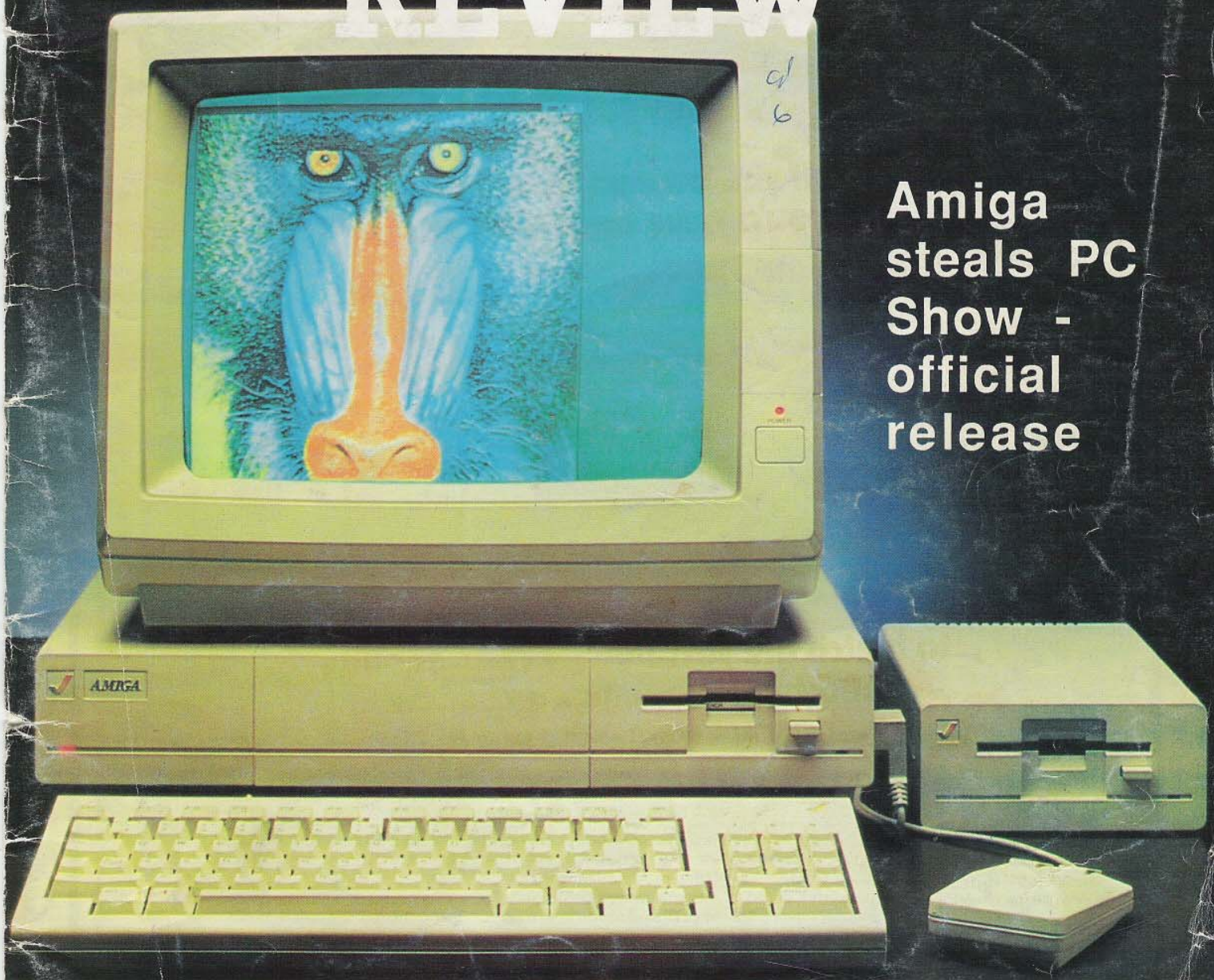
Vol 3 No 4 A Gareth Powell Magazine April 1986 $3*

The Australian COMMODORE REVIEW



Amiga steals PC Show - official release

C128 Memory Map

C128D User Report

Reviews of Paradroid, Frankie goes to Hollywood, Racing Destruction Set

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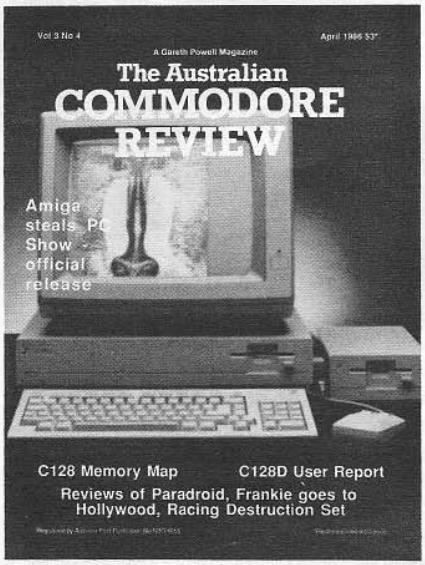

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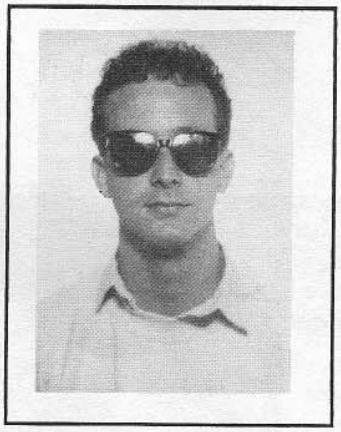
Contents

Editorial



Andrew Farrell

This month we make special welcome to Paul Blair, who recently joined our ranks as a regular contributor to *The Australian Commodore Review*, in a technical capacity. This month we have the first of three C128 memory maps which he and Greg Perry have gone to great lengths to prepare. No doubt you will find it an invaluable aid in understanding further how the C128 ticks.

Our usual swag of game reviews, growing in number by the issue, along with the latest top ten sellers, can be found in Hot Stuff. Special thanks to all those readers who have began supporting our newer columns by way of some very provocative letters. They will all be answered in full in due time, whilst a few selected matters are being chased up as you read these very words.

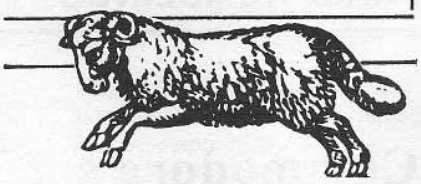
Amiga has arrived, along with a few unexpected budgetary surprises. Specifically a massive cut in the price of the basic unit, including a full colour RGB monitor, to a very acceptable $2495. This action will no doubt keep Atari busy, who we have wind already plan to cut the price on their machine. Microbee are out of the running and Apple may just have missed the boat all together - although the colour Mac is still rumoured.

A line up of 68000 machines, all boasting some of the most advanced features we have ever seen on a small computer - or on a large computer for that matter. A price war of sorts is likely to ensue.

With software a well arriving from all directions, the Amiga looks set to survive. Is it as good, better, worse than its competitors? Will Jack Tramiel bid a hasty retreat or does he have the staying power to stick it out and fight Commodore's winner? Are the others in the running?

Whatever the answers, it seems that we will continue to benefit from the vast improvements in computing power that have developed from such hot competition.

RAM RUMBLINGS



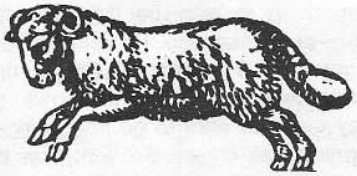
Amiga steals Sydney PC Show

Standing shoulder to shoulder, hundreds of eager show goers had their first glimpse of the Amiga on the busy Commodore standii ii6§i i^i i impressed. Apple was not at all amused. As the colour graphics, animated cartoons, digitised pictures and impressive sound samples all blipped and bleeted across the large colour monitor, cameras clicked, flashes flashed and the occasional sigh was emitted from the mesmorised audience.

Amiga truly stole the entire PC Show. An entirely new wave of people are venturing between the Commodore doors. People whom Commodore have never dealt with before. We certainly hope they can deal with this new influx of professional persons who can see the potential of the machine, which is now available from a select group of Commodore dealers about Australia.

At the time of the show the price was around the $3000 mark. Now the unit is officially available and it sells, with a colour monitor, for a mere $2495. Atari is hot on Amiga's tail, but can not offer the same technical excellence that this machine boasts. Software availability is improving with companies such as Neriki Enterprises importing hardware add ons, memory expansion and a whole swag of excellent programs.

Ross Bloore was certainly kept busy at the PC Show, endeavouring to explain the various intricacies of Amiga. His approach was friendly and easy to follow. A tough job, and you could not wish for a nicer chap to do it. No doubt the Amiga itself will prove to be equally as popular amongst its users.



The Amiga has arrived...Commodore's National Distribution Manager, Kevin McBrien (left) checks the first shipment of the revolutionary personal computer, to arrive in Australia. Helping out are Peter Resch (centre) and George Delaportas.

Strong sales

Commodore reports strong sales in Australia and internationally during the first months of 1986.

Australian Managing Director, Tony Serra, says the sales momentum from the last quarter of 1985 has continued into 1986. "Australian sales in January and February were up 66 percent over the same period last year. And there is every indication that March will be even better," he says.

In Australia, sales successes were heavily based on the Commodore 64 and Commodore 128.

Sales of the PC-10 and PC-20, both compatible with the IBM-PC, had also been strong, indicating a positive response throughout major market sectors.

Commodore began the year with a back order of 100,000 computers - and the company says the level of sales is accelerating.

Commodore International appoints new CEO

Commodore International Ltd has appointed Thomas J. Rattigan as its Chief Executive Officer, succeeding Marshall F. Smith, who will remain on the board of directors and serve as consultant to the company.

Commodore's Chairman, Irving Gould, said "With Thomas Rattigan's new appointment, Commodore is assured of a continuity of strong and decisive leadership."

Commodore's Amiga Here At Last

Commodore's new Amiga computer has arrived in Australia - ahead of schedule - to meet mounting orders for the computer that has stood the personal computer market on end.

The first shipment of the new Amiga arrived in Australia last week - and supplies should have reached selected dealers by the eighth of this month.

Commodore's big surprise has been its pricing of the Amiga.

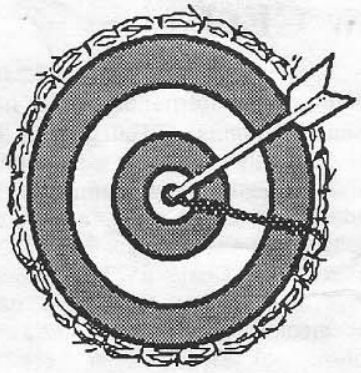
Originally believed to be in the vicinity of $3,000, the Amiga is carrying an introductory recommended retail price of $2,495 in Australia.

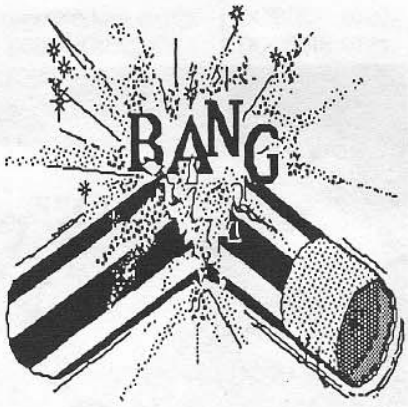
This introductory pricing includes CPU with 512K of memory, 3.5 inch disk drive and colour monitor.

Commodore says that makes it by far better value for money than ever perceived by the marketplace.

Commodore's Australian Managing Director, Mr Tony Serra, says the shipment of Amiga computers arrived because of a special effort by the Commodore factory, the freight company MSAS and Commodore staff, in an endeavour to meet a rapidly-mounting demand for the Amiga throughout Australia.

"Orders for the Amiga had rolled well over 3,000 - and we were still months away from our supplies arriving in Australia," he says.





"It was our original intention to release in late May early June. Then we were hit with a huge reaction from PC '86, where thousands of people showed a strong interest in buying the Amiga".

"We had to act to reduce the outstanding demand as we only had a shipment of 2,000 due in late in April, and this is still on schedule.

"We would have been too far behind in back-orders, so we decided to undertake the special flights."

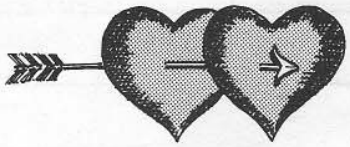
The arrival of the Amiga, which has been hailed as the most revolutionary personal computer in years, is likely to spark an even stronger market reaction than expected and Commodore executives are anxious to ensure a continuity of supply.

Creative organisations have shown a strong interest in the computer, because of its high-resolution colour graphics and the ability to synchronise animation with sound.

But Mr Serra says that there has also been massive interest from scientists, business executives and traditional home computer enthusiasts.

Initially, distribution of the Amiga will be channelled through a select group of Commodore dealers, simply because of limited quantities. But the following shipments will allow a broader distribution of the computer.

For those dealers who have been chosen to carry the first of these rare machines, the Amiga should be an easy sale, with some shops accepting deposits over the past three months. No doubt the computing world will be awaiting the next arrival with much eagerness.



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40 CHARACTERS PER LINE	YES	YES	YES	YES	YES	YES
80 CHARACTERS PER LINE	YES	YES	YES	YES	YES	YES
66 CHARACTERS PER LINE	YES					
132 CHARACTERS PER LINE	YES					
(PAPER HANDLING)						
FRONT LOADING FOR EASY PAPER SETTINGS	YES					
BUILT-IN PRINTER STAND	YES					
PRINT ON POST CARDS	YES					
(SOFTWARE COMMANDS)						
DOUBLE STRIKE	YES					
EMPHASIZED	YES					
COMPRESSED	YES					
UNDERLINE	YES					
SUPER/SUBSCRIPTS	YES					
ITALICS	YES					
DOUBLE DENSITY BIT IMAGE	YES					
(CHARACTERS)						
9X9 FONT	YES					
TRUE DESCENDERS	YES					
ITALICS	YES					
COMMODORE GRAPHICS	YES	YES	YES	YES	YES	YES
(OTHER FEATURES)						
SINGLE DENSITY BIT IMAGE	YES	YES	NO	YES	YES	NO
EXPANDED	YES	YES	YES	YES	YES	YES
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NO

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Paradroid

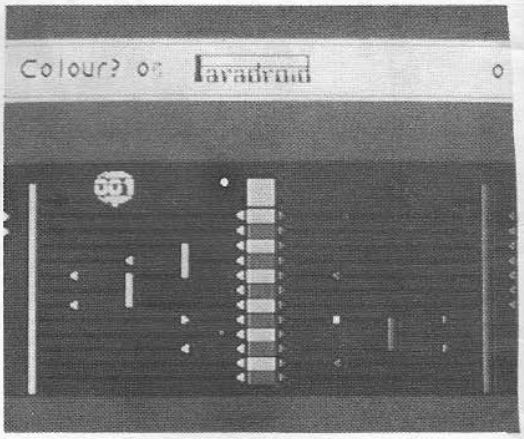
A mean program with exceptionally brilliant presentation, *Paradroid* has won the praise of many overseas magazines.

In a time far from now, in the lonely depths of outer space, a lone craft drifts aimlessly. Aboard are a renegade crew of droids. Hyperactively marching about the ships decks it becomes abvious that they have been affected by an extreme dose of radionic beams. Circuits in disarray, the droids become uncontrollable. The situation is critical. Orginally part of a small fleet of galactic freighters, since abandoned due to the dangers of remaining nearby, the Paradroid looks set to be destroyed by its occupants.

However, the possibility also exists that enemy craft may capture it and use the knowledge they gain to the detriment of the entire human race. In desperation it is decided to test a new prototype droid known simply as the Influence Device. Little more than a self sufficient helmet, complete with power supply and simple weaponry. However, it may also temporarily take full control of other droids, maintaining and operating all its available functions.

The device overtaken will attempt to regain control, leading to an eventual burn out. Therefore it is necessary to change hosts regularly. On your own you have a low power twin laser which will destroy other droids. Some may require several direct hits, whilst the lower forms will disintegrate with one direct hit. Robots may also be rammed for a similar destructive effect.

Transferring to other droids is done by holding down the joystick button until your screen representation changes colour. Making contact with another robot will commence the transfer process. Now begins the complex task of taking over the micro-circuit of your target. The screen displays the circuit. You may now choose which colour to modify from.



Transfer under way...so far it doesn't look too promising

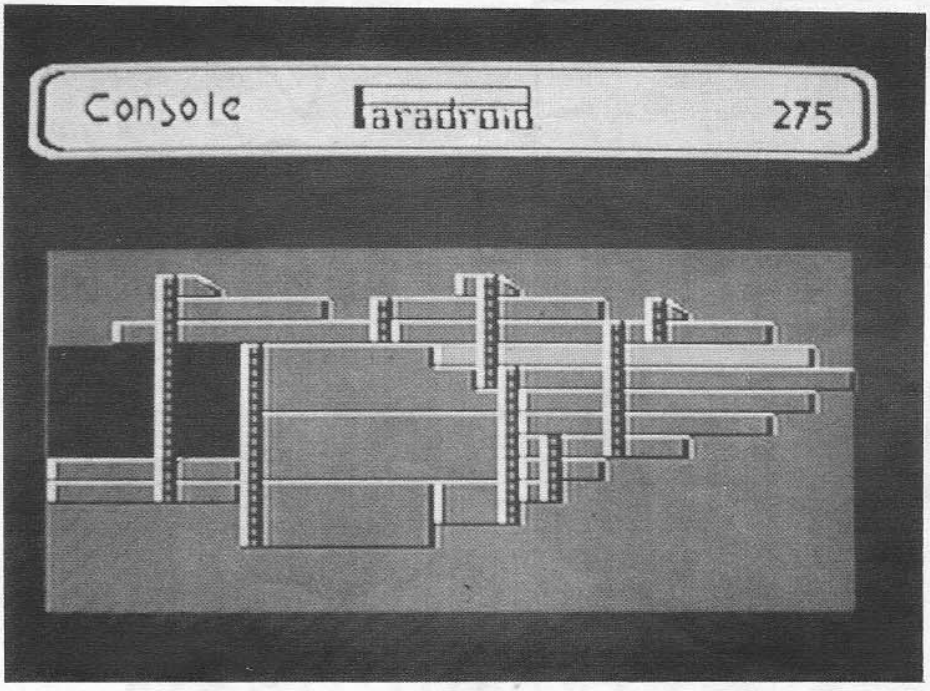
Having selected it, you have but a few brief moments (99 time units) to activate wires by moving your pulsars to the most strategically advantageous position.

More advanced robots are formidable opponents, working quickly to take control of a greater number of the centre bars. Transfer will result in the destruction of your current host. If unsuccessful you return to a standard class 001 Influence Device, unless you had no host, in which case Whammo.. you're destroyed.. Game Over.

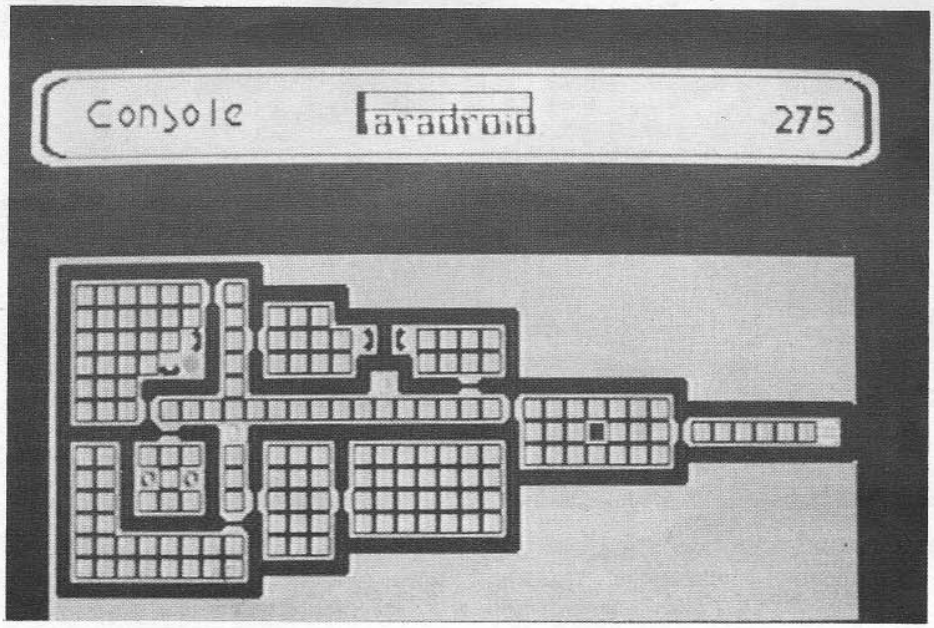
During play, the screen displays a top on floor plan of the level you are currently on. You may move to other levels using elevators. Scattered about each deck are consoles which allow access to important information about your robot, other robots, a plan of the entire deck you are on, and a side elevation of the ship.

In the droid data library, 24 different droids grouped into 9 classes are on file. These include Disposal Robots, Servant Robots, Servant Robots, Messenger Robots, Maintenance Robots, Crew Droids, Sentinel Droids, Battle Droids and Security Droids. Finally there's the rather nasty 999 Command Cyborg. There is only ever one of these on board, and you can't take over this one for very long.

You may view information about any of these, so long as their ranking is lower than that of your current host. When a robot appears on the screen, it contains a three digit number, providing details of the unit's class and power. Robots



Side on view of the Paradroid ship, showing decks and elevator shafts



Display of the current deck, note console points, status and elevator

continue to operate even when off screen, demonstrating the extensive design in giving these droids a personality of their own.

Graphics are detailed, well designed, with good use of colour. Sound effects are also very good. I especially like the space-like feel that the graphics give, through the use of bas-relief - a sort of metalic look. The entire craft is very complete, as are the many robots. Moving around each deck is accomplished through the use of a window technique which displays a small portion of the level you are on.

Scrolling within this window area is fast and smooth. Top stuff by any standards. Your view within the actual window area is limited to that that would be visible if you were standing where your robot is. Therefore parts of the visible area are obscured by pillars and corners in the many rooms. Again another piece of programming excellence. Every minor detail has been given major consideration.

