**) and try again. Please note that the system will not respond to position values outside minimum and maximum parameters.

Don't be afraid to experiment a little more with our sprite. Try altering

some of the addresses in the above chart to alter sprite positions and colours or characters. Remember that **C16 SPRITE** is interrupt-driven, so that it will not be necessary to keep turning on the sprite, just after the appropriate address for instant results. Also remember to turn off the system when not required (**SYS DECT0075**), or strange things may start to happen!

If you wish to change sprite to background priority, then a 0 in address 15981 will cause the sprite to be in front of any characters on the screen. A 255 in this address will change it to be behind. It is possible to make the sprite lie in front of some characters and behind others. This can be very useful, and is well to good effect. Here is an example of how to use this facility:

### POKE 15982,26:POKE 15981,1

Now, any characters whose screen code is within the range 1 to 26, (i.e. alpha numeric), will now always appear in front of the sprite. Any others will be behind. Two rules apply here: all characters with screen codes within selected parameters will be foreground, and 0 is the maximum amount of foreground characters.

Another handy feature of this utility is collision detection. As long as our sprite rests in a clear part of the screen, address 15983 will contain a zero. If, when the sprite is moved, it happens to be in front of, or behind a character, then address 15983 will contain a 1. This makes collision detection a piece of cake!

## Limitations

Using **C16 SPRITE** will not cause the screen to scroll, but your program may. If this happens then the sprite characters will also scroll. This is, unfortunately, a limitation of the system. Another is that the system updates the sprite only if any changes in the control addresses are detected; this is to avoid flickering. However, flickering may occur if, during animation techniques, the sprite pointer is changed rapidly when the sprite is near the bottom of the screen.

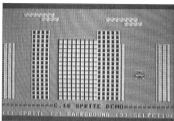
## The Demonstration Program

Program 2 is the demonstration program which shows **C16 SPRITE** in action. Guide the helicopter through the skyscrapers by the following keys: **Z** Move left.

- X Move right
- E Move up.
- . Move down.
- 0 Move in front of buildings.
- 2 Move behind buildings
- 3 Move between buildings.
- 4 Collision mode.

Key 4 will toggle between collision mode and normal. If the sky turns grey then colliding with anything will cause a crash. Remember to have C16 SPRITE in memory before running the demo. Line 10 will automatically load it for you. If you are using tape, then C16 SPRITE must be saved immediately after the demo program as a 'boot load' file as described earlier. Also the device number 'W' must be changed to a 'D'.

Have fun!



#### PROGRAM LISTING 3

```

0 FORE20,VT,POX200,VT,CLR=CO=0
1 POX0=0,VT,POX200,VT,CLR=00
2 CLR=00,VT,POX200,VT,CLR=00
3 CLR=00,VT,POX200,VT,CLR=00
4 CLR=00,VT,POX200,VT,CLR=00
5 CLR=00,VT,POX200,VT,CLR=00
6 CLR=00,VT,POX200,VT,CLR=00
7 CLR=00,VT,POX200,VT,CLR=00
8 CLR=00,VT,POX200,VT,CLR=00
9 CLR=00,VT,POX200,VT,CLR=00
10 CLR=00,VT,POX200,VT,CLR=00
11 CLR=00,VT,POX200,VT,CLR=00
12 CLR=00,VT,POX200,VT,CLR=00
13 CLR=00,VT,POX200,VT,CLR=00
14 CLR=00,VT,POX200,VT,CLR=00
15 CLR=00,VT,POX200,VT,CLR=00
16 CLR=00,VT,POX200,VT,CLR=00
17 CLR=00,VT,POX200,VT,CLR=00
18 CLR=00,VT,POX200,VT,CLR=00
19 CLR=00,VT,POX200,VT,CLR=00
20 CLR=00,VT,POX200,VT,CLR=00
21 CLR=00,VT,POX200,VT,CLR=00
22 CLR=00,VT,POX200,VT,CLR=00
23 CLR=00,VT,POX200,VT,CLR=00
24 CLR=00,VT,POX200,VT,CLR=00
25 CLR=00,VT,POX200,VT,CLR=00
26 CLR=00,VT,POX200,VT,CLR=00
27 CLR=00,VT,POX200,VT,CLR=00
28 CLR=00,VT,POX200,VT,CLR=00
29 CLR=00,VT,POX200,VT,CLR=00
30 CLR=00,VT,POX200,VT,CLR=00
31 CLR=00,VT,POX200,VT,CLR=00
32 CLR=00,VT,POX200,VT,CLR=00
33 CLR=00,VT,POX200,VT,CLR=00
34 CLR=00,VT,POX200,VT,CLR=00
35 CLR=00,VT,POX200,VT,CLR=00
36 CLR=00,VT,POX200,VT,CLR=00
37 CLR=00,VT,POX200,VT,CLR=00
38 CLR=00,VT,POX200,VT,CLR=00
39 CLR=00,VT,POX200,VT,CLR=00
40 CLR=00,VT,POX200,VT,CLR=00
41 CLR=00,VT,POX200,VT,CLR=00
42 CLR=00,VT,POX200,VT,CLR=00
43 CLR=00,VT,POX200,VT,CLR=00
44 CLR=00,VT,POX200,VT,CLR=00
45 CLR=00,VT,POX200,VT,CLR=00
46 CLR=00,VT,POX200,VT,CLR=00
47 CLR=00,VT,POX200,VT,CLR=00
48 CLR=00,VT,POX200,VT,CLR=00
49 CLR=00,VT,POX200,VT,CLR=00
50 CLR=00,VT,POX200,VT,CLR=00
51 CLR=00,VT,POX200,VT,CLR=00
52 CLR=00,VT,POX200,VT,CLR=00
53 CLR=00,VT,POX200,VT,CLR=00
54 CLR=00,VT,POX200,VT,CLR=00
55 CLR=00,VT,POX200,VT,CLR=00
56 CLR=00,VT,POX200,VT,CLR=00
57 CLR=00,VT,POX200,VT,CLR=00
58 CLR=00,VT,POX200,VT,CLR=00
59 CLR=00,VT,POX200,VT,CLR=00
60 CLR=00,VT,POX200,VT,CLR=00
61 CLR=00,VT,POX200,VT,CLR=00
62 CLR=00,VT,POX200,VT,CLR=00
63 CLR=00,VT,POX200,VT,CLR=00
64 CLR=00,VT,POX200,VT,CLR=00
65 CLR=00,VT,POX200,VT,CLR=00
66 CLR=00,VT,POX200,VT,CLR=00
67 CLR=00,VT,POX200,VT,CLR=00
68 CLR=00,VT,POX200,VT,CLR=00
69 CLR=00,VT,POX200,VT,CLR=00
70 CLR=00,VT,POX200,VT,CLR=00
71 CLR=00,VT,POX200,VT,CLR=00
72 CLR=00,VT,POX200,VT,CLR=00
73 CLR=00,VT,POX200,VT,CLR=00
74 CLR=00,VT,POX200,VT,CLR=00
75 CLR=00,VT,POX200,VT,CLR=00
76 CLR=00,VT,POX200,VT,CLR=00
77 CLR=00,VT,POX200,VT,CLR=00
78 CLR=00,VT,POX200,VT,CLR=00
79 CLR=00,VT,POX200,VT,CLR=00
80 CLR=00,VT,POX200,VT,CLR=00
81 CLR=00,VT,POX200,VT,CLR=00
82 CLR=00,VT,POX200,VT,CLR=00
83 CLR=00,VT,POX200,VT,CLR=00
84 CLR=00,VT,POX200,VT,CLR=00
85 CLR=00,VT,POX200,VT,CLR=00
86 CLR=00,VT,POX200,VT,CLR=00
87 CLR=00,VT,POX200,VT,CLR=00
88 CLR=00,VT,POX200,VT,CLR=00
89 CLR=00,VT,POX200,VT,CLR=00
90 CLR=00,VT,POX200,VT,CLR=00
91 CLR=00,VT,POX200,VT,CLR=00
92 CLR=00,VT,POX200,VT,CLR=00
93 CLR=00,VT,POX200,VT,CLR=00
94 CLR=00,VT,POX200,VT,CLR=00
95 CLR=00,VT,POX200,VT,CLR=00
96 CLR=00,VT,POX200,VT,CLR=00
97 CLR=00,VT,POX200,VT,CLR=00
98 CLR=00,VT,POX200,VT,CLR=00
99 CLR=00,VT,POX200,VT,CLR=00
100 CLR=00,VT,POX200,VT,CLR=00

