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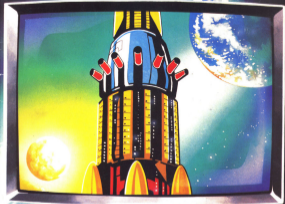
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DATA STATEMENTS

Soft in the Head

THE SOFTWARE MARKET IS NOW entering the quiet season of the year, but having said that, there are still a lot of interesting products finding their way to the shelves of your local computer store.

Going Cheap

BUDGET SOFTWARE IS ON THE UP and up. Firebird has recently been proud to announce that it is the first software company to have its products simultaneously at number one in the UK (Callup) and the Nam (Billboard).

The two products which helped to achieve this accolade are *Shrek*, a game in the Firebird silver range, and the now famous title, *Dino* which has at last made it to the top in the UK at the reasonable price of a mere \$29.95.

Firebird has now announced a new set of budget titles, which, it is claimed, "are available to every computer user and newswriter in the country". These include one game for the C64/C16, *Caves of Eldar*, and two for the C-128, *Rumor* and *Shark*.

Another Firebird offer is the Silver Club, which enables you to purchase a \$1.99 game of your choice and with it you receive a package of goodies and a newsletter.

Not to be outdone, Mastertronix is releasing some new games for Commodore machines.

In the \$1.99 range are two titles. First, a volleyball simulation entitled, *Bump Set Spike - Double Volleyball*. Attributes of the game include: crowd applause, professionally composed music, choice of courts (beach or indoor) and nine difficulty levels.

Those who are interested in sampling the high life of the professional gambler may like to go for *Vegas Poker*, also \$1.99 and for the C64.

Two titles now available on Mastertronix's \$2.99 MAD label are *Conquests* to *Interludes* and *Ice Palace*. The former involves the dramatic scenario of an accident at a nuclear power plant and the latter enters the land of fairy tales to bring you face to face with the wicked Ice Queen.

CRL's budget label, Alpha-Omega, has recently launched a new Commodore title, *Jet Strike Mission*. The game is a combat flight simulator where your task is to avoid enemy air and ground attacks and seek out and destroy the target. The price is \$4.95. Yes, it is on the budget label.

Out of the Arcades



A NEW VERSION OF POPEYE, THE computer game, has been released at \$7.99 by Maximilian Software. The game deals with the classic situations which the spinach-munching hero daily encounters in his attempts to protect his rather ineffectual girlfriend Olive.

Popeye has recently returned to the public eye on TV-RM every day and *Movieguide* is about to launch a new range of Popeye's clothes. If you want to join in this new exciting craze maybe you'll better get the game too! Excitingly entitled *I Hate Myself I Hate*.

Bug-Bite, now under the wings of Argus Press Software, has long been impressing software from down under for release in this country. *Cliff's Fall* and *W-Air Mission* and *Final Assault* is the title of the Aussie game and was in the Top Ten in its home country.

Claims made by *Bug-Bite* for the game are as follows: stunning graphics and sounds, two games in one with four separate sections each, and a ridiculous level of addiction.

Los Adventurers!



FOREIGN SOFTWARE IS ALSO ARRIVING from across the channel. Infogames, a big French software house is soon to release *Manabagone*. The date for launch is, significantly, 16 July, Bastille Day.

The *Manabagone* package includes two cassettes to accommodate the 2000 program, an instruction book and a 180-page book of hints and tips. It's a role playing graphic adventure and there are hints of a trip to the south of France for a few lucky players. Look out for more details.

NEILS the much heralded arcade adventure from new software house, NEILS, is now available for the C64. At a cost of \$9.95, it involves you in an attempt to crack an evil drug ring. Only the NEILS team can supply you with the information you need to complete your mission.

A new scenario for a computer game comes from Arislovak with the release of *Stonking Stones* on the C64. This is a new graphic adventure set at Stone Henge, where you must recover the Coal, Mitchell Chain Mail and other fabulous treasures from ancient folklores. The treasures lie hidden deep beneath the ancient monument. It's \$14.95 on disk.

The long awaited Japanese adventure from Virgin, *Shogun*, has now been released and Virgin hopes it will do as well as the book and TV series which preceded it.

The game is check-a-block with 40 characters and you may choose which one you wish to be. Each one has a personality and life of its own and you must learn to manipulate these. *Shogun* is \$29.95 on cassette and \$19.95 on disk.



Touch Line

Revised: Wellington House, Upper St Martin's Lane, London WC2H 9DL, 01 379 6700.

Mastertronic: 8-10 Pav 74, London EC2A 4PH, 01 277 5099.

Alpha-Design: 9 Kings Yard, Cannonm's Rd, London E15 2HD, 01 985 5477.

Microware Software: 4 Link Lane Street, London WC2R 3LF, 01 838 0613.

Big Bytes: Liberty House, 221 Regent Street, London W1B 7DB, 01 479 8800.
Micro: 125B Avenue, 30 High St, Beckenham BR3 1AB, 01 658 5721.

Arctian: 68 Long Acce, Covent Garden, London, 01 336 3471.

Virgin Games: 2-4 Vinton Yard, Portobello Road, London W11 2BS, 01 737 8073.

But Seriously

OPERATION ALIGNMENT, FROM Global Software, is an offspring of Operation Carriker, a product released last year. The new package contains just the alignment tape and screwdriver for adjusting tape heads and is into smaller matter. The price is smaller too at £5.95.

Kuma Computers is entering the Amiga software market with an Editor/Assembler/Debugger named K-Seka.

The package includes an Editor, Disassembler, Linker and Machine Code Monitor and operates under Amiga DOS.

K-Seka is available now and costs £79.95.



Touch Line

Global Software: PO Box 67, London SW11 1BS, 01 228 1380.
Kuma: 52 Haverhill Park, Pangbourne, Berks, 0757 4033.

And the Rest

ACTIVISION HAS BRANDED INTO the world of psychology to give you the chance to live out your life over and over again - how horrific!

The new game is called Alive! and it delves into every aspect of your life, from birth to old age. The program processes and tracks the player's input to develop the alter ego's experiences, status and personality.

A status report shows the player which ego attributes influence his alter ego's skills in several areas: social, intellectual, emotional, physical, familial and vocational.

Because of the nature of the program there are different male and female versions.

There is also a warning which comes with the game. Because of the nature of some of the material used it is unsuitable

for under 16s and PARENTAL DISCRETION is advised.

Have you a little Vic sitting in the cupboard under the stairs and gathering dust? Well, now it's time to let it see the light of day again!

Umscoff has come to the aid of languishing Vic-20 owners with the Viva Vic collection. Games such as Abolisher, Critchman, Traxx, Amiga Attack, Casanova, Atlantic, Metagalactic Game Battle at the Edge of Time and Hellgate.

It is now available in 8K or 14K repartition and costs £8.50.

Touch Line

Activision: 21 Ford Street, Hampstead, London NW3 2PP, 01 452 1181.

Umscoff: 48 Alport Crescent, Teddley, Middx, 07158 4476.



Hard Lines

MICROTEK HAS COME UP WITH A telnet adapter for the Cit 6 or 520 so that users can access the hundreds of free telnet pages available 24 hours a day on all four UK channels.

It is suitable for use throughout Europe (except France) and Australia and New Zealand. The free pages which can be accessed using this adapter include news, finance, sport and features. Any page can be saved to disk and re-used later.

For the overall price of £85.99 the adapter is supplied plus a connecting lead, software on cassette and a manual. There is a 12 month guarantee on the package and the software is copy-protected so backup copies can be made.

Miracle Technology's 64 Multi-modem has now received British Telecom approval.

The new modem is semi-driven and multi-speed. It supports CCITT V21/22 and Bell standards. Handles baud rates of 300/300, 1200/75 and 75/1200. This allows access to Postel, Micromet and Microlink and numerous on-line data services and bulletin boards. It costs £298.50 (£118.15 including VAT and UK delivery).

Touch Line

Micromet 7 Beldip Place, Harmondsworth, Bucks PO8 9PA. 0750 570605.

Miracle Technology 11 Priory Street, Ipswich IP1 1GB. 0471 276143.

Generally Speaking

A FUROR HAS BLOWN UP IN THE tape manufacturing industry over government plans to introduce a tape levy on blank audio cassettes.

Christopher Hobbs, Chairman of the Tape Manufacturers Group said it would be "an administrative nightmare to have an expensive red tape perforated with legal loopholes".

The group has issued a whole lot of objections on behalf of the manufacturers. They state that home taping doesn't damage copyright owners' interests, that no distribution of the money realised by the government levy could be fair. The levy would inflate the price of tapes and the administration to collect money raised in this way would be cumbersome. The rebate system would also penalise the disadvantaged, such as the blind, because it would not include identifiers and retailers mark-ups. There is also a possibility that the levy is illegal under EC law.

The Consumers Association has also come out against the government in this issue saying that the levy on blank audio cassettes is a "typical exercise in producer muscle".



Raymond McRoberts of the Consumers Association said: "Ordinary customers who buy blank tapes are not pirates or counterfeiters, and they don't make dozens of copies of copyright performances."

Yellow Pool

BRITISH TELECOM IS TO introduce an electronic version of the Yellow Pages Directory. Information on advertisers will be held on a central database accessible to anyone with a suitable communication terminal.

Initially, the Electronic Yellow Pages (EYP) will contain information covering the London, Reading and Guildford areas.

Richard Hooper, of BT's Value Added Systems and Services Division said: "Electronic Yellow Pages will be a valuable addition to our growing range of electronic publishing products. EYP will not be a substitute for the printed book, but, as an extension of it, will

allow Yellow Pages advertisers to meet a real market need by adding up-to-the-minute information to their advertising.

The new service will be launched in January 1987.

Touch Line

Consumers' Association 14 Buckingham Street, London WC2H 9BS. 01 839 3122.

The Tape Manufacturers Group Aspect PB, 17-19 Foley Street, London W1P 7JL. 01 580 8074.

British Telecom 81 Newgate Street, London EC1A 7AL

DATA STATEMENTS

Stop Press

IN A NEWS ITEM BY OUR ELNE 1986 issue, we stated that Arkolochi was giving prizes to 12 people who achieved a handicap of zero in Golf Construction Ltd. In fact, there is only one prize which will be awarded to the best person in either this amazing list. We would like to apologise for any confusion caused by this error.

Also in the June 1986 issue, we published the wrong address with our article 'Cautiously Speaking', which reviewed the Yellow 44 package. The product is from CRI - not Aristocrat - and can be obtained for £4.95 from CRI, 9 Kings Yard, Capenhurst Road, London E15 2ED. Tel: 01 913 2918.

COMPETITION

This month we bring you a

musical competition from

Nu-Wave.

REMEMBER MIKE OLDFIELD'S CLASSIC album, *Tubular Bells*? It was a cult in the twenties and now Nu-Wave Software has introduced it to the computer era with an alternative style of software.

Nu-Wave's *Tubular Bells* program features the entire soundtrack of the original album plus graphics which keep time to the music and also compliment it.

We have a top prize of a copy of *Tubular Bells*, the album, signed by Mike Oldfield, plus *Tubular Bells*, the video and *Tubular Bells*, the computer program. The top prizewinner will receive all of these.

There are also 21 runners up prizes of copies of the Nu-Wave program.

How to Enter

We want you to show us your knowledge of popular music by naming a maximum of seven song titles which feature the names of the days of the week. You should have one song title per day.

For example, if you think there is a song called 'You only love me on Mondays', then write this in the space provided on the entry form and go on to Tuesday. There may be a song called 'Tuesday Girl', if there is then this could be your answer for Tuesday. Continue until you have thought of as many as you can, remembering that we only want ONE for each different day.

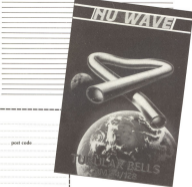
When you have completed this, fill in the rest of the entry coupon and seal it in an envelope. Write the number of titles you thought of on the back of your envelope. You may enter as many times as you wish but each entry must be sealed in a separate envelope and on an original entry coupon not a copy.

The closing date is Friday, 26 August 1988. Send your entry to: Nu-Wave Competition, Your Commodore, 1 Golden Square, London W1R 3AB.

The Rules

Entries will not be accepted from employees of Argus Specialist Publications, CRI and Alabaster Pizzmore and Sons. This restriction also applies to employees' families and agents of the company.

The How to Enter section forms part of the rules. The editor's decision is final and no correspondence will be entered into.



Nu-Wave Competition
Entry Coupon

Name

Address

post code

Monday Song

Tuesday Song

Wednesday Song

Thursday Song

Friday Song

Saturday Song

Sunday Song

Send your entry to: Nu-Wave Competition, Your Commodore, 1 Golden Square, London W1R 3AB. Closing date: Friday, 26 August 1988.

BUG-BYTE



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HOOOOO VOODOOO

Defeat the Bloopalpaop curse of Krolio IX, amazing graphics.



SOLO

Fast and furious action. The Battegroms are coming



RUPERT

Lots of slippery fun with Rupert's chums. 4* review (C.C.).



LEAPER

All action, animation, 8 Credits, the best VW and great music.

Argus Press Software Group Liberty House, 222 Regent Street, London W1R 9 7DB 01-439 0888

"Bite Me" bright yellow tee shirts are go-go-great — C3 (S/M/L)

Selected titles are available at W. H. Smiths and all good computer stores.

TOUCHDOWN

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address, to **Activision, P.O. Box 411, London W91 3BQ.**)

Touchdown Football C64 Disk £24.95
Cassette £9.95





Eric Doyle takes a look at

Microsoft's new game —

Biggles.

BIGGLES HAS BEEN THE HERO of many children down the years and, with the advent of the movie, Microsoft has released the computer game.

Biggles is a flying ace who goes into all sorts of scrapes with his friends Agy, Bertie and Clinger. In the film story, several new characters are introduced including the beautiful double agent Maria.

The computer program is heavily based on the film. It comes in two parts: *Timewrap* and *Sound Weapons*. *Timewrap* must be completed first if you want to stand a chance of completing the *Sound Weapons* in part two.

Timewrap is really three games in one. Biggles appears in a biplane shooting down enemy fighters in 1917. He can then swing into present day London and then back to ground combat in 1917.

Biggles in the Air sees our hero being hit by enemy planes and flak. He can fire his cannon at the planes or drop bombs on the carriers but his bombs are limited. You always have to keep one bomb in reserve to hit an enemy aerial which replenishes your supply. Manipulating the plane to avoid the enemy fire becomes quite tricky, especially when an enemy plane is circling in on you. At the same time a flash of lightning can mean you jump into one of the other games if you are hit by enemy fire or if you drop you into an enemy trap.

Biggles' London escapade sees Bertie and Biggles swimming across the rooftops of London. They must escape to keep Bertie's back to the building, avoiding enemy patrols and guards. Only one of the roofs can be moved at a time, the other stays awaiting his turn to move. At all times both characters must be on the screen. The strategy is to take a long run up and jump across to the next building, avoiding the patrolling guards. Then find somewhere

safe for the character to wait while you bring his twin across.

This is not an easy task especially when an sniper starts shooting from a nearby window. Once again time wraps will blast you out of this scenario.

In *Biggles* on the Battlefield you may think for a moment that you've stepped into a game of *Commando*. You haven't, but the rules are similar. Shoot all the guards and throw hand grenades at the pill boxes to silence the guns. Biggles has little room to dodge about in and he has to descend into one of the many caves to restock with grenades when his supply runs out.

As a guide to your success rate these icons are shown at the bottom of the screen. Each time you fall and are killed, a piece of iron disappears. If an icon vanishes, you must start again.

If all three games are completed in the correct order, you'll find yourself in London, you are given a task which to start the second part of the game.

The *Sound Weapons* is a helicopter flight simulator but don't think that worries you. The controls are simple and the graphics with some scrolling give added touch to the game.

Before attempting the *Sound Weapons* you have to perform certain tasks. One of these is to pick up a radio which is in the allied camp and use it safely to the command. Flying the helicopter requires good practice at controlling the helicopter using the radar and compass to keep on the correct heading.

The radar has two modes of operation. In long range mode it shows the sector you are currently in and the type of enemy you may encounter. Scrolling areas of heavy enemy infestation is advisable until you are sure of your combat capabilities. Other areas may also have enemy planes which could prove costly.

The hints and tips given for this section are invaluable otherwise you could be wandering across the extensive mapped area for a while. You are told to examine the world map carefully before heading for the command,

extra fuel and Biggles' friends are somewhere around here so the hint is worth taking because without these the mission will fail. Each friend has a particular skill or ability. For example, one of the team is good at repairing the helicopter and should prove invaluable when the heat is really on.

Eventually you will locate the weapon's area and complete your mission by using it.

Several games of *Biggles* have been shipped without, at the least but this one does not have any sense of the mission or the plot. When playing the game, *Timewrap* extremely quickly, but when you think you've made it you're never method of attack you find that you've boxed yourself in with no hope of escape. Sometimes it is for a lack of bombs or grenades, another time it will be a patrolling rooftop guard or a short run up for a long jump that ends your life and sends you off into another scene.

The graphics are not the best I've seen but certainly nothing to complain about. *Microsoft* like is the best description.

The program is accompanied throughout by music. No facility is available to switch the music off but at least it's not too irritating. Produced by Tony Crowther's little team, the music is good but Roy Hubbard is in danger of losing his crown as the best future.

When reviewing a game I like to play through as far as possible. Unfortunately the fact that you need to complete the first part before standing a good chance of completing the second game means that I only really viewed the *Sound Weapons* scene as a tourist rather than as a combatant but I must say I was impressed with what I saw, even if it did resemble a poor man's *Firefox*.

When a game offers as many challenges as the one done it would be impossible to say that it lacked appeal. This is one of those packages with something for almost everyone and should not be ignored. If you have any doubts don't ignore the game try to find a copy and give it a whirl.

COULD THIS BE YOUR PROGRAM?



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peripherals used and your name, address
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★ STAR QUALITY ★

Eric Doyle gives his verdict on the Star NL-10 printer

PRINTERS ARE A PAIN IN THE NECK. They use convoluted codes, failed letters on the Commodore printers do not descend below the line, other printers need interfaces which means more spaghetti trailing out the back of my computer, and the printers look like a monochrome attack of the measles. If you've ever rolled any of these reasons for not buying a printer, Star Electronics must have been listening because the NL-10 printer goes a long way to eliminating them.

First and foremost, the printer is available with a Commodore interface which fits neatly and easily into a recess in the back of the printer so you don't spoil its very nice appearance. Connection to your Commodore is via

the usual standard DIN lead and the interface has two sockets to allow daisy chaining to other peripherals such as a disk drive. A secondary benefit of this is that if Commodore ever changes to a new printer operating system, Star can produce a new interface module to match and save you the expense of buying a new printer.

The interface allows you to select PETSCII code (Commodore's character numbering system) or ASCII code at will. This can involve typing a code such as:

```
PRINT #4,CHR$(27),CHR$(96),CHR$(96)
```

Just thought I'd show that in to panic you. Star does not totally get away from the CHR() hex notations but some of the standard printer features can be changed either by the usual array of DIP switches or by skillful use of the diagnostic switches on the front of the printer.

Switched On

The DIP switches are easily accessed at the back of the printer but I don't see why DIPs are so loved by the majority of printer manufacturers. They're so small that you have to use the tips of a ballpoint pen or a small screwdriver to flip them. Admittedly, a three year old child could use them but my fingers are substantially thicker than that. In a business environment these switches would normally only be set once but I have to see them a lot in my work and they really are a nuisance. My own theory is that a part has been made with ballpoint pen manufacturers to offset the unemployment that wordprocessors may create in their industry!

The switches are set as a bank of eight allowing or negating auto line-feed and paper-out detector, or for setting a standard page length, device number plus ASCII/Commodore mode. Several

THIS IS THE N10 TYPEFACE

THIS IS THE STANDARD DRAFT PRINT WITH UNDERLINING

THIS LINE IS CONDENSED PITCH

THIS LINE IS IN ELITE PITCH

THIS LINE IS IN NORMAL P104 PITCH

THIS SHOWS PROPORTIONAL SPACING

EXPANDED CHARACTERS

BOLDFACE

EMPHASIZED

EMPHASIZED BOLDFACE

EITHER SUPERSCRIPTS OR SUBSCRIPTS IF YOU PREFER

ROMAN CHARACTERS OR ITALICS

DOUBLE OR EVEN QUAD SIZED PRINTING

foreign character sets can also be selected using a combination of three of the switches.

The front panel selections are used singly or in combination to allow quick access to various useful printer modes. By holding down the relevant keys when you switch on, you can initiate a printer test, start up in NLQ italic mode or switch the computer into hex dump mode.

NLQ stands for Near Letter Quality which means that the printer lays two passes to print a line but the quality is very close to that achieved by a typewriter or daisywheel printer instead of the lesser quality achieved by straight forward single pass printing (draft mode).

The hex dump mode is very useful for checking the output from your computer to the printer. Instead of the usual set of characters the printer gives the information in use hexadecimal numbers. It is also a quick way of doing a memory dump for machine code programming purposes.

Now that I've actually reached the point where the printer is turned on we can look again at the other special features of the NL-90.

Features

The front panel switches can now be used to carefully align the top of the paper (TOP) with the printer head and

set the right and left margins.

The ability to set margins does rather spoil the neat feature on the panel which allows you to select the number of characters per line. These figures are specified for the default width of the printed line and are measured in characters per line (CPL). If you set margins to anything other than their default values, then the maximum value of CPL alters too. I would like to see the measure of characters per inch (CPI) listed alongside the CPL value instead of being hidden away at the back of the manual.

For the record the values of CPL given are 80, 96 and 128 in draft mode plus 80 in NLQ.

In addition to the normal pitch widths characters there are three other typographic styles, condensed and the aforementioned italics. Bold, expanded, emphasised, underlined, double and quadruple height and width characters plus proportional spacing can also be produced. Of these only bold can be selected directly from the front panel. If this is not enough you can define your own characters for special purposes.

Defining characters is the strong point of matrix printers over daisywheels because it allows the dumping of high resolution screens on to paper. Doing this does involve an extensive amount of programming and for most people it would be beyond their

abilities. Nearly all commercial daisy wheel programs have a screen dump facility, however, and magazines have often published them in the past. Most of these utilities are designed for Epson printers but because of the compatibility of this machine with the Epson standard most routines will be usable with the NL-90.

Using the machine has proved to be delight. Speaker wheels allow the use of tractor-drive paper and a friction platen will pull normal sheets of paper through. This means that it is ideal for business or private use. There is a selector switch to the right of the platen which determines the paper feed mode and/or the adventurous a sheet paper hopper for auto-feed is included.

Although Star has gone a very long way towards user friendliness, the company has failed to take advantage of the capabilities which its machine specific interface allows. All of the CHR8 code could have been replaced with simpler, user-friendly commands. Perhaps in future models this will be rectified, after all we're not a nation of computer buffs. Compared to the opposition, this machine is either more advanced or cheaper and offers great value for money.

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WELCOME TO THE MACHINE

Allen Webb on the complexities of machine code.

First a little snippet of news. I hear that Ocean has bought out a new assembler system—Laser Genix. The company tells me that the assembler part is the same as *White Lightning* but there is a new feature—an analyzer is included. Apparently this allows you to set intelligent break points and, on breaking, examine the previous instructions. It certainly sounds like the answer to many problems.

The BIT Instruction

There is a handy instruction called **BIT** which performs a logical AND (see later this part) of a memory location and the accumulator. As usual this is non-destructive, if the result of the AND is zero, the zero flag is cleared otherwise it is set. Additionally, the overflow and negative flags are set according to the value of bits six and seven of the memory location. Listing 1 gives a way of generating a non-destructive cursor using **BIT**.

Listing 1

```
10 ASSEMBLE $U
20 $I$4 =%C$80
30 $I$4 LOCOP BIT $0400
40 $I$4 $I$4 LOCOP1
50 $I$4 LDA $0400
60 $I$4 ORA $130
70 $I$4 STA $0400
80 $I$4 PMP DELAY
90 $I$4 LOCOP1 LDA $0000
100 $I$4 AND $137
110 $I$4 STA $0400
120 $I$4 DELAY1 LDR $700
130 $I$4 DELAY1: DRY
140 $I$4 $I$4 DELAY1
150 $I$4 DCS
160 $I$4 $I$4 DELAY1
170 $I$4 PMP LOCOP
180 $I$4 ]
```

This routine is rather convoluted but illustrates one way of using **BIT** to monitor bit seven of a single memory

location (in this case, the top left corner of the screen). Since **BIT** functions only in absolute and zero page, it isn't really suited to perform this function for the whole screen unless you load the current cursor position by indirect indexing into a memory location and **BIT** that.