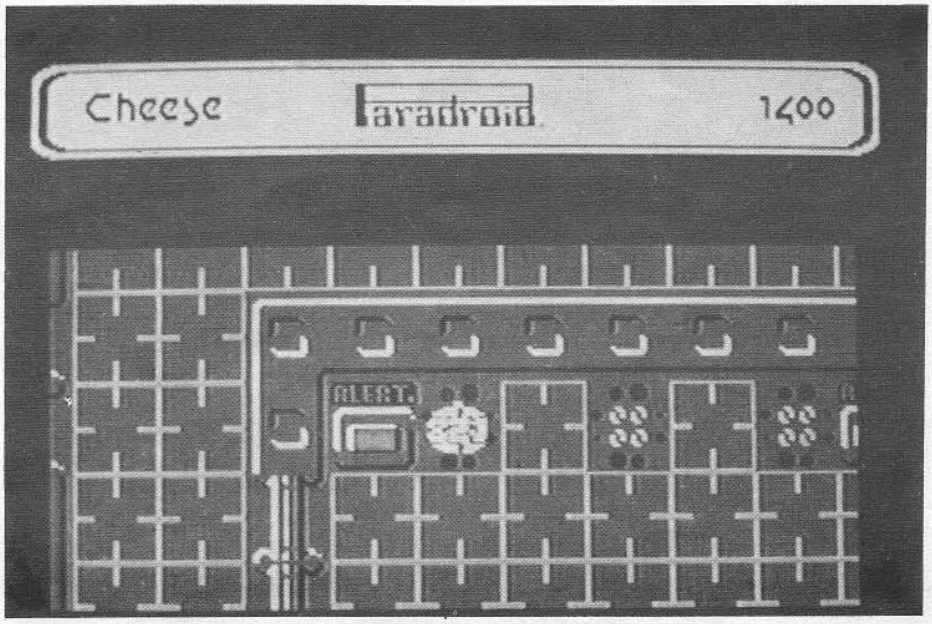
Droids may be destroyed by ramming, shooting or transferring. Ramming tends to weaken you very quickly, and is only best used if you are in control of a very powerful unit. Shooting is the quickest and easiest way, although some of the higher ranking droids may require a multitude of direct hits. Others are quick to fire back so be prepared for anything.

The ship plan has a variety of rooms and nooks and crannies. Open spaces are bad news, leaving you open to fire from robots out of view. Once you have fully cleared one deck, tis time to move on, the system shuts down - dimming the lights and adding a small bonus to your score. Clear all twenty sections of the ships and you'll get a more noticeable addition to your growing score. Then there are seven more freighters to tend to.

Overall, fabulous graphics. Brilliant presentation, and most addictive. *Paradroid* is proof that all computer games aren't the same, even if the basic theme is. No doubt a potential big seller!

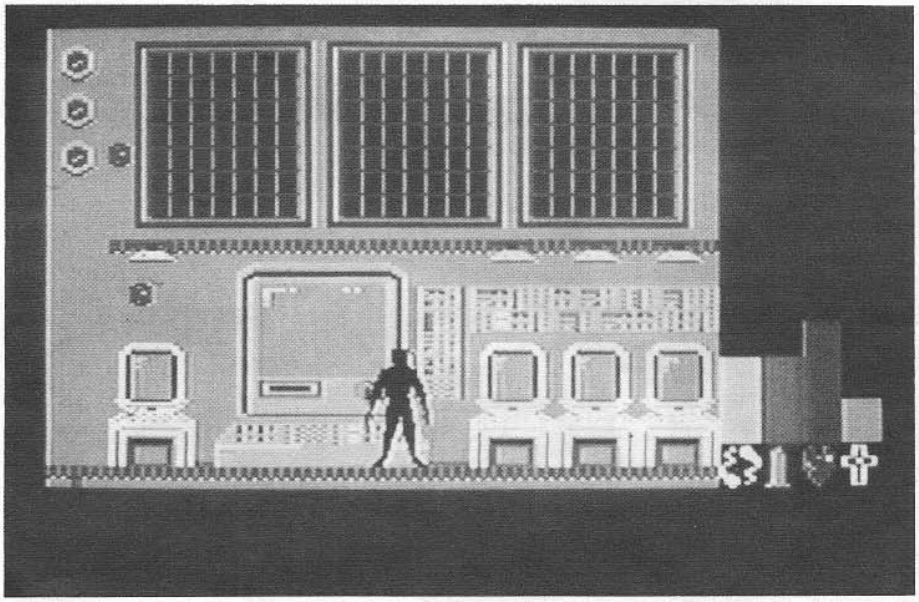
Machine : Commodore 64
Game : Paradroid
Publisher : Hewson Consltnts
Distribution : Ozi Soft and ISD
Price : $39.95

Graphics :	**98**
Sound :	**84**
Originality :	**88**
Presentation :	**100**
Addictiveness :	**92**
Overall :	**96**



A Class 8 Security Droid (centre of screen). In this position it's replenishing its energy.

Frankie Goes to Hollywood

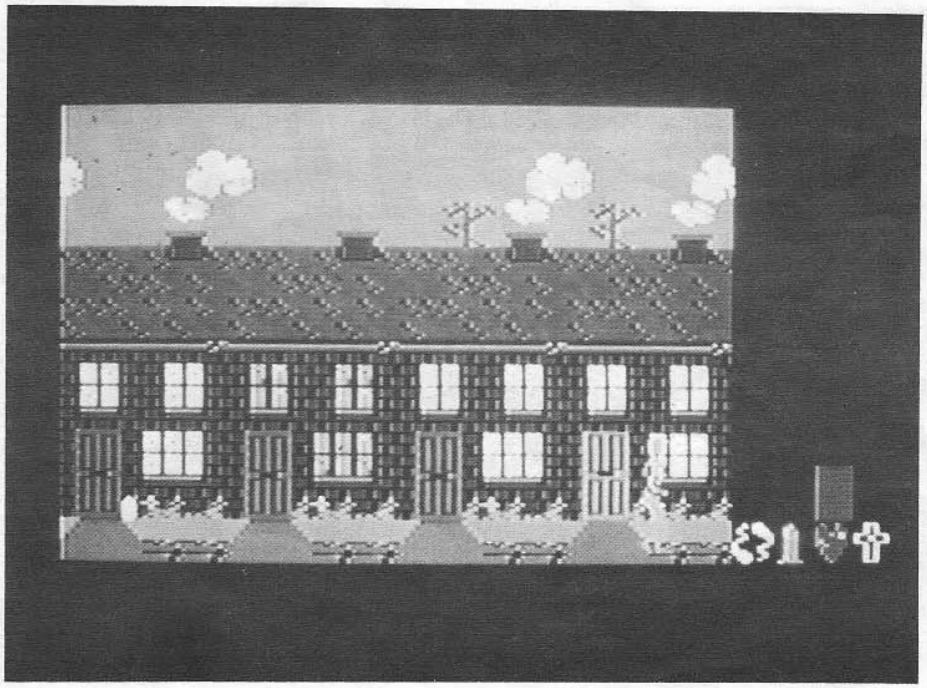


A Frankie Game? Could it possibly match the already massive reputation of the pop group by the same name? The answer is a most definite yes. Not your average sort of game, by any means. It is an adventure, yet unlike any other that you will have played.

You begin life in Mundaneland, a very average suburb. (No doubt it is near a block of flats in Sydney which has actually been named Blandsville.) Devoid of personality, you must endeavour to work on the various characteristics needed to become a real person and thus enter into the pleasure dome.

The four factors which must be acquired are sex, war, love and religion. By exploring the rooms within the houses lining the streets of Mundaneland, you will discover many objects of use. Within each home are several rooms, full of the sort of things you'd expect to find in such a mundane environment. Washing machines, fridges, TVs, cupboards and the odd video recorder.

Each may be searched by pointing to that item. A small window will then appear displaying what is contained for you to take. Apart from the occasional red herring, you will also find money, computer disks, revolvers, videos and less descriptive items that add to your personality. Partway through the game a murder occurs, which you must then solve.



Once you discover the body, a clue as to the identity of the killer is given each time you enter a new location. By returning to the scene of the crime you may attempt to name the murderer. The clues simply eliminate various suspects by telling you their habits and likes or dislikes. This may include statements such as "The killer likes to gamble" or "Miss Average is a movie buff". To solve the murder mystery quickly and accurately, you really need to write down every clue as it appears.

Having guessed the murderer, further points are added to your score, placing you closer to your ultimate goal.

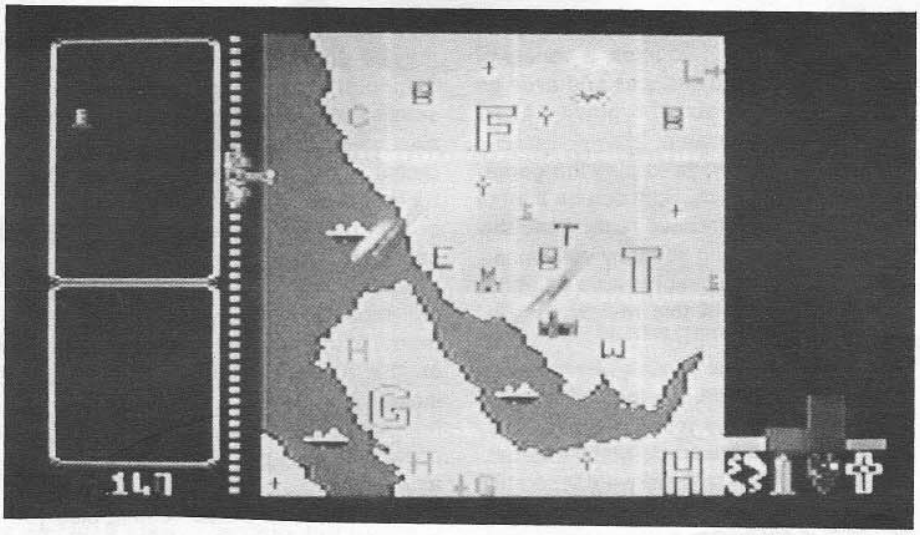
Videos which are scattered around the place may be inserted into video recorders, at which point a window appears in the centre of the screen. By moving your figure into the window, the window itself enlarges, exposing the arcade aspect of this game. In all there are ten different games to be played, of varying difficulty and complexity.

Completing a game gives you added pleasure and character points. If you don't complete them, it's back to the land of Mundanesville. Some of these games are entered just by touching something.

Game List

Sea of Holes

Move your man into the holes to warp about the screen. Not as tricky as it



appears, just persist a little and discover how you can get to the bottom of this one.

The Terminal Room
Heaps to see, but what to do? Did you bring your floppy disk? And a pass to pass - plenty of windows to enter, if you can get there.

Cybernetic Breakout
Only one brick in this rather tough version of an old favourite.

Cupid's Arrows
This one is hard - ride from heaven to hell on a cloud to become a saint. On completion you'll get a worthwhile reward.

Raid over Merseyside
Shoot down the planes and bombs before they rain destruction on the cities below. Fast accurate shooting required.

Talking Heads
Not another pop group... no, Reagan and Gorbachev rap it out. Go left or right to choose your politics.

Shooting Gallery
Free the ducks before you tackle this one. Don't miss a thing if you can help it.

War Room
Just shoot everything!

Flower Power
Where's my incense sticks?... but really - just pick a bunch.

ZTT Room
You can get out without completing the puzzle.. With a little knowledge of matrices and multiplication you can do wonders.

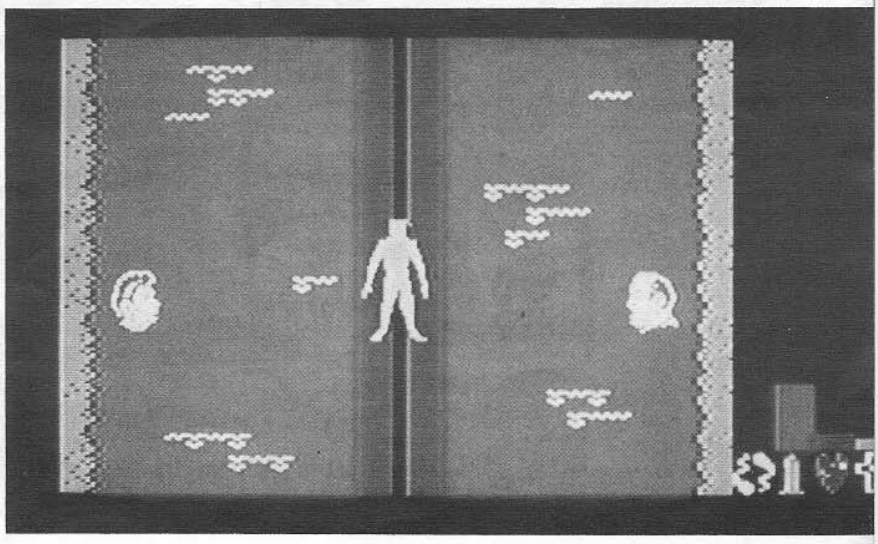
If you ever make it to the pleasure dome, mapping is a must. Various doors lead to the games, while others lead back to the outside world. Watch for those nasty floating sparks, just dodge the ones which emerge from manhole covers. You can also shoot sparks, but beware, if one touches you it's back to the real world.

What do we think?

A top game, with quality graphics and music. Very addictive and no doubt likely to gain quite a cult following. There are some tough problems to solve, and a few twists that are not easily mapped. Don't be afraid to do plenty of exploring, and touch or pick up anything that looks interesting.

Very impressive use of icons for the selection of objects and viewing of your inventory. This game is a breeze to understand. Plenty of variation, and most of all, this is a really entertaining game that will keep many amused for long hours.

Commodore	**64**
Game:	**Frankie Goes to Hollywood**
Publisher:	**Denton Designs**
Distribution:	**ISD**
Price:	**d$39.95, c$29.95**
Graphics:	**96**
Sound:	**92**
Originality:	**90**
Presentation:	**96**
Addictiveness:	**98**
Value for Money:	**90**
Overall:	**94**



Racing Destruction Set

By Andrew Farrell

Just when you thought there wasn't room for one more road game, car game, or construction set for that matter... enter *Racing Destruction Set*. It's an all crazy game with some great panoramic 3D graphics.

A secret to any successful game is plenty of variation and lots of challenges. When it gets down to base level, RDS has got the lot. There are multiple difficult levels, variations in courses, a variety of cars, different road surfaces and even an option to select your own gravity. More on all those a little later.

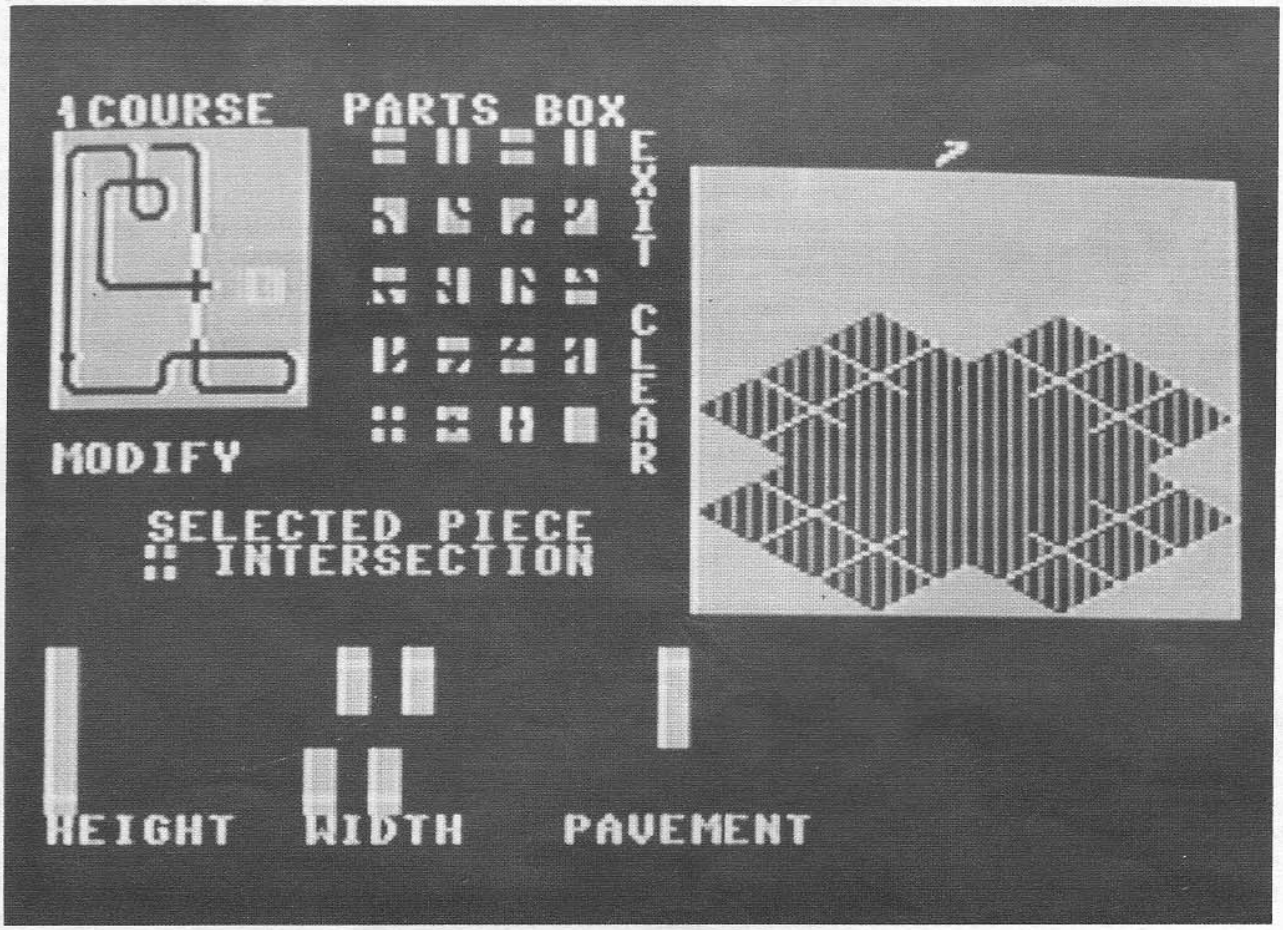
There are two ways to play the game, racing or destruction. Both can be a lot of fun. Electronic Arts have really gone the full swing in allowing so many variations - you'll probably still hear me rave on about them at the end of this review. Really, there are heaps.

To start you must choose which course you wish to race on. On the disk version there are some fifty ready made circuits, 19 of which are based on real life tracks. The other 31 are real awkward type stuff that really just demonstrate how much flexibility is allowed in designing your own custon tracks. Yes, if you can't like any of the 50 presets, just do your own thing.

Next you may select the number of laps from one to nine. Your opposition may be either another human form or the computer itself. The background that scrolls around behind the track itself is also variable between a lunar surface, racing scenery, moto-cross, or abstract as in the picture on this page. (If it ain't on this page, the layout artist is hereby sacked!)

Having then chosen the gravitational pull that will be in effect you're nearly ready. You can have anything from any of the planets in our solar system, including a few of the moons. This can make for some really weird events, with some cars spending as much time in the air as they do on the ground.

Cars.. now there's something else you have to choose. Wow, we could be playing this game soon, who knows! There's a variety of machines to drive, ranging from clunky four wheel drive dead



weights, to sleek Mustang type material. All are good in their own element. Of the ten vehicles, all may have various features about them modified. These include engine size and extras carried.

As you choose a machine, its various characteristics are displayed at the top of the screen. These include its name, weight, engine capacity and other associated attributes as well as the type of tyres it is fitted with. This may be changed to suit the surface you will be racing on. Spiked tyres go well on ice, but tend to be very slow on other surfaces. You can have knobbly tyres or slicks (for smooth surfaces such as pavement).

Other nasties may be added to your vehicle, and its overall weight. These are especially for use in the destruction side of the game. Armour, oil, crushers, and landmines must all be considered. A fast car is not always the best answer to success on some of the gruelling circuits that can be devised. All your own designs may be saved to disk or tape for posterity.. or any other excuse you have in mind.

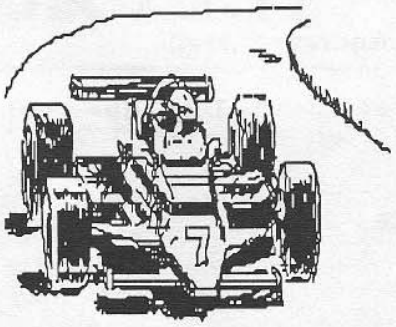
Your own tracks are great to make. Working on an 8 x 8 grid you choose the pieces to place in each square much the same as you might build a jig-saw puzzle. The pieces themselves may also be changed to suit your own needs. Hills may be raised or lowered, surfaces changed, and the whole kit and kaboodle made very very tough to play. You can expect a lot of entertainment from the two player option, especially once you start do unkind things to each other.

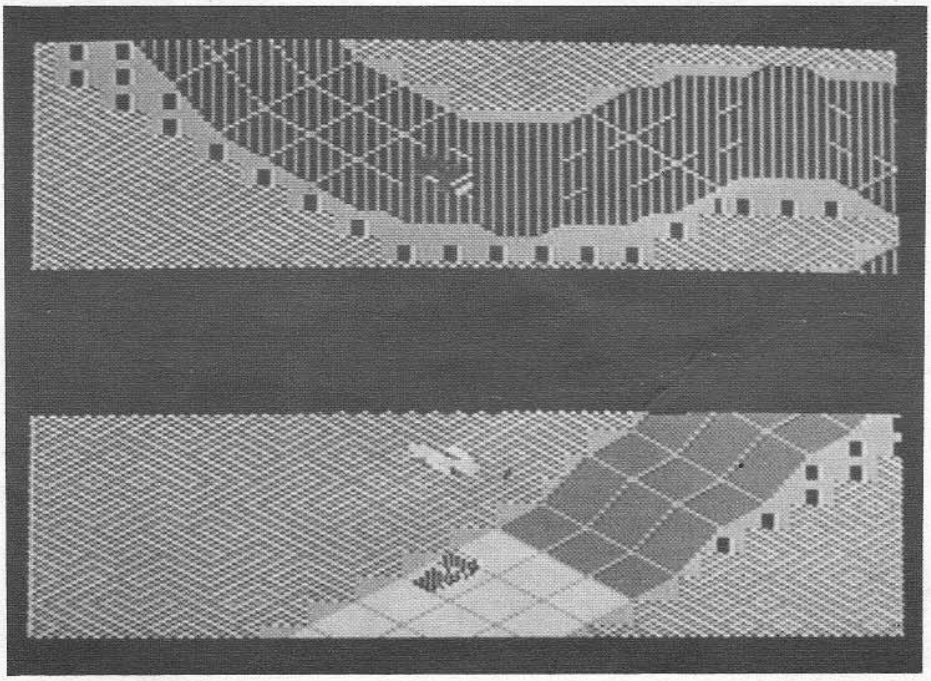
What do we Think?