```

```

210 CLR=00,VT,POX200,VT,CLR=00
211 CLR=00,VT,POX200,VT,CLR=00
212 CLR=00,VT,POX200,VT,CLR=00
213 CLR=00,VT,POX200,VT,CLR=00
214 CLR=00,VT,POX200,VT,CLR=00
215 CLR=00,VT,POX200,VT,CLR=00
216 CLR=00,VT,POX200,VT,CLR=00
217 CLR=00,VT,POX200,VT,CLR=00
218 CLR=00,VT,POX200,VT,CLR=00
219 CLR=00,VT,POX200,VT,CLR=00
220 CLR=00,VT,POX200,VT,CLR=00
221 CLR=00,VT,POX200,VT,CLR=00
222 CLR=00,VT,POX200,VT,CLR=00
223 CLR=00,VT,POX200,VT,CLR=00
224 CLR=00,VT,POX200,VT,CLR=00
225 CLR=00,VT,POX200,VT,CLR=00
226 CLR=00,VT,POX200,VT,CLR=00
227 CLR=00,VT,POX200,VT,CLR=00
228 CLR=00,VT,POX200,VT,CLR=00
229 CLR=00,VT,POX200,VT,CLR=00
230 CLR=00,VT,POX200,VT,CLR=00
231 CLR=00,VT,POX200,VT,CLR=00
232 CLR=00,VT,POX200,VT,CLR=00
233 CLR=00,VT,POX200,VT,CLR=00
234 CLR=00,VT,POX200,VT,CLR=00
235 CLR=00,VT,POX200,VT,CLR=00
236 CLR=00,VT,POX200,VT,CLR=00
237 CLR=00,VT,POX200,VT,CLR=00
238 CLR=00,VT,POX200,VT,CLR=00
239 CLR=00,VT,POX200,VT,CLR=00
240 CLR=00,VT,POX200,VT,CLR=00
241 CLR=00,VT,POX200,VT,CLR=00
242 CLR=00,VT,POX200,VT,CLR=00
243 CLR=00,VT,POX200,VT,CLR=00
244 CLR=00,VT,POX200,VT,CLR=00
245 CLR=00,VT,POX200,VT,CLR=00
246 CLR=00,VT,POX200,VT,CLR=00
247 CLR=00,VT,POX200,VT,CLR=00
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252 CLR=00,VT,POX200,VT,CLR=00
253 CLR=00,VT,POX200,VT,CLR=00
254 CLR=00,VT,POX200,VT,CLR=00
255 CLR=00,VT,POX200,VT,CLR=00
256 CLR=00,VT,POX200,VT,CLR=00
257 CLR=00,VT,POX200,VT,CLR=00
258 CLR=00,VT,POX200,VT,CLR=00
259 CLR=00,VT,POX200,VT,CLR=00
260 CLR=00,VT,POX200,VT,CLR=00
261 CLR=00,VT,POX200,VT,CLR=00
262 CLR=00,VT,POX200,VT,CLR=00
263 CLR=00,VT,POX200,VT,CLR=00
264 CLR=00,VT,POX200,VT,CLR=00
265 CLR=00,VT,POX200,VT,CLR=00
266 CLR=00,VT,POX200,VT,CLR=00
267 CLR=00,VT,POX200,VT,CLR=00
268 CLR=00,VT,POX200,VT,CLR=00
269 CLR=00,VT,POX200,VT,CLR=00
270 CLR=00,VT,POX200,VT,CLR=00
271 CLR=00,VT,POX200,VT,CLR=00
272 CLR=00,VT,POX200,VT,CLR=00
273 CLR=00,VT,POX200,VT,CLR=00
274 CLR=00,VT,POX200,VT,CLR=00
275 CLR=00,VT,POX200,VT,CLR=00
276 CLR=00,VT,POX200,VT,CLR=00
277 CLR=00,VT,POX200,VT,CLR=00
278 CLR=00,VT,POX200,VT,CLR=00
279 CLR=00,VT,POX200,VT,CLR=00
280 CLR=00,VT,POX200,VT,CLR=00
281 CLR=00,VT,POX200,VT,CLR=00
282 CLR=00,VT,POX200,VT,CLR=00
283 CLR=00,VT,POX200,VT,CLR=00
284 CLR=00,VT,POX200,VT,CLR=00
285 CLR=00,VT,POX200,VT,CLR=00
286 CLR=00,VT,POX200,VT,CLR=00
287 CLR=00,VT,POX200,VT,CLR=00
288 CLR=00,VT,POX200,VT,CLR=00
289 CLR=00,VT,POX200,VT,CLR=00
290 CLR=00,VT,POX200,VT,CLR=00
291 CLR=00,VT,POX200,VT,CLR=00
292 CLR=00,VT,POX200,VT,CLR=00
293 CLR=00,VT,POX200,VT,CLR=00
294 CLR=00,VT,POX200,VT,CLR=00
295 CLR=00,VT,POX200,VT,CLR=00
296 CLR=00,VT,POX200,VT,CLR=00
297 CLR=00,VT,POX200,VT,CLR=00
298 CLR=00,VT,POX200,VT,CLR=00
299 CLR=00,VT,POX200,VT,CLR=00
300 CLR=00,VT,POX200,VT,CLR=00