Line 100 copies the value of bit seven of the contents of location \$0400 into the negative flag. It happens that this bit is used to show whether or not the character on the screen is normal or reversed field, if bit seven is set (reversed field character), the program branches to line 140 where the bit is cleared (line 120 clearing). Otherwise line 100 sets the bit. Lines 100 to 200 perform a simple delay.

You will notice that lines 130 to 170 use some new instructions. These are some of the logical or Boolean instructions. Boolean instructions set various flags to allow the combination of bit patterns. These are used in a variety of ways.

The **AND** instruction follows the following truth table:

A	1	0
0	0	0
1	1	0
0	0	0

Using this table if **AND** two set bits, the result is a set bit. All other combinations result in a zero bit. Imagine that you want to ensure that a location never holds more than 15. The bit setting sequence will ensure this:

```
LDA number
AND #15
STA location
```

If the accumulator contains binary %11001010, the sequence will have the effect:

```
%11001010 AND %00001111 =
%00001010
```

We have effectively masked out the top four bits. Hence by using **AND** we can selectively remove or retain bits.

Line 120 in listing 1 clears bit seven by **AND**ing with 127 (%01111111). The next instruction is the inclusive **OR**. This has the truth table:

A	1	0
1	1	1
0	1	0

In effect, if either bit is set, the result is a set bit. **OR** allows the selective setting of bits. Line 130 in listing 1 sets bit seven by **OR**ing with 128 (%10000000).

Finally we have the exclusive **OR** (**XOR**):

A	1	0
1	0	1
0	1	0

This instruction can be used as a comparison tool since dissimilar bits result in a set bit. It can also be used to complement or invert a bit pattern. Consider the effect on:

```
%101101101008 %11110111 =
%00000000
```

This effect is very handy in graphics to obtain reverse field effects.

Summing It Up

Last time I was very friendly in my dealing with arithmetic. Things are in fact a little more involved than I indicated but I didn't want to put you off there. Now, unfortunately, we have to look at things in a little greater detail.

The rules for adding binary are quite simple: Two zero bits, when added result in a zero bit. Adding a zero bit to a set bit results in a set bit. Adding two set bits results in a zero bit and a set carry. The following examples will show what I mean:

```
0010 + 0011
0100 0101
0110 0111
```

I've already mentioned that bit seven is the sign flag. What happens, therefore, if your addition gives a result with a set seventh bit? Clearly this is incorrect since we've generated a negative number. The answer to this problem results in an overflow which sets the **V** flag. Here is an example:

```
%001100-
%000000
%001100
```

The overflow flag is set when there is a carry from bit six to bits seven and can occur in one of four situations:

- When large positive numbers are added.
- When large negative numbers are added.
- When a large positive number is subtracted from a large negative number.
- When a large negative number is subtracted from a large positive number.

Clearly, you must make allowances in your coding to check for overflow if you are using signed arithmetic.

In signed binary, bit seven is set to denote a negative number. Consider this example in which we try to add 40 to -3:

```
40 ..... 00010000 +
-3 ..... 11111111
11111111
```

The result is -71, which is clearly incorrect. There is a bug in adding binary this way. The solution is to use the concept of two's complements to represent negative numbers. To get the two's complement, you invert each bit and then add one. Here are two examples:

```
1 - 00000101
invert the bits: 11111110
```

```
add 3: 11110111 = 5
8 = 00001000
Invert the bits: 11110111
add 3: 11111000 = 8
Let us go back to our earlier
example but using two
complementers:
+8...000001000 =
-3...111111100
000001000
```

The answer is five as required. We ignore the carry flag. Using two complementers, we can add or subtract signed binary numbers at will. It won't take much thought to realize that subtraction is simply the addition of a number to the two's complement of the other.

These concepts will be of great value to those of you who wish to manipulate real data rather than playing games. If that is your goal, then further reading from a standard text, such as *Basic*, is mandatory.

Those of you who have used electronic measuring equipment, may have come across Binary Coded Decimal (BCD). This is a frequently used format for data transmission. The 8255-8256 allow you to use BCD. To enter decimal mode, you must set the Decimal flag with the instruction **MD**. To return to binary mode, you clear the flag with **CLD**. In decimal mode, a byte is used to hold two four bit coded numbers. This is:

CODE	BCD DIGIT
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9

Consider a location holding the bit pattern 01100110. In binary mode it contains 34. In decimal mode it contains:

```
0110 0010
= 22
```

The reason is that the left nibble contains the 10 coded

as above and the right nibble contains the units. Try listing 2:

Listing 3

```
10 ASSE=0010 001
90 R104 =+C=000
100 R104 000
110 R104 CLC
120 R104 LDA 000
130 R104 ADCA 001
140 R104 STA 002
170 R104 CLD
180 R104 RTS
190 R104 |
```

Try running the routine both in decimal mode and in binary mode (by erasing line 90). If you try with a value of six in each of 000 and 001. I.e. you are adding six and six. You should get 12 in binary mode and 12 in decimal mode. The reason is that the result of adding six and six is put into 002 as the two nibbles representing one and two.

```
0001 0010
1 2
```

When you peak 002, however, you get 18 since 18 in binary is 0010010. Try some other combinations of numbers. Never forget to include the **CLD** instruction before you return to *Basic* since failure to do this will cause a crash.

BCD can also be of use when calculating scores in games without recourse to floating point.

The Stack

I have previously mentioned an area of memory called the stack. It might be a good idea if we finish this issue with a few paragraphs on this item.

The stack is essentially a scratch pad which the microprocessor uses to remember things. For example, when the processor executes a jump subroutine instruction, it must somehow remember where to return to at the end of the subroutine. It therefore saves details of the return address on the stack. The size of the stack is limited which explains why you are limited in the number of nested

CALLs you may have in *Basic*.

Not only is the stack useful to the machine, it is also useful to you. It is a simple matter to temporarily push data on to and pull data off the stack. Four instructions perform such tasks: **PHA**: pushes the accumulator contents on to the stack. **PLA**: pulls the next stack value into the accumulator. **PHP**: pushes the status register on to the stack. **PLP**: pulls the next stack value into the status register.

The current value on the stack is monitored by a eight bit register called the stack pointer. It is often handy to save or alter this pointer. Two instructions allow this:

SPA: transfer stack pointer to S register.
SXA: transfer S register to the stack pointer.

One word of warning, you must take care to balance your push and pull instructions and monitor how you change the stack pointers. If not, you may end up with a nasty crash.

Homework

You may find these problems a bit more challenging.

- Write a routine to plant a character at a specified location on the screen. (Hint: If X is the horizontal position (1 to 40), and Y is the vertical position (1 to 25), then the memory location occupied by the character is given by $LCY=1524+(Y-1)*40+X$.)
- When plotting high resolution graphics, a new point is created by ORing the relevant memory byte with a mask corresponding to the point to be set. This mask is equal to two raised to the power of the bit number corresponding to the position of the point in the memory byte. Why?
- Running on from question 2, the following sequence of code will set the bit whose value is in the S register and the memory location to be masked is held in R10 and SPC:
 LDN S;
 LDN R10

```
LDA R0FLY
ORA TABLEX
STA R0FLY
RTS
```

TABLE 001E LEADR0FLY,00A120

Write a similar routine which will erase a specified point. If you're unsure about how high resolution graphics work, try reading the *Compendium of Programmers' Reference Guide*.

The Answers

Last month we started on simple 76 bit arithmetic. The homework should help reinforce the material discussed.

The first question was a bit of a trick question. To multiply an eight bit number by 256, you simply move the eight bit number into the most significant byte of a 16 bit number and zero its least significant byte.

Question 2 is a frequently met situation where you're handling data on the screen and you want to move down a line. Here is my solution:

```
10 ASSE=0010 001
90 R104 =+C=000
100 R104 CLC
110 R104 LDA 000
120 R104 ADC 040
130 R104 STA 000
140 R104 BCC 001
150 R104 INC 001
160 R104 EXIT: RTS
170 R104 |
```

The third example was simply included to make you think a bit. This solution is the nearest I can come up with:

```
10 ASSE=0010 001
90 R104 =+C=000
100 R104 CLC
110 R104 ANI 000
120 R104 RCR 001
130 R104 LSR 005
140 R104 RCR 002
150 R104 CLC
160 R104 LDA 000
170 R104 ADC 002
180 R104 STA 004
190 R104 LDA 001
200 R104 ADC 003
210 R104 STA 006
220 R104 RTS
230 R104 |
```

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Title:
The Anatomy of the Commodore
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Author:
K Greis, J Scheib & F Thrus
Publisher:
First Publishing Ltd
Price: £12.95

SUCH A DETAILED BOOK AS THIS often takes many months to clear all of the copyright problems which precede its release. It's immensely pleasing to see the C128 laid bare to the enquiring mind so soon after the machine's UK release.

The book is in two principal sections: a long and detailed look at accessing the facilities offered by the computer and a full disassembly of the ROM routines.

Although the book goes into depth on the 128 mode, the CP/M mode is a little more sketchy and 64 mode is almost ignored. This is not really a criticism of the book, after all the C64 is well documented already and the CP/M section does give enough detail on the Commodore CP/M to allow a general book on CP/M to take over.

The first chapters deal with 128 programming for the informed user. No long duplications of Commodore's introduction to Basic here, it's straight in to the control programs for the Binary Management Unit, 80-column high resolution screen, accessing the Kernel routines and much much more.

Each chapter is dedicated to an individual chip (including the 280 and 8563 video chip) and technical specifications are revealed alongside the more digestible hints, tips and

programs.

The ROM disassembly is highly detailed with a short description accompanying each line of code so that the reader can easily determine just what the ROM is up to at any particular point.

If you're serious about your 128 you can't do better than this impressive tome.

Title:
Tricks and Tips for the C-128
Author:
T Wehnec, R Hornig, J Trapp
Publisher:
First Publishing Ltd
Price:
£12.95

SOAL OF THE CONTENTS OF THIS book are duplicated in the Anatomy of the Commodore 128 but in no way does it destroy the value of either. Tricks and Tips is aimed more at the intermediate programmer than the advanced user but, as an introduction to the hidden abilities of the machine and as an aid to fledgling machine code programmers looking for something to do with their new found knowledge, it has no peers.

The large typeface used throughout the book could be described in kinder moments as a useful concession to disabled readers who gain a lot of pleasure and practical help from their computer. If I want to be wicked, I would say that it uses more paper and makes the book look as thick as its companion books thereby justifying the

cover price, but I wouldn't be that nasty.

The routines given, range from simple software protection on disk and tape, interrupt driven music, graphics routines, sprite and character generators, multiple windows and the MMIO. There is even a section on adding extra commands to Basic. For those throwing their hands up in horror saying that there are enough 128 commands for even the most discerning programmer, buy this book you'll definitely benefit from it!

Many of the smaller tips are little gems which would take months to unravel if this book was not in your library. The book fully describes all of the techniques used in clear concise English (the authors are German) and it should provide hours of fascinating study.

Title:
Commodore 64/128 Graphics
and Sound Programming
Author:
Stuart Krutz
Publisher:
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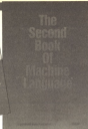
DON'T BE FOOLED BY THE TITLE, THIS book is valid for the C64 or the 128 in 64 mode. Although this title looks good on the cover, I think it will put off more buyers than it attracts. C64 owners may gaze it over with a cynical glance thinking that half of the book will prove irrelevant to their machine.

Kicking off with sprite programming, the book soon advances to moving the shapes around the screen and overlay animation techniques in unicolour and multicolour. The author then moves on to deal with character graphics in a similar way and then we have an elementary high resolution chapter. The listings, and there are an awful lot of them, are in Basic, very clearly printed and they work slowly.

The audio section deals with the shaping of musical sounds and sound effects. There are a few really good notes in amongst this lot. One criticism I will make is that a sample program using machine code interrupts would have stored quite nicely in with the sample machine code program at the end of the book.

The final section puts it all together,

BOOKS



sound and graphics in synchrony, the simple program is especially synchronic. It's a full program. Two creatures take turns dropping from a rooftop on to a net-line, catapulting the other back up to the book. Surely a small single-game could have been developed from this!

The appendices give grids and programming aids which are the best thing this book has to offer.

Title: The Second Book of Machine Language
Author: Richard Mansfield
Publisher: Computer Books/Holt Saunders
Price: \$12.95

IF MACHINE LANGUAGE FOR BEGINNERS was an introduction to the rudiments of machine code, then this book is an essay on the grammar of the language. More than this, working through the book gradually builds up a powerful assembler program which not only teaches the basics of machine code programming in detail but also acts as a useful addition to your utility library for creating your own routines and programs.

As the name suggests, the Label Assembler Development System (LADS) allows the use of labels and comments within a program which looks like a normal Basic program except that it uses its own mnemonic language based on normal machine code mnemonics.

This forms a much easier way to construct a machine code program and not being in code itself means that it can be used to show many of the facets of programming including communicating with peripheral devices and maintaining a database.

The book is written in intelligent English which assumes nothing more than a bit of common sense and perseverance on the part of the reader. Perseverance comes in useful because you have to enter several pages of data which lacks the customary check-sum features of other books in the Computer series.

An appendix of useful subroutines for incrementing, adding and subtracting double byte numbers, multi-byte addition and multiplication and division adequately cover areas which can be problematic to beginners.

Undoubtedly, the contents of this book offers great value for money to anyone interested in a good introduction to machine language.

Title: Tool Kit: Kernel
Author: Dan Heeb
Publisher: Computer Books/Holt Saunders
Price: \$13.95

COMPUTER GAZETTE IS A RATHER EXPENSIVE American magazine which is a mine of information for Commodore, Apple and Atari users, and Computer's

books of abstracts for each machine are always good value for money.

Tool Kit: Kernel may sound like a collection of utility programs but it is a description of the ROM kernel routines at the end of the memories of the C64 and V16 30.

The book is not fully self-contained and Computer's Tool Kit: Basic, which deals with the Basic ROM, along with a full disassembly of the kernel memory would be a useful companion to help gain the full benefit from the wealth of information contained in this book.

Each chapter is a grouping of the various subroutines in 'family' groups. For example, all the tape I/O routines form a large chapter which not only describes the routines but explains the



way in which a tape file is structured. Other chapters deal in a similar way with interrupts and system reset, screen, serial I/O, RS-232 and principal kernel routines.

Apart from giving details of the subroutines and their relatives, there is a smattering of hints and tips and short useful programs which demonstrate how the kernel may be used within your own projects.

The routines are listed in memory order and abbreviated groupings in two final appendices that a more standard index would have improved the facilities offered by this very useful book.

SHELF

Bookworm, Eric Doyle,
 delves between the covers
 of the best Commodore
 books.

MAKING

Stuart Cooke takes a look at

The Commodore Music

Expansion System

THE COMMODORE 64 IS WELL known for its musical capabilities. In fact the sound is so good that some companies are manufacturing audio cassettes of computer music so that you can listen to computer music on your hi-fi!

Not satisfied with having a computer that has some of the best sound, Commodore, together with Music Sales, has gone even further and produced the Sound Expander.

The Expansion System consists of a small box which plugs into the cartridge port on either a Commodore 64 or 128. This small box will then give your Commodore the ability to play eight different notes at once together with a drum backing sound and numerous solos.

The Expansion System contains an FM Music Synthesizer chip which produces all of the sounds. FM Synthesis is used in the very popular Yamaha DX7 synthesiser and gives your computer facilities very similar to these very expensive machines.

In Use

Obviously before you can use the interface you will have to put the sound through some sort of amplifier. Leads are provided with the interface so that you can put the sound through either a television or a monitor. The best sound reproduction is achieved by putting the sound through your hi-fi or a music amplifier, the sound output going from the interface to the AUX input on your hi-fi. The lead to do this is not included so you will have to buy your own.

Once the controlling software is loaded from either tape or disk you can make music.

The various options offered to you are chosen from pull down menus. The menus available are:

SETUP - which allows you to choose keyboard split, single finger chords etc.
WNTM - which allows you to choose

which of the preset voices you are going to use.

RHYTHM - allows you to choose from one of the preset drum patterns.

RBT - allows beginners to play tunes and listen to drum music.

DISK - available only to people who buy the disk version of the software. This allows you to load in new sounds and new music.

Using these menus is very simple. Use functions F1 and F2 to select the option that you want, then press F7 to 'pull down the menu'. Once the menu is down use the same keys to move up and down the menu and select the appropriate function. The only problem that I found with this is that there is no quick escape option. The ESC key function is always at the top of the list, if you want to change something at the bottom of the list then you must go down make the necessary change and then go back up to the top again to leave the menu. Very time consuming.

As previously mentioned the Setup menu allows you to set many useful parameters. For example you can split the keyboard whenever you want and have one sound playing on the left hand keys while another plays the right hand keys. This means that you could play a tune with an organ sound while you play the chords with a guitar sound.

You can take this even further by using auto chords. This function allows beginners to play chords by simply pressing a key. For example to play C major press the C key. Both major and minor keys are available but unfortunately there are no sevenths.

If you select one of the rhythms and you have auto chording switched on, a backing track will automatically be added to the chords, this is great for beginners as they can play complete tunes with just two fingers, one for the tone the other for the chord.

The sounds offered from the WNTM menu are pretty diverse and of exceptionally high quality. The voices range from a harp/iron through to a jazz organ so there is probably something to suit just about every taste you are likely to play. Disk users have the added benefit that they can load in a second set of voices from disk.

The rhythm section is quite good though it sounds a little tinny. It would be possible to use the sound expander on tape but on no screen would you feel happy using the built in drum sounds.

If you have never touched a keyboard before you will love the RBT option. When you choose this option each key has 'sounded in it' a little tune. Pressing keys at random will link up to 20 of these tunes together giving quite catchy tunes. RBT that are available are Country, Pop and Disco. Disk users also have a big band sound option.

As I have previously stated, the interface allows you to play up to eight notes at once. The notes being played are represented on a musical scale on the screen. To actually play the notes you can either press keys on the keyboard, use an optional overlay as used with the Commodore Music Maker, or use an add-on keyboard.

The add-on keyboard is a five octave full size keyboard. It is fairly well made and has a very good 'feel' to it. People who are used to pianos and organs will be quite at home using it. If you are used to a piano it is worth pointing out that there is no touch sensitivity to the keyboard, no matter how hard you press a key the note will play at the same volume.

Obviously a product like this has to have some bad points and it does. However, most of my gripes are over the documentation and the software NOT the interface itself.

The manuals can be described as fairly adequate. There is information on each of the functions available but there is no information on how to program the interface yourself. OK so it may be complicated but surely there are people who would like to give it a go. Commodore will be releasing a package that allows you to generate your own sounds at a later date but it has yet to be seen if this will let you generate new notes for use with the keyboard.

This shouldn't be too difficult for the disk system but since the cassette version doesn't have a UDAD option I'm fairly certain that you won't be able to change the voices on the cassette version of the software.

MUSIC

The RFF function is great fun but after a little while becomes a little boring, after all you wouldn't listen to the same record over and over again would you? My personal opinion is that the memory given over to this could have been used to offer a few more input options especially the option of more voices.

If you purchase the sound expander together with the full size keyboard then you will also get the Commodore Sound Studio thrown in. Being honest I can't quite understand why this program comes with the package as it is used for editing the OS's internal SID chip not the new sound chip.

The program basically gives you a symphony front panel and allows you to

change parameters such as attack and decay very simply as well as allowing you to write tunes. The program isn't really that bad my personal opinion is that it is the incorrect one to be packaged with the keyboard.

Verdict

The Commodore Sound Expander in whatever form you purchase it can only be described as superb. OK to have mentioned a few dislikes but it's good qualities far outweigh those.

The keyboard and software reviewed here was seen by both professional musicians and people who have never touched a keyboard before, all were equally impressed.

If you are thinking of taking up playing keyboards or would like to own one but until now have been put off by the price, dig deep and go and buy one of the available systems, you're sure not to regret it.

Touch Line

Sound Expander plus full size keyboard £149.99

Sound Expander plus Commodore 64 and keyboard £189.

Available from most Commodore Dealers.



CHIP

Eric Doyle crawls

inside his

Commodore to look

at some chips.

A SMALL NUMBER CAN BE easily stored in a computer's memory but most programs use numbers which are outside the range of simple integers. Two byte integer values can only include whole numbers in the range of 32767 to -32768, so how does Basic deal with extremely large numbers or decimals?

The system used is known as floating point mathematics or scientific notation. In the decimal system of numbering any number can be expressed as a power of 10. For example, the number 10 is represented by $10 \cdot 1$ or $1 \cdot 10$. One hundred becomes $10 \cdot 10$ which is $1 \cdot 10 \cdot 10$ and a thousand is $10 \cdot 10 \cdot 10 = 10^3$.

Numbers between multiples are represented in the following way:

$30 = 10 \cdot 1 \cdot 3$ ($3 \cdot 10 = 30$)
 $3.52 = 10 \cdot 11$ ($3.52 \cdot 10 = 35.2$)
 $5.4786 = 10 \cdot 12$ ($5.47 \cdot 10 = 547.86$)

You can see that converting a number to floating point format means dividing it repeatedly by 10 until the number is reduced to a value between one and nine. Then the number of divisions is written down as a power of 10. This process is called 'normalising' the number.

Values below one are normalised by multiplying them by 10 until the value lies in the range one to nine, as follows. This time the number of multiplications are represented as a negative value of 10.

0.1 becomes $1 \cdot 10^{-1}$
 0.00121 becomes $5.21 \cdot 10^{-3}$

In this form of notation 10 10 has the value of one, so any number from one to nine is represented by 10 10.

The two parts of the floating point number are known as the mantissa and the exponent. The mantissa is the fractional number and the exponent is the power of 10.

Because the power is always a power of 10 the computer uses the letter E instead of printing 10 every time:

1.24E10

By now you will realise that the decimal place is determined by the exponent. The name 'floating point' is derived from the fact that as the exponent is increased and decreased the decimal point floats forward and backward along the mantissa when the expression is converted to normal decimal notation.

Binary Power

This is all very well but there's a fly in the ointment. Computers use binary notation not decimal. Fortunately, the method is the same but to base two.

We have seen that normalising a decimal

number means converting the number so that it lies between one and 10 or, to put it another way, one and the number base 10 minus one. Applying this to binary base two, a normalised number lies between one and the number base two minus one, so a normalised binary number always has a one before the decimal point.

When reading a byte from left to right the value of each successive bit in decimal is half of the previous bit in the series 8, 4, 2, 1. This series continues beyond the decimal point as, since binary one is the lowest whole number in the series and it equals one decimal, binary 0.1 is 0.5 decimal, binary 0.01 is 0.25 and 0.001 gives decimal 0.125.

Decimal	Binary	Normalised	
1.8	1.8	1.80	$\times 2 \cdot 10$
2.5	10.1	1.01	$\times 2 \cdot 10$
0.8625	0.1001	1.00	$\times 2 \cdot 04$
5.375	101.011	1.0101	$\times 2 \cdot 12$

Five bytes are used in memory to store floating point numbers. The first byte is the exponent and the following four bytes give the number.

The exponent lies in the decimal range 127 to -128 but this does not convert directly from the binary byte. Instead a binary value of zero means that the number is also zero in decimal. A decimal value of one converts to a value of -128, two is -127 and so on until 255 converts to +127. It follows that a real value of 129 is equivalent to an exponent of zero.

Frying Mantissas

The mantissa is not as straight forward as it first might seem. The first byte assumes an imaginary decimal point following the highest bit of the byte. We have discovered that any normalised number has a value greater than one but

less than two, so we can always assume that the highest bit of this byte will be one. Using this fact, the computer uses this bit to signify positive and negative



CHAT'



numbers. A one in this position would mean a negative number and a zero signifies a positive value.

If the stored value are **FFFF** an ordinary decimal value would reach. Mantissa 7 would return a value of 182. To convert this to a mantissa value we must first evaluate the high bit by **AND**ing the location with 128. This gives 128 which means the bit is set and the number represented will be negative.

Next we must determine the value of the rest of the byte. **AND**ing with 127 will eliminate the first bit and give 64. This is the first decimal place of the binary mantissa and equates with a value of 0.5 decimal. The maximum value which it could reach if **FFFF** is 127. This is almost 128 which is double 64. If we divide our value by 128 we therefore get 0.5.