When asked this question, our reveiwers have been known to go into long periods of silence. This one was different. The problem was more trying to get them off the machine long enough to get a word out. Well the verdict was pretty encouraging.

A game that was obviously well thought out, not always prevalent in some programs. Plenty of action, variety and good graphics make it fun to play and to watch. Some things are a little weird in their design, making it difficult to see just what it is you're looking at at times. The cars themselves for instance are rather small.

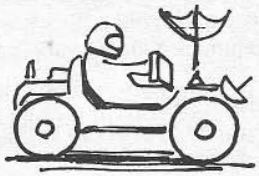
Nevertheless, a definite winner. Mega options to keep you amused for long hours. Look forward to making some massive jumps, chicanes and slopes. A good track is well worth the time spent to construct it.

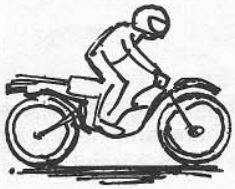




Machine : Commodore 64
Game : Racing Destruction Set
Publisher: Electronic Arts
Distributor :ECP

Graphics :	**90**
Sound :	**76**
Originality :	**88**
Presentation :	**98**
Addictiveness :	**96**
Overall :	**94**





HOT STUFF

Mercenary revisited

by Andrew Farrell

Escape from Targ, the first part in this epic game reviewed last month, is certainly proving to be far larger than expected. After several late nights and early mornings, Andrew Farrell had this to say.

I have barely scratched the surface. Before me a massive world has unfolded with much depth and complexity. The labyrinth of tunnels and rooms which exists beneath the cities surface is far larger than expected. Mercenary is worthy of much exploration. It appears that the two warring factions, the Mechanoids and the Palyars have some vast differences.

Whilst the Mechanoid ground base seems small at this stage, the Palyar installations are widespread and contain many transporters which may relocate you to distant bases, even way out of the city limits. At this stage the following locations should be noted:

3,0 - Mechanoid Base, with hanger, centre of operations, only small in size.
9,6 - Palyar Base, with hanger, briefing room and bank.
9,5 - Palyar Base, with hanger. Joined to 9,6 by extensive tunnel network.
11,13 - Palyar Base, with hanger and bank. Extensive tunnel network.
34,11 - Communication Tower (Out of city limits)
0,3 - Radar Tower
75,39 - Pyramid (Out of city limits)
81,35 - Palyar Hanger
8,8 - Elevation 64,800 Palyar Colony Craft

Tips

Some parts of the game are difficult to reach and there are many snags that need to be given careful attention. To reach the Palyar air base you will need the power amp, or a lot of cups of coffee. Having arrived, simply move slowly toward the base, and once you land on the top, press 'e' for elevator. Unfortunately, by the time I reached that stage I had made enemies of the Palyars and all the doors were locked. It seems that different doors become locked or unlocked depending on whose side you're on.

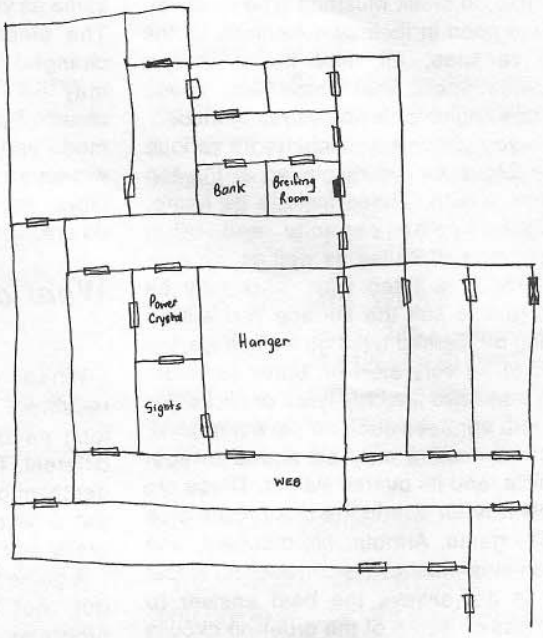
One must be very careful what one shoots. I managed to blow the chief Palyar commander's brother-in-law's son's brand new space ship clear out of the sky. The Palyars were not impressed. They have most of the fastest craft too, with the Mechanoid ships appearing far more akward and a lot more sluggish to fly. With the power booster I got the Dominion Dart up to a top speed of 9900.

Try going into a vertical dive at that speed. Worse still, see if you don't get a slight case of nausea when you get shot down at 64,000 feet above the city.

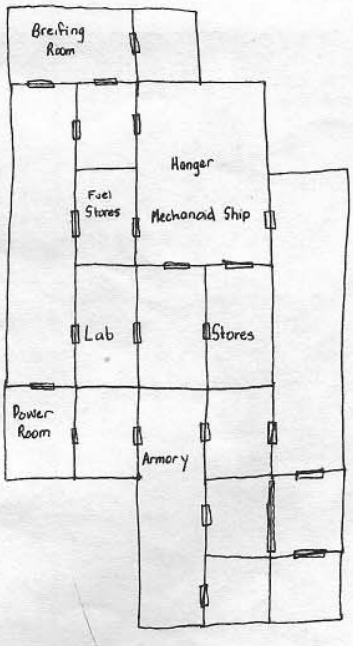
More maps and information next month. Please, any other *Mercenary* players, write in and keep us up to date with any discoveries you may have made.

Objects To Find:

Photon Emitter
Catering
Provisions
Power Crystal
First Aid Kit
Power Booster
Gold
Sights
Useful Armament

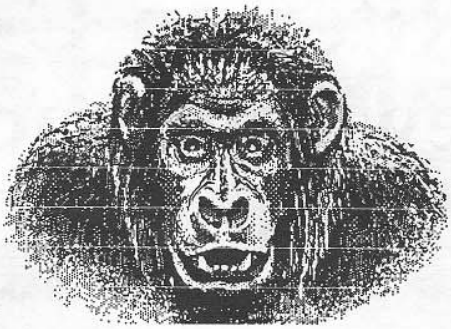


LOCATION9,6 PALYAR BASE



LOCATION 3,0 MECHANOID BASE

Rock 'n Wrestle



From Redneck McCoy (the Southern farmer) to Lord Toff (the most dangerous wrestler in the world today) you, Gorgeous Grey (the blonde hero), wrestle your way through ten different opponents to become the world wrestling champion. To do this you have to pin each opponent within a time limit without being pinned yourself, using over 25 different moves.

Rock 'n Wrestle can be either keyboard or joystick controlled. All moves cannot be done from the one position, they are all divided up into seven sections. The first, the simplest of all, is just to move around the ring. This is done without pressing the button and moving left, right, up and down; however, if you keep moving in one direction you begin to run. If you run into the ropes you can bounce off and gain extra momentum by reversing your joystick direction.

The next is to just soften up your opponent by kneeing, kicking etc. After this he will be slightly dazed so you will have the opportunity to grab him. From this you will be able to do an assortment of different moves including the atomic drop, aeroplane spin, hit driver, body slam, back breaker, arm twist, elbow drop and turnbuckle fly.

By now you may be getting the impression that *Rock'n Wrestle* is a complex, difficult game to play, but I assure you that you will get the hang of it sooner or later.

Rock'n Wrestle has a complete rock sound track with the usual thumping noises, and very realistic three dimensional figures. All this makes it a fun and addictive game to play. Well done, Melbourne House (again).

by Matthew Tow (14 years)

Commodore 64
Game: Rock'n Wrestle
Publisher: Melbourne House
Distribution: Melbourne House
Price: $29.95

Graphics:	**86**
Sound:	**92**
Originality:	**95**
Presentation:	**80**
Addictiveness:	**84**
Value for Money:	**86**
Overall:	**87**

NATIONAL TOP TEN

April

1. **Goonies - OziSoft**
2. **Zorro - OziSoft**
3. **Rambo - ISD**
4. **Hacker - Imagineering**
5. **Rockfords Revenge - OziSoft**
6. **Monty on the Run - Melbourne House**
7. **Elite - ISD**
8. **Island Caper**
9. **Mercenary - ISD**
10. **Frankie Goes to Hollywood**

Expected Hits

Infiltrator - Paradroid - Blade Runner - Transformers

Riteman C+
A new approach to printing

by John Blyth

It is seldom these days that one can honestly say, "Why didn't they think of that before", but in the case of the new Near Letter Quality RITEMAN C+ Printer, built by the wellknown C-Itoh Company and distributed by Anitech, it seems a breakthrough has been made.

The C+ stands for Commodore compatible plus Epson compatible.

It is a pleasant change to purchase a product which has been packed in an easy carry box, complete with handle, but it is even more amazing when the printer is removed and you discover that it looks quite unlike any you've seen before.

Gone is the platen around which the paper is normally bent, typewriter style, and instead there is a much more sensible arrangement where the paper feeds directly through the front of the printer, exiting at the back in one smooth straight line. The printer will accept anything from tissue paper to quite thick cardboard, thanks to this simple arrangement, and even sits on its own built-in stand so tractor feed fan fold paper can be placed underneath or in a myriad of possibilities for single sheet or fan fold papers.

The ribbon comes in two spools and is even supplied with a pair of tweezers so your fingers don't get grubby. It's quite easy to mount and also ingenious in its operation.

The printer came with a thick manual of instructions, plus a few photocopied sheets of updated instructions to cater for an updated ROM chip.

The manual gives good examples of all the printer's features, such as Graphics, Near Letter Quality, Draft mode, Enhanced, Bold, Double strike, Compressed, and Italic print styles. Subscripts and Superscripts are there at a touch. Really just about all anyone would need!

Where the manual is not so clear is just what Standard 1 and 2 modes are, or what the Plus mode is. After a fair bit of reading and playing around, it would appear that Standard 1 and 2 modes are Commodore 801/803 printer graphic and letter printing modes, while Plus mode puts the printer into an Epson Printer arrangement, which gives full access to all the additional features not found on the 801/803 printers.

Unlike some other printers on the market, the Riteman C+ can be switched from mode to mode by both software control and dip-switches. Perhaps this is just as well, as the dip-switches lie under a small panel on the top of the machine, and are not the easiest to change.

Not all is lost, however, as most word processors allow for printer control codes

This is the Riteman C+ printing in the DRAFT MODE.

This is the Riteman C+ printing in the NEAR LETTER QUALITY MODE.

This is the Riteman C+ in the UNDERLINE MODE.

This is the Riteman C+ in the CONDENSED MODE.

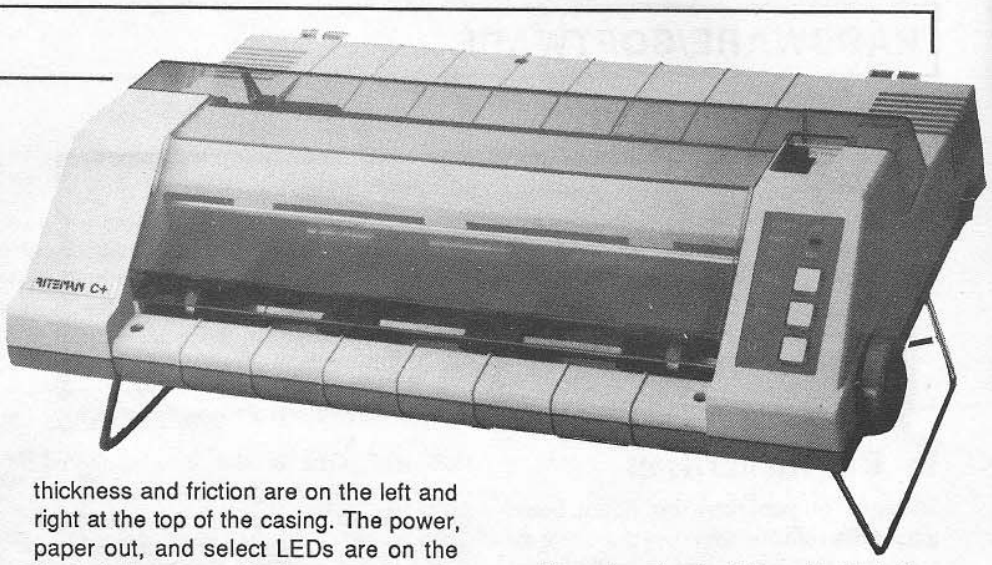
This is the Riteman C+ in the BOLD MODE.

This is the Riteman C+ in the SUPERSCRIPT MODE.

This is the Riteman C+ in the SUBSCRIPT MODE.

This is the Riteman C+ in the ITALICS MODE

And they were all printed out together



to be sent from within the program. It took me a number of hours of playing around with the new Superscript word processor program before I could shout "Eureka", and be able to swap modes without changing the dip-switch settings. How, you ask? Just set up the printer as a Commodore 801/803, send it the "change of mode" command (chr$27,chr$86), to change to the Plus mode, then set the printer up as an Epson and all those great print styles that the Commodore printer does not support are yours. And you never have to change a dip-switch again. The NLQ mode can also be activated by pressing the SEL and FF button when the printer is turned on.

Physically, the Riteman C+ is an attractive and compact unit. It's reasonably quiet, and faster than the now defunct Commodore 802 when in draft mode. Remembering that the paper is cleverly loaded from the front of the machine, the controls to adjust for paper thickness and friction are on the left and right at the top of the casing. The power, paper out, and select LEDs are on the front right, along with three very handy button switches to select the printer on and off line, and paper advance by page or by line.

All in all, I am most impressed with the Riteman. Its simplicity of paper loading will win it many friends, whilst the quality of its print, particularly in the NLQ mode, is very good. The manual is at least as good at its main rivals, but they could all be better.

The only minor fault I can find is in the dip-switches being internal. For most people this won't be a problem, as a bit of forethought allows everything to be controlled from within a program anyway.

For its price of around $599 recommended retail (usually sold a bit cheaper though), the Riteman C+ is a great step forward for Commodore owners. In fact it leaves the competition wallowing!

Amiga hits the road

by Ric Richardson

Many of you have no doubt been touched in some way by the Amiga's media circus. The centre stage being of course Commodore's dominance of this year's PC Show.

But the other partner of the marriage that makes up a successful machine is software. And until now all the talk about what is available and how good it is has amounted to a large volume of wind.

The real test will come within the next few months as a whole new range of PCs jostle for supremacy, an exercise which would truly be a non-event if the Amiga had a wider software base.

So here we are, the first shipment is on the streets and everybody wants to know what software is available, where can you get it, what peripherals are at our disposal and who can help me get acquainted with my new machine.

Software

Of the 70 or so programs that we at the Australian Commodore Review know of, only a small percentage represents any imediate benefit for the average buyer. The basic list consists of *Graphiccraft* and *Textcraft* both at about $99 rrp, a series of programmers' packages covering most popular languages and some tutorial/ demonstration programs that are soon to become public domain.

The other end of the scale consists of a few very well thought out specialist packages. *Deluxe Paint*, from ECP in Brookvale, Sydney, has quickly become one of the MUST HAVE items at an rr. of $245. From the pages of the US *Amiga World* magazine you will find that two of the Maxi series are here, *MaxiComm* and MaxiDesk, for around $200.

As I feel *Deluxe Paint* will become a standard, so also will the Aegis packages fare well. One of the star spangled features of the Amiga is the prospect of doing close to professional standard animation, and *Aegis Animator* (which includes *Aegis Images)* fills the bill very well.

Other creative applications are covered by *Harmony*, or as it is known here *Concertcraft*, which is a MIDI sequencer and internal voice controller with a few excellent features inbuilt.

Musicraft is also available although it only seems to be dealers who can get their hands on it. There are also the Mimetics range of music products soon to arrive at their distributors' offices. In fact Neriki at Crows Nest in Sydney are quite heavily into Amiga support with Aegis, the Metacomco series of development kits and the Mimetic range under their belt. To add to this they have also tackled the momentous task of devising a series of seminars ranging from introductory Amiga familiarisation right through to advanced tuition on using the Amiga in the music, video and film production industries.

A big hit overseas is the Amiga's adaptability in the technical industries, and the large availability of programs for drafting and architecture certainly sits the Amiga squarely in the serious business sector. In fact the number of technical application programs that are available really is surprising.

The *Rags to Riches* accounting suite is also apparently available for around $800 retail, although I have not seen one myself.

Soon to be released will be also a homegrown small business package from Sybiz in South Australia, an important move as there will be definite differences in the needs of Australian business.

To top all this off there are surprisingly many fluent Amiga programmers out there already. This is no doubt a side benefit anticipated by all of those eager souls who got their Amigas straight from the US over the last six months.

In fact the eager people at that hive of activity known as Neriki have also tapped some of this existing expertise and set up a software development group of their own with background in the vertical markets. Custom packages for graphic artists, television production, interior decorators, animators, advertising people and musicians are catered for.

Add ons

On the peripheral front there is some further good news.

To date there are two good alternatives for those keen to use Amiga graphics. The Okimate colour printer at $690 retail is a fantastic boon. its ability to print on transparency film with excellent results is going to make overhead projection presentations a very inexpensive affair indeed.

On the other end we have the prospect of an excellent colour printer for $1500 from Epson. Both are good prospective acquisitions, depending on your needs.

A hinging factor in using the Amiga to the full is the breaking of the "PAL standard" barrier. The good news is that the conversion can be done cheaper than expected.

Many of the Amiga's most intriguing features are dependent on the ability to process video information. The *Framegrabber* (a video digitiser) and a Genlock device (used for mixing computer graphics and video signals) are soon to be available thanks to the work of Craig Schuetrumpf who apparently has tackled the problems involved and is adapting his conversion to fit existing and proposed video adapters for the Amiga. All in all the future looks a bit more positive than many have proposed.

More User Groups:

WESTERN AUSTRALIA
Dealer Based

LEEDERVILLE
W.A.C.C.U.A.
PO Box 31
Leederville 6007
Contact: Mr N Headlam (09) 381 4398

LESMURDIE
VIC Ups
4 Sheild Road
Lesmurdie 6076
Contact: Mr G Padfield (09) 451 4629

KALGOORLIE
VIC Ups
28 Dart st
Boulder 6432

ROCKINGHAM
VIC Chips
48 Hercules street
Rockingham Park
Contact: Dave West (095) 27 3954, Ron Teague (195) 27 6558

QUEENSLAND

SOUTHPORT
Southport User Group
Scraborough Street
Southport
Contact: Mr Fitzpatrick (075) 32 0061

SPEINGWOOD
Sld Commodore/PET User Group
PO Box 274
Springwood 4127
Contact: Mr G Perry (07) 38 3295

Dealer Based

COOLANGATTA
Tedita Pty Ltd
116 Griffith Street
Coolangatta 4225
Contact: Mr P Hamill (075) 36 6722

MOUNT ISA
Commodore Computer User's Club
3 Crystal street
Mount Isa 4825
Contact: Mr Steve William, Mr Peter Robbins

TOWNSVILLE
Townsville Users Group
1 Paxton Street
Townsville 4810
Contact: Mr Tone Moore 72 6454

IPSWICH
Commodore User Group
P.O.Box 298
Ipswich 4305
Contact: 201 8118, 202 3601

ROCKHAMPTON
Commodore User Group
50 Ocean Parade
Yeppon 4703
Contact: Mr Goodsell

Commodore 128D User Report

A transportable version of the 64's big brother - and it's cheaper!

Commodore's 128 has been a great success. No doubt this is due to the fact that there was a ready market of Commodore 64 owners out there who were just waiting to upgrade to something with a little more "oomph".

For those who aren't familiar with this machine, it has plenty to offer.

Of course you get 128K of RAM to play with, which is used by two of the three different modes of operation.

In **mode one**, your 128 is just like a standard Commodore 64. Nothing more, nothing less - we hope. In **128 mode** you have a whizz bang version of the 64 - there's a better BASIC, access to the full 128K, a selection of 40 or 80 columns in very sturdy colour and a fast, fast disk drive.

Now when we say fast here, we mean real fast. At full throttle the 1571 disk drive, as it is known, will LOAD a high resolution graphics picture in around three seconds. Well, perhaps just a few tenths of a second more, but I doubt you'll be counting.

So now you can have all these amazing bells and whistles in a portable form.

It's called a C128D. (The 'D' stands for portable?)

In the **third mode**, which I almost forgot to mention, you may use CP/M version 3.0. An antiquated operating system by some standards and yet still very popular amongst many old timers.

This means you should be able to use thousands of existing software packages in the business world of the software arena. At the last word it seems that the number of users investigating the potential this mode offers is very few. Perhaps that is because so much good software is arriving for use in the 128 mode, which is far more interesting than dull and boring CP/M.

The Commodore 128D has a slimline keyboard which clips into the back

The 128D is a 128 and a 1571 disk drive (that new fast one we mentioned) all housed together in one neat package.

So we have established that the 128 is a good thing. The 128D is just a 128 and a 1571 disk drive (that new fast one we mentioned) all housed together in one neat package. In my mind it is aesthetically and economically more appealing, to any person considering the purchase of a C128 and 1571 disk drive.

