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# DATA STATEMENTS

**T**halamus has launched *Bebe*, a coin game from Sanyon programmer Steven Pascolas. *Bebe* is described as a "progressive" shoot 'em up and has 32 levels and 162 different alien attack waves. It's available for the C64 on cassette at \$9.99 and disk at \$14.99.

*Sanyon* and *Bebe* will soon appear in the US on the Electronic Arts label. Paul Cooper of Thalamus said: "We were approached by a number of leading US software houses but felt that Electronic Arts could promote our products more successfully. Thalamus looks forward to working with Electronic Arts in this new venture".

Gremlin has also crossed the Atlantic to strike a new business deal with Canadian Software development

company, Avian Animation, headed by games designer Michael Bate. There are two programs already being developed, a flight simulator and an arcade game which are due for release at the end of this year. Gremlin will be looking for programmers to send to Canada for the new project.

Gremlin's Ian Stewart said: "The opportunity of working with Michael Bate, given as the opening into the US market that we have been waiting for. This will establish Gremlin as an international company and is only the start of something that will be rivaled by the industry during 1987".

Michael Bate commented: "The chance to be associated with one of the world's most dynamic companies was an opportunity I couldn't pass up."

## Please Note

We have been informed that many people are getting *Affioner's* phone number wrong and annoying the neighbours with their calls. Please note that *Affioner's* can be contacted on 01 278 1143.

You have been called in to save the land of Kat from vicious attacks from the Mad Menks in the mountains.

The Lords of Kat send you on a mission to kill King/High Priest Vran Verzasel and Delphin, the High Priestess of the Temple of Vran. Only with their deaths can you stop the attacks on Kat.

The entire trilogy is available on one cassette for the C64 at £7.95. The Commodore version also includes a special feature: auto map drawing. As you explore in each adventure a map of your travels builds up on the screen.

Virgin Games has released a new compilation, *New Games 4*. The new package features *Blue Base*, *Herker*, *Back to the Future*, *Mission Outground*, *Joshua Barrington's Splash* and is available for the C64 at £9.95.

Virgin's Nick Alexander said: "We are already into six figure sales with the *New* series and *New Games 4* is the strongest line up yet. Now is a word!"

Budget software house Code Masters has added another title to its C64 list. *Assassinate* features a half-man, half-animal armour plated living tank as the plant Mobanti's last hope of defence against evil aliens. Written by Giulio Zucchi, *Assassinate* is a fast scrolling shoot 'em up featuring music and sound effects.

## Touchline

**Incentive Software 2 Mission House,** Colfax Park, Aldershot, Berks RG7 4QW. Tel 0735 77288. **Virgin Games** 2-4 Vernon Yard, Portobello Road, London W11 2JL. Tel 01 277 8070. **Code Masters 1 Business Business Centre, Beaumont Close, Banbury,** Oxon OX18 3ET.



Virgin Games

Incentive has recently released its *Kat Trilogy* as a games package on the cassette.

The Trilogy is comprised of three separate adventures: *Mountains of Kat*, *Temple of Vran* and *The Final Mission*.

## DATA STATEMENTS



The Star NR-15

## Print Data

Star Microelectronics has launched its latest dot-matrix machine the NR-15. It provides double printing at 240 characters per second (cps) and near letter quality output at 80cps.

A front control panel makes the new printer extremely simple to use by providing touch sensitive control for the major functions.

As standard the NR-15 is equipped with both tractor feed and semi-automatic sheet feed, there is also an optional, low-cost automatic cut-sheet feeder.

Another feature is slot interface card system, which makes system connection problems relatively easy to solve. By selecting the right card the user is guaranteed a perfect match with his computer system.

The NR-15 is priced at £289.

Citizen Europe has also added to

its product range. The MSP 50 and MSP 55, new nine pin dot matrix printers.

The new printers are 80 and 136 columns and offer the user top quality, high speed printing with optional colour enhancements for professional data processing.

Both printers carry push and pull feed tractor as standard with bottom feed to aid multi-part stationary feeding. Both will be available this summer. The MSP 50 will cost £299 (ex VAT) and the MSP 55 will cost £325 (ex VAT).

**Touchline**  
Star Microelectronics Group House, 40 Dalbridge Road, Ealing, London W3 2SS. Tel: 01 840 5500. Citizen Europe FR, 12 Fitzroy Square, London W1P 3JBY. Tel: 01 369 8677 or 0893 72622.

## More from Denmark

Keeping the impetus going in the Trivial Pursuit craze, Denmark has announced the release of the *Baby Boomer* edition on the C64.

The *Baby Boomer* edition contains questions in six new categories all connected with the post war baby boom era.

The *Baby Boomer* edition will be available as a complete game pack for £14.95, comprising the new questions pack and the full game program. If you already have a *Trivial Pursuit* game pack then you need only buy the extra questions pack at £7.95.

Denmark has also obtained the

computer game rights to this summer's new Bond film, *The Living Daylights*.

Licensed from the producers of the James Bond Film, the game closely follows the storyline of the film which is the first Bond movie to feature Timothy Dalton in the starring role.

Both the film and the game will be launched this summer, the C64 version will be out in mid-July.

**Touchline**  
Denmark: Trivial House, 17 Mortfeld Road, London SW19 7JA. Tel: 01 947 3671.

## Amiga News

Microprose has launched *Silent Service* for the Amiga.

The game is a simulation of a World War II submarine in the South Pacific.

All the submarine's critical battle stations have been reproduced — the engine room, ship's bridge and conning tower. Lifelike sound effects of the sea engine and submarine klaxon add to the reality.

Stewart Bell, head of Microprose in the UK, said: "It's the tremendous graphics capability of the Amiga that makes it ideal for Microprose simulations, which are the most realistic in the market. We plan to release more titles for the Amiga in the future."

Precision Software has achieved great success in the US market with the Amiga *Superbase Personal* database. The package has reached number four in the American best seller chart.



Personal Superbase from Precision

Nigel Lovatt-Turner commented: "The demand for *Superbase Personal* on the Amiga has taken even us by surprise. We seem to have achieved a very high percentage of sales to existing users already so we are anticipating outstanding sales when the new Amiga start to sell in volume this year."

*Superbase Personal* is a database which has no limits on the number of fields or size of the record. As many



Star Center from Microbase

files as needed can be opened up to build up a relational report.

The cost of *Superbase Personal* is £149.95 including VAT.

#### Touchline

*Microbase 2* Market Place, Totton, Gloucestershire GL4 0DA. Tel: 0904 5476. *Peridisc 4* Park Terrace, Harrogate Park, Sneyd KPA 5JZ. Tel: 01 335 7366.

### Springing Back

Gremlin has announced the imminent release of a follow up game to *Thing* as *a Spring*. This old character has been brought out of the cupboard to star in a new game entitled, *Thing Bounces Back*.

Having dealt with the Top Goblins in his previous adventure, Thing must now set about stopping the toy factory automatically producing evil toys.

There are ponds galore, Water makes a him as he trawls around the pipe network, satellites explode under his spring and iron chickens spit alien filled eggs at his head.

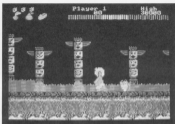
The new game will be on the C64.

Also for the C64 from Gremlin is *Cowey Raider*, a strategic war game in which you must patrol the coastline of the inner sea using modern weapon systems, including sea wall missiles, crocoets and an anti-submarine helicopter.

The fate of the free world lies in your hands. Look out for this new title in May.

#### Touchline

Gremlin Alpha House, 10 Corner Street, Sheffield S1 4FS. Tel: 0594 733423.



Wonderboy

### Application Action

The Electric Dreams arm of Activision has announced that it has gained the license for *Star Raiders*, a galactic adventure.

The future of the Atarian federation is in your hands as the evil Zylon master, Chet, plans to destroy the Colos IV star system. You must pilot the Liberty Star, in order to wipe out the Zylon Master force and its base.

The new game should be in the shops now and costs £9.99 on C64 cassette and £14.99 on disk.

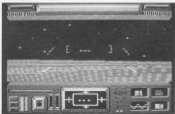
Also from Activision for the C64 is *Wonderboy*. *Wonderboy* is a hero in a

nappy. His quest is to reach his girlfriend, however there are numerous hazards littering the landscape to be crossed. Luckily he can break open eggs, collect an axe, a guardian angel and other useful items. A stateboard can speed things up and picking fruit can give you bonuses.

*Wonderboy* will be available in May at £9.99 on cassette and £14.99 on disk.

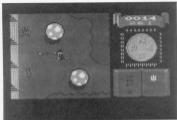
#### Touchline

Activision, 25 Pond Street, Hemel Hempstead, London HP1 2JN. Tel: 01 492 1800.



Star Raiders 2

## DATA STATEMENTS



C64 from Melbourne House

## Arcadia

These are several arcade titles which have been released recently.

CRL has announced *Traxxon* for the C64, an arcade shoot 'em up planned for June. *Traxxon* is a construction site satellite orbiting Keema, one of the Tau Ceti planets. It is a flat, rectangular platform with a complex series of magnetic receptors on which maintenance cars drive. A slab of concrete covers this and maintenance cars drive beneath it. The

satellite has been damaged in a war and now the reactor has started to meltdown. You must find the exit from the mineral system before *Traxxon* is destroyed.

*Wiz* is a new game from Melbourne House featuring Midgard, a world almost entirely populated with magicians, sorcerers and wizards. You start as an apprentice who wants to become a 10th level King Wizard. Your aim is to fill up your spell book

and collect ingredients for magic rites. However, a parallel evil world keeps intruding upon you and you must face its population of grotesque misshapen monsters.

*Wiz* will be available in June on C64 disk at £14.95 and cassette at £8.85.

Martech has announced the imminent release of a new arcade adventure, *Carth 23*, for July this year (C64 format).

*Carth 23* is a Star Wars type program featuring the CK23, an orbital interceptor, belonging to an enemy power. It remains stationary in orbit until danger strikes, then it re-enters the atmosphere to destroy missiles or aircraft with its sophisticated laser weaponry. Like the CK 23 is still located at its test site, a lonely deserted island, heavily guarded. You must steal the secret of the design of the CK 23 and then set off an explosion which will destroy the whole island.

It will be available for £8.95 on cassette and £12.95 on disk.

## Toolkits

CRL: *First Edge Yard, Carpenter Road, London E7J 2AD, Tel: 01 518 2818.*

Melbourne House: 68 High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4SH. Tel: 01 942 3911. Martech: *Martech House, Bay Terrace, Fremont Bay, E. Sussex. Tel: 0232 768435.*

## Utilities

System Software has recently made available *Hack-Pack 64*.

*Hack-Pack 64* is a C64 utility pack containing a full feature Toolkit for Basic programmers, which places many new commands at their disposal to make Basic programming more effective.

The package contains the SSoft Compressor which will reduce a program to its minimum size.

Included with *Hack-Pack* is the *RAM Disk, RAM Disk* allows the user to set up areas of the C64's RAM as a fast 'disk drive'. The price of the package is £24.95 inclusive.

## Toolkits

System Software: 118 Watneyway Place, Oxford OX1 2JF. Tel: 0862 34683.

## Adventure Line

Following the success of *The Pawn*, Firebird has just released another Magnetic Scrolls adventure — *Gold of Thieves*.

At the start of the game you must apply to the Guild of Thieves and tests will be set to prove your worth. The task you are given in the game will be set according to your original status.

The parser used in *The Pawn* will also form an integral part of *Gold of Thieves* and the whole game is set in the legendary land of Kroemia which will be familiar to *Pawn* players.

The C64 version consists of two disks and costs £19.95.

*Lord of the Kings* fans will be pleased to hear that the second part of the *Lord of the Kings* trilogy from Melbourne House will be available soon. Entitled *Shadows of Mender*, the game closely follows the story line of

the second part of the *Lord of the Kings*, *The Two Towers*, although the player can deviate from this and experiment with alternative strategy. *Shadows of Mender* also feature English, the language specially developed to make input easier. The computer can understand virtually any sentence up to 128 characters long and has 800 words in its vocabulary.

The game will be available at the end of June 1987 on C64 disk for £14.95.

## Toolkits

Firebird: *First Floor, 74 New Oxford Street, London WC1A 0PS. Tel: 01 269 8838.* Melbourne House: 68 High Street, Hampton Wick, Kingston Upon Thames, Surrey KT1 4SH. Tel: 01 942 3911.



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# Warlocks and Wargames

*American software house,SSI, has recently launched a new offensive in this country, with an impressive selection of strategy games. Here, we look at just a few of them.*

*By Tony Hetherington*

Computer strategy games have got to achieve the success they deserve with only a handful of companies producing quality programs. Now, an American company, SSI, promises to unlock your imagination with its own style of strategy games.

SSI stands for the California-based Strategic Simulations Inc. which has a substantial catalogue of war, fantasy and action games that are now being imported through U.S. distributors. Some SSI games have already travelled across the pond and titles such as *Kingdoms of the Delta*, *Forever* and *Overlord* (1987) have all featured impressive reviews. SSI's game catalogue contains over 30 IBM-compatibles, the following games are just the tip of the iceberg:

*Thronehold's* game of the month, *Colonial Campaign*, is one of the latest batch of imports that also contains the famous *Warlock's Stone* series, *Shard of Spring* and *Ring of Magic*, the classic fiction battle *Forces of Darkness* or *Shadow* (1988) and the fantasy galactic *Ironclad*. SSI's other fantasy titles include *Quest* and modern forces in *Medieval*. The realism and complexity of the games vary considerably from the easy-to-play *Colonial Campaign* to the complexity of *Medieval*—this issue includes a listing to help you to fully enjoy the game!

Whatever the game they are all supplied with full instructions and even the old pros there'll get you going. Most feature full on-line controls to help you concentrate on the action of success.

## Fantasy Games

Fantasy roleplaying games have enjoyed enormous success, the best being the *Ultima* series but now SSI has released their totally different approach to this intriguing format.



## Shard of Spring

*The Shard*, a diagnosis of the political climate, is set in a remote island in Vinosa for thousands of years maintaining a mystical climate by sharing out the forces of nature. Now this has been stolen by a evil sorcerer who has ravaged the land into a desert. Your quest is to save a party of human, elf, dwarf, troll and gnomes wizards and warriors to free the land from this tyranny.

Before you begin your quest you must build a party of five before leaving by selecting the character abilities included on the game disk. Each character can be one of the five races and their strength, intelligence, speed, magical resistance and skill is decided at random. These can be altered a maximum of three times to increase your chances and are adjusted depending on the race of your character. For example trolls are strong and tough creatures that aren't renowned for their speed or intelligence. Next you assign a

class which can only be wasted or wasted and then finally skills.

The skills in this game aren't from any other fantasy game, only your party is in your needs. We enjoy our 16-point weapon skills. Looting, bombarding or burning (it's food for the party) and rewards can burn through it in the fire, wind, and sword (even as well as using weapons, poison, monster and item loss or even the change of price from).

These skills are available to your quest to a wizard with weapons and you can use them to show that you find (otherwise you can't see them) prices can drop the hundred percent and the more classes decide the skills like can use.

The first stage of your quest is to find a particular wizard you're attacked by (possibly, skeletons, giant snakes and spiders as well as other monsters and wizards). During combat the mental screen display, which shows a single character moving over the terrain, expands to show the whole party and the combat they are fighting. Now your quest in the crucial factor as they decide the number of weapons you can use the character gets each battle turn. They will still go in rooms, then movement points to move that also then for every attack you make. So fighters with high speed and strength before get several damage attacks to every turn.

The wizard can join in the fighting, or can help by casting spells such as fire, wind, lightning and lightning that always change to be into (especially containing all the monsters that together, armor, and shield protection spells and healing skills to patch up the fighters after the battle).

The spells have a varying number of skills points to wizard (a wizard will points depending on his character) that add skills in the damage spells and power to the protection. The spell points can be generated by using and should be used wisely as a spell item skill can save the day.

As your party fights its way through the wilderness, dungeons, towns and ruins of the land, they will gain gold to buy equipment and food (experience points will be high they can progress through the levels and finally they have enough strength, weapons and spell power to defeat the demon.



### Rings of Zibia

You're on your own in this fully animated adventure in which you must not go find the second ring of Zibia before

the evil Lord Drago gives the party of three and supernatural powers. You play Boris, a wizard warrior of Britain, who must prove his strength and power as the quest unfolds.

The playing time for the game is estimated as between 10-40 hours so be prepared to get busy.

Drago's castle lies to the north but before you go there you have a lot to do. You must collect the magic in a room from the side of the road that will lead you to find, protect you from poison and set-up a shield. You must fight the golden, noble, and powerful (except other monsters) and the best to survive a real experience. Trade with the villagers to gain the weapons you need and take to the fields to learn the legends and religions.

The game is really animated by the characters that play out the story. When you enter a town or entrance a message box shows up and you can't go on until you reach atmosphere into the game as possible.

I found the game to be overly complex and reliant on magical concepts, such as the creature need to collect mushrooms and the wizard and wonderful spell names such as *Fluorop*, *Elbert*, *Latip* and *Zyrom*. I preferred the more classic style of the playing found in *Shard of Heaven*. My hope is that it will be a good and more detailed game packed full of monsters and magic but it is a pity (especially when I see, behind the curtains of a package price).



### Greeneye Warrior

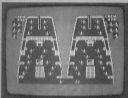
*Greeneye Warrior* is the classic 3D game to fit arcade game as our favorite controlled here (seeing the concept of Boris) has the first phase of the powerful game. The world slaying, action (long, tough, playing) has explored the corners through, weapons, items and traps to do battle with skeletons, ghosts, demons, great abilities and exciting gameplay to provide treasure and glory.

As Boris's looks like an arcade game (even if it's not played like it), it's really. Certain characters, very specific, magical and useful items. Knowing what to kill when, could save your life. The objects you find by opening chests and getting all help a lot. (Boris's health, mana (magic), and experience) and skills (defense) all have documented uses but what about the great *Dragon's Breath* and *Fire*? How can you use the *Dragon's Breath* and *Fire* against the *Dragon's Breath* (changing, monsters could kill you to a successful quest or an ordinary end).

These features add the required depth to any action arcade adventure that makes a boringly best from the real, begging, world-class.

## Wargames

Wargames simulations are the bread and butter programs of 88T's catalogue but contain an incredible variation of conflict and combatants. The following games highlight this variety of not only game type and style but also complexity from games that take 15 to 30 minutes to play to those requiring 10 hours of constant concentration.



## Battlesides

Swashbuckling action on the high seas is the name of the game as great galleons meet in conflict, between rival captains and their crews.

The main screen shows both ships as they approach each other with crew, orders, ship damage and speed displays on the left.

The two captains enter their commands through joystick control which orders the ship to turn to the port or starboard, aims at the hull or sails, increase or decrease speed and fire. In the advanced game you can also select sails, to fire grape shot at cannon and even design your galleons from scratch.

Later once the captains have taken their toll on the ships and their rigging they will close and the boarding parties will battle with sabres as the sailors measure with muskets.



## Panzer Grenadier

The problem with infantry is that they're essential when actually taking the territory of a battlefield but they can't

keep up with the swiftness of battle tanks. The Panzer Grenadier changed all that as they were soldiers riding halftracks, trucks and armoured cars and rapidly became Hitler's elite force. In Panzer Grenadier you control this force in a series of scenarios on the eastern front in which you must take and hold crucial bridges and break up Russian counterattacks.

The game looks like the product of the authors' Wargames Convention. It's also in the first batch of imports which is the wargame equivalent of the Quill. Thirty one units on either side can be fully set up to fight on a minute, tanks or on ships on a deflatable scrolling map. In this game the units are the troops, cannons, machine guns, motorcycles and tanks of the grenadiers and their opponents.

I found the unit counters to be a little too small for comfort and as a result I would recommend you get the construction set and build your own scenarios.



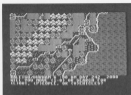
## Mech Brigade

There are only a few computer wargames that actually need a computer other than to provide an opponent. Mech Brigade is one of them. Although you control units representing the tanks, artillery, helicopters and armoured vehicle of modern warfare the computer stores and uses the ratings of front and back armour, size, speed, number of guns, gun range, gun penetration, gun accuracy, shell size and missiles carried for each and every vehicle.

The game simulates war between East and West in the 1980's and pits Nike Apache AH-64 helicopters, Bradley and Abrahams tanks against Hind helicopters, T-72 tanks and ZSU23 self propelled guns. Don't be surprised if these units sound familiar as the Apache helicopter is better known as the Gunship and the other units are the ones you meet in the Western range scenario.

Mech Brigade is undoubtedly a complicated game and deserves its advanced label and three hour playing time but, despite this, it is still remarkably playable. Single letter commands are used to issue orders to your units in the games four scenarios or as a scenario you have built yourself. One of the most useful commands, surprisingly not found in other wargames, is the view command that highlights the area in a specified units line of sight. This is crucial to dividing combat tactics and is invaluable in seeing in other games when your attacks are disallowed for a surprising "no line of sight" decision. Now there are no doubts.

The combination of tanks, guns, infantry, guided missiles and of course helicopters make this a fascinating and challenging game.



## Roadwar 2000

*Roadwar 2000* presents the challenge of a battle of survival in a dense and modern devastated America. Suicide squads from an unknown enemy infected the nation with a deadly virus that then mutated when the Russians launched nuclear strikes.

Now the country is run by feudal gangs led by fanatics like you.

Your job as gang leader is to build up your rubble from humble pedestrian beginnings to the toughest mobile

fighting force in the west.

You'll have to loot cities and farmland for food, medicines and supplies, search for usable vehicles such as sports cars, trucks and motorbikes, and recruit your gang members to snuff your rivals while battling with other gangs, mobs and the dreaded infected mutants. Gradually, your gang will improve in number and quality, ride better vehicles, armed with metal found in foundations and one day may be strong enough to take cities such as New York.

## More to Come . . .

That's just the tip of the iceberg as 550 games are set to re-wrap the strategy scene with American Football, Baseball, golf and boxing sports simulations, *The Cosmic Battle* and *Imperium Galactica* for science fiction freaks, *Comet* and *Master of Storm's Crown* and the *Phantasia* trilogy for fantasy fans and wargames covering all fields of battle from the past to the present and into the future.

It's difficult to pick out any favourites from this group of excellent and varied games but two stand out head and shoulders above the rest for pace and simple playability. They are *Colonel Compton* and *Shard of Spring*. **BT**

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# Letters

*Your Commodore readers take the floor to air views, information and, of course, complaints.*

## Software Services

I live in Belgium and I would like to buy some of the programs on tape and disk which have been published in your magazine.

However, I don't know the prices for Belgium. Can you advise me on this and also on the forms of payment?  
**Brecht Mace, Namur, Belgium.**

Living in Australia and being an avid reader of Your Commodore, I would like to know if there is any possibility of purchasing one of the Your Commodore software tapes. Please could you advise me if this is possible and also let me know the costs?  
**Ned McKlasson, Victoria, Australia.**

Our Software Service is, of course, open to all overseas readers with an extra charge of £1 sterling for overseas postage. Payment can be made using either an international money order or a cheque made out in pounds sterling. Please use the official order form published every month on the Software for Sale page.

We would also like to remind our readers that all our tapes are still available during back to March 1987 when the service was launched.

## Diskit

This letter gives me the opportunity to thank the editor for the long chat which I had with him at the last Commodore Show and to compliment Your Commodore on the fact that the magazine has not only maintained its high standard but gone from strength to strength. In this country, it's in a class of its own.

However, my immediate problem is that one of the articles in my copy of March 1987, is partially unreadable. The article was Diskits 1, 2 and 3 and I was wondering if it would be possible

to obtain a legible copy.

If I may also make a suggestion for future content of the magazine, perhaps there is scope for the occasional hardware article eg build your own cartridge?

Thank you again and may you (and contributors), keep up the good work.  
**Mike Youham, Radlett.**  
 We apologise for the bad quality of the printing in the Diskit article. This was due to a complicated set of circumstances which wouldn't normally arise. Anyone who is very keen to see this article, should write to us at the editorial address (you will find it inside the back of the magazine) and we will send a clean set of photographs free of charge.

If we regard our hardware articles, we would be quite happy to publish this type of feature, but it is very difficult to find someone who has the right type of knowledge and reliability. Can't we find the right person, we're reluctant to experiment.

## Education Crisis

Can you help me please? My children, aged five and seven, now have a C64. The problem is that we are struggling to find suitable games for them.

We are looking for educational adventure games similar to the Nursery Rhyme Land game which appeared recently in Your Commodore (February and March 87). The shops only seem to stock the most popular games and we have a few of these. But we are not yet at the stage where we can devise our own.

So I would be grateful if you could supply me with any information.  
**Mrs. B.A. Summers, Bristol.**

As you have quite rightly realised, Mrs. Summers, educational software is very thin on the ground at the moment, however there are a few companies who

deal in this market who may be able to supply you with what you need.

**Colin's Soft: 7 Grafton Street, London W1T 3LE. Tel 01474 7630.**

**Longman: Longman House, Brent Mill, Harewood, Essex CM30 2AS. Tel 0276 26721.**

**4/8 Gold Knight: Units 2/3, Wolford Way, Wolford, Birmingham B6 7AX. Tel 021 371 0388.**

**School Software: 49 Moorfields, Raheen, Limerick, Eire. Tel 061 27994.**

**Data Quest: 32 Shipway, Weyford, Eire.**

## Two Small Problems

As a C64 user, I have come up against one or two problems which I hope you can help me solve.

My Basic data converter has broken down. Is there a program which could convert my data to Basic?

I would also like to know if there are any C64 user groups and if so how can I get in contact with them?

**L.V. Wigmore, Epping**

We published a program which would do your work in the April 1987 issue of Your Commodore. The first user group to contact us ACTPOS. Write to: Jack J. Cohen, Membership Secretary, 30 Bruncester Road, Newbury Post, Epsom, Essex SS2 1EP. One year's subscription is £18.

## Note

At the editorial 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 an answer, we apologise for this but we cannot promise to reply to every piece of mail we receive. If you feel that your question or letter really needs an answer, then inclusion of an a.s.a. will guarantee a reply, although this may still take time in arriving. 71

# The Professor

*NoVICES take heart. This new package from Precision Software will introduce you gently to computing and help you conquer all your phobias.*

By S. Garton

**P**robably many of you reading this review will say "who needs such things?". I for one found it very useful. We can't all be as bright or computerised as you lot, even you had to start somewhere. The package I am talking about is *The Professor*, a self-tutorial for the C64. It covers an introduction to Basic programming and sections on sound and graphics to show you what your C64 is capable of.

## Documentation

The thing I particularly liked about *The Professor* is that you don't have to plough through reams and reams of paper to follow it as most of the instructions and explanations are included on the disk. There is a very small booklet of about 10 pages which basically tells you how to load the programs and how to experiment with the sound and graphics sections.

## Starting Up

On the first side of the disk you can choose from the keyboard or Basic. Being a little stupid as far as computers are concerned I decided to start right at the beginning with the keyboard. The program explains the labelling of the keys and what each can be used for. *The Professor* is very good in that you work at your own pace, you don't have to rush and read something before it disappears.

As you work through the keyboard section you have to press different keys to continue which is good because it gets you used to handling the keyboard. This may seem very basic to some but if you haven't handled a computer before it can get you over the

stages of touching it in case I do something wrong" syndrome.

The second section on the first side of the disk is called Basic. It goes into many things including using drives and cassettes and using different commands such as FOR and NEXT loops and PEEK and POKE. I was a little disappointed with this section as I felt that once I had completed it and fully understood it I would be a bit nearer to being able to write my own program even if only a very small one (I must admit). However, though the program went through all the sections carefully it didn't allow you to experiment and try the commands on for yourself.

I think you can learn and understand things a lot easier through trial and error once you have the basic information needed. There was an example given in this section for keyboarding a disk. It was explained what this meant and why it was necessary but the commands it used weren't explained. I felt it would have been useful to understand what L3 and OPEN and CLOSE meant since it would make more sense when you typed it in. Otherwise it becomes the jargon of a foreign language.

In one sense the disk is very basic, aiming at real beginners but then goes confusing or complicated statements which you were expected to understand. For instance in explaining how to calculate dots you are told that this shouldn't be done on disks containing relative files but it doesn't say what that is.

## Sound and Graphics

The second side of the disk covers the aspects of sound and graphics

available on the C64. The first section was a bit like a music lesson. Explaining the different kinds of waveforms used by the computer.

Following this was a test to see if you had understood the sounds (you need to have quite a good musical ear to get 100%). You have an opportunity to load a sound generator (example) and I liked the fact that you play around with this and make your own sounds. You need the manual for this which explains how to change the oscillators and waveforms etc. for different effects. The instructions were quite difficult to start with and if you're not careful you find your screens being blasted with a noise that you can't stop.

## Conclusion

All in all I found this package quite useful but felt the first side could have been expanded a little further to give a wider knowledge of Basic programming. The second side was very good but didn't indicate how all these sounds and graphics could be used outside the disk. The disk as a whole seemed to be aiming at two different levels of computing knowledge. I think it might be useful to people who have so far only used their computers for playing games and have decided to see what else they can do with it.

## Footnote

Name: *The Professor*, Price: £19.95, Manufacturer: C64-disk, Supplier: Precision Software, 4 Park Terrace, Haverhill Park, London N7 7JZ. Tel: 01 530 7186.