What if the third highest bit was set instead? **AND**ing with 127 would give 32 and dividing by 128 gives 0.25, so the system seems to work. This deals with Mantissa 1 and we now go on to consider Mantissa 2.

Imagine for the moment that this whole byte was an eight bit Mantissa 1 with only the highest bit set. The value would be 128. To make this equal to 0.5 we divide by 256. It can't be 64 in this position so we must divide again by 128. Similarly, Mantissa 3 is divided by 256, then again by 256 and finally by 128 to reveal its decimal value. Mantissa 4 is divided three times by 256 and once by 128.

This four-byte Mantissa gives an accuracy of approximately nine places which is accurate enough for most purposes.

The exponent is a power of two, ranging from -128 to 127:

$$2^{128} = 2 \times 10^{38}$$

$$2^{-128} = 1.7 \times 10^{-38}$$

This gives the maximum range of floating-point integers.

Peeking Out

A program to reveal the value of a stored floating point number would have to do four things:

Firstly, find where the variable is located; secondly, evaluate the exponent; Thirdly, determine the sign of the final number and finally calculate the Mantissa. The following program does all of this.

PROGRAM	LIST	FORTRAN
100	00 = 4, 120	100 004 * CALCULATE 0204 *
110	004 * 0000 24 0120 0000	200 01000+01111+01000 128
120	000 000 000 000 010	300 000 * REMOVE 0204 BYTE
	* 004 * 000 000 000 010	4
	24 0120 *	200 0111+01100 127
130	000 000 000 000 010	300 004 * 0000 0204
	* 004 * 000 000 000 010	4, 000 *
	24 0120 *	200 000+0000/0256
140	000000000+000000000	200 000+0000+01110256
	24 0120 * 0016,	200 000+0000+01110256
	000 18 0120 *	200 000+0000+01110256
150	004 * 000 000 000 010	200 004 * 000 000 000 010
	7 0120 *	200 004 * 000 000 000 010
160	000 000 000 000 010	200 004 * 000 000 000 010
	000 0000	200 000+0000
170	004 * 000 000 000 010	200 004 * CALCULATE 0000000
	7	000 000+00000000
180	000+0000+010+0204	200 0000 000

Functional Arrays

Defined functions are also stored as a kind of variable. The first two bytes are the function name. The following two bytes point to the actual location of the function definition in program memory. The location of the variable used within the function is pointed to by the next two bytes. The location is always within variable memory. The final byte does not signify anything and remains at value zero.

Arrays are stored in an area which begins where the variable data ends. Unless it is a **FOR** loop, how long a piece of string? The start position depends firstly on how long the program is and, secondly, how many variables have been defined. As a new variable is encountered by

the program, so the array memory moves up by seven bytes.

Arrays are as complex to store as they are to manipulate in a program. First a header must be created then a block of memory is put aside for all of the values liable to be created. The actual format can be seen in the tables at the end of this article.

Obviously, a vast amount of memory can be reserved for arrays and when you consider that this block has to be moved up seven bytes every time an ordinary variable is created, it is clear that this could slow the program noticeably. Some computers lack the ability to move the array area and all variables must be initialised in the first few lines of a program to obtain a fixed point for the start of arrays. Even though this is not necessary on a Commodore, it can be convenient, in cases where several arrays are used, to initialise integer, floating point, string variables with zero or null values before defining arrays. Also remember to define functions at this point too.

Get Organised

You will now see why memory is wasted when defining variables so that they all occupy seven bytes. It makes the moving of variables a lot simpler if a fixed space has to be created regardless of the variable type. This is crucial to chip memory management and many more examples of reserved memory will be seen in future articles, as we progress through all of the computer's chips.

Gordon Hamlett looks at US
Gold's pocket money range.

AMERICANA

WHEN BUDGET GAMES FIRST appeared, they tended to be poor versions of Space Invaders and Pacman, written in Basic and sold in newsagents and garages with no product advertising and very low company profiles. It did not take long though for the major companies to see that there was a place in the market for games at a low price and soon they were re-releasing their old titles at a lower price in order to gain an increased shelf life and profit from their products.

With this increased respectability, it was always on the cards that US Gold, one of Britain's largest software distributors, would jump on the bandwagon. Americana is the title of the US Gold budget range. Nine titles have been released for the C64 in the initial launch and there is promise of some titles in the future for the C-16. As you would expect from US Gold, the packaging is slick with clear, plastic cases (universal for the company) and a uniform colour scheme of yellow, reds and oranges. One of the criticisms levelled against US Gold has always been that the product has been too highly priced but I don't think that many people will be too disappointed if they pay £2.99 for one of these titles.

So what of the games themselves? They fall into two categories, some that have previously been released at a

higher price and some that have never before seen light of day under a US Gold label.

Pinball

Stamball is a pinball game that scrolls over four screens. You must knock down 17 targets with five balls in order to progress onto the next screen. There are four sets of flippers to manipulate and you can "nudge" the machine a limited number of times as you endeavour to keep the ball in play. An unusual feature is the two player option which is not as you may think, a head to head confrontation, but one player controlling the flippers and the other the nudges. I found this game highly addictive, and my favourite amongst the titles released so far.

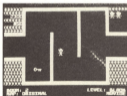
Adventuring

Scrolls of Abaddon is an arcade adventure that at first sight looks like a Pacman derivative but there is a lot more to it than that. You must explore a series of rooms searching for the four pieces of all the gems that are lying around whilst avoiding the snakes. The more you move round the screen, the more you restrict your future movements as by picking up the gems, you put down

Left to right:
Breakdown,
Spartan, Stamball



Left to right:
Sherma, Wizard
Zines, Office Follies



some directional arrows that must be followed. There are also wrecks to collect that contain spells to help you on your way.

Arcadia

Odin's Fables is a one- or two-player, 24-screen platform game, reminiscent of a cut-down version of *Bounty Bob*. On each screen, you must collect a key and make your way to the exit while leaping around the various obstacles. Rabbits pursue you relentlessly although if you pick up an object, you have a limited amount of time in which to destroy them. There is the usual selection of teleports, life and lanes to be overcome.

Arcade Shuttle is a space shoot-'em-up game in which you battle your way through alternate screens of marauding aliens and asteroid belts. There are several varieties of aliens including blob men, squaroids, and bomb launchers. The asteroid belt is solid and you blast a way for your ship to pass safely through it. At higher levels, the asteroids move considerably faster.

Another space arcade game is *Neural Zone* where you aim a charge of a perimeter gunnery pod, trying to defend your early warning station Alpha IV. You are given warnings as to which direction the next enemy ship is

approaching from and must try to destroy it as quickly as possible. There are five difficulty levels to choose from and your score is determined not only by the number of enemies that you destroy, but also the length of time that you took to do it.

Street Life

New York City is a strange sort of game where the object is to go round visiting various sights such as the Empire State Building and the city Zoo. You can drive round the city or walk or use the subway. You will need to eat and get money from the bank in order to pay for your car repairs etc. At all these locations, there is a platform type game to solve before you are allowed to proceed. If you crash your car, you get taken to the hospital while the car goes to the garage and all of the rest time and money. The entire game must be completed within a certain time period.

All Sorts

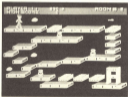
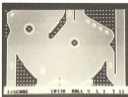
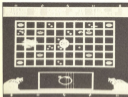
Shamus is a *Break* type game which sees you trying to penetrate the Shadow's lair and destroy him. You must explore the maze searching for colour coded keys that allow you access to further levels. All this must be done while defending yourself against the assorted intruders.

There are extra lives to be gained either by collecting bottles or by riding walking over a question mark and there is the continual threat of the shadow to be overcome - he can't be killed, only stunned if he comes chasing after you.

Centinel is a *Star Trek*/Star Raiders variant. A map of the stellar grid displays both friendly and enemy forces and you must warp into the appropriate quadrant to do battle with the foe in an arcade type sequence. There are long and short range scanners to help you find the enemy and you must navigate through asteroid fields as you travel in hyperspace to your destination. You must also find friendly bases where you can dock, refuel and rearm.

The final game to be reviewed is *Breakdance*. In this you can select from four different variants as you try to prove to rival gangs that you are a better dancer than they are. This involves watching the computer opponent make a move and then copying it. If you get that right, you get a sequence of two moves to reproduce, then three, then four and so on. Yes, it's no more than a variant of *Simon*, one of the last ever electronic games. This one's only likely to appeal to dance fans.

Well, there you have it. Nine games, none of them really bad and all representing good value for money. Yet another winner than *It's Good*.



Listings will be much easier to enter with our new system.

COMMODORE LISTINGS ARE RATHER well known for the horrible little black blobs they always caused. Unfortunately the graphics characters which are used to represent graphics and control characters do not reproduce very well and they are also difficult to find on the Commodore keyboard.

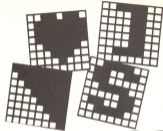
In future all control and graphics commands will be replaced by a mnemonic within square brackets. This mnemonic is not typed (as is printed in the magazine) but rather the corresponding key or keys on the keyboard are pressed. For example [RIGHT] means press the cursor right key, you do not type in [RIGHT]. All of the keywords, what keys to press and how they are shown on the screen are shown below.

Any character that is accessed by pressing shift and a letter will be printed as [letter].

[A] shift and A
[+] shift and +

Any character that is accessed by pressing the Commodore key and a letter will be printed as [Cletter].

[CA] Commodore and A
[C+] Commodore and +
[CC] Commodore and C



LISTINGS

If any characters are repeated the mnemonic will be followed by a number. This number is how many times you should enter the character. Any number of spaces over one will also be represented in this form.

[RIGHT10] press cursor right 10 times
[C+]10 press Commodore and + 10 times
[SPACE10] Press the space bar 10 times

Any other characters should be easily recognisable for example CTRL-N means press CTRL and N and LEFT-ARROW means press the left arrow.

Any number of mnemonics can be enclosed in brackets for example

[DATA,SPACE,ANY]

means type 10 shift A's, 10 spaces and another 10 shift A's.

Mnemonic	Symbol	what to press
[RIGHT]		left/right
[LEFT]		shift left/right
[UP]		shift & up /down
[DOWN]		up/down
[F1]		F1
[F2]		shift & F1
[F3]		F3
[F4]		shift & F3

Mnemonic	Symbol	what to press
[F5]		F5
[A]		shift & F5
[F7]		F7
[F8]		shift & F7
[CLEAR]		shift & CLR /HOME
[HOME]		CLR/HOME
[REASON]		CTRL & R
[REASON]		CTRL & R

Mnemonic	Symbol	what to press
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8

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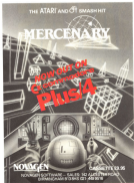
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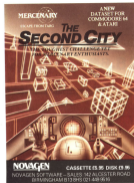
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Bill Bremner gets in a spin with his disk drive.

FAST FORMATTER

FAST FORMATTERS HAVE been commonplace on the C64 ever since the 1541 was added to the growing range of peripherals. Almost every function to do with the 1541 seems to be synonymous with a trail, and the standard 1.5 minute "NO." FORMAT routine does little to help.

However, if the format routine is studied in depth, the reason for this sluggishness is made clear. There is a trade-off point in disk drives between speed and reliability: the faster you make operations such as data transfer and read/write operations, the larger the chance of data errors. The format routine used in the 1541 is designed to divide the disk surface into tracks and sectors, supplying a working area that allows the Disk Operating System selective data storage. Gaps are supplied between sectors and sector headers to allow for variations in the drive motor speed.

However, individual 1541s often run at different speeds, and although the difference is very small, occasionally problems arise due to sector over/under-writing. Commodore originally opted to use a fixed length gap between the end of one sector and the start of another (DO6 1-6), but this eventually led to read and write errors. Later versions of DO6 formatting (including the 1541) were rewritten to allow for these speed fluctuations, achieved by writing a unique series of marks along a track.

These marks are timed and the results are divided by the number of sectors on the track to calculate the tail gap length. The same track is then re-read, formatted and verified. This results in each track passing under the read/write head about 80 times, or two seconds.

Obviously, by-passing the timing routine and inserting a single constant for all the tail gaps on the disk would

PROGRAM: FAST FORMATTER

```
100 POKE 53280,11:POKE 53281,11
:PRINT"CLEAR!"
110 PRINT"YELLOW,RIGHT4)
FAST FORMAT V1.0 BY BILL BREMNER
120 PRINT"RIGHT4)-----
"
130 PRINT"(DOWN,SPC4)
45 SECONDS-FULL VERIFY"
140 PRINT"(SPC7)-TAIL GAP CALCULAT
ION"
150 INPUT"(DOWN2,SPC4)DISK NAME
:":NAME
160 INPUT"(DOWN,SPC6)DISK ID:":IDS
170 OPEN 15.5,13:HI=3:POB LO=0 TO 3
180 CS="M-W"+CHR$(LO*25)+CHR$(HI)+
CHR$(26)
190 FOR N=1 TO 26:READ BY
:CS=CS+CHR$(BY):NEXT
200 PRINT#15,CS:NEXT
210 PRINT#15,"M-W"+CHR$(7)+CHR$(26
)+CHR$(1)+CHR$(32)
220 PRINT#15,"UC:"+NAME+", "+IDS
230 PRINT#15,"M-W"+CHR$(7)+CHR$(26
)+CHR$(1)+CHR$(36)
240 CLOSE 15:END
250 DATA 160,68,185,199,250,153,0,4
260 DATA 136,16,247,160,100,185,25,
5
270 DATA 153,69,4,136,16,247,76,91
280 DATA 4,160,3,165,34,217,87,4
290 DATA 240,6,136,16,248,76,54,293
300 DATA 76,12,251,31,25,18,1
310 DATA 169,11,141,42,2,169,0,141
320 DATA 1,2,32,238,193,172,123,2,
185
330 DATA 0,2,133,16,185,1,2,133
340 DATA 19,169,1,133,128,169,1,32
350 DATA 211,214,169,224,133,1,165,
1
360 DATA 48,252,32,238,209,238,123,
2
370 DATA 238,122,2,76,64,238,234,
234,234
```

reduce the formatting time by about half. By cutting out this routine various fast formatters that includes fast copies with built-in formatters) achieve their high speed, however they often take out the verify routine as well. Using a formatter which calculates the tail gap is more reliable simply due to the fact that the format is biased towards the performance of your drive.

The format routine I have written cuts down the formatting time by calculating the tail gap only when a new Zone barrier is reached. The way the DO6 format routine works makes it easy for us to insert a simple patch. The FORMAT routine at DO6:1 sets up a PMP-MAC7 in buffer 2 (26800), and activates formatting by saving an EXECUTE (160) job Code in 80001, providing for continuous monitoring of the writing.

What we have to do is copy the first part of the set-up at MAC7 into a buffer created during formatting. We can then insert a small machine-code routine to check what track the head is on, and if it's the start of a Zone continue where the original code left off. Otherwise, the routine jumps straight to the track format routine at SPC8, by-passing the timing routine.

A "UC:" (MMP 1600) command is used to activate the routine inside the drive RAM, as well as providing a similar function to the "NO." command, to eliminate the disk name/id parsing problems.

Good luck, and be careful when typing in the program since hitting a wrong key is one of the commonest errors which amateur typists make!

Joe Nicholson

Improves the C-16's hi-res memory.

AS EVERY C-16 OWNER knows only too well, when the computer is in high resolution mode only 2K is available for Basic. This article shows how the available memory can be doubled using associated memory.

When the hi-res screen is in use, the low-res screen's of course not needed unless you use the split screen option in GRAPHIC modes 3 and 4. Therefore it should be possible to overwrite this low-res memory area when using the hi-res screen. The problem is that when you are writing the program routines for the hi-res screen you need to use the low-res screen!

In theory, it is not possible to have a hi-res screen with colour and attributes without a low-res screen. This also means that you only get a miserable 2K for Basic.

The Method

The method we are going to use for all machines a machine code routine which moves the Basic up and down depending on whether or not you are in the hi-res mode. The memory maps for each mode are shown in the two sections of Figure 1.

This method works on the principle that, although it is necessary to have complete hi-res and low-res screens, because only one screen is displayed at a time, it does not matter if the Basic is moved down into the low-res screen memory when the hi-res screen is active, and up into the colour and luminance memory of the hi-res screen when the low-res screen is active. The program is therefore moved down and up by 2048 bytes.

But why not simply move the 2K hi-res colour and luminance maps down into the low-res screen and attributes block? In theory this should work (the Commodore-64 uses the low-res area for the hi-res colours when in hi-res mode) as it is possible to move the colour and attributes table around by POKEing bits 3 to 7 of register

PROGRAMMING THE C16

6508 (RT 14 hex) with the top 5 bits of the high byte of the address of the table.

In effect this enables the position of the table to be in any 2K block starting at 00, 2K, 4K etc. Note that because of the way that the C-16 interrupt service routine continually REPOKEs this address (its address with the value stored in \$07B, it is more effective to POKE bits 3 to 7 of address \$07B (\$243 decimal), the 'VM base mask for split screen') while in hi-res. Although the 2K colour/luminance area does move with this POKE, hi-res commands such as CIRCLE, DRAW, MOVE and BOX will think the colour and luminance maps are stored in their old positions. This means that the hi-res Basic commands still address the 2K block starting at 004, overwriting any programs stored in this area.

Thus, although it is in theory possible to merge the low-res screen and hi-res colour/luminance maps together, the C-16 does not allow you to use any of its Basic commands. This method would still work with machine code programs though, and also means that the code would not have to be re-locatable as the program would not have to move.

As this method would be useful to machine coders, the memory map of the system is shown in Figure 2. Note the resemblance this system has to the C64 memory layout for the hi-res screen. It could prove useful in adapting C64 machine code programs on to the C-16.

The other 'possible' method of getting extra memory would be to move the low-res screen and attributes up into the hi-res screen colour and luminance

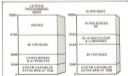


Figure 1. Memory map for BASIC.

table. This should be possible by POKEing \$08, 24 while in low-res mode - although for this to work the machine's own interrupt service routine has to be disabled first. Unfortunately, again the C-16 still attempts to use the low-res screen at 004 and writes to that area making your program look like a Chinese Takeaway menu card. You could use this method for machine code programs, but can't see any particular advantages with it.

So the only way of getting 4K for Basic appears to be to move the program up or

down whenever you want the low-res or hi-res screens.

A bit of a mess! Not really, as it is now possible to use the hi-res CHART and SHARP commands for instance (which can occupy up to 256 bytes per shape) and still have room for a useful Basic program. With only 2K of memory there was not much point in having these commands in the machine at all. Also the transition up or down takes place in a flash - literally.

Figure 3 shows the assembly test for the moving routine. This is based on the

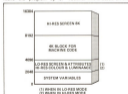


Figure 2. Memory map for machine code.

C-18 Assembler which appears in the June 1985 issue of *Your Commodore*. If you haven't got this assembler up and running, the code in DATA statements in Figure 4 type this in and RUN to FORG the code into memory.

The routine occupies 238 bytes starting at \$0800 (\$106 decimal) in a portion of memory not used by the C-18. This space is not available to Plus-4 owners, but they couldn't need to do this memory juggling anyhow, could they?

The Program

The program contains three routines: (1) set the top of Basic pointer to 8001 to have 4K of Basic; (2) move Basic down 2848 bytes to go into hi-res mode, and (3) move Basic up to 4096 again to go into low-res mode.

The 'set pointers to 4K' routine is at address 1690 (\$6A2).

The 'move Basic down' routine is at address 1636 (\$660).

The 'move Basic up' routine is at address 1678 (\$662).

Now follows a line-by-line explanation of the program so everyone can marvel aloud how clever it all is!

Explanation

Lines 11000-11040 build the MOVIBASICDOWN routine. Lines 11050-11140 set the old and new start of Basic pointers for the relocate routine at lines 11200-11250. \$100-\$104 contains the old start at 8000 (\$7000), and \$407-\$413 contains the new start at 2048 (\$8000).

Lines 11260-11290 move the Basic down one page (256 bytes) at a time calling the BLOCKMOVE routine at line 10800 to actually move each 256 byte block.

Lines 11270-11280 set a vector for subtracting from the high byte of the pointers (such as the start of Basic pointer), setting it to \$4 as in this case means that the pointers will move down 2K (in the start of Basic pointer example, the pointer will change from 1690 to \$0800).

Lines 11300 sets the start of Basic for the free link address

changing to \$0008 (2048, the new start of Basic). Line 11290 calls the 'Relocate free links' routine (RL) at line 16008.

Lines 11300-11470 change all the relevant system pointers so that the machine can carry on as usually whether the whole of Basic has been moved up or down. Note that this code is used by the MOVIBASICUP routine (line 11600) also.

Lines 11480-11590 change all the pointers that are between \$10 and \$18 using a machine

code loop. The pointers changed are:

The 'start of Basic text' pointer at \$20-\$22.
The 'start of Basic variables' pointer at \$2D-\$2E.
The 'start of Basic array' and 'end of Basic arrays+1' pointers at \$2F-\$30 and \$31-\$32 respectively.
The 'bottom of strings' pointer at \$3D-\$3F.
The 'higher address used by Basic' pointer at \$1F-\$18.

Lines 11480-11470 change all the other pointers at odd places in memory.

Lines 11480-11420 change the 'current DATA item address pointer' at \$41-\$42.
Lines 11430-11430 change the 'current Basic variable class' pointer at \$47-\$48.
Lines 11440-11470 change the 'text pointer' at \$38-\$3C.
Lines 11470-11470 change the 'DPTR0' pointer at \$48-\$4C.
Lines 11480 then jumps to the 'RELLOCATE' (\$18-\$1F) (\$7000-\$7050) routine at line 16000.
Lines 11600-11590 are the

FIGURE 3

\$7007	1000	(RELLOCATE) BASIC	11476	80C 404	14210	101
10010	101100	DO WHILE \$00	11478	87A 84C	14212	00A (MOV),Y
10020	000 16000		11480	89F 498	14214	000 \$18
11000	(MOVE BASIC) DOWN		11500	(MOVE BASIC) UP	14240	870
11010	LDI #0		11510	LDI #0	15000	(SET UP END OF BASIC)
11110	STI \$00		11520	STI \$00	15010	(MOV \$0000) (SET ILL)
11120	STI \$01		11530	STI \$02	15020	LDI #0F
11130	LDI #000		11540	LDI #007	15110	STI \$00
11140	STI \$01		11550	STI \$01	15120	STI \$00
11150	LDI #008		11560	LDI #00F	15130	LDI #0FF
11160	STI \$01		11570	STI \$02	15140	STI \$00
11200	LDI \$00 (\$0)		11580	LDI \$00 (\$0)	15150	STI \$07
11210	LDI \$01		11600	80C 401	15160	870
11220	LDI \$02		11620	80C 400	16000	(RELLOCATE) STRING LINKS
11230	LDI #000		11630	80A 80F	16010	LDI \$18 \$00
11240	DO \$00		11640	89F 400	16110	STI \$00
11250	80C \$00		11650	80C \$00	16120	LDI \$02
11270	LDI #000		11700	LDI #000	16130	STI \$00
11280	STI \$04 \$04		11710	STI \$04	16200	LDI \$0A \$00
11290	STI \$02		11712	LDI #000	16210	DO \$0F
11295	LDI #00		11714	STI \$02	16220	80C \$00
11300	LDI \$01 \$0		11720	DO \$00	16230	LDI \$00
11310	LDI \$00 \$0C,\$1		11730	80A \$0F	16240	DO \$00
11320	80C		11800	(RELLOCATE) LINK LINKS	16270	80C \$00
11330	80C \$00		11810	LDI \$01 \$0	16280	870
11340	STI \$0C,\$1		11820	LDI \$0A \$00,\$1	16300	LDI \$0F \$0
11350	80A		11830	STI \$00,\$1	16310	LDI \$00,\$1
11360	80C		11840	80C \$00	16320	80C \$00
11370	STI \$1 \$1		11850	LDI \$0F \$1	16410	LDI \$0A \$00,\$1
11380	80C \$00		11860	STI \$02	16420	80C
11400	LDI \$00 \$00		11900	LDI \$0A \$00,\$1	16430	LDI \$0A \$00,\$1
11410	80C		11910	80C	16440	STI \$00,\$1
11420	80C \$04		11920	80C \$04	16500	LDI \$0A \$00
11430	LDI \$0A \$00		11940	LDI \$00,\$1	16510	LDI
11434	80C		11950	LDI \$01 \$0	16520	LDI \$0A \$00,\$1
11436	80C \$04		11960	LDI \$0A \$00,\$1	16530	80C \$00
11440	STI \$0A \$0C		11970	80C	16540	STI \$00,\$1
11450	LDI \$00		11980	LDI \$01 \$0	16550	STI \$00
11460	80C \$04		11990	LDI \$0A \$00,\$1	16560	80C \$01
11470	STI \$0C		12000	LDI \$02,\$1	16570	LDI \$01
11480	80C \$04				16580	80C \$00
11490	LDI \$00 \$0C				16620	80C \$7
11495	80C				16630	STI \$00
11500	80C \$04				16590	80C \$01
11470	STI \$0C				16620	LDI \$01
11472	LDI \$0C				16560	LDI \$0C
11474	80C				16570	80C \$0A

OLIO 1 & 2

Sega-Byte

CD - joystick

7 4 4 3



CHALLENGING FIRST ACTION with superb background graphics are a feature of this shoot 'em up space game from Sega-Byte.