```



# RS232 On The Plus/4

*19,200 baud on the Plus/4? A Beeb listing in a  
Commodore mag? Are we kidding you? We certainly  
aren't, . . .*

*By R C Homes*

Surprising though it may seem, the Plus/4 is a lot faster at communicating using RS232 than the 64. This is due to the 64 using a software simulation to copy the action of the 6550 ACIA IC which would normally be used for RS232. Indeed, the 64 is so slow that it often misses characters even at the leisurely 300 baud.

The Plus/4 on the other hand, has a 6551 which handles all the RS232 signals except CTS which is dealt with by a 6525. Also, there is no need to connect 5-volt pins B (as suggested in 'Interfacing with the RS232', *Four Commodore*, January 1987, p 82-90).

The Plus/4 software has the ability to use XON/XOFF flow control with the user's choice of XON/XOFF characters. These are normally CTL/S for XOFF and CTL/Q for XON. This facility is used to stop the remote device from transmitting more data when the receiving device has no more room in its input buffer, and to restart the remote device when the receiving device has removed enough characters from its buffer.

The Plus/4 has a dedicated 64-byte RS232 user receive buffer located at \$00F7, to \$00A6, and a one byte system transmit buffer at \$607CF which is used to hold the current XON/XOFF character.

If the ACIA is configured, the interrupt handler will call two sub-routines to handle RS232 interrupts. The first routine:

```

5 REM BBC PROGRAM TO TEST PLUS/4 TO BBC BUILT AT 19200 BAUD
10 PRINT 0
20 PRINT 0
30 PRINT 0
40 PRINT 0
50 FOR I=0000
60 BB=INKEY$()
70 IF BB=CHR$(10) THEN 100
80 BB=INKEY$()
90 IF BB=CHR$(17) THEN 60
100 PRINT CHR$(10)
110 NEXT I
120 GOTO 30

5 REM PLUS/4 PROGRAM TO TEST PLUS/4 TO BBC BUILT AT 19200 BAUD
10 OPEN "2.vb" FOR INPUT AS #IN0
20 FOR I=0 TO 13:PRINT I:GOTO 10
30 GOTO 20
40 PRINT " "
50 GOTO 30

```

*Listings 1 and 2: programs for the BBC B (top)  
and the Plus/4 to show transmission from the BBC  
to the Plus/4 at 19,200 baud.*

Checks for a remote device; initiates XON/XOFF sequence and handles it appropriately;

Checks user receive buffer is full, and if so then ignores that received character and returns;

If there is room for eight characters, then it sets various flags, and stores XOFF character from SPD into the status transmit buffer and puts the received character in the user input buffer.

The second routine called with:

Check AC1A transmit buffer empty and return if not;

Check for CTS signal low, and return if so;

Check input buffer full flag, and send either XOFF or XON as appropriate.

It is the job of the BS232 portion of the CHRIN routine to reset the user

buffer-full and remote-paused flags and initiate sending of the XON character.

Note that the XON/XOFF protocol is used only if the user has FDBid (the XON/XOFF character in to SFC and SPD respectively); if these two locations are zero then characters received when the buffer is full are ignored.

#### And The Proof...

I have tested the Plus/4 connected to a BBC Model B, running at 90,000 baud, with the BBC sending the Plus/4 at full speed, and over a one hour period not a single character was lost by the Plus/4. The two programs for the Plus/4 and the BBC are shown in Listing 1 and 2.

Unfortunately, there is a bug in the Plus/4 ROM BS232 routines, which

causes the Plus/4 to crash immediately after it has transmitted the first XON remote character, and the rest of this article describes how to fix this bug.

First we need to make our own copy of the Kernel ROM, and then patch the incorrect code. This is not so easy... Listing 3 is a listing of a Basic Program and a machine code program which copy the ROM down into RAM, cause the new version of the Kernel to be executed, and inhibit switching back to ROM. The top of memory pointers are also reset to \$FFFF, and the bad code in the ROM copy is fixed. The Basic program must be typed in **Exactly** as shown, with **No** additional spaces, etc, as the machine code program is immediately above it at \$465A.

A disassembly of the BS232 code in the Kernel is included in figure 3.

```

1  P00051,0:0P00053:0:P00055,0:P00057,128:P00059,128:P0005A,128:CL0
2  2104705
3  MEM

```

Listing 3A: Basic program to reset up of memory pointers and call machine code program to copy the Kernel and Basic from ROM to RAM, and change all references to ROM to RAM.

Listing 3B: Machine code program to copy ROM to RAM and inhibit switching to ROM.