The 128D is a smart looking beast. It has a solid look about it, and looks at home next to an IBM clone as much as it does beside an Amiga. The unit is designed to be transportable. A detachable keyboard clips on the under side of the main unit. Inside this beige coloured box you will find all the inner workings of a C128 along with a trusty 1571 disk drive and a cooling fan.

The cooling fan groans to life when you power up, rather like listening to a small jet aircraft warm up. The front panel contains a power light in the top left hand corner, with the power switch itself mounted at the front left hand side of the unit. To the right front is the drive with a drive-in-use light further toward the centre.

On the right hand side are the keyboard connector, (an awkward heavy cord

rather than the more useful extendable telephone type cables), and the two joyports. There is also a reset switch for the computer and a recessed one for the drive.

At the rear you will find all your normal C128 expansion ports and assorted sockets. These are shrouded slightly by two pegs for winding the power cord around when you're on the move.

The cable for the keyboard remains attached at the keyboard end, and tucks away neatly into a slot underneath the main unit.

Your keyboard is exactly the same as a standard C128. Rubbers on the base stop it from sliding around; however most people will fold down the small legs, which elevate the rear of the keyboard for a better typing angle. These legs are without the rubber feet, which is rather annoying as that stable feel is immediately lost. Another minor complaint regarding the keyboard cable relates to its length - you can't sit it neatly in your lap because it just won't reach.

Once set up on your desk top, a monitor placed neatly on top of it all makes for a smart looking system that is complete and ready for use.

Overall the 128D represents excellent value for money. At the time of writing it was cheaper than purchasing a 128 and drive separately.

As far as portability goes, it is light enough to carry over a reasonably long distance. I am a little concerned about the lack of protection offered to several protusions from the casing. A little care is in order here, despite the robust look of it all.

An impressive unit nonetheless, definitely worth a closer look before you buy otherwise.

The 128D weights only eight kilos and is the size of a briefcase for easy transport

Software Incompatibilities

Having played around with a 128 for some time now, I must complain bitterly with regard to the number of packages which state they will operate on the machine and yet refuse to LOAD. I don't blame Commodore, for they surely cannot be held responsible, despite the fact that compatibility was promised. Indeed the 64 mode is, with the exception of one minor change, fully compatible.

To bring out an improved drive, changes were necessary amd they are what is responsible for so many non-event loads.

There is also talk of a small change in the video chip. Supposedly there are two additional registers, which some programs may accidentally wipe, thereby causing some rather odd happenings.

Software houses are fully aware of these differences and have been for some time. It would be appropriate that they endeavour to make the necessary changes to programs to ensure they will load, or alternatively make it clear on the packaging that they will not.

Rap Back

Print Shop help

In a letter published in your January issue, P. Thacker complained that an AMUST DT100 printer with a Xetec interface would not print on a full-sized page when using *Print Shop.*

I suspect that Mr or Ms Thacker is using the wrong version of *Print Shop.* One side of the program disk is the version to be used with Commodore printers; the other side should be used for other printers.

The non-Commodore side includes "SETUP" as an additional option in the first menu. If this option is selected, the program offers a number of different printers that can be accommodated.

As the AMUST DT100 is an "Epson-type" printer, one might assume that the printer option to select is "EPSON MX-, FX-, RX-(80 or 100)". However, this is not necessarily the case. I found with my BMC BX80 printer (which is practically identical to the AMUST DT80) and XETEC GPI interface that the only printer option that would work properly was "MANNESMAN TALLY SPIRIT 80". This may also prove to be the option to select for the AMUST DT100.

I suggest that any frustrated Commodore-user who is having difficulty in getting *"PRINT SHOP"* to work properly with a non-Commodore printer should try out the various options available under the "SETUP" facility. It is likely that one of these will do the job. Once the appropriate printer option has been selected, the program will automatically adjust itself to suit the selected printer every time it is loaded. The "SETUP" facility need be used again only if the program is to be used with a different printer.

It also seems that *Print Shop* is designed to use American Quarto size paper. So far I have been unable to find any way of adjusting it to suit the A4 size that is more common in Australia.

Michael Noblet
Blackwood, SA.

Bank Street Filer and Mailer

In your January issue you said that *Bank Street Filer* and *Bank Street Mailer* are now available from Imagineering and thus I duly ordered these through Grace Brothers, Orange.

I was advised, when I enquired a week later, that this software was only available for Apple Computers, thus I rang this particular software supplier direct when I was advised that these items were unlikely to be available for Commodore computers.

I have used a Commodore Executive Computer for the past 12 months, I am quite satisfied with its performance and should be glad if you would advise me when and from whom these items can be obtained.

F.J. Scanlan
Orange, NSW.

RB: *Contact ECP on (02) 949 7300. They are the Australian distributors of the Bank Street series.*

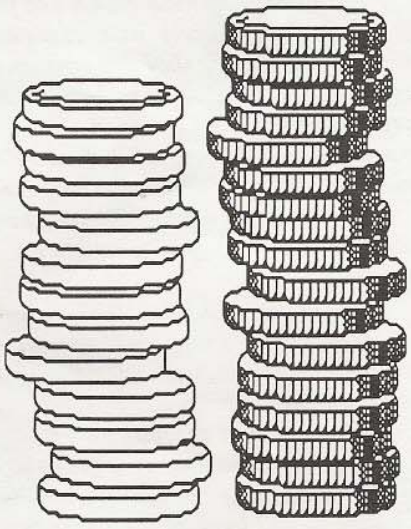
C128/1571

I am writing this letter to all those prospective Commodore 128 and 1571 disk buyers who currently read your magazine.

Commodore in their wisdom have made available two versions of its new 128 micro computer. The standard desktop model (128), and the portable (128D). The latter has a 1571 disk drive built into the body of the computer, and in Commodore's words, "shares all the 128's features". Unfortunately Commodore's pricing policies between machines leaves something to be desired. Purchasing the 128 and the separately available 1571 disk drive will put you $200 more out of pocket than if you purchase the 128D. Commodore please explain! $200 for a separate plastic box to hold the 1571 seems somewhat excessive in my book!

Secondly, supplied with both machines is a CP/M operating disk. My experience with the supplied disk was short lived, it was faulty and had to be replaced by Commodore. The second disk was also corrupt . . . I'm waiting for the third . . . third time lucky! And Commodore's excuse to me . . . "With software made in the USA, the machines manufactured in Germany and finally packaged in England, something is bound to go wrong".

Dennis Nicholson,
Burwood, Vic



READERS' PAGE

C64 word processor on tape

I am writing to enquire about the fact that I cannot find a word processor for the Commodore 64 on tape. I really like your magazine, and would really appreciate it if you could send me the dealer's name and how much it will cost.

Jason Boyer,
Kyneton, Vic.

***RB:** Try Scroller, which is distributed by Ozi Soft - about $30. Their phone number is (02) 211 1266.*

Service delay

I read with interest (no disbelief) the article on page 3 of the February 86 *Commodore Review* about the new General Manager of CBM Australia. He talks about improving dealer support, what about his customers!

I purchased a C64 just prior to Christmas and in mid January a fault developed and the machine was returned to CBM on 21 January for repair. The CBM warranty states that a turnaround of "not exceeding two weeks should be allowed" for repairs.

It is now six weeks since my machine went for repair.

C.D. Miesch,
West Pymble, NSW.

Monty on the Run

Hi! I'm 12 years old, going on 13, and I reckon your magazine is the best in the whole of Australia!

About a month ago, I purchased a terrific game called *Monty on the Run.* I think it was the best game I had ever bought (the music on the game was unreal!) but nobody I knew had heard of this game, nor had any other computer magazine reviewed it, until I saw the March issue of *The Australian Commodore Review* and there was my old friend Monty Mole on the front cover. Well, what can I say? You are the very best.

Could you please tell me how do you put the pokes in a game to make it have unlimited lives etc etc. I've been battling with *Monty on the Run* for a while now, but I always crash out in the car and then it's back to the start again. (My highest score is 3800).

Also, I reckon your mag should have a "Kids' Page" where us here kids can review games, give ideas, and hold competitions. It could be a first for Australia . . .

Okay, thanks a lot for a superb magazine and keep up the good work!

Glen Murphy
Geelong, Vic 3219

***Editor:** Thanks for the compliments. Good idea about the "Kids' Page - what do other kids think? We're looking into the pokes you need, and in the meantime do any of you readers know the answer?*

Get organised!

Commodore 64
Price: $29.95 each (disk only)
Distributed by ECP, (02) 949 7300

by Kelly Essoe

Do you have too much stuff? You can always buy a bigger house, build a warehouse in the back yard, have a huge garage sale or (heaven forbid) throw some of that wonderful stuff away. Or you can do what I did: I got Batteries Included's **Home Organizer** *series.*

No, the *Home Organizers* are not the latest development in robotics technology or a band of labor-loving elves who enjoy engaging in magical midnight cleaning sessions. Nor are they some ingeniously contrived marketing gimmick to profitably dispose of a stockpile of used cardboard boxes (lids are extra).

The *Home Organizers* are a series of eight programs for the Commodore 64. Based on their powerful *Consultant*, a professional database manager, Batteries Included created the *Home Organizer* series for those of us who want the same power that a larger program offers but without the headaches.

No tedium here. Your *Home Organizer* takes care of all the nasty and time-consuming little details of data base construction. Each of these dedicated programs has the data fields, screens and formatted printer reports already set up for you. All you have to do is enter the information about your stuff. And there is a program for just about every category of stuff you might happen to have stuffed into your poor over-stuffed house.

For example, there is a program for stamp collections, **"Stamps"**, which organises and keeps track of all pertinent information such as the country, denomination, size, collection set number(s), shape, condition, colour, value and any additional remarks for every stamp in your collection. I am not a stamp collector myself, but my oldest son is and he tells me that this particular program is quite thorough.

Home Organizer's **"Audio Video Catalog"** can forever do away with the usually hopeless and always infuriatingly prolonged search for a particular album or a specific film from within a large music and video-tape library. This program gives you speedy access to everything in your collection by title, author or artist, label or maker, type, category, play time, counter position (for cassettes and videotapes), producer, personal remarks and more. It does not, however, keep track of whose turn it is to choose the evening's entertainment.

For anyone who ever wondered when a particular photograph or home movie was shot, who took it or even what the ?#$%! it is anyway, **"Photographs, Slides and Home Movies"** will forever solve the riddle of the beheaded body and disembodied head. Description of scene, film make and type exposure, print size, paper type, frame type, date, photographer, catalog number and additional notes can be entered for every photograph or home movie. Never again will you have to wonder who the genius was who took three pictures of his own feet or ponder over what city and on what vacation the picture of the whole family looking tired, hot and hostile in front of a hotel was taken.

The **"Address Book"** program lets you know who and where your current friends, enemies and business acquaintances are and the **"Mail List"** program not only keeps track of the people you know, but makes it easier to send them those invitations, moving notices, thankyou notes, Christmas cards or chain letters. Both programs keep records of names, addresses and phone numbers as well as allowing for a short remark or additional note. Probably intended for adding information such as other family members' names, birth dates, anniversaries or the like, I have found another, less conventional use for this space. I cannot use a genuine entry to illustrate this therapeutic application because many of my additional notes and short remarks are unprintable at best, but using the entry "All work and no pay... " for an employer might give you the idea.

The electronic **"Checkbook"** allows you to classify, calculate and review your finances. Checks are entered by issuance name, check number and date, then placed into one of seven categories: mortgage/rent, food, clothing, automobile, leisure, utilities or other. Total monetary expenditures by either time period of category can be printed out as solid proof that there are still a few dollars left in the monthly budget to buy more stuff.

Kitchen detail is made easier with the **"Recipes"** program. With this module of *Home Organizer* you can classify meals by any number of categories or groupings, then recall recipes by name, category or type, ingredient, calorie content, cooking time, cooking temperature or quantity of servings. Recipes will even help you to plan out special diet menus or write your weekly shopping lists.

The last program in the series, as it now stands, is the first program I used. **"Home Inventory"** was just what the doctor ordered: it helped turn my (ware) house back into a home. It also put me back in control.

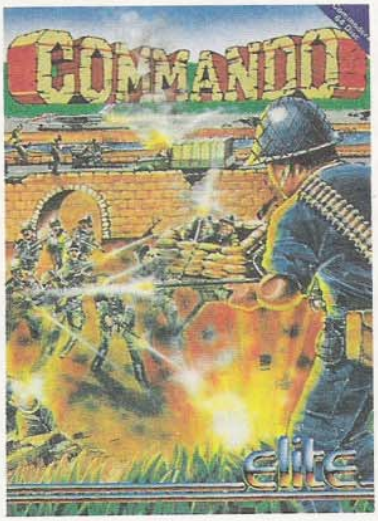
With "Home Inventory" and one three-day weekend, I managed to put into impeccable order what had taken me years to arrange into the total random chaos that my family so wryly referred to as home. Keep in mind that neither I nor Batteries Included ever once claimed there wasn't going to be some work involved. The programs will organise your stuff, but first you've got to tell it what your stuff is!

To the country sound of Waylon and Willie, I loaded and ran "Home Inventory", chose the screen border, background and cursor colours with the function keys, followed the instructions to format a data disk and then pressed "1" from the

Hit List

▲
Fastest selling game in **Electronic Arts** history!
Multi award winner.

It's a knockout !



◀The No.1 U.K. Hit

First of the
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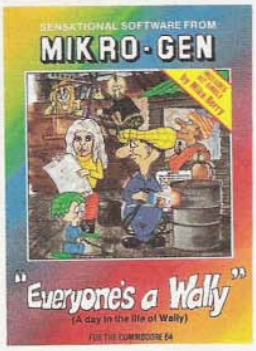
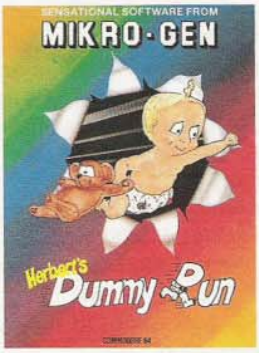
◀Make Movies for less than $50.

Have you met the WEEK family?



◀ Why not meet **Wally** and **Herbert** in the first two family adventures? ▶



Please contact your local ECP representative:
Vic ECP Pty Ltd, 1981 Malvern Road, Malvern East, Vic 3144 Ph (03) 211 8410
Qld Computronic, 8 Harlequin St, Sunnybank Hills, Qld, 4109. Ph: (07) 273 3398.
SA Phil Stubbs Agency, 239 McGill Rd, Maylands, SA,5069. Ph: (08) 332 9827
WA John Mills Agency, PO Box 278, Greenwood, WA 6024. Ph: (09) 448 1137
Tas. Tasmanian Record Company, 10 Cameron St, Launceston, Tasmania 7250. Ph: (003) 31 5588.

menu to take me to the data entry screen.

The preset fields in "Home Inventory" consist of the item description or name, the serial number, colour, location, purchase price, current value, insurance coverage and manufacturer. There is also a field for noting what system, collection or grouping the item belongs to, if any, and a remarks field where any other bit of information you care to add about the item can be typed in.

At the bottom of the screen is the command line where you choose to (E)xit, (A)dd or (U)pdate a record. Since this was the first time I had used the program and therefore I didn't have anything to update, I pressed "A" to add data. The prompt line immediately changed to read "Enter Record Date - press (left arrow key) to finish" and the cursor blinked merrily on the first field waiting for me to give a name to my first piece.

I typed in "Commodore 64". Might as well start where my fingers are. I pressed <RETURN> and the cursor jumped to the beginning of the next field. I entered the serial number, pressed <RETURN> and continued in this manner until all the fields contained the specified information. Then with a touch of the left arrow key, the disk drive came to life and my completed first record was written onto the data disk.

All through the day, like Sir Edmond Hillary, I slowly but resolutely scaled our ominous and towering Everest of stuff. At first the going was rough, but by late afternoon I knew I would make it. I had drafted the rest of my family to act as the emissary, research, validation, detective, dispersal and task force of the expedition. In other words, they did the manual labor.

That evening, our house was almost unrecognisable. More than half of our agglomeration of stuff was recorded on disk and stored away, set up or rearranged according to its purpose and/or frequency of use.

After dinner I felt it was time to test the system.

The most useful and powerful feature of a data base lies in the user's ability to specify any particular field of information, such as "item name: table saw", 156B82" or "part of: stereo system" and have the computer search through the file and find the record or records that match the search string data.

Conversely, let's say that ugly serving bowl your mother-in-law gave you only gets dusted off and put into use when she comes tovisit at Christmas time each year. Let's also say it's December first - and you can't remember where you put it. So, you enter "ugly serving bowl" into the name/description field as the search string data. Up comes the file card, and as you can see in the location field, you've been keeping it stored as Roxanne's dog food bowl on the back porch.

A wild-card search enables you to search for a specific field of information without specifying all the characters in the search string. For example, if you want to search for all the items in your "Home Inventory" file whose colour field has an "e" as the second character, you would describe the string by typing "?e". The question mark is the wild card symbol and can stand for any character. The computer would then come up with all the stuff on file that is either red, yellow, beige, neutral or any other colour which is spelled with an "e" as the second letter.

A match-anywhere-search will look for the occurrance of a string anywhere in the given field. You can use this type of search, for example, to find all items whose location is specified as being some room, as opposed to a shelf, a cupboard or the back porch. To perform this search you would enter "!" at the location field and then type "room". The exclamation point stands for the match anywhere order.

The not-equal search lets you search for any records that do not match the previous criteria. Say you happen to be partial to products made by a certain manufacturer - we'll call the company "Neverbreaks" - and just about every household appliance in your possession is made by them. If you wanted to see the file cards on everything you owned that was not made by Neverbreaks, then you would first press CTRL/9 (or RVS ON) and enter Neverbreaks into the manufacturer field. Now you know exactly what you have that always breaks.

Three other types of searches are supported by these programs: unequal search - not to be confused with the not-equal search - with which you can look for records containing data that is either greater than or less than some indicated value; the any-match search, which allows you to simply browse through the entire field of records, and, lastly, the key-field search, which uses the name/description field to display all the items in alphabetical order.

In all of these different types of searches, you can also specify more than one search criteria. You want to see everything you have on file that is manufactured by Commodore, is the colour beige and located in the computer room? Enter those specifications into the appropriate fields and, voila! just about every piece of hardware in your Commodore system will be displayed on your screen.

Still another marvellous offering by the *Home Organizer* programs is their printer reports. "Home Inventory" offers two different hardcopy report formats. The first prints in neatly laid out columns the item name, serial number, purchase price and insurance amount of every item in your file. At the bottom of this report, it tabulates the total number of items and the total calculated purchase and insurance values.

The second report available from "Home Inventory" prints out all the fields, each on a separate line, of all the records in your entire file. Depending on the size of the file or files you are printing out, this report can take anywhere from forever to eternity to finish printing.

I ran every kind of search, with both single and multiple criteria, and printed out a columnar report of all the stuff I had on my "Home Inventory" data disk so far. I must admit, I did this not only to test the program, but also, seeing as I still had another two days' work ahead of me, I suppose I needed to be totally convinced that it was all worth the mammoth effort. It was.

Even if you have not got quite as magnified and terminal a case of stuff-itis as I do, you will find that the programs in the *Home Organizer* series are invaluable helpmates and timesavers that make life with stuff much more fun and much less frenzied.

Battle of Midway

A recent trend in the field of computer games has been the synthesis of arcade and adventure/strategy themes into single programs.

Some players would deny that the shoot-'em-up aspects of arcade games have any place in the more thoughtful, intellectual challenges of adventures and simulations. However, it's always been my feeling that so long as the sleight-of-hand joystick bashing doesn't totally overwhelm the strategy elements of the game, the mixture of chance and hand-eye coordination which arcade elements introduce into a game make for greater realism, and allow less chance for monotony to creep in.

PSS's *Battle of Midway* is a good attempt to combine these two elements, and in my opinion perhaps fails only in not going far enough.

Midway is certainly not the most complex strategy game around, although the preproduction manual I was given suggests that the final product will contain enough information to make at least half-an-hour's study of the rules necessary before attempting to play!

For those of you unfamiliar with your history, the Battle of Midway was a crucial point of the Pacific conflict of World War two. The PSS *Midway* manual gives full historical details, but to summarize briefly, the island of Midway had to be defended by the American carriers Yorktown, Hornet and Enterprise to prevent Japanese landings which would have opened up the way to an invasion of Hawaii and eventually the American mainland.

On loading the game, from disk or tape, you must first select keyboard or joystick control. The control key for "joystick" is "S", for some reason, which caught me out first time since I instinctively pressed "J". Never mind.

There are three game levels and six speeds available.

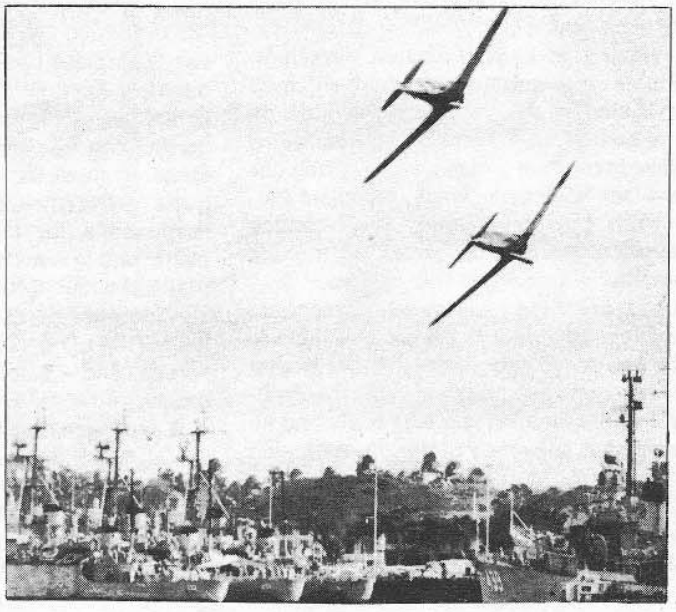
Each game begins in Map mode. The map, which suffers from a distinct lack of detail, shows the island of Midway, the surrounding islands and shallows, and the disposition of your American fleets and courses of the Japanese invasion fleets. This last detail appears only in mode 1, which is intended largely for practice purposes; in mode 2 the courses of the Japanese fleets are not marked, and in mode 3 the Japanese fleet is blessed with extra carriers.