In part one you have to pilot a craft across various landscapes blasting everything that appears on the screen, dodging and weaving to avoid collision with your prey. The background animation looks stunning as it scrolls in sympathy with the movement of the spacecraft.

Olio 2 is equally as challenging but has more purpose to the game. It bears an incredible resemblance to

Allgate's Z but I shan't hold that against it.

As you pilot your ship over an alien complex you are shot at and rammed by enemy craft and gun emplacements. You must try to eliminate the power supplies and guns of the complex to win a round. This compels your craft into a space battle between screens and then back to another complex which is even more dangerous than the one before.

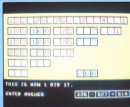
Otherwise the games are traditional kill or be killed programs with the distinction of high resolution backgrounds. **LB**

COUNTDOWN

Macros Software

CD

7 7 7 6



THIS GAME BASED ON Channel 4 and Yorkshire Television's Countdown will appeal to anyone who finds anagrams and arithmetic absorbing.

The game is split into three principle parts. The first allows you to select nine letters nominating each selection as a vowel or a consonant. When complete, both players have 30 seconds to extract the longest possible word from the selection of letters and the one who makes the longest word gains a point for each letter.

The second type of game allows one of the players to

select a series of numbers. At this point the computer takes over generating a random number. Both players then have another 30 seconds to devise a simple formula which will result in a number as close as possible to the computer's number. The person with the nearest value is awarded the points.

The final type of game is the Countdown Conundrum.

A problem with this game is that all of the characters are left on the screen. This makes cheating a distinct possibility, so play fair. **LD**

RACING BLAST

CD

Worked

01.79

5 8 8 7



WITH THE CROWD BAYING for blood, you flick the red cape that you're carrying and stand your ground as the bull comes charging towards you. At the last moment, you lift the cape clear allowing the bull to pass underneath. Unfortunately, you misjudge things slightly and Alfonso, the bovine beast, tosses you casually round the arena until your body can take no more punishment and the stretcher bearers have to carry you away to hospital.

That just about sums up the game. You attempt to get the bull to pass underneath your cape as often as possible

while he tries to gore you to death. If you are successful enough, the crowd throws a ring into the arena which you must endeavour to place on Alfonso's horns. If you are quick enough on your joystick when you are tossed, you can land on the bull's back and ride him round in style for extra points.

Given that the whole idea of bullfighting is particularly unappealing and that the game itself has few redeeming qualities, I can find no reason to recommend it, even at the price. There are many better budget games on the market. **G.B.H.**



ROBOTT
C64

Finalist
LHM



SHOOT ME TIMBERS, AGAST! Behind pieces of sight and other physical barriers, the Black Colosseum contains huge amounts of 81 gateson gains in its 20 levels, and as for the cabin floor, it is your duty to liberate as much of it as possible from those evil cat theons. Not that they are likely to give in without putting up a fight but you can cope with that, can't you?

Robott is an extremely addictive baddies and rumpers variant. Each of the levels contains assorted treasures and doors to other levels, but before you can access most of them you must first clear a

path through the numerous locked doors that stand in your way. These are all colour coded and sure enough, there are keys of various hues lying scattered around although you can only carry one at a time so that a lot of backtracking is required. Most screens start off empty but you soon find yourself chased by ghost pirates and killer persons!

Robott's graphics are simple and clear accompanied by some awful Gilbert and Sullivan but the game's the thing and at £1.99 this one is excellent value for money. **G.H.**

MAX HEADROOM
Qualitative C64 - joystick



MAX HEADROOM, COM-puter generated presenter extraordinaire, started life in a movie bearing his name. The game is a blend of the conceited Max of Channel 4 and the plot of the film.

The story follows the plot of the film very closely but this does not spoil the entertainment value. Max Headroom is, to be precise, the presenter of a video show which will include an invaluable advertising technique known as the 'biggers' which has a nasty side-effect. Certain people viewing these ads will explode!

Such behaviour cannot be tolerated and Edison has been chosen to recover the Max Module from the massive NETO skyscraper. Intelligence sources have revealed that the module is hidden in

the laboratory behind a complex security system. Some of the security codes have been retrieved from the NETO computer. These allow Edison to reach all but the top two levels above the 20th floor. The code for the lab situated on Level 200 is in the Presidential Suite on the floor above and the code for the suite is in the Director's office somewhere on the floor below.

A door locking mechanism is in operation which must be disabled if Edison is to succeed and the floors are patrolled by vicious robots. Quite a challenge.

The lift security requires the operator to keep the single character code lit on an LCD display for a fixed time period. This is done by sending a small voltage along

the wires which connect to the correct elements of the display. The capacitors effect decay after a while and the elements must be recharged regularly or the lift will go out of control and plunge you to one of the lower floors.

Once on the floor of your choice Edison is controlled by icons on each side of the screen. Your first task is to switch off the door locking mechanism by a Roman style game in which you have to play a randomly generated series of four tones back in reverse order.

At the same time the robots will be hunting in on you, guns blazing. Edison can withstand a certain number of hits but he may have to rest to recover from his injuries if he is badly wounded. This is where the time element comes into play.

Once he has located the key codes on the floors between Level 200 and 209 by searching each room in turn, he can gain access to the Presidential Suite to find the code for the Lab. He can then locate the Max Module and rendezvous in the basement for the end of his mission.

At this point you are invited to load side two of the tape where an animated Max wants to speak a synthesized message to you. I would have preferred sub-titles to complement the speech synthesis because much of what he says borders on the unintelligible.

It is still a convincing piece of programming.

The game looked to more challenging than it turned out to be. It completed it in only an hour or two with two-computer hosts to spare, just to test this wasn't beginner's luck. I tried again (twice) with similar results. With a few modifications this could be a great game but as it stands does not represent good value for money.

For example, if Edison quickly cracks the door lock code for the first floor he can hide in one of the rooms and crack all the codes for the other floors. It would have been more challenging if a floor code could only be cracked on the level in question with the robots beating down on him. This would necessitate naming the quantities of robots and finding a breathing space to gain time to unlock the doors.

There are a few random problems like the malfunctioning Mable and Breggal who roam the floors, but this presented no real threat and most of the other problems, code changes and something nasty in the lab, failed to appear.

The graphics and music are excellently integrated to give a feeling of excitement and the lift sequence is simple but extremely effective. My the game is not more challenging. **L.D.**

8 1 8 5 7



AMERICAN FOOTBALL seems to be all the rage at the moment. The strategies and showbiz glamour of the sport are gradually being absorbed into our culture. One day its popularity may reach the same degree of fanaticism which accompanies rugby or soccer today.

Artisoft has resisted jumping on this bandwagon too soon and consequently this game is far more intelligible to the British market than other computer simulations that I have seen.

Compromises have had to be made to allow the sport to be successfully portrayed. The roles of cheerleaders have been reduced to a single performer and the team consists of just six players per side.

The game options allow a two player tournament, man-

versus machine or a demo mode. The length of play can be five, 10 or 15 minutes per quarter.

Strategies are selected by joystick while the two sides are down in a huddle. The menu for the defending side consists of a choice of nine formations but offence is more complex.

The attacking side must decide the plays for team formation, two pass patterns and line blocking. If a kick is chosen, a new series of options is revealed allowing three types of kick.

Only one of your players is controlled by the joystick but he may pass the ball to one of two other players depending on the chosen pass pattern.

Assuming the player can gain positional advantage without being brought down by an opponent, he can pass the

ball to one of his forwards. When the ball is thrown, the receiver becomes the one controlled by the joystick. If the receiver catches (except) the ball successfully he must gain as much ground as possible before a tackle is made on him.

While all this is going on the rest of the team should be successfully occupying the other members of the opposition but this only works if the correct blocking counter has been chosen.

As play progresses down the field you must decide whether to kick for goal or go for a touchdown. As in rugby, the scores are higher for a touchdown than for a kick. Successful touchdowns are rewarded with a chance to convert your score with a kick at goal.

The game is complex and contrasts with the rather crude scrolling of the graphics but such is the drawing power of the game you hardly notice this deficiency after the first few minutes.

As an opponent the computer is formidable though not infallible. Although I didn't succeed in defeating the other team I always felt that I'd blown my chance rather than feeling helplessly overruled.

The instructions are thankfully clear and despite the fact that my review copy was accompanied by the

original IBM PC game manual I managed to fathom it all out. I hope that the CD book is a little more informative, a glossary of terms could help.

Plays are often individually devised according to the team's strategy so there is a series of diagrams explaining the mode of action which each play involves. Using these with the gameplay helps you to anticipate when the receiving player will be at any particular time while the play is still on.

Careless players will run back out of range of both of his receivers. This is indicated by a loud buzz when you attempt a pass. The only way out is to run forward and try to dodge the tackles of your opponents. This is not easy.

A kick can be blocked if your strategy is correctly chosen and your players are quick off the mark. The idea being to gain possession of the ball and then hang on to it as long as possible.

Watching your strategy pay off is extremely satisfying and when things go wrong the game becomes totally absorbing. Devotes of the game may cringe at the limitations of the program and those who don't know the game may feel overruled. Don't let this put you off, this game is great entertainment and you always have your hands full (hopefully with the ball).

I.D.

INTERNATIONAL KARATE System 3 £19.95



WHEN I FIRST RECEIVED A copy of System 3's latest game, International Karate, my immediate reaction was "Oh no, not another martial art game!".

As a game, International Karate plays in a similar, if obviously superior way to Exploding Fist. In one player option, you must fight against a computer opponent in a series of 10 second bouts. Each time you beat the opponent three times your standard of belt is increased, although I doubt if many people will ever see black belt!

As well as the purely fighting parts, System 3 has included two different sections to test your control of the game. The first of these tests involves smashing bricks with your head, which is fun if a little futile! Secondly, and much more difficult, is a test which involves jumping, ducking and generally avoiding a series of weapons which fly towards you.

Priced at £19.95, International Karate can only be viewed as excellent value for money, and it is a game that no self respecting arcade fan should miss.

C.D.

5 1 9 10 9



THRUST

Mastertronic £1.99 C64



STRICT ORDERS HAVE BEEN given. Your mission: to seek out and recover a valuable batch of pods, scattered around a mysterious and dangerous network of caverns. The pods are protected by missile bases which have to be destroyed.

Once you have a pod, the task is to zoom to the top of the screen and return it to the atmosphere where you will be rewarded with completion points.

In theory, the game appears to be very easy but don't be misled by the first two missions. The first mission merely involves shooting one rather sleepy missile base, picking up the pod and throwing back to the top of the screen.

On each mission, fuel supplies are randomly

scattered and you need to collect as many as possible if you are to succeed. The further you proceed the longer the caverns become and with fuel becoming scarce you need to collect all the supplies that are available in the opening stages. Sometimes the fuel tanks are located next to the missile base and trying to shoot one and not the other can be a real challenge.

The first encounter of real difficulty occurs in the third stage. You must guide your trusty and rather frail looking ship through a large and winding cavern that tends to bend at extremely difficult angles. There are several more missile bases to cope with and less fuel to be found but lifting the pod out of the cavern is, at first, quite a

daunting task. It will take you several attempts to master this stage but Thrust's addictive qualities will give you that vital incentive needed to progress.

The missions that follow this are far more difficult and your task becomes more complex. The caverns become huge and to gain access to certain areas a special barrier must be hit causing the previously locked entrances to slide open. One piece of advice for here is to not be too hesitant when passing through the newly opened area, as the entrances soon close again and finding yourself being crushed to death is not very pleasant.

There is not as graphically stunning as the arcade original Gravitar but it does feature some nice music and a satisfactory standard of sound effects. The caverns are visually good as are the pod-like pods.

One excellent feature of the game is the superb response of the keyboard, allowing sensitive control of the ship. Manoeuvring in the caverns can be very difficult in certain situations but this can be overcome by mastering the thrust control. Thrust and electricity are essential once you have attached the pod to the base of your ship. If you are too fast then the pod will swing causing its weight to drag you

into the walls and instant oblivion. Travelling too slow will result in the pod dragging your ship down to the floor of the cavern and, once again, immediate death awaits a hail of flames. If you do manage to guide the pod out of the cavern it is a simple task to zoom upwards to the top of the screen where you will be rewarded with points for the completion of the mission.

There are numerous missions to complete, another contributing factor to the game's vast appeal. The argument that budget price software reflects the game will certainly be invalid in this case. Although previous budget software has often been of poor quality and of a far too difficult standard, this one should not be missing from any serious games player's collection.

An interesting situation could arise if Mastertronic follows up Thrust with another game of similar appeal. It would increase the gap of budget software on the games market, a circumstance that could put the 'big boys' on the big guns forcing them to drop the price of their so-called 'better software'.

As present it could not think of a better way of spending £1.99, so go out and buy it. I guarantee you won't be disappointed in the slightest.

S.E.

SABOTEUR

C64 Dorell



A LIST OF REBEL LEADERS is contained on a disk, hidden somewhere in the central security building. You are being highly paid to infiltrate a building - seemingly a warehouse - find a disk and make your escape from the roof by helicopter.

The warehouse is heavily guarded with dogs and camera guided weapons, on the ceiling to be avoided. Your combat skills consist of kicking and punching and you can also throw weapons that you have found - you start off with a shuriken, a

pointed throwing star and flint knives, rocks, grenades etc. in your. Combat results in a loss of energy, shown as red bar. There are computer terminals to be manipulated for opening doors (although not all will be useful to you) and underground paths to be found as you explore the multi-levelled complex.

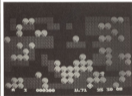
The graphics are excellent, especially with regard to the animation of the main character and the atmosphere created by the title is very well implemented. Definitely an above average arcade adventure.

C.B.H.



THE RETURN OF ROCKMAN

Mattel/Intellivision 61.99 C-78 • Jopstick



AFTER BEING ROCKMAN, the Return of Rockman filled me with anticipation of another exciting search through rock filled caverns in the diamond mine. I was disappointed.

The caverns are complex enough but the game is let down badly by the jerky animation which drove my eyes crazy. Rockman is a cute little character who inhabits a very dangerous world. His passion for diamonds is the only thing that keeps him going in a never-ending search.

The skill of the game lies in your ability to reach the

diamonds without blocking your own path with rocks or falling foul of the fast moving hazards. Speed of action and thought are the skills required. Delay too long and tons of rock will descend on Rockman's path, killing him outright. Move too quickly and falling boulders will block your way to the diamonds.

Why the screen should jerk around so much instead of scrolling gently is a mystery to me. I admit that it adds to the difficulty of the game but it also puts an incredible strain on the eyes.

ED.

VIVA VIC

Hamamichi Vic-20 • Jopstick



VIC-20 OWNERS PREPARE yourself for a treat. Rarely do we have good news for you but at least Jeff Minter has not forgotten you.

Ever since he formed Hamamichi in the early days his games have attracted a lot of attention. In many ways the games market owes a lot to Minter's innovative experimentation in the development of the sophisticated games we see today. His taste is in the realm of fast action but his techniques have been applied in many different areas.

Arctic Attack was going to be a version of Defender but was changed to avoid possible litigation with Atari. It also hailed the start of Minter's preoccupation with fire and gave vent to his love of that country's wildlife especially the llamas.

With Buzz he may have painted the town red but certainly this became the predominant colour on the monitor screen. Based on another arcade game, in Buzz you are pursued around a grid by as many as nine evil Bugs. Your aim is to enclose each square of the grid which then turns red. If you capture the corner squares, the bunnies become the hunted as you race around the screen gobbling up the Bugs.



Gridrunner was the game which really showed Minter's mastery of the medium. Tenety waves of very fast action in a mere 1.5K is quite an achievement especially as it only took a week to write! A Centipede-like creature is threatening your space grid and the humanoid under your protection. Your aim is to blast each centipede out of existence with your plasma gun but a hit causes it to split into two parts, doubling the threat. Two enemy craft patrol the edge of the grid and you also have to avoid their bolts while you battle on.

Later Zone places you in control of two cannons which

run along two rails running at right angles to one another like the X-Y axis of a graph. Always attack towards the tails with ever increasing determination and you must coordinate the position and direction of your firing to protect each gun. Often this means using one gun to protect the other in a state of absolute panic.

Mantis is an expanded version of Gridrunner and, like some of the other games, needs at least 8K expansion. The action is even faster than the original game and features many more embellishments.

Metagalactic Haman will not solely on the strength of

the game but equally on its rather eye-catching title. It was to be the forerunner of Minter's long dalliance with the angular breeds in his forays into the CGH market.

Genetic manipulation has led to the development of Metalamas which spit laser beams at the spider hordes of the evil empire. If one of these Cybering Archival mutants manages to land on the planet at the Edge of Time, it changes into a Wirehead which travels towards the llama. Only skilled maneuvering of laser spit from the sides of the screen can save the llama now.

Like most Minter games this collection represents almost pure talent 'ere excitement. I always get the feeling that he uses the human race as guinea pig for his experimentation with gameplay techniques. Playing them is like doing some sort of ability test. This is not surprising because Jeff genuinely loves his games and tends to write for his own enjoyment rather than for pure profit. It's fortunate for him that his love of fast action is in tune with so many game players around the world.

I would not say that Minter appeals to every one's taste but love him or loathe him you can't ignore him. ED.

NEWS

News Development
 £1.99 on CD-ROM • CSM • Jovitch



KICKING THE DRUG HABIT is slightly gaining a lot of publicity lately. In this game you get a chance to kick the men behind the posters. A drug ring in Colombia, South America, has kidnapped a friend and your newspaper has given you the chance to rescue him. It returns you can help to smash the ring by hunting out the answers to 11 burning questions.

The parasilitary members of the ring are holed up in a sprawling HQ complex where room upon room harbours clues to the ring's operations. The stronghold has been breached by a team of secret agents (NEXUS) who will help you to search the building for these clues and to find your friend, Tavo.

Long passages and complex lift networks connect the various sections of the complex but each floor requires a special colour coded pass card which the NEXUS crew will happily supply. Without the correct card you must rely on your skills in karate and on any weapons you can find to defeat the enemy forces.

A specific member of Nexus can be contacted via a computer location system. The blue personal computers may be found in one of the many rooms on the various levels. Held in the

databases are details of all the NEXUS personnel. Most are fugitive agents but there have special skills. Icons can tell you where to find hand grenades. Paul is an informer and can point you towards a specific clue and the other specialists can show you where the stun guns are hidden.

To hide their true identities the agents must behave like the ring's goons. If your pass is invalid they will attack you unless you reveal your identity with a special greeting. Even Tavo will attack if you fail to greet him. It's a tough world in the complex.

All commands are issued via the joystick. Attacking moves are made with the fire buttons pressed and this mode also gives access to the special command menu. From these options you can greet your friends, check your score or arm yourself with grenades or a stun gun. The defensive moves allow you to duck and weave in battle or to move around the corridors.

Most of the screen is reserved for information panels, with an elongated window at the top showing the animated gameplay. When a room is searched the floor either changes colour or remains spot as an indicator and, while you are hunting for an unsearched room, a



long range 'radar' map will show you any utilities lurking further along the corridor.

At either side of the screen are two panels which show the faces of any of the NEXUS team who are currently on the animation screen. The pictures are digitised images of real people, giving a touch of plausibility to the game.

On one of the floors you will find the ring's Transmission Room. All of the information which you have gleaned in your searches can be relayed back to your editor from here. Marks are awarded for decoded answers to the riddles and for any photographs which you may have taken with one of the cameras holed around the HQ.

There have been several 'corridor' games produced in the past but few have managed to combine the elements of adventure, strategy and action which this game communicates so successfully. The search for Tavo can be approached on two levels. As a quick hit and run after the room searches can be largely ignored but your battle skills will be honed to a fine art, or as a full blown assault on the HQ building your abilities to think coolly and logically under pressure will be tested to the full.

Recommended as a worthy addition to anyone's collection.

E.B.

HERC

Infotronics
 £1.99 • 2-16 • Jovitch

HERC IS ONE OF THE OLDEST types of arcade computer games. I first saw a version of it on the Apple many years ago when it was known as Apple Panic. It must be the granddaddy of all platform games.

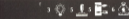
The screen is split into five levels connected by ladders. Boasting maliciously from floor to floor are monsters cut for your blood. The only means of defence is a spade with which you can dig holes to trap the monsters. Hit the storyline clips into the realm of a video nasty as you both your wily quarry about the

ears with the spade until it falls through the hole to certain death.

As you progress, the monsters get nastier and you have to dig aligned holes in several levels so that the nasty creature can fall far enough to make his trip a date with death.

The placement of ladders is made on a random basis so no two screens are ever quite the same. There are 18 levels to pass through and judging by my performance I fear that this may prove to be an inexhaustible supply for me.

E.B.





PRINT SHOP

FROM
PRECISION SOFTWARE

**Stuart Cooke takes a look at
a package that will make
your rubber stamp obsolete.**

EVERY ONCE IN A WHILE A PROGRAM appears that makes you wonder how on earth you managed without it. Printshop is one such program.

In a nut shell the program will turn your C64 and your Commodore compatible printer into a specialised print shop dealing in letter heads, cards and banners. Now you can generate your own stationery, print your own birthday cards and generally impress your friends.

In Use

The program is extremely easy to get started, you simply load the program from disk and wait until the menu appears. The following options are available:

GREETING CARD
SIGN
LETTER HEAD
BANNER
SCREEN MAGIC
GRAPHIC EDITOR

The Greeting Card option lets you choose from either pre-designed cards such as birthday and Christmas greetings or you can design your own. If you choose to design your own you can choose a graphic from the numerous available on the disk. These range from a Christmas tree to a floppy disk.

As you can see, the range is extremely large. If you do get fed up with the graphics available on the disk you can either purchase one of the graphic supplements that are available which give you even more graphics to choose from or you can use the Graphic Designer option from the main menu to design your own. A number of graphics have been included with this article so you can see what sort of detail is possible.





Once you have chosen graphics and the border for the front of the card which can range from hearts to a single line all way around the edge, you can select the font that you want your message to appear in. The available fonts are:

When you type in your message you can choose numerous options such as, where you want the text positioning and whether you want the text to be printed as outline, in 3D or solid. Examples of the fonts have also been included so you can see exactly what they look like.

The greeting card option prints four

sides on one piece of paper. Simply fold it and you have a ready made, customised card.

The sign option offers similar facilities to the greeting card option but will allow you to print one large picture. The size and position of the graphic used in both this and the card option can also be changed, this means that the graphic that you use on the sign could be either about one inch square or fill the whole page. Also the smaller the graphic the more that you can print on the page. Signs is a great way of producing cheap posters with a little character.

The letter head option is simply superb. Basically this option allows you to produce paper with a customised header in any of the fonts. The text at the top of the paper can be centred or moved to the left and right of the page. Graphics can also be added and you have the option of just placing graphics in the corners, putting a graphic every other space or having a solid band of graphics. It is also possible to place text and graphics at the bottom of each sheet of paper.

To use the letter head option to its full potential you would have to produce numerous sheets on fan-fold paper and then stick this back into your printer so that you could use it with your wordprocessor. Time consuming but well worth the effort.

The banner option will print large letters sideways on the paper. This can be used to print messages in any of the fonts. Graphics can be added on either side of the message. This is great for producing large banners for parties etc.

The screen magic option simply draws pretty line patterns on the screen, once a pattern that you like has been displayed you can store it so that it can be printed out. I must admit I don't think that this option is of much use, it simply isn't as much fun as using the graphics included or your own.