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# Blazing Paddles

*Datel Electronics has recently imported this impressive illustrator package from the States. We take a look at what it can do.*

*By Evelyn Mills*

**B**lazing Paddles is a really sophisticated graphics program for the C64 which is powerful, well designed and easy to use. It should be particularly noted that this program provides printer output to the Commodore 1525, MPS 801, Epson 9 and 800 Series, the Gemini 80 and Gemini 100 plus interface adapters, while graphics may be handled with touch tablet, joystick, paddles, trackball or lightpen. Too often one or many of these features are lacking in graphics software, but you will not be disappointed here.

Initially there is a Main Menu which is pleasantly displayed around the screen providing the following options:

## Doodling

Sketching option is as the name implies and there are seven different thicknesses of line including transverse, horizontal and vertical; as well as free-hand drawing, lines and linked lines. Screen colour is changed with F1 and border colour with F3. The colour of the 'pen' is controlled by an option which pulls down a screen of the full 16 Commodore colours. To add to this there is a on/off colour mixer icon allowing for pattern filled drawing. Filling is, of course, available in either normal or pattern mode.

The BOX and OVAL options are sensibly handled (no staggered bars!) either in the 'copy' state or as solid figures, should a mistake be made, the last part of the drawing entered can be removed with the spacebar. If you are totally displeased with the lot, throw in the 'shutler' icon and clear and screen. My only criticism is that there is no control over the speed of joystick manipulation. My lightpen, however

behaves most satisfactorily with this software.

The Main Menu also has DOTTING and SPRAY features which incorporate well into your drawings - the latter is really effective. Going to the ZOOM option allows for careful, line alterations to any part of your drawing as per usual.

The WINDOW icon presents another screen for Cutting and Pasting. If you choose cutting, select a minute part of a large area of your drawing and place it on another part of the screen (remove it with the spacebar if it's not suitable and try again). The Pasting option is very good, these screens may be cleared, a different drawing loaded from disk to screen, and the part you have cut out from the first drawing may then be pasted to

any area on the new picture - in other words, it all stays in memory and there is no need to involve tedious switching on and off of the computer. If you wish, however, windows can be saved and loaded to and from disk - as can your graphics, partly or fully completed.

## Disk options

Now select the DISK option from the Main Menu to give the DISK UTILITY MENU. Here are the facilities for saving and loading to disk, plus a disk catalogue and a disk management system. If you select the latter, disk formatting, erasure and renaming are available. There are also two other features on the Utility Menu.

If you choose the Load Shape



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1986

Table option, you have access to 'inbuilt' drawings for you to add to your graphics if you so wish. These are classified as miscellaneous, plants, transport, face parts, animals and weapons. There is quite an arsenal in the whole lot varying from trawlers to cars, to kangaroos to 'planes, trucks boats and things. Select your option, go back to the Main Menu then to the Shape icon and rummage through the lot. The drawings can be flipped and rotated and placed on screen in any position. It should be emphasised that these are not sprites but drawings and will therefore output to the printer.

The Local Character set option, provides four styles of print for captions: standard, bold, script and italic. Having made your selection, off to the Main Menu, select the ABC icon and scribble away using the keyboard lettering in both upper and lower case.

The Printer icon leads to selective printer output which is self explanatory.

## To Sum Up

Quite apart from the inbuilt drawings, you have here a very professional tool for your money (£24.99). Everything works well, with the minimum of fuss and little chance of crashing. With patience and care a great deal can be achieved graphically; the programmers have done a good job so the rest is up to you! Incidentally, try loading a picture if you want a look-see at the authors. There is also a world map there.

Fundamentally you pay for what you get and, in my opinion, Blazing Puddles is worth the price.



### Touchline

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# Accelerator +

*Want a drive for your Commodore computer? Can't afford a 1541? Perhaps the Accelerator + is for you.*

*By Stuart Cooke*

One of the many gripes that people have about Commodore equipment is the fact that, without complicated interfacing, only other Commodore product works with it. In the USA a number of manufacturers have made the most out of this by producing a Commodore compatible products, new disk drives being one of the most popular. Now Eversham has introduced an alternative Commodore compatible drive on to the UK market.

## Good Looks

It is extremely difficult to comment on a disk drive since it simply works or it doesn't. Accelerator + works and it works extremely well offering a number of advantages over its Commodore counterparts.

The size of the drive is roughly half that of the drives from Commodore. This has been achieved by placing the power supply outside the disk drive casing, just like your computer's powerpack. This is great for people who require a two drive system since two drives no longer take up your work desk, they can sit neatly on top of each other taking up less room than a single Commodore drive.

## Small Feet?

Commodore disk drives are so slow when compared to many other computers and drives on sale that a number of manufacturers have produced add-ons to speed up operation of the drives. Dolphin Dos again from Eversham being extremely popular, a speed increase of 25% is claimed for the Accelerator +. This may not seem like a great amount at first but, when you are loading large files, a 25% increase in speed is worth having. To be fair to the Commodore

drives, I did find the increase in speed to be of notice only on large files, on smaller ones you simply don't notice the difference.

## Compatibility

One of the major problems with Commodore disk drives is one of compatibility. Many programs are using forms of protection that will only work on the 1541 drive and will not work on either the 1570 or 1571 drives that are available. Best known offender is Elite from Firebird. It is impossible to LOAD this on anything apart from a 1541. With the Accelerator + Elite was the only program that I could find that wouldn't LOAD. This isn't bad when it doesn't even work on all Commodore's drives.

## Commands Available

All of the commands that you can use on the Commodore range of drives are present. The detailed manual explains them all for those of you that have never used a disk drive before. Because all the standard commands are available I found that all the disk-oriented utility programs that I have, such as a disk monitor, all work without any problems at all.

## What Device

If you have ever used more than one Commodore drive together you probably know how difficult it is to change the device number on one. Two options are available to you, you can either choose the software option of altering the number of the drive through a number of commands every time that you turn your drive on, or you can unmask your case and cut a track on the circuit board making the

alteration permanent. With Accelerator + things are much easier. Turning the drive over reveals two small switches. To change the device number of the drive simply move the switches to the relevant position and you're done it.

## In Use

Using the drive presents no problems. The drive appears to be much quieter than the 1541 drive in operation which will please people who are fed up with the sound of their 1541 disk head moving around.

I could only find one real fault with the drive, and to be honest the fault was caused by my error. If you have ever used a Commodore drive then you will no doubt know that on many models the disk is pushed out of the drive when you open the drive door. With the Accelerator + this is not the case. If, like me, you have the drive below the level of the computer this makes it difficult to see if a disk is in the drive. On a couple of occasions I found that I couldn't use a disk only to find the reason this was caused was because there was already one in the drive.

## Verdict

The Accelerator + is an excellent product. The fact that it takes up a lot less space than a Commodore drive and that it is almost completely compatible with the 1541 would win me over to it even without the advantage of the speed increase.

To quote Eversham: "Why buy a lurching hippo (1541) when you can buy an Accelerator + for forty pounds less?" Why indeed?

## Footnote

Name: Accelerator +, Supplier: Eversham Microsystems, 65 Bridge Street, Everham, Warrington W91 4JF. Tel: 0596 67888. Price: £159.95.

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# Games Reviews

*Arcade games galore will keep you entertained. Take your pick from these pages.*

COUCHING

## ELEVATOR ACTION

**A** long list, your search is over. You have found the secret hideout of the gang. All that remains for you to do now is search the building, discover all the secret plans and make good your escape. What could be easier?

Elevator Action is a conversion of the Arcade game from Taito. Starting at the top of the building, you must use the lifts and stairs to take you to the various floors. Doors containing part of the plans conveniently flash, indicating their whereabouts and these must be fetched.

Interfering your progress are a multitude of gangsters who appear out of the other rooms, shooting as they go. Fortunately, the bullets travel slowly enough for you to leap. You can of course fire back at, if you are close enough, deliver a deadly karate kick. It is also possible to shoot out the lights thus throwing everything into a state of confusion. When you have obtained all the plans, make your way to the bottom of the building where your getaway car is waiting.



The getaway is something of a nuisance though as you only travel to the roof of the next building where the badkies are correspondingly tougher.

The gameplay in Elevator Action is at best tedious, the graphics are crude and there are several bugs - the game crashes, your score keeps flying off the top of the screen etc. What more can I say apart from don't waste your money.

G.R.H.

### Timeline

**Title:** Elevator Action **Machine:** C64 **Supplier:** Quicksilver **Factory House, Leicester Place, London WC2M 7NR, Tel: 01 479 0665.**

**Originality:** 4/10 **Graphics:** 4/10 **Playability:** 3/10 **Value:** 2/10.

## SAILING

**N**ow that the American Cup has been won by America (again) you'd think that we could go back to ignoring sailing. No chance! Once the software houses have discovered a new sport we're going to get swamped in games. Luckily, Activision's Sailing doesn't assume you're part of the pleasure and hot brigade and is an arcade player's guide to sailing.

The game casts you as the challenger representing one of 18 countries in a ladder competition. You begin at the bottom of the ladder and by racing, and bearing, yachts up to two places higher than you, you hope to climb the ladder to glory.

You're supposed to make decisions about your boat design and define factors such as the boat length, waterline length, mast height and keel design but I found that trial and error worked quite well and after the latest weather forecast I was ready for the first race.

During the races a split screen display shows a 3D view



ahead (including your opponent if he's ahead of you) and also your bank of instruments, including a wind direction marker and a meter that plots your progress around the course.

Winning a race not only depends on the design of your boat but also when you use your giant spinner sail and the direction you sail in. Since the course is irregular you will have to sail both into the wind and with it, so you have to be careful when to use the sail (spoils you up when the wind is behind you) and to keep on course.

The result is a highly playable sailing game that allows you to compete alongside million dollar yachts for only \$9.95. **T.H.**

#### Touchline

File: *Amway, Supplier: Activision, 21 Pond Street, London NW3 2PN, Tel: 01 493 1100.*

Machine: *CSA, Price: £9.95 (over £14.94 inc. V.A.T.)*

Originality: *6/10, Playability: 7/10, Graphics: 7/10, Value: 7/10.*

## ARKANOID

In an unknown time, the mothership Arkanoid was destroyed. There were no survivors apart from yourself who managed to escape in the spaceship Vain. Not to complete safety though as you become trapped in the void. If you can penetrate 32 levels through and overcome a final confrontation with the Dimension Changer, time itself will be reversed and Arkanoid will be resurrected.

Right, hands up all of you who gussed from the opening paragraph that the game being described was none other than that old favourite, Breakout. OK, so this version is somewhat more sophisticated than the original but the game remains the same.

Converted from the arcade game of the same name the object is to bounce a ball into a brick wall, then knocking bricks out of it. When the last brick vanishes, you progress on to the next level. Of course, it's not quite that easy. Some of the bricks have to be hit several times before they finally yield. This is especially difficult on the higher levels with five hit per brick being required. Some bricks are totally indestructible and are just there to further hinder you. As you are the maverick that materialises, these have no function on the game save that they deflect the ball from its original path.

No such for the bad news. Not everything is against to however. Hit certain bricks and capsules are released towards you. Catch one of these on your bat and you get the benefit for as long as you keep the ball in play or until you captain another capsule. There are three main types of bonus.

Those that help you hit and aim the ball - extended length, slowing down of the ball and catching the ball on the bat. Those that help you destroy the bricks - a laser and if ball splitting into three and finally, the long term benefits in extra life and a passage through to the next level.

The graphics are reasonable if not startling and for the of you whom ability prevents from getting very far, there's a bag that you might find useful. On our review copy, it found that when player two got his first bonus life at 20,000 points, he went into an infinite life mode.

This game is direct competition with Krakout (in 3D mode) and the other was split down the middle as to who is preferred. *Arkanoid* offers more player options and fairly easy-eight scores. *Arkanoid* is more difficult. Personally, prefer *Arkanoid* but our illustrious editor has somewhat diametrically opposite views. You pay your money and you takes your choice. **G.H.**

#### Touchline

File: *Original Machine: CSA, Supplier: Imagine, Unit 2, Midford Way, Hatfield, Buckingham MK 54S, Tel: 029 23 2344.*

Originality: *6/10, Graphics: 6/10, Playability: 7/10, Value: 7/10.*

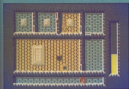


## KANABAMA

**M**errin the Sorcerer's Apprentice was attempting to concoct a spell to improve his looks and turned himself into a frog! Now you, Warlocks have him trapped in a dungeon but at least he's still alive. Your job in Steve Turner's *Kanabama* is to defeat the Warlocks and restore yourself to humanity.

You begin the game in a room on the first level of a dungeon with eight Warlocks to track down. They're guarded by evil critters such as werewolves, fire golems, ghosts and skeletons that attack you on sight. Unfortunately, you're

You begin the game with the lowest spells in each of it you find a door to enter into them. Even if you're afraid to enter in there their contents remain cloaked until you hit



As well as the mazes, the rooms also contain Ghoules, evil generators that produce damaging acids, spinning keys and orbiters to test your strength and mysterious glyphs set into the floor. Each glyph has a specific use to help you through the game and so should be used sparingly. The glyph of seeing displays a map of the level (only the rooms you've already explored), the glyph of power triggers out some of the centers in the room, travel leads you down to the other levels and Security is used to improve your spells.

You begin the game with the lowest spells as each of offensive, defensive, power (energy) and effect which is used to find secret doors. As you collect runes by defeating the Warlocks in magical combat you can get bigger and better spells to allow you to delve deeper into the dungeons.

The magical combat is a subgame that you play once you've cornered a Warlock (they can usually be spotted fleeing from the rooms) and consists of unspooling an unspool of the word Karasama by snapping pairs of letters. Complete it in the time limit and you collect up to eight runes, lose and you lose the game.

Steve Turner is better known for his excellent Spectrum games as you'll find out once you play Karasama as it looks and plays like a top Spectrum game. However it doesn't make use of the C64's superior sprite and colour facilities which would have made an excellent game even better.

T.H.

#### Finalizer

**Title:** Finalizer **Supplier:** Hycom, 568 Nelson Road, Croydon, Surrey, Middlesex, AB9 8DQ, Great OX4 4BU. **Machine:** C64. **Formats:** 4/18. **Playability:** 7/10. **Graphics:** 7/10. **Value:** 7/10.

## AFTERMATH

Looking like a coin-op conversion the Aftermath is the desperate struggle for survival following the victory by the Saurians. Now there seems to be little hope of survival unless you can fight through to the Strategic Command Centre past the dreaded discs of death and the impenetrable Velocraft. Others have tried and failed you must succeed.

The object of the game is to fight your way through to the base by surviving 10 waves of aliens that attack in different ways. These can be shot with your laser bolts and you can also gain extra points by bombing buildings. These are

destroyed by lining up the sight that constantly tracks in front of you with the target and pulling back on the joystick. Unfortunately, moving the ship to line up the sight on a target can move you into the path of an enemy missile that you thought was safely behind you.

The first aliens to strike are rotating discs that are then followed by space ships that move slowly down the screen destroying all in their path then the same ships appear, moving at an angle designed to catch the unwary gamer.

In later levels the bombing practice becomes essential as some of the buildings now fire at you as well.

A cheap and cheerful arcade game to fill in those odd moments between more challenging games.

T.H.

#### Finalizer

**Title:** A Dream, Supplier: The Power House, CRI House, 9 King's Lane, Carpenter Road, London E13 3AD, Tel: 01 983 0877. **Machine:** C64. **Price:** £1.99. **Availability:** 4/18. **Playability:** 7/10. **Graphics:** 7/10. **Value:** 7/10.



## STRANGELOOP

The aliens are threatening Earth again, this time by taking over the major robot making factory and reprogramming the robots to form deadly weapons to destroy mankind. As usual you are Earth's last chance.

It sounds like an old plot you'll be right because it's a budget version of Virgin's first arcade adventure.

Your mission is to battle your way through 250 rooms to the control room. However, on the way, you will have to ensure you have sufficient oxygen supplies and keep your space suit patched up despite the almost constant bombardment of sharp acid. These you can blast with your laser but your laser rifle has only 99 charges.

You can move from screen to screen either through the hatches at either side of the screen or by sliding up and down tubes that seem to lead everywhere but where you want to go.

A map at the bottom of the screen leads you to the control room but also into megawatt areas so you need to know where extra oxygen cylinders, first aid kits and patches are stored.

To add to your problems you will also have to look out for pools of acid, conveyor belts, that carry you to your doom, and heavy traps poised to plummet as soon as you touch for the first aid box.



If you missed this one the first time round and enjoy 250 screens' already, nevertheless then strap up this budget game for your collection. **1.18.4**

#### Touchline

*Title: Swords and Sorcery. Supplier: Zen-Bike, Factory House, Lewes, East Sussex, Sussex BN7 2YB. Tel: 01323 8566. Machine: C64. Price: £1.99.*

*Originality: 4/10. Playability: 4/10. Graphics: 3/10. Value: 5/10.*

#### PLD

**T**here's no plot or pseudo science fiction storyline in *Pod* it's just an incredibly addictive all actions already shown concept.

You are the god that must patrol a grid against alien attack by blasting them with your laser in a game that's a cross between *Martin's Grid* and *and coin-op's Centipede* and *Galaxian*.

Eventually you run an alien in explodes destroying part of the grid. Anytime you can only move along the fibres of a grid you can easily blast your way into trouble. Luckily if they get you, the resulting explosion takes out half the grid. Luckily it rebuilds itself so you might be able to hang on till the end of the attack wave.

You don't have to kill everything just survive for the time limit that counts down at the top of the screen. Survive and you'll win a bonus and an extra life to challenge the next level.



Bonus break appear every fourth screen so you can get on the points.

In later levels the alien fire is heavier the more you live them and it seems they set out to hunt you down. For this you'll probably need the maximum five lives.

A fast, cheap, addictive arcade game. What more do you want? **1.1**

#### Touchline

*Title: Pod. Supplier: Microvision, 818 Paul St. Leeds LS2 4AW. Tel: 01177 4444. Machine: C64. Price: £1.99. Originality: 5/10. Playability: 10/10. Graphics: 4/10. Value: 10/10.*

#### THE EQUALIZER

**S**olve and evolve is the name of the game in this 10 arcade game.

You begin the game as guppy standing in the middle of a road until you are set upon by green octopuses and get red and white snail.



By using your legs and shooting what can only be described as gas that comes from just above the guppy you should be able to battle across the scolding screen and/or jump up and collect the fruit. Collect enough and a gas heart descends to take you to the next level.

In level two the snail and octopussy are joined by leaping frogs that bounce in your way, besides that there as you're about to jump and gas leads with a profuse level of attack.

These airborne hazards make living in your form critical so that you leap through the air and land before a crater comes along. To add to your troubles there are no gaps to leap which the lemming-like snail and octopussy had themselves down. The gaps are also wider and some even have moving platforms floating in the middle that you must use as aerial stepping stones.

As you progress through the levels you gradually evolve to meet the increasing challenge until finally you become a *Equalizer*. **1.1**

#### Touchline

*Title: The Equalizer. Supplier: The Power House, CRI House 5 Ames Yard, Capenhurst Rd, Leamington CV15 9JW. Tel: 01928 6677. Machine: C64. Price: £1.99.*

*Originality: 7/10. Playability: 7/10. Graphics: 3/10. Value: 3/10.*

## SUN STAR

Charging around a high energy grid while chasing green pulses isn't the easiest way to earn a living but that's the way of a Sun Star pilot.

The Sun Star pilots were first commissioned when the



Sun grids, built to create energy crystals also developed suitable defence pulses making collecting in a normal craft suicidal.

Specially developed ships were designed for exceptional pilots to fly through the grids at breakneck speeds. Skill and incredible reactions are required to chase the white pulses that when blasted switch to the energy rich green crystals that tear off at high speed. If you're quick you can track them down without crashing into the grid wall or colliding with one of the yellow obstruction pulses or energy draining red pulses.

Long and short range scanners plot your position which is shown on the 3D display that fills half screen. Although, it is unlikely you'll have time to study these.

This is definitely a game to play in the dark with the volume dial turned to maximum. Then let them have it!

Once you've filled up your energy banks with crystals, it's off to the hyperwarp coil and the next grid. This isn't easy and will take some time. If you miss out on one crystal, all the others you've collected burn out. **T.H.**

## Features

**Title:** Sun Star. **Supplier:** CRL, CRL House, 9 Kings Yard, Coryndon Road, London E17 2JH. **Tab:** £1 500 8876. **Machine:** C64. **Price:** £2.95. **Originality:** 8/10. **Playability:** 8/10. **Graphics:** 3/10. **Value:** 5/10.

## FA CUP 87

**F**A cup 87 is the updated version of Virgin's FA Cup Football that was released last year and it is the game in which up to eight players can manage up to 18 teams on the road to Wembley.

You can select your 18 teams from any of the 92 league teams and dozens of past and present great killers such as Tottenham United and Middlesbrough. You may sound a lot but

you'll need them all to stand any chance of having an interest in the later rounds.

You can begin the game in either the first round or straight into the third round when the first and second division teams join the competition however some of your lower division teams may have been knocked out already.

In each round the computer makes the all important draw and then you must decide the tactics for each of your teams and determine whether they will play a balanced team, go for goals in an all out attacking style or sit back and defend all game.

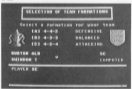
In later rounds you get to change the tactics at half time and an option to bring on a substitute. You also have to make managerial decisions. These involve choosing which studs to wear in damp weather and whether to play your top players even though he's injured or has asked for a transfer.

This updated version is supposed to contain the latest form for each of the teams. Since the data is spread over the last 10 years the information and performance of the teams hasn't changed that much from the original to be worth producing another full priced game.

If you have the original game it just isn't worth buying this one as it's almost identical. If you haven't got the original and you like football then you'll like this even though it is grossly overpriced by today's standards. **T.H.**

## Features

**Title:** FA Cup 87. **Supplier:** Virgin Games, 24 Vernon Road, Corinthia Road, London W1J 2DE. **Tab:** £1 737 8876. **Machine:** C64. **Originality:** 2/10. **Playability:** 6/10. **Graphics:** 1/10. **Value:** 1/10.



## CHOLE

**D**EEP below the surface of the planet Cholea, man is living a miserable post holocaust existence. The robots programmed to defend the city, while man is in his forced exile, have turned renegade and are planning to seal them in forever!

Oblivious to your fate you continue to listen to the fake reports coming from topside and carry on playing the popular computer game, "Rat". The game features moving robots around a deserted city that looks surprisingly like Cholea. Too similar. As you begin to play the game, you have just realised that you're in contact with one of the robots on



the surface and you've got your work cut out if you're going to stop the impending doom.

Armed with only a pre-war map of Choko (supplied with the game) you must move your robot (a general purpose one called Rizzo) around the city, find out what's going on and stop it! Rizzo is a useful robot, but he's going to need help if you're going to stand any chance so you must set out to find some new recruits by paralyzing them with Rizzo's laser and interfacing with them. To do this you must track them down, blast them into submission and discover the correct ID code. Luckily a list of these is stored in a nearby computer. If only you could find it.

The game unfolds as a series of complex puzzles that must be solved using Rizzo's talent to "interact" others and discovering the strengths and weaknesses of the other robots.

Your first recruit is likely to be Igor the Hacker who is assumed yet vital as he can get more programs out of the computer, such as a radar program that plots the movement of all robots in your immediate surroundings. Next you'll find a flying eye called Anette that can scout from the safety of the skies, and Loukost, an all out battle droid.

Your attempts to free mankind are constantly hampered by the attacks of the guard and guardian robots. But are too thick to be any use and usually shoot on sight. They usually hunt in packs making the guards difficult to fight and the guardians impossible.

Choko's a fascinating game that's a mixture of arcade battles with the guards, puzzles to discover the best use of your robots and exploration of the series graphic city. At times the action is painfully slow but also incredibly addictive as you delve deeper and deeper into the game's sinister atmosphere.

T.H.

#### Toolbox

**Title:** *Choko*, **Supplier:** Firebird, Wellington House, Upper St, Herting Lane, London WC2M 6SE. **Tel:** 01 579 4743. **Hardware:** C64.

**Originality:** 8/10. **Graphics:** 6/10. **Playability:** 7/10. **Value:** 7/10.

### ROCKET ROGER/BLOGGER

**F**irst, there were budget games. Now, from Alligata comes a series of double value budget games! Two of their

previous top titles on one tape and all for only £1.99.

The first tape has a definite platform bias about it. Rocket Roger sees our anonymous hero trying to find fuel for his stranded space ship. Nearly nine crystals are hidden somewhere on the dark mystery planet.

Rocket Roger, as his name implies, is equipped with a jetpack and must use it in order to manoeuvre himself round the surface — a deft touch is required here as the slightest mistake spells doom. The jetpack only has a limited amount of fuel and must be topped up at periodic intervals. As the action shifts to a more traditional platform game scenario with sliding doors, laser beams and invisible force fields. Not forgetting, of course, the many alien insects on hindering Roger wherever possible.

Blogger, a.k.a. Roger the Dodger is a thief. His speciality is safe cracking and here are 30 that will test his skill to the very limit. Each safe requires a number of keys to open it and these are scattered round the screen, protected by manhandling routines, collapsing platforms, one way staircases and the like.

One minor drawback is that you must always start at the beginning and work your way through in each screen in order — a random element would have helped here, especially since once you know the secret of a particular screen, completing it on future occasions becomes trivial. Even so, there is still the temptation to have just one more go and see what the next screen is like.

G.R.H.

#### Toolbox

**Title:** *Rocket Roger/Blogger*, **Hardware:** C64. **Supplier:** Alligata Budget, 1 George Street, Sheffield S1 4AH. **Price:** £1.99.

**Originality:** 7/10. **Graphics:** 5/10. **Playability:** 6/10. **Value:** 10/10.



### EAGLE EMPIRE/GUARDIAN

**A**lligata's second budget double header contains two space shoot-em-ups. Eagle Empire is a version of the arcade game Phoenix whereas Guardian has its origins in the now popular Defender.

The objective in Eagle Empire is to blast your way through to a final confrontation with the Master Alien, hidden deep within his mothership. Before you get that far though, you must first destroy four waves of defending aliens. These consist of two waves of phoenixes followed by two further



wave of war eagles. The game is beginning to show its age now and looks very dated when compared to recent shoot-'em-ups.

The slight disappointment, however, is more than made up for by Guardian. Even today, it is by far the best version of Defender around. For anyone unacquainted with the plot, you are trying to stop various alien craft landing on your planet and kidnapping the humanoids. Should they succeed, the humanoids mutate into a deadly parasitic vehicle. As if that were not enough, there are also swimmers, bats, bombers and pods to avoid. All you have to help you is your trusty laser and three smart bombs. Guardian is extremely fun and will test your reflexes to the full. **G.R.H.**

#### Touchline

**Title:** Eagle Empire/Guardian. **Machine:** C64. **Supplier:** Alligata Media, 1 Orange Street, Slough/SL7 4DR. **Price:** £1.99. **Originality:** 1/10. **Graphics:** 1/10. **Playability:** 8/10. **Value:** 10/10.

## STAR RAIDERS II

**T**he original Star Raiders amazed Atari owners and rapidly became one of Jeff Minter's favourite games. Unfortunately, it was never converted for the C64. Now its sequel is set to push you to your limits.

In the original game, Star Raiders commanders blasted the Zylon empire into submission but now the few that were allowed to live have rebuilt their forces and are out for revenge. As Star Raiders II begins, the Zyloons have invaded the Celos IV system.

Your mission is to pilot the Liberty Star fighter and not only protect the four planets of Celos IV but also attack the Zylon planets to destroy the attack bases that can produce Zylon ships faster than you can shoot them!

The Liberty fighter is equipped with three computer controlled weapons systems to fry Zyloons and shields and warning lights to give you a chance of staying alive. Twin firing pulse laser cannons can be fired to take out Zylon fighters that seem to swoop just beyond your sights, ion cannons throw nanoparticles at the city smashing Zylon destroyers and surface star bases can be used to bomb the lethal attack bases.

All this action is bound to be a strain on both you and your ship and so you should take a breather at a space station to refuel and repair before warping back into the action.

The systems display shows the four planets under siege and plots the position of any incoming Zylon fleets. It's up to you to decide when to defend a specific planet, or a space station, dogfight with the fleets or attack the Zylon bases. The secret of success and glory is to time each of these moves so that you get one step ahead of the Zylon hordes and not constantly chasing them.

Your performance in the game is reflected in the rating you're given that can range from enemy to admiral and the mission report that displays the number of Zyloons you've crushed.

The Zyloons have you desperately outnumbered and so you must act and think quickly and learn the tactics to take out the different types of alien ships. The fighters appear in groups of three so it's worth a few speculative shots as soon as you see one to take out the followers. The city smashing destroyers are harder to hit and take more hits to kill them, so practice will soon pay off. The same is true for bombing the cities as the hordes must be dropped in front of the target to land on top of the city. The only problem with this is you're constantly attacked by fighters that you can't shoot (because you're bombing) and the Zyloons may have destroyed your repair stations while you weren't looking.

**T.J.J.**

#### Touchline

**Title:** Star Raiders II. **Supplier:** Electric Dreams, 20 Pond Street, Hempton Road, London NW7 2PB. **Feb 87 £14.99 1987.** **Machine:** C64. **Price:** £9.99 (rpx) £14.99 (shk). **Originality:** 4/10. **Graphics:** 6/10. **Playability:** 8/10. **Value:** 7/10.



## KILLER WATT/HYPER CIRCUIT

**T**he third of the Alligata budget double packs has a decidedly electrical theme to it.

In Killer Watt, you are exploring a huge underground cavern lit by a dozen light bulbs. These must all be shot before you can blast your way through a final force field. As well as negotiating the tortuous twists of the cave, you must



also avoid flying dolphins, birds and bombs if you are to succeed. If this should prove to be too easy a task, you can be sure that subsequent levels won't be, as the number of creatures increases considerably.