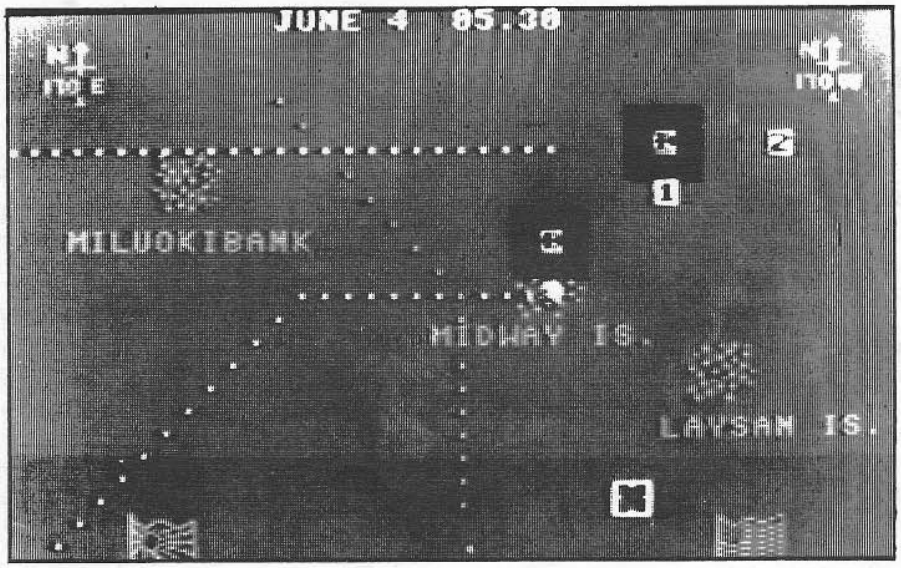
Com Box

The graphics in map mode are chunky but acceptable. To manoeuvre your fleets you use a square cursor which is controlled by keyboard or joystick, and which is designated the Com Box.

Your forces consist of sea fleets, search aircraft shown with a surrounding search area (square instead of circular, which I would have thought would have been more accurate) and later in the game, attack aircraft. The Japanese forces are represented by sea fleets and attack aircraft, all of which are invisible on the map unless they fall within the search area of a search squadron.

Units are moved by placing the Com Box over them; pressing the trigger so that the box changes colour; moving to the new position; and pressing the trigger again. The units then begin to move in stages, at a speed determined by the speed option you selected earlier. A game-time clock at the top of the screen ticks over in intervals of ten minutes, and it's important to keep an eye on this clock since after a certain time, *Midway*





becomes more likely to be attacked.

While in Map Mode, you have the option to read the Unit Book, which gives the relative strengths of the American and Japanese fleets. This is apparently useful in working out which Japanese fleet you are currently in conflict with, though whenever I got to that stage I was much too busy trying to stay alive to worry over which fleet was trying to sink me! Also from Map Mode, you can get an up-to-date report on losses and damage to each fleet.

Having used your search aircraft to locate a Japanese fleet - which is indicated by a "J" appearing overlaid on the search area - you can get an aerial view of the fleet by pressing "R", then use the Unit Book to work out which fleet it is.

Your next task is to launch attack aircraft, which is accomplished through another menu page. This tells you which units are ready to launch, which are arming, how long it will take for them to battle-ready, and so on. It's a pity that there aren't any graphics in this section - it would liven things up a bit if you had an animated sequence of the planes taking off.

There's a nice animated section when you guide your attack aircraft to the Japanese fleet - tiny planes dodge and weave avoiding flak, and you can use your joystick to take the role of the Japanese anti-aircraft gunners and try to shoot the planes down with lines of tracer fire. Should you be unlucky enough to sustain an air attack on Midway island, there's a similar sequence in which you have to contend against Japanese fighter-bombers with your own guns.

Direct Hit

Unfortunately, though these arcade sequences are beautifully animated and have excellent sound effects, they don't contribute much to the progress of the game. You can never be sure if your shots, or those of the other anti-aircraft guns which are operating, are responsible for the destruction of a plane; and in any case it doesn't seem to make much difference, since you inevitably end up with the message "GUN DESTROYED BY DIRECT HIT" on the screen, and a smouldering mass on the ground.

A Japanese air attack on your fleet has similar results, whereas a sea attack features a slightly different sequence, in which flashes on the horizon are your only clue to the position of the Japanese ships at which you fire your artillery.

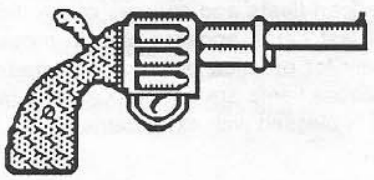
Hectic

After a day of hectic searching and shooting, you'll have to return your planes to their carriers, and use the Launch menu to land them again, since they aren't allowed to fly at night. The game clock runs twice as quickly at night, but beware, since attacks are still possible.

Should all three of your aircraft carriers fall victim to Japanese air attacks, you'll hear what must be the Japanese National Anthem, and see the Rising Sun emblem being hoisted. Presumably if you sink the four main Japanese warships, you'll see the Stars and Stripes - I must admit I never did that well!

Battle of Midway has many good features, and a full range of SAVE and LOAD options which make it possible to return to a half-finished game. It suffers, though, from poorly-designed menu screens, insufficiently integrated arcade sequences (they should play a much greater part in the game), and if anything a superfluity of detail on the historical background to the battle. Reading section 16 of the manual - "Basic Tactics - How to Win" - gives you so much help that you wonder whether the game is worth playing. It would perhaps have been better to give less detail, or, to be honest, to have designed a battle strategy game around fictional rather than real events. Fantasy strategy games have, I would have thought, become so popular partly because the element of the unexpected is very strong. *Battle of Midway* doesn't have much of this element - I enjoyed playing it once or twice, but it could have been a perennial favourite had a little more thought gone into its design.

Distributed by: Ozi Soft
Price: $29.95 for either disk or cassette



The Commodore 128

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The Commodore 128 will amaze you with its new generation of powerful yet easy to use productivity software. Like 'Jane', which allows you to follow simple symbols instead of typing complicated commands. And because it's so easy to learn, you'll have the 128 working hard in minutes! You get 128K of RAM both 40 and 80 column displays, and 16 colours for graphics.

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MUSIC

News

April marks the end of what I considered to be a teething period for this section of the magazine. Teething period indeed! The response from you, our readers, and people in the music industry has literally knocked our socks off. A quick glance at this issue proves just how quickly the interest in computer aided music has grown.

Indeed it seems as if music companies are more interested in Commodore users than most computer companies. And why shouldn't they be, when using your computer for playing and learning music is such a healthy alternative to playing shoot 'em ups. That's it for editorial, so let me present some pertinent news for your edification.

Amiga

- yet more news

No doubt you have been drenched with news of the Amiga after its release, but please bear with me as there is a side to all this fanfare that will benefit all lovers of CAM (computer aided music) including 64 and 128 users. This is due to the underlying interest that musicians have suddenly shown in the wake of rave reviews from magazines in the States and the UK.

The simple truth is that once music companies pick up on the pulse of this swing in ideals by musicians it will be but a few months before we see a whole new range of music orientated software. Wishful thinking? I think not, as it has been proven time and again by the business sector that writing software for one machine is a lot more profitable when you do fairly simple modifications to make the program work on other machines.

With, to date, twelve completely new packages available for the Amiga around the world so far, 64 and 128 owners are bound to benefit.

Serious business

One company determined to do it right the first time is a company called Neriki, who are setting up a comprehensive support package for prospective Amiga owners. An intriguing twist to the news of their plans was the jealousy with which they concealed the name of the person they are lining up to handle their music section. If in fact they have nabbed a muso of some repute, they will have no doubt a toe hold on myriad musicians and therefore begin the much needed movement towards computers that we all can benefit by.

On the software front they are also set to receive some rather interesting new products of which one in particular looks promising. It is a sequencer that has unlimited tracks and unlimited sequences. A system that complements perfectly all the real advantages of MIDI.

Any interest can be directed to Mr Craig Schuetrumpf at Neriki Enterprises, phone (02)957-4778.

Apologies

As you no doubt noticed in the last issue Musicomp Marketing have volunteered to be a focus for interest in CAM, but they have called us to apologise to our readers as they have not been able to keep up with the number of enquiries they are having.

None the less we are assured all enquiries will be answered. As the manageress said, "We really didn't expect the deluge of interest we've had. Our whole business has taken an about face, much to our delight as we are all personally interested in music."

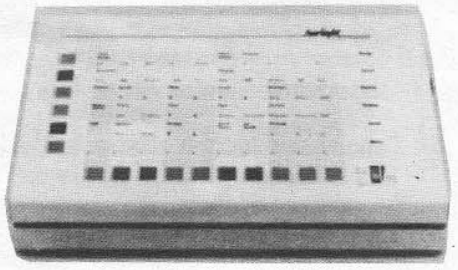
Further enquiries can go to Musicomp Marketing, PO Box 248, Lane Cove, NSW 2066.

New from Fairlight

A really great idea is a device from the famous or infamous Fairlight people (depending on whether you look at the price or who uses them). The Voicetracker, at $2,500, sounds as though it will have to do a lot to live up to its price, and until someone comes along with some software that will do the same thing with a computer we will just have to shut our eyes and pray. Now that the bad news is out of the way let's look at what it can do.

Basically the machine takes almost any monophonic sound and converts it into an elaborate MIDI signal. It does this with an excellent standard of clarity and precision. The end result is that you can use a guitar, your own voice or a trumpet to control other instruments via MIDI. If you find it hard to get what you want from using a keyboard to control MIDI messages, this is the ultimate solution. In principle such a chore should be child's play for a home computer, so programming whizzes, how about it! I for one would jump at the prospect.

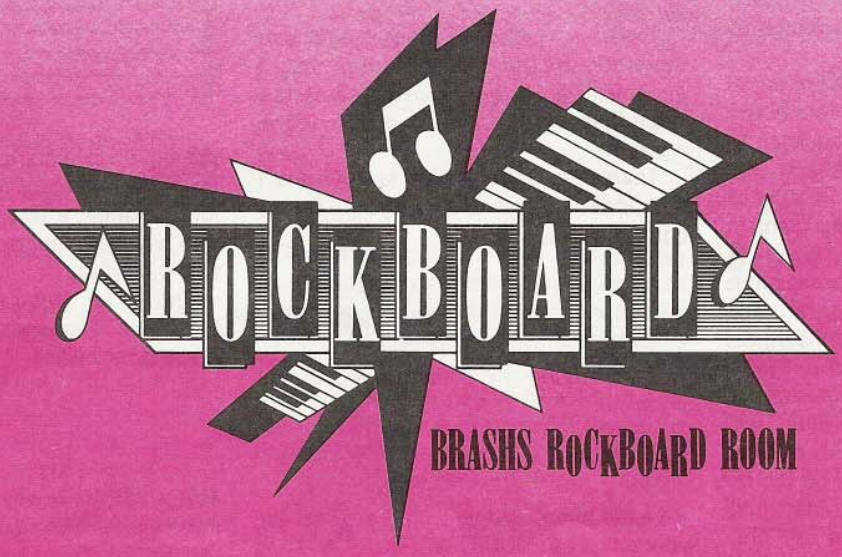
For those with the where-with-all or who are downright rich, the Voicetracker is available from Fairlight Instruments, 15 Boundary St Rushcutters Bay NSW 2011. (02) 331 6333.



At Brashs Rockboard Rooms U2 can sound like UB40.

Or Lloyd Cole without all the commotion.

Or even put some bite into your Bach.



For everything in electronic and computer aided music.
See the best brand names on show: Casio, Korg, Roland, JVC, Siel, Technics, Yamaha, Location.

See us at Brashs, Melbourne, Vic, and Brashs, Moorabbin, Vic, Allans, Adelaide, SA, Brashs, Canberra, ACT, and Elveys, Parramatta, NSW. See us soon in Sydney and Brisbane.

MUSIC

Mass market merchants

Music for the Masses is the foundation of the efforts of Mobex, the company behind Casio keyboards and synthesizers, Casio watches, and of late dare I mention, Atari computers. It would appear that their motto takes priority over their own product loyalties, as they have shown much interest in supporting all you Commodore users out there. Details of their proposals are in the pipeline, but in the meantime there are two items that I should bring to your attention.

The first is the little known or little publicised advantage of their CZ 101 synthesizer over most other brand synthesizers. The CZ 101 can be accessed by four MIDI channels at once,which means that you can use four of the synthesizer's different sounds at the same time, each playing its own monophonic MIDI signal as it comes from your sequencer. That is four times more use than can be had from any other brand synthesizer that I know of in this price range. Of course the fact that these features are monophonic does lessen the gap between it and other MIDI keyboards which are polyphonic, but the advantages, especially to someone buying their first MIDI synthesizer, are a big plus.

The second tidbit comes with the news of a MIDI digital drum machine that Casio has produced that boasts four sounds that can be sampled or changed by the user. More details will be available soon so keep a watch out for these.

The CZ 101 retails for $799 and the drum machine, the RZ 1, will retail for $1195. Enquiries to Mobex, phone (02)406-6277 or Glyn Johnson at Farrells Music phone (02) 939-2444. Toiv Opilt at Turramurra Music (02)440-8375.

Candour

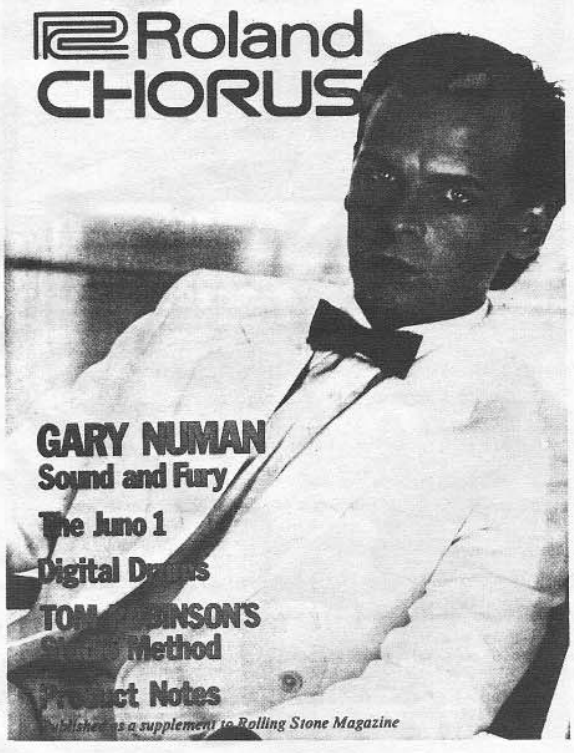
Pointing out the advantages of other publications is not an act of insanity, rather a show of trust and confidence in our readers that they will remain loyal. And to follow on in that line of thought, it would be advantageous for those of a musical leaning to look at *Sonics* for Australian music news and reviews as an expansion on what you read here. Of late, particularly after the thrust of OS magazines towards the Amiga and computers in general, you can find the occasional CAM article. The latest issue has a review of a JMS software package. They are geared towards muso's so it takes a while to get used to the jargon. The next step is to look at the excellent magazines known as "*E&MM*" and "*1 2 Testing*", both with features on the Amiga of late. See, we do have the readers' interests at heart!

Surprisingly all these magazines are available from most local newsagents.

Roland helps out

As the amount of support for CAM lovers expands, Roland have made available two booklets that you should know about. The first is quite a well written booklet explaining the basics of MIDI. And I'm sure they would consider sending out this booklet to you if you added your name to their mailing list, which would entitle you to a newsletter type booklet called Chorus. It is presently being distributed within the pages of the Australian version of *Rolling Stone* magazine and has a picture of Gary Numan on the cover, apparently a real Roland fan.

Please send your enquiries to Roland Corporation, PO Box W104, Brookvale,N.S.W, 2100. Phone (02)938-3911.



Thinking Music...

...try PASSPORT design MIDI software.

MIDI/4 plus ™

Four Channel Recording Software for MIDI Equipped Synthesizers

MIDI/4 plus is the answer to your requests for an inexpensive MIDI recording system. It combines the power and performance of Passport's earlier MIDI/4, with new features that make editing and recording even easier.

Working alone you can compose, orchestrate, and arrange complete multi-track recordings using your synthesizer, drum machine, and personal computer. MIDI/4 plus allows your keyboards, drum machine, and analog tape recorder to work together. The four separate channels can control individual keyboards simultaneously, or the same channel can control several keyboards.

You also don't have to worry about playing a sequence over and over again until you get it right. When a note or measure isn't just the way you want it, you're just a click away from fixing it. With MIDI/4 plus single step playback, fast forward/rewind, and punch in/out features, the computer will help you edit any section of your work, without affecting the rest of the music you've already put down.

MIDI/4 plus makes recording and editing easy so you can spend your time and energy creating the music.

- Unlimited overdubbing on four separate channels
- Select from 16 different channel assignments
- Controls one or more MIDI equipped synthesizers
- Syncs to and from tape, MIDI, and drum machines
- Punch-in/Punch-out, Single Step Playback and Fast Forward/Rewind to facilitate editing
- Auto-correct to 32nd note triplets
- Fully polyphonic: digitally records all controllers including velocity, pitch bend, preset changes, aftertouch, and breath control
- Real time tempo control
- Over 6,000 note recording capability

MIDI/8 plus ™

Eight Channel Recording Software for MIDI Equipped Synthesizers

MIDI/8 plus is designed for professional musicians who need to control more than four MIDI channels at a time. Whether you're a single musician composing, orchestrating, and recording your own work, or a live band working together, MIDI/8 plus lets you build a truly sophisticated performance system. It combines studio quality recording with the power and flexibility of a personal computer.

Sync to an from MIDI, tape, and drum machines to create multi-track recordings of outstanding proportions...Overdub as often as you want on eight separate channels...Chain sequences to play over as a backup rhythm track...Use the beat clock and single step play back to punch in and out wherever you like, so you can edit accurately. MIDI/8 plus will revolutionize the way you compose and record music!

Since every nuance of your performance is digitally recorded in the computer, you can perform with confidence. Unlike overdubbing on tape, you'll have no loss of fidelity in your recording.

MIDI/8 plus allows your keyboards, drum machine, and analog tape recorder to work together. Because of its eight channel capability you can be rest assured that as new MIDI instruments become available, you won't be short on channels.

MIDI/8 plus is, simply speaking, the most efficient and creative way you can compose, orchestrate, and record your music.

- Unlimited overdubbing on eight separate channels
- Select from 16 different channel assignments
- Controls one or more MIDI-equipped synthesizers
- Syncs to and from tape, MIDI, and drum machines
- Sequence chaining, linking, and merging
- Punch-in/Punch-out, Single Step Playback and Fast Forward/Rewind to facilitate editing

PASSPORT

Music Software

MIDI interface ™

The Computer Connection for MIDI Instruments

The Passport MIDI Interface is the recognized standard interface in the music industry. That means that more software developers and synthesizer manufacturers are designing their programs around its specifications. When you use The Passport MIDI Interface, you have access to the largest library of music application software on the market.

The MIDI Interface syncs to and from MIDI, tape, and drum machines — everything you need for a flexible music system. With The MIDI Interface, you'll have the assurance that as the number of MIDI instruments on the market grows, your system will be able to expand with it. That's a great comfort in such a fast-moving industry!

The Passport MIDI Interface is for use with:

- Commodore 64 or Apple II +, IIIe or Compatible Computers
- 1 or more MIDI synthesizers
- Conventional or MIDI drum machines
- Any analog tape recorder

For your local stockist contact: ROSE MUSIC Pty. Ltd. in your State

03. 699 2388	02. 750 8999	07. 52 9422	08. 223 3966	09. 361 8922
Melbourne	Sydney	Brisbane	Adelaide	Perth

MUSIC

THE RIFT

Computer People and Music

When I first invited the idea of computer aided music I did not realise the advantages that I had over most people. An overview of programs available for computer aided music making does demonstrate a need for computer literate musicians with a knowledge of multitrack recording. As I have found this is a rather select few, it is a wonder that so many people have taken on the struggle and are to this day loyally expending their free time trying to work out how to use the programs to make music.

Don't fret, the sheer volume of interest in the subject will no doubt get the writers of such software to clean up their act. But in the meantime I would like to bring to your attention some of the gaps that need to be bridged for you to enjoy the wonderful prospects of writing and playing your own music using computers.

This section will handle the mental blocks that come after you have learnt the basics of working the program you are using and have come to the point of doing something CREATIVE. Anyone can waffle away with some musical doodlings, but how do you go about writing a proper song?

There is a certain magic associated with writing music, decidedly more so with lyric writing. Being magical does not mean that it has to be mystical, especially if you set an instrumental piece in your sights. Writing good instrumental music is a lot more methodic than you would think. Let me outline what is involved.

Bridging gaps

In an instrumental piece there are four main areas to be written and arranged in an interesting way to maintain interest. These are percussion, bass section, chordal accompaniment and the lead melody line. These could be likened to drums, bass guitar, synth and vocals respectively, in most Rock band lineups.

In our case we don't have a singer or a bass guitarist or whatever. We substitute these with MIDI controlled sound modules and play them all ourselves using our computer. Forget about all that! Computer aided music making tends to bring out the power monger in me.

Anyway, we substitute drums with digital drum machines, use a bass synth for bass sounds, a normal polyphonic synth for chordal accompaniment, and a monophonic synth voice for lead vocals. The Roland MKS7 is ideal for this as is also a combination of a drum machine and a synth such as the CZ101 with multiple MIDI addresses.

Back to the theoretic side of writing. And there are a myriad options open to you. By far the easiest way to start your masterpiece is to select just one of the four groups as a foundation for building the rest of your music. If you have had a melody line humming in your head all day, why not start by putting that down first? It is important if you do this part first to put down what is called a click track in the music industry. It is a timing beat like a metronome to help you keep time and to keep continuity in the piece. A lot of singers tend to write music this way, especially ballads and other melodic forms of music.