As previously mentioned the Graphics Editor allows you to design your own graphics, print them out and store them on disk for retrieval at a later date. Great fun if you're any good at art and would like to send a specialised message to someone. The graphics editor is easy to use and all available functions are clearly displayed at all time.

Print Shop is simply an extremely useful and fun program. Just think, you may never have to buy another birthday card. Hated you, one friend did go a little far when she used Print Shop to send a wedding invitation to her Godchild!



Touch Line

Precision Software
6 Park Terrace,
Worcester Park,
Surrey KT4 7SD.
Tel: 01 308 7106



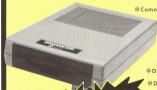
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SAVE:SAVE:SAVE:SAVE:SAVE:SAVE:SAVE:SAVE

George Duval doodles his way through some Amiga software.

Art on the

HOWEVER IMPRESSIVE THE AMIGA'S hardware specifications is, it wouldn't be anything without the plethora of high quality programs which have been written for it, to take advantage of the technical wizardry.

Almost all of the software I am going to talk about was programmed in America, but with the Amiga having been recently launched at the Commodore Show, it seems that many British software houses are developing programs of a very high standard.

Commodore

When Commodore launched the Amiga in the US, they had planned to have two pieces of software available: *Graphicraft* and *Textcraft*. *Graphicraft* is an entry level graphics package, as its name would suggest, which although not very special, allowed many people to get the feel of the machine's capabilities - and work out what could be done when a really good package appeared.

Textcraft is a very basic word-processor that, although it provides most of the functions of you would expect (finders, footers, help files, text styles etc.) lacks the finesse to put it up with the excellent packages available for the Amiga's closest business rival, the *Atacintosh*. However, as it is the first, it succeeds in filling a gap that would otherwise make the Amiga an undesirable product.

The final product in the Craft range is *Muscraft*. Although it is not yet finished, I have seen the most up-to-date version and can tell you that it has a great deal of potential.

Muscraft has three main options; the first is a straight score which allows the user to enter or edit a file, as if it were in true musical notation (and you don't need any Tappan!). Option two is to play using the Amiga's keyboard, which is all very well, though a little impractical to say the least! Finally, and in my view most importantly, is the waveform editor. This allows you to load and edit waveforms to produce almost any sound you could want.

Graphically you can draw the waveform you want, or you can choose from a sine wave, a step-up, a step down or a variety of others. This section also allows you to edit the envelope and various filters (of which there are quite a few).

If you are a budding musician, *Muscraft* has a great deal of promise, and if (as we all hope) Commodore sees fit to release it with a full MIDI sequencer built in, it could easily be of use to professional musicians.



One product for which everyone has very high hopes is Commodore's *Transfonex*. This is the much-heralded piece of software that will allow Amiga users to run existing IBM PC and compatible software. Although I have seen this product, I cannot search for its 100% reliability as no one has any dumb 5.25" disks to test it out on. However if this product is finished and released, you can be sure it will have a phenomenal effect on the Amiga's market penetration!

Electronic Arts COMM/AUG/P/M1/P1

In America, the first company to receive black-box development machines was Electronic Arts, and it was therefore not

very surprising that EA released the first piece of software which really showed off the Amiga's capabilities, *Deluxe Painter* (or *Dpaint* as it is more commonly known) is without doubt the most comprehensive and impressive piece of graphical software ever to appear on a personal computer! This may sound like a very over-the-top statement, but it has to be seen to be believed. *Dpaint* provides many levels of use that vary from fun for the Amigauser, who wishes to show what his machine can do, to accessible pictures from artists who decide the Amiga is the tool of their dreams.

Dpaint really does make the most of the Amiga's limited capabilities. It can operate in any of the three graphics modes, low, medium or high, although

VAMIGA



high resolution requires the use of interesting techniques and is therefore very demanding on memory.

Starting to use Opaint is really simple. Either you can control everything via the mouse or, for the more experienced user, you can use the optional keyboard commands - which certainly speeds up the process of drawing no end.

Having selected the mode in which you wish to draw, you are then presented with a blank screen. On the right you have a permanent control panel, and the top screen has a variety of pull-down menus. To start, the best thing is to load in some of the provided files, these vary from a very impressive interpretation of Botticelli's *Venus* to a technically amazing 'sharflight' scene.

Once you have got to grips with the

basics of Opaint, you can start to use some of the effects that put it so far ahead of any of its competitors. The control panel allows you to pick a variety of drawing shapes and commands. You can draw lines, boxes, circles, polygons, arcs, and ovals (all of which can be filled if appropriate). You can also choose to add text in any of 11 fonts, as well as being able to draw using various symmetrical options.

It must be said however, that these are only the very basic commands - the complex ones are awesome. Perhaps the most famous feature of Opaint is its ability to pick up any section of the screen and use it as a brush. In other words that you could pick up one of *Venus's* eyes, enlarge it, spin it round, and then draw with it! This is very

effective if you wish to create multiple images, each of which takes up only a small section of the screen.

Another feature of note is the zoom, which allows you to enlarge any section of the screen to a greater size, thus making it much easier to edit or change detailed sections.

For people who wish to give an impression of basic animation, the comprehensive palette adjustment and colour cycling abilities will be vital. By allowing you to alter the palette completely, it is possible to create 25 varying shades of whatever colour you wish, and by then choosing the range of the cycle you can produce, some very realistic movement. This is very well illustrated by a file called *Waterfall*, which comes on the Opaint disk.

Quite three dimensional filled drawings can be easily created using the wide variety of colours, in union with the Blend, Smooth and Shade commands. They allow you to use the airbrush technique to the full, and can lead to some very impressive results.

Because Opaint uses the standard BP format for graphics files, any printer created on one of the other popular graphic packages can be loaded into Opaint and then edited.

Printers are all covered for through the Workbench interface, but I must mention the Climax 20 printer which, when used creatively with Opaint, can produce some of the most outstanding colour stamps I have ever seen.

Overall Opaint is a spectacularly good piece of software. Its only drawback is that it is sometimes a little slow, mainly due to the fact it was programmed in C. Otherwise it must be said that if you own an Amiga, you must have Opaint!

The biggest problem with releasing one piece of software as good as Opaint is that everything else must be as good. It isn't a little bit better. Electronic Arts' next release, another in the productivity series, is *Deluxe Print*.

Using files either created on Opaint, or built into the art disks of Opaint, this package is a comprehensive printing utility that allows the user to create letters, cards, signs, stickers, invitations, and a whole variety of other things amazingly simply.

Not only can you load other BP files, you can merely type in any of the fonts provided, and even use the Roman command to enter text strings longer than 81 characters. To make the most of Opaint you really need one of the wide variety of colour printers catered for in Preferences, the results just don't look the same in 16 shades of grey!

In theory, Opaint could be used to

produce small booklets or, using some special functions, colour separations. Products like Dpaint show how close we are to complete magazine production on a disk.

If these two programs were not enough to establish Electronic Arts as THE software house for the Amiga, the finishing touches are being added to a product which should sustain everything before. Named The Deluxe Video Construction Set (ghwv2), it will do for animation what Dpaint has done for static graphics.

Deluxe Video was written to let Amiga Users create animated shows that could either be for fun or, in a business environment, practical. Professional video companies will find the scope for Deluxe Video endless, and in many ways it should assure the Amiga of a certain market.

As well as creating animated drawings, Video allows you the sophisticated feature of being able to add a complicated soundtrack - anything from explosions to Vangelis. Using a graphics storyboard, and a variety of timing marks Divideo can create sequences that many competent 80000 programs could be very jealous of.

I have already used one very impressive sequence created using Divideo, showing the various stages of the Shuttle, from a close up at take-off, to a sequence of it orbiting the world - and it certainly lived up to my expectations.

Without doubt Electronic Arts lives confident of the Amiga's success, and if EA keeps on producing software of this quality, it really can't fail!

Amiga

If there is one company that has managed to rival the quality of Electronic Arts when it comes to graphics packages, it must be Amiga. Not only has this company produced an animation package before EA has managed to release Deluxe Video, but it also has an excellent graphics package.

Amiga's Amiga! attempt at a graphics package to make the most of the Amiga. As with Dpaint it uses BIT format, allowing pictures to be imported from and exported to other packages. Although Amiga! is an outstanding product, it unfortunately isn't as good as Dpaint. Deep down, it lacks the facilities that enable such easy creation of complex pictures.

Perhaps the most notable alteration, when compared to Dpaint, is the inability to create brushes of anything but a limited width. Amiga does have one major thing in its favour - two disks. It is the resident price for Amiga, and it

without doubt the best artist on the Amiga. His Parallel files (especially the new Turbo) are astounding.

Amiga's second release for the Amiga is Animator, a complex and very good animation package that uses storyboard techniques - in a similar way to Divideo - to create excellent sequences. Written by the now defunct Island Graphics team, it allows the user to create

Art on the AMIGA



anything from basic polygon to polygon modeling, to much more complex filled graphics animations.

Although Animator runs in low resolution mode (320x200), commands such as merge, hook, rotate and hue allow you to mix shapes and colours to create some very effective 'Through' graphics, and I'm sure that given enough time someone could produce a very good version of the Channel 4 opening logo!

Space seems to be the order of the day as far as animation packages are concerned as the one storyboard provided with Animator consists of an Apollo look-alike landing on the moon. Using the background ability, a very effective three-dimensional feel has been created.

My personal favourite product from Amiga is Draw. Designed primarily as a serious CAD/architectural program it allows you a variety of features you could not normally associate with graphics packages and which, especially on the Amiga, can be used very effectively.

A massive variety of straight lines, three dimensional boxes and polygons are all available at the click of a mouse! Perhaps the most dramatic facility of Draw is Zoom. This allows you to zoom in amazingly close to edit any previously created pictures. Draw is another product, like Dpaint, that could quite easily justify the purchase of an Amiga, if you had the right application for it.

Overall, Amiga are a very good software house. Until now a little overshadowed by EA, but by getting Animator out before Divideo, and by releasing the excellent Draw, Amiga has proved that it's really a force to be reckoned with.

Various

As well as the big companies who are producing more than one program for the Amiga, there are plenty of companies producing one or two products. One of these companies produces a product called Onfile. As its name suggests, this is a collection of little utilities that add up to a very impressive package indeed. As well as the now obligatory calculator, there is an excellent communications package, and plenty of other bits and bobs.

Whilst on the subject of calculators, I thought I'd mention an excellent terminal program I received called Onfile. Not only does it allow the Amiga to emulate various other computers, but it allows split screens, stored files, auto dialling, preset calling (which means you can let it to call up a certain system at a certain time and grab any messages before logging off), and all for \$70 in the UK.

Not to be left out, England has at least one product to be proud of. Although not finished yet, TCI's Protext software is particularly impressive - especially when you consider that the Amiga has been on sale in America for more than six months!

Conclusion

It is a great relief to me to see the quality and quantity of software that is coming through, both from America and more recently the UK. Products such as Deluxe Paint are of such a high quality that they almost assure the Amiga's success, whatever its critics have said.

WORDPROCESSING

o n t h e

PLUS/4

Artie Blomberg
provides some handy
tips for Plus/4
Cassette users.

IT HAS ALWAYS STRUCK ME as being extremely silly that Commodore packaged the Plus/4 computer with a cassette recorder. The reason that it seems odd is because in-built software has no way of SAYING to this device. Don't despair, I have found a way in which you can use the built-in wordprocessor with the cassette recorder. Now you don't have to go to the expense of buying a disk drive.

As well as giving information about how to use the Plus/4 with cassette, I have also modified the Full Speed Ahead! fast tape routine so that it sits in a better place in the Plus/4 memory so that you can enter longer programs as well as use it with the wordprocessor. Now you can SAVE and LOAD documents just as fast as your friends with disk drives.

Saving Documents on Tape

Type the document as usual, you can print it either before or after saving on tape. However, you will need to make a

note at the last line of your document in the word processor. Read '1' on the display on the bottom of the screen.

When the document is completed enter the Machine Code Monitor by following the procedure below VERY CAREFULLY.

1. Press the RESET button (small button next to the on/off switch) and hold it depressed.
2. Press and HOLD down the RUN/STOP key (next to SHIFT LOCK).
3. Now release the RESET button, and after the screen has changed, the RUN/STOP key, if the RUN/STOP is pressed first it puts the letter '1' in the document.

The document is stored in RAM memory starting from location hex \$C000 finishing according to its length. It is possible to view it in the Monitor's ASCII dump display, type 'M0000' [RTN] but only upper case letters and numerals will be shown. For the Monitor to access RAM above \$8000, you have to change the value in Location \$07B to \$40. See the Plus/4 manual page 181 for a full explanation.

Now type the following to save the data:

```
'FILENAME';LCR00.XXX  
[RTN]  
XXXX being the end address
```

found in the table below according to the last line of text in the document.

The cassette recorder prompts will show as normal.

To load a previously saved document enter the word processor first and go to the Machine Code Monitor as described above, but clear any document from memory first, by typing CBM 'C', then '0' [RTN].

If you don't clear, the documents will merge - which could prove a workal tactic, load a short document into the top of the processor to merge with one already in the lower part.

The load command is '1' [RTN]. You can specify 'FILENAME' after the '1', as on tape it will otherwise load the first program that it comes to. I hope, however, that you will keep a clear record of the cassette recorder revolutions for each document as, unlike the disk drive, it cannot go straight to a file. If you do not know where it is, you may have a long wait before the letter which you want to load is found.

When the tape has stopped key '1' [RTN] [RTN]. The Plus/4 has taken us to the spreadsheet, key CBM 'C' and then '0' [RTN]. You will now be in the wordprocessor with your document displayed. Use the same procedure to return to the wordprocessor after saving on tape.

Another merge possibility is to save the document not from the beginning, but from a later line number. In this case substitute '0000' with the corresponding line number for that line in the table. Doing it this way, we lose the Set Pointers for that section, as these are stored in the first part of the RAM at \$C000 before the actual text. It is best to set these again at the end of each paragraph after merging, in order to be able to use the edit facility.

I have encountered a strange phenomenon when printing a document after loading it from disk. The same may also happen when loading from disk.

If you print straight after loading, it will only print up to the line actually displayed on the screen, and will only print the whole document if you have run the cursor down the document to the bottom line at some stage. You may also find peculiar things occurring if you try to edit, insert, or delete lines without going down to the last line first. And the shifted ClearScreen will not take you right down until you have viewed the end of the document.

Using Fast Tape Save

Published in the February 1986 edition of our Commodore magazine was an

WORDPROCESSING

article and program by Nick Hampshire called *Break the Speed Limit*, a Fast Tape Save/Loader, which I have used for all my programs since. I have found that it also works excellently with the word processor, if the routine is stored at lines \$7000. The program as published stores the Machine Code Routine at \$8000, top of RAM for the C16. In order to store it at \$7000 or any other location, some of the lines have to be amended as shown in the listing.

Using the Fastsave with the wordprocessor you have to stop the Macrom

jumping into Basic after loading or saving, as you cannot get back to the wordprocessor by the "SYS162" command on key TT without closing the document from memory. This is presented in line 1061, forcing a BREAK to the Monitor. To activate the Fast Save when in the Monitor, the command is "G700 [RTN]. In the save command, substitute 'J' for the 'I' after the second ". Now tapes will work about 10 times faster.

As the document can be up to eight kilobytes in length, normal tape operation will take almost five

minutes to load or save, whereas Fastsave will do it in about only 45 seconds. Incidentally, roughly 20 seconds of this time is taken up by leader, header and gap, and eight kilobytes of data is actually written and read in only 20 seconds. I urge you to use the Fastsave routine - you will definitely not need a disk drive then.

You can load the previously saved Fastsave routine from the Monitor either before entering the wordprocessor or after, by the command 'J [RTN]. If you do the former, you can also load it from Basic with "LOAD" "J". When ready to Fastsave you must have commanded "G700" and then use direct code 'J' before the addresses.

If you want to use the fast tape routine with other programs, I find it best to store it at \$7000, which is the highest RAM that Machine Code can easily access. To protect this from being overwritten it is necessary to lower the top of memory by "POKE \$4, DEC("J")CLR". This leaves 27888 bytes for your Basic program and variables.

If this is too little, I suggest you store the routine at \$7000, which is the beginning of RAM for Basic, so the vector for start of Basic will have to be raised before you install run the Fast Tape Loader, and any programs that have been fast saved previously. Do this by "X=DEC("J"); POKE44,3; POKE("3568-NHX").

This will not work if you are going to use the binary mode.

Then store the routine at \$4000, and take the start of Basic to "DEC("J")". But you have to command "GRAPHIC 2" [RTN] at least once before loading or moving the start of Basic. If you use binary mode with the Fastsave routine at \$7000, the start of Basic will not have to be moved, but you should also use the GRAPHIC2 command first before loading. Don't use GRAPHIC CLR at all. Whenever I have

tried it, it just seems to move Basic higher up rather than lower. Although GRAPHIC 0 on its own is alright.

I find that it best to load the Fastsave routine before any Basic programs, and then type "J [RTN]. But you do not need the routine to load a fastsaved program, this is only necessary if you intend to do more saving.

Wordprocessing Tips

If you want to write quotation marks ", you will find that pressing shifted ' will give an apostrophe. To get a proper quote you have to use its ASCII value 34 in reverse video (Control key/BA) ON, the manual calls it "Embedding ASCII Characters". You then type "ac34". I have found some problems in using this, is that sometimes the character appears in the wrong position, perhaps in the middle of an adjacent word.

I think this has something to do with the justification of the document, as it doesn't seem to happen when not justified, so it may be easier to give the command no justify preceding the paragraph with the quote.

Another method which allows you to keep the justification is to ignore the incorrect position of the printed ASCII character, and you have finally edited and corrected the printed document.

You now have to force the line in which the ASCII character appears to become the end of a paragraph. Place the cursor on the word that, on the paper, starts the next line after the ASCII character. Now insert spaces (shifted Ins/Del key) so that this part of the text recedes and it is at the beginning of the next line on the screen. Then move the cursor back to where it was when you started inserting and press return. Although a new paragraph has been created, it will still be printed as continuous text. Occasion-

PROGRAM: FAST SAVE AMENDMENTS

```
800 REM * ADDITIONAL LINES TO FAST
SAVE IN YOUR COMMODORE FEB 1986 PA
GE 20
810 REM * TO LOCATE THE ROUTINE AT
AN LOCATION FROM $1000 TO $7000
820 REMOVE* LINE 1165 UNLESS SAVING
@ FAST SAVE ROUTINE FOR WORDPROCES
SOR
900 INPUT"LOCATION";HX:H=DEC(HX)
:HL=[INT(HX/256)]:FNLC=HX/256 THEN
:GOTO 900
1100 POKE26,HL:CLR:HL=PEEK(56):(HX=
HL)/256
1110 I=HX:T=0:DI=HL-61
1125 T=T+A:IFA<60AND A<64THEN CB=1
:HX:I=PCB:30AND CB:<63AND CB<176
THEN A=A+DE
1130 POKE1,A
1165 POKEH=438.0:POKEH+197.0:POK
EH+10.0:REM THIS LINE ONLY FOR WO
RDPROCESSOR
1202 PRINT"(DOWN) 'SYS'HX" TO A
CTIVATE FASTSAVE "
1205 PRINT"(DOWN) TO SAVE AS MACHI
NE CODE ROUTINE GOTO"
1207 PRINT"(DOWN) MACHINE CODE NOW
:TOR ADD COMMAND"
1209 PRINT"(DOWN) S'CHR$(24)"FASTS
AVE"(CHR$(24))','."HEX$(HX) ",".HEX$(H
X+63)
1210 REM SYS HX:END
```

o n t h e

PLUS/4

ally, you have to do the same with the beginning of the line with the ASCII character to get it laid out correctly.

It can be a bit tedious, but worth it if you want to have a good looking document. Don't forget to set the pointers at the end of each paragraph as, if you try to edit without, you will tear your hair out with frustration.

As well as the 'enhance on/off' (possible with letters) 'asc14/15' (as mentioned in the manual, other ASCII codes that can be embedded are:

```
reverse on      asc18;
linefeed       asc20;
graphic mode   asc14;
reverse off    asc14a;
carriage return asc13;
nongraphic mode asc17;
```

The graphic mode 'asc14a' will enable the graphic characters that can be generated by shifted alphabet keys (just with CBI keyboard printed), but you will not see them displayed on the screen as such. You have to check the symbols on the keyboard carefully and type more or less blind.

It appears you may also have to repeat the 'asc14a' command for each new line on the paper (not another Plus/4 peculiarity. The 'asc17' will return to the normal non-graphic mode.

It is also possible to print the other graphic characters by bringing their ASCII codes together, from page 194 to 196 in the User Manual. It appears that the maximum possible number is five, and the 'graphic mode' will have had to be set first. When using two or more ASCII codes together in reverse video, separate each number from the previous one by a semicolon. You do not need to repeat the 'asc' command.

Underlining can be made by the 'u' (broken) or shifted 'u' (continuous), but only when the underlining itself occupies its own line on the paper. And again you may have found out by trial and error.

I have noticed that a created block will stay in memory even after you have cleared memory (cleared the screen), and can be inserted on the blank screen, which is useful if you want to retain only one paragraph of a document.

You can use the line feed to keep records of mailing lists of names and addresses more easily as a word-processor document (saved on tape). After each segment of the address type 'asc18' in reverse video, and continue typing the remainder of the

address on the same line without pressing Return until the end of each address. Each section of the address will be printed on paper on a new line, although on the screen it appears as a continuous line. Up to 99 addresses can be stored on one document. Before printing Return you can add 'asc18,90' for two extra blank lines before the next address.

Please remember that every time 'asc', followed by a number has been mentioned, it must be typed in reverse video on the screen (Control

Rev. On). It should also be mentioned that all these tips may only work on Commodore type Disk Address pointers.

I hope that some of these hints and procedures will enable many more Plus/4 owners to utilize the built-in software, which after all is quite good for the average home user. If you have neither a disk drive nor a printer, but are contemplating one or the other, take my advice - get the printer. It will widen your scope of usage much more than the disk drive.

End Addresses for Tape Saving

LINE 1 = C12C	LINE 2 = C129	LINE 3 = C1C3	LINE 4 = C215
LINE 5 = C260	LINE 6 = C26D	LINE 7 = C2FA	LINE 8 = C347
LINE 9 = C394	LINE 10 = C3B1	LINE 11 = C40E	LINE 12 = C478
LINE 13 = C4C8	LINE 14 = C505	LINE 15 = C562	LINE 16 = C5A7
LINE 17 = C5FC	LINE 18 = C669	LINE 19 = C686	LINE 20 = C6E3
LINE 21 = C738	LINE 22 = C775	LINE 23 = C7CA	LINE 24 = C817
LINE 25 = C864	LINE 26 = C881	LINE 27 = C8FE	LINE 28 = C948
LINE 29 = C998	LINE 30 = C9B5	LINE 31 = CA12	LINE 32 = CA77
LINE 33 = CAAC	LINE 34 = CB19	LINE 35 = CB84	LINE 36 = CB8D
LINE 37 = CC89	LINE 38 = CC40	LINE 39 = CC94	LINE 40 = CC17
LINE 41 = CD14	LINE 42 = CD83	LINE 43 = CDCE	LINE 44 = CD18
LINE 45 = CD68	LINE 46 = CD85	LINE 47 = CD00	LINE 48 = CD4F
LINE 49 = CD7C	LINE 50 = CD79	LINE 51 = D056	LINE 52 = D081
LINE 53 = D408	LINE 54 = D11D	LINE 55 = D18A	LINE 56 = D187
LINE 57 = D304	LINE 58 = D357	LINE 59 = D396	LINE 60 = D369
LINE 61 = D158	LINE 62 = D365	LINE 63 = D3D2	LINE 64 = D419
LINE 65 = D46C	LINE 66 = D469	LINE 67 = D308	LINE 68 = D311
LINE 69 = D488	LINE 70 = D3ED	LINE 71 = D41A	LINE 72 = D867
LINE 73 = D6D4	LINE 74 = D727	LINE 75 = D786	LINE 76 = D789
LINE 77 = D808	LINE 78 = D855	LINE 79 = D8A7	LINE 80 = D881
LINE 81 = D93C	LINE 82 = D969	LINE 83 = D924	LINE 84 = DA13
LINE 85 = DA78	LINE 86 = DA8D	LINE 87 = D824	LINE 88 = D837
LINE 89 = DBA4	LINE 90 = DBF1	LINE 91 = DC3E	LINE 92 = DC28
LINE 93 = DC18	LINE 94 = DC25	LINE 95 = DC72	LINE 96 = DC88
LINE 97 = DB8C	LINE 98 = DB59	LINE 99 = DBA6	

Notes for Table

After going to the monitor (press re-set button, press Run/Stop) and release re-set, type:

```
'*PBRNAAA*';LOCHE,XXX  
[RTN]
```

Type XXX (end address) from the table, where the line number is the one after the

last line in the completed document in the word processor.