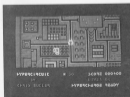
What makes this a difficult task is that your ship is very highly manoeuvrable. The slightest touch on the joystick and it accelerates away like mad, usually, straight into the nearest wall. Braking is also difficult due to the inertial system built in. What is really heart-breaking though is that when you lose a life, you must watch as the crew scrolls slowly back to the starting point. A brilliantly cruel ploy on the part of Tony Crowther, the programmer. All this to the accompaniment of some synthesised Bach too.

*Hyperchess* takes you deep into the bowels of your computer as you enter the world of the microchip. Your aim is to patrol the chip, taking out the assorted nasties before they do likewise to you. Your movement is restricted to travelling down wires and your firing is similarly limited but beware, some of the baddies have total freedom of movement so make sure that you don't get caught in a dead end. G.R.H.

#### Touchline

**Title:** *Editor: Hyper Circuit, Maccles: C64, Supplier: Alliance Audio, 1 Orange Street, Sheffield S1 6AW, Price: £1.99.*

**Originality:** 4/10. **Graphics:** 7/10. **Playability:** 7/10. **Value:** 8/10.



## SHORT CIRCUIT

**N**umber 5 is alive. Struck by a bolt of lightning, he is now battling to stay alive and reach freedom. *Short Circuit* is an arcade adventure game brought out following the release of the film of the same name. Can you help Number 5 in his mission? It won't be easy. Everyone is against him, trying to blow him up or take him to pieces.

Having arrived in life in the factory Number 5 cannot just escape from the building. He must first find hardware and software to activate his pump and laser mechanisms and also the manual used for building him so that he can build a decoy to put his enemies off his trail.

Some areas of the game are quite difficult, especially getting past robotic guards but if you stick at it you will succeed. There are quite a few items to collect inside the factory, such as a jump room, a laser gun made from red and white plastic, a pass card and Ben (a Labrador puppy who will roll round his neck, found in a locker). Number 5 must take these and other items outside the factory where he starts part two of the game.

Once outside the guards and other robots continue to give chase but here you have also got to avoid the wildlife. Animals such as frogs, bunnies and hedgehogs insist on throwing themselves at you while you are trying to avoid everything else. If you manage to avoid them you gain points, but if you stand on them or hit them your energy rapidly runs out.

If you find you are having problems with part one you can go on to part two and practice with that though obviously you can't build your decoy until you have



obtained all the items from part one.

I found the game quite entertaining but difficult at times. If you like a challenge it could be your game. I must however warn you that the music is very monotonous. The first few times it is quite good but then it just goes on and on. The music in the second part is a bit of an improvement.

Anyway, happy robotics and good luck in your mission. Number 5's happiness depends on you. S.C.

#### Touchline

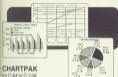
**Title:** *Short Circuit, Supplier: Ocean, 6 Central Street, Manchester M2 5NS, Tel: 061 832 8513.*

**Originality:** 4/10. **Playability:** 6/10. **Graphics:** 7/10. **Value:** 8/10.



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# Colonial Conquest

*Wargames don't usually get the publicity that they deserve, perhaps because they are considered a minority interest. Here's one which should definitely appeal to the masses.*

*By Tony Hetherington*

Imagine a game that's captured the best features of classic board games such as Risk and Diplomacy but can also provide devious and ruthless computer opponents. Imagine a game in which six players compete for global power by bribery, espionage, deception and war! You're imagining the award-winning global strategy game from 1991.

Computer and human players take the role of empire builders as they attempt to steer England, France, Germany, Russia, USA or Japan to global dominance.

Three different scenarios are set in the turbulent times between 1880 and 1914 when a gentleman was the accepted form of diplomacy.

The standard scenario confines the player powers to their own borders on the game begins with neutral continents such as Africa, India, Australasia and South America ripe for the picking. These neutral continents, although packed with their own armies, form the stepping stones for empires as the tensions escalate they bring in adds to your own resources to







# Dual Programming

*Chop your Plus/4's memory in half and get twice the value*

By Jonathan Morley

**W**ith all your Plus/4's memory isn't a bit silly that you can only have one program in the memory at a time?

Well look no further than this simple program. It works by separating your computer's memory into two halves, each working individually with its own set of variables etc. Some functions such as the screen remain the same for your convenience and speed of change, while graphic modes and sounds are dependent upon which area you are in. The cursor, for instance, moves to the place where it would have been had the program area not been changed.

If a program is left running, when you return to it, the operating system will re-start at the next command in the program.

All of this may at first seem confusing but with a little time this could become a treasured programming tool allowing you to switch from one program to another or simply just have two basic programs in the memory at once.

## Theory

The way in which the program works is simple: when a short machine code routine is called it switches the constants, parameters and pointers at the beginning of the memory for another set relating to the second program area, and stores the first.

## Using It

You are now ready to program and experiment; load your old programs into either area, write new ones or add new parts to your main program. You are limited, as ever, only by your own imagination so **HAPPY PROGRAMMING!** and remember that at any time to switch areas all you need to do is type SYS125 in your program e.g.

```
10 print "loading now"; SYS125;
print "back again"
run = RETURN
```

(If an error signal appears ignore it, this is just a result of the initial change).

You are now in the other area press F4 (ahh go F!) to clear the screen and then F1 which types SYS 125 for you and you will be back into the other mode where the program will finish running.

N.B. Adapt C64 programmers will find that the principle of swapping the zero-page, and a few other parameters, will also work for them as long as they are careful to change addresses 44 and 56 to the correct values.

## A Machine Code Expert

The main machine code that does this is in Figure 1.

## Instructions

To start the program, type in the **LOADER** and **SAVE** it.

Every time **AFTER** you **RUN** this program set up your boundaries by typing the instructions in Figure 2. ()

**PROGRAM: LOADER**

```

10 POKE 34568,0:POKE34561,0
20 D=0
30 A=00000
40 READ:POKE,A,A+1:D=D+B
50 IFB=80THEN60:ELSE40
60 A=1525
70 READ:POKE,A,A+1:D=D+B
80 IFB=80THEN90:ELSE70
90 KEY1,"SYS1525"<CHR$(13)
100 DATA160,0,101,0,72,100,0,050
110 DATA140,0,104,137,0,050,050
120 DATA241,162,6,100,0,255,72,1
55
130 DATA0,251,157,0,255,104,167,
0
140 DATA001,232,224,25,200,237,9
0
150 DATA120,141,03,235,32,0,050,
141,02,255,00,90
160 A=00000
170 READ:POKE,DEC(B):A=A+1:D
=D+DEC(B)
180 IFB="60"THEN190:ELSE170
190 IFD>10204 THENPRINT"TYPIING
ERROR"
200 DATA0,00,00,00,00,00,00,00
210 DATA0,00,02,00,00,00,00,00
220 DATA00,00,00,10,00,00,00,00

```

Figure 1

. fa00	a200	lda # 000	init
. fa02	05 00	lda 000,x	load mem
. fa04	40	pha	hold mem
. fa06	bd 00 10	lda 000,x	load new
. fa08	00 00	sta 000,x	store new
. fa0a	60	pha	get mem
. fa0c	bd 00 10	lda 000,x	store mem
. fa0e	00	inx	next char
. fa10	-00 01	bcc 00a0	go back
. fa12	a2 06	lda # 006	
. fa14	bd 00 07	lda 000,x	do same
. fa16	40	pha	
. fa18	bd 00 0b	lda 0000,x	for colors
. fa1a	9d 00 07	sta 000,x	
. fa1c	00	pha	and sounds
. fa1e	9d 00 0b	sta 0000,x	
. fa20	00	inx	etc.
. fa22	00 1a	cpy # 01a	
. fa24	d0 0d	brz 0013	
. fa26	00	inx	return

Figure 2

POKE36,134 < RETURN >	no stop program 1 running into program 2
CLR < RETURN >	no align system variables
SYS 0000 < RETURN >	no copy this pattern into the storage area
POKE44,135 < RETURN >	no start this area at the end of the last
POKE36,247 < RETURN >	no define the end of this area
COLORA,3 < RETURN >	no distinguish each area
CLR < RETURN >	no align system variables
NEW < RETURN >	
SYS1525	change area
NEW < RETURN >	

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# I.Q.

*Read on if you're a card fanatic and we'll tell you about the latest in bridge programs. Otherwise, we test the water on a budget adventure trilogy.*

## CLASSIC BRIDGE

**F**or a variety of reasons, bridge does not lend itself to the same sort of computer analysis as chess. This idea is well borne out when it comes to computer games. Whereas chess programs can now beat all but the top club players very easily, bridge programs can handle the display well enough — imparting the bids and cards to be played — but the actual nitty-gritty of the game, the bidding and card play, is of a very poor standard.

The basic idea in bridge is for you and your partner to determine how many tricks you can make between you. This is done during the bidding where you try to assess where your strengths and weaknesses lie. If you outbid the opponents, then you must try and make the number of tricks that you declared for. If they outbid you, then you and your partner must try to defeat their contract.

In *Classic Bridge*, the computer handles the other three hands allowing you to play without having to find three like-minded fellows first. Unfortunately, the game is of a very poor standard. There are a number of reasons for this. First, the game is very slow when it comes to actually dealing a hand. This would be bearable if you actually got a different hand each time but it is not quite as simple as that. Every time that you want to play a hand, you must input a number. This acts as a seed for the randomiser within the program. While this means that there are a vast number of hands available to you, it also means that you must keep track of which numbers you have already used — otherwise you get the same hands again. This proves to be very clumsy.

As mentioned earlier, poor bidding and card play is common to all bridge games currently available and *Classic Bridge* is no better or worse than any other program. Where there is a problem though is that the bidding system used is Goren. Although this is the system used by most Americans, it is totally alien to British players who normally play a system called Acol. In nearly 20 years of playing tournament Bridge, I have only ever met two pairs who play Goren! Again, this problem isn't insurmountable, but it does show a considerable lack of insight on the part of someone.

The main lack with the game, though, is in the cardplay. The program does not always remove the cards played by you. In one case, I was left with six cards in my hand when everybody else only had two left. The computer would not let me play any cards that I didn't actually hold, but this bug totally removed any last traces of pleasure I was deriving



from playing this game.

Bridge is a classic game, but I would go so far as to say that it is the best game ever devised. *Classic Bridge* isn't a tragedy. Anyone who can already play will be extreme disappointed. Any beginner will be put off for life. Don't buy a good beginners book and a pack of cards and find what you've been missing all these years. G.R.

### Touchline

*Bridge: Classic Bridge, Supplies: Amos, 15 West Hill, Darton, Kent DA1 2EL, Machine: C64, Originality: N/A, Groups: N/A, Playability: 1/10, Value: 2/10.*

## OXFORD BRIDGE

Even though Bridge is the greatest game in the world, it does suffer from one major drawback. You do need four partners to play it. Which is bad news if you are on your own or with only one or two like-minded friends. This leads to a real drawback. In order to cater for these poor unfortunate software companies will invest in trying to write a solo program. One of these days, they will learn. It just does not work.

The latest people to try their hand is a company called Thinking Games. This program features lots of options including some that I have not come across before in a solo program but the final result is the same as every other attempt — failure. Here's why.



Presentationwise, the program is fine although the input screen could be improved. Every card played must be entered individually, and suits and cards played to the last trick could be handled automatically. A joystick option would also be a great help. Also, there is no claim option. This would allow declarer to claim some or all of the remaining tricks when it is perfectly obvious what the outcome of the hand is going to be.

In the actual playing of the cards, the program is better than most of its competitors but very predictable and as best as better than average. As in real life, its declarer play is better than its defence.

But it is in the bidding that the program falls down. Even without claiming to play any particular system (natural, weak notrump and no conversion in it, not even Stayman or Blackwood) the bidding is a fiasco. A typical example was the hand: Holding S K 1072, H K85, D AQJ3, C Q, the computer correctly opened one heart. The response was two clubs and it now found the monstrous bid of three spades! Apart from totally misdescribing the strength and shape of the hand and using up vast amounts of bidding space, the bid is flat.

Before Thinking Games get too upset about this, I should point out that this is something common to all bridge programs released to date (and I suspect for many years to come). The bidding is far and away the most important part of the game and the fact that the program can't cope makes a mockery of everything else.

The novel feature about Oxford Bridge is the duplicate facility. The results of the hands can be saved on disk and replayed to several other people at a later date. The program will then score as in any duplicate pairs event. It's all very nice but the problem is, I can't actually see anyone using it, if you have enough people available to use the facility, you might as well sit down and play the real thing.

#### Touchline

**Title:** *The Oxford Bridge Program, Machine: C64, Supplier: Thinking Games, 18 Newton Road, Farnborough, Kent ME13 9JZ. Price: £29.95/£49.95 (incl/VAT).*

**Originality:** N/A. **Graphics:** 6/10. **Playability:** 4/10. **Value:** 5/10.

#### KET TRILOGY



There wasn't really any choice in the matter. You had been framed for a murder and the verdict was execution on the small matter of saving the lands of Ket from the vicious attacks led by King Yvan, leader of the Mad Mages and his assistant, the High Priestess Delphin. Naturally, you opted for the chance to be a hero. Even though the odds on you surviving were small, they had to be greater than the first choice. Just in case you decided to die a quick death you did, they found an assassin bug into your neck ready to deliver a final nibble should you attempt anything naughty.

The game consists of three different adventures. In The Mountains of Ket, you have to find the secret entrance to the mountains and then negotiate the perils that lie within. In the Temple of Yvan, you must destroy the evil forces lurking within the temple and, in the Final Mission, you must seek a final confrontation with Yvan himself as well as making sure that you can escape at the end of it. Although all three adventures are linked, you can play each one separately which is good news if you happen to get stuck early on.

As the games are fairly old, the parser is quite crude — verb/noun input only. There is also a rudimentary combat system — your strength against that of your opponent with a luck factor thrown in for when you try to escape. The unusual bit though is that instead of using pictures to illustrate some of the locations, the top half of the screen provides a map of the areas that you have visited. This is a nice touch and should appeal to beginners and those adventurers forever getting lost alike.

Although the games are a bit dated now, they are still fun to play and £7.95 for the three adventures is good value.

G.R.H.

#### Touchline

**Title:** *The Ket Trilogy, Machine: C64, Supplier: Invenio Software, 2 Minerva House, Colville Park, Aldershot, Berks RG7 4QW. Tel: 07538 77284. Price: £7.95.*



The bad news doesn't end there either I'm afraid. The price of this package is absolutely ridiculous. At just under £80 for the tape and £25 pounds for the disk version, I reckon that it is overpriced by at least £20. For the money it costs, you could buy several bridge books, bridge evening classes for a year or, perhaps best of all, membership of a couple of just local clubs. Then you need never be short of a fourth player again. Bridge, unlike chess, is a social game. Let's hope it always remains that way.

G.R.H.

# Cadpack-64

*Increasingly, professional people are using computers aided design in the office. This package makes it available in your home.*

*By Evelyn Mills*

**C**omputer Aided Design - CAD in brief - is a well known method for creating graphic designs. In general, CAD is aimed at the architect, the professional designer, the graphic artist etc., and is not intended as a sketching tool for the free-hand artist.

Cadpak-64, however, is more flexible in this respect, and when used in conjunction with the recommended light pen can almost be considered as a CAD-ART package! The light pen is very satisfactory (brighten up your screen first) and gives good free-hand drawing; there is no need however to indulge in the luxury of extra expense as the complete system is camera controlled.

Before buying any CAD package, find out what it can do, what you are getting for your money and, more important - are your printer outputs scaled properly with respect to proportional impact? Having investigated Cadpak with considerable care, I can thoroughly recommend it for reliability, printer accuracy and increasing flexibility.

## The Manual

The manual may be a bit obscure if you

are a casual programmer. Indeed it needs careful reading to grasp the full potential of Cadpak - there are so many extras here which you might well miss through 'rapid scanning'. The best way to test the package in full is to take it section by section (page 1).

While there is a Main Menu with 22 functions, there are equally important subdivisions of this which you should certainly use to the full. They are all detailed both in the Manual and on-screen, and the very excellent index at the back will help you with continuity.

## Facilities

Right then - what can Cadpak do? While there are the usual facilities for colour selection, circling, boxing, clipping, rays, filling, zoom, etc. it would be more useful to detail the more advanced features of Cadpak.

Business output (no sight printer makes) is DIMENSIONED automatically according to the dimensions keyed in. Relevant answers to the questions asked will do the job and the x-y co-ordinates may be keyed in with the Logo key; the computer will then automatically show you the distance you are from the starting co-

ordinates as you move around the screen. Positions for objects may be keyed in as required, and distances measured - which all adds up to accurate scale drawing.

The LINE function allows solid and dashed line drawing, either as single or connected lines. Forced horizontal, vertical and parallel lines are available as a true angle. ERASE means is very effective while there is, of course, total screen clearance.

FILLING may be solid or as a pattern. Happily the fill operation may be stopped with the space bar and undone with F4 should you miscalculate. While there are seven preset patterns from which to choose, the option to design and save your own pattern to disk is available - good opportunities here.

TEXT to screen is available in four sizes (also including upper and lower cases and reverse fields). Three special fonts are available - Old English, Text and 3D Font. Full instructions are given for the loading and use of these fonts. Please note the instructions as there are two screens available in Cadpak and screen two is required here.

Now the cursor keys will position







ROM and it will save you from wading through screens full of code.  
**FB - GO UNTIL.**

This is probably the most powerful command in the Emulator. Pressing FB and then entering a start and stop address causes the code to be run from the start address but stop as soon as the end address is reached. The user may then use the F1 key etc. to step through remaining code.

It is possible to use GO UNTIL at three different speeds. Slow is best used if the program is being traced. Each time an instruction is carried out the border colour changes. If the border doesn't change then your program has crashed and you will have to reset your computer.

The last prompt with this command, allows the trace to be switched on or off. If Y is pressed, the

hex address of the current location will be displayed in the upper left hand corner of the screen.

During GO UNTIL, the PKey may be used to freeze the emulation. Releasing the K key will allow the program to continue. RUN/STOP will return the program to the main screen, as will any invalid instruction encountered by the Emulator.

EMULATOR PROGRAM

```

7000 4C 0A 7A 3F 3F 3F 71 79 00
7001 70 11 10 14 11 83 83 83 83 83
7002 13 13 13 13 13 13 13 13 13 13
7003 10 10 10 10 10 10 10 10 10 10
7004 10 10 10 10 10 10 10 10 10 10
7005 10 10 10 10 10 10 10 10 10 10
7006 10 10 10 10 10 10 10 10 10 10
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7024 10 10 10 10 10 10 10 10 10 10
7025 10 10 10 10 10 10 10 10 10 10
7026 10 10 10 10 10 10 10 10 10 10
7027 10 10 10 10 10 10 10 10 10 10
7028 10 10 10 10 10 10 10 10 10 10
7029 10 10 10 10 10 10 10 10 10 10
7030 10 10 10 10 10 10 10 10 10 10
7031 10 10 10 10 10 10 10 10 10 10
7032 10 10 10 10 10 10 10 10 10 10
7033 10 10 10 10 10 10 10 10 10 10
7034 10 10 10 10 10 10 10 10 10 10
7035 10 10 10 10 10 10 10 10 10 10
7036 10 10 10 10 10 10 10 10 10 10
7037 10 10 10 10 10 10 10 10 10 10
7038 10 10 10 10 10 10 10 10 10 10
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7099 10 10 10 10 10 10 10 10 10 10
7100 10 10 10 10 10 10 10 10 10 10

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7698	00	01	81	01	98	08	81	03	00
7699	00	02	00	05	01	04	08	02	00
7700	00	03	10	02	01	01	01	05	09
7701	00	04	01	01	00	00	01	08	00
7702	00	05	09	00	00	01	01	02	00
7703	00	06	00	00	00	00	00	00	00
7704	00	07	10	00	00	00	00	00	00
7705	00	08	05	02	00	01	00	00	00
7706	00	09	01	00	00	00	00	00	00
7707	00	10	00	00	00	00	00	00	00
7708	00	11	00	00	00	00	00	00	00
7709	00	12	00	00	00	00	00	00	00
7710	00	13	00	00	00	00	00	00	00
7711	00	14	00	00	00	00	00	00	00
7712	00	15	00	00	00	00	00	00	00
7713	00	16	00	00	00	00	00	00	00
7714	00	17	00	00	00	00	00	00	00
7715	00	18	00	00	00	00	00	00	00
7716	00	19	00	00	00	00	00	00	00
7717	00	20	00	00	00	00	00	00	00
7718	00	21	00	00	00	00	00	00	00
7719	00	22	00	00	00	00	00	00	00
7720	00	23	00	00	00	00	00	00	00
7721	00	24	00	00	00	00	00	00	00
7722	00	25	00	00	00	00	00	00	00
7723	00	26	00	00	00	00	00	00	00
7724	00	27	00	00	00	00	00	00	00
7725	00	28	00	00	00	00	00	00	00
7726	00	29	00	00	00	00	00	00	00
7727	00	30	00	00	00	00	00	00	00
7728	00	31	00	00	00	00	00	00	00
7729	00	32	00	00	00	00	00	00	00
7730	00	33	00	00	00	00	00	00	00
7731	00	34	00	00	00	00	00	00	00
7732	00	35	00	00	00	00	00	00	00
7733	00	36	00	00	00	00	00	00	00
7734	00	37	00	00	00	00	00	00	00
7735	00	38	00	00	00	00	00	00	00
7736	00	39	00	00	00	00	00	00	00
7737	00	40	00	00	00	00	00	00	00
7738	00	41	00	00	00	00	00	00	00
7739	00	42	00	00	00	00	00	00	00
7740	00	43	00	00	00	00	00	00	00
7741	00	44	00	00	00	00	00	00	00
7742	00	45	00	00	00	00	00	00	00
7743	00	46	00	00	00	00	00	00	00
7744	00	47	00	00	00	00	00	00	00
7745	00	48	00	00	00	00	00	00	00
7746	00	49	00	00	00	00	00	00	00
7747	00	50	00	00	00	00	00	00	00
7748	00	51	00	00	00	00	00	00	00
7749	00	52	00	00	00	00	00	00	00
7750	00	53	00	00	00	00	00	00	00
7751	00	54	00	00	00	00	00	00	00
7752	00	55	00	00	00	00	00	00	00
7753	00	56	00	00	00	00	00	00	00
7754	00	57	00	00	00	00	00	00	00
7755	00	58	00	00	00	00	00	00	00
7756	00	59	00	00	00	00	00	00	00
7757	00	60	00	00	00	00	00	00	00
7758	00	61	00	00	00	00	00	00	00
7759	00	62	00	00	00	00	00	00	00
7760	00	63	00	00	00	00	00	00	00
7761	00	64	00	00	00	00	00	00	00
7762	00	65	00	00	00	00	00	00	00
7763	00	66	00	00	00	00	00	00	00
7764	00	67	00	00	00	00	00	00	00
7765	00	68	00	00	00	00	00	00	00
7766	00	69	00	00	00	00	00	00	00
7767	00	70	00	00	00	00	00	00	00
7768	00	71	00	00	00	00	00	00	00
7769	00	72	00	00	00	00	00	00	00
7770	00	73	00	00	00	00	00	00	00
7771	00	74	00	00	00	00	00	00	00
7772	00	75	00	00	00	00	00	00	00
7773	00	76	00	00	00	00	00	00	00
7774	00	77	00	00	00	00	00	00	00
7775	00	78	00	00	00	00	00	00	00
7776	00	79	00	00	00	00	00	00	00
7777	00	80	00	00	00	00	00	00	00
7778	00	81	00	00	00	00	00	00	00
7779	00	82	00	00	00	00	00	00	00
7780	00	83	00	00	00	00	00	00	00
7781	00	84	00	00	00	00	00	00	00
7782	00	85	00	00	00	00	00	00	00
7783	00	86	00	00	00	00	00	00	00
7784	00	87	00	00	00	00	00	00	00
7785	00	88	00	00	00	00	00	00	00
7786	00	89	00	00	00	00	00	00	00
7787	00	90	00	00	00	00	00	00	00
7788	00	91	00	00	00	00	00	00	00
7789	00	92	00	00	00	00	00	00	00
7790	00	93	00	00	00	00	00	00	00
7791	00	94	00	00	00	00	00	00	00
7792	00	95	00	00	00	00	00	00	00
7793	00	96	00	00	00	00	00	00	00
7794	00	97	00	00	00	00	00	00	00
7795	00	98	00	00	00	00	00	00	00
7796	00	99	00	00	00	00	00	00	00
7797	00	00	00	00	00	00	00	00	00

# Smart Lister

*Make your listings look smarter and cleaner with this clever little program.*

*By Gregory Murphy*

I have often thought that the appearance of a program listing is not at all enhanced by the inherent inclusion of the READY prompt which immediately follows the last line of the program. Also, when listing long programs, I usually find that the last line on each page is nearly bisected by the row of perforations on the continuous stationery! The following Basic program was written to overcome both of the above problems.

## Program Description

The program allows the user to specify the beginning and end of the range of program lines to be printed, the size of the continuous stationery being used (in terms of the number of lines per page) and the maximum number of printed lines which may appear on each page. Default values for each of the above options are displayed on the screen, and may be used (by simply pressing RETURN) or altered by overtyping as required.

## How It Works

All prompt messages are disabled by means of the POKE instructions in line 63879, thereby ensuring that the READY message is not printed at the end of the program listing.

The program operates by scanning the Basic line addresses and associated line numbers until the line corre-

sponding to the start of the required has been found. The program then counts forward a line (where it represents the maximum number of lines that may be printed on each page) and determines the number of the line appearing at that point.

A nice feature is that the program does not calculate the number of lines to be printed from the values of the line numbers involved, but actually counts the lines themselves. This means that programs written (either by choice or through lack of a RENUMBER facility) with irregularly incremented line numbers can be listed without difficulty.

The program then clears the screen, displays a LIST command to the printer for enough lines to fill one printed page and then stops. At least it would stop if instructions had not been previously poked into the keyboard buffer line 63868. These instructions home the cursor and enter RETURN, thereby executing the previously displayed LIST command to the printer.

At this stage the program should also stop, but there are still further instructions in the keyboard buffer. These instructions ensure that the program will GOTO line 63866 and continue the scanning, counting and printing process until all of the required range of lines has been printed.

When printing is complete, the

program re-enables all prompts, clears the printer buffer and then terminates.

## Important Note

It should be noted that lines 63863, 63868 and 63869 contain a capital letter "O" (not a zero) in the expressions "g063896" and "g063898" - i.e. GOTO 63896 and GOTO 63898 respectively.

## In Use

First enter the program as shown and then save it either to disk or tape before attempting to run it. This is always a good precaution to take with any program, but is especially necessary in the case of a program containing either SYS or POKE instructions.

Load the program for which if listing is to be printed and then append this program to it. Obviously the last line number in the program to be listed must not exceed 63858, but in an extreme situation the REM statements in lines 63860 to 63869 could be entered and the default value of L\$ altered to 63868 in line 63871.

The simplest way to append this program is as follows:

Enter the command POKE 43, (43)-(POKE 44, FEEL (44) in direct mode. Load this program. Enter the command POKE 43, 1; POKE 44, 8 in direct mode.




PROGRAM	PAGES LISTED		
21	00000 ram	0	00000 -
22	00001 ram	00	00001 -
23	00002 ram	00	00002 -
24	00003 ram	00	00003 -
25	00004 ram	00	00004 -
26	00005 ram	00	00005 -
27	00006 ram	00	00006 -
28	00007 ram	00	00007 -
29	00008 ram	00	00008 -
30	00009 ram	00	00009 -
31	00010 ram	00	00010 -
32	00011 ram	00	00011 -
33	00012 ram	00	00012 -
34	00013 ram	00	00013 -
35	00014 ram	00	00014 -
36	00015 ram	00	00015 -
37	00016 ram	00	00016 -
38	00017 ram	00	00017 -
39	00018 ram	00	00018 -
40	00019 ram	00	00019 -
41	00020 ram	00	00020 -
42	00021 ram	00	00021 -
43	00022 ram	00	00022 -
44	00023 ram	00	00023 -
45	00024 ram	00	00024 -
46	00025 ram	00	00025 -
47	00026 ram	00	00026 -
48	00027 ram	00	00027 -
49	00028 ram	00	00028 -
50	00029 ram	00	00029 -
51	00030 ram	00	00030 -
52	00031 ram	00	00031 -
53	00032 ram	00	00032 -
54	00033 ram	00	00033 -
55	00034 ram	00	00034 -
56	00035 ram	00	00035 -
57	00036 ram	00	00036 -
58	00037 ram	00	00037 -
59	00038 ram	00	00038 -
60	00039 ram	00	00039 -
61	00040 ram	00	00040 -
62	00041 ram	00	00041 -
63	00042 ram	00	00042 -
64	00043 ram	00	00043 -
65	00044 ram	00	00044 -
66	00045 ram	00	00045 -
67	00046 ram	00	00046 -
68	00047 ram	00	00047 -
69	00048 ram	00	00048 -
70	00049 ram	00	00049 -
71	00050 ram	00	00050 -
72	00051 ram	00	00051 -
73	00052 ram	00	00052 -
74	00053 ram	00	00053 -
75	00054 ram	00	00054 -
76	00055 ram	00	00055 -
77	00056 ram	00	00056 -
78	00057 ram	00	00057 -
79	00058 ram	00	00058 -
80	00059 ram	00	00059 -
81	00060 ram	00	00060 -
82	00061 ram	00	00061 -
83	00062 ram	00	00062 -
84	00063 ram	00	00063 -
85	00064 ram	00	00064 -
86	00065 ram	00	00065 -
87	00066 ram	00	00066 -
88	00067 ram	00	00067 -
89	00068 ram	00	00068 -
90	00069 ram	00	00069 -
91	00070 ram	00	00070 -
92	00071 ram	00	00071 -
93	00072 ram	00	00072 -
94	00073 ram	00	00073 -
95	00074 ram	00	00074 -
96	00075 ram	00	00075 -
97	00076 ram	00	00076 -
98	00077 ram	00	00077 -
99	00078 ram	00	00078 -
00	00079 ram	00	00079 -

This program will now be appended to the program to be listed, and may be run by entering the command RUN 63930.


If printing is aborted by means of the RUN/STOP button, the simplest method of returning things to normal is to enter the command GOTD 63995 in direct mode. This re-enables prompts and clears the printer buffer. The scrolling "File not open error" message may be ignored.

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• **SCREEN FLIPPING** - Flips screens and can be set to flip screens in a directory.

• **SCREEN MIRRORING** - Mirrors screens and can be set to mirror screens in a directory.

• **SCREEN INVERTING** - Inverts screens and can be set to invert screens in a directory.

• **SCREEN STRETCHING** - Stretches screens and can be set to stretch screens in a directory.

• **SCREEN SHRINKING** - Shrinks screens and can be set to shrink screens in a directory.

• **SCREEN SCROLLING** - Scrolls screens and can be set to scroll screens in a directory.

• **SCREEN UNSCROLLING** - Unscrolls screens and can be set to unscroll screens in a directory.

• **SCREEN SLIDING** - Slides screens and can be set to slide screens in a directory.

• **SCREEN UNSLIDING** - Unslides screens and can be set to unslide screens in a directory.

• **SCREEN ZOOMING** - Zooms screens and can be set to zoom screens in a directory.

• **SCREEN UNZOOMING** - Unzooms screens and can be set to unzoom screens in a directory.

• **SCREEN PANING** - Pans screens and can be set to pan screens in a directory.

• **SCREEN UNPANNING** - Unpans screens and can be set to unpan screens in a directory.

• **SCREEN SCISSORING** - Scissors screens and can be set to scissors screens in a directory.

• **SCREEN UNSCISSORING** - Unscissors screens and can be set to unscissors screens in a directory.

# Printer Control

*Will this word processor from McGowan be just what your printer has been waiting for?*

*By Evelyn Mills*

**P**rinter Control is a word processor which has most of the facilities associated with other good word processors (i.e. line deletion, block deletion, copying and transfer, editing, page numbering, centering, file linking, disk handling, justification and so forth). Apart from such generalized techniques however, other facilities exist which enhance word processing.

Before discussing these, it should be noted that this review is for the disk system handling the MIPS801/800 printers only. Systems for other printers are also available and the package comes with a generalised Manual plus amendment data for the printer which you are using. The amendment pages for the MIPS series must be examined with due care.

## Files

The first thing you will no doubt wish to do is create a file. The Main Menu provides the necessary options, including one for adjusting the speed of the cursor control. Select the requisite option and follow the manual plus the amendment sections. Reference to pages 12-13 in the General Manual will help you here. While the commands are relatively simple and are mostly achieved through the function keys some facts are rather elusive.

Pay particular attention to the F1 key when not using a document. This is your escape key for quitting commands. Any formatting errors are highlighted at the bottom of the screen as numbers 1-6 which can be tracked down in the Manual which is intended to cover the major features of

processing.

Effortlessly it is possible to increase the size of text print within a document (by a two, four or eight scale) and also to underline text. The latter facility is not easy to locate (in its simplest form). However, it may be done in the following manner — press F5, write text, press F4. In the Manual, these are defined as 'condense on' and 'condense off' which are bypassed on the MIPS801/800. It is certainly not possible to obtain 'condensed' or 'double density' text with this program (unless you redesign the character set with the Graphics Editor) but these keys will underline for you although the Manual does not describe this facility. A more complicated method is provided.

## Other Commands

The RUN/STOP key allows you to back-step very efficiently. Should you run into problems, save as you go along which will allow you to do a further search for the solution in the manual. Editing is simple, using I for insertion and D for delete.

Use of the Commodore key allows you to toggle between text and graphics mode in your document. This, of course, eliminates use of the graphics using this key. The shift key is fully functional. As you use the program more and more you will no doubt find the methods best suited to your own needs.

## Formatting Up

To summarise: In text mode, you may, within the text itself, enhance it to line, underline, position at right, full or

centre, save to disk and output to printer. Page numbering, lines left and multiple page printing are also possible while very specialised instructions for using handling are provided.

The other standard facilities of processors are, of course, present. I supplement this, use the PICTURE MODE and do as much free-hand drawing on screen as you wish use the keyboard graphics. This is easily handled, the cursor acting in a 'wrap around' fashion. Again the Commodore key allows some screen graphics and text; this is an interesting mode and your print may be scrolled up, down, left or right changed to inverse video, and rotated in the horizontal plane. Text may be inserted anywhere on the screen or erased in best effected by using the space-bar in the graphics mode.

You can make really substantial headings (up to 60 lines, A4 paper) etc. The screen is 24 line by 80 column which may be modified to print part of your picture working on a 5 x 8 line size. Printer output may be in 1404 expansion output on the X or Y axis.

Redefining graphics is fast standard and is described in full as a printer output function and very cheap. While the General Manual, fairly extensive, please refer to its amendment supplement to find out what may or may not be possible in the MIPS801/800.

As a word processor, the package is average, but the addition of its facilities described give it an added attraction. At a cost of £20 on disk, £25 on tape, the decision is yours.

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# Procedures

*Programming in Basic can be very long winded and clumsy. Using procedures can make your program much cleaner and smoother.*

*By Nick Gregory*

**G**ood programs, so the old story goes, are those which are easily read and thus properly constructed. This philosophy certainly makes writing them a lot quicker and the end product is easier to understand.

However, it is very difficult to achieve this in Basic because even the best end result is only a program full of REM annotated subroutines. In the end, you are left with code consisting of a mass of GOSUBs which are very difficult to follow.

## The Solution

Procedures offer a very neat way around this problem by allowing you to write your program in readily understood segments. Each procedure is in effect a mini-program all of its own. The implications of this are that several mini-programs can be put together and then called by name from the main program.

For example a small program to ask for a name, and then print a message could look like this:

```
10 DEFPROC ASK NAMES:AS
20 INPUT "WHAT IS YOUR NAME"; AS
30 END
40
50 DEFPROC PRINT MESSAGE:AS
60 PRINT "HELLO"; AS
70 END
80
90 PROC ASK NAMES:NAME$
100 PROC PRINT MESSAGE (NAME$)
```

In this example the actual program starts at line 90 and ends at line 100 because any lines between DEFPROC and END are ignored when you type RUN. Notice how the procedures are called by their names. The name of any variable associated with the procedure (NAME\$ in this case) is

called something different at the start of the procedure. This type of syntax allows you to read the program (lines 90 and 100 demonstrate how easy this is) and to use the same procedure with different associated variables (though variables are optional).

The routine PROC:LOAD is a Basic loader for the machine code, necessary to implement procedures on the 64. As always, type the program and SAVE it before running it or else there are errors.

The machine code version, PROC:CODE, of the program should be entered using the program HEX DATA ENTRY II. Do not use the earlier version of this program. For details on how to enter this code refer to the article Hex Data Entry II. When you have finished entering all the data you should SAVE it with the name 'PROC:CODE'. If using tape this should be placed after 'PROC:LOAD'.

To use the program in future simply LOAD and RUN the program 'PROC:LOAD'. This will automatically LOAD and execute the machine code.

The machine code will now be incorporated into the Basic interpreter and you can continue to use the 64 as normal.

The routine works by wedging into the Basic command interpreter and not into the GETCHARACTER subroutine as is normal. However, to avoid changing the LIST and CRUNCH Basic routines each new command begins with the character '@'. There are three new commands:

## @DEFPROC

@DEFPROC = name of procedure (optional parameters)

This command is used to define the start of a procedure. The procedure name can be any length up to 127 characters long and SPACES ARE SIGNIFICANT so the names GET A

NAME and GETANAME are recognised as being two different procedures.

This is unusual but I felt it allows the names to make more sense. Note that a space between the last character and the parameter bracket, 'Y', is also significant. The procedure name can contain any Basic key word, eg PRINT, in which case the appropriate abbreviation can be used. The optional parameter list can contain any number of parameters, separated by commas, within a limit which I will explain later.

The variables can be strings, integers or floating point numbers but they cannot be arrays, expressions or numbers. The only other restriction is that you can not use SYSTEM variables (SL, TL, or TR) in the parameter list.

For example see Table 1:

The @DEFPROC and @END commands behave like REM statements towards any instructions after them on the same line; that is to say they are ignored.

## @END

This command marks the end of a procedure. You must always use @END after using @DEFPROC. @PROC procedure name (optional parameters)

This command is used to call a procedure like GOSUB is used to call a subroutine. There must be a procedure defined by @DEFPROC with the same name. If you are using parameters then they must be of the same type, in the same order and be same number as in the @DEFPROC command. @PROC is just an ordinary Basic command, you can for example include it as part of a multi-statement line. If, however, you are using it after an IF command then put a colon between the THEN and @PROC. For example:

Table 1

#DEFPROC PRINT	OK
#DEFPROC PRINT (A,B,C,D)	OK
#DEFPROC PRINT (12)	ILLEGAL
#DEFPROC PRINT (A*B/C)	ILLEGAL
#DEFPROC PRINT (ST,TR)	ILLEGAL

PROGRAM: PROC.CODE

```

0000 70 A0 00 00 00 02 05 1C : 70
0001 00 00 00 00 00 00 00 00 : 07
0010 A9 46 00 00 00 00 00 00 : 09
0011 01 03 00 00 00 73 00 00 : 00
0020 09 48 F0 04 00 4C E7 07 : 02
0030 00 00 A7 00 00 00 00 72 : 02
0040 73 00 00 00 F0 04 00 00 : 00
0050 F0 04 00 00 00 00 00 44 : 00
0060 02 02 00 00 00 00 00 00 : 00
0070 00 00 00 00 00 00 00 00 : 00
0080 03 00 7F 00 00 00 00 02 : 07
0090 00 00 01 00 00 00 01 02 : 3F
00A0 00 00 00 00 00 00 00 00 : 00
00B0 47 00 00 00 00 00 73 00 : 53
00C0 00 00 02 02 00 01 00 00 : 00
00D0 00 00 00 00 00 00 00 00 : 00
00E0 00 00 00 00 00 00 00 00 : 00
00F0 00 00 00 00 00 00 00 00 : 00
0100 00 00 00 00 00 00 00 00 : 00
0110 00 00 00 00 00 00 00 00 : 00
0120 00 00 00 00 00 00 00 00 : 00
0130 00 00 00 00 00 00 00 00 : 00
0140 00 00 00 00 00 00 00 00 : 00
0150 00 00 00 00 00 00 00 00 : 00
0160 00 00 00 00 00 00 00 00 : 00
0170 00 00 00 00 00 00 00 00 : 00
0180 00 00 00 00 00 00 00 00 : 00
0190 00 00 00 00 00 00 00 00 : 00
0200 00 00 00 00 00 00 00 00 : 00
0210 00 00 00 00 00 00 00 00 : 00
0220 00 00 00 00 00 00 00 00 : 00
0230 00 00 00 00 00 00 00 00 : 00
0240 00 00 00 00 00 00 00 00 : 00
0250 00 00 00 00 00 00 00 00 : 00
0260 00 00 00 00 00 00 00 00 : 00
0270 00 00 00 00 00 00 00 00 : 00
0280 00 00 00 00 00 00 00 00 : 00
0290 00 00 00 00 00 00 00 00 : 00
0300 00 00 00 00 00 00 00 00 : 00
0310 00 00 00 00 00 00 00 00 : 00
0320 00 00 00 00 00 00 00 00 : 00
0330 00 00 00 00 00 00 00 00 : 00
0340 00 00 00 00 00 00 00 00 : 00
0350 00 00 00 00 00 00 00 00 : 00
0360 00 00 00 00 00 00 00 00 : 00
0370 00 00 00 00 00 00 00 00 : 00
0380 00 00 00 00 00 00 00 00 : 00
0390 00 00 00 00 00 00 00 00 : 00
0400 00 00 00 00 00 00 00 00 : 00
0410 00 00 00 00 00 00 00 00 : 00
0420 00 00 00 00 00 00 00 00 : 00
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0440 00 00 00 00 00 00 00 00 : 00
0450 00 00 00 00 00 00 00 00 : 00
0460 00 00 00 00 00 00 00 00 : 00
0470 00 00 00 00 00 00 00 00 : 00
0480 00 00 00 00 00 00 00 00 : 00
0490 00 00 00 00 00 00 00 00 : 00
0500 00 00 00 00 00 00 00 00 : 00
    
```

```

C100 05 00 13 01 00 0C 05 0A : 0D
C101 00 73 00 00 F0 00 13 01 : 0E
C102 00 F0 00 00 03 00 04 F0 : 00
C103 00 00 00 00 F0 00 00 00 : 00
C104 F0 00 00 00 00 00 00 00 : 00
C105 00 73 00 00 00 00 F7 02 : 00
C106 00 00 F0 00 02 00 00 00 : 00
C107 02 00 00 00 00 00 00 00 : 00
C108 00 00 00 00 00 01 00 00 : 00
C109 F0 00 00 00 00 00 00 00 : 00
C110 00 00 00 00 00 00 00 00 : 00
C111 00 00 00 00 00 00 00 00 : 00
C112 00 00 00 00 00 00 00 00 : 00
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C152 00 00 00 00 00 00 00 00 : 00
C153 00 00 00 00 00 00 00 00 : 00
C154 00 00 00 00 00 00 00 00 : 00
C155 00 00 00 00 00 00 00 00 : 00
C156 00 00 00 00 00 00 00 00 : 00
C157 00 00 00 00 00 00 00 00 : 00
C158 00 00 00 00 00 00 00 00 : 00
C159 00 00 00 00 00 00 00 00 : 00
C160 00 00 00 00 00 00 00 00 : 00
    
```

Please read LISTINGS before entering this program.

PROGRAM: PROC.LOADER

```

C7 1 PRINT"CLR,DOWN,RIGHT73P0
C8 2 PRINT"DOWN,RIGHT10M,P 00
C9 3 PRINT"DOWN,RIGHT10M,P 00
C10 4 REM INITIALISED BY SYS 491
C11 52
C12 00 00 00 00 00 00 00 00
C13 00 00 00 00 00 00 00 00
C14 00 00 00 00 00 00 00 00
C15 00 00 00 00 00 00 00 00
C16 00 00 00 00 00 00 00 00
C17 00 00 00 00 00 00 00 00
C18 00 00 00 00 00 00 00 00
C19 00 00 00 00 00 00 00 00
C20 00 00 00 00 00 00 00 00
C21 00 00 00 00 00 00 00 00
C22 00 00 00 00 00 00 00 00
C23 00 00 00 00 00 00 00 00
C24 00 00 00 00 00 00 00 00
C25 00 00 00 00 00 00 00 00
C26 00 00 00 00 00 00 00 00
C27 00 00 00 00 00 00 00 00
C28 00 00 00 00 00 00 00 00
C29 00 00 00 00 00 00 00 00
C30 00 00 00 00 00 00 00 00
C31 00 00 00 00 00 00 00 00
C32 00 00 00 00 00 00 00 00
C33 00 00 00 00 00 00 00 00
C34 00 00 00 00 00 00 00 00
C35 00 00 00 00 00 00 00 00
C36 00 00 00 00 00 00 00 00
C37 00 00 00 00 00 00 00 00
C38 00 00 00 00 00 00 00 00
C39 00 00 00 00 00 00 00 00
C40 00 00 00 00 00 00 00 00
C41 00 00 00 00 00 00 00 00
C42 00 00 00 00 00 00 00 00
C43 00 00 00 00 00 00 00 00
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C46 00 00 00 00 00 00 00 00
C47 00 00 00 00 00 00 00 00
C48 00 00 00 00 00 00 00 00
C49 00 00 00 00 00 00 00 00
C50 00 00 00 00 00 00 00 00
C51 00 00 00 00 00 00 00 00
C52 00 00 00 00 00 00 00 00
C53 00 00 00 00 00 00 00 00
C54 00 00 00 00 00 00 00 00
C55 00 00 00 00 00 00 00 00
C56 00 00 00 00 00 00 00 00
C57 00 00 00 00 00 00 00 00
C58 00 00 00 00 00 00 00 00
C59 00 00 00 00 00 00 00 00
C60 00 00 00 00 00 00 00 00
C61 00 00 00 00 00 00 00 00
C62 00 00 00 00 00 00 00 00
C63 00 00 00 00 00 00 00 00
C64 00 00 00 00 00 00 00 00
C65 00 00 00 00 00 00 00 00
C66 00 00 00 00 00 00 00 00
C67 00 00 00 00 00 00 00 00
C68 00 00 00 00 00 00 00 00
C69 00 00 00 00 00 00 00 00
C70 00 00 00 00 00 00 00 00
C71 00 00 00 00 00 00 00 00
C72 00 00 00 00 00 00 00 00
C73 00 00 00 00 00 00 00 00
C74 00 00 00 00 00 00 00 00
C75 00 00 00 00 00 00 00 00
C76 00 00 00 00 00 00 00 00
C77 00 00 00 00 00 00 00 00
C78 00 00 00 00 00 00 00 00
C79 00 00 00 00 00 00 00 00
C80 00 00 00 00 00 00 00 00
C81 00 00 00 00 00 00 00 00
C82 00 00 00 00 00 00 00 00
C83 00 00 00 00 00 00 00 00
C84 00 00 00 00 00 00 00 00
C85 00 00 00 00 00 00 00 00
C86 00 00 00 00 00 00 00 00
C87 00 00 00 00 00 00 00 00
C88 00 00 00 00 00 00 00 00
C89 00 00 00 00 00 00 00 00
C90 00 00 00 00 00 00 00 00
C91 00 00 00 00 00 00 00 00
C92 00 00 00 00 00 00 00 00
C93 00 00 00 00 00 00 00 00
C94 00 00 00 00 00 00 00 00
C95 00 00 00 00 00 00 00 00
C96 00 00 00 00 00 00 00 00
C97 00 00 00 00 00 00 00 00
C98 00 00 00 00 00 00 00 00
C99 00 00 00 00 00 00 00 00
C100 00 00 00 00 00 00 00 00
    
```

```
150 IF A > 12 THEN @ PROC
PRINT ERRORER)
```

This oddity is caused by the way the Basic interpreter processes the IF... THEN commands.

### Error Messages

All the Basic error messages are redirected via this routine so that the procedure stack is reset unless it is a STOP, END or RUN/STOP in which case the program can be continued as normal.

Apart from the standard error messages three Basic errors have different meanings and these are three new messages.

### Syntax Error

This will be caused if the parameters are not the same or you've spelt something wrong. It is usually quite obvious what the problem is.

### Type Mismatch

This occurs if the variable in @ DEFPROC isn't of the same type as in @ PROC.

### Out Of Memory

This will occur if you have no more room to store the parameter information. Each procedure uses four bytes of a buffer plus five bytes for every parameter. The buffer is 256 bytes long so you can have a maximum of 26 procedures active in a program if there is just one parameter each. Procedures use their own buffer throughout so you can still have the normal amount of FOR...NEXT and GOSUB...RETURN loops in your program. Procedures with more than one parameter will use that much more space though you shouldn't have any problems.

### NO @ END FOUND

This means that @ DEFPROC has not got an associated @ END. This can be tricky to debug because the @ END is looked for but doesn't pair it specifically with any @ DEFPROC. This error will occur if there isn't the same number of @ ENDS to @ DEFPROCS. Remember, always close

procedures with @ END.

### UNDEF. PROCEDURE

No @ DEFPROC name can be paired with a procedure call. Check spelling and parameter list.

### ILLEGAL VARIABLE

This error occurs if you try to use array variables ( a(n) ) as a parameter.

### @ END WITHOUT PROC

This error occurs if the program meets an @ END when it isn't inside a procedure. This is similar to RETURN WITHOUT GOSUB ERROR.

It is important that you note that the @ DEFPROC command, when called from @ PROC, is checked before BASIC is told what line the @ DEFPROC is on. If there is an error caused while checking @ DEFPROC the error will be reported as having occurred in the line with @ PROC.

### In Use

You can use procedures to do almost anything within a program. For example a small procedure to incorporate a delay into a program can be written as:

```
100 @ DEFPROC WAIT(N)
110 T18="00000"
120 IF INT(T18/60) < N THEN 120
130 @ END
```

This procedure can now be called by @ PROC WAIT(SECONDS), where SECONDS is given by any value you please. A similar procedure can be written to wait for a key press. For example:

```
200 @ DEFPROC PRESS SPACE BAR
210 PRINT "PRESS SPACE BAR TO CONTINUE"
220 GET AS:IF AS => CHR(32) THEN 220
230 @ END
```

These two routines could be called in succession as:

```
300 SECONDS=5
310 @ PROC WAIT(SECONDS)
320 @ PROC PRESS SPACE BAR
330 REM rest of program
```

You should now have a reasonable

idea of how procedures can be used within your program to make the whole code that much more readable and easier to debug. The last thing I want to cover is a brief description of what's going on within the 64 and how this imposes one serious restriction on this implementation of Basic procedures.

When the @ PROC command is encountered a check is made to see if there are any parameters associated with the procedure. If there are none there's no problem and the program branches into the appropriate @ DEFPROC.

If, however, there are parameters, they are checked off in turn and their name is kept on the special procedure stack. When the parameter list is checked at the @ DEFPROC command the new variable name is put into the 'variable name' bytes within the BASIC VARIABLE space (immediately after the Basic program). This is how a different variable name is assigned to the same value and why SYSTEM variables, expressions and arrays cannot be used (because they are not stored in this space).

When the @ END statement is reached the original variable name is replaced. The advantage of this is that procedures can be used as multi-line functions, for example:

```
10 @ DEFPROC CONVERT TO BINARY(AS)
20 AS=" "
30 FOR J=7 TO 0 STEP-1
40 AS=AS+MID$(AS,"01",1)
AND 21,30,1,1
50 NEXT J
60 @ END
```

This procedure converts a decimal number to binary number with a returned value from the procedure in its string variable. It could be called by line such as:

```
100 @ PROC CONVERT TO BINARY(DECIMAL)BINARY
```

The disadvantage is that because the variable value is changed it is impossible to set up recursive procedures.

It could be legitimately argued the occasion is the great advantage of procedures but I think even without this facility procedures on the 64 will make your programs that much better.

# USA Today

*What the American software user is buying this spring, and lots of news on the Amiga. It's all here.*

*By Lewis Tilley*

**A**re you British computer game players like your US counterparts? A recent magazine survey here investigated several thousand readers to arrive at a profile of those who played games. Some of the results were surprising, some not.

## Polling Day

Over three quarters of them were male, which one would expect, but more than half of these men were over 35 years old. A majority of these had owned their computer for at least two years.

Family Computing is a "general" computing magazine with a pronounced bias toward Apples, but Commodore accounted for 8% of the computers used, Apples 28% and the IBM PC (and compatibles) 54%.

520 to 530 games were purchased most often. Although a game price of \$15 to \$20 dollars didn't deter 28% of the buyers. More than \$50 for a game? All but 2% said "Forget it!". 7% said that they never bought games. They reasoning that there were too many.

Game playing seems to be an 87% alternative to viewing the television. David Hallerman, the editor of this information, was encouraged to find that only 5% of those who replied to the questionnaire, had given up time formerly spent in study.

What type of games appeal most? *Assault and Assault/Strategy* were the top two. They outranked the *Political/Military/Strategy* (the lowest of nine categories) by two to one. And, now for the winners! The top game choices are: *Zork I&II* and *IX*, *Ultima II, III* and *IV*, *Flight Simulator II*, *King's Quest I* and *II*, *Sea*

*on Our Summer Games I* and *II*, *Loch Ranner*, *Hercules's Guide Galaxy*, *Jet Pac Man*, *Yank*, *Pac Man!*

US computer game players are hooked on flight programs. In addition to *Simulator II*, which can teach you how to really fly (and now offers nine extra Scenario disks of places to fly), there is *Jet Super Hero II*, *JetRover*, *A.C.E. Sporter 40*, *Steer Flyer*, *Air of Aces*, *Dave Beavers* and five simulators of combat flying by Strategic Simulations, Inc. *MicroFins*, alone, offers *Avrocar*, *F-15 Strike Eagle*, *Kennedy Approach* (an air controller's traffic game), *Solo Flight* and *Top Gunner*.

All of the above are available for the C 64. WC3D concern can get it on the line with *MicroPress's Top Gunner*.

The great news is Amiga's version of *Flight Simulator II*. Ben Dunnington, ENFO magazine's publisher and editor, says, "BEGIN your Amiga/game collection with this one!". He also gives his \*\*\*\*\* five star rating to another new Amiga release *Chromaster 2000* by Electronic Arts/Software Technology. Although the 64 version of *Chromaster* is just another good chess program, the Amiga version comes very close to real chess pieces (in just choice of wood or metal, 2D or 3D seen from the front or side) and more features than you've ever had from a live teacher. My favorite feature is the key you press when "the boss is coming".

*Marble Madness*, also Electronic Arts, for the Amiga is far superior to its C64 little brother, MC, who didn't care for it in his review in *Your Commodore* should try it on the office Amiga.

My "office Amiga" is now one month old. When I can escape from *Chromaster 2000* and *Marble Madness*, I am totally transfixed in the two programs which led me to purchase the Amiga. I find myself using both *Argis Images* and *Deluxe Painter II* to work on the same graphic since they share IFF files. *Deluxe Painter II* is much the more powerful program, but *Argis'* pattern making tricks are irresistible.

Add a *Digi-View Video Displayer* from NewTek, used with a Panasonic CCTV camera model WV 1410, for visual input to the Amiga in IFF files, and you would get as excited as I am about the Amiga. Also, both *Argis Images* and *Deluxe Painter II* with their IFF files can only work with 52 colors produced by the *Digi-View* although *Digi-View* shows you three H.A.M. "add-and-modify" mode to display 4096 colors at the same time on the screen. A new *Digi-View* software program will soon be available from NewTek to manipulate the 4096 mode in H.A.M. It will cost 159.99 and requires an update software version 2.0.

The Amiga is getting a 1.2 Kickstart and Workbench update, but deliveries through local dealers has been delayed.

Scuffed is the best of the presently available word processors for the Amiga. It was developed by Micro-Systems Software and is sold by Brown-Wagh Publishing. Version 2.0 is now out. Amiga *WordPerfect* is promised for this spring. This program for the IBM-PC is presently the best word software with the Blue Search. Let's hope it sells cheaper than \$495 in

its Amiga version for it would be just what all US column writers need.

Your Superstar Personal has been written from the 64 to the Amiga and brought over here. It's said that you can file HPF graphics and CAD drawings to be used within text layouts. The same Progressive Paragraphs and Software who handle Logarith, a project and time management type spreadsheet, sell the Superstar. Features included finally got their 128 Paperclip wordprocessor to the market place. R11N magazine said finally, "...best professional word processor available." It has a built-in telecommunications system in addition to a spellcheck and dictionary. Cost is \$79.95. There is no sign of Paperclip Elite which will integrate text and graphics for the Amiga.

However, it is Amiga software that is inundating the market. What a great answer to the old put down still being used by their competitors that there is more software for Atari's ST. Microsoft on Commodore's good health is revealed for its market value, when this

was written, of 13.5 a share - up from last year's low of four.

Online communication seems to lend itself to gossip and rumors. Last month's disk-chat included talk of a production end for the C128 so more 64Cs could be made and of a reduced cost Amiga under \$300. Let's hope the C128 will hang in there. At least a third of the members of my local Commodore Club converted to the 128 within three months of its arrival on the market, and they are very satisfied with it. Well, if the Amiga could get down to \$290, with a disk drive? Oh, heck, they'd change again!

#### Finalists

**Spiggle #8, Golf Strike: Avalon And Micro Games, 4117 Maryland Road, Rockaway, MD 21154.**

**Stunt Flyer: Sierra On-Line, 48677 Victoria Lane, Oakland, CA 94634.**

**Age of Aes, Dan Baston: Accolade Inc., 38813 Stevens Creek Blvd., Cupertino, CA 95014.**

**Acrobat, F19 Studio Eagle, Kennel Approach, Lake Placid and Top Games MicroPress, 120 Lakington Drive, The Valley, MD 21020.**

**Chromaster 2000, Madole Madole Deluxe Paint 20 Electronic Arts, P.O. Box 7530 San Mateo, CA 94403.**

**Angie Images: Angie Developments, 211 Wilshire Blvd, Santa Monica, CA 90402.**

**Digi-Plex Video Highlights, B&W PAINT: Newtek, Inc. 701 Jackson Turnpike, KS. 66602.**

**AviSlide: Brown-Wright Publishing, 18750 Leff Ave, Los Gatos, CA 95032.**

**Family Computing: TSO Associates New York, NY 10002.**

**Flight Simulator II, Jet, Screenshot SubLogic Corp., 713 Edgewater Ave, Champaign, IL 61820.**

**Super Mary II: Camel Inc., 413 Pigeon, Wilmington, CA 90744.**

**Expenses: Microscope, 3444 Sand Road, Northbrook, IL 60062.**

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# 64 Source Generator

*Ever wondered just how your favourite machine code program works? Now's your chance to find out with this powerful disassembler.*

*By Kevin Ottos*

A good disassembler is one of the most important tools in a programmer's arsenal. By using such a utility to examine programs, he can find out just how a certain programmer manages to scroll the screen so smoothly, or simply learn to improve his own coding.

64 Source Generator is a disassembler that goes a step further than most programs of this type. It actually provides a file which can be assembled.

If you have never come across a disassembler before the operation of one is quite simple. You tell the disassembler which area of the computer's memory you wish to examine. The computer then prints to your screen or printer a list of all the machine code instructions that are to be found in the area of memory specified.

This is all well and good, but what if it were to come across an instruction such as JSR SC000? With most disassemblers, it would take some time to find the actual location of SC000.

64 Source Generator improves on this by actually putting labels within the programs to where any instruction jumps. This makes it much easier when trying to follow instructions of any program.

The file that Source Generator creates in memory can be manipulated in the same way as Basic programs; LOAD, SAVE etc. And can be assembled with any assembler

program that uses a standard Basic file structure. The extremely popular MIKRO assembler being an example.

## Getting It All In

The program is presented in two parts. The first program, SOURCE.GEN, is simply a small Basic program that is used to actually LOAD and RUN the Source Gen program. This program should be typed in and saved on to cassette or disk for use later.

The second program, S-GEN.M/C, is presented in a form suitable for use with our updated Hex Data Entry II program. Read the instructions accompanying this program for detailed information on how to use this program.

Once you have entered all of the S-GEN M/C program, save it out to your tape or disk. If you are using tape then the program should be SAVED after the SOURCE.GEN program.

**Note:** For your own programming safety make sure that you only use the new version of Hex Data Entry. Do not use the earlier version.

## Using The Program

To use the program simply LOAD and RUN the SOURCE.GEN program, this will automatically LOAD and RUN the program S-GEN.M/C.

Once the program has started you will be presented with a choice of three numbers. These are options for the

Source Gen program to start in memory. The possible numbers are:

- 1 = 828 (Cassette buffer)
- 2 = 784 (Sprite List)
- 3 = 49152 (Free RAM)

Select whichever one of these you require. The numbers 828,784 and 49152 are the SYS numbers that you will need to activate the SOURCE program. The selection of the area to be used should be guided by where the program you are 'investigating' starts in memory, to avoid a clash with the generator.

Tape users should note that, as memory location 828 is the tape buffer, performing a SAVE or LOAD operation will corrupt the SOURCE.GEN program.

Once selection is made the program will be moved to the necessary area and you will be returned to Basic. Now type NEW to make sure that the memory is free for your disassembly. Typing SYS followed by the location of the SOURCE.GEN program, e.g. SYS 49152, will cause the start up menu of the SOURCE.GEN program to be presented. Most of the options available are self explanatory and a brief description of these should suffice.

## FILE DISASSEMBLE

In order to disassemble, the program to be disassembled should have already been loaded into memory. If

necessary, the Move Basic option should be used before using this function.

You will be asked for a START ADDRESS, END ADDRESS, and a LINE NUMBER to start the disassembler working. If the line number is already in use the new program code will overwrite the original and following line numbers. Hitting RETURN with no line number entered will result in the computer working out the next line number + 10 and adding it to the existing file.

RUN/STOP will abort the disassembly function but no error checking or correction takes place.

Extra long machine code programs may need disassembling in more than one part due to the limited memory available as the labels and source code are generated.

## F2) RENUMBER

This is only suitable for use with

programs created by the Source Generator as it only renumbers the lines and not any GOTDs or GOSUBs etc.

## F3) DELETE

This will delete all lines from the first and last specified inclusive.

## F4) APPEND

Use this option to add additional parts to the program already in memory. Disk users must enter a filename.

## F5) START/END ADDRESS

For DISK USERS ONLY — This function displays the start and real address of the specified disk program.

## F6) ALTER START OF BASIC

This function is extremely useful if there is a possibility that your machine

code source file may overwrite your machine code being examined. For example if your machine code program starts at \$0000, the same place where a Basic program usually starts, and it ends at \$1100, the source code generated would overwrite your machine code. In this case you could use this function to move the start of Basic to say \$2000 and you will suffer no such problems.

## F7) EXIT TO BASIC

This quite simply returns you to the Basic READY prompt where you can LIST, LOAD, SAVE etc. the source code you have generated.

## Numeric Input

When a numeric input is required it can be entered in either decimal or hexadecimal format. For a hexadecimal number then you should prefix the number by a \$ sign e.g. \$C000. If