Simply set up a track on your sequencer program with a "click" on each beat of the bar. This could be a hi-hat or rimshot on a drum machine. Next you hum to yourself the phrase that you have in mind and try to play it on your keyboard. If necessary slow down the tempo of your click track and get it down with more accuracy. I recommend you experiment with the layering of the other tracks in this order.

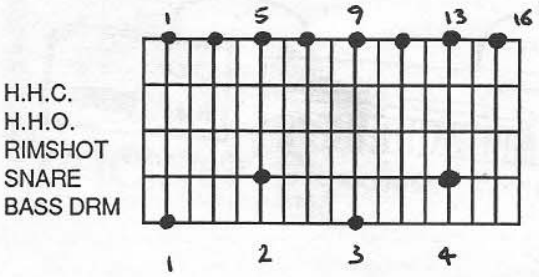
1.melody line
2.chordal accompaniment
3.drums and
4. bass.

With each step experiment with different sounds. Drums in particular are hard to write and I will deal with them later.

For more rhythmic music as with Rock, Reggae and Blues, a different approach is needed. The drums have a much more important part to play in the direction of the music. And usually the melody line is the last thing to be layered over the top of the foundation of drums, bass and chords.

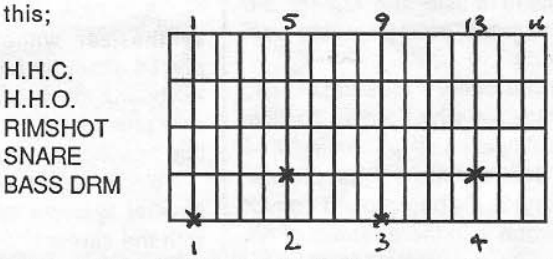
An interesting effect is to think up some really good rhythmic bass line using a click track and to write the drums and chords around it. This is the basis of most good dance music. Think of Grace Jones' song "Dance to the Rhythm".

The whole song is impregnated with a sly drum rhythm that is known as a lazy rhythm in the music world. If you listen to the bass guitar in that song you will hear how closely interweaved a set of drums and a bass guitar can be. The use of neat little counter rhythms and tight emphatic beats make the song really swing. That is part of the legacy that has been given by the black influence in pop music. They seem to have an innate sence of rhythm.

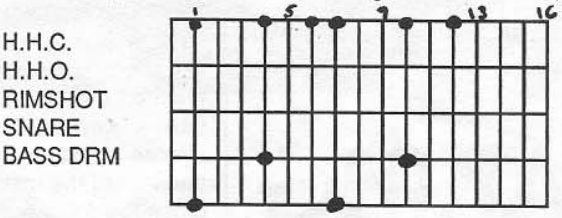


Writing drums

An area of particular contention is the writing of drum rythms. The problem is exacerbated by the fact that most people don't have a good feel for rhythms. A way to solve this is to get a drum machine with an LCD screen that enables you to graphically see what you are playing. The screen may look like this;

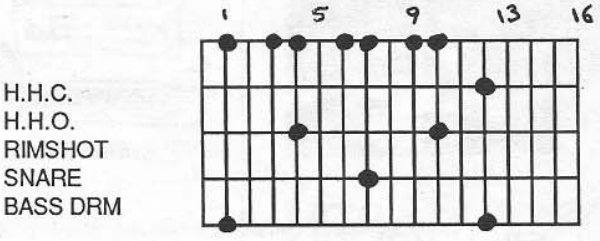


The screen is dissected into 16 segments, each equal to 1/16 of a bar in 4/4 time. The lazy rhythm spoken of earlier is obtained by limiting the bar to 12 segments of the bar;



Examples of other types of rhythms are as follows. If your drum machine is not gifted with such a tool as this, why not use a piece of paper and write out the rhythm you want on it, using our graphs as a guide.

To wind up this section of bridge building I would like to remind you of the main points of our discussion. Remember that music making is not some mystical gift given to a special few, it is a skill that most can learn and use with self satisfying proficiency. Keep trying and before you know it the Rift will be gone.

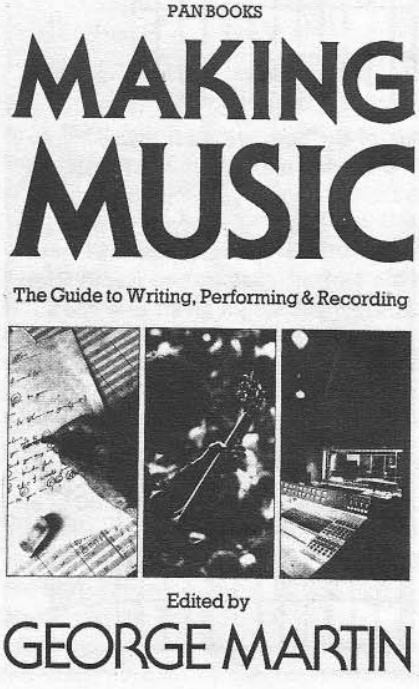


Making Music

Making Music is the title of one of the best written books on music that I have ever read. If you would like an insight to the way professionals in all areas of the music industry work, then this is THE book. Of particular interest are sections written by Sting, Paul Simon, Eric Clapton, Jeff Beck and Herbie Hancock, to name a few. Although published in 1983, the book does have a section on computer aided music and covers the steps in writing and arranging your own songs.

Perhaps the editor's credentials also add to the reasons why I am so positive about the publication. If producing and guiding the Beatles, (the biggest popular band in history) is his background I doubt any would argue with the trueness of his ideals. The man is George Martin, who has a heritage as big and as broad as pop music itself. I really invoke you not to miss out on this mandatory reading.

Making Music is distributed by Pan Books in Sydney.



Commodore Musings

by Stephen A Walter

Just what do you do if you own a Commodore and want to create music? You can either use the internal sounds - which are severely limited - or you can use a sound 'module' controlled by your computer.

A module is basically an organ or synthesizer without a keyboard.It is played either by a separate (or 'mother') keyboard, or a computer. It may have only one sound at once, or several - and this may include drums and the like.

So how does it all work? Well, there are several systems available, and I'll start with the simplest and cheapest, the Siel Sound Buggy.

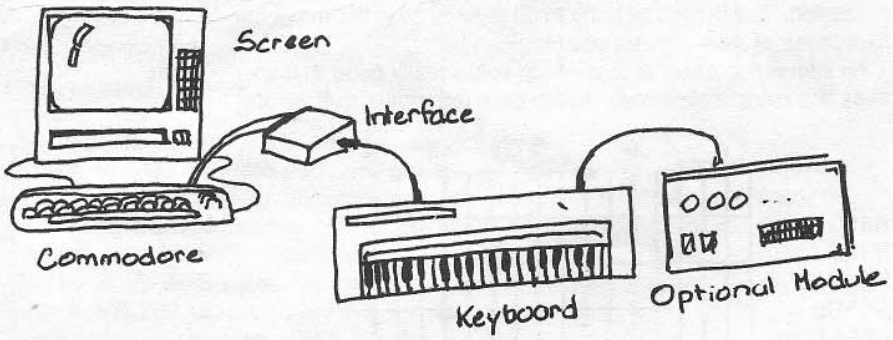
The Sound Buggy is simply an organ without keyboards. It has rhythms, accompaniments, and solos. Nine songs come with the package, but you can play and record your own songs, and record them on disk or cassette. To do this you use a keyboard overlay. Then you choose a rhythm (eg Rock or Disco etc) and record the melody,. Then repeat the procedure, this time playing the chords (the Sound Buggy will replay the melody and drums at the same time). Now, choose sounds, give the song a name, and put it on disk or cassette. Simple!!!

A more advanced system would involve a MIDI Interface (MIDI stands for Musical Instrument Digital Interface). Basically MIDI just connects your computer to a keyboard or module. Now load up the Siel Multitrack Composer.

The Multitrack Composer is designed for people who know about computers, but not about music. It doesn't use akeyboard or even an overlay. You just choose the music you want to play from the music store, (some music even has the name of the notes already printed next to the note). Now type in the name of the note, and how long you want the note to play. For example, if you want to play middle C, type in "C4 100". This will play the 4th C on the keyboard for 100 time units.

The Multitrack Composer allows you to play six notes at once, and change sounds automatically! You can play something as simple as "Twinkle Twinkle Little Star" or as complex as Bach's "Brandenburg Concertos" (In fact one of these concertos comes as a demonstration). All this without you even having to read music, touch a note, or worry about timing.

From here we could move to sequencer systems. A typical system would be like this:

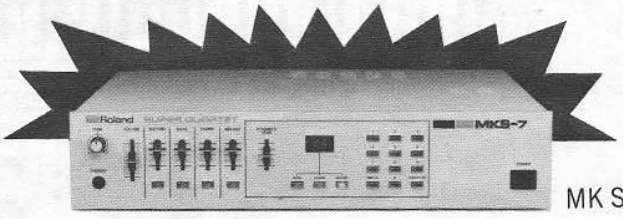


MUSIC

THE BEST GAME OF ALL

Computing, Mathematics, Art, Structure and Balance, infinite variation – Music is the teacher in the subtlest way, the way that gives great pleasure to all by their own natural expression.

And now in a single, simple to use module, ROLAND can expand your computer into a complete music system – drums, bass, polyphonic chord blocks and melody. Interfaced with keyboard and computer by uncomplicated midi connection and monitored on your own stereo system or portable cassette, the ROLAND MK S7 gives you the facility of a musical group in a recording studio*. That's not only great fun in education for all, but even an instant no-fuss tool for professional or amateur composers to quickly build and preview compositions without the technology bogging down the creative process. The computer has come alive with the greatest game of all – MUSIC.



MK S7

Roland

WE DESIGN THE FUTURE

*YOUR COMPUTER WILL REQUIRE MUSIC SOFTWARE

With this system you have a wide choice of software, the best examples being the Siel, Passport, or MusicData (Roland) Sequencers.

Now what do they all do?

First let's consider your module. This is an optional add-on, but a good example would be the **Roland Super Quartet.** An excellent description of this machine was made by Ric Richardson (Vol 2 No 9).

Briefly, the Super Quartet provides four sound sources; a Melody, Chords, Bass, and Rhythms. It has well over 140 sounds! These four sound sources are on different MIDI channels. This is just like TV, where you can watch one channel, and perhaps record another on video.

With a sequencer, you might record a solo Melody. Now go back to the start and record the chords. The computer will replay the Melody, with the same sound you used and play the chords with a completely different sound (if you wish) whilst busy recording the chords. Now go back and put down a funky bass line, and finally orchestrate with your digital drum kit.

For beginners, this system allows you to play music like professionals, with great sounds, but you only need to play one note at a time.

For musicians, you can use both hands on the Melody, then both hands on the chords, then both hands again on the bass, and finally both hands again on rhythms. Added to this is the fact that you can still play along on your master keyboard. Imagine the complex textures you can create with 10 hands (or more!!!) playing at once.

Now how about the software? The cheapest combination is the **Siel Interface and Software.** The Siel sequencer software allows you to record all 16 channels of MIDI. To use the sequencer, press "R" to record. The sequencer will ask you to adjust the tempo (with the "+" and "-" keys). It will then suggest a track to record on. You can select your initial sound at this time.

Now hit "F7". The sequence will count you in, and away you go. When you have finished recording, just hit "F7" again to stop.

You can do this for as many as 16 tracks. Each time you record you will hear the previously recorded tracks play back (if desired).

To alter tracks (ie. delete or edit) press "E" for edit play, and the sequencer prints a multi-coloured display showing the status and MIDI channel assignements of all tracks. All this data may be changed at the touch of a button.

More sophistication

The next level of sophistication is the **"Passport"** range of software. This sequencer operates similarly to the Siel, but allows you to edit, link, mix, copy, delete, or even transpose tracks. It also has the ability to "Punch in" and "Punch out", record, just like a multitrack recorder.

Whilst the Passport has many editing advantages over the Siel, it is over twice the price and offers only 4 or 8 MIDI tracks to record on.

Far superior at a similar cost is the **Music Data Sequence**r from Roland.

This sequencer features 16 recording areas called "Sequences", each with 16 tracks. What this means is: normally you must play the entire song in, WITHOUT STOPPING. This must be repeated for every track. If you make a mistake after repeating the chorus for the third time, well...

The Music Data sequencer, however, allows you to record, say, an introduction, on all 16 tracks, in "area" (Sequence) 1. You can edit and correct it, or just leave it for the time being.

Now record your verse in Sequence 2; your chorus in Sequence 3; your Solo in Sequence 4; and an ending in Sequence 5.

All of these sequences can be edited INDIVIDUALLY. Ie. if you make a mistake in the chorus, you won't have to re-record the verse.

Now your song might go something like this:

INTRO - VERSE - VERSE - CHORUS - VERSE - SOLO - CHORUS - CHORUS - ENDING.

So arrange your sequences in the Sequence Table like this:

1 - 2 - 2 - 3 - 2 - 4 - 3 - 3 - 5.

You can change it as often as you like at the touch of a button. As the example shows, I need only record the verse once, but you can have it play as many times as you wish.

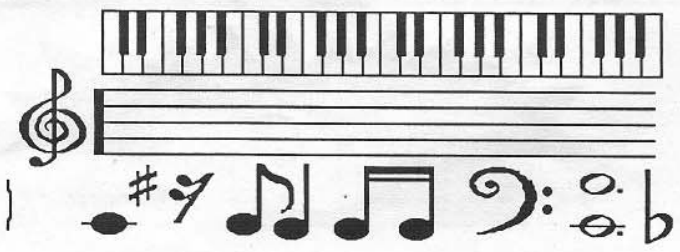
The sequencer also features "Quantization", a device which fixes up faulty timing - drums sound like they have been entered in step time, for example.

All these features are made easy to use by the single screen display and help files included on disk. Also included is an electro-pop 7-track demonstration program.

It is my opinion that this is possibly the finest sequencer program for the Commodore.

I would suggest that for beginners or those on a budget the Siel system is an excellent introduction to sequencing, allowing total control of your music from the computer.

Alternatively, the Music Data (Roland) Sequencer allows easy editing and variability in your music, though some musical ability would be helpful. This software used in conjunction with a Super Quartet would be the supreme home musical system.



SATURDAY COMPUTER SERVICES

MAIL ORDER LIST

This is our new up to date catalogue with all the latest releases.

For reasons of space we can't include *everything*, so if you don't see what you want on this list, please telephone us on (02) 398 5699 and enquire about price and availability.

Games

ADVENTURE QUEST
Explore middle earth and reach the black tower. 200 locations. Text.
$29.95 (D or C)

CONAN THE BARBARIAN
Your goal is to find and destroy the villanous Volta. 7 levels.
$39.95 (D)

DALLAS QUEST
Hi-Res adventure. JR Ewing takes you in search of 2 million dollars.
$39.95 (D)

DRAGONRIDERS OF PERN
Alliance forming and battle constitute this fast paced game.
$29.95 (D)

DUNGEON ADVENTURE
200 locations and 100 puzzles will keep you off the streets. Text.
$29.95 (D or C)

GHOSTBUSTERS
You've seen the movie, now you too can get slimed. Back off man!
$34.95 (D) $29.95 (C)

Perry Mason: The Case of the Mandarin Murder

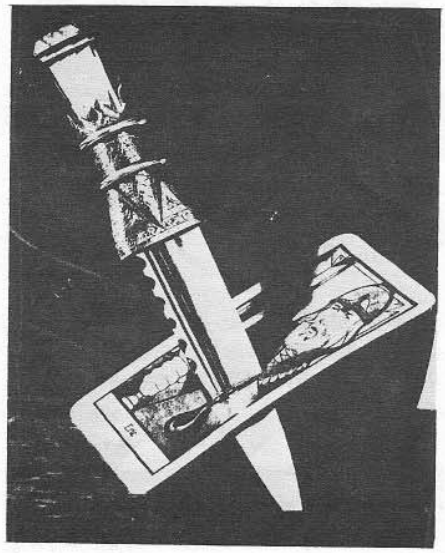
Victor Kapp is dead - murdered. Laura is in jail, charged with his death. And facing trial very, very soon.

You'll have to work fast - and smart. Dig into people's lives.

The first interactive mystery to use the world-famous criminal lawyer created by Erle Stanley Gardner. It also represents a major breadthrough in interactive fiction: the cooperation of the characters and jury changes as a direct result of your interactions with them.

In addition, you can do virtually everything a court room lawyer can do.

Price: $49.95 (D)



Nine Princes in Amber

They tried to kill you - and when that failed, they stuck you in a private hospital with enough drugs to keep you out cold for the rest of your life.

Well, almost enough drugs.

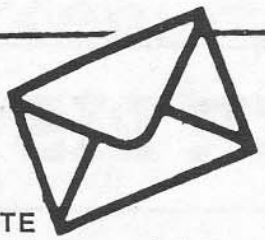
You are a prince of Amber, fighting for the throne against your eight brothers and four sisters - all of them treacherous. Yet you must gain the support of some of them if you are to succeed. And that will be as complex and tricky a game of politics as you ever hope to play. Especially without your memory.

Price: $49.95 (D)

I have carefully looked over the entire range of software and hardware being offered in this mail order list, and believe that it is of good quality and excellent value for money.

Andrew Farrell, Editor

SATURDAY COMPUTER SERVICES



INSTITUTE
Freudian solutions may help you escape or you die a 1000 deaths.
$24.95 (D)

JUMPMAN
See the Aust. Commodore Review for low down and up top of this game.
$29.95 (D & C)

OIL BARONS
Board game as well as software. Dallas at home. Big game.
$69.95 (D)

PITSTOP
Classic car driving action game. Strategy and nerve are necessary.
$19.95 (C)

POLE POSITION
Experience the thrills of Formula 1 as you race against the clock.
$29.95 (C) $39.95 (D)

POTTY PIGEON
Make your home to the tune of great music and superb graphics.
$19.95 (C) $24.95 (D)

RETURN TO EDEN
First Level 9 game with graphics. 250 locations, many puzzles.
$29.95 (D or C)

SNOWBALL
Huge adventure with over 7000 locations awaiting you! Text.
$29.95 (D or C)

SPACE ACE 2101
Strategic arcade real time game. Trade before you fight.
$19.95 (C) $24.95 (D)

SPY HUNTER
Hunt spies till the cows come home and the chickens roost!
$29.95 (C)

SPY VS SPY
Classic from Mad now comes home. Ingenuity + steady hand required.
$29.95 (C) $34.95 (D)

STRIP POKER
R rated computer game - sizzling graphics! Have to see to believe.
$29.95 (C) $39.95 (D)

SUICIDE EXPRESS
The future of the human race is in your hands once again. Arcade.
$19.95 (C) $24.95 (D)

THEATRE EUROPE
Combination of strategy and arcade action in this popular new game.
$29.95 (D or C)

ZIGGURAT
The most bewildering maze ever created. Is there a way out?
$24.95 (D)

SUPERMAN THE GAME
Superman and Darksied are pitted against one another in the ultimate battle of good against evil. 'Super' graphics and split screen action.
$29.95 (C) $34.95 (D)

BRUCE LEE
Meet the master of the arts in the most artful form of self defence. His body is his weapon, and now he's ready to join forces with you.
$29.95 (C) $39.95 (D)

THE GOONIES
Instead of playing the role of one Goonie, you must know and control the mischievous role of all The Goonies. See ACR Vol 3 No 1 for full review.
$29.95 (C) $39.95 (D)

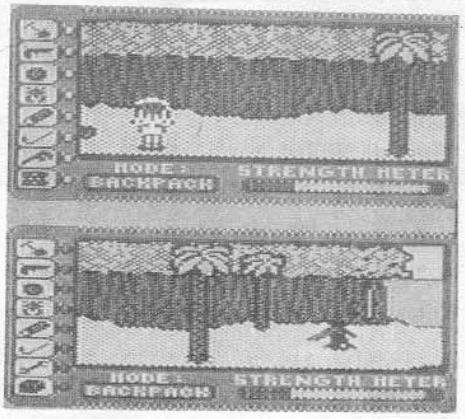
ZORRO
Multiple levels, traps, escape routes and tunnels are only some of the obstacles that form part of your quest. See ACR Vol 3 No 1 for full review.
$29.95 (C) 39.95 (D)

HARDBALL
Baseball that's so real and true to life, it's like you can reach out and touch it. The most spectacular sports simulation you will ever play. See this issue for full review.
$29.95 (C) $34.95 (D)

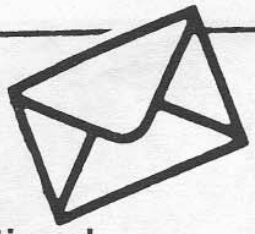
LAW OF THE WEST
If you've ever wanted to strap on a six-shooter, pin a tin star to your chest and match the exploits of Bat Matterson or Wyatt Earp, then this is your chance. See Vol 3 No 1 for full review.
$29.95 (C) $34.95 (D)

KENNEDY APPROACH
You are in charge! It's your job to get all the aircraft and passengers on the ground, or on the way safely.The first speaking simulation that allows you to communicate between pilot and control tower. See Vol 2 No 8 for full review.
$39.95 (D)

THE ISLAND CAPER
This is the sequel to the original hit computer game "Mad Magazines official Spy vs Spy". If you've played Spy vs Spy, then don't miss this exciting real time episode.
$29.95 (C) $34.95 (D)



SATURDAY COMPUTER SERVICES



Educational

METEOR MULTIPLICATION
From DLM.
By using the keyboard, the player must aim his spaceship at the closest meteor, work out his answer, type it in, then shoot and move on to the next closest meteor until the screen is empty. It sounds simple, but it really is excellent. It makes education fun and exciting.
$39.95

Other educational games available from DLM are:

Alien Addition
Alligator Mix
Demolition Division
Dragon Mix
Minus Mission

$39.95 Each

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Adventurers' Corner

Adventure

by Ed Mehrtens

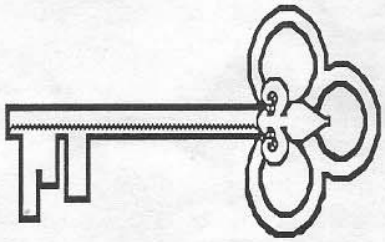
The original "*Adventure*" program was written in Fortran for the PDP-11 computer by Crowthers and Wood, it contained 130 rooms, 15 treasures, 40 useful objects and 12 obstacles. The descriptions in this version were very long and particularly witty, but it took 200k bytes on a 16 bit machine. Obviously to fit this program into the Commodore was going to take considerable editing, the descriptions were drastically edited but the original dimensions were kept

There are four companies producing versions of Adventure for the Commodore; Microsoft, Adventure International, Programma and Rainbow. I would recommend Microsoft as being closest to the original with Adventure In ternational being the second choice, both are written entirely in machine code with A.I. being entirely in memory and subsequently is further edited. All versions are in text, as was the original, but no adventurer should be without at least one copy of this classic game and adventure addicts will have more than one version, and savour the differences.