1043 F8	OR0	\$1043	
1044 88 38 FF	SET		
1047 AD 00	STA	\$F F38	204705H TO ROM
1049 89 00 80	LBT	\$000	
104C 89 00 80	LBA	\$000, Y	20000 PART 1 OF ROM TO RAM
104E 89 00 80	STA	\$0000, Y	248000 TO \$FFFF
1050 C8	IMP		
1050 80 FF	OR0	LP1	
1052 88 48 10	INC	LP1+2	
1053 88 4E 10	INC	LP1+3	
1058 A9 4E 10	LSL	LP0+3	
1058 C9 F0	IMP	\$8FB	
1058 80 6A	OR0	LP0	
105F 80 40	LSR	\$840	
1061 89 00 FF	LBA	\$FFFF, Y	COPY PART 2 OF ROM TO RAM
1064 89 00 FF	STA	\$FFFF, Y	20FF40 TO \$FFFF
1067 C8	IMP		
1068 80 FF	OR0	LP2	

PLUS/4 UTILITY

1064 87 3F	LDA	200F3F	J1000007 ALL ROM SWITCHES
106C 89 82 04	STA	80482	
106F 89 9C 04	STA	8049C	
1072 89 AC 04	STA	804AC	
1075 89 B7 04	STA	804B7	
1078 89 C2 04	STA	804C2	
107B 89 CB 04	STA	804CB	
107E 89 D8 04	STA	804D8	
1081 89 E5 04	STA	804E5	
1084 89 F1 07	STA	807F1	
1087 89 7E 81	STA	8817E	
108A 89 4C 81	STA	8814C	
108D 89 9B CF	STA	8CF9B	
1090 89 F7 FF	STA	8FFF7	
1093 89 7F FF	STA	8FFF7	JSWITCH TO RAM
1096 A9 4C	LDA	284C	JPUT JMP SECS AT 0870
1098 8A 18 CB	STA	8CB18	
109B A9 C5	LDA	28C8C5	
109E 8B 1C CB	STA	8CB1C+1	
10A0 A9 CE	LDA	28C8CE	
10A2 8B 18 CB	STA	8CB18+2	
10A5 A2 08	LDA	2808	JCOPY CODE TO PATCH AREA
10A7 89 82 10	LPS LDA	8082	
10A9 99 C3 CE	STA	8CEC3	
10AB CA	SEC		
10AE 10 F7	BNL	LPS	
10B0 58	CLI		
10B1 50	RTD		
10B2 86 CF 07	PCB STA	807CF	JSAVE CH IN SYSTEM O/P BUFFER
10B5 68	PLA		JFULL NEXT USER INPUT CHAR
10B8 4C 1E 8B	JMP	881E	RETURN TO 85212 ROUTINE



Using 4. The Plus/4 RS232 module.

TRANSMIT RS232 CHARACTER, ENTERED FROM I/O ROUTINE AT SC225

```

EA50 A0 04 07 5E450    LDR 30704    JGET ACIA STATUS
EA52 29 10            AND 1810     JTX DATA REG FLAG
EA54 F0 12            BEQ 0E194    J=JTX DATA REG NOT EMPTY
EA56 80 10 F0        LRA 1F910    265296
EA58 29 02            AND 2102     JCTS PRESENT
EA5A F0 20            BEB 0E194    P=2MS, DO NOT TRANSMIT
EA5C A2 00            LRA 1900
EA5E 2C 0C 07        BIT 30700    JCYSTER INPUT BUFFER FULL?
EA60 10 09            BPL 0E178    Z -> NO
EA62 80 C4 07        LRA 307C0    JREG, GET CHAR FROM TXS BUF
EA64 80 90 07        STX 30700    JCLEAR SYSTEM BUFFER FULL FLAG
EA66 4C 89 0A        JMP JE489
EA68 2C 08 07 0E178  BIT 307C0    JDSR INPUT BUFFER FULL?
EA6C 10 16            BPL 0E194    Z -> NO
EA6E 2C 06 07        BIT 30708    JYES, LOCAL PAUSE SET?
EA70 50 11            AND 0E194    Z -> YES
EA72 A0 C0 07        LDR 307C0    JNO-GET USER CHAR TO SEND
EA74 80 C0 07        STX 307C0    JCLEAR USER BUFFER FULL FLAG
EA76 80 00 F0 JE489  STA 1F800    JACIA TRANSMIT REG
EA78 80 04 07        LRA 30704    JGET ACIA STATUS REG
EA7A 29 07            AND 2107    JIRYS ONLY TRANSMIT DATA REG
EA7C 80 04 07        STA 30704    J STATUS BIT
EA7E 60            BEA94    RTS

```

CHECK FOR RECEIVED RS232 CHARACTER ENTERED FROM I/O AT SC225

```

EA80 A0 04 07 5E450    LDR 30704    JGET ACIA STATUS REG
EA82 29 08            AND 2008    JRECEIVE DATA REG FLAG
EA84 F0 04            BEB 0E178    P=2MS DATA REG NOT FULL
EA86 A0 04 07        LDR 30704    JGET RX DATA REG FLAG
EA88 29 07            AND 2107    JRRYS ONLY RX DATA REG

```

PLUS/4 UTILITY

```

E8A1 80 84 07      STA 80784      J STATUS BIT
E8A4 80 00 F0      LBA 8F800      JSET ACIA RCV REGISTER
E8A7 F0 10        BEQ BEAC2      J -> NO DATA OR NULL
E8A9 80 83 07      STA 80785      JSAVE THE CHR
E8AC C5 F0        CMP #FC        JIS IT NON CHARACTER?
E8AE 80 07        BNE BEA87      J -> NO
                RECEIVED NON REMOTE INQ WANTS US TO RESTART TRANSMISSION
E8B0 49 10        LBA 1000      JYES, CLEAR
E8B2 80 86 07      STA 80786      J LOCAL PAUSE FLAG
E8B5 F0 50        BEQ BEA88      J AND RETURN
E8B7 C5 F0      BEA87      CMP #FD        JIS IT XOFF CHARACTER?
E8B9 80 07        BNE BEAC2      J -> NO
                RECEIVED XOFF CHARACTER, REMOTE INQ WANTS US TO STOP TRANSMISSION
E8BB 49 FF        LBA 1FFF      JYES, SET LOCAL
E8BD 80 86 07      STA 80786      J PAUSE FLAG
E8C0 80 20        BNE BE8FD      J AND RETURN
E8C2 80 83 07 BEAC2  LBA 80783      INCHANG IN USER INPUT BUFFER
E8C5 C9 10        CMP 155F      ZFULL?
E8C7 F0 27        BEQ BE8FD      J -> YES
E8C9 C9 10        CMP 155E      INQ. AT THRESHOLD FOR XOFF?
E8CB 80 07        BNE BE88C      J -> NO
E8CD 83 F0        LBA #FD      JYES, SET XOFF CHAR
E8CF F0 00        BEQ BE88C      J -> NO XOFF CHAR DEFINED
E8D1 80 07 07      STA 807CF      JPUT IN SYSTEM O/P BUFFER
E8D4 49 FF        LBA 1FFF
E8D6 80 80 07      STA 80780      JSET SYSTEM BUFFER FULL FLC
E8D9 80 07 07      STA 80787      JSET REMOTE PAUSE FLAG
E8DB 80 81 07 BEA8C  LBA 80781      JSET USER I/P BUFFER INQ
E8DE 10          INX
E8E0 84          TBA
E8E2 29 1F        BND 155F      JRAKE INQ#R HD# 84 AND