To load a document from tape, enter monitor from wordprocessor as above and type:

```
'C'[RTN]
```

To return to the word processor after saving or loading, key 'X' [RTN] - then CBI 'C' and 'TW' [RTN].

Your

Submissions

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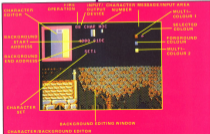
THE VAST MAJORITY OF computer programmers probably a diverse range of graphics tasks. These may include screen editors, character editors or sprite editors. The only problem is that some of them can carry out all the functions that the programmer requires. Obviously, the only way around this is to use a number of programs to produce one finished product.

For example, if I was writing a game I would use a character editor to produce user defined characters. I would then use these to produce the actual background for the game. Then I would load in a sprite editor and produce the sprites. Wouldn't it be easier if it could all be done with one program which encompassed all the functions I could ever need? Hence the birth of the **JIN 1 EDITOR**.

JIN 1 consists of a sprite editor that has provision for multi-colour and hi-res sprites. Sprites can be animated, copied, positioned on top of each other etc. Within the program there is also a combined character and background editor. What makes this part of the program so special is that you are not limited to designing just single screens but it is possible to define screens that take up to 128 of the computers memory.

The editing screen acts as a small window that can be moved over a much larger area. Screens such as the ones I created in games like *Manly on the Run* and *Man of Blagger* are extremely easy to produce. Until now most scrolling screens were designed as individual pictures and 'back' use next to the other at a later date.

The **JIN 1 Editor** has already aroused much interest in programming circles and many programmers will be using it to help them design games that will be appearing over the next few



months. The complete editor program is published here so that it is available to anyone who is interested in graphics. This month I will detail the commands available within the editor so that you will be able to use it. In next month's issue of the magazine I will be presenting a few example backgrounds so that you can see exactly what is possible with the editor.

Getting it All In

JIN 1 Editor is presented in the form of a series of Basic loaders. This makes it extremely easy to enter and check for typing errors. Simply type in all of the loader programs and save them on to disk or tape. If you are using tape then do make sure that you change the 'D' to 'J' in the **LOAD** instructions where indicated.

Once you have entered all of the programs and saved them individually then you can create the actual machine code file that you will use. To do this **LOAD** the program **JIN1 LOADERT** and type **RUN**. This will **FORN** the machine code into the neces-

sary areas of memory. Once the program has finished running it will automatically load the next part of the program from **TAP1** or **DISK**. You do change the numbers if using tape (don't you!) Once the last part of the program has been **RUN** press the space bar to enter the program. **JIN1 EDITOR** is now ready for use.

Use options like **SAVE JIN1 EDITOR**.

To use the editor in future you type:

```
LOAD "JIN1 EDITOR",J1 for disk
or
LOAD "JIN1 EDITOR",J1 for tape.
```

In order to start the program you then type:

```
MS 6000
```

If, while entering the program, you made any typing errors these will be found by the individual **LOADERT** programs when they are **RUN**. If you do find any errors then you will either be presented with the line number where the error is located or an 'Illegal quantity

error'. The way to deal with each of these errors is detailed below.

Error in Line Number

If you get this error message then simply list the program so that you can find out in which **LOADERT** program the error occurred. Then correct the line by comparing yours with the listing for that **LOADERT** and then re-save the program. Do make sure that if using tape you don't re-save the program over another part and that you save it in the correct position so that it can be loaded in order.

Illegal Quantity Error

If you get this error then you have either typed in a number greater than 255 or simply mixed a number out. If you do get an error then type this line and press **RETURN**:

```
PRINT 256*(1%L)
```

The number that is printed denotes the line where the error is. Correct the line as for the above error and try again.

EDITOR



Using the Program

Once you have loaded the program and started it running, with the SYS 8000 command as detailed above you will be presented with the editor's main menu which offers the following options:

- 1) SPRITE EDITOR
- 2) CHAR/SCREEN EDITOR
- 3) HELP SPRITES
- 4) HELP CHAR
- 5) DISK COMMANDS
- 6) DIR
- 7) DISK REPORT
- 8) SAVE EDITOR
- 9) LOAD

Pressing the corresponding key will call up the specified function. Options 1 and 2 call up the sprite editor and the character/background editor respectively. These will be explained in their own sections later on.

Options 3 and 4 give access to label reminders of all of the functions that are available in the relevant programs. These two screens will no doubt be of great use once you start to use the program.

Option 5 allows you to send the standard disk in-

structions to your disk drive. If you are unsure of what the commands are I have listed the main ones in figure 1.

The DIR function will display a directory listing from any disk in the drive. However, because INT only uses program files (i.e. P000) then only this type of file is listed to the screen. Also the size of the file is not given and is not really that important.

Just in case you ever have any disk errors, I have included Option 7 which will read the error channel of the disk drive and report any errors.

Options 8 & 9, extremely important. This function allows you to make more copies of the program without having to use the basic loaders. If you use this function then you will be prompted for the filename that you wish to call the program by. The default output device when you load

this program is disk. If you are using tape then you will need to change the output device this is done by pressing P1. You will be able to tell which is currently being used by output as both this option and Option 9 will have either a '1' or an '0' after them. A '1' specifies an output device of 1 i.e. cassette while an '0' means device 0 which is disk.

The final command available from the main menu is LOAD. This will LOAD the specified file into the same area of memory that it was saved from. This means that you can load any of the files created with the editor programs from the main menu.

Using the Editors

Before I take a close look at the individual editors programs it is worth pointing out a few conventions.

Firstly all numerical inputs and outputs are in HEX. This is because most programmers work in hexadecimal since it is a lot easier when writing machine code than using decimal. Since this program was designed as a programmers tool it is obvious that it should use HEX. All inputs must be made up of two digits e.g. '00' or '0F'.

A lot of the functions can be controlled by either the cursor keys or a joystick in port two. Since the joystick only has one fire button and it may need to either raise or set points, the 'F' key is used to select its operation. On both editors a flag of either one or zero is used. One indicates that the joystick will set a point while a zero means that it will delete again. Take a look at the labelled pictures of both editors to see where the flags are.

Next to the joystick flag in both editors is the device flag. As with the main menu this can be either a 0 or 1. Again look at the pictures in order to see where the flag can be found.

The Sprite Editor

The sprite editor allows you to edit sprites in either multi-colour or 16-colour mode. Sprites (16-bit) can be loaded with the editor. If you are unsure about sprite numbers then I suggest that you have read the section on sprites in the EM manual. If you take a look at the picture you will see that there is quite a lot of information on the screen.

Firstly we have the actual sprite editing screen. This displays a blown up version of the sprite being edited. If you choose multicolour then the horizontal resolution will be the same as with 16-colour sprites. Unlike most sprite editors you actually draw the sprite using the colour for each dot. This means that you don't have to think about combinations of dot colours which colour. Simply press one to three to select the editing colour and key protect those dots with it.

Colour changing is also extremely easy. Press shift one to five and the corresponding colour will go through all 16 possibilities. Changing colour mode is also

Disk Commands

SP	Initialise disk
VB	Validate disk
FO	Format disk
RS	Rename file
SC	Search file

Figure 1

extremely easy simply press 'W' to enter multi-colour mode or 'H' for hi-res mode. If you want to reverse the sprite simply press CONTROL and L, here we'll do it.

It's not really worth mentioning all of the available commands since they are all listed in Figure 2. However, a few functions do need further explanation.

At the bottom right hand corner of the screen there are four sprites referred to as sprite sets in these notes these are NOT the same as sprite numbers but are just used as reference numbers

for the four at the bottom of the screen. Usually these four positions hold the same sprites as the which is being edited. It is possible to expand these sprites using the left arrow () and up arrow () keys so that you can see the different combinations of sprites available. To alter the way that the sprite looks simply pass one of the above keys followed by the corresponding sprite position number (0-3).

Pressing CONTROL AND F followed by a number allows you to move that numbered sprite around the

bottom of the screen. This means that you can position the four sprites next to each other or even overlap them. This may not seem all that useful at first but it is possible to make each of these four sprites different. This means that you could define a large character of up to four sprites joining the sprites together at the bottom of the screen so that you can see what they look like. It is even possible to animate this section of the screen with the CONTROL, N command and the Q and R keys. Pressing CONTROL and N followed by 00 will cause each of the four sprites at the bottom of the screen to become the same as the one being edited. If on the other hand after typing CONTROL and N you enter a number greater than 00 you can set up animations.

Animation is quite difficult to explain and is best figured out with practice. However I will do my best to explain how to set up and use this special animation function.

When you enter a number greater than 00 for the number of animations after a CONTROL, N instruction the sprites at the bottom of the screen will change. If, for example, we had pressed 01 after CONTROL, N, sprite 0 would be the same as the actual sprite 0 and sprite 01 will be the same as sprite 01 etc. If we now press the keys R and Q we can increment and decrement the sprite numbers at the bottom of the screen giving the appearance of animation. If we press 'W', Sprite 01 will become actual sprite 0A1, Sprite 01 will become actual sprite 0A2 etc. If we had entered 04 after a CONTROL, N instruction then the sprites would be incremented by four every time you pressed the 'W' key, i.e. sprite 01 would become 0A4, Sprite 01 would become 0A5 etc.

I did say that this form of animation was complicated but if you try it then I'm sure that it will all fall into place.

But in case you have problems with this type of animation there is a simpler form. This is the 'A' instruction. This instruction will change all the sprites on the screen, including the

large editing screen, in increments of one for a preset length. When you press 'W' you will be prompted at the top of the screen for the first sprite in the sequence and the list, then the sprites will be displayed in order. Pressing 'Y' and 'Z' will speed up and slow down the speed of this animation.

That just about sums it up for the sprite editor. I'm sure that you will find it very easy to use with a little practice and that you will find most of the instructions that you are even likely to need.

Character Screen Editor

Each of these editors are present on the same screen. The top half is the character editor while the bottom is used as a small window over a larger screen.

Quite a lot of information is present on this screen and it is worth studying the commented picture in order to find where everything is.

For more experienced programmers I have included the provision of using two different character sets. In order to see the second set you must set up an interrupt timer on the graphics editing screen with the 'T' command while inside the background editor. Above the timer, character set one will be displayed, while below the timer you will be in the second character set. Character set one sits at \$0080 and set two is at \$2080.

Again it is worth looking at some of the available commands in more detail, a summary of them all can be found in Figure 1.

As with the sprite editor, characters can be edited in either multi-colour or hi-res mode, colours being chosen and changed as in the sprite editor.

Once you have entered a character you can place it anywhere within a defined background in the background editor. The 'Y' key is used to move control between either the character editor or the background editor. You can see which mode you are in by seeing which cursor is flashing.

The background is defined with the CONTROL, D command and the window

Sprite Editor Commands

Cursor/ joystick	Move cursor
'HOME' 1	Draw point
space/ HOME 0	Delete point
01	Joystick fire function
04	Multi-colour mode
08	Hi-res mode
0-3	Select drawing colour
N.B. only colour 2 can be used in hi-res.	
	1 = Multi-colour 1
	2 = Sprite colour
	3 = Multi-colour 2
SHIFT 1-3	Change colour
	4 = Background colour
	5 = Background
G	Get sprite number
C	Copy sprite number
+	Increase sprite number
-	Decrease sprite number
U	Move sprite up
D	down
L	left
R	right
DEL	Scroll row left
SHIFT DEL	Scroll row right
SHIFT ESCAPE	Clear sprite
X	S-Flip
Y	T-Flip
A	Animate
	Input T: from
	T: to
	Press F for faster
	S for slower
CTRL L	LOAD data
CTRL S	SAVE sprite data
ES	Input/Output device

SPRITE BLOCK FUNCTIONS

CTRL F (0-3)	Position sprite with cursor keys
(0-3)	Expand sprite Y direction
(0-3)	Expand sprite X direction
CTRL N (N)	Animate group of N
	N=00 display edit sprite
	Q - decrease step
	R - increase step
STOP	Goto main menu

Figure 2

CHARACTER/SCREEN EDITOR

Cursor/ joystick	Move cursor
*/FIRE 1	Exit point
space/FIRE 2	Delta point
F1	Joystick fire function
M	Multi-color mode
H	Hi-res mode
T-B	Select drawing colour
SHIFT B-S	Change colour
	0 = Background colour
	1 = Background
C	Copy character number
C	Copy character number
+	Increase character number
-	Decrease character number
U	Move character up
D	down
L	left
R	right
SHIFT HOME	Clear character
S	Change character set
	(1) 0000
	(2) 2000
CTRL F	Fetch character set to editor:
	DC = 80M characters
	DB = SET 1
	DI = SET 2
X	8-flip
T	9-flip
CTRL R	Inverse character
BI	Input/Output device
CTRL L	LOAD data
CTRL S	SAVE character data
	Input start and end character
	to save
CTRL D	Define background size
CTRL B	Define start of window
	BL = High byte
	BL = Low byte
B	Define border character
J	Jump to background editor
STOP	Go to main menu

BACKGROUND EDITOR

Cursor/ joystick	Move cursor
*/FIRE	Place character
G	Get character
+	Increase character number
-	Decrease character number
CTRL F	Fill window with character
W	Go to full size display; cursor
	leaps over screen W
	to exit
P	Position raster
	00 at bottom of screen
	xx at that character
	position
CTRL L	LOAD data
CTRL S	SAVE background data
J	Jump back to character editor

Figure 1

can be anything from two by two characters upwards, the maximum in either direction being 255 characters or MF. Obviously your screen size is limited by the amount of memory available. If there is not enough room for your window then you will have to enter new values. I have made up to 126 of memory available for the window though I'm sure that you will find that you very rarely use this much. The two numbers in the middle of the screen show you where your window starts and finishes in memory.

One very important consideration for games programmers is where they are actually going to put their screens. The **CONTROL B** command will prompt you for the high byte and low byte for your screen position so that you can move it where you want. Do make sure that you don't overwrite any other programs in memory, such as the editor.

You may think that it is a little limiting to just see a small section of your total graphics screen at one time. I have therefore included the **W** command which will switch to a full screen display in which you can move around the background, movement being controlled by the cursor keys only.

It is possible to set up a border character which is displayed around the smaller editing window. I usually leave this blank though you may try different effects by putting fancy borders around the screen. This does not apply to full screen mode.

Saving and Loading

As I said earlier, it is possible to load any type of file into memory from the main menu. It is also possible to load any type of file from within any of the other editors as well. However the I/O device is separate in each editor so you must change it in each section of the program.

Even though you can **LOAD** in any type of data from within any section of the program, you can only save each type of data from the correct editor. You must therefore be in the character editor in order to **SAVE** your

user defined graphics. You must be in the sprite editor to save sprites and you must be in the background editor in order to save backgrounds.

Note

When you design a background, make sure that you keep a note of the screen size that is defined, since a screen that is supposed to be 20 characters wide will look rather silly if the screen is set to 21 characters.

Examples

Since there is probably quite a lot of information to grasp about the editor in this issue of the magazine I will leave it there. Next month I will be giving you some sample screens, which you can see in the photographs accompanying this article, together with some more hints and tips about how to use the program.

IBM PC editor will no doubt be updated continually. I will try to get updates in *Your Commodore* when they are available. In the meantime if you have any ideas or comments about this program then please write to me via *Your Commodore* and it will be forwarded to me.

I hope that you find the program as useful as many programmers have already done.

Stop Press

Since the text for this article was originally set, the **IBM PC EDITOR** has been improved.

The main improvement is the addition of a pull down menu facility for accessing the commands. If you press the **F7** key, a list of the available functions will be displayed. Move the selector up and down the list and press **RETURN** to select the option that you require.

A **GRAPH** option has also been added. This will allow you to copy large areas of the background screen with ease as well as copy sprites into characters and vice versa. These functions are described in the **HELP** sections of the program and I will explain them in more detail next month.

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TIME TRAX

Just after the holocaust you wouldn't think anything else could go wrong now, would you? There you were sitting peacefully in your cellar, trying to have the nervous breakdown you've earned and the next thing you know you're sent out through the Portals to stop the Evil One reading under the fabric of Creation. Some days nothing goes right. An amazing, all-action, animated adventure across the ages of time to save civilisation. You'll be able to start playing it in minutes but you mightn't finish it for years!

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MIND GAMES

DIVISION 28

An Impish 128 utility

by M E Catley.

DIVISION 28 IS A DISE utility program for the C128 Computer for use with a CBM 5041 or CBM 5071 disk drive.

Carefully type in the program, which MUST be saved before running as it will overwrite itself. It is fully error trapped, and on completion will ask for a filename. This is the name under which the machine code will be saved and subsequently loaded as a basic program.

When run, you will see a menu/help page giving all the commands and their syntax. This page can be recalled at any time by pressing "M". All commands need to be followed by pressing the return key.

A word of warning. Some of the commands incorporate write directly on to disk track/sectors. It is always worth making a back-up copy of the disk before starting, as any error could prove catastrophic.

Commands

- M - Re-display the main menu/help page.
- R XX XX - READ a track/sector directly off the disk into a buffer in the computer. This command will enable any track/sector of the disk to be read into the buffer where it can be stored, altered or prepared for saving back on the disk.
- W XX XX - WRITE a track/sector from the computer buffer directly on to the disk. This command enables data in the buffer, be it typed in from the keyboard or read off the disk and modified, to be recorded on to the specified track/sector of the disk.
- M XX XX - Display memory from the buffer. One sector of data consists of 256 bytes. This command will enable all or any of these bytes to be displayed on the screen. The first hex number is the first byte to be displayed, while the second is the final byte. Due to the size of the screen is 40 columns wide, not all 256 bytes can be simultaneously displayed. The display will show the hex contents of the buffer and the ASCII contents providing these are printable. I.e. ASCII codes between 32 and 127 are printed, others being replaced with a period.
- MT - This is a variant of the memory command and is a short hand method of displaying a screenshot of memory starting at the top of memory (000) down to (00F).
- MB - This is similar to the MT command, but displays the bottom of the buffer from (000) to (0FF).
- ! - The semi-colon command enables on-screen editing of the buffer. When the memory display commands are used, the buffer contents are displayed on the screen preceded by a semi-colon. This enables on-screen editing to take place, so that when the cursor is placed over a byte and the byte is modified, the buffer contents are also modified ready for saving back to disk.
- ER - This is the command that reads the disk error channel and displays it on the screen. Any time the error light flashes on the disk drive, pressing "ER" will clear the error indication and display the error number, error type, error track and error sector.
- + - When a track/sector has been read into the computer buffer, the first two bytes contain the track and sector respectively of the next block of the file. If this is the last block in the file, the track value is zero. This command will read the track and sector values of the next block and load that block into the buffer, displaying which track and sector is involved. A track value of zero indicates the last block of the file has been loaded.
- D - This command will read the disk directory, displaying the track and sector of the first block of the file, the length of the file, the filename, and the file type. It will display

all file types, including deleted files which facilitates the recovery of files that have been inadvertently scratched, providing that no writing has been done to the disk since the scratch. The directory is displayed in blocks of up to 16 files, and finishes with the number of blocks free, as always in hex.

- T** - TRACE will, as its name suggests, trace a file on a disk and display the sequence of track/sector in the order in which it was read. The requested filename must be correct, and no wildcards are allowed.
- X** - XDT to Basic.
- L** - LOCK or write protect the disk. This command will render the disk write protected without the use of a writeprotect tab (which always falls off). Any attempt to save a file on a disk so protected, results in error PL DDIS TRN error message.
- U** - UNLOCK or write enable the disk. This command is the opposite of the LOCK command and renders the disk write enabled, reversing the software protection afforded by LOCK.
- I** - On the CBM 1071 and CBM 1041 disk drives, when the file type byte in the disk directory has bit six set, the file cannot be scratched by the BASIC 7 command SCRATCH or by BASIC 2's OPEN\$(A\$, "M:filename") close\$. This condition is indicated in a directory listing by a "<" character next to the filename. The I command sets bit six of all the files in the directory and so renders them individually protected against erasure.
- K** - The K command is the opposite of the I command, and resets bit six of all the files in the disk directory enabling erasure from the directory by conventional means.
- A** - The A command is similar to the I command, but only operates on one named file in the directory. Again, the filename must be correct and no wildcards are allowed.
- B** - The B command is once more the opposite of the A command and will enable one named file to be unprotected in the directory. ■

Used with care, the disk monitor can be of considerable assistance in the management of a disk library. However, careless use can have disastrous results, so always ensure you have a back-up of your disk.

(Happy disk monitoring!)