"*Adventure*" is a classic and I really reommend it as an extremely entertaining game. As with all games, map your progress as there are two difficult mazes.

Cryptic Clues

(1) Moving by magic is fast and easy.
(2) Getting rid of the snake appears bird-brained.
(3) Kung Fu or Karate deals with one monster.
(4) The plants are saying something.
(5) At the Troll Bridge (pay Troll) bear in mind that it doesn't have to be a treasure.
(6) You were told it was delicate.
(7) A hungry animal is an angry animal.
(8) Some objects frighten some animals.
(9) How are you going to carry it?
(10) Not only dogs need to be on a leash.
(11) Neptune would be able to open it.
(12) "Fee Fie Foo Foo"?
(13) Was it "Twisty Little Maze"
(14) Ordinary coins are hardly "Treasure"
(15) Do you have the foggest idea where the diamonds are located?
(16) Rust is a normal problem.
(17) Keys imply a lock.
(18) How would a magician use a wand?
(19) You can take it as read, that the final point (350) will drive you to your wits end.
(20) Getting more water is the pits.
(21) Some objects can't be with otherds.
(22) Of course there are secret passages.
(23) Magic works in quite a few places.
(24) If it is described as dard, compared with what?



Zork III

I have a score of six out of seven in this, and am completely stuck.
1. Can the Scenic View table be made to send me just one way?
2. Is it possible to bring light across the lake?
3. What next after the Key Room? The waterfall? If so, how?
4. What's the Puzzle Room for?
5. What's the vial of liquid for?
6. Is the time machine of any use, or just a diversion?

I hope you can help me as both my patience and my sanity are going.

S. Pillay
Epping, NSW.

Bastow Manor

The answer to Rickie Pratt's question on Bastow Manor in the February issue is as follows:

You have to go down to the Cellar and get suit of armour. Wear this and it will prevent the old man from hitting you. Anyway, he puts the key from under the crate (in the closet) in the Mailbox, so you will have to go outside the house to get it.

Also I have gone on a bit further in the game myself and shall be most grateful if you could print these questions for me:
(1) How do you pour water on robot in stone cell to stop robot pushing you back?

(2) How do you short cut robot with buckets of water (three trips required) in empty cell?
(3) What do you do in secret laboratory?
(4) How do you get up the balcony?

Thomas Rogers,
Carlingford, NSW

Zork I

Help! I'm very close to committing Zorkicide! My hubbie has threatened to divorce me if my nocturnal habits don't settle down along with my rapidly worsening language! I have Zork I and have managed to rise to the dizzy heights of Amateur Adventurer (even though a friend and I solved *The Neverending Story* in about two weeks). Very damaging to the ego this *Zork* business.

Having bought January's issue I immediately went home and tried all I could think of to kill the thief, but only managed to confuse myself further. I brought the thief to his knees but when I go to finish him off, Zork tells me that there is no thief there and "the other occupant (he of the large bag) has left disgruntled".

Q.16. Who the hell am I trying to kill and how?

Q.17. Is there a certain place I should be leaving the egg?

Every time I leave it - the bag carrier takes off with it and I can't get the (wretched) thing back because the nice guy sends me to Heaven! Zork then tells me I am a suicidal maniac - which could be somewhere near to the truth!

Q.18. What significance is the green bubble on the central panel at the dam? I've tried to turn it, burn it, hit it, break it, attack it, get it, inflate it, cut it, sit on it, push it, and put "gunk" on it - all to no avail.

Please can some Advanced Adventurer give me a few tips to help save my sanity and possibly my hubbie's as well?

Sonja Taylor
Stafford Heights, Qld

PS. Thanks for the review on *The Standing Stones.* I have managed to amass 100,380 experience points and over 50 hits, jumped down from a plane and back up with heaps of gold, only to be snuffed by a "small spider", but it does get you in!

Asylum

I am writing to you regarding *Asylum* which I have had for approximately two years.

In the two years, I have been able to get the following: Credit Card, Silver Card, Gold Card, Bean Bag, BirdCostume, Stethoscope, Rocket Belt, Axe, Fuse, Sign, Copper Wire and Battery.

I have gone down all corridors, into all doors that I can open (with some shocking surprises), tried trading things with all "people" (be it inmates or "workers") and have gone nearly insane trying to get that bit closer to the end. I have been at this stage of the game close on twelve months.

I thought perhaps you could give me some extra clues as to what can be done to make the game interesting, as being in a stalemate like I am is frustrating and if I cannot get the game out within the next twelve months I feel that the game has not been worth it. It is frustrating when you type up for clues and the machine gives you nothing. "Please help am desperate for the completion of *Asylum* before I end up in one."

Colin Awege Jnr
Naracoorte, SA.

Taipan

by Ed Mehrtens

Taipan is produced by Avalanche Productions and was written by Ronald Berg. It is loosely based on the book of the same name by James Clavell *(Sho-Gun, King Rat, The Noble House)* and is set in the far east around the 1800's. The object of the game is to become a millionaire by trading. It is a change from the usual game of "whomp the monsters, get the gold" and as it is written in assembler, it is fast. There is good error checking and it is fun to play. The instructions are included on disk and it is easy to play, with single logical keys being used.

Taipan (pronounced Dai-Bawn) comes from the Chinese and means supreme leader or big boss. Comprador (or compradore) is Portuguese for agent. The setting is the 1800's in the Far East based on Hong Kong.

You have a small boat and the choice of starting with a small amount of working capital and a debt, or five guns and no debts, but no working capital. Both are equally good, but with the five gun start you have to find and defeat some pirates before you can get any money. From then on the games are identical.

Trading is the way to fame and fortune, your company is based at Hong Kong and it is there that most of the facilities are based such as the shipyards, the bank, a money lender and your warehouse. All the other six places are trading centers only. The shipyard will repair your ship, if it has been damaged by pirates, but it will be expensive. The bank will allow you to deposit and withdraw money in complete safety, it will not give loans as your occupation is too risky, however interest is paid at 6% per year on all money deposited there. The money lender, "Elder Brother " Wu, will gladly lend you money, up to twice as much as

the cash you have at the time in fact. He does not consider his rates at 10% per month to be high, as no-one else will lend to you at all, but he does wish to be repaid. Your warehouse has a capacity of 10,000 units and when you are in Hong Kong you may transfer cargo between the ship and the warehouse. At this time you can overload your ship with transfers or large purchases, but naturally you can't sail while overloaded. To get from one port to another takes one month, prices vary from port to port and time to time in a random fashion.

Trading is in four commodities: General Cargo, Arms, Silk and Opium. You buy when something is cheap and sell when the price is high. General Cargo normally ranges from 4 to 28, Arms 60 to 320, Silk 500 to 2,800 and Opium 6,000 to 100,000, although sometimes sudden fluctuations occur when the price on a particular item will greatly exceed these ranges.

When you start you will deal mainly in general cargo and arms, gradually moving up to silk and finally to the ultimate cargo - Opium. Opium is a dangerous cargo, as officials will occasionally confiscate your opium and fine you. For this reason do not carry more opium than you can afford to lose, however opium is the big money winner.

Other things than confiscation of opium can accur, warehouse robberies can halve your warehouse stocks, thugs can beat you and steal any ready cash, but by far the biggest danger is pirates. Independent pirates fear only the greatest pirate of all, Li Yuen, to whom all the wise traders pay tribute. Li Yuen sends a message sthat he would like to see you in Hong Kong, post haste. He then asks for a donation of so much for the temple of the Sea Goddess, If you do not have sufficient cash "Elder Brother" Wu can make up the difference (adding it to your debt of course). If you do not pay and you meet Li's pirates they will attack and they always travel in large fleets. I advise paying the tribute, as his fleet is extremely large.

This is not to say that nothing can be done about pirates, you can fight if you have guns aboard your ship (not arms which is cargo), or you can try to outrun them. If you cannot seem to escape by running, throw some cargo overboard for greater speed, you can throw all the cargo by pressing "*"

From time to time you will be offered large ships and guns, for a price. Double the number of guns you have is the maximum number of ships you can fight without major damage.

Scoring is based on the amount of money you have versus how long it took to get it. When you have over a million and are in Hong Kong you will be offered the choice to quit, your score will then be assessed. There are five grades depending on your score. All commands are by single Keystroke except for numbers.

SOME HINTS

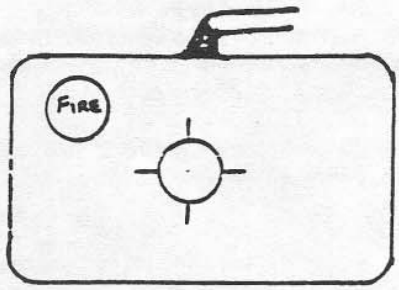
(1) Pay off debt to Wu as fast as possible.
(2) Keep some money in the bank in case of robbery.
(3) Always leave 10 units free on the ship to allow purchase of an extra gun.
(4) Pay Li Yuen's tribute.
(5) Never carry more opium than you can afford to lose.
(6) Keep your ship in good repair.
(7) Go straight to Hong Kong when Li Yuen says immediately.
(8) Make Hong Kong every second trip early in the game.
(9) Buy larger ships if you can use the extra capacity, but not early in the game.
(10) Run from large numbers of pirates and dump cargo if necessary.

SOFTWARE APPLICATION NOTE 4003

Author = Bill Hindorff
Subject = Digital Joystick Read
Television Standard = NTSC or PAL

This routine reads and decodes the joystick/firebutton data as given in the accumulator. The accumulator is assumed to be a value from port A or port B of CIA #1. The routine will set two variables, DX and DY, which represent the two's complement direction vector. I.E. $FF = -1, $00 = 0, and $01 = 1. Upon returning, the carry reflects whether or not the fire button is being pressed. Carry set (c = 1) means the button was not pushed, carry clear (c = 0) means the button has been pushed.

a) Diagrams: The following diagram illustrates the joysticks values and which bits they represent.



b) Program listing as assembled at $C200

1) Assembly

```
1000  .Page (JOYSTICK.8/5) JOYSTICK - BUTTON READ ROUTINE
1010  ;
1020  ; AUTHOR - BILL HINDORFF
1030  ;
1040  DX=$C110
1050  DY=$C111
1060  *=$C200
1070  DJRR  LDA $0C00 ; (ENTRY POINT FOR PORT A ONLY)
1080  DJRRB LDY #0    ;THIS ROUTINE READS AND DECODES THE
1090  LDX #0    ;JOYSTICK/FIREBUTTON INPUT DATA IN
1100  LSR A ;THE ACCUMULATOR. THE LEAST SIGNIFICANT
1110  BCS DJR0  ;5 BITS CONTAIN THE SWITCH CLOSURE
1120  DEY       ;INFORMATION. IF A SWITCH IS CLOSED THEN IT
1130  DJRO  LSR A     ;PRODUCES A ZERO BIT. AN OPEN SWITCH
1140  BCS DJR1  ;PRODUCES A ONE BIT. THE JOYSTICK DIR-
1150  INY       ;ECTIONS ARE RIGHT, LEFT, FORWARD, BACKWARD
1160  DJRI  LSR A ;BIT3=RIGHT,BIT2=LEFT,BIT1=BACKWARD
1170  BCS DJR2  ,BIT0=FORWARD AND BIT 4=FIRE BUTTON.
1180  DEX       ;AT RTS TIME DX AND DY CONTAIN 2'S COMPLIMENT
1190  DJR2  LSR A     ;DIRECTION NUMBERS I.E. $FF-1,$00=0, $01=1.
1200  BCS DJR3 ;DX=-1 (MOVE RIGHT) DX=1 (MOVE LEFT),
1210  INX ;DX=0 (NO X CHANGE).DY=-1 (MOVE UPSCREEN),
1220  DJR3  LSR A     ;DY=1 (MOVE DOWN SCREEN), DY=0 (NO Y
1230  STX DX    ;THE FORWARD JOYSTCK POSITION
      CORRESPONDS
1240  STY DY    ;TO MOVE UP THE SCREEN AND THE BACKWARD
1250  RTS       ;POSITON TO MOVE DOWN SCREEN.
1260  ;
1270  ;AT RTS TIME THE CARRY FLAG CONTAINS THE FIRE BUTTON
      STATE.
1280  ;IF C=1 THEN BUTTON NOT PRESSED. IF C=0 THEN PRESSED.
1290  . END
```

2) Hex Dump:

```
.: C200 A2 00 A0 00 AD 00 DC  4A B0 01 88 4A B0 01 C8 4A
.:  C210 B0 01 CA 4A B0 01 E8 4A 8E 10 C1 BC 11 C1 60 80
```

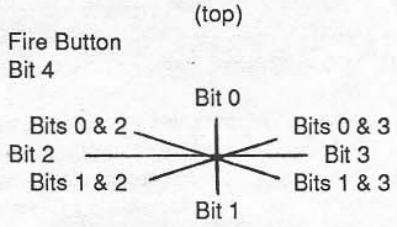
3) Data Statements:

```
DATA 162,0,160,0,173,0,220,74,176,1,136,74,176,1,200,74
DATA 176,1,202,74,176,1,232,74,142,16,193,140,17,193,96
```

d) Memory/Register requirments: The routine usees 31 ($1f) bytes of memory as well as 2 bytes of storage. It also uses the accumulator, X, and Y registers.

e) Worst case execution time is 48 ($30) cycles (or 47.04 usecs on a 1.02 MHz system).

f) Limitations: This routine asumes that the data direction registers have been properly set to read digital joysticks attaced to port A and/or port B. The C64 does initialize the DDR's properly upon power-up to 255 (in $DC02) and 0 (in $DC03). If the DDR's are not properly set, then the routine will not yield accurate results.



g) Prior to using this subroutine, be sure that the accumulator holds the joystick reading and that the X and Y registers have been saved. Also see section 'f' above.

h) Example: The following BASIC program pokes the joystick subroutine into memory starting at location 49664 ($C200). It then calls the subroutine and displays the joystick data. The only difference between the example's routine and the assembly listing is that the fire button state has been stored at location $C112.

```
10 C=12*4096
20 FOR I=0TO34:READA:POKEI+512+C,A:NEXT
30 SYS C+512
40 X=PEEK(C+272):Y=PEEK(C+273)
50 F=PEEK(C+274)
60 PRINT"delta x = ":X,"delta y = ";Y
70 IF F=1 THEN PRINT "fire"
80 PRINT"S":GOTO30
90 DATA 162,0,160,0,173,0,229,74,176,1,136,74,176,1,
   200,74,
94 DATA 176,1,202,74,176,1,232,74,142,16,193,140,17,193
96 DATA 106,141,18,193,96
```

Commodore 128 Memory Map

by Paul Blair

Version 1 - January 1986

This memory map has been prepared to assist programmers understand more about the structure of Basic 7.0 as implemented in the Commodore 128 computer.

As the machine has 2 functions in Basic (as a C64 and a C128), the map reflects common entry points as far as possible.

This reference draws on work done by Jim Butterfield. Jim had access to early releases of the C128, and was generous in his supply of information to friends. Without his assistance, this map would have been a long time coming. My thanks to him. Thanks also to Greg Perry for his assistance.

The memory map represents our ideas of what is in Release 0 of the C128 Basic ROM. It has not been the policy of Commodore to release memory maps to the general public, so we offer this map to help you get more from your Commodore computer.

BANK 0

Label	C128	C64	Description
D6510	0000-01	0000-01	I/O port, similar to C64
BANK	0002	NA	
PC-HI	0003	NA	Monitor use - Program counter MSB
PC-LO	0004	NA	Program counter LSB
S-REG	0005	NA	Processor status
A-REG	0006	NA	Accumulator (.A) store
X-REG	0007	NA	X-register (.X) store
Y-REG	0008	NA	Y-register (.Y) store
STKPTR	0009	NA	Stack pointer (SP) store
INTEGR	0009		
CHARAC*	0009		Search character
ENDCHR	000A		Flag: scan for quote at end of string
TRMPOS	000B	0009	Screen column from last tab
VERCK	000C	000A	Flag: 0=LOAD 1=VERIFY
COUNT	000D	000B	Input buffer ptr / # subscripts
DIMFLG	000E	000C	Flag: default array dimension
VALTYP	000F	000D	Variable type: $FF=string $00=numeric
INTFLG	0010	000E	Var type: $80=integer $00=floating point (FLP)
GARBFL	0011	000F	Flag: DATA scan/LIST quote/garbage collection
SUBFLG	0012	0010	Flag: subscript ref / user function call
INPFLG	0013	0011	Flag: $00=INPUT $40=GET,$98=READ
TANSGN	0014	0012	Flag: TAN sign / comparison result
POKER	0015		Current I/O device # :
LINNUM	0016-17	0014-15	Integer value (line #, GOTO, POKE etc)
TEMPPT	0018	0016	Pointer: next string stack entry
LASTPT	0019-1A	0017-18	Pointer: current string stack entry
TEMPST	001B-23	0019-21	Stack: 9 bytes for 3 string pointers
INDEX1	0024-25	0022-23	General purpose pointer
INDEX2	0026-27	0024-25	General purpose pointer
RESHO	0028-2C	0026-2A	Workspace used by multiply and divide
TXTTAB	002D-2E	002B-2C	Pointer: start of BASIC (for Bank 0)
VARTAB	002F-30	002D-2E	Pointer: start of variables (Bank 1)
ARYTAB	0031-32	002F-30	Pointer: start of arrays
STREND	0033-34	0031-32	Pointer: end of arrays+1
FRETO	0035-36	0033-34	Pointer: string storage (moving down)
FRESPC	0037-38	0035-36	Utility string pointer
MAXMM1	0039-3A	0037-38	Pointer: limit of memory (Bank 1 in C128)
CURLIN	003B-3C	0039-3A	Current Basic line number
TXTPTR	003D-3E	007A-7B	Pointer: Basic work pointer (CHRGET etc)
FORM	003F	NA	Used by PRINT USING
FNDPTR*	003F-4A	NA	Pointer to item found by search
DATLIN	0041-42	003F-40	Current DATA line number
DATPTR	0043-44	0041-42	Current DATA address
INPPTR	0045-46	0043-44	Vector: INPUT routine
VARNAM	0047-48	0045-46	Current Basic variable name
VARPNT	0049-4A	0047-48	Current Basic variable address
FDECPT*	0049-4A		
LSTPNT	004B-4C		
ANDMSK*			Mask used for comparisons
FORPNT*		0049-4A	Pointer: index variable for FOR/NEXT
EORMSK*			Mask used for comparison
VARTXT	004D-4E	004B-4C	Pointer to operator table
OPPTR*			
OPMASK	004F	004D	Mask used for comparison
GRBPNT	0050-51	004E-4F	Pointer: used for function definition
TEMPF3*			
DEFPNT*			
DSCPNT	0052-54	0050-51	Pointer: used for string operations
HELPER	0055		Flag: HELP or LIST
JMPER	0056-58	0054-56	$4C (JMP) + address of function
TEMPF1	0059		
PTARG1	TEMPF1+2		Multiple defined for INSTR
PTARG2	TEMPF1+2		
STR1	TEMPF1+4		
STR2	TEMPF1+7		
POSITN	TEMPF1+10		
MATCH	TEMPF1+11		
ARYPNT	005A	0058-59	Used to define arrays (DIM)
HIGHDS*	005A-5B	0058-59	Pointer: used for block transfer

HIGHTR	005C-5D	005A-5B	Pointer: also used for block transfer
TEMPF2	005E	005C-60	Temporary FLP Accumulator (Accum)
DECCNT	005F-60	005D-5E	# decimal point digits in conversions
GRBTOP	0061	005F	Flag: used to test for decimal pt in strings
DPTFLG*			
LOWTR*			
EXPSGN	0062	0060	Sign of exponent
FACEX	0063	0061	FLP Accum #1: exponent
FACHO	0064-67	0062-65	FLP Accum #1: mantissa
FACSGN	0068	0066	FLP Accum #1: sign
ARGEXP	006A	0069	FLP Accum #2: repeat as per FLPA #1
ARGHO	006B-6E	006A-6D	
ARGSGN	006F	006E	
ARISGN	0070	006F	Sign comparison, Accum #1:#2
FACOV	0071	0070	FLP Accum#1 rounding
FBUFPT	0072-73	0071-72	Pointer: cassette buffer
AUTINC	0074	NA	Increment value for AUTO ($00=off)
MVDFLG	0076	NA	Flag: 10K hires allocated
KEYNUM	0077	NA	Key chosen
NOZE*		NA	Leading zero counter
SPRNUM*		NA	Move sprite and sprite temporary
HULP	0078	NA	Counter
KEYSIZ*	0078	NA	Key command length
SYNTMP	0079	NA	Temp for indirect loads
DSDESC	007A-7C	NA	Descriptor for disk error (DS$)
TOS	007D-7E	NA	Basic pseudo stack pointer
RUNMOD	007F	(see 9D)	Flag: RUN/direct mode
PARSTS	0080	NA	Status word for DOS parser
POINT*	0080	NA	Pointer to decimal point
PARSTX	008	NA	
OLDSTK	0082	NA	