```

```

E0E3 04 01 0F      STA 30704      J STORE NEW INDEX
E0E4 04      TAX          JGET INDEX IN JE
E0E7 00 05 0F      LDA 30705      JGET RECEIVED CHAR
E0EA 00 07 05      STA 303F7.5   J AND STORE IN USER I/P BUF
E0ED 00 05 0F      DBC 30705      JCHARS IN USR I/P BUFFER
E0F0 00      READD      RTS

```

CONTINUATION OF CHR0M FOR RS232 SERVICE

```

E0F1 00 05 0F 0A0F LDA 30705      JCHARS IN USR I/P BUFFER
E0F4 00 14      BEQ 00B2A     J -> EMPTY
E0F6 00      RMP          JXMR INHIBIT STATUS
E0F7 78      SEI          JXMR INHIBIT STATUS
E0FA 00 03 0F      LDR 30702     JI/P & FETCH INDEX
E0FB 00      DNE          JXMR DNE
E0FC 00      TXR          JXMR DNE
E0FE 20 3F      AND 003F     JXMR MOD 64
E0FF 00 02 0F      STR 30702     J AND RESTORE IT
E102 20      PLP          JRECOVER INHIBIT BIT
E103 0A      TAX          JI/P & FETCH INDEX
E104 00 07 05      LBA 303F7.5  JGET NEXT CHAR FROM I/P BUF
E107 40      PHA          J ONTO STACK
E108 00 03 0F      BEC 30703     JDECREMENT NCHARS IN BUF
E10B 00 03 0F      LBA 30703     JGET NCHARS IN I/P BUF
E10E 09 08      CMP 1008     JXMR
E110 00 19      ONE 0000     J -> NCHARS <= 0
E112 20 07 0F      BIT 30707     JIS REMOTE PAUSE FLAG SET?
E115 10 14      BPL 00020     J -> NO
E117 05 0C      LBA 00C      JIS XMR CHAR DEFINED?
E119 00 10      BEQ 00020     J -> NO
E11A 00 0F 0F      STA 3070F     JYES, PUT IT IN SYS OFF BUF

```

HERE IS THE BUS, THE NEXT CHARACTER TO BE RETURNED TO THE USER IS THE TOP ENTRY ON THE STACK. A PLP SHOULD BE DONE HERE.

```

0010 38          SEC
0017 40 00 07   ROR 00700      RESET SYS BUFFER FULL FLAG
0027 40 07 07   LSR 00707      7 AND REMOTE PAUSE FLAG
0035 20 00 07 00025  RIR 00708      FACIL PRESIDENT?
0038 10 00          SPL 00035      7 -> NO
0024 40          RMR08      PMA      PFS, SAVE NEXT CHAR TO SEND
0028 40 04 07 00028  LSR 00704      POST ACIA STATUS REG
002F 20 40          AND 001001111  7 SAVE DIR
0030 40 40          OR  001000010  7 AND INVERT IT
0032 05 70          STA 000      7 STORE IN KERNEL, ST WORD
0034 05          PLA          DECODED CHAR SEND
0035 10          00035      CLC      FLAG NO ERROR
0036 40          RTS

      SETUP USER CHARACTER TO TRANSMIT
0037 20 00 07 00037  SET 00FC8      USER XMIT BUFFER FULL?
003A 30 00          ORI 00037      0-2YES, WAIT FOR IT TO EMPTY
003C 00 00 07       STA 00FC8      END, STORE USER XMIT CHARACTER
003F 30          SEC          2 IN USER XMIT BUFFER, SET
0040 40 00 07       ROR 00FC8      2 USER XMIT BUFFER FULL FLAG
0045 40 2A 00       JMP 0002A

      INITIALIZE RS232 CONSTANTS AND ACIA
0046 40 00          00046  LRA 0000      PCLEAR ALL
0048 42 00          LBR 0000      7 RS232
004A 70 00 07 0004A  STA 00700,0  7 VARIABLES
004C 0A          ORX
004E 10 7A          SPL 0004A
0050 00 01 00       STA 00001      PRESET ACIA
0053 05 7C          STA 00C      CLEAR XMIT CHARACTER
0055 05 70          STA 000      CLEAR XMIT CHARACTER
0057 60          RTS

```



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# Windows

*Put text anywhere on the screen you want, and scroll it too, with this set of fast C64 routines.*

*By R.A. Henderson*

**H**ave you ever tried drawing windows with your 64, and then writing text in those windows in an attempt to simulate the features of the ubiquitous IBM PC? It is not a difficult task in Basic using the graphics symbols available in the Commodore character set. However, it is of limited use in this simple form, and is very cumbersome to manipulate.

The routines which are presented in this article are all machine code based. They enable complex windowing tasks to be implemented easily, and provide many useful features.

With these routines you can draw a window of any size, anywhere on the screen. On removing that window, the text underneath is restored. Up to five windows can be displayed at any one time, and in all cases the text underneath is restored as each window is removed. The windows can even overlap one another. The only restriction imposed when using multiple windows, is that they must be removed in reverse order to their application.

Finally, routines are presented which allow the contents of the windows to be scrolled in any one of four directions: up, down, left and right. Indeed, multiple scrolling of different windows in different directions is possible, although this feature cannot be applied to overlapping windows.