```
PROGRAM: SOURCE.BEM
HE $ B-PEEK(1280)
LD $P @FF@FF@FF@FF+1:GOTO$B-BEM P
" C" , 1
CF $D PEEK($BEM, $, PEEK($HE, 14, 0)
BEMISE
Use HEX DATA ENTRY !! to enter
this program.
```

```
PROGRAM: B-BEM.PVC
A000 9C 4F 40 9C 7F 4C 9C 80 19
A008 40 40 33 00 28 9F 00 9A 17
A016 4A 40 00 00 78 48 24 80 10
A01E 7C 00 00 00 2A 31 70 00 10
A026 0C 80 20 70 18 0A 70 80 17
A02E 08 00 78 56 7C 00 00 80 18
A036 7C 12 8F 80 12 45 78 00 7A
A03E 0C 20 8C 70 00 00 80 17
A046 78 00 20 80 00 70 40 30
A04E 00 40 2A 51 78 60 27 81 8C
A056 78 00 7C 40 40 40 40 7C
A05E 00 00 00 00 00 00 00 00
A066 00 00 00 00 00 00 00 00
A06E 0C 00 00 00 00 00 00 00
A076 0C 00 00 00 00 40 00 00
A07E 00 70 00 40 50 51 80 00 08
A086 00 70 00 00 8F 80 80 10
A08E 0C 04 00 00 4F 80 18 00 84
A096 00 70 4F 00 00 00 00 71 80
A09E 0C 00 80 00 80 3F 7C 80 84
A0A6 00 00 80 80 47 80 00 80 86
A0AE 00 13 4F 00 40 00 00 00 85
A0B6 0A 70 00 9C 78 00 40 00 80
A0BE 00 00 20 7F 00 00 20 78
A0C6 7F 00 00 00 00 00 00 00 7E
A0CE 00 7F 7F 7F 00 00 00 00 7D
A0D6 00 7C 7C 7C 7C 00 00 00 7C
A0DE 0C 00 4C 00 00 00 00 00
A0E6 0C 00 4C 00 00 00 00 00
A0EE 01 41 00 00 00 00 00 17
A0F6 41 20 0F 00 00 00 40 1A
```

```
A000 00 00 00 00 00 00 00 00 00
A008 00 00 00 00 00 00 00 00 00
A010 00 00 00 00 00 00 00 00 00
A018 00 00 00 00 00 00 00 00 00
A020 00 00 00 00 00 00 00 00 00
A028 00 00 00 00 00 00 00 00 00
A030 00 00 00 00 00 00 00 00 00
A038 00 00 00 00 00 00 00 00 00
A040 00 00 00 00 00 00 00 00 00
A048 00 00 00 00 00 00 00 00 00
A050 00 00 00 00 00 00 00 00 00
A058 00 00 00 00 00 00 00 00 00
A060 00 00 00 00 00 00 00 00 00
A068 00 00 00 00 00 00 00 00 00
A070 00 00 00 00 00 00 00 00 00
A078 00 00 00 00 00 00 00 00 00
A080 00 00 00 00 00 00 00 00 00
A088 00 00 00 00 00 00 00 00 00
A090 00 00 00 00 00 00 00 00 00
A098 00 00 00 00 00 00 00 00 00
A0A0 00 00 00 00 00 00 00 00 00
A0A8 00 00 00 00 00 00 00 00 00
A0B0 00 00 00 00 00 00 00 00 00
A0B8 00 00 00 00 00 00 00 00 00
A0C0 00 00 00 00 00 00 00 00 00
A0C8 00 00 00 00 00 00 00 00 00
A0D0 00 00 00 00 00 00 00 00 00
A0D8 00 00 00 00 00 00 00 00 00
A0E0 00 00 00 00 00 00 00 00 00
A0E8 00 00 00 00 00 00 00 00 00
A0F0 00 00 00 00 00 00 00 00 00
A0F8 00 00 00 00 00 00 00 00 00
A100 00 00 00 00 00 00 00 00 00
A108 00 00 00 00 00 00 00 00 00
A110 00 00 00 00 00 00 00 00 00
A118 00 00 00 00 00 00 00 00 00
A120 00 00 00 00 00 00 00 00 00
A128 00 00 00 00 00 00 00 00 00
A130 00 00 00 00 00 00 00 00 00
A138 00 00 00 00 00 00 00 00 00
A140 00 00 00 00 00 00 00 00 00
A148 00 00 00 00 00 00 00 00 00
A150 00 00 00 00 00 00 00 00 00
A158 00 00 00 00 00 00 00 00 00
A160 00 00 00 00 00 00 00 00 00
A168 00 00 00 00 00 00 00 00 00
A170 00 00 00 00 00 00 00 00 00
A178 00 00 00 00 00 00 00 00 00
A180 00 00 00 00 00 00 00 00 00
A188 00 00 00 00 00 00 00 00 00
A190 00 00 00 00 00 00 00 00 00
A198 00 00 00 00 00 00 00 00 00
A1A0 00 00 00 00 00 00 00 00 00
A1A8 00 00 00 00 00 00 00 00 00
A1B0 00 00 00 00 00 00 00 00 00
A1B8 00 00 00 00 00 00 00 00 00
A1C0 00 00 00 00 00 00 00 00 00
A1C8 00 00 00 00 00 00 00 00 00
A1D0 00 00 00 00 00 00 00 00 00
A1D8 00 00 00 00 00 00 00 00 00
A1E0 00 00 00 00 00 00 00 00 00
A1E8 00 00 00 00 00 00 00 00 00
A1F0 00 00 00 00 00 00 00 00 00
A1F8 00 00 00 00 00 00 00 00 00
A200 00 00 00 00 00 00 00 00 00
```

```
A208 00 00 00 00 00 00 00 00 00
A210 00 00 00 00 00 00 00 00 00
A218 00 00 00 00 00 00 00 00 00
A220 00 00 00 00 00 00 00 00 00
A228 00 00 00 00 00 00 00 00 00
A230 00 00 00 00 00 00 00 00 00
A238 00 00 00 00 00 00 00 00 00
A240 00 00 00 00 00 00 00 00 00
A248 00 00 00 00 00 00 00 00 00
A250 00 00 00 00 00 00 00 00 00
A258 00 00 00 00 00 00 00 00 00
A260 00 00 00 00 00 00 00 00 00
A268 00 00 00 00 00 00 00 00 00
A270 00 00 00 00 00 00 00 00 00
A278 00 00 00 00 00 00 00 00 00
A280 00 00 00 00 00 00 00 00 00
A288 00 00 00 00 00 00 00 00 00
A290 00 00 00 00 00 00 00 00 00
A298 00 00 00 00 00 00 00 00 00
A2A0 00 00 00 00 00 00 00 00 00
A2A8 00 00 00 00 00 00 00 00 00
A2B0 00 00 00 00 00 00 00 00 00
A2B8 00 00 00 00 00 00 00 00 00
A2C0 00 00 00 00 00 00 00 00 00
A2C8 00 00 00 00 00 00 00 00 00
A2D0 00 00 00 00 00 00 00 00 00
A2D8 00 00 00 00 00 00 00 00 00
A2E0 00 00 00 00 00 00 00 00 00
A2E8 00 00 00 00 00 00 00 00 00
A2F0 00 00 00 00 00 00 00 00 00
A2F8 00 00 00 00 00 00 00 00 00
A300 00 00 00 00 00 00 00 00 00
```









# Mini Office II

*Your chance to win a copy of the update of the award  
winning Mini Office for your C64.*



For many owners the price of professional software such as word-processors and databases places these packages totally outside the range of their pocket. *Mini Office* from Database created quite a stir when it appeared on the market offering a wordprocessor, database and spreadsheet in one package and at an affordable price.

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 Postcode .....  
 Number of differences found .....

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# Arcade Action

*Get those characters moving with this latest routine in our programming series.*

*By Tony Crowther*

**W**henever the type of game you are aiming to write on your computer, you will no doubt need some type of background. This background can be made to stand out even more if sections of it are moving.

For example in a platform game you may have ladders that move up and down or conveyor belts that move left or right. In this installment, I will be giving a routine that makes this type of animation extremely simple.

At this stage of the proceedings I was about to spout forth into a discussion on user defined graphics and how you can design your own characters when the editor brought me to halt screaming that this was covered in last month's magazine (see Evermann's Guide to Graphics). I will therefore miss this out completely and jump straight into the programs and some examples.

## What to do

Let's suppose that you are writing a program that requires the use of some rotating shapes in the background. If you take a look at Figure 1 you will see a simple design for a few characters that would make up the different animations of a moving ladder. If in Basic you were to print one character on top of the other then you would be getting the feeling that the object, in this case a ladder, was moving.

If you take a look at Figure 2 you will find a Basic program for the Commodore that will place the characters from Figure 1 into memory and proceed to print them over the top of each other. OE so it is simple and isn't a really useful example but should give you an idea of how character animation is achieved. In this case we just happened to define a ladder.

## Arcade Routines

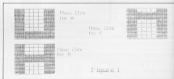
The problem with using Basic for animating a displayed character is that it is an extremely slow process and no matter what else you do within the program you would need to keep jumping to the section of it that changes the character. If you take a look at last month's issue of *Your Commodore* and my discussion of

interrupts, wouldn't it be easier to set up the character changing on an interrupt and leave the computer to handle it, thus leaving you free to control the rest of the program?

This is just what the program in Figure 3 will do. This is a Basic loader for a program that will animate a character on the screen on a Commodore 64 computer. If you want to see exactly how to program works then you can take a look at the assembly language for it in Figure 4.

The Character Animate program uses the Interrupt Database program that was published in last issue so you must make sure that this has been loaded into memory before attempting to run any of the programs presented here.

Once you have RUN the Character Animate program it is extremely easy



to use. All that is needed to set your characters changing is a simple SYS call followed by the data for the animations. The syntax for the command is:

SYS #CHAR, Char No, Data Pos, Animation Pos, Number of Frames, Speed

Where:

Char No is the number of the character to be animated. Up to eight different characters can be animated on the screen and are numbered from 0-7. It may help if you think of the eight different characters as a type of sprite.

Data Pos is the character that is going to be altered in the range 0 to 127. It is the same as the character code (26 so 1 will be a character A etc.

Animation Pos. This is the position in the character table that the animation sequence starts. All of the characters that are used for an animation should be placed one after the other and stored as character positions 0-128.

No. of Frames is quite simple the number of changes that is to occur to the character.

Speed is quite simply the rate at which the changes are to take place. This can range from 1 to 255 with 1 being fast and 255 being slow.

Before the animations will start you will of course have to tell the interrupt database that this routine is in use. This is quite simple achieved by the following command:

POKE 0,0,1

Don't forget that you also have to start the IRQ data base with a SYS 49152 instruction.

**In Use**

Figure 3 gives an example of how this program can be used. It is fully documented so you should have no problems figuring out how it works. The program quite simply POKEs a number of characters to the screen and proceeds to animate them all as starting stars at different speeds. Again nothing clever but it does demonstrate the power of this routine and should give you some ideas.

The next installment in this series of world programming routines will be to provide you with a routine that is another animation routine, but this time to animate the CB4 sprites. 

```

PROGRAMMERS BACK IN 2000
90 90 PRINT"HELLO"
91 100 R = (22000 R + 50000)
92 110 REM #OFCHAR OF CHAR# IN ROM
93 120 REM #OFCHAR OF CHAR# IN ROM
94 140 FOR S=0 TO 9:REM STOP TIMER
95 250 FOR I=1 TO ROM SWITCH IN CHAR
ROM
96 260 REM ROM CHAR ROM INFO ROM
97 130 FOR J=0 TO 0
98 280 FOR K=1, 1:REM 0=0
99 150 NEXT I
100 200 FOR L=1 TO ROM SWITCH OUT CHAR
ROM
101 210 FOR M=50000-1:REM SWITCH IN 11
ROM: REM REM DATA FOR CHARACTER#
M
102 220 DATA 0%:1%:1%:1%:1%:1%:2%
2%:2%
103 230 DATA 0%:1%:1%:1%:2%:2%:1%:1%
1%:1%
104 240 DATA 0%:2%:2%:2%:1%:1%:1%:1%
1%:1%
105 260 FOR N=1 TO 10
106 270 FOR O=1 TO 10
107 280 FOR P=1 TO 10
108 290 FOR Q=1 TO 10
109 300 FOR R=1 TO 10
110 310 FOR S=1 TO 10
111 320 LET AA="XXXXXXXX"
112 330 PRINT"CHARCI" FOR B=1 TO 0:REM
M000:"C001" NEXT B:REM PRINT COLUMN
OF SWITCHED-A
113 340 REM NOW LETS PRINT OTHER CHAR
ACTING OVER THE TOP
114 350 PRINT"CHARCI" FOR B=1 TO 0:REM
M000:"C001" NEXT B:REM PRINT COLUMN
OF SWITCHED-B
115 360 PRINT"CHARCI" FOR B=1 TO 0:REM
M000:"C001" NEXT B:REM PRINT COLUMN
OF SWITCHED-C
116 370 REM KEEP GOING AROUND LOOP
117 380 GOTO 250

```

```

PROGRAMMERS GIVE AWAY
10 100 DATA 0, 1, 10, 25, 50, 25, 170,
30, 100
11 110 DATA 0, 25, 50, 25, 100, 200, 25
5, 100, 100
12 120 DATA 0, 10, 20, 5, 25, 25, 5, 25
0, 75
13 130 DATA 0, 20, 10, 10, 10, 10, 10, 10
0, 10, 10
14 140 DATA 0, 5, 10, 25, 10, 5, 10,
0, 75
15 150 DATA 10, 20, 10, 10, 10, 10,
5, 100
16 160 DATA 10, 10, 5, 10, 10, 10, 10, 10,
10, 10
17 170 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
18 180 DATA 10, 10, 10, 10, 10, 10, 10, 10,
10, 10
19 190 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
20 200 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
21 210 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
22 220 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
23 230 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
24 240 DATA 10, 10, 10, 10, 10, 10, 10,
10, 10
25 250 FOR X=0 TO 0
26 260 FOR Y=0 TO 0
27 270 FOR Z=0 TO 0
28 280 PRINT"HELLO"
29 290 NEXT Z
30 300 NEXT Y
31 310 NEXT X
32 320 PRINT"HELLO"
33 330 REM "HELLO"
34 340 PRINT"*****"

```

```

*****
81 200 PRINTW*(SPC24)*
82 206 PRINTW*(SPC23CHARACTER AND
  WITH "*)
87 207 PRINTW*(SPC23PPL*9999-5007
  SPC24)*
90 208 PRINTW*(SPC24)*
99 209 PRINTW*(PAGE 006 ,SPC22)*
"
20 210 PRINTW*(SPC24)*

```

```

89 203 PRINTW*(SPC 49998 ,CHAR 800
  81,SPC23)*
90 202 PRINTW*(SPC11),WITH P00,SP
  C23)*
9A 203 PRINTW*(SPC11),WITH P00,SP
  C23)*
9B 214 PRINTW*(SPC11),WITH,OF P0A
  800)*
9C 205 PRINTW*(SPC11),SPC23(SPC1)*

```

```

20 204 PRINTW*(SPC24)*
75 217 PRINTW*(*****
******)
4C 300 LI = 100 :FOR I = 9998 TO 500
  79 :SQR I + 1 = FOR J = 0 TO 7 :RE
  80 A
5A 204 P00 I + J ,SQR I + 1 :NEXT J :I
  6A0 :IF A LT 10:PRINT:COUNT IN
  LINE 7:J :END
95 302 LI = LI + 1 :NEXT I

```

## PROGRAM ONE ASSEMBLY

```

1000 *****
1010 ***** ASSEMBLY ONE *****
1020 *****
1030 :
1040 (HOW TO USE
1050 : BASIC ) : PAGE
1060 : ----- :
1070 : :
1080 :SYSPRINT,LOC,LOC, : LDA 0001
1090 :LOC,LOC,LOC : STA 000
1100 : : LDA 0002
1110 : ST= AND RESULT : STA 000
1120 : WITH IN TEXT : LDA 0003
1130 : ON SEC BASIC : STA 000
1140 : UNDER, : LDA 0004
1150 : : STA 000
1160 : : LDA 0005
1170 : : STA 000
1180 : PAGE 006, : LDA 000
1190 : CRT OF IN 000 : STA 000
1200 : WITH 000, : STA 9999
1210 :
1220 : NO = 0 OR I :ON 0-OFF
1230 :
1240 *****
1250 :
1260 PAGE = 250
1270 JMP TO = 4034 ,JMP TABLE
1280 FLAG = 000
1290 BASIC = 4037
1300 BASIC = 4442L
1310 BASIC = 4700S
1320 PAGE = 30
1330 FLAG = 090
1340 COUNT = 095
1350 FLAG = 908
1360 FLAG = 911
1370 FLAG = 919
1380 FLAG = 927
1390 FLAG = 935
1400 FLAG = 943
1410 = = 099A

```

```

1420 :
1430 :
1440 PAGE
1450 LDA 00
1460 LOOP1
1470 STI PAGE5
1480 :ON BASIC :SET J NUMBER
1490 :ON BASIC
1500 :ON BASIC
1510 :ON PAGE5
1520 :ON PAGE1
1530 :ON FLAG,
1540 :ON
1550 :ON 00
1560 :ON LOOP1
1570 :ON :PAGE :ONHOW PAGE TO 100
1580 :ON JMP TO
1590 :ON :PAGE
1600 :ON JMP TO
1610 :ON FLAG
1620 :ON : :CHECK NUMBER THEN 0
1630 :ON LOOP1
1640 :ON FLAG : :SET NEW FLAG
1650 :ON FLAG :Y
1660 :ON FLAG :C
1670 :ON FLAG :Y
1680 :ON FLAG :S
1690 :ON FLAG :S
1700 :ON FLAG :S
1710 :ON FLAG :Y
1720 :ON 00
1730 :ON FLAG :Y
1740 :ON FLAG :Y
1750 LOOP1
1760 STI
1770 :
1780 PAGE
1790 :ON FLAG : :CHECK ON/OFF FLAG
1800 :ON LOOP1
1810 :ON 00
1820 LOOP1
1830 :ON COUNT : :PAGE OF CHANGE
1840 :ON COUNT,
1850 :ON FLAG,
1860 :ON LOOP1

```