Graphic zero page storage

COLSEL	0083	NA	Current colour selected
MULTC1	0084	NA	
MULTC2	0085	NA	
FG	0086	NA	
SCALEX	0087	NA	Scale factor in X
SCALEY	0089	NA	Scale factor in Y
STOPNB	008B	NA	Stop PAINT if not same colour
GRAPNT	008C-8D	NA	Utility pointers
VTEMP1	008E	NA	
VTEMP2	008F	NA	
STATUS	0090	0090	ST = status
STKEY	0091	0091	Flag : STOP and RVS keys
SVXT	0092	0092	Tape timing constant
VERCK	0093	0093	Flag: $00=LOAD $01=VERIFY
C3PO	0094	0094	Flag: serial character awaiting output
BSOUR	0095	0095	Actual serial character waiting
SYNO	0096	0096	Flag: end of data block from tape
XSAV	0097	0097	Temporary store during input (tape/RS232)
LDTND	0098	0098	# open files / index into file table
DFLTN	0099	0099	Default input device (0=keyboard)
DFLTO	009A	009A	Default output (CMD) device (3=screen)
PRTY	009B	009B	Cassette parity during write
DPSW	009C	009C	Flag: byte read complete
MSGFLG	009D	009D	I/O messages: $00=nil $40=errors $80=all
PTR1	009E	009E	Cassette error pass 1
T1*	009E		Temp workspace 1
PTR2	009F	009F	Cassette error pass 2
T2*	009F		Temp workspace 2
TIME	00A0-A2	00A0-A2	Jiffy clock
PCNTR	00A3		Cassette / serial temp
BSOUR1	00A4		Serial routine temp store
COUNT	00A5	00A5	Serial / cassette temp store
CNTDN*			
BUFPNT	00A6	00A6	Cassette buffer pointer
INBIT	00A7	00A7	RS232 receiver input bit storage
BITCI	00A8	00A8	RS232 receiver bit count in
RINONE	00A9	00A9	RS232 receiver flag for start bit check
RIDATA	00AA	00AA	RS232 receiver byte buffer
RIPITY	00AB	00AB	RS232 receiver party storage
SAL	00AC-AD	00AC-AD	Pointer tape buffer
EAL	00AE-AF	00AE-AF	Tape end adrs/end of program
CMP0	00B0	00B0	Tape timing constant
TEMP	00B1		
TAPE1	00B2		Address of tape buffer
BITTS	00B4	00B4	RS232 transmit bit count
NXTBIT	00B5	00B5	RS232 transmit next bit to send
RODATA	00B6	00B6	RS232 transmit byte buffer
FNLEN	00B7	00B7	Number of characters in file name
LA	00B8	00B8	Current logical file
SA	00B9	00B9	Current secondary address
FA	00BA	00BA	Current device
FNADR	00BB-BC	00BB-BC	Pointer to file name
ROPRTY	00BD	00BD	RS232 transmit priority
OCCHAR*	00BD	00BD	Output character
FSBLK	00BE	00BE	# blocks left to read / write
MYCH	00BF	00BF	Temp to collect byte
DRIVE*			
CAS1	00C0	00C0	Cassette motor control flag
STAL	00C1-C2	00C1-C2	I/O start address
MEMUSS	00C3-C4	00C3-C4	Pointer for general use
TMP2	00C5	NA	Tape read / write data
BA	00C6	NA	Bank for current LOAD/SAVE/VERIFY
FNBANK	00C7	NA	Bank where current file name(for FNADR)
RIBUF	00C8-C9	00F7-F8	RS232 input buffer addresses
ROBUF	00CA-CB	00F9-FA	RS232 output buffer addresses

GLOBAL screen editor variables

KEYTAB	00CC-CD	00F5-F6	Keyboard decode pointer (Bank 15 in C128)
IMPARM	00CE-CF	NA	PRIMM utility string pointer
NDX	00D0	00C6	Number of characters in keyboard buffer

KYNDX	00D1	NA	Number of programmed chars waiting
KEYIDX	00D2	NA	Flag: index to function key string
SHFLAG	00D3	028D	Flag: shift key $00=no shift
SFDX	00D4	00CB	Copy of LSTX for rollover
LSTX	00D5	00C5	Last key pressed
CRSW	00D6	00D0	Input from screen / keyboard
MODE	00D7	NA	Flag: 40/80 columns: $00=40 columns
GRAPHM	00D8	NA	Flag: text/graphic mode
CHAREN	00D9	NA	Character base: $00=ROM, $04=RAM
SEDSA	00DA-DD	NA	Pointers: MOVLIN routine (2 adrs)
SEDT12	00DE-DF	NA	Pointers: SAVPOS
KEYVAR	00DA-DF	NA	Programmable key variables

LOCAL screen editor variables (40/80 change maps out)

PNT	00E0-E1	00D1-D2	Pointer to screen line / cursor
USER	00E2-E3	00F3-F4	Colour line pointer
SCBOT	00E4-E7	NA	Window lower limit
SCTO	00E5	NA	Window upper limit
SCLF	00E6	NA	Window left margin
SCRT	00E7	NA	Window right margin
LSXP	00E8-E9	00C9-CA	Input cursor log (row, column)
INDX	00EA	00C8	Current input line end
TBLX	00EB	00D6	Position of cursor on screen line
PNTR	00EC	00D3	Row where cursor lives
LINES	00ED	NA	Max number of screen lines
COLUMN	00EE	NA	Max number of screen columns
DATAX	00EF	00D7	Current char to print
LSTCHR	00F0	NA	Previous char printed (for ESC test)
COLOR	00F1	0286	Current colour to print
TCOLOR	00F2	NA	Saved attribute to print (INST/DEL)
RVS	00F3	00C7	Flag: reverse mode on/off
QTSW	00F4	00D4	Flag: quote mode
INSRT	00F5	00D8	Flag: insert mode (>0=# inserts)
INSFLG	00F6	NA	Flag: auto-insert mode ($00=off)
LOCKS	00F7	NA	Disable SHIFT/C= CTRL-S
SCROLL	00F8	NA	Disable screen scroll, line linker
BEEPER	00F9	NA	Disable CTRL-G (bell)
	00F9-FA		UNUSED

PAGE 1

FBUFFR	0100-FF	Processor stack area
XCNT	0110	DOS loop counter
DOSF1L	0111	DOS filename 1 length
DOSDS1	0112	DOS disk drive 1
DOSF1A	0113-14	DOS filename 1 address
DOSF2L	0115	DOS filename 2 length
DOSDS2	0116	DOS disk drive 2
DOSF2A	0117-18	DOS filename 2 address
DOSOFL	0119-1A	BLOAD/BSAVE start address(SA)
DOSOFH	011B-1C	BSAVE ending address (EA)
DOSLA	011D	DOS logical address
DOSFA	011E	DOS physical address
DOSSA	011F	DOS secondary address
DOSRCL	0120	DOS record length (REL files)
DOSBNK	0121	DOS Bank #
DOSDID	0122-23	DOS disk ID
DIDCHK	0124	Disk ID check

PRINT USING work area (C128 only)

BNR	0125	Pointer: beginning number
ENR	0126	Pointer: end number
DOLR	0127	Flag: dollar
FLAG	0128	Flag: comma
SWE	0129	Counter
USGN	012A	Sign exponent
UEXP	012B	Pointer: exponent
VN	012C	# digits before decimal point
CHSN	012D	Flag: justify
VF	012E	# of positions before decimal point
NF	012F	# of positions after decimal point
POSP	0130	Flag: plus or minus
FESP	0131	Flag: exponent
ETOF	0132	Switch
CFORM	0133	Character counter
SNO	0134	Sign number
BLFD	0135	Flag: blank / asterisk
BEGFD	0136	Pointer: beginning of field
LFOR	0137	Length of format
ENDFD	0138	Pointer: end of field

PAGE 2

BUF	0200-A0	0200-58	Basic input buffer
FETCH	02A2-AE	NA	Bank PEEK subroutine
FETVEC	02AA	NA	
STASH	02AF-BD	NA	Bank POKE subroutine
STAVEC	02B9	NA	
CMPARE	02BE-CC	NA	Bank compare subroutine
CMPVEC	02C8	NA	
JSRFAR	02CD-E2	NA	JSR to another Bank
JMPFAR	02E3-FB	NA	JMP to another Bank
	02FC-FD	NA	Function execute hook

PAGE 3

		C128 /C64	
IERROR	0300-01	0300-01	Vector to $4D3F/$E38B-output error message
IMAIN	0302-03	0302-03	Vector to $4DC6/$A483-main system loop
ICRNCH	0304-05	0304-05	Vector to $430D/$A57C-tokenize routine
IQPLOP	0306-07	0306-07	Vector to $5151/$A71A-LIST routine
IGONE	0308-09	0308-09	Vector to $4AA2/$A7E4-RUN routine
IEVAL	030A-0B		030A-0B Vector to $78DA/$AE86-eval routine
IESCLK	030C-0D	NA	Vector to $4321/NA -escape token crunch

PROGRAMMING - Commodore 128 Memory Map

IESCPR	030E-0F	NA	Vector to $51CD/NA -escape token print
IESCEX	0310-11	NA	Vector to $4BA9/NA -execute vector
.....	0312-13	NA	Unused ($FFFF)
CINV	0314-15	SAME	Vector to $FA65/$EA31-IRQ
CBINV	0316-17	FOR	Vector to $B003/$FE66-Break interrupt
NMINV	0318-19	C64	Vector to $FA40/$FE47-NMI interrupt
IOPEN	031A-1B	...	From $FFC0 to $EFBD/$F34A-OPEN routine
ICLOSE	031C-1D	...	From $FFC3 to $F188/$F291-CLOSE routine
ICHKIN	031E-1F	...	From $FFC6 to $F106/$F20E-CHKIN routine
ICKOUT	0320-21	...	From $FFC9 to $F14C/$F250-CHKOUT routine
ICLRCH	0322-23	...	From $FFCC to $F226/$F333-CLRCHN routine
IBASIN	0324-25	...	From $FFCF to $EF06/$F157-CHRIN routine
IBSOUT	0326-27	...	From $FFD2 to $EF79/$F1CA-CHROUT routine
ISTOP	0328-29	...	From $FFE1 to $F66E/$F6ED-STOP routine
IGETIN	032A-2B	...	From $FFE4 to $EEEB/$F13E-GETIN routine
ICLALL	032C-2D	...	From $FFE7 to $F222/$F32F-CLALL routine
EXMON	032E-2F	NA	Vector to $B006/NA - Monitor
ILOAD	0330-31	...	Vector to $F26C/$F4A5-LOAD
ISAVE	0332-33	...	Vector to $F54E/$F5ED-SAVE
CTLVEC	0334-35	NA	Vector to $C7B9/NA-Print CTRL chars
SHFVEC	0336-37	NA	Vector to $C805/NA-Print SHIFT chars
ESCVEC	0338-39	NA	Vector to $C9C1/NA-Print ESC chars
KEYVEC	033A-3B	NA	Vector to $C5E1/NA-keyscan logic
KEYCHK	033C-3D	NA	Vector to $C6AD/NA-store key
DECODE	033E-49	NA	Vector to $FA80/NA-keyboard matrix tables
KEYD	034A-53	0277-80	IRQ Keyboard buffer
TABMAP	0354-5D	NA	Tab stop bits
BITABL	035E-61	NA	Line wrap bits
LAT	0362-6B	0259-62	Logical file table
FAT	036C-75	0263-6C	Device number table
SAT	0376-7F	026D-76	Secondary address table
CHRGET	0380-9E	0073-8A	CHRGET subroutine
CHRGOT	0386	0079	CHRGOT entry
QNUM	0390	007C	Check for number

Subroutines to fetch from RAM Banks

INSRA0	039F	NA	Shared RAM fetch subroutine ($03A6)
INSRO1	03AB	NA	Shared ROM fetch subroutine ($03B2)
INDRA1	03B7	NA	INDEX1 indirect fetch
INDRA2	03C0	NA	INDEX2 indirect fetch
ZERO	03D2	NA	Numeric constant for Basic
CUBNK	03D5	NA	Set by BANK cmd for SYS POKE PEEK
TMPDES	03D6	NA	Temp for INSTR
FNBNK	03DA	NA	Bank ptr for string-number conversion
SAVSIZ	03DB	NA	Temp work area for SSHAPE
BITS	03DF	NA	Accum #1: overflow digit
SPTMP1	03E0	NA	Temps for SPRSAV
SPTMP2	03E1	NA	
FG-BG	03E2	NA	Packed fore/background colour nybbles
FG-MC1	03E3	NA	Packed fore/multicolour 1 nybbles

BANK 0

VICSCR	0400-07E7	40-column screen memory
	07F8-07FF	Sprite identity area
	0800-09FF NA	Basic pseudo stack

Absolute Kernal Variables

SYSVEC	0A00-01	NA	Vector: Basic restart
DEJAVU	0A02		Kernal warm/cold start status vector
PALNTS	0A03		PAL/NTSC system flag
INSTAT	0A04		
MEMSTR	0A05-06	0281-82	Bottom of memory pointer
MEMSIZ	0A07-08	0283-84	Top of memory pointer
IRQTMP	0A09-0A	029F-A0	Save for IRQ during tape
CASTON	0A0B	02A2	TOD sense during tape
KIKA26	0A0C	02A3	Tape read temp
STUPID	0A0D	02A4	Tape read IRQ indicator
TIMOUT	0A0E	NA	Fast serial timeout flag
ENABL	0A0F	02A1	RS232 enables
M51CTR	0A10	0293	RS232 control register
M51CDR	0A11	0294	RS232 command register
M51AJB	0A12-13	0295-96	RS232 user baud rate
RSSTAT	0A14	0297	RS232 status register
BITNUM	0A15	0298	RS232 # bits to send
BAUDOF	0A16-17	0299-9A	RS232 baud rate full bit time
RIDBE	0A18	029B	RS232 receive pointer
RIDBS	0A19	029C	RS232 input pointer
RODBS	0A1A	029D	RS232 transmit pointer
RODBE	0A1B	029E	RS232 send pointer
SERIAL	0A1C	NA	Flag: fast serial internal/external
TIMER	0A1D-1F	NA	Decrementing jiffy register
XMA	0A20	0289	Keyboard buffer size
PAUSE	0A21	NA	CTRL-S flag
RPTFLG	0A22	028A	Flag: key repeat $80=all, $40=none
KOUNT	0A23	028B	Delay between key repeats
DELAY	0A24	028C	Delay before key repeats
LSTSHF	0A25	028E	Delay between SHIFT/C= toggles
BLNON	0A26	00CF	Cursor mode $00=blink $FF=steady

PROGRAMMING - Commodore 128 Memory Map

BLNSW	0A27	00CC	Cursor blink enable $00=flash
BLNCT	0A28	00CD	Cursor blink counter
GDBLN	0A29	00CE	Character under cursor
GDCOL	0A2A	0287	Cursor colour before blink
CURMOD	0A2B	NA	VDC cursor mode (when enabled)
VM1	0A2C	NA	VIC text screen/char base ptr
VM2	0A2D	NA	VIC bit map base
VM3	0A2E	NA	VDC text screen base
VM4	0A2F	NA	VDC attributes base
LINTMP	0A30	NA	
SAV80A	0A31	NA	80 col routines work area
SAV80B	0A32	NA	
SAV80C	0A33	NA	
SAV80D	0A34	NA	
CURCOL	0A35	NA	VDC cursor colour before blink
SPLIT	0A36	NA	Split screen raster value
FNADRX	0A37	NA	Save .X during Bank operations
PALCNT	0A38	NA	Jiffy adjustment for PAL systems

MONITOR stores (C128 only)

XCNT	0A80	Compare buffer
HULP	0AA0	
FORMAT	0AAA	
LENGTH	0AAB	
MSAL	0AAC	
SXREG	0AAF	
SYREG	0AB0	
WRAP	0AB1	
XSAVE	0AB2	
DIRCTN	0AB3	
TEMPM	0AB4	

CURBNK	0AC0	NA	Current function key ROM bank
PAT	0AC1	NA	Physical address table
TBUFFR	0B00-BF	033C-FB	Cassette buffer
RS232I	0C00-0DFF		RS232 I/O buffers
RS232O	0E00-0FFF		System sprites
PHKBUF	1000-09	NA	Programmed key lengths
PHKDEF	100A-FF	NA	Programmed key lengths and definitions
DOSSTR	1100-30		DOS output buffer

Graphics variables
1131-38
Line drawing variables
1139-48
Angle routine variables
1149-4F
Circle drawing variables or general use variables or shape and move shape or graphics variables
1150-6F

ADRAY1	117A-7B	0003-04	Vector to FLP-fixed routine ($84B4)
ADRAY2	117C-7D	0005-06	Vector to Fixed-FLP routine ($793C)
LPEN	11E9-EA	NA	Light pen X,Y values
OLDLIN	1200-01	003B-3C	Previous Basic line number
OLDTXT	1202-03	003D-3E	Pointer: Basic statement for CONT
PUCHRS	1204-07	NA	PRINT USING chars (,.$)
ERRNUM	1208	NA	ER = Error type
ERRLIN	1209-0A	NA	EL = Error line number (FFFF No error)
TRAPNO	120B-0C	NA	Line to go to on error (FFxx none)
TMPTRP	120D	NA	Hold trap # temp
ERRTXT	120E		
TEXTTP	1210-11		End of Basic (Bank 0)
MAXMM0	1212-13		Basic program limit $FF00
TMPTXT	1214-15		Used by DO loop
USRPOK	1218-1A	0310-12	USR program jump
RNDX	121B-1F	008B-8F	RND seed value

Music Stores
1220-71
Interrupt Stores
1276-80
Sound Stores
1281-FF

START	1C01	0801	Normal start of Basic text
BASIC			
2000-3FFF			Screen memory (hi-res)
4000-FBFF			RAM memory (hi-res)

BANK 1-

0400-FBFF	Basic variables, arrays, strings

BANK 14- (Same as Bank 15, except-)

D000-DFFF	Character generator ROM (same as C64)

BANK 15-

4000-CFFF	A000-C000	Basic ROM
D000-D030	...	40-col video chip 8564 (Same as 64)
D400-D41C	...	SID sound chip 6581 (Same as 64)
D500-D50A	NA	MMU 8722 memory setup registers
D600-D601	NA	80-column CRTC
D800-D8E7	...	Colour nybbles (Same as 64)
DC00-DC0F	...	CIA1 6526 (IRQ) (Same as 64)
DD00-DD0F	...	CIA2 6526 (NMI) (Same as 64)
DF00-DF0A	NA	DMA controller
E000-FEFF	E000-FFFF	KERNAL ROM
FF05-FFFF	FF81-FFFF	ROM: transfer, jump table*cy

Basic 7.0/2.0 ROM ROUTINES

Label	B7.0	B2.0	Description
BCOLD	4000	A000	JMP COLD START ($4023) Start of Basic ROMs
BWARM	4003	A003	JMP WARM START ($4009)
	4006		JMP $A84D IRQ S/R

PROGRAMMING - Commodore 128 Memory Map

BASSFT	4009	E37B	Warm start routine
INIT	4023	E394	Cold start routine
INITCZ	4045	E3BF	Initialize Basic
TINKLE	4112	NA	Bell
	417A	NA	Set preconfiguration registers
	418D	NA	Set up sprite movement tables
INITMS	419B	E422	Print "COMMODORE Basic 7.0..."
INITV	4251	E453	Set Basic links initialize vectors
INITAT	4279	E3A2	CHRGET routine to move to $0380
	42CE	NA	Indirect fetches:from ($50) Bank 0
	42D3		from ($3F) Bank 1
	42D8		from ($52) Bank 1
	42DD		from ($5C) Bank 0
	42E2		from ($5C) Bank 1
	42E7		from ($66) Bank 1
	42EC		from ($61) Bank 0
	42F1		from ($70) Bank 0
	42F6		from ($70) Bank 1
	42FB		from ($50) Bank 1
	4300		from ($61) Bank 1
	4305		from ($24) Bank 0
CRUNCH	430A		Crunch tokens ($AF8A)
CRUNCH	430D	A57C	Crunch tokens ($0304)
ESCLK	4321		Escape token crunch ($030C)
	43E2		Check if keyword found
RESLST	4417	A093	Table of Keywords
OPLIST	46FD	A140	Keyword vectors
OPTAB	4828		Operator vectors ($AF6F)
ERRTAB	484B	A19E	Table of error messages
ERROR	4A82	A437	Find message (.A) start of error mess
GONE	4AA2	A7E4	Read and execute next statement ($0308)
NEWSTT	4AF6		Set up statement for execution ($AF90)
CONT	4B34	A857	Update CONT pointer
	4B3F	NA	Execute/trace statement
ESCEX	4BA9		Skip statement ($0310)
STOP	4BCB	A82C	Perform STOP
END	4BCD	A82F	Perform END
GETFMN		4BF7	B3E1
	Set up FN reference		
OROP	4C86	AFE6	Perform OR
ANDOP	4C89	AFE9	Perform AND
DOREL	4CB6	B016(S/R)	Perform COMPARE
HIDERE	4D2A	C474	Print "READY"
ERROR	4D3F		Output error ($0300)
	4DAF		BREAK
MAIN	4DC6	A480	Ready for Basic ($0302)
HOHUM	4DCD		Ready ($AFA5)
MAIN1	4DE2	A49C	Handle new line
LNKPRG	4F4F	A533	Rechain lines ($AF87)
INLIN	4F93	A560	Get Basic line
	4FAA		Search Basic stack
	4FFE		Insert in stack
	5017		Check if room for more
	5047		Copy stack pointer
	5050		Set stack pointer
	5059		Delete from stack
FNDLIN	5064	A613	Find Basic line ($AF8D)
LINGET	50A0	A96B	Get FLP number ($AF9F)
LIST	50E2	A69C	Perform LIST
QPLOP	5151	A6C9	LIST subroutine ($0306)
ESCPR	51CD		Escape token print ($030E)
NEW	51D6	A642	Perform NEW ($AF84)
RUNC	51F3	A659	Get ready to RUN ($AF7E)
CLEAR	51F8	A65E	Perform CLR ($AF81)
LDCLR	5238	A677	Reset stack
STXPT	5254	A68E	Back up text pointer
RETURN	5262	A8D2	Perform RETURN

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