Now, down to the routines. All the code has been written and assembled using the SuperSoft Micro Assembler, but is pretty well universal. The code has been assembled starting at \$C110

so that it does not interfere with your Basic program. The program is constructed from a number of modules, and the line numbers presented with each module, whilst essentially arbitrary, do enable you to slot the modules together easily.

## Listing 1 - Variables

The first routine declares all the variables used by the program. It also identifies, in line 300, the start point for the assembly process at \$C110.

A word or two about the major variables will ease understanding of the program.

Each window is defined by four parameters: the top left-hand corner of the window frame; the number of columns and rows of text within the window; and the colour of the window frame.

The corner is identified by its memory location. This can be established by referring to the screen memory map in Appendix G of the User Manual. The top left-hand corner of the screen is \$024 (\$8480), and the bottom right \$023 (\$847F). The corner must be identified as two bytes, LOCORNER and HICORNER, in normal low-high format.

The other three parameters, COLUMN, ROW and COLOUR, can all be specified as single byte numbers, and in the case of COLOUR, this is defined in Appendix G of the User Manual.

FRAME represents the parameters which make up the window frame. By referring to Appendix E of the User

Manual, you will see that 73 is the top right-hand corner of the frame, 66 is a vertical line, 75 the bottom right-hand corner, 67 a horizontal line, 72 a space, 85 the top-left corner and 94 the bottom left-hand corner. These parameters can be changed, if desired, to give alternative window outlines.

In order to restore the contents of the screen once a window is removed, it is first necessary to save these contents. To avoid wasting valuable memory space, I have chosen to store the contents of the screen under each window in that area of RAM which resides beneath the Basic ROM. MEMSTART identifies the start of each stored window in memory, using two bytes in low-high format, and starts at \$AB00. PNTB points to the start of the most recent window. MEMCORN stores the corner location in two bytes, and MEMPARAM also two bytes to store COLUMN and ROW respectively.

A word of warning! These are no traps in the program to prevent you from specifying unstable windows. Poor specification can result in windows which wrap around the screen, or, worse, if you specify a window whose size would cause it to go beyond memory location \$FFF1, then you are in grave danger of overwriting your Basic program, starting at \$0000.

## Listing 2 - Drawing a Window

Having declared our variables in Listing 1, this is the first routine which

actually does something.

To prove that this routine works, assemble it, together with the variables (Listing 1) and make the following POKES (in immediate mode):

```
POKE149427,166:POKE149428,4:
POKE149429,16:POKE149430,25:
POKE149431,5.
```

Now call SYS49431 and you should see a green window frame appear instantly on your screen.

### Listing 3 - Save and Replace Window

Before drawing a window, it is first necessary to save the screen contents under that window. Then, when you remove that window, the original screen contents can be replaced.

Now assemble Listing 3 together with Listings 1 and 2, and then repeat the series of POKES. Call SYS 49432 followed by SYS 49473 and the green window will appear. Now call SYS 49714. The window is removed, and the original screen contents replaced.

### Listings 4 and 5 - Scrolling

The routines in Listings 4 and 5 provide up, down, right, and left scrolling of the windows. If you don't want this facility, then omit these routines entirely.

We won't bother testing these routines until you've entered our final two listings, since this next listing avoids the need for all these POKES.

### Listing 6 - Data Entry

We can simplify the process of entering our window data by making use of Basic keys already in your 64. The ones we will use are:

1. At ASCII 266 is the kernel ROM, which echoes the current character.
2. At ASCII 268, also in the kernel, which checks for, and skips the "." character.
3. At ASCII 6 in the Basic ROM, which places the entered data into locations \$14 and \$15 of Zero Page.

Listing 6 accomplishes this by loading

our window parameters, LOCORNER, HECORNER, COLUMN, ROW and COLOUR, into the variables table of Listing 1.

### Listing 7 - Module Linker

I have presented you with a number of routines which can be strung together to provide a comprehensive windowing program. This last listing is self-explanatory, and simplifies the task of accessing the various functions from Basic. If you have decided to omit the scrolling routines, then delete line 996 to 999 also.

If you have entered all the code and assembled it, then you should get a start address for assembly of \$C100, and a finish address of \$C400.

Now down to using the program. The machine code can be accessed either from Basic or in immediate

mode as follows:-

```
Draw window: SYS 49428,CM,
RW,CL
Scroll up: SYS 49437,CR,CM,
RW,CL
Scroll down: SYS 49444,CR,CM,
RW,CL
Scroll right: SYS 49451,CR,CM,
RW,CL
Scroll left: SYS 49458,CR,CM,
RW,CL
Remove window: SYS 49463
where
```

```
CR = corner location
CM = number of columns
RW = number of rows
and CL = colour
```

The best way to use the program is by experimentation, and our final listing is a short Basic program to demonstrate this. 

```

PROGRAM: 1.LISTING1
100 | *****
110 | **
120 | **
130 | ** * WINDOW *
140 | ** *****
150 | ** VERSION 04 10/01/87
160 | **
170 | *****
180 |
190 LOCORNER=STORE
200 HECORNER=STORE+1
210 COLUMN=STORE+2
220 ROW=STORE+3
230 COLOUR=STORE+4
240 Z0=0FF
250 Z1=0FF
260 Z2=0FF
270 Z3=0FF
280 Z0P1=0FF
290 |
300 *-HC110
310 |
320 TEMP BYT 0
330 TEMP BYT 0
340 PNR BYT 0
350 STORE BYT 0,0,0,0,0
360 NEXTRT BYT 0,0,0,0,0,0,0,0,0,0,0
370 NEXTDR BYT 0,0,0,0,0,0,0,0
380 NEHPAR BYT 0,0,0,0,0,0,0,0
390 |
400 | ***** WINDOW OUTLINE *****
410 FRAME BYT 73,66,75,67,32,67,65,66,71
420 | *****
430 |