```

1870 :ON 00 : :NEXT COUNT
1880 :ON COUNT,
1890 :ON FLAG, : :ON 00 :OFF
1900 :ON LOOP1
1910 LOOP1
1920 :ON 00
1930 LOOP1
1940 :ON FLAG : : :ON ANIMATION
1950 :ON FLAG,
1960 :ON FLAG, : :CHECK WITH
1970 :ON LOOP : :ANIMATION PAGE,
1980 :ON 00 : :SET SET ANIMATION
1990 :ON FLAG,
2000 LOOP1
2010 :ON 00
2020 :ON PAGE :
2030 :ON FLAG, : :HOW TO CHANGE
2040 :ON PAGE
2050 :ON PAGE :MULTIPLY BY 0
2060 :ON PAGE+
2070 :ON PAGE
2080 :ON PAGE+
2090 :ON PAGE
2100 :ON PAGE+
2110 :ON PAGE+ : :PAGE TABLE
2120 :ON
2130 :ON 00
2140 :ON PAGE :
2150 :ON FLAG,
2160 :ON PAGE : :POSITION OF
2170 :ON 00 : :ANIMATION
2180 :ON PAGE+
2190 :ON PAGE+ :MULTIPLY BY 0
2200 :ON PAGE+
2210 :ON PAGE+
2220 :ON PAGE+
2230 :ON PAGE+
2240 :ON PAGE+
2250 :ON FLAG : :ANIMATION PAGE =
2260 :ON A :FLAG + COUNT
2270 :ON A
2280 :ON A
2290 :ON PAGE+
2300 :ON PAGE+
2310 :ON

```



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# Oxford Basic

*A new package from Systems Software to take the drudgery out of Basic programming.*

*By Stuart Cooke*

**A** craftsman of any type would be lost without a decent range of tools. A programmer too will find life a lot easier if he holds a collection of programming tools designed to make programming easier.

Systems Software has produced a package, entitled *Oxford Basic*, that provides a Basic programmer with an excellent selection of programming utilities.

The package contains four major programs. These are, a compiler to speed up execution of Basic programs, a toolkit providing the user with seven useful commands, a compressor to reduce the amount of space that a program takes up and an analyzer that produces a list of important program information.

## Getting Started

Unlike many other program houses, Systems Software does not put any protection on programs. This means that you can make copies of any programs that you want to use and place them on the relevant disk.

However, before you can start any program you must enter a series of colour codes. These vary every time the program is used and are found on a coloured grid of 27\*40 dots. Some people don't like this type of protection as it is time consuming finding the codes every time the

program is to be used. Personally I don't mind it, the fact that you can make a backup of expensive software is much more important to me.

Probably the best way to deal with this package is to take a look at each section in turn.

## Ox-Comp

This section of the package is a Basic compiler. In essence this takes a Basic program and turns it into machine code generating a program that will RUN much faster than the original Basic version.

Before you can use the compiler for the first time you must set yourself up with a series of work disks. These should consist of a disk containing the compiler and one containing a set of compiler utilities.

Compiling a program is extremely easy. All you have to do is RUN the OX-COMP program and when requested enter the filename of the Basic program to be compiled. The program will then do the rest.

OX-COMP isn't totally compatible with C64 Basic, though the differences shouldn't cause anyone too many problems. Perhaps the major difference between normal Basic and OX-COMP is with arrays.

OX-COMP does not allow you to use three dimensional arrays within your program. However if you do have

a program that uses this type of array then there is help to hand. One of the OX-COMP utilities, FREE-SCAN, will go through a program and change all three dimensional arrays to 2D.

OX-COMP also needs to know, at compile time, the dimensions of all arrays. Therefore you can't use a parameter as the dimension of an array, you must use a constant. This shouldn't cause any problems if you dimension the array to the maximum size you expect to need.

Other commands not allowed in OX-COMP are LIST, CONT and SAVE.

Programs that are to be used by OX-COMP can make use of extra commands that the package provides.

User defined string and mixed functions are allowed.

Integer FOR-NEXT loops are allowed. This gives a slight speed advantage when the program is used.

When writing a normal Basic program only the first two characters of any variables are taken into consideration, for example, DEVICE and DEVELOP would be the same as far as Basic is concerned. With OX-COMP you can force the compiler to recognize every character of a variable name, in the above example the two variables would be different.

Simple commands are also included to enable and disable the STOP key.

Before you can compile any program it is important that you check



for errors. Since a machine code program doesn't have any line numbers, if an error occurs while running a compiled program, it isn't easy to sort out exactly where in the original Basic program the error is. A witty programmer is provided so that, if your compiled program stops with an error, you can find out at which program line this occurred. It's now up to you to get out the original Basic program, find and solve the problem and then re-compile the program.

If you are a good Basic programmer but don't want to start learning machine code then this compiler will be an extremely powerful tool. You can write your programs easily, make sure they work and then use the compiler to speed things up.

## Analyzer

When you write a Basic program it is very difficult to remember if you have used a specific variable or whether you have some lines from an earlier version of the program that are no longer needed. ANALYZER produces reports on the specified Basic program allowing you to check the program thoroughly.

Once the ANALYZER has 'looked' at the program specified, a menu is produced showing the various options available.

The first option is to produce a 'Flow cross reference'. This is a list of all lines that are accessed by a GOTO or GOSUB statement followed by the line that calls them. This is useful if you are trying to trace a program through.

The 'Data cross reference' option produces a list of all the variables, arrays and functions that are used within a program. Again a list of the lines where they are used follows the variable name. This option is great if you are trying to find out just what variables are being used. It also helps when you want to make sure that you haven't used the same variable for more than one purpose, an extremely common programming fault.

An interesting option is that of 'dead word analysis'. This produces a list of all the lines that are in a program that will never be reached. If a program has undergone many modifications it is not unusual for program lines to become redundant,

this option allows you to see just which lines are no longer used. This is also useful when debugging a program as it allows you to check if a certain section of the program is being reached.

One nice feature of the 'Dead Word' option is the fact that ANALYZER will strip these lines from the program and SAVE the new version out to disk.

If you want to improve on the execution speed of any program, placing all of the variables in the first lines will help. The Generate Header File option will create a file that sets up all of the variables in your program. This can then be added to your program with the MERGE function of the toolkit.

The final option of this section of the package is the ability to print out information about the file. Information provided is the length of the program, how many variables that you have used, the arrays that you have used and how many lines, GOTOS, GOSUBs, variables and arrays are in the program.

## Compressor

When you have generated what you think to be the most efficient Basic program by using the ANALYZER to strip unwanted lines and created a header for the program, there will no doubt be further ways of improving the operation and saving space. The compressor helps with this as it removes all unnecessary spaces and REM statements from the program. It then packs as many statements as possible on to each program line and then finishes by renumbering the program. This results in a much smaller Basic program that will usually RUN a little bit faster.

Do make sure that your program is bug free before you use this type of program since it is impossible to debug a compact program.

## Toolkit

This program merges itself into an area of the C64's memory which is not in use when writing Basic programs. Once this has been done the Basic language on your C64 has a further eight commands added to it. If you already own a programmer's toolkit

then this may not seem to offer many commands, however, the commands are the ones that I find myself using most of the time from the larger packages.

The commands available are:

**FIND:** this is used to search through a specified program range for a specific string of characters, you could for example list all the lines in the program that contain the string PRINT or specify that you want all of the lines from 1000 onwards that contain a PRINT statement.

**CHANGE:** is a modification of the above command as it also searches on specified for a specific string. The modification is that this command allows you to then change the string into a new one. For example you may change all of the PRINT statements between lines 300 and 1000 into PRINT 1.

**DUMP:** will display a list of all the variables used in a program and their values. This is an extremely useful command to have when trying to debug a program since you can look at the state of each variable.

**INFO:** is similar to the Basic FREE command as it gives you statistics on the program in memory. INFO is greatly expanded from the usual FREE statement since it not only gives the amount of free memory but many other parameters as well. Data produced by this command is:

- 1) The number of bytes occupied by Basic.
- 2) The number of bytes used by variables.
- 3) The number of bytes used by arrays.
- 4) The number of bytes used by strings.
- 5) The number of bytes free excluding variables etc.
- 6) The number of free bytes including variables etc.

As you can see, quite a comprehensive range of information.

**MERGE:** allows you to merge programs together. This is very useful if you have a library of subroutines, such as ones to read the joystick or produce sounds. You use MERGE this into any program that you are writing and it will save you from re-keying all of the program again. The



# MIDI and Your Micro

*MIDI is a fascinating subject if you're vaguely musical. Here we bring you a comprehensive breakdown of currently available packages.*

*By Ian Waugh*

Since the advent of MIDI, hardware and software packages have proliferated at the speed of sound. There are now so many music and MIDI packages on the market that it is difficult to know just what is available, however we writing this and you reading it, new packages will have appeared and others updated. Some may have been removed from sale, new companies will have been founded and some companies may even have ceased trading. Yes, it's a busy life in the MIDI music software market.

## Making a Choice

There are more music and MIDI packages for the Commodore 64 than any other computer put together so you couldn't have chosen a better computer for making music. Choosing a package is another matter. How do you decide? This guide is aimed at helping you narrow down the type of package you are interested in. Most companies will be pleased to send you their literature and some will be happy to answer any queries you may have by phone.

One important point to bear in mind is that most manufacturers

produce their own interface and their software usually won't work with a different one. This could severely limit your choice as, having bought an interface you could find yourself restricted to software packages from that one company. Some producers, however, are converting their programs to run with other interfaces. This can only be good for the customer - that's us - and is to be welcomed.

MIDI is not the be all and end all of computer control, however, and there are other stand-alone packages which you may like to consider such as Commodore's Music Expansion System. Perhaps something like that suits you better. Don't let technology bully you into buying a computer music system. Look into the subject, read about what it can do and then make your decision.

For those who have read and decided, there follows a brief run-down of what you'll find in the market place.

## MKS MIDI

Famous for the Spectrum and Amstruc (why not Commodore?),

Chetiah has just released the MKS MIDI controller keyboard which can be used with any MIDI Interface. It has five octaves of full-sized keys and you can select MIDI channel, shift the keyboard range over an octave and transmit a MIDI patch-change number between one and 128.

## C-Lab

Available from Sound Technology, C-Lab's Super Track Separator's (STTS) interface is real-time input although you can record in stop-time too. A single screen is used for all major operations but you can call up a MIDI Event Editor screen which lets you peep around in the depths of MIDI's innards. You don't have to get involved, though, and even without delving, the program is easy to use. Definitely one for your short list.

C-Lab produce a MIDI interface (M76) and a Sync interface (S766) although the software will work with a number of other interfaces including Sonoboy's.

A sequencing package called Super Track is in the offing.

## Commodore Interface

Commodore produces the cheapest MIDI interface on the market - so far - at £19.95, designed for use with packages such as the *Music Studio*, *Music Expander* and *Composer*. No separate software is available yet.

Also, in conjunction with Music Sales, Commodore has several programs and add-ons at pocket-money prices. For example, a little clip-on keyboard extender and album music to play. The *Music Expansion System* (£144.99) consists of a keyboard, some MIDI voice editing software and an FM Sound Expander. All items should be available separately. FM synthesis is really the best's friend - as long as you don't have to program it - but the *Expander* restricts you to only a few presets.

The new packages are available to supplement the *Expander's* restricted facilities; an *Editor* to help program in music notation (both at £24.99). You should really budget for the *Editor* along with the *Expander* and if you're at home with music notation, get the *Composer*, too.

## Electromusic

Electromusic Research Ltd is the world's most prolific producer of MIDI packages and has produced hardware and software for almost every popular home computer.

EMR's Commodore 64 interface is very reasonable (£79.90) a link box called *ANALOGIC* (£34.95) with one MIDI IN and six MIDI THRU sockets is also available.

Software for the C64 includes the *Miditrack Performer* (£49.95), an eight-track, real-time polyphonic sequencer with features such as punch-in, two punch-out, thought track copying and transposition.

The *Miditrack Composer* (£44.95) is a six-track step-time editor with a good range of editing facilities although you will find it difficult to enter odd note durations - as I sometimes wish to do during frenzied bouts of composition.

The *Miditrack Editor* (£36.95) gives you step-time editing control over the *Performer's* tracks and will convert *Composer's* tracks to real-time. This really takes you down among the bits and bytes.

Finally, *Pix-Music* (£24.95)

converts MIDI into into visual patterns. It only does this in real-time, however, and cannot produce a display from a pre-recorded piece.

EMR software gives you a great deal of control over your music although it helps if you have some knowledge of MIDI. The packages are quite cheap for the facilities offered and are continuously being updated. EMR also provide a MIDI INTERFACE (0762 335741) and the helpful people there are glad to assist with any MIDI queries. They also run special package deals, too, so phone for details.

## MIDI I.I

The *MIDI I.I* (£300) from Hinton, although not exclusively for the C64, provides an interface between MIDI equipment and a computer with an RS232C socket. Software has yet to appear but a utility program is aimed at encouraging you to write your own.

## Jellingham

The Jellingham Commodore 64 interface (198) was commissioned from MEL (see MEL) and has a MIDI IN, a MIDI THRU, three MIDI OUTs and an external Clock In.

The 12-track *Recording Studio* (£99.95) is a real-time package which holds velocity, after-touch, pitch-bend and pitch-change information. It is quite easy to use but the manual could be better (unless it has been improved recently).

The *Sequence Chain Program* (£45) allows sequences to be linked to produce changes in time signature and tempo. Patch changes can also be stored.

The *Sequencer* (£340) produces a hierarchy of your music, including lyrics. It contains three programs on EPROM: the 12-track *Recording Studio*, the *Sequence Chain Program* and the *Sequencer itself* which seems, therefore, to cost around £395. Rather expensive, perhaps, but the EPROM means the programs are instantly available. The program works well but you may have to do a lot of set-up to produce the results you want. The manual could be better but the printed notation is excellent.

The *SixTrack Sound Editor* (£50) is a voice editor for Sequential's SixTrack and MAX polytexts.

## Jareth

The *Jareth Music Composer System* (£235) comprises their own AL25 interface and software (recently updated) which includes real- and step-time sequencing and editing.

Jareth's approach has been aimed at the musician rather than the computer buff. The 70-plus page manual contains all you need to know and, although it is quite a lot to wade through, a *Quick Reference Guide* helps so don't be put off. There are also several loose sheets of notes, information and corrections.

The program offers eight-track real- and step-time sequencing and uses a simple low-level MCL (Music Composition Language). Although it takes a significantly different approach to most software packages it is easy to use considering its complexity. It must be a strong contender for the best overall C64 MIDI package.

Other programs include a *Real-Time Part Editor* (£11.95) which allows the loading of real-time files part by part, from multiple files.

The *Key Programmer* (£11.95) accepts input in any key (or even no key) and allows key selection for persistent at a later date.

For Casio CZ owners, the *True Editor* (£44.95) simplifies voice editing and permits voice storage on disk - a real boon.

Brand new is Jareth's *Linker System* (£94.90), an extension of the real-time system in their MCS. It allows you to link, loop and repeat up to 128 sections of music with near infinite precision.

Also new is the *System 7* (£79.90), for Yamaha's DX7 and TX7 synths. It's a rather superb voice editor and librarian with lots of editing facilities, 328 free sounds and a sophisticated library organisation system which lets you build up and name your own banks of 32 voices.

All Jareth's programs are new but with other interfaces, too, although their AL25 has very impressive mixing facilities and it worth considering if this is your first interface.

## Passport

The *Passport Design Commodore interface* (£110) has a MIDI IN, MIDI OUT, drum sync In and Out with 30, 60 or 90 pages (pages per quarter note) and most drum machines. It has

become something of an industry standard - which means that other companies have copied it and are probably selling it cheaper.

Software for the Commodore includes *MIDI/4 Plus* (£85) and *MIDI/8 Plus* (£120), four- and eight-track real-time sequencing packages. The software is fairly easy to use, has good editing facilities and lets you merge tracks very easily.

*Music Shop for MIDI* (£80) is a step-time program. Notes are entered and shown in traditional notation and the program will produce a printout of your choice. It is very easy to use but most MIDI systems are not supported, a fact which will not worry many users but bear it in mind. It works superbly with multi-timbral instruments such as Casio's CZ synths. A very good and easy introduction to MIDI and good value.

Also available is the *Midi Player* (£85) which stores up to eight songs/arrangements on a disk and produces a synchronised video display on the screen during playback.

### Rainbird

Produced in association with System Software, the *Advanced Music System from Rainbird* (£19.95) is a MIDI-oriented music package - the best there is - which also includes some MIDI software. It is designed to work with the MIDI and Passport interfaces and is basically a six-track real-time sequencer. It doesn't compare with a dedicated MIDI package - and really isn't intended to - but it gives you the opportunity to experiment with MIDI. For example, it lets you convert music files to MIDI files and vice versa.

### SIEL

SIEL recently sold out to Chase, a company which claims that it intends to continue to support SIEL keyboards and MIDI software. That being so, there follows a list of SIEL packages. Other music stores may still have stock, too. The prices are SIEL's and Chase may not adhere to these (they may even be reduced) but they are a guide.

The SIEL interface for the Commodore 64 (£79) is identical to IM's.

The *Live Sequencer* (£89) for the C64 is an excellent 16-track real-time sequencer. It is easy to use and,

although editing could be better, it's good value.

The *Multitrack Composer* (£90) is a six-channel step-time sequencer with lots of editing facilities but putting notes in can take time.

The *Expander Editor* (£58) helps, necessarily with editing on SIEL's Open 6, DR600 and Expander 6 by showing parameters graphically on the screen. The *DR600 Editor* (£59) is for the DR600. Both programs have good graphics and editing facilities. A

*MIDI Data Base* (£59) can store 250 patches from any MIDI synth apart from Yamaha's DXs and Casio's CZs. That probably excites more than half the synth owners in the UK but if you're one of the others it's a worthwhile program.

### Steinberg Research

Steinberg's *Pro-16 Sequencer* (£100) is a 16-track real- and step-time sequencer with perhaps better real-time facilities than step-time. In operation it has taken its inspiration from a 16-track tape recorder. For example, you can edit a sequence by punching in and out. A very respectable, professional piece of software, comparatively priced.

The *TMS* (The New System) *Sequencer* (£150) produces a printout of a *Pro-16* recording in traditional notation. It affords a degree of step-time entry, and allows you edit the pieces which can then be played from the *Pro-16*.

An *Edit Kit* comprising a note-editor and drum machine editor for the *Pro-16* is available for £30 and a combined *Pro-16* and *Edit Kit* is available on cartridge for £20.50 and a combined *Pro-16* and *TMS* is available for £285.00.

The D&T MIDI interface will set you back £150.

The packages are very professional, thorough and impressive. Definitely worth serious consideration.

*Track-Set* (£70) is an entry-level MIDI package containing its own MIDI interface. If MIDI pans the wires up you then *Track-Set* is for you.

*Casio* (£77.50) is a voice editor and library system for Casio's CZ synths, a sight on the expensive side although it contains 128 sounds on disk. *SEAS* (also at £77.50) does likewise

for Yamaha's DX and TX synths) *MIDI* (£120) is a visual editing system for the Mirage keyboard and expander.

### Dr. T

Dr. T is an American software company, producing its own MIDI interface (£80) but the software will work with Passport's Sequential and possible other interfaces.

The *Keyboard Controlled Sequencer* (£125) combines real- and step-time in one. It has lots of features not found in other software such as Time Reverse which plays a sequence backwards and Auto Channel Assign which re-assigns consecutive events to different channels. Real-time is easy to use. Step-time has lots of options to let you program in many notes and time signatures as you wish. Certainly more products worth serious consideration.

Dr. T also produces *Casio CZ1000* and *Yamaha DX* (£75) Library Programs. 11

### TouchAll

*Clonish Hardware* / Withoutout Science Park, Crickhowell Road, St. Mellons, Cardiff. Tel 0332 7775777.

*Sound Technology* / 6 Ladbroke Square Centre, Avenue One, Ladbroke, Wroth 5G 2JH. Tel 0462 578073.

*Communiware* / Haversham Road, Welton, Cusby, Northants NN17 1BE. Tel 0538 267373.

*EMM* / 14 Mount Close, Weybridge, Essex SS17 5HG. Tel 0302 337567.

*Albion Instruments* / 68 Abingdon Road, Oxford, Oxon OX1 4EA. Tel 0862 721772.

*Arbuthnots* / Four Rivers, 130-140 Old St, London EC1P 3BE. Tel 07 263 3294.

*Arcofit* / PO Box 28, Dunham, Warrs WU17 5HG. Tel 0565 821 627.

*Passport Designs* / Four River Music Europe, 24 Brampton Gardens, Edgware, Middx. Tel 81 937 3397.

*Reinhold* / First Floor 74 New Oxford Street, London WC1A 1PS. Tel 07 260 8838.

*SIEL* / from Chase, 22 Chardon Street, 50 Farnham Road, London NW1. Tel 01 267 7626.

*Dr P* / from Tube Note Music Services, 212-126 Camden High Street, London NW1 0NR. Tel 01 267 6871.

# Mini Office II The Facts

*Mini Office II from Database Software will turn your C64 into a complete home office at a ridiculously low price*

By Gordon Hamlett

**P**ty the small businessman. There he is, trying toeke out an existence and everywhere he looks, he is faced with a plethora of advertisements imploring him to computerise. The idea makes a lot of sense but where does he start? What machine and, more importantly what software does he need?

There is also the small matter of cost. Hardware can cost anything from a few hundred pounds up to an infinite limit. Then you need to buy the big three — a word processor for your letters, a spreadsheet for managing your finances and a database to keep track of all your clients. The list goes on and on. Wouldn't it be nice if you could use the C64 that you've already got instead of splashing out on a new system.

Well, surprise surprise, you can. I wouldn't really be writing this article otherwise. The software packages mentioned above have been available for a long time but there has always been the nagging problem of compatibility — how easy is it to transfer information from your database to your word processor or whatever?

## The Solution

*Mini Office II* is the name of the

product which can do all this. Database Software has put together a fully compatible big three. Not only that, graphics, communications and label printing packages have been thrown in as well. Very useful, you may say. All I've got to do now is save enough pounds to buy this *Mini Office II*.

That shouldn't be too difficult either for, unbelievably, the package comes in at well under 20pounds! And if that still proves to be too much, you can always enter our competition this month and try to win one!

The package comes on tape or disk but anyone wanting to use any sort of computerised system to run their business will soon discover that a tape based system soon becomes unmanageable. That is not to say that the tape package is useless. It is ideal for anyone who wants to learn about using business software.

## In the Office

On loading *Mini Office II*, you are presented with a main menu allowing you to access any of the six programs. Selecting one of these loads the appropriate program and leads you into a further menu of choices. Any Commodore or Epson compatible

printer is fully supported and most others should work perfectly. The only problem areas are likely to be in printing screen dumps from the graphics package.

## Word Processing

The word processor is fairly comprehensive, containing the majority of commands that you are most likely to use. These commands are entered via a combination of the control, tape and function keys. I found these to be strangely organised but this could just be that I am used to a totally different set of commands on my current wordpro. Files can be saved either as text or ASCII. The latter option is useful if you intend sending a document somewhere down a modem.

Before you print a document, you can alter various settings — headings, margins, page length etc. If you are likely to use the same settings time and time again, it will be worth your while setting up a file containing these commands that you can call up as well rather than have to enter everything separately all the time. Other facilities include a mail merge — useful when you are sending out a series of

standard letters and an automatic word count — ideal if you are writing magazine articles for demanding editors.

### Computer Card Index

A database is no more than a collection of information. When the computerised version scores over the traditional card box is the way that information can be accessed and manipulated.

The database consists of a series of records. Each separate record might correspond to e.g. a name and address of a customer or details of a record in your collection. Each record is further divided up into fields e.g. title of record, recording artist, recording company, date of release and price.

In *Mini Office II*, each record can consist of up to 30 fields and you can design the structure yourself; you can specify whether you want a field to contain alphanumeric characters (i.e. anything, decimal, integers, data or a formula). Designing the actual structure of a record is the hardest part and some considerable thought should be used. How many records you can have in a particular database depends on how big the record is. One disadvantage of the C64 is that the available memory soon gets used up although you can of course set up several similar bases if you find that you have too many records.

Where databases become particularly useful is when you want to access the information. Records can be sorted on any field or a combination of them and it is easy to extract bits of information rather than complete records. A typical example would be a club secretary writing to his members to remind them that their annual subscriptions are now due. Not everyone will have joined at the same time so you instruct the computer to pull out only those records that apply; you can then use the mail merge facility in the wordpro to send them a personalised renewal form.

If planning a database is hard, then doing the same for a spread sheet is doubly so. Yet for anyone running a small business, the results are definitely worthwhile.

### Calculations

A spreadsheet is no more than a large piece of paper, divided up into rows and columns, with each individual area called a cell. You put figures into these cells and the computer juggles them about for you. Sound complicated? It's not really that bad.

Suppose that you were using the spreadsheet to keep a note of your company's money — bills to be paid and invoices received. You could set things up as follows: Across the top of the sheet, you could have a column for each month of the year and down the side, details of your previous expenses and profits. Data can then be entered accordingly.

So far, this does not seem to offer much of an advantage over the paper and pencil method. The first advance comes from the fact that a particular cell can also be a formula rather than just an item of data. Thus you could have a row marked total expenses and let the program work out the sum of the previous rows for you. OK, so it saves you a bit of time but it's still not exactly mindblowing. But what if the Chancellor suddenly decides to alter the rate of V.A.T. It will take you ages to recalculate everything by hand, but it is simple using a spreadsheet and you can have the new figures in a matter of minutes.

Then you can start making 'what if' calculations. What if I cut the price of my products but still 10% more etc.? The spreadsheet allows you to examine the various possibilities so that you can maximise your profit.

### Picture This

Unless your name is Isaac Newton or similar, given a page full of figures — e.g. a spreadsheet — most people look blank. It doesn't matter that you have everything neatly labelled or whatever, very few people can extract any sort of meaningful data quickly when it is presented like that.

Well on the graphics package. Information can be saved from the spreadsheet for representing graphically. Typically, this will be the totals produced by the spreadsheet e.g.

monthly profit, but information can be entered directly.

There are three forms of display available to you — a bar chart, a line graph and a pie chart. These can all be labelled and you can use different types of shading to delineate the various sections. Presentation of data is becoming increasingly important. If you can show your bank manager a graph of your projected profits, he may be more willing to sit through the raw data than if you just give him a spreadsheet and told him to draw his own conclusions.

### Extras

The other two features of *Mini Office II* are a communications package and a label printer. The comms package can be used either via a serial modem/RS232C or Compuport. The protocols have been established for Modemlink/Telocom (both) but you can establish your own protocols if you want to hook up somewhere else, somewhere else.

The label printer lets you design your own layout and size. Information can then be pulled from your database ready for printing.

### Verdict

Who would use *Mini Office II*? It is ideal for anyone who is running a club and wants to maintain records of its members. If you are running a business, again the package is excellent but... think long and hard about plunging into your expansion. If your business is likely to remain at its current level then fine, but if you intend branching out, you may be advised to invest in a more powerful micro. Not because *Mini Office II* is no good, but because of the limitations of the C64.

The package itself is superb value for money and has got to be one of the bargains of the year.

### Timeline

*Mini Office II*, Supplier: Sanyo/Amstrad, Jarvis House, 66 Clarendon Road, Wandsworth, Stockport SK7 3WE. Tel: 061 426 8833. Price: £78.95 (Sanyo) £79.95 (Amstrad). □

# Hex Data Entry II

*An updated version of our machine code entry program.*

*By M.C. Stretton assisted by P.A. Eves*

**T**he Four Commodore Hex Data Entry program has been written with you, the reader in mind. No longer will it be a painstaking ordeal, typing in all the long list of data. This program will ensure a 100% correct entry, each and every time you use it.

It has become apparent that a number of people are experiencing problems using an earlier version of this program. The program presented here is an update of this version and cures any problems that we are aware of.

For your own safety, do not use the first version of Hex Data Entry.

On first entering the Hex Data Entry, only the LOAD DATA and DATA ENTRY options are available to you. This is because the buffer is empty, and the other two options require data to be present. On selecting the LOAD DATA option, you are asked for TAPE or DISK. Press either 'T' or 'D' then RETURN. The program remembers the last input/output, and so it is possible to just hit RETURN if the correct device type is being displayed. You are then required to enter a filename.

If you should make an error in your filename entry, you may either delete single characters by the DEL key, or SHIFT/CLEARHOME will delete the whole filename. After the prompt, hit return and the file will be loaded into the buffer. The program will allow files up to 95 blocks in length to be loaded

in. If you want larger programs to be entered, you will have to split them into two or more parts first.

The SAVE option is identical to the LOAD, except that it takes the contents of the buffer and saves them out to the given start address. This will save an executable file, that can be loaded and run, independent of the input program.

## Data Entry

The Data Entry option is the option by which you can enter data from your Commodore, or your own creation. Once this option is selected you are asked if you want to continue from the given address. If you have just 'LOADed' a file, this address will be the next available byte in the buffer. (Allowing you to add more data to the end of the loaded file). Therefore if you wish to continue typing in at the last address, type 'Y'. If 'N' is pressed the program assumes you are starting a fresh entry. When this happens the buffer is reset to zero, thus losing any program currently in memory. (I have chosen \$C000 as the normal start up address purely because most M/C programs start here). After pressing 'N', you are then asked for the starting address, in Hex. Any valid Hex number is acceptable, e.g. \$400, \$C00, \$C340. In this example, the first figure, \$400, would be interpreted as

\$0400 by the program. Likewise \$200 is taken to be \$0200.

Once the start address is given, you are asked if you want checksum or not. If you are typing in a program from your Commodore your response will be 'N'.

The screen display now changes to show the current address being poked into. Type any valid Hex number and the program automatically skips the next byte without the need to type commas, spaces or returns. If you make a mistake, one press of the DEL key will erase the whole number. If in the no checksum mode, when you get to the end of the line, the line will automatically scroll up ready for your next input.

If in checksum mode, after eight bytes are entered you must type the two digit checksum at the end of the line. Unlike the no checksum mode you now press return to enter the line.

If the program finds that the checksum does not match the line entered, a warning tone will be sound. You will then be asked if you wish to either: a) Re-enter the line or b) Re-enter the checksum.

After checking your line, if you find you have entered it wrongly, then press 'L'. The line will be erased and you then re-enter it correctly. If you find that you have only made a mistake in typing in the checksum, then press 'C' and re-enter it. Should you wish to stop entering data, simply press return.



or space bar on a blank line to get you back to the main menu. Here you may SAVE your program so as to return another day, or you may wish to use a printer.

On choosing the print option, you have a choice of hard copy or screen copy. The listing can be paused at any time by pressing down and holding down any key. Pressing the RUN/STOP key and holding it down will break out of the print mode and return you to the main menu.

The left arrow key 'top left of the keyboard', acts as zero when typing in your data. The space bar acts as the return key when entering data, thus leaving you free from searching for the return key.

I hope that this program will help to take the drudgery out of typing in long lists of data statements.

PROGRAM: REC DATA ENTRY 11

```

00 10 POSKTRM,50,CLR,BL,LSM99
01 20 DATA C64128M,PROG008,100,
    POSKTRM,10,POSKTRM1,10,PR
    DATA,1,PRINT"CLR, RM R, RM
    SCL"
02 30 LS-R,END,"RECSD",CA="RSDM
    RM-R"
03 40 SCL
04 50 PRINT"CLR"
05 60 PRINT"HOME,RSOFF,BLACK,LS
    M99"
06 70 PRINT"DOWN,BLACK) YOUR C
    ONSIDER ME! SUFFER - (C)
    1988"
07 80 PRINT"HOME) -DECLINED BY
    C WRITER BY R C DIRECTOR - (
    RASOFF)"
08 90 PRINT"HOME,DOWN,RIGHT10
    2IF1,LOAD,DATA"
09 10 PRINT"DOWN,RSDM1300P1)
    SCL"DATA"
10 11 PRINT"DOWN,RSDM1300P1)
    SCL"DATA"
11 12 PRINT"DOWN,RSDM1300P1)
    PRINT"DATA"
12 13 DATA1
13 14 DATA1
14 15 DATA1
15 16 PRINT"DOWN,DOWN,BLACK,RS
    OFF)100,100,DOWN,DOWN,DOWN
    100,100)"
16 17 POSKTRM,0,RSOFF100,1,SETM

```

```

08 00
09 18 PRINT"TOP,DOWN,BLACK,RS
    OFF)100,100,DOWN,DOWN,DOWN
    100,100)"
10 25 POSKTRM,0,RSOFF100,1,SETM
11 26 PRINT"TOP,DOWN,DOWN,DOWN,
    DOWN,DOWN,DOWN,DOWN,DOWN
    100,100)"
12 27 PRINT"CLR,WRITE)"
13 28 POSKTRM,0,RSOFF100,1,SETM
14 29 PRINT"TOP,DOWN,DOWN,DOWN,
    DOWN,DOWN,DOWN,DOWN,DOWN
    100,100)"
15 30 PRINT"CLR,WRITE)"
16 31 POSKTRM,0,RSOFF100,1,SETM
17 32 POSKTRM,0,RSOFF100,1,SETM
18 33 POSKTRM,0,RSOFF100,1,SETM
19 34 POSKTRM,0,RSOFF100,1,SETM
20 35 POSKTRM,0,RSOFF100,1,SETM
21 36 POSKTRM,0,RSOFF100,1,SETM
22 37 POSKTRM,0,RSOFF100,1,SETM
23 38 POSKTRM,0,RSOFF100,1,SETM
24 39 POSKTRM,0,RSOFF100,1,SETM
25 40 POSKTRM,0,RSOFF100,1,SETM
26 41 POSKTRM,0,RSOFF100,1,SETM
27 42 POSKTRM,0,RSOFF100,1,SETM
28 43 POSKTRM,0,RSOFF100,1,SETM
29 44 POSKTRM,0,RSOFF100,1,SETM
30 45 POSKTRM,0,RSOFF100,1,SETM
31 46 POSKTRM,0,RSOFF100,1,SETM
32 47 POSKTRM,0,RSOFF100,1,SETM
33 48 POSKTRM,0,RSOFF100,1,SETM
34 49 POSKTRM,0,RSOFF100,1,SETM
35 50 POSKTRM,0,RSOFF100,1,SETM
36 51 POSKTRM,0,RSOFF100,1,SETM
37 52 POSKTRM,0,RSOFF100,1,SETM
38 53 POSKTRM,0,RSOFF100,1,SETM
39 54 POSKTRM,0,RSOFF100,1,SETM
40 55 POSKTRM,0,RSOFF100,1,SETM
41 56 POSKTRM,0,RSOFF100,1,SETM
42 57 POSKTRM,0,RSOFF100,1,SETM
43 58 POSKTRM,0,RSOFF100,1,SETM
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48 63 POSKTRM,0,RSOFF100,1,SETM
49 64 POSKTRM,0,RSOFF100,1,SETM
50 65 POSKTRM,0,RSOFF100,1,SETM
51 66 POSKTRM,0,RSOFF100,1,SETM
52 67 POSKTRM,0,RSOFF100,1,SETM
53 68 POSKTRM,0,RSOFF100,1,SETM
54 69 POSKTRM,0,RSOFF100,1,SETM
55 70 POSKTRM,0,RSOFF100,1,SETM
56 71 POSKTRM,0,RSOFF100,1,SETM
57 72 POSKTRM,0,RSOFF100,1,SETM
58 73 POSKTRM,0,RSOFF100,1,SETM
59 74 POSKTRM,0,RSOFF100,1,SETM
60 75 POSKTRM,0,RSOFF100,1,SETM
61 76 POSKTRM,0,RSOFF100,1,SETM
62 77 POSKTRM,0,RSOFF100,1,SETM
63 78 POSKTRM,0,RSOFF100,1,SETM
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71 86 POSKTRM,0,RSOFF100,1,SETM
72 87 POSKTRM,0,RSOFF100,1,SETM
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74 89 POSKTRM,0,RSOFF100,1,SETM
75 90 POSKTRM,0,RSOFF100,1,SETM
76 91 POSKTRM,0,RSOFF100,1,SETM
77 92 POSKTRM,0,RSOFF100,1,SETM
78 93 POSKTRM,0,RSOFF100,1,SETM
79 94 POSKTRM,0,RSOFF100,1,SETM
80 95 POSKTRM,0,RSOFF100,1,SETM
81 96 POSKTRM,0,RSOFF100,1,SETM
82 97 POSKTRM,0,RSOFF100,1,SETM
83 98 POSKTRM,0,RSOFF100,1,SETM
84 99 POSKTRM,0,RSOFF100,1,SETM

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08 00,25,LS,LS-R
09 70 RETURN
10 71 POSKTRM,0,RSOFF100,1,SETM
11 72 POSKTRM,0,RSOFF100,1,SETM
12 73 POSKTRM,0,RSOFF100,1,SETM
13 74 POSKTRM,0,RSOFF100,1,SETM
14 75 POSKTRM,0,RSOFF100,1,SETM
15 76 POSKTRM,0,RSOFF100,1,SETM
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84 145 POSKTRM,0,RSOFF100,1,SETM
85 146 POSKTRM,0,RSOFF100,1,SETM
86 147 POSKTRM,0,RSOFF100,1,SETM
87 148 POSKTRM,0,RSOFF100,1,SETM
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89 150 POSKTRM,0,RSOFF100,1,SETM
90 151 POSKTRM,0,RSOFF100,1,SETM
91 152 POSKTRM,0,RSOFF100,1,SETM
92 153 POSKTRM,0,RSOFF100,1,SETM
93 154 POSKTRM,0,RSOFF100,1,SETM
94 155 POSKTRM,0,RSOFF100,1,SETM
95 156 POSKTRM,0,RSOFF100,1,SETM
96 157 POSKTRM,0,RSOFF100,1,SETM
97 158 POSKTRM,0,RSOFF100,1,SETM
98 159 POSKTRM,0,RSOFF100,1,SETM
99 160 POSKTRM,0,RSOFF100,1,SETM

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67	159 248-878848-0020030	68	178 216-5758510	69	214 218-110000-0020000
70	159 248-878848-0020031	69	178 216-5758511	70	214 218-110000-0020001
71	159 248-878848-0020032	70	178 216-5758512	71	214 218-110000-0020002
72	159 248-878848-0020033	71	178 216-5758513	72	214 218-110000-0020003
73	159 248-878848-0020034	72	178 216-5758514	73	214 218-110000-0020004
74	159 248-878848-0020035	73	178 216-5758515	74	214 218-110000-0020005
75	159 248-878848-0020036	74	178 216-5758516	75	214 218-110000-0020006
76	159 248-878848-0020037	75	178 216-5758517	76	214 218-110000-0020007
77	159 248-878848-0020038	76	178 216-5758518	77	214 218-110000-0020008
78	159 248-878848-0020039	77	178 216-5758519	78	214 218-110000-0020009
79	159 248-878848-0020040	78	178 216-5758520	79	214 218-110000-0020010
80	159 248-878848-0020041	79	178 216-5758521	80	214 218-110000-0020011
81	159 248-878848-0020042	80	178 216-5758522	81	214 218-110000-0020012
82	159 248-878848-0020043	81	178 216-5758523	82	214 218-110000-0020013
83	159 248-878848-0020044	82	178 216-5758524	83	214 218-110000-0020014
84	159 248-878848-0020045	83	178 216-5758525	84	214 218-110000-0020015
85	159 248-878848-0020046	84	178 216-5758526	85	214 218-110000-0020016
86	159 248-878848-0020047	85	178 216-5758527	86	214 218-110000-0020017
87	159 248-878848-0020048	86	178 216-5758528	87	214 218-110000-0020018
88	159 248-878848-0020049	87	178 216-5758529	88	214 218-110000-0020019
89	159 248-878848-0020050	88	178 216-5758530	89	214 218-110000-0020020
90	159 248-878848-0020051	89	178 216-5758531	90	214 218-110000-0020021
91	159 248-878848-0020052	90	178 216-5758532	91	214 218-110000-0020022
92	159 248-878848-0020053	91	178 216-5758533	92	214 218-110000-0020023
93	159 248-878848-0020054	92	178 216-5758534	93	214 218-110000-0020024
94	159 248-878848-0020055	93	178 216-5758535	94	214 218-110000-0020025
95	159 248-878848-0020056	94	178 216-5758536	95	214 218-110000-0020026
96	159 248-878848-0020057	95	178 216-5758537	96	214 218-110000-0020027
97	159 248-878848-0020058	96	178 216-5758538	97	214 218-110000-0020028
98	159 248-878848-0020059	97	178 216-5758539	98	214 218-110000-0020029
99	159 248-878848-0020060	98	178 216-5758540	99	214 218-110000-0020030
100	159 248-878848-0020061	99	178 216-5758541		



# List Enhancer

*This program will improve the LIST facility on your C64, almost beyond recognition.*

*By A.J. Barker*

**P**age-Lister is a utility/program aid that supplements the List function on the Commodore 64.

The normal List command is adequate if you are working on a small program. With larger programs it has some drawbacks; you need to either remember line numbers or LIST all of the program up to the section on which you are currently using the CTRL key and RUN/STOP to stop the display.

This procedure is, to say the least, clumsy and inefficient - especially since it is frequently repeated during program development.

One answer to the problem would be a scrolling program list which allows you to list both forwards and backwards through the program to the appropriate point. This is most definitely an improvement, but it would still require a line number to be typed in each time if you are not working near the start of the program.

## An Alternative

The Page-Lister utility presented here is an alternative to scrolling and it is, I believe, more practical. Instead of scrolling, Page-Lister allows the program being developed to be listed as selected sections of "pages", stopping after each complete page. It then allows you to continue to page forwards or backwards through the program, editing as required. The size of the page is initially set to 21 lines. This may be altered, however, so that you could, if you wanted, display the program a line at a time, stopping after each line.

COMMAND	PARAMETER	DEFAULT (if blank)	DESCRIPTION
+	Number (n)	Current Page size.	Shift display forward n lines.
-	Number (n)	Current page size.	Shift display backwards n lines.
B	None	N/A	List last page of program.
C	None	N/A	List current page.
L	Line number	0	List 1 page from line number
P	Number (n)	21	Set current page size to n.
F	None	N/A	List first page of program.

Other functions allow you to list the first or last page of the program or to shift the display forwards or backwards a specified number of lines relative to the current line number at the top of the page. You may also list a page starting from a specified line number or re-display the current page. The current page location is always remembered by Page-Lister. This means that you can work on a particular page, run the program, and then re-display the page you were working on without having to remember line numbers - a most useful development aid.

## Loading and Activating

Type in the Basic loader and save to tape or disk, as usual, before running to install the machine code. Type SYS49152 RETURN to activate Page-Lister - this will cause the message "PAGE-LISTER ACTIVE" to be

displayed to inform you of its current state. You will also notice that, when active, Page-Lister sets character colour to black. INSTANCES is entered again then Page-Lister is de-activated, causing the message "PAGE-LISTER INACTIVE" to be displayed and setting character colour to blue. Now load a Basic program - preferably a large one - and activate Page-Lister before trying out the commands.

## Page-Lister Commands

Page-Lister commands consist of one letter followed by an optional number, where applicable, and must be entered on a blank line (i.e. carriage return is not allowed). The command + or - command is forced into the cursor position immediately after the READY prompt after a page has been displayed. Thus scrolling forwards or backwards through the program

requires only RETURN. If you set the repeat key on (POKE 650, 128) then you can page through a large program very rapidly by simply holding down the repeat key.

**Keeping Track**

The + command, if entered with no parameter, will move the display on a number of lines equal to one less than the current page size. This means that the bottom line of the current page is stated as the top line of the next page. The opposite is true of the - command. The idea of this is to help you keep track of where you are in the program while paging.

Page-Lister is located at 49152-5942 (88C000-SC17A) if you wish to use it as a machine code object program. It is not re-locatable and cannot be used to list a loaded directory but it works with MIBRO assembler and so far has been compatible with the Commodore Cist DOS loader. **TM**

```

00 1210 C010 221,00,221,00,229,
05,121,00,121
01 1000 C010 210,199,202,229,100
,273,181,180,000
02 1000 C010 20,100,0,133,291,1
00,100,100,000
03 1000 C010 100,100,100,173,0,1
,171,171,100,000
04 1000 C010 273,0,0,171,171,0,0
,100,000,000
05 1000 C010 100,100,299,000,10
,100,0,100,000
06 1070 C010 100,100,100,000,0,0
,100,100,173,171
07 1000 C010 100,170,110,100,100,10
,0,0,0,170,100,100
08 1070 C010 100,170,0,0,170,0,0
,0,0,0,0,0
09 1000 C000 70,7,100,000,100,1,0
,100,100,0,0
10 1010 C000 250,000,0,100,100,100
,171,110,100,100
11 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
12 1000 C000 100,0,229,001,100,
100,000,0,100
13 1070 C000 10,000,000,173,117
,100,100,100,173
14 1000 C000 110,100,100,100,0,0,0
,171,100,100,000
15 1000 C000 110,100,000,000,0,0
,0,0,0,100,100,100
16 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
17 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
18 1000 C000 250,000,0,100,100,100
,171,110,100,100
19 1000 C000 100,100,100,100,100,100
,100,100,100,100
20 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
21 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
22 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
23 1070 C000 10,000,000,173,117
,100,100,100,173
24 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
25 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
26 1000 C000 100,0,229,001,100,
100,000,0,100
27 1070 C000 10,000,000,173,117
,100,100,100,173
28 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
29 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
30 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
31 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
32 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
33 1070 C000 10,000,000,173,117
,100,100,100,173
34 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
35 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
36 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
37 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
38 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
39 1070 C000 10,000,000,173,117
,100,100,100,173
40 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
41 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
42 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
43 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
44 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
45 1070 C000 10,000,000,173,117
,100,100,100,173
46 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
47 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
48 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
49 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
50 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
51 1070 C000 10,000,000,173,117
,100,100,100,173
52 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
53 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
54 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
55 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
56 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
57 1070 C000 10,000,000,173,117
,100,100,100,173
58 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
59 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
60 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
61 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
62 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
63 1070 C000 10,000,000,173,117
,100,100,100,173
64 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
65 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
66 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
67 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
68 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
69 1070 C000 10,000,000,173,117
,100,100,100,173
70 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
71 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
72 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
73 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
74 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
75 1070 C000 10,000,000,173,117
,100,100,100,173
76 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
77 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
78 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
79 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
80 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
81 1070 C000 10,000,000,173,117
,100,100,100,173
82 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
83 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
84 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
85 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
86 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
87 1070 C000 10,000,000,173,117
,100,100,100,173
88 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
89 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
90 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
91 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
92 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
93 1070 C000 10,000,000,173,117
,100,100,100,173
94 1000 C000 110,100,100,100,0,0,0
,171,100,100,100
95 1000 C000 100,170,110,100,0,0
,110,0,0,0,0,110
96 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
97 1070 C000 0,170,0,0,000,100,1
,0,10,100,100
98 1000 C000 100,100,100,100,10,10
,0,0,0,100,100
99 1070 C000 10,000,000,173,117
,100,100,100,173
100 1000 C000 110,100,100,100,0,0,0
,171,100,100,100

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00 100 0000 *****
01 110 0000 *****
02 120 0000 *****
03 130 0000 *****
04 140 0000 *****
05 150 0000 *****
06 160 0000 *****
07 170 0000 *****
08 180 0000 *****
09 190 0000 *****
10 200 0000 *****
11 210 0000 *****
12 220 0000 *****
13 230 0000 *****
14 240 0000 *****
15 250 0000 *****
16 260 0000 *****
17 270 0000 *****
18 280 0000 *****
19 290 0000 *****
20 300 0000 *****
21 310 0000 *****
22 320 0000 *****
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26 360 0000 *****
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28 380 0000 *****
29 390 0000 *****
30 400 0000 *****
31 410 0000 *****
32 420 0000 *****
33 430 0000 *****
34 440 0000 *****
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36 460 0000 *****
37 470 0000 *****
38 480 0000 *****
39 490 0000 *****
40 500 0000 *****
41 510 0000 *****
42 520 0000 *****
43 530 0000 *****
44 540 0000 *****
45 550 0000 *****
46 560 0000 *****
47 570 0000 *****
48 580 0000 *****
49 590 0000 *****
50 600 0000 *****
51 610 0000 *****
52 620 0000 *****
53 630 0000 *****
54 640 0000 *****
55 650 0000 *****
56 660 0000 *****
57 670 0000 *****
58 680 0000 *****
59 690 0000 *****
60 700 0000 *****
61 710 0000 *****
62 720 0000 *****
63 730 0000 *****
64 740 0000 *****
65 750 0000 *****
66 760 0000 *****
67 770 0000 *****
68 780 0000 *****
69 790 0000 *****
70 800 0000 *****
71 810 0000 *****
72 820 0000 *****
73 830 0000 *****
74 840 0000 *****
75 850 0000 *****
76 860 0000 *****
77 870 0000 *****
78 880 0000 *****
79 890 0000 *****
80 900 0000 *****
81 910 0000 *****
82 920 0000 *****
83 930 0000 *****
84 940 0000 *****
85 950 0000 *****
86 960 0000 *****
87 970 0000 *****
88 980 0000 *****
89 990 0000 *****
90 1000 0000 *****
91 1010 0000 *****
92 1020 0000 *****
93 1030 0000 *****
94 1040 0000 *****
95 1050 0000 *****
96 1060 0000 *****
97 1070 0000 *****
98 1080 0000 *****
99 1090 0000 *****
100 1100 0000 *****

```

# 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.*

**L**ooks there *click* in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from Four Commodore. Your fingers reach for the keyboard and press the letters K, U and N. You press RETURN, sit back and nothing happens.

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 Four 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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TEL: (0442) 48435

please contact this address for prices and availability.

## The Disk

Programs on the disk will also be supplied as totally 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 Plus/4 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 strap containing the article type, C16 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strap. 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. 15

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# Bare Facts

*In order to translate a screen display from one machine to another an intimate knowledge of the machine's video controller is required. We give comparisons of the video on the popular Commodore machines.*

**E**very computer program will use the video display at some time or another. Writing a program that looks professional requires an intimate knowledge of the various functions of the computer's video controller.

This article will provide you with memory maps for the video-controller of all the popular Commodore home computers.

It is beyond the scope of this article to explain exactly how how individual memory location is used. We have dealt with graphics in many articles in the past.

## POKEing Around

Quite often we are asked the question, what does this POKE do or why is that POKE used? If you refer to the memory maps printed here for the video chips, and the earlier memory maps printed in the February 1987 issue you should be able to find out what most of the different POKEs perform. For example, the best way to attract anyone's attention to your display is to alter the colour of the screen display. This is extremely easy to do on all of the Commodore computers but must be approached in a different way depending on the actual computer that is being used.

To change any colour on the C64 you are required to access the video controller directly with POKE instructions. If you have a look at the memory map for this chip you will see that the screen colour is stored in memory location 52281 and the border colour is stored in memory location 52280. Poking a number between zero and 15 into either of the above locations will change the relevant item to the specified colour. For example:

FIGURE 1

### C-16 COMMAND

COLOR SOURCE, COLOUR, LINESIZE

SOURCE

- 0 = BACKGROUND
- 1 = FOREGROUND
- 2 = MULTICOLOUR 1
- 3 = MULTICOLOUR 2
- 4 = BORDER

### POKE 52280=POKE522810

will change both border and screen to black.

When trying to convert programs to or from a C64 to any of the other Commodore computers altering the colours can become confusing. This is because the C16, Plus/4 and C128 all have basic commands that allow you to change the colours without referring to POKEs. The syntax for the colour commands are shown in Figure 1.

Since all the above commands do is to alter the registers in the machine's video chips, as you would yourself on the C64, it is possible to access the various registers yourself. If you refer

to the details for the C128 and C16/Plus/4 you will see that the colour of the border is stored in memory locations 52280 and 52285 respectively. Should you enter the following commands:

POKE 52280,0 on the C128 or  
POKE 85300,0 on the C16 and Plus/4  
you will find that the border colour will change to black, just as though you had entered the relevant COLOR command.

Don't be afraid of POKEing around in memory to see what effects can be achieved, the worst that you can do is crash your Computer so that you have to reset it.

ADD - ADDS THE REGISTER NUMBER	Reg No	Reg Bit	Description
How many times the original register value should be accessed (high values POKE commands). To calculate the register address enter zero you want.	1	0	Horizontal Total - in the total number of characters 800-16320 Horizontal Dimension - the number of actual characters 800-16320
If 0 you wish to write to the C64, write the register number in address 52280.	1	1	Horizontal Total - number of characters 800-16320
If 1 you wish to read a register, write the register number in memory. When you access the value of this register.	1	1	Horizontal Total in the width. Horizontal Dimension value in the width. Horizontal Total - number of lines







# C64 Teletext

*Most people imagine that Teletext is merely a sports results and weather forecast service. With the C64 adaptor from Microtext, it can be much more.*

*By Mike Roberts*

**T**eletext on computers such as the BBC has been common for some time. But only now can the humble Commodore owner access the cheapest general purpose database around.

## Background

Many years ago before home computers were the reality that they are now, it was still obvious that there would be a need for a public computer service. The original teletext concept was designed with the paged system of showing information on individual pages with subsidiary frames for extra information. From the start it was to be a colour system and people would be charged for using the information.

The video standard chosen was now the familiar 40 x 24 Teletext graphics system. At about the same time however, many eyes were going on to create a unified teletext system based around similar ideas except that the screen would be format based around a 32 column format. In a search for standardization, both these groups met and adopted the videotext system. The name Videotext was then adopted to cover both services.

## In Use

The format of teletext is dramatically simple and is one of the best system analysis jobs that I have ever seen. A remote keypad is used to key in a three digit number from an initial screen. The first screen leads to subsidiary screens or to the information required. The page can also be accessed directly if the number is known or by looking on the index. Once a page has been selected it can flick through a number of frames.

The transmission time aspect is important. Depending on the service, between nine and five frames are transmitted per second. So when you type in your page request you have to wait a few seconds for it to appear. So you see the page number, read the screen and, every 30 seconds, the page will change to the next frame as they cycle around. If you want the page to stay longer than you can "hold" the page so that it will not be updated until you want it to. Alternatively, you can ask for an update which will put the normal TV picture back on to the screen until a new frame has been received when it will automatically be put up on to the screen.

## The Commodore Connection

BBC micro (as usual) had the first

crack at Teletext with the incredibly expensive Agorn Teletext adaptor. However, this was the first case that, if the Agorn software failed to work, the user could just download the patch to fix it from the TV. This downloading is potentially the most interesting thing about Teletext — think of each screen as 1K of information, then think of a data rate of one Megabyte per second.

When Channel 4 started to use a system very similar, they couldn't use the BBC system. So a Spectrum Teletext adaptor was commissioned and Teletext programs transmitted for it.

Somewhere though, in the dash to bring out Teletext adaptors for the cheapest and most expensive computers on the market, one of the best — the Commodore 64 — was left out. Microtext has sought to remedy the situation.

Nowadays the page acquisition circuits are all well contained in mass produced chips. The main problem is interfacing them and building the extremely good base that a teletext pickup requires — ever seen a portable with a loop and with teletext? The graphics picture is also another problem — but not with modern home computers.

## C64 Adapter

The Microsoft Teletext adapter gets around the greatest problem, that of a tuner, by using a video recorder. No, you don't get one in the package, but you do get six feet of cable. The cable connects to the normally unused video out socket to the video recorder. This connection puts out a good composite video signal of whatever the video is tuned to. This can also be connected to a Commodore monitor.

Most video recorders have either a phono or BNC connector on them. The supplied cable has a phono connector on the business end and a BNC adapter. So there should be little connection difficulty. However, having an old singing, old dancing, stereo/Hi-Fi/hi-fi/hi-fi named/size of the art etc. television, my direct video connection was already being used and I had to disconnect the TV from the video via this route and use the normal RF connection to get the video to talk to the TV again.

However, if you know enough about TV/video hook ups to get a direct video connection going then you should appreciate and understand the problem. If you look behind your TV and see only about two wires (power and aerial) going to it then you're alright. If you've got five or six (like mine) and don't know why there get help. Microsoft say that they are bringing out a separate tuner in the near future that will alleviate all these problems.

All this said and done it is easy to connect the box to the wire, the wire to the video, and the box to the Commodore 64. From here you load the tape into the computer and away you go.

The adapter has most of the functions of a normal TV adapter and one or two more that it is sensible to have. To change channel you use the channel selector switch on the video, pages are selected by just typing the number in. Standard functions included are Recall — that puts on the screen information that is usually hidden, such as the answers to a quiz — and Hold, freezing a page until it is read.

Usual functions such as Expand, which zooms in on the top or bottom of the screen, Update, which was described earlier, and Mix are not present — though there are good reasons for it. Expand is to let you read the display screen at distance, TVs are

usually watched from across a room. A computer monitor is not usually set up in this way. However, if it was being used in a Teletext application a normal TV would be used, in which case normal Teletext rules apply.

Update and Mix are not present because you can't run a normal TV signal in with the Commodore 64's output so there is no need for them. The final missing command is TCF, or time control program. This is where you can program your Teletext adapter to put up a page on the screen at a specified time. This is again normally used to remind you of something when watching a normal programme on TV. Though I wish it could have been included.

There are a lot of extra commands though. You can call up the next or last page, of limited use but nice anyway. Base and Load will perform these functions to-disk or tape and would be expected in a package of this type as memory saves are awkward on a Commodore as it is. The last extra command is the best of all, allowing you to ping a page on to paper.

## The Package

The Software is more in the form of an operating system than of a program. There are two parts to it. The first is a Basic program that provides all the above functions, and the second is a collection of machine code routines that actually do all the hard work like accessing the screens.

Both programs are unprotected and the Basic portion is documented by REMs telling you what parts do what, making it easily customised. Both programs are easy to save to-disk or tape. The machine code section even has a routine to save itself.

The manual is a marvel of documentation, after a quick overview of the system that explains a bit about Teletext and the way it is used, the software is fully explained. Teletext is largely self-explanatory and has help pages on it.

As well as explaining all the system calls to access the machine code, there example programs are included that expand the system slightly, for instance accessing and printing out the TV times for the evening. There is also a patch on to the main program that provides a screen dump on to a cheap school printer.

## Applications

Once you've got the hang of Teletext, and that's not difficult, you can do what you like. The adapter can be programmed to do almost anything. Just think, a database with most of the information that you would never need to access on Prestel, plus some more that's constantly updated. No line changes, no page changes, no modem with indifferent software that ties up a phone line for hours.

Applications that Microsoft knows of in use include, reading the football results directly into a pool predictor program to keep it updated, and a program that analyses weather trends by reading the weather map.

I know of someone with a HiC micro that picks itself up, prints out the news and TV information, then wakes up his owner ready for his just printed newspaper to read on the train — and remember the news is only minutes old, not up to 18 hours like a normal hot lead and newspaper.

## Conclusion

I've been using Teletext for nearly four years now. As a result I don't buy newspapers and I don't buy any of the TV listings magazines. The few pounds extra on the price of a TV set is easily worth having the extra facilities.

When I first started using the Microsoft adapter I thought that all there was to Teletext was what I'd already been using, how wrong I was. With computer control, and a computer controlled tuner and eight Teletext channels to read off, I can use Teletext as no-one ever intended. The adapter is good and produces less errors than my normal Teletext set and the software is excellent and easy to use.

The initial price looks daunting when compared to the price of a Teletext TV set, but think what the price of a Modem, good software, and line charges would be after a few months. This then becomes a lot cheaper.

Teletext has become my main source of information, if I need any, my handsets bring me passively. Now with computer control the sky's the limit. I wouldn't hesitate to recommend this to anyone.

## Footnote

Microsoft, 7 Reddy Place, Mountain View, CA 94035, Tel: 0703 252799

# Cedit

*We provide cassette modifications for our character editor.*

*By Brian Rhodes*

Cedit 44 is proving an extremely popular program amongst our readers. Unfortunately we aren't able to bring you more detailed instructions as promised in this issue, however the changes required for cassette users are presented here widening the appeal of this superior character editor.

## The Changes

All of the changes required are extremely simple. Even if you are a disk user then it is probably worthwhile making the changes to your program since it allows you to select between tape and disk as well. You never know when you might need to SAVE something out to cassette.

The major change to the program is the CHAR ED LOAD routine. This program has been altered quite a lot. The new version of the program has been printed here.

The CHAR ED M/C LOAD program needs a very minor change to its very last line. H48, this should be changed to:

```
END SAVE "CHAR CODE", 1
```

A number of lines need to be added to the CHAR BASIC program, and several modifications are also made to some existing lines.

All of the necessary changes and additions are presented here and should cause no problems.

REMEMBER when using cassette the programs should be SAVED in the following order:

- 1) CHAR ED LOADER
- 2) CHAR CODE — created when you RUN the CHAR ED M/C LOAD program.
- 3) CHAR BASIC

It is important that you give the programs the correct names or the program will not work.

## PROGRAM: CHAR ED LOAD

```

10 REM CHARACTER EDITOR LOAD
20
30 GO CHR(240):DEV=PEEK(100)
40
50 POKES3001,0:POKES3000,14
60 PRINT"CLLR, BLUE:POKE93,1:
POKE94,05:POKE10040,0:NEW"
70 PRINT"DOWN:11:001"00"CHA
R CODE"00", "DEV", 1"
80
90 IF DEV=1 THEN PRINT
100 PRINT"DOWN:13:00"
110 PRINT"DOWN:11:001"00"CHA
R BASIC"00", "DEV"
120
130 IF DEV=1 THEN PRINT
140 PRINT"DOWN:13:00":CSPC,WH
ITELOADING:CHARACTER EDIT
OR"
150 PRINT"DOWN:1:SPC10:WRITE
N BY BR1:04:03"
160
170 POKEL00,0
180
190 IF DEV=1 THEN POKEL00,0
200 POKES31,10:POKE-03210000
:POKEK,15:NEXT
210 END

```

## CHANGES TO CHAR BASIC

```

405 PRINT"1:SPC7,RED:0F2:BLUE,SPC5
ITAPE"
410
410 IF 00="CF13" THEN POKE49197,0+P
OKE49469,0:DEV=01:GOTO440
417 IF 00="CF23" THEN POKE49197,1+P
OKE49469,1:DEV=11:GOTO440
427
430 IF DEV=0 THEN OPEN0:0,15
440 PRINT"CLLR,SPC16:STORAGE"
450 PRINT"1:SPC16,CF13"
460
470 IF DEV=1 THEN GOTO460
480 IF DEV=0 THEN GOTO420,C4:PRINTC4:
1:POKE<<CHR(113)> THEN 500

```

# TELETEXT A world of information at your fingertips

The Microtext adaptor turns your C64 or 128 into a sophisticated Teletext Receiver. Giving you a full colour display of any of the free pages from Celexa or Oracle. Teletext is constantly updated to give you the latest information available. As well as news and sports results, there's travel, car and air travel information, which on TV are weather reports. You can get up-to-date on-line prices or foreign holidays, at the touch of a button. And not only does Teletext cater for special interests like shopping, gardening or gardening, but you'll also find things to do and places to go in your area, price comparisons and last year's daily horoscope. Just much much more. It's all free, easy to use and it's all at your fingertips.

With the Microtext Adaptor a page like a recipe or a software licence may be saved in colour or saved for later re-loading, or you can print a page like the TV programme times on any printer which uses the serial bus. All the functions are free. Back one page, or Print are simply activated by pressing one key. It's very easy to use for powerful!

The manual has examples, and shows how to access and use Teletext from your own programs, the ability to log the massive database available on Teletext and select any page information free. Football results, exchange rates or weather conditions, provide procedures (typed into the program).

The Adaptor is hard and the ready on the User part it comes with software on cassette with instructions for copying to disk. A lead which could be extended to another floor, connects to the custom made VIDEO DUPLICATION board. On your video recorder to bring your video to the screen for the program. This important concept means an extra aerial is not required, your family can still use the Main TV as before and channel selection for Teletext is done on the video-tape, which reduces the complexity of the adaptor to storing your channel.

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# Analyser

*Machine code programs are difficult to write, however debugging them can be even more of a problem. This program for your 128 provides some useful facilities to make this task easier.*

*By R. Attenheim*

**T**he problem with machine code programs is that once designed and coded, they never work. If you have designed a particularly long piece of work, then it is a long and complicated job trying to debug the program.

This program is designed to aid programmers in debugging their *src* programs.

## Loading and Running

Once you have typed in the loader, the Basic program will save a copy of the program on disk under the name 'ANALYSER'.

Once this is done you can either run it in BANK 0 or 1. First load the ANALYSER either from the MONITOR or from Basic using the **LOAD** command. The program **MUST** be loaded at address 0400, so for example if you want to load the ANALYSER in BANK 1 from the monitor then type:

```
1 "ANALYSER",R,HEAD or 1
"ANALYSER",S
```

for loading into BANK 0. If you don't have a disk then you will have to save the ANALYSER yourself using the MONITOR, with the command:

```
S "ANALYSER",1,HEAD,1FILE0
```

after running the loader. (Don't forget to delete the **SAVE** command in the loader.)

Load the program in as above, but just replace the 0 with a 1.

As the program can either run in BANK 0 or 1 this gives plenty of scope for other programs to run.

## Once Loaded

The way this program works, is to allow the programmer to place "breakpoints" in a machine code program. When the processor, as it is stepping through a machine code program, reaches one of these breakpoints, an interrupt occurs and control is then returned back to the ANALYSER. This allows the programmer to use the functions available either in the Analyser or the monitor, to see if the program is doing what it should. These breakpoints don't affect how the program runs, and it is possible to restart execution from one of these and the 8502 will continue as though nothing has happened.