```



## PROGRAM 2. LISTING

```

1100 : ** OPEN WINDOW **
1120 WINDOW L&D COLURN
1140 END
1150 LDA #0
1160 JBR BRW
1170 JNZ
1180 LOOP1 JBR BRW
1190 BRW SKIP1
1200 BRW
1210 BEY
1220 JBR LOOP1
1230 BRW SKIP1 END
1240 JBR BRW
1250 BRW
1260 :
1270 BRW JBR SETUP
1280 JBR SCREEN
1290 BRW
1300 LDA #0
1310 STA TEMP
1320 LOOP2 JBR ADD1
1330 JBR SCREEN
1340 INC SKIP1
1350 LDA TEMP
1360 BRW ADD1
1370 BCC LOOP2
1380 JNZ
1390 JBR ADD1
1400 JBR SCREEN
1410 BEY
1420 BRW
1430 :
1440 SCREEN JBR ADD1
1450 LDA FRAME,X
1460 STA CMO,Y
1470 LDA COLURN
1480 STA CMO,Y
1490 BRW
1500 :
1510 :
1520 : ** ADD LINE **
1530 ADD1 CLC
1540 LDA #0
1550 ADC ADDR
1560 STA #0
1570 BCC SKIP1
1580 INC #1
1590 SKIP1 BRW
1600 :
1610 :
1620 : ** ADD COLUMN TEMPOR **
1630 ADD1 CLC
1640 LDA #0
1650 STA #0
1660 LDA #0
1670 ADC ADDR
1680 STA #0
1690 BRW
1700 :
1710 :
1720 :
1730 SETUP LDA LOCORNER
1740 STA #0
1750 LDA LOCORNER
1760 STA #1
1770 BRW
1780 :

```

## PROGRAM 3. LISTING

```

1790 : ** SAVE WINDOW **
1800 BRW%18 L&X P%18
1810 CPX #0
1820 BRW BRW SKIP1
1830 LDA P%18,X
1840 STA #0
1850 LDA LOCORNER
1860 STA #0
1870 STA P%18,X
1880 STA TEMP
1890 LDA COLURN
1900 STA P%18,X,X
1910 LDA
1920 LDA P%18,X,X
1930 STA #0
1940 LDA LOCORNER
1950 STA #1
1960 STA P%18,X
1970 STA TEMP
1980 LDA COLURN
1990 STA P%18,X,X,X
2000 LDA
2010 LDA P%18,X,X
2020 STA #0
2030 LDA LOCORNER
2040 STA #1
2050 STA P%18,X
2060 STA TEMP
2070 STA COLURN
2080 STA P%18,X,X
2090 STA #0
2100 :
2110 :
2120 :
2130 :
2140 :
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2160 :
2170 :
2180 :
2190 :
2200 :
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6890 STA #0
6900 LDA P%18,X
6910 STA #1
6920 LDA TEMP
6930 LDA P%18,X,X
6940 STA #0
6950 BRW
6960 LDA P%18,X,X
6970 STA #0
6980 LDA P%18,X,X
6990 STA #0
7000 STA TEMP
7010 LDA P%18,X,X
7020 STA COLURN
7030 STA #0
7040 STA P%18,X
7050 JBR REPLACE
7060 JBR SWITCH
7070 JBR REPLACE
7080 SKIP1 LDA #0
7090 STA #0
7100 :
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## PROGRAM 4. LISTING

```

4000 : ** SCROLL UP **
4010 @PTRCOLL L&R #0
4020 STX TEMP1
4030 JSR SETUP
4040 JSR MOVE
4050 JSR BLANKCELL
4060 L&R #0
4070 JSR BLANKCELL
4080 :
4090 JSR SETUP
4100 JSR #0
4110 JIF SKIP2
4120 :
4130 :
4140 : ** SCROLL DOWN **
4150 @BLANKCELL L&R #FFF
4160 STX TEMP1
4170 JSR @BLANK
4180 JSR BLANKCELL
4190 L&R #0
4200 JSR BLANKCELL
4210 :
4220 JSR @BLANK
4230 STX TEMP1
4240 STX #0
4250 JSR BLANKCELL
4260 STX
4270 :
4280 :
4290 L&R #0
4300 STX TEMP1
4310 STX #0
4320 STX #0
4330 STX #0
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5990 STX #0
6000 STX #0

```

```

4330 JSR #0
4340 L&R #0
4350 STX
4360 L&R #0
4370 STX
4380 STX
4390 STX
4400 :
4410 : ** SUBTRACT LINE **
4420 SUB1 #0
4430 L&R #0
4440 STX #0
4450 STX #0
4460 STX #0
4470 STX #0
4480 STX #0
4490 STX #0
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4590 :
4600 :

```

## PROGRAM 5. LISTING

```

4600 : ** SCROLL RIGHT **
4610 @PTRCOLL L&R #0
4620 JSR SETUP
4630 JSR #0
4640 L&R #0
4650 STX #0
4660 STX #0
4670 STX #0
4680 STX #0
4690 STX #0
4700 STX #0
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5980 STX #0
5990 STX #0
6000 STX #0

```

```

5800 STX #0
5810 STX #0
5820 STX #0
5830 STX #0
5840 STX #0
5850 STX #0
5860 STX #0

```

## PROGRAM 6. LISTING

```

6000 : ** FECH WINDOW PARAMETERS **
6010 @PARAMETERS JSR FECH
6020 STX #0
6030 STX #0
6040 STX #0
6050 STX #0
6060 STX #0
6070 STX #0
6080 STX #0
6090 STX #0
6100 STX #0
6110 STX #0
6120 STX #0
6130 STX #0
6140 STX #0
6150 STX #0
6160 STX #0
6170 STX #0
6180 STX #0
6190 STX #0
6200 STX #0
6210 STX #0
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6230 STX #0
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6280 STX #0
6290 STX #0
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6980 STX #0
6990 STX #0
7000 STX #0

```

## PROGRAM 7. LISTING

```

710 : *****
720 : ** SET UP WINDOW **
730 : *****
740 JSR PARAMETERS
750 JSR @BLANK
760 JSR @BLANK
770 STX #0
780 :
790 :
800 :
810 : ** REPLACE WINDOW **
820 : *****
830 JSR @BLANK
840 STX #0
850 :
860 :
870 :
880 : ** SCROLL WINDOW UP **
890 : *****
900 JSR PARAMETERS
910 JSR @PTRCOLL
920 STX #0
930 :
940 :
950 :
960 : ** SCROLL WINDOW DOWN **
970 : *****
980 JSR PARAMETERS
990 JSR @BLANKCELL
1000 STX #0
1010 :
1020 :
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# Listings

*Get it right first time with our deluxe program system for the C64.*

**Y**ou may have noticed that our listings are free of those horrible little black blobs which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the fancy numbers by the side of each line of our listings. First no more, it's all part of our easy entry aid.