The advantage of this is not only to see what is happening at that point in the code, but you are also allowed to change the situation so as to test the program response to different circumstances. This is invaluable when designing a bug-free program.

Another useful feature of this program is that when you are debugging a machine code program, and something does go wrong, then pressing **RUN/STOP** will exit this program and return you back to the Analyser command line, however, there is a danger when using this with the **TRACE** facility, but this is described later.

The **command** key can be used to show output to the screen, but **DO NOT** use the **NO SCROLL** key as this will cause the whole system to lock.

Two further features included are a **USER INTERFACE** and the ability to define how information is output.

The **USER INTERFACE** is a relatively simple one. You enter a

command and supply parametric data with this command.

There are two ways of supplying the parametric data. Either you can let the Analyser prompt you for the required information, or you can skip all the prompting, and just supply all parametric data straight after the command word, and then press enter.

Just press enter on a prompt to terminate the interaction between you and the system and the system ignores all previous input for the command.

The ability to define information output is very useful. Since a machine can access the screen directly, you may be designing a screen of some kind within the program. You don't want the Analyser just displaying information anywhere, and messing up the screen, and perhaps covering a point on the screen you particularly want to see.

This next section describes the available examples on how to use them.

## BP

This is used to set a breakpoint at an address either in Bank 0 or Bank 1. When program execution hits the address specified, it returns control back to the Analyser, listing any information required.

The parametric data required is:

**ADDRESS** of breakpoint (only possible in BANK 0 or BANK 1),  
**TURNING ON** or **OFF** a breakpoint,  
**IF TURNING ON** then - **LIST MEMORY** or **REGISTERS** (if required).

**Example 1**  
**BP**

```
ADDRESS ... 0200
ON/OFF ... ON
LIST/SOLIST (N/L) ... L
TYPE (A/R) ... A
ADDRESS ... 0000
LENGTH ... 30
MODE (B/D/C) ... D
```

#### Now

Typing N will stop further prompts. A=address, R=register, H=hex, D=dec, C=char.

Example 1 sets a breakpoint at address 2000 in BANK 0. When the 8502 gets to this address in this bank, you are returned to the command line of the Analyser and the first 30 bytes from address 0000 in bank 0 are displayed in decimal.

The address is given in five bytes, the first byte being the BANK and the next four bytes being the ADDRESS. Please note that the BANK can ONLY be 0 or 1. If you specify a different bank then the system will decide whether it is part of BANK 0 or 1 and then use that RAM BANK.

If no BANK is given, then BANK 0 is the default.

The BANKS are defined the same way as in the bank command available in Basic.

As you get more experienced with this program, the above example could be entered on one line:

```
BP 0200 ON L A 0000 M D
```

You can only have 11 breakpoints set at any one time.

For the more cautious, the way breakpoint works, is to place a hex '0F' (i.e. a BREAK command) at the address specified. When the PC reaches this address it generates an interrupt. This interrupt is detected, and so the breakpoint routine are run.

If you disassemble an address where you have placed a breakpoint, it will be different as the the Analyser changes the code at that point by placing 0F at the address. OFF will replace the code. You MUST place a breakpoint on a COMMAND boundary for it to work.

## COLOUR

This allows the user to change the colour of the border, background, colour of cursor, and colour of output

text. The system will prompt for required parameters.

```
Example 2
COLOUR 9 0 4 7
```

This sets border colour to brown, background colour to black, cursor colour to yellow and character colour to purple.

The colour definitions are in the same order as in Basic, but the starting value is 0 not 1.

The program won't let you define the cursor colour (input ink) to be the same as the background colour (paper). This stops you from setting up a situation where you can't see what you are typing in. If you forget the order, just type "COLOUR" and the Analyser will prompt you for the required information.

## DELAY

This slows down execution of the program being debugged when using the TRACE facility: 1 = fastest and 255 & 0 = slowest.

```
Example 3
DELAY 50
or
DELAY AMOUNT (k...255) ... 50
```

## END

This ends the Analyser, removing all breakpoints and IRQ vector changes. You are then returned to the MONITOR.

```
Example 4
END
```

## GO

This command is used to restart execution from the last breakpoint encountered which has been set up by the Analyser.

The program will start as though no stop has been encountered. This is useful if you want to change the conditions at a certain point. You would do this by setting a breakpoint at an address, and when it stopped, you could change memory or registers using the monitor (see later on how to enter the memory).

```
Example 5
GO
```

## HELP

This lists all commands available to the user.

```
Example 6
HELP (or just press the HELP key)
```

## IRQ

The trace facility requires the use of the IRQ vector for it to work. This means that the sector is readdressed. If the program you are trying to debug also requires the use of the IRQ vector, then the TRACE facility is lost. However, if you stop your program from changing the vector, and then use the command to route the IRQ vector to the address of your interrupt routine, then the TRACE facility can still be used and whenever an interrupt occurs, your routine will be called. Please note that if you don't return to the usual KERNAL IRQ routine after processing the interrupt, then the GRAPHIC command facility will not be available to you.

```
Example 7
IRQ PFA63 (first byte is the bank)
```

## IRQ

Current address = PFA63 new address = xxxxxx

Just pressing return here will exit this command without any changes. Otherwise, just enter the new address.

Again the default bank is BANK 0.

## JUMP

Similar in use to the 'G' command in the monitor, this allows the facilities of the Analyser to be used on the program to be debugged.

```
Example 8
JUMP 0300
```

This causes the program counter to start executing in BANK 0 at address 2000.

You can jump to any of the 16 BANKS and this is the starting bank until changed by the program to be debugged.

If only the address is entered, then the BANK defaults to 0.



## LIST

This command will LIST an area of memory of a register.

**Example 7**  
LIST  
type (a/Y) ... A  
address ... FA000  
length ... 50  
mode (h/d/c) ... H

### Note

A stands for address. Address is list from F to bank 15. Number of bytes to list is DECIMAL, max=255. H=h hexadecimal, D=decimal, C=charact.

Example 9 is similar to typing: MPA000 FA00.

### Example 10

LIST  
type (a/Y) ... R  
register ... X  
mode (h/d/c) ... D

### Note

Choices are A=accumulator, X=X register, Y=Y register, S=STATUS register, P=stack pointer.

Example 10 lists the contents of register X in decimal.

This command is usually used only in conjunction with the BP command, as described in the "BP" command description above.

## MON

This switches to the monitor. Command 'X' will return you to Analyser command line.

All commands in the monitor are available, but to use the Analyser properly, it is better not to use the G command, but the "JUMP" command in the Analyser.

You can change memory, or change registers so that, on a GO or JUMP command, these will be the new values used.

DO NOT try to change the BANK in the monitor as this could have unpredictable effects.

**Example 11**  
MON

## PRINTER

This allows certain information to be displayed on the printer. The only information that is listed to printer is:

1. the list information when a breakpoint is encountered.
2. The TABLE information.
3. The information from the HELP command.

4. The WHERE information.
5. The LIST information from the LIST command.

The TRACE data CANNOT be put to printer because of the nature of the KERNAL software that drives the serial bus.

### Example 12

PRINTER ON (output to printer).  
PRINTER OFF (output to screen - default).

## RESET

This will reset all screen definitions (i.e. it will remove GRAPHIC and WINDOW facilities).

### Example 13

RESET

## SPLIT

This command is useful if the program to be debugged prints to the screen using the KERNAL print routine. It will divide all program output to the top half of the screen, and all Analyser output to the bottom half of the screen.

You specify the proportions for output.

### Example 14

SPLIT 18

Will let the first 18 lines of the screen to be used by the program being debugged, and the other six lines used by the Analyser. The RESET command clears this feature.

## TABLE

This lists all the breakpoints set at present whether the TRACE is set or not. It also displays what will be listed when that breakpoint is reached, or during a TRACE. If a "" is displayed, then no information is displayed.

### Example 14

TABLE

output:

```
ADDRESSLIST-INFO
024F0 " -breakpoint at
024F0 no data
listed
02345 R X H -bp at 02345, X
listed in hex
12676 A 03F76:80C-var (a)
TRACE R A D -Trace on and
list are in dec-
imal
```

This lists 50 bytes from address 3F76 in BANK 4. The data listed is in character format.

## TRACE

Command is used to either turn the TRACE on or off, and the LIST information is also defined here. The trace output is activated when a JUMP or GO command is entered.

Entering the list information is exactly the same as in the BP command.

### Example 15

TRACE ON N

This sets the TRACE with no information to be listed.

Because of the way the TRACE works, every 1/50th of a second the program is interrupted and the system displays current position and any list information required.

It does NOT display information at every 6502 command. The data output by the TRACE cannot be sent to printer. When a TRACE is on, speed of execution is delayed. Control of the amount of delay is via the DELAY command.

## WHERE

This command lists the current address at which the program being debugged has been stopped.

### Example 16

WHERE

## WINDOW

If your program does direct access to the screen, you may want to have only



a small part of the screen disrupted by output from the Analyser. This is done via this command, and defines a window as in the BASIC command.

#### Example 16

##### WINDOW

upper border ... 11  
lower border ... 15  
left border ... 13  
right border ... 23

This defines a window of height four, length 10 in the middle of the screen.

You can reset this using the RESET command or by pressing HOME twice.

#### Further Points

A message of 'EXTERNAL BREAK ...' means that a BREAK command has been encountered which was not set up by the Analyser.

As far as I know there is only one place you can't put a breakpoint: on the command JOB SETUP. This is due to the way this INTERNAL program works. There could be others, as you get to know this program, you will probably find similar situations.

Example 5 will restore execution from the latest breakpoint encountered which was set by the Analyser. It won't start execution from an externally set breakpoint (i.e. a BREAK command you have to put in yourself).

```

100 PRINT "ANALYSER", 80, PRINT
110 PRINT
120 PRINT "LOADING WINDOW PROGRAM"
130 PRINT
140 PRINT
150 PRINT 07, 70, 00, 00, 30, 00, 00, 17
160 PRINT 14, 77, 00, 07, 70, 70, 00, 00, -100
170 PRINT
180 PRINT 07, 70, 00, 00, 30, 00, 70, 00
190 PRINT 17, 00, 00, 00, 00, 00, 00, 1000
200 PRINT 00, 00, 00, 00, 00, 100, 10, 00
210 PRINT 00, 00, 00, 00, 00, 00, 00, 1700
220 PRINT 0, 0, 00, 00, 00, 00, 0, 100
230 PRINT 00, 100, 00, 100, 00, 00, 00, 00
240 PRINT 00, 00, 00, 00, 00, 00, 00, 00
250 PRINT 00, 00, 00, 00, 00, 00, 00, 00
260 PRINT 00, 00, 00, 00, 00, 00, 00, 00
270 PRINT 00, 00, 00, 00, 00, 00, 00, 00
280 PRINT 00, 00, 00, 00, 00, 00, 00, 00
290 PRINT 00, 00, 00, 00, 00, 00, 00, 00
300 PRINT 00, 00, 00, 00, 00, 00, 00, 00
310 PRINT 00, 00, 00, 00, 00, 00, 00, 00
320 PRINT 00, 00, 00, 00, 00, 00, 00, 00
330 PRINT 00, 00, 00, 00, 00, 00, 00, 00
340 PRINT 00, 00, 00, 00, 00, 00, 00, 00
350 PRINT 00, 00, 00, 00, 00, 00, 00, 00
360 PRINT 00, 00, 00, 00, 00, 00, 00, 00
370 PRINT 00, 00, 00, 00, 00, 00, 00, 00
380 PRINT 00, 00, 00, 00, 00, 00, 00, 00
390 PRINT 00, 00, 00, 00, 00, 00, 00, 00
400 PRINT 00, 00, 00, 00, 00, 00, 00, 00
410 PRINT 00, 00, 00, 00, 00, 00, 00, 00
420 PRINT 00, 00, 00, 00, 00, 00, 00, 00
430 PRINT 00, 00, 00, 00, 00, 00, 00, 00
440 PRINT 00, 00, 00, 00, 00, 00, 00, 00
450 PRINT 00, 00, 00, 00, 00, 00, 00, 00
460 PRINT 00, 00, 00, 00, 00, 00, 00, 00
470 PRINT 00, 00, 00, 00, 00, 00, 00, 00
480 PRINT 00, 00, 00, 00, 00, 00, 00, 00
490 PRINT 00, 00, 00, 00, 00, 00, 00, 00
500 PRINT 00, 00, 00, 00, 00, 00, 00, 00
510 PRINT 00, 00, 00, 00, 00, 00, 00, 00
520 PRINT 00, 00, 00, 00, 00, 00, 00, 00
530 PRINT 00, 00, 00, 00, 00, 00, 00, 00
540 PRINT 00, 00, 00, 00, 00, 00, 00, 00
550 PRINT 00, 00, 00, 00, 00, 00, 00, 00
560 PRINT 00, 00, 00, 00, 00, 00, 00, 00
570 PRINT 00, 00, 00, 00, 00, 00, 00, 00
580 PRINT 00, 00, 00, 00, 00, 00, 00, 00
590 PRINT 00, 00, 00, 00, 00, 00, 00, 00
600 PRINT 00, 00, 00, 00, 00, 00, 00, 00
610 PRINT 00, 00, 00, 00, 00, 00, 00, 00
620 PRINT 00, 00, 00, 00, 00, 00, 00, 00
630 PRINT 00, 00, 00, 00, 00, 00, 00, 00
640 PRINT 00, 00, 00, 00, 00, 00, 00, 00
650 PRINT 00, 00, 00, 00, 00, 00, 00, 00
660 PRINT 00, 00, 00, 00, 00, 00, 00, 00
670 PRINT 00, 00, 00, 00, 00, 00, 00, 00
680 PRINT 00, 00, 00, 00, 00, 00, 00, 00
690 PRINT 00, 00, 00, 00, 00, 00, 00, 00
700 PRINT 00, 00, 00, 00, 00, 00, 00, 00
710 PRINT 00, 00, 00, 00, 00, 00, 00, 00
720 PRINT 00, 00, 00, 00, 00, 00, 00, 00
730 PRINT 00, 00, 00, 00, 00, 00, 00, 00
740 PRINT 00, 00, 00, 00, 00, 00, 00, 00
750 PRINT 00, 00, 00, 00, 00, 00, 00, 00
760 PRINT 00, 00, 00, 00, 00, 00, 00, 00
770 PRINT 00, 00, 00, 00, 00, 00, 00, 00
780 PRINT 00, 00, 00, 00, 00, 00, 00, 00
790 PRINT 00, 00, 00, 00, 00, 00, 00, 00
800 PRINT 00, 00, 00, 00, 00, 00, 00, 00
810 PRINT 00, 00, 00, 00, 00, 00, 00, 00
820 PRINT 00, 00, 00, 00, 00, 00, 00, 00
830 PRINT 00, 00, 00, 00, 00, 00, 00, 00
840 PRINT 00, 00, 00, 00, 00, 00, 00, 00
850 PRINT 00, 00, 00, 00, 00, 00, 00, 00
860 PRINT 00, 00, 00, 00, 00, 00, 00, 00
870 PRINT 00, 00, 00, 00, 00, 00, 00, 00
880 PRINT 00, 00, 00, 00, 00, 00, 00, 00
890 PRINT 00, 00, 00, 00, 00, 00, 00, 00
900 PRINT 00, 00, 00, 00, 00, 00, 00, 00
910 PRINT 00, 00, 00, 00, 00, 00, 00, 00
920 PRINT 00, 00, 00, 00, 00, 00, 00, 00
930 PRINT 00, 00, 00, 00, 00, 00, 00, 00
940 PRINT 00, 00, 00, 00, 00, 00, 00, 00
950 PRINT 00, 00, 00, 00, 00, 00, 00, 00
960 PRINT 00, 00, 00, 00, 00, 00, 00, 00
970 PRINT 00, 00, 00, 00, 00, 00, 00, 00
980 PRINT 00, 00, 00, 00, 00, 00, 00, 00
990 PRINT 00, 00, 00, 00, 00, 00, 00, 00

```

#### PROGRAM: ANALYSER 100

```

10 HOME 0
20 COLOR 0,1,0:PRINT "ANALYSER 1.0"
30 PRINT "CLEAR"
40 LOCATE 0,0
50 PRINT
60 PRINT
70 PRINT "LOADING WINDOW PROGRAM"
80 PRINT
90 PRINT
100 PRINT 07, 70, 00, 00, 30, 00, 00, 17
110 PRINT 14, 77, 00, 07, 70, 70, 00, 00, -100
120 PRINT
130 PRINT 07, 70, 00, 00, 30, 00, 70, 00
140 PRINT 17, 00, 00, 00, 00, 00, 00, 1000
150 PRINT 00, 00, 00, 00, 00, 100, 10, 00
160 PRINT 00, 00, 00, 00, 00, 00, 00, 1700
170 PRINT 0, 0, 00, 00, 00, 00, 0, 100
180 PRINT 00, 100, 00, 100, 00, 00, 00, 00
190 PRINT 00, 00, 00, 00, 00, 00, 00, 00
200 PRINT 00, 00, 00, 00, 00, 00, 00, 00
210 PRINT 00, 00, 00, 00, 00, 00, 00, 00
220 PRINT 00, 00, 00, 00, 00, 00, 00, 00
230 PRINT 00, 00, 00, 00, 00, 00, 00, 00
240 PRINT 00, 00, 00, 00, 00, 00, 00, 00
250 PRINT 00, 00, 00, 00, 00, 00, 00, 00
260 PRINT 00, 00, 00, 00, 00, 00, 00, 00
270 PRINT 00, 00, 00, 00, 00, 00, 00, 00
280 PRINT 00, 00, 00, 00, 00, 00, 00, 00
290 PRINT 00, 00, 00, 00, 00, 00, 00, 00
300 PRINT 00, 00, 00, 00, 00, 00, 00, 00
310 PRINT 00, 00, 00, 00, 00, 00, 00, 00
320 PRINT 00, 00, 00, 00, 00, 00, 00, 00
330 PRINT 00, 00, 00, 00, 00, 00, 00, 00
340 PRINT 00, 00, 00, 00, 00, 00, 00, 00
350 PRINT 00, 00, 00, 00, 00, 00, 00, 00
360 PRINT 00, 00, 00, 00, 00, 00, 00, 00
370 PRINT 00, 00, 00, 00, 00, 00, 00, 00
380 PRINT 00, 00, 00, 00, 00, 00, 00, 00
390 PRINT 00, 00, 00, 00, 00, 00, 00, 00
400 PRINT 00, 00, 00, 00, 00, 00, 00, 00
410 PRINT 00, 00, 00, 00, 00, 00, 00, 00
420 PRINT 00, 00, 00, 00, 00, 00, 00, 00
430 PRINT 00, 00, 00, 00, 00, 00, 00, 00
440 PRINT 00, 00, 00, 00, 00, 00, 00, 00
450 PRINT 00, 00, 00, 00, 00, 00, 00, 00
460 PRINT 00, 00, 00, 00, 00, 00, 00, 00
470 PRINT 00, 00, 00, 00, 00, 00, 00, 00
480 PRINT 00, 00, 00, 00, 00, 00, 00, 00
490 PRINT 00, 00, 00, 00, 00, 00, 00, 00
500 PRINT 00, 00, 00, 00, 00, 00, 00, 00
510 PRINT 00, 00, 00, 00, 00, 00, 00, 00
520 PRINT 00, 00, 00, 00, 00, 00, 00, 00
530 PRINT 00, 00, 00, 00, 00, 00, 00, 00
540 PRINT 00, 00, 00, 00, 00, 00, 00, 00
550 PRINT 00, 00, 00, 00, 00, 00, 00, 00
560 PRINT 00, 00, 00, 00, 00, 00, 00, 00
570 PRINT 00, 00, 00, 00, 00, 00, 00, 00
580 PRINT 00, 00, 00, 00, 00, 00, 00, 00
590 PRINT 00, 00, 00, 00, 00, 00, 00, 00
600 PRINT 00, 00, 00, 00, 00, 00, 00, 00
610 PRINT 00, 00, 00, 00, 00, 00, 00, 00
620 PRINT 00, 00, 00, 00, 00, 00, 00, 00
630 PRINT 00, 00, 00, 00, 00, 00, 00, 00
640 PRINT 00, 00, 00, 00, 00, 00, 00, 00
650 PRINT 00, 00, 00, 00, 00, 00, 00, 00
660 PRINT 00, 00, 00, 00, 00, 00, 00, 00
670 PRINT 00, 00, 00, 00, 00, 00, 00, 00
680 PRINT 00, 00, 00, 00, 00, 00, 00, 00
690 PRINT 00, 00, 00, 00, 00, 00, 00, 00
700 PRINT 00, 00, 00, 00, 00, 00, 00, 00
710 PRINT 00, 00, 00, 00, 00, 00, 00, 00
720 PRINT 00, 00, 00, 00, 00, 00, 00, 00
730 PRINT 00, 00, 00, 00, 00, 00, 00, 00
740 PRINT 00, 00, 00, 00, 00, 00, 00, 00
750 PRINT 00, 00, 00, 00, 00, 00, 00, 00
760 PRINT 00, 00, 00, 00, 00, 00, 00, 00
770 PRINT 00, 00, 00, 00, 00, 00, 00, 00
780 PRINT 00, 00, 00, 00, 00, 00, 00, 00
790 PRINT 00, 00, 00, 00, 00, 00, 00, 00
800 PRINT 00, 00, 00, 00, 00, 00, 00, 00
810 PRINT 00, 00, 00, 00, 00, 00, 00, 00
820 PRINT 00, 00, 00, 00, 00, 00, 00, 00
830 PRINT 00, 00, 00, 00, 00, 00, 00, 00
840 PRINT 00, 00, 00, 00, 00, 00, 00, 00
850 PRINT 00, 00, 00, 00, 00, 00, 00, 00
860 PRINT 00, 00, 00, 00, 00, 00, 00, 00
870 PRINT 00, 00, 00, 00, 00, 00, 00, 00
880 PRINT 00, 00, 00, 00, 00, 00, 00, 00
890 PRINT 00, 00, 00, 00, 00, 00, 00, 00
900 PRINT 00, 00, 00, 00, 00, 00, 00, 00
910 PRINT 00, 00, 00, 00, 00, 00, 00, 00
920 PRINT 00, 00, 00, 00, 00, 00, 00, 00
930 PRINT 00, 00, 00, 00, 00, 00, 00, 00
940 PRINT 00, 00, 00, 00, 00, 00, 00, 00
950 PRINT 00, 00, 00, 00, 00, 00, 00, 00
960 PRINT 00, 00, 00, 00, 00, 00, 00, 00
970 PRINT 00, 00, 00, 00, 00, 00, 00, 00
980 PRINT 00, 00, 00, 00, 00, 00, 00, 00
990 PRINT 00, 00, 00, 00, 00, 00, 00, 00

```





0070 DATA 119,898,89,100,1,191,1  
 19,898,133,000,100,147,30,898,89  
 0,90,-0000  
 0080 DATA 37,879,30,100,3,100,07  
 9,107,107,898,898,898,107,100,09  
 0,900,-0018  
 0090 DATA 100,898,100,100,191,100  
 1,898,90,100,3,100,899,107,100,89  
 0,101,-0009  
 0100 DATA 100,107,178,898,898,10  
 899,100,100,141,178,898,90,100,  
 100,101,-0019  
 0110 DATA 100,898,90,898,0,898,0  
 898,0,898,0,898,0,898,0,90,-0000  
 0120 DATA 100,0,133,898,100,100,  
 100,30,133,891,100,89,100,898,90  
 0,90,-0000  
 0130 DATA 30,18,898,30,898,13  
 80,80,73,78,89,80,80,30,0,-0007  
 0140 DATA 173,81,898,898,10,100,  
 80,141,899,898,30,80,898,70,70,1  
 3,-0100  
 0150 DATA 0,70,37,899,100,80,191  
 899,898,30,80,898,70,70,70,13  
 1,-1000  
 0160 DATA 0,70,37,899,70,30,178,  
 899,100,147,30,899,898,100,07,  
 30,0,-0000  
 0170 DATA 50,178,898,100,10,191  
 899,100,0,178,898,100,0,80,101,3  
 03,-0000  
 0180 DATA 100,0,100,119,898,70,0  
 7,099,100,0,100,0,107,100,898,10  
 0,-0007  
 0190 DATA 99,100,0,178,0,178,0,178  
 00,100,100,100,100,100,100,89  
 0,100,-0000  
 0200 DATA 100,898,100,100,100,89  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0210 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0220 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0230 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0240 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0250 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0260 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0270 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0280 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0290 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0300 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0310 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0320 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0330 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0340 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0350 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0360 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0370 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0380 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0390 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0400 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0410 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0420 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0430 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0440 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0450 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0460 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0470 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0480 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0490 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0500 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0510 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0520 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0530 DATA 100,898,100,100,100,100  
 100,100,100,100,100,100,100,89  
 0,100,-0000  
 0540 DATA 100,898,100,100,100,100  
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 1010 DATA 010,090,090,100,178,00  
 090,090,090,30,090,100,100,090,09  
 1,100,-0000  
 1020 DATA 0,133,899,100,0,133,09  
 1,100,0,133,898,30,90,093,13,07,  
 0-0000  
 1030 DATA 70,80,87,70,73,70,71,3  
 0,73,70,80,80,89,80,84,80,-0000  
 1040 DATA 0,80,899,899,100,11,80  
 899,899,100,13,100,50,899,15,80,  
 0-0000  
 1050 DATA 0,000,30,897,100,0,140  
 087,091,30,80,899,30,39,898,130  
 0,7000  
 1060 DATA 110,898,100,0,898,000,  
 100,100,000,000,100,0,101,3,70,0  
 00,-0000  
 1070 DATA 0,000,000,000,000,0,70  
 000,013,000,83,000,30,13,000,0  
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 1080 DATA 141,100,0,173,000,898,  
 141,100,0,173,898,898,141,100,0,  
 70,-0017  
 1090 DATA 100,0,100,0,170,100,0,  
 100,101,141,179,0,100,000,141,10  
 0,-0000  
 1100 DATA 0,000,000,30,007,001,1  
 000,0,000,010,898,80,70,079,00  
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 1110 DATA 999,000,009,100,140,00  
 0,051,149,100,0,100,000,000,0,00  
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 1120 DATA 1,000,10,090,178,000,0  
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 00,1,100,0,178,898,898,173,000,  
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 1130 DATA 0,100,100,100,100,100,  
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 173,-0019  
 1140 DATA 119,898,898,00,100,000,  
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 1150 DATA 100,898,100,898,100,17  
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 098,133,-0007  
 1160 DATA 898,80,178,119,898,898,  
 00,80,898,0,133,000,100,0,133,0,  
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 1170 DATA 30,100,898,100,1,100,1  
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 00,100,-0700  
 1180 DATA 10,898,178,100,100,100,  
 100,100,100,100,898,0,891,0,1  
 70,-0000  
 1190 DATA 80,30,80,898,13,80,77,  
 70,80,78,81,80,70,80,80,80,-1007  
 1200 DATA 100,80,83,83,81,70,80,80,  
 0,30,80,80,70,70,80,80,897,-10  
 81  
 1210 DATA 898,141,100,898,70,37,  
 899,141,100,100,100,898,898,100,  
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 1220 DATA 898,898,898,100,0,141,000  
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 1230 DATA 70,898,31,100,107,000,  
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 1500 DATA 100,898,100,100,100,100  
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 1510 DATA 88,89,88,89,89,13,8,70,79  
 0,898,70,898,118,799,199,0,898,-  
 1007  
 1520 DATA 898,171,170,0,170,898,  
 90,30,898,107,107,70,90,03,899,  
 73,-0000  
 1530 DATA 100,899,30,89,898,899,  
 80,70,100,30,100,100,2,109,30,13  
 0,-0000  
 1540 DATA 0,80,70,898,897,141,20



## 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 so 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 SYS49053 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 lies 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! 

Macronomic	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
[KYSOIN]		CTRL & 9
[RVSOFT]		CTRL & 0

Macronomic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 1
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 3
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LBARROW]		←
[UPARROW]		↑
[PI]		SHIFT & π
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CTRL + letter
[Sletter]		SHIFT + letter





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B A E A H

### Plus/4 Cribbage

**A** number of people seem to be having problems entering our Cribbage program published in our April 1987 issue. There are no problems with this program as printed.

Problems are occurring where people haven't read our Listings page which explains the series of symbols that we use to make program entry easier. If you read the Listings page you will see that a [C letter] means that you should hold down the Commodore key and press the relevant letter. [B letter] means press SHIFT and the letter. You never type the square brackets.

The only symbols that may cause problems are the [158] and [152]. These are simple the codes for flash on and flash off. Refer to your manual to see how you enter these. ☺

### Calling All Hippies

**A**ll you aged hippies, or would be hippies who were born too late, will no doubt be annoyed to hear that Denmark has launched the long awaited Betty Boomer edition of the popular *Twinkl Perseus* computer game. It's priced at £14.95 for the full game version or just £7.95 if you already own the original computer version.

Mark Strachan and Dominic Wheatley of Denmark, normally seen in suits and bow ties, celebrated the launch by regressing back to their dim and distant past with a visit to London's Cavendish Street.



We at Four Commodore feel that you can think of some suitably apt caption to go along with a picture of this long haired duo and to back this up we are giving away a fiver to the best caption.

Send your witty prose to Your Commodore, Boomer Caption Competition, 1 Golden Square, London W1R 0AB. Entries must reach our office by Friday 26 June 1987. ☺

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