Instead of those messy graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an ace of spades in layman's terms, and [SA10] would mean a row of ten of those symbols.

[B+1] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realize that [C+2] means exactly the same thing except that the Command key (bottom left of the keyboard) is held down instead of the shift key.

If more than five spaces appear in a statement then this will be printed as [SPC4] or, exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as [CTRL N, DOWNLEFTS, BLUE, F1C2].

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F1 key and, finally hold the Command key down while pressing the number two key (C2 would of course make the computer print in brown).

Always remember that you should only have a row of graphics characters on your screen with its square brackets and no commas, unless something like this appears:

[SS][C\*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quote mode. Hold down CTRL and press the number nine key (RVSON), type the relevant number of reversed T's and then hold down CTRL and press zero (RVSOFF). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A lot of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string; the symbol for pi. This may appear when its value is needed in a calculation as this may look something like:

:OC=24[PI]R:

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol).

## PROGRAMS SYSTEM CATALOG

```

3 000 00000 000000 - BASIC SYNTAX
10 [B]-[C] 100-70 100-100.00
20 FOR L=0 TO 20 [B,C]000-000 040 TO
  20
30 [B]00 01 01 00 000000000000000000
40 [B] 10 1000 100-100-10000-0000
50 [B]00 10 000 00000 0000
70 [B]00 100 0 0 000 100 000 00 0
80 100 0 100 00 000 100 00 000 0
85
90 [B]00 100 0 100 100 0 000 0 0
0 0 0 0 000 000 00 100 0 0 0 000 100 0
95
100 [B]00 2 000 00 100 100 0 000
00 000 100 0 100 00 000 000 00 00
110
120 [B]00 00 100 100 00 100 00 10
0 00 000 0 100 00 100 000 000 00
130
140 [B]00 00 100 000 0 000 000 100
0 0 000 00 000 000 100 000 000 00
150
160 [B]00 0 0 000 0 000 000 00 10
2 000 000 000 000 100 1 100 100
170
180 [B]00 0 100 000 00 00 00 00 0
0 100 100 00 000 000 000 00 00
0000
190 [B]00 00 00 100 000 00 000 00
0 100 100 00 000 000 000 00 00 00
0 1000
200 [B]00 000 000 0 000 100 0 100
1000 000 100 100 000 00 100 00 00
1 10000
210 [B]00 000 00 100 00 100 00 00
00 00 00 00 00 000

```

by Eric Doyle

## Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly as printed—go back and check each character carefully. When you find the error simply correct it and

press RETURN again.

If you want to turn off the checker simply type SYS49132 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum has you can go back to it with the same SYS command.

No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing! 

Mnemonic	Symbol	Keypress
[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RYSON]		CTRL & 4
[RYSOFF]		CTRL & 0



Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LBARROW]		←
[UPARROW]		↑
[F9]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		no text
[Clear]		CBM + home
[Letter]		SHIFT + letter

[BLACK]



CTRL &amp; 1

[WHITE]



CTRL &amp; 2

[RED]



CTRL &amp; 3

[CYAN]



CTRL &amp; 4

[PURPLE]



CTRL &amp; 5

[GREEN]



CTRL &amp; 6

[BLUE]



CTRL &amp; 7

[YELLOW]



CTRL &amp; 8

[POUND]

£

[LBARROW]



[UPARROW]



[F9]

SHIFT &amp; ↑

[INST]

SHIFT &amp; INST/DEL

[REV T]

no text

[Clear]

CBM + home

[Letter]

SHIFT + letter

# Software for sale

*If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out.*

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Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The *Your Commodore Software Service* makes available all of the programs from each issue on both cassette and disk at a price of \$6.00 for disk and \$4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

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please contact this address for prices and availability.

## The Disk

Programs on the disk will also be supplied as fully working versions, i.e. when possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strip containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strip. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

## Please Note

Since the programs supplied on cassette are total working versions of the program, we do not put disk only programs on tape. There is no sense in placing a program that expects to be reading from disk on to tape.

## MARCH 1987

**SPELLING CHECKER** — for use with the Plus4 word processor — disk only.

**NINE LINE MATRIX** — Clears 58 column display on your C128.

**JOYSTICK READ** — Invaluable joystick routine for Basic programmers with a C64.

**LABELLER 64** — See February 1987.

**HEX DATA ENTRY** — Our machine code entry program for C64.

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**NURSERY RHIME LAND** — See February 1987.

**POPPER** — A game featuring Popper the green pea, for the C64.

Cassette codes

DISK 1D/MAR 87 \$6.00

TAPE 1C/MAR 87 \$4.00

## APRIL 1987

**CORREPAGE** — A computerised version of this popular card game, Plus4, disk only.

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**DISKIT 5** — A machine code to DATA statement converter for C64. (Disk only).

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Two copies of your program on tape or disk.

A description of your problem.

If possible a listing of your work (you may omit this).

A stamped, self-addressed envelope for return of the program to you.

Should any of the above be missing then we will not be able to deal with your query.

We will try to point out where you have made errors and place a corrected copy of the program back on to your tape or disk before we return it to you.

Do not send a program to us as soon as it stops working, please check it several times first.

We do get a large number of queries and so it may take a while for us to deal with yours personally.

Notices can only deal with problems relating to programs published in *Your Commodore*.



**B**efore all you C64 addicts rush to Marston to playtest their last and furious new game, *Mega-Apocalypse*, remember where you first read about it — in this month's *Your Commodore* news pages of course. The two-track

individual above is the game's programmer, Simon Michael, who has been working on the game since 1985 — and its beginning to show! Put pen to paper and we will give away a liver to the best caption for Simon's reaction.

Send your caption to *Your Commodore*, *Mega-Apocalypse* Competition, 1 Golden Square London W1R 1AR.

Entries must reach our office by Friday 26th August 1987.

At the *Your Commodore* office we receive hundreds of letters from readers every month. We do try and answer each individually but sometimes this is impossible due to pressure of work. If you have written to us and not received a personal reply, we apologise for this but we cannot promise to reply to every item of mail we receive. If you feel that your question or letter really needs an answer, then inclusion of an SAE will guarantee a reply, although this may still take time to arrive.

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