PROGRAM PROGRAM: DIMON 128 LOAD

```

10 DATA 1001
20 DATA 00,10,0A,00,0E,07,31,30,31,0
0,00,00,AD,00,8C,20,00,8C,21,00,0039
30 DATA 20,7D,FF,93,98,12,30,20,30,2
0,20,20,20,20,20,20,20,20,20,0497
40 DATA 20,44,43,40,4F,4E,30,30,31,3
2,38,20,20,20,20,20,20,20,20,038E
50 DATA 20,20,20,20,20,20,39,43,39,2
0,31,39,30,3E,20,20,4D,2E,20,43,036A
60 DATA 41,54,4C,40,59,20,20,52,49,4
3,48,4D,4F,4E,44,20,20,4E,2E,20,04E7
70 DATA 59,4F,53,48,53,20,9E,60,59,1
8,85,EA,89,02,85,EB,89,00,85,EB,08A9
80 DATA 89,27,85,EB,20,70,FF,93,00,2
0,30,30,99,12,43,4F,4D,6D,41,4E,073E
90 DATA 44,29,53,55,4D,4D,41,52,52,2
0,20,20,58,58,20,30,20,48,48,58,030C
100 DATA 20,4E,55,4D,42,4E,52,29,92,
0D,0D,9E,4D,20,20,20,20,20,20,048
9
110 DATA 20,52,4E,2D,44,49,53,50,4C,
41,59,20,54,48,49,53,2D,4D,4E,4E,055
2
120 DATA 55,0D,52,20,58,58,20,58,58,
2D,2D,52,4E,41,44,20,53,45,43,54,04F
F
130 DATA 4F,52,20,20,28,54,52,41,43,
4B,29,41,4E,44,20,53,45,43,54,4F,050
F
140 DATA 52,29,57,29,58,58,20,58,58,
20,29,57,52,49,54,4E,20,53,45,43,053
8
150 DATA 54,4F,52,20,28,54,52,41,43,
4B,29,41,4E,44,20,53,45,43,54,4F,054
3
160 DATA 52,29,4D,29,58,58,20,58,58,
20,20,44,49,53,50,4C,41,59,2D,42,052
0
170 DATA 53,46,46,43,52,20,28,53,34,
41,52,54,20,41,4E,44,20,43,4E,44,053
8
180 DATA 29,20,4D,54,20,20,20,20,20,
20,20,44,49,53,50,4C,41,59,2D,42,044
2
190 DATA 53,46,46,43,52,20,28,24,30,
30,2D,54,4F,2D,24,41,46,29,0D,4D,045
5
200 DATA 42,20,20,20,20,20,20,20,44,
49,53,50,4C,41,59,20,43,53,46,46,047
B
210 DATA 45,52,20,28,24,35,30,20,54,
4F,2D,24,46,46,29,0D,28,20,20,20,03B
C
220 DATA 20,20,20,20,20,4E,45,58,54,
2D,53,43,43,54,4F,52,20,49,4E,20,04A
E
230 DATA 46,49,4C,45,0D,40,2D,20,20,
2D,20,20,20,20,52,45,41,44,2D,44,03E
D

```

240 DATA 49,53,48,30,45,52,52,4F,52,
20,43,48,41,4E,4E,45,4C,50,44,30,051
8
250 DATA 20,20,20,20,20,20,20,50,52,
49,4E,54,20,44,49,52,45,43,54,4F,049
7
260 DATA 52,59,00,54,20,20,20,20,20,
20,20,20,54,52,41,43,43,20,50,52,043
0
270 DATA 4F,47,52,41,40,00,58,20,20,
20,20,20,20,20,20,49,58,49,54,20,043
5
280 DATA 54,4F,20,42,41,53,49,49,00,
4C,20,20,20,20,20,20,20,20,57,52,043
7
290 DATA 49,54,45,20,20,52,4F,54,49,
43,54,20,44,49,53,48,00,55,20,20,051
0
300 DATA 20,20,20,20,20,20,57,52,49,
54,45,20,40,4E,41,42,4C,43,20,44,047
6
310 DATA 49,53,48,00,4A,20,20,20,20,
20,20,20,20,4C,4F,49,48,20,41,4C,041
4
320 DATA 4C,20,46,49,4C,45,53,00,4B,
20,20,20,20,20,20,20,20,55,4E,4C,042
6
330 DATA 4F,43,4B,20,41,4C,4C,20,46,
49,4C,43,33,00,41,20,20,20,20,045
7
340 DATA 20,20,20,4C,4F,43,48,20,41,
20,46,49,4C,45,00,42,20,20,20,20,03F
9
350 DATA 20,20,20,20,53,4E,4C,4F,43,
48,20,41,20,46,49,4C,45,00,3B,20,045
5
360 DATA 20,20,20,20,20,20,20,53,43,
52,40,40,4E,20,40,4F,44,49,46,50,048
8
370 DATA 20,42,55,46,46,45,52,00,00,
20,50,22,42,00,49,2A,20,CA,20,49,05B
7
380 DATA 00,80,01,02,20,00,20,C9,2A,
F0,F9,C9,20,F0,F9,AE,80,29,CA,00,0A5
5
390 DATA 81,29,00,0F,8E,00,02,8A,0A,
AA,BD,91,29,48,8D,90,29,48,80,CA,07F
E
400 DATA 10,E9,4C,C9,1E,19,00,8D,02,
02,20,00,20,C9,20,00,09,20,00,20,07E
2
410 DATA C9,20,00,0F,18,40,20,20,1F,
0A,0A,0A,0A,8D,02,02,20,00,20,20,049
0
420 DATA 28,1F,00,02,02,98,60,C9,3A,
00,29,0F,20,90,02,69,00,60,20,00,04B
B
430 DATA 20,20,FE,1E,90,1D,6D,A9,08,
20,0D,20,20,FE,1E,90,12,8D,AA,0B,07B
7
440 DATA 60,20,33,1F,20,7C,20,A9,31,

20,03,25,20,3A,20,4C,C9,1E,20,33,059
C
450 DATA 1F,20,7C,20,20,6B,25,A9,32,
20,4C,20,20,AA,20,4C,C9,1E,89,97,062
5
460 DATA 20,EC,20,89,00,0C,20,8B,20,
C8,00,03,EE,01,02,C6,97,00,8D,60,08F
2
470 DATA AD,01,02,00,06,0C,04,02,20,
01,60,68,68,4C,C9,1E,20,89,20,A9,073
E
480 DATA 2B,A2,2A,4C,CA,20,98,38,89,
0B,A8,A2,20,A9,12,20,CA,20,A2,00,07D
7
490 DATA 80,00,0C,29,7F,C9,20,80,02,
A9,2E,20,D2,7F,A9,60,85,F4,C8,CA,098
4
500 DATA 00,EA,A0,92,4C,D2,FF,4C,7D,
1C,AD,00,0C,D3,D2,88,8C,04,02,20,08E
2
510 DATA CF,FF,C9,54,00,0B,AD,80,8C,
04,02,4C,0A,20,C9,42,00,0B,AD,90,08E
8
520 DATA 9C,03,02,4C,0A,20,C9,0D,F0,
05,20,FE,1E,90,12,8D,03,02,20,CF,070
1
530 DATA FF,C9,00,F0,00,20,FE,1E,90,
03,8D,04,02,AC,03,02,20,03,1F,20,08C
4
540 DATA 95,1F,98,20,8B,20,20,EC,20,
A9,08,20,6F,1F,20,9F,1F,4C,00,20,062
9
550 DATA 20,FE,1E,90,03,99,00,0C,0B,
C8,97,60,20,FE,1E,90,13,A8,A9,08,089
1
560 DATA 85,97,20,0D,20,20,0D,20,20,
25,20,00,FB,20,9F,1F,4C,C9,1E,8D,062
1
570 DATA 74,20,AD,A9,0B,20,AE,20,8E,
7B,29,6D,7C,29,AD,AA,0B,20,AE,20,07A
0
580 DATA 8E,7E,29,8D,7F,29,A2,0F,20,
C9,FF,A2,00,8D,73,29,20,D2,FF,20,09D
7
590 DATA 80,00,00,F0,4C,CC,FF,A9,0F,
A8,A2,00,20,8A,FF,A9,02,A2,70,A9,080
9
600 DATA 29,20,8D,FF,20,C0,FF,A9,00,
A8,A2,0B,20,8A,FF,A9,01,A2,72,A9,082
3
610 DATA 29,20,8D,FF,4C,C0,FF,A9,00,
20,C3,FF,A9,0F,4C,C3,FF,A2,20,28,0A7
8
620 DATA 89,0A,90,03,EB,80,F9,69,3A,
60,40,4A,4A,4A,4A,20,D3,20,AA,6B,08A
F
630 DATA 29,0F,20,D3,20,4B,8A,20,D2,
FF,68,4C,D3,FF,18,69,FB,90,02,69,090
5
640 DATA 06,69,3A,60,20,CF,FF,C9,0D,
00,FB,68,68,4C,C9,1E,89,00,20,A9,092

3
 650 DATA 20.4C.D2.FF.A0.03.B9.1E.29.
 F0.0E.20.D2.FF.C8.D0.F5.AD.00.0C.0A0
 A
 660 DATA 8D.A9.0B.4B.20.BB.20.68.F0.
 D9.A0.03.B9.23.29.F0.06.20.D2.FF.095
 3
 670 DATA C8.D0.F5.AD.01.0C.8D.AA.0B.
 20.BB.20.4C.4D.1F.20.7C.2D.A2.0F.07A
 9
 680 DATA 20.C0.FF.A2.00.8D.6A.29.2D.
 D2.FF.E8.E0.06.D0.F5.20.CC.FF.A2.0BE
 B
 690 DATA 0F.20.C6.FF.A2.00.20.CF.FF.
 9D.6D.21.E8.E0.17.D9.F5.20.CC.FF.089
 E
 700 DATA A9.01.85.8C.8D.AA.0B.A9.12.
 8D.A9.0B.20.7D.FF.93.11.99.92.20.088
 4
 710 DATA 20.20.20.20.20.20.20.12.2D.
 20.20.20.20.20.20.20.20.20.20.027
 2
 720 DATA 20.20.20.20.20.20.20.20.20.
 20.2D.0D.9A.92.11.94.92.20.20.93.03E
 3
 730 DATA 45.20.20.4C.45.20.20.54.49.
 54.4C.45.20.20.20.20.20.20.20.03D
 B
 740 DATA 20.20.20.54.59.50.45.20.20.
 2D.20.20.20.20.20.C5.C5.C5.C5.C5.067
 B
 750 DATA C5.C5.C5.C5.C5.C5.C5.C5.C5.
 C5.C5.C5.C5.C5.C5.C5.C5.C5.0F8
 4
 760 DATA C5.C5.C5.C5.C5.C5.C5.C5.C5.
 C5.C5.C5.C5.C5.9E.00.20.4E.22.0CB
 9
 770 DATA AD.A9.0B.F0.19.20.8F.22.20.
 4E.22.AD.A9.0B.F0.0E.20.8F.22.AD.07A
 B
 780 DATA A9.0B.F0.06.20.59.22.4C.5D.
 21.20.89.20.A2.0F.20.C9.FF.A2.00.077
 3
 790 DATA 8D.64.29.20.D2.FF.E8.E0.0E.
 D0.F5.20.CC.FF.A2.0F.20.C8.FF.20.0B6
 F
 800 DATA CF.FF.48.20.CF.FF.20.CF.FF.
 48.2D.CC.FF.A9.24.20.D2.FF.68.20.0B6
 B
 810 DATA BB.20.68.20.BB.20.20.7D.FF.
 2D.42.4C.4F.43.4B.53.20.46.52.45.06B
 3
 820 DATA 45.0D.00.20.A4.20.A9.00.85.
 8C.4C.C6.1E.AD.A9.0B.F0.05.A9.31.075
 3
 830 DATA 20.4C.20.60.20.7D.FF.11.20.
 2D.2D.20.20.20.20.12.96.50.52.45.050
 B
 840 DATA 53.53.20.41.4E.59.20.4B.45.
 59.20.54.4F.20.43.4F.4E.54.49.4E.056
 3
 850 DATA 53.45.9E.92.00.20.84.FF.F0.
 F8.48.A9.93.20.D2.FF.68.60.A9.00.0A9
 E
 860 DATA 8D.A8.0B.85.FD.A2.0D.20.C8.
 FF.2D.CF.FF.8D.A9.0B.20.CF.FF.8D.0B0
 0
 870 DATA AA.0B.E6.FD.E6.FD.2D.CF.FF.
 85.FC.A5.FD.85.FF.20.CF.FF.FD.0C.0DF
 A
 880 DATA 8D.F9.29.20.CF.FF.8D.FA.29.
 4C.C8.22.2D.CF.FF.E6.FD.E6.FD.A0.0CD
 7
 890 DATA 0D.20.CF.FF.E6.FD.99.8D.0B.
 C8.18.CO.1D.9D.F2.A0.F3.20.CF.FF.0BE
 3
 900 DATA 99.0B.29.E6.FD.A5.90.F0.03.
 8D.A8.0B.C8.D0.EE.A3.FC.D0.0C.AD.0BC
 5
 910 DATA 8D.0B.D0.67.AD.A8.0B.D0.16.
 F0.A9.A5.8C.FD.03.20.20.23.AD.A7.096
 9
 920 DATA 0E.F0.03.20.18.23.AD.A8.0B.
 F0.F5.2D.CC.FF.60.A0.00.8F.AC.C8.089
 9
 930 DATA F0.0B.D9.8D.0B.D0.07.C8.D0.
 F3.EE.A8.0B.6D.A9.00.85.FC.6D.AD.083
 3
 940 DATA F9.29.20.AE.23.AD.FA.29.20.
 AE.23.AD.04.2A.20.AE.23.B9.8D.0B.082
 1
 950 DATA F0.06.20.D2.FF.C8.D0.F5.A5.
 FC.29.07.A8.B9.F4.29.8D.59.23.20.0AE
 C
 960 DATA D0.29.A5.FC.29.4D.FD.07.A2.
 96.A9.3C.2D.CA.20.A2.0D.A9.9E.4C.089
 3
 970 DATA CA.20.20.CC.FF.20.A4.20.20.
 E9.20.A9.96.A2.0D.20.CA.20.A9.0F.089
 3
 980 DATA A8.A2.06.20.8A.FF.A9.00.20.
 8D.FF.20.C0.FF.A2.0F.20.C8.FF.20.0A4
 5
 990 DATA CF.FF.20.D2.FF.C0.0D.D0.F8.
 2D.CC.FF.2D.A4.20.A9.9E.A2.0D.20.0B4
 0
 1000 DATA CA.20.4C.C9.1E.2D.BB.20.A9.
 2D.AA.4C.CA.20.A9.42.3C.A9.41.8D.0B
 4F
 1010 DATA 20.24.8D.3C.24.20.7D.FF.92.
 11.20.20.49.4E.53.45.52.54.20.44.05
 F1
 1020 DATA 49.53.4B.20.49.4E.20.44.52.
 49.56.43.20.20.20.20.96.12.41.92.05
 33
 1030 DATA 20.54.4F.20.41.42.4F.52.54.
 9E.09.09.20.59.22.C9.41.D0.03.4C.05
 CA
 1040 DATA E4.20.2D.7C.2D.2D.EC.26.A9.
 31.20.4C.2D.A2.0F.2D.C9.FF.A2.00.07
 93
 1050 DATA 8D.5C.29.20.D2.FF.E8.E0.07

.D0.F5.20.CC.FF.A2.02.86.FF.20.3B.0E
36
1060 DATA 39.A2.0D.20.C9.FF.A9.00.20
.D2.FF.20.CC.FF.A2.86.96.FF.20.3B.0A
6C
1070 DATA 28.A2.00.20.C9.FF.A9.00.20
.D2.FF.20.CC.FF.20.BC.26.A9.32.20.09
71
1080 DATA 4C.20.4C.84.20.A9.12.8D.00
.0C.A9.01.8D.01.0C.20.7C.20.8D.00.05
7D
1090 DATA 0C.F0.E8.8D.A9.08.8D.01.0C
.8D.AA.0B.A9.31.2D.05.25.A9.02.8A.08
1D
1100 DATA 8D.00.0C.F0.09.EA.EA.9D.00
.0C.8A.98.89.20.9D.EF.2D.8B.23.A9.08
3E
1110 DATA 32.8D.74.29.2D.87.20.20.1B
.29.AE.7B.29.AD.7C.29.2D.CA.20.20.08
35
1120 DATA 32.29.8E.7E.29.AD.7F.29.2D
.CA.20.4C.2B.24.20.7D.FF.93.0D.20.07
34
1130 DATA 20.20.20.20.20.20.20.20.20
.20.20.20.12.4C.4F.43.4B.20.41.4C.03
68
1140 DATA 4C.20.46.49.4C.43.53.92.0D
.0D.A9.09.8D.76.24.A9.40.8D.77.24.08
68
1150 DATA 20.59.22.20.4E.24.20.7D.FF
.0D.0D.20.20.20.20.20.20.20.20.12.03
F5
1160 DATA 41.4C.4C.20.46.49.4C.45.53
.20.41.52.45.20.4E.4F.57.20.4C.4F.05
33
1170 DATA 43.4B.45.44.92.9E.0D.09.4C
.06.1E.20.7D.FF.93.0D.20.20.20.06
40
1180 DATA 20.20.20.20.20.20.20.20.12
.53.4E.4C.4F.43.4B.20.41.4C.4C.2D.03
F7
1190 DATA 46.49.4C.45.53.92.0D.00.A9
.29.8D.76.24.A9.8F.8D.77.14.20.29.07
14
1200 DATA 22.20.4E.24.20.7D.FF.0D.0D
.20.20.20.20.20.20.29.12.41.4C.4C.04
35
1210 DATA 20.46.49.4C.45.53.20.41.52
.45.20.4E.4F.57.20.50.4E.4C.4F.43.05
40
1220 DATA 49.45.44.92.9E.0D.00.4C.06
.1E.A2.00.86.FF.20.3B.28.A2.0D.20.08
8A
1230 DATA C9.FF.A2.09.8D.00.0C.20.02
.FF.E8.50.F7.4C.0C.FF.20.4C.20.A2.0B
18
1240 DATA 0D.20.06.FF.A2.09.20.CF.FF
.9D.00.0C.E8.50.F7.4C.0C.FF.20.7D.0A
8E
1250 DATA FF.93.0D.20.20.20.20.20
.20.20.20.20.20.12.4C.4F.43.4B.04

5A
1260 DATA 20.45.4E.54.49.52.45.20.44
.49.53.4B.92.0D.0D.00.20.27.23.20.04
F8
1270 DATA 7D.FF.00.0D.20.20.20.20.20
.20.12.44.49.53.4B.20.49.53.20.4E.C4
8D
1280 DATA 4F.57.20.57.52.49.54.45.20
.20.52.4F.34.45.43.54.45.44.92.0D.05
8A
1290 DATA 00.4C.06.1E.20.7D.FF.93.0D
.2D.20.20.20.20.20.20.20.20.20.04
CC
1300 DATA 12.55.4E.4C.4F.43.4B.20.45
.4E.54.49.52.43.20.44.49.53.4B.92.05
A2
1310 DATA 0D.0D.00.20.8A.23.20.7D.FF
.6D.0D.20.20.20.12.44.49.53.4B.20.04
8A
1320 DATA 49.53.20.4E.4F.20.4C.4F.4E
.47.45.52.20.57.52.49.54.49.20.50.05
5B
1330 DATA 52.4F.54.45.43.54.45.44.92
.0D.00.4C.06.1E.20.7D.FF.93.0D.20.06
85
1340 DATA 20.20.20.20.20.20.20.20.20
.20.20.20.20.12.54.52.41.43.45.20.03
41
1350 DATA 41.20.46.49.4C.45.92.0D.0D
.09.A9.4B.8D.28.27.A9.26.8D.59.27.06
09
1360 DATA 20.FA.16.0D.CD.AD.F9.29.8D
.A9.0B.8D.FA.29.8D.8A.0B.20.3F.29.09
87
1370 DATA 20.F4.28.20.E9.20.CA.E8.20
.1D.FD.3E.8A.4B.20.1B.29.AD.A9.0B.08
C4
1380 DATA 0B.20.8B.20.28.F0.32.20.32
.29.AD.AA.0B.20.8B.2D.A9.31.20.4C.06
68
1390 DATA 20.A2.0D.20.C8.FF.20.CF.FF
.8D.A9.08.20.CF.FF.8D.AA.0B.20.0C.09
FF
1400 DATA FF.68.AA.4C.94.28.20.E9.20
.20.59.22.A2.FF.4C.8A.26.20.CC.FF.09
63
1410 DATA 20.84.20.68.A9.00.8D.A7.0B
.2D.E9.20.4C.06.1E.A9.00.2C.A9.01.07
0C
1420 DATA 8D.AA.0B.A9.12.8D.A9.0B.6D
.20.7D.FF.96.12.41.92.9E.20.54.4F.09
36
1430 DATA 20.41.42.4F.52.54.20.20.20
.20.20.20.20.20.20.20.20.20.20.03
58
1440 DATA 20.12.96.44.92.9E.20.45.4F
.52.20.44.49.52.45.43.54.4F.52.59.05
18
1450 DATA 0D.00.20.59.22.C9.41.D0.09
.20.0C.FF.20.84.20.4C.E4.20.C9.44.07
87

```

1460 DATA D0.17.A9.00.8D.A7.0B.A9.60
.8D.C9.1E.20.24.21.A9.A2.8D.C9.1E.0B
7D
1470 DATA 68.68.4C.00.00.A9.01.00.A7
.0B.A2.CF.A9.A0.9D.AC.0B.9D.09.29.07
22
1480 DATA CA.10.F7.20.7D.FF.0B.05.43
.4E.54.45.52.20.46.49.4C.45.4E.41.06
04
1490 DATA 4D.45.0D.0D.00.A2.00.20.CF
.FF.C9.6D.F0.08.9D.AC.0B.EB.E0.10.0B
56
1500 DATA D0.F1.A9.00.85.8C.20.7C.20
.20.EF.28.A9.31.2D.4C.2D.20.8F.22.07
A3
1510 DATA A5.FC.D0.25.AD.A9.0B.D9.EF
.2D.3F.29.20.F4.28.2D.7D.FF.0D.0D.09
4D
1520 DATA 96.20.2D.2D.2D.2D.2D.2D.2D
.2D.2D.2D.2D.2D.12.46.49.4C.45.2D.03
68
1530 DATA 4E.4F.54.20.46.4F.55.4E.44
.11.9E.92.0D.00.4C.FA.28.A9.00.8D.08
7D
1540 DATA A7.0B.AA.60.A9.09.8D.7F.28
.A9.4D.8D.8D.28.2D.7D.FF.93.0D.9E.0B
9A
1550 DATA 2D.2D.2D.2D.2D.2D.2D.2D.2D
.2D.2D.2D.2D.2D.12.4C.4F.43.4B.2D.03
1B
1560 DATA 41.20.46.49.4C.45.92.0D.0D
.00.A9.EB.8D.58.27.A9.27.8D.59.27.06
A4
1570 DATA 2D.FA.28.D0.C3.20.6D.28.2D
.7D.FF.20.49.53.2D.4E.4F.57.20.4C.07
6D
1580 DATA 4F.43.4B.45.44.0D.00.4C.06
.1E.A9.30.8D.59.29.A5.FF.C9.64.90.07
EC
1590 DATA 09.E9.64.85.FF.EE.59.29.D0
.F1.20.AE.20.8E.5A.29.8D.5B.29.A2.09
9D
1600 DATA 0F.2D.C9.FF.A2.00.8D.52.29
.2D.D2.FF.EB.E0.0A.D0.F5.4C.CC.FF.0B
7D
1610 DATA A9.31.8D.74.29.20.67.2D.2D
.2B.2B.A2.0D.2D.C9.FF.A5.FC.09.40.07
AF
1620 DATA 2D.D2.FF.20.CC.FF.A9.32.8D
.74.29.2D.67.2D.2D.A4.2D.A9.0D.AA.0B
CC
1630 DATA 2D.CA.2D.4C.F4.28.2D.7D.FF
.93.0D.9E.2D.2D.2D.2D.2D.2D.2D.2D.06
4C
1640 DATA 2D.2D.2D.2D.2D.12.55.4E.4C
.4F.43.4B.2D.41.2D.46.49.4C.45.92.04
B1
1650 DATA 0D.0D.09.A9.29.8D.7F.28.A9
.FF.8D.8D.28.A9.9B.8D.58.27.A9.28.07
0E
1660 DATA 6D.59.27.2D.FA.28.D0.C2.2D

```

```

.6D.28.2D.7D.FF.2D.49.53.2D.4E.4F.07
A9
1670 DATA 57.2D.55.4E.4C.4F.43.4B.45
.44.0D.00.4C.06.1E.A9.8C.85.07.8D.06
8A
1680 DATA 08.84.08.8D.0F.81.07.99.09
.29.86.10.FB.2D.7D.FF.0D.6D.00.6D.65
F5
1690 DATA 6D.00.00.6D.6D.00.00.00.00
.6D.00.00.00.8D.2D.7D.FF.0D.2D.2D.02
49
1700 DATA 2D.2D.2D.2D.2D.2D.2D.2D.2D
.54.52.41.43.4B.2D.00.6D.2D.7D.FF.64
B1
1710 DATA 2D.53.45.43.54.4F.52.2D.00
.6D.2D.7D.FF.93.0D.12.9E.46.49.4C.06
37
1720 DATA 45.4E.41.4D.45.2A.2D.6D.6D
.43.2D.5D.2D.31.33.2D.3D.3D.3D.4D.64
6D
1730 DATA 2D.57.61.61.61.41.6D.4D.2D
.52.FA.62.63.4D.2D.52.9D.07.17.49.04
63
1740 DATA 3D.23.29.31.3A.31.33.2D.2D
.2D.3D.3D.2D.3D.3D.0F.58.52.57.4D.64
24
1750 DATA 3B.2B.44.4D.4C.55.4A.4B.54
.41.42.A3.2D.49.1F.5A.1F.CA.1F.3D.05
B4
1760 DATA 2D.F9.2D.2D.21.4E.23.9A.2D
.FD.25.A6.24.07.25.4A.26.E4.27.9A.06
E4
1770 DATA 2D.2D.7D.FF.44.45.4C.45.84
.45.44.2D.2D.0D.6D.2D.7D.FF.53.45.06
6F
1780 DATA 51.2D.2D.2D.2D.2D.2D.00.6D
.2D.7D.FF.5D.52.4F.47.52.43.4D.2D.05
45
1790 DATA 2D.09.6D.2D.7D.FF.53.53.4D
.52.2D.2D.2D.2D.2D.0D.6D.2D.7D.FF.05
F7
1800 DATA 52.45.4C.41.54.49.56.4D.2D
.6D.6D.AE.8C.CA.D8.0D.0D.0D.0D.0D.05
EB
1810 DATA END
63995 PRINT "(CLR)":COLOR 1:COLOR 4.1
:CHAR 1,10,12,"YELLOWWORKING...$".1+C
HAR 1,14,14,"PLEASE WAIT".1:RESTORE
63996 READ#A:5-DEC(A):E-5.D0:READ#B
:1P8#="END"THENEXIT
63997 SU=0:(FORJ=0TO19:B=DEC(B)):POKE
E+3,B:SU=SU+B:CHAR 1,22,12,HEX$(E+3)+
"+$"+B$,1
63998 READ#B:NEXT B:B=B+20:(P0#>DEC(B
B) THENPRINT"(CLR)(DOWN)(DOWN)(DOWN)(D
OWN)(DOWN)(DOWN)DATA ERROR IN LINE"
PEEK(65)+256*PEEK(66):END
63999 LOOP:INPUT"(CLR)(DOWN)(DOWN)(D
OWN)(DOWN)(DOWN)FILENAME OF TA
BSET FILE:"NS:SAVE(WS).20.P(5)TOP:
E1:END

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Video

Classic

128

Classic Video 128 is a truly innovative addition to the home video market. It's the first 128 video card to offer, using a unique video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

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Supersave 64 is a truly innovative addition to the home video market. It's the first 64 video card to offer, using a unique video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

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Tricks & Tips for the 128

The 128 is the first computer to offer a true "real time" video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

Presenting the Amiga

The Amiga is the first computer to offer a true "real time" video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

The Anatomy of the 1571

The Anatomy of the 1571 is a truly innovative addition to the home video market. It's the first 1571 video card to offer, using a unique video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

Easy TYPE

Easy TYPE is a truly innovative addition to the home video market. It's the first Easy TYPE video card to offer, using a unique video stream processing technique called "the look-ahead video stream processing" which allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time. The look-ahead video stream processing technique allows the user to watch the video stream in real time.

The Anatomy of the 128

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Scratchpad

Eric Doyle presents a selection of your routines.

While delving through my box of routines I came across this one from one of our many Australian readers. This particular Wizard of Oz is Anthony Garrett of Capal, Western Australia, and he has conjured up a routine which will make a NIBBled program reappear as if by magic. Obviously, it's all entered in direct mode on any C64:

```
POKE 2000,0
SOS 2001
POKE 45,PEEK(174)
POKE 46,PEEK(175)
POKE 47,PEEK(176)
POKE 48,PEEK(177)
POKE 49,PEEK(178)
POKE 50,PEEK(179)
CLR
```

When NEW is entered two zero bytes are placed in the first two program memory locations. These normally tell the computer where to find the next line. Because zero bytes say "that's your last, pal", all programs end with two zeros and the REST and RUN commands react by leaping back to the familiar READY message above a flashing cursor. Naturally enough, if zeros are the first bytes these routines receive then they assume there's nothing worth reading and switch off straight away.

The first line gives a value to one of these bytes. It's not the correct value so the second line jumps to the REST routine which reclaims the lines. This is one of the clever little routines which the Operating System uses when you add a line to the middle of an existing program. The effect is that the first two bytes are changed to their correct values so the program is all there now.

Unfortunately, no one's told the rest of the computer, so it still won't run yet. This is where the other lines come in. Locations 174 and 175 now point to the end of the program but we have to make sure that locations 45 to 50 know this by poking the values in.

PROGRAM: SLOW PRINT

```
10 REM SLOW PRINT
20 M="THIS STRING HOLDS 100
  0 CHARACTERS"
30 LD=LDR#M:L=L+40-LL:V=0
  0
40 PRINT M;M$(1);(DOWN);(DOWN);
  (DOWN);(DOWN);(DOWN);M$(1);
  0
50 FOR#=1 TO 10
60 PRINT M$(M#),A,(1)
70 FOR B=1 TO 100:NEXT B,A
80 IF D=1 THEN 140
90 PRINT M$(1);(DOWN);(DOWN);
  (DOWN);(DOWN);(DOWN);M$(1);70B
  0
100 FOR B=1 TO 10
110 PRINT M$(1),B,(1)
120 FOR B=1 TO 100:NEXT B,A
130 PRINT M$(1);D=1:GOTO 70
40
140 END
```

PROGRAM: SCROLL

```
10 REM SCROLL STRING LEFT
20 LL=10
30 M=" "
  YOUR MESSAGE HERE... "
40 M=M+M TO 255:INSTRUC
  RE... "
50 LD=LDR#M:L=L+40-LL:V=0
60 FOR A=1 TO 10
70 PRINT M$(M);(DOWN);(DOWN);
  (DOWN);(DOWN);(DOWN);M$(1)
80 PRINT M$(M),A,(1)
90 FOR#=1 TO 100:NEXT B,A
```

Even now they're still not quite correct but a simple CLR command sorts them out properly. It's vital, back comes the old program.

Being the basic for a while, **B Night** of William Kaynes, has two string handling routines to give your old page a bit of pizzazz.

In both routines LE is the length of the string and L calculates a TAB value to check it in at the centre of the screen. Beyond that, my legs are tired. If you want to know what happens you'll have to try them for yourself.

Starboardline is famous for poetry and Steve Kimberley, who is well known as someone who likes powering about with C-64s to produce programs such as Cyborg, He writes, to give everyone the benefit of his experience:

"A listing is useful for debugging or producing a hard copy of some code. This program will allow the user to send monitor-style or disassembled code to a printer. Save the program and then run it. Specify AT or DW in the main and finish of your code and it will print the desired output."

PROGRAM: PROTECTOR

```
100 INPUT"PLEASE ENTER YOUR
  NAME";M$(1)
110 M=M+CHR$(147)+"PROTECTOR" M
  M+M+1:GOTO 100:WAIT
120 FOR D=1 TO LEN(M$(1))
130 FOR#100 TO 4:GOTO 100#M$(1)
  ,A,(1)
140 NEXT
150 FOR#100 TO 1:0
160 FOR L=PEEK(L) TO 40000
170 READ A:POKE L,A:ANDIT
180 GOTO 100#M$(1)
190 DATA 149,132,141,142,143,149
  ,152,144
200 DATA 7,5,6,149,149,149,149,
  152,132,130
210 DATA 171,76,116,104,0,0,0,
  0,0,0
220 DATA 149,144,141,142,149,
  147,141,7,1,1,14
```

"The program will abort after the first time to allow the printing of more than one block of code."

Nave also reminds us not to use the Basic program storage area at \$1000 for the code because the program overwrites it. We wouldn't be that stupid would we? Well, would we?

Makefile *Makefile* of Starvogue has something simple, short and effective which he'd like to share with the world. It's a loader routine for safeguarding your C64 programs.

The program works by asking the user's name and then storing a message high in memory. It then points the LIST jump vector to a routine which will print the message on the screen. The net effect is that any user naughty enough to try taking the program is greeted by a personalized refusal. The machine code breaks down into three simple routines:

4034-4034 points the LIST vector to the print message routine.

4015-4020 is the print message routine

4000-4000 restores the LIST vector

The last section of code is called by \$C1, \$C29. In the interests of security it can be omitted by leaving out line 208 and changing the larger number in the loop in line 168 to \$C29.

The creation readers of the magazine might also like to try hitting a trap in the protected program in case some bright

PROGRAM: C64 P/C LETTER

```

10 REM C64 P/C LETTER
20 PRINT, "HPROG16,LP
30 COLOR,1
40 COLOR,2,7
50 SCREEN=PRINT*(SCREEN) (SCREEN)
(SCREEN) (SCREEN) (SCREEN) (SCREEN) (SCREEN)
71 (RIGHT) (RIGHT) (RIGHT) (RIGHT) (RIGHT) (R
(RIGHT) (RIGHT) (RIGHT) (RIGHT)
(LEFT) (RIGHT) (RIGHT) (RIGHT) (RIGHT)
(LEFT) (LEFT) (RIGHT) (RIGHT) (RIGHT)
71"
60 PRINT*(SCREEN) (SCREEN) (RIGHT) (R
(LEFT) (LEFT) (LEFT) (LEFT) (LEFT) (R
70 INPUT*ROW/20 OR (SCREEN)
80 CLEAR
90 IF "123456789" THEN END
95 IF "BCDFGH" AND "IJKL" THEN
END

```

```

100 PRINT*(SCREEN) (RIGHT) (RIGHT)
(RIGHT) (RIGHT) (RIGHT) (RIGHT) (RIGHT)
71 (RIGHT) (RIGHT) (RIGHT) (R
110 INPUT*(LEFT) (SCREEN) (LEFT) (R
120 PRINT*(SCREEN) (RIGHT) (RIGHT)
(LEFT) (LEFT) (LEFT) (RIGHT) (LEFT)
(LEFT) (LEFT)
130 INPUT*(LEFT) (SCREEN) (LEFT) (R
LEFT) (LEFT) (LEFT)
140 COLOR,1
150 SCREEN
160 PRINT "81" "043;" "009
170 PRINT""
180 PRINT*(SCREEN) (SCREEN) (PRINT*(
190 (SCREEN) (SCREEN) (SCREEN)
190 (SCREEN) (SCREEN) (SCREEN) (S
200 INPUT, (SCREEN) (SCREEN)

```

spark teach it after bypassing the protection routine. Use this in your program exactly as it is printed, without spaces between the commands.

10 COLOR,0000

```

1000 A=PEEK(ADDRESS);R1#A
1010 IF A=ADDRESS/255-R1#A
1020 RETURN

```

Then move the cursor on to the space after the quotation marks in line 1000. Hold down CTRL, press 815 ON. Next press the letter T, 0433. Get out

of revs made and type something like FOR A = 1 TO 100. Repeat this procedure on line 1010 using 21 instead of 81 and type NEXT A immediately after them.

When you hit the part of the program the REMs override the actual statements making it look like a harmless delay loop. Not bad for a 1 admb, but it's fast!

If you're looking to see your crafty routines in plain text there is: Scratchpad, four Commodors, 1 Golden Square, London W8J 5AB.

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FROGG

PROGRAM: SCREEN DATA

START- 34576		34912	20843086 20202020	CH	652		
NO. BYTES- 1024		34920	86202030 20202086	CH	652		
24578	20202020 20202020	CH	256	34928	202020 20862020	CH	454
24584	20202020 20202020	CH	256	34936	2020208686 202020	CH	652
24592	20202020 20202020	CH	256	34944	208620 2086208620	CH	850
24600	20202020 20202020	CH	256	24952	20862086 20208620	CH	850
24608	20202020 20202020	CH	256	24960	86202086 20202086	CH	850
24616	20202020 20202020	CH	256	24968	2020202086 202020	CH	454
24624	20202020 20202020	CH	256	34976	202020868620 2020	CH	652
24632	20202020 20202020	CH	256	34984	2086202086202086	CH	850
24640	20202020 20202020	CH	256	24992	862020 2086868620	CH	1048
24648	20202020 20202020	CH	256	25000	20868686 20202086	CH	1048
24656	20202020 20202020	CH	256	25008	202020 2086862020	CH	454
24664	20202020 20202020	CH	256	25016	2020868686202020	CH	850
24672	20202020 20202020	CH	256	25024	2020202020202020	CH	256
24680	20202020 20202020	CH	256	25032	202020 2020202020	CH	256
24688	20202020 20202020	CH	256	25040	2020202020202020	CH	256
24696	2086868686868686	CH	1642	25048	202020 2086202020	CH	454
24704	8686868686868686	CH	1840	25056	2020202020202020	CH	256
24712	8686868686868686	CH	1840	25064	2020202020202020	CH	256
24720	8686868686868686	CH	1840	25072	2020202020202020	CH	256
24728	86868686 20202020	CH	1048	25080	2020202020202020	CH	256
24736	2020208686202020	CH	652	25088	2020202020202020	CH	256
24744	2020202020202020	CH	256	25096	2086868686868686	CH	1642
24752	2020202020202020	CH	256	25104	8686868686868686	CH	1840
24760	2020202020202020	CH	256	25112	8686868686868686	CH	1840
24768	2020202020202020	CH	454	25120	8686868686868686	CH	1840
24776	2020208686202020	CH	652	25128	8686202086202020	CH	850
24784	2020202020202020	CH	256	25136	2020202020202020	CH	256
24792	2020202020202020	CH	256	25144	2020202020202020	CH	256
24800	2020202020202020	CH	256	25152	2020202020202020	CH	256
24808	2020202086202020	CH	454	25160	2020202020202020	CH	256
24816	2020208686868620	CH	1048	25168	2020202020202020	CH	256
24824	86868686 20202086	CH	1246	25176	2020202020202020	CH	256
24832	8620202086862020	CH	850	25184	2020202020202020	CH	256
24840	208686 2020862020	CH	850	25192	2020202020202020	CH	256
24848	2086 202086202020	CH	652	25200	2020202020202020	CH	256
24856	2020208686202020	CH	652	25208	2020202020202020	CH	256
24864	20862086208620	CH	850	25216	2020202020202020	CH	256
24872	2086208620208620	CH	850	25224	1012051313200699	CH	124
24880	8620208620208620	CH	850	25232	120520340F201314	CH	161
24888	8620202086202020	CH	652	25240	0112142020202020	CH	199
24896	2020208686202020	CH	652	25248	2020202020202020	CH	256
24904	2086208620208620	CH	850				



THIS MONTH'S ARTICLE IS the final one in the series (all together — Ahh!) so I shall finish off by adding a title screen. The data should be typed in using the entry routine provided in the first article (Four Commodore, January '85). The start address is 345% and the number of bytes is 1634. Save it under the name of "ROCKCROCK".

The short piece of code simply sets the background colour to black, sets all character squares to blue background and transfers the data from \$8000 to \$8400 (the video matrix). Finally JOYREAD is called upon for a depression of the firebutton. That's it!

Enjoy yourself, and watch out for menacing Frochment!

Daryl Bowers

completes his

arcade series.

```

25256 : 2020202020202020 CH : 256
25264 : 2020202020202020 CH : 256
25272 : 2020202020202020 CH : 256
25280 : 2020202020202020 CH : 256
25288 : 2020202020202020 CH : 256
25296 : 2020202020202020 CH : 256
25304 : 2020202020202020 CH : 256
25312 : 2020202020202020 CH : 256
25320 : 2020202020202020 CH : 256
25328 : 2020202020202020 CH : 256
25336 : 2020202020202020 CH : 256
25344 : 2020202020202020 CH : 256
25352 : 2020202020202020 CH : 256
25360 : 2020202020202020 CH : 256
25368 : 2020202020202020 CH : 256
25376 : 202020202192004 CH : 191
25384 : 0112190520020F17 CH : 122
25392 : 0512132048232004 CH : 275
25400 : 4848302531323133 CH : 438
25408 : 3230343430353132 CH : 402
25416 : 3133323030303531 CH : 396
25424 : 3231333232303531 CH : 400
25432 : 3231333330353132 CH : 401
25440 : 3131303531323230 CH : 394
25448 : 3531313035353030 CH : 401
25456 : 3031313231393043 CH : 417
25464 : 3230303230463137 CH : 418
25472 : 3730313132313930 CH : 405
25480 : 4332303032304631 CH : 430
25488 : 3130313132313930 CH : 399
25496 : 4332303032304648 CH : 431
25504 : 3031313231393043 CH : 417
25512 : 3230303230303031 CH : 389
25520 : 3132313930433230 CH : 418
25528 : 3032323031313231 CH : 393
25536 : 3930433230303030 CH : 414
25544 : 3131323139304332 CH : 419
25552 : 3030303131323139 CH : 398
25560 : 3043323030313132 CH : 411
25568 : 3139304343303131 CH : 434
25576 : 3231393030303131 CH : 388
25584 : 3231393030313132 CH : 409
25592 : 3131303131323230 CH : 392

```

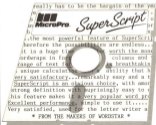
READY.

```

2800 : JRR TITLE
:
11000 FINAL : JRR WHITS
11010 : JRR SWARS
11020 : JRR INIT
11030 : RTS
11040 :
:
14510 TITLE : LDA #0
14520 : STA $D021
14530 : LDA #6
14540 : LDY #0
14550 COLOOP :
14560 : STA $D808.Y
14570 : STA $D900.Y
14580 : STA $DA08.Y
14590 : STA $DAP8.Y
14600 : DEY
14610 : BNE COLOOP
14620 :
14630 : LDY #0
14640 NXLOOP :
14650 : LDA $D000.Y
14660 : STA $D408.Y
14670 : LDA $D500.Y
14680 : STA $D508.Y
14690 : LDA $D600.Y
14700 : STA $D608.Y
14710 : LDA $D708.Y
14720 : STA $D808.Y
14730 : DEY
14740 : BNE NXLOOP
14750 MICHK :
14760 :
14770 : JSR JOYREAD
14780 : BCS MICHK
14790 : RTS
14800 :
14810 FINISH :
14820 : END

```


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EXHIBITIONism

IT'S NOT OFTEN THAT THE COMPUTER Press gets excited, but the official launch of the Amiga was an event not to be missed, for once the lure of a Champagne Breakfast wasn't the main attraction and the buzz which was going around wasn't the sound of all-night copywriters cackling up on their sleep.

We were shepherded past Ulmasoff's stand into the Commodore Theatre and the tension mounted. At last the gods would descend and reveal to us mere mortals the price of their great mistake. Never since Moses was given the Tablets of Stone had words been awaited with such great expectation.

Enter the Amiga

The reality was about as exciting as Moses disclosing a note to his milkman. With such a revolutionary piece of hardware one would have anticipated demo games, flashing lights and inspirational music. All we got was Clive Kaulay, a slide show and the intrusive strains of music by Pop!bendula from the Ulmasoff stand.

Admittedly, the slide show was produced by projected images from an Amiga which were, in their way, impressive but they merely gave a hint at the capabilities of the machine. No Amiga ball this time (just images to help the pop talk along. Oh yes, and the price. Any dreams of a sub £1000 price tag were soon shattered (if any such romantic dreams were still with us). The stark reality is £1425 + VAT with a single disk drive, which means £375 charge here £1700 for the more modest machine and £1875 + VAT for the twin drive version.

Music Sales' demonstration of the new Music Expansion System under the magic touch of megastar Rick Wakeman was far more impressive, but more of this later.

Outside the theatre the Show was coming to life like some great monster stirring itself after a year of hibernation. Another black-throated raven was waiting to unfold. Where were the big boys. Sir Gold and Aristocraft? I mean no disrespect to Bubble Bus, Ulmasoff, Mirvessell, Martech, Anco, Tyrosell and Lovell 9 who all made the effort to meet the people they serve so well, but the many games publishers were noticeable by their absence. Where were they all?

At least there was plenty for the punter in the bazaar basement. At times it seemed more like a Middle Eastern bazaar than an exhibition, with milling crowds and cat-cry offers. Not

Rick and Adam Wakeman



Eric Doyle takes a sidelong

look at the Seventh

Commodore Show.

The venue: Smeaton, Harrogate
The date: Friday, 19th May 1986
The venue: The Seventh Commodore Show
The time: 9.30am
The event: The Official Amiga Launch

that we saw much of a throng on Saturday with the FA Cup's inevitable attractions keeping the attendance down. In contrast, Sunday was like the good old days of computer mania, rambly and unwinding.

Updates the scene was beginning to look like the Commodore Pet Show of a year with the principal commodity being business software for the 64, 128 and Amiga.

The two Rioks



Reactions

The optimistically named Amiga Village was a special area set aside to display the Amiga and its works in all their glory. The new machine was put through its paces for interested groups of visitors but once again the enormous potential of the machine seemed to be frustrated, unless the sight of flying hotdogs turns on you one.

The Amiga is a bit of an enigma at the moment. Its undoubted graphics capabilities and speed make it an extremely desirable acquisition for computer buffs, but how will the business fraternity react. With the long shadow of IBM being cast across the marketplace I wonder if the Amiga's glow will shine brightly enough in the dark.

The general view of showgoers was that the Amiga will be a very strong contender in the area of Computer Aided Design, video graphics generation or even in the publishing world but I've yet to hear a convincing argument for it in the business world. Certainly the software on display failed to take my breath away. Commodore hopes that I'm wrong and would rather see IBM's lengthening shadow as a sign that the sun will soon be setting on its empire, heralding the rebirth of Commodore as a force in industry. Only time will tell if it's a case of welcome back CBM or sales Amiga.

Classics

The most impressive array of hardware was displayed by Vixta Software. No other company managed to create the impression of total support for the Commodore range. Kelvin Lacey of Vixta was not backward in expressing his surprise that CBM was giving the impression of being a one machine company.

On the Vixta stand, were displayed the full range PCs, 128K and 640 to show the power of the software. Particularly impressive was the K128 Vixta Classic Cartridge which must surely be the Bulk Buyer of wordprocessors. The cartridge gives instant access to the full power of the program plus the advantages of an 80 column display. Sophistication comes at a price, however, and in this case it is £99.95.

Get Smart

Next door to Vixta was a rather featureless looking area labelled Micropro International. Covering the same area as its neighbours, the stand looked empty because no display equipment had arrived. For the full weekend the staff busied heavily to make their presence felt amongst the empty drinks cans and other debris which their wide open spaces seemed to attract. The new product was equally as small as their display area but its significance is enormous. For the first time a Smart Card was being shown running a program on the 64 and 128.

Smart Cards look like normal credit cards but hidden within their plastic exterior is a small but powerful microchip. Micropro's application was the extremely popular SuperScript wordprocessor which simply slots into an adaptor in the cartridge part of the computer. This gives instant access to the user at a relatively modest cost of around £95.



To be Precise

SuperScript is a product from the Precision Software range, the full strength of which was being demonstrated next to the Amiga Village. In all honesty the demonstration of the precision Amiga graphics packages upstaged the official demonstration and visitors to the show squeezed in to the small display area to marvel at the numbers on display.

SuperScript and its companion program SuperBase have now been combined in the 128 so that both programs can run concurrently and exchange information for mailing list applications, making a very powerful business tool for the small businessman. For those who are still struggling with SuperBase, help is at hand with the publication of SuperBase: The Book and for those who have given up there is the simpler SuperBase Starter.

US Influence

The appearance of the Amiga has attracted one or two Stateside companies to test the water over here. Timeworks is

one such company which was particularly eager to show LibBusiness software. LibBasic, Micro Writer and Data Manager will all be appearing during these summer months. I am particularly eager to see the Timeworks Sideways program in operation. This is a spreadsheet utility which prints text along the length of printer paper instead of across the width, saving a lot of the time which collating and putting together printed sheets normally involves.

And Euro Power

The only true software launch at the show was a utility cartridge from Power Products which is a Danish company marketing its products through the auspices of Peter Warr's Rainbeck company in this country. The Power Cartridge has an impressive array of facilities not least of which is the fact that it employs its own external memory and is transparent to the computer. This means that it does not use a large chunk of memory which could be better used for programming.

Bizarre bargain

Bright Ideas

My own award for technical innovation at the show must go to Overboard. Bob Glynn revealed his Thing to the general public and everyone agreed that they'd never seen anything like it. Everyone wanted one. For around £7 you too can have a Thing! Just like his. What is it? When I tell you you'll kick yourself for not thinking of the idea yourself.

The best way to describe it is that it is a kind of building clip on a strong plastic arm which attaches to the top of your monitor. The clip will hold a listing or a piece of text which you want to type into your computer. Holding the clip up by your monitor means that eye movement is kept to a minimum and hopefully reduces the strain of constantly refocusing back and forth from copy to screen. Simple but very effective, the Thing proved very popular at the show and has the distinction of being compatible with any make of computer!

An alternative use for the Thing is to clip a picture of your girlfriend or spouse (or both) to it so that you don't forget what they look like!

When the going gets tough...



The cartridge offers programming toolkit commands to 64 lines, 8x10 type and disk commands, low and high resolution screen dumps and a machine code monitor.

All long list cartridges seem to be coming in a vogue for the 64 and a lot of this attention can be traced back to Germany and Holland. Robotik markets Dutch cartridges amongst its range of products. The Robotik 58 Cartridge fairly leaves the cartridge poon on my 64 and the Game Killer cartridge is proving to be phenomenally successful amongst the game playing fraternity. Paul Stone of Robotik is not slow to point out that the company is not short of ideas for the future. The latest product is a disk maintenance kit which should help prevent the need for costly repairs.

than Music Sales. Using Rick Wakeman and Rick Cardinall as demonstrators, the full potential of the FM music system was realised.

Once more Chris Kayday was called upon to act as Master of Ceremonies and his performance was quite a contrast to his appearance at the press launch. Life and soul of the party Chris bounced on to the stage and in his best-kept-of-the-show-style announced the two Ricks.

The staging could have been better staged by avoiding extensive views of Wakeman's rear end but the music was magic. Now ageing gracefully, Rick Wakeman has allowed himself of the long-haired, capped keyboard crusader look of his days with Yes and now merely looks rich. Rick Cardinall, in contrast, is more flamboyant and less rich. Dressed in a style which he self-confessingly describes as 'like the Penguin in Batman', it's a pity that Wakeman no longer employs a cape in his act.

Wakeman and Cardinall make a highly entertaining double act being both talented and witty. The audience sat open-mouthed as Wakeman worked his magic on the tones of the Music System while Cardinall showed the equally impressive powers of Music Sales Sound Sampler. Even Wakeman's son, Adam, got a look in and lets us all wondering if he'll follow in his father's footsteps in future years.

The price-performance of the show was a Commodore tap in which Cardinall distracted his voice through the sampler to give a rich, deep 'black' sound and then turned up the pure to make it sound like a Donald Duck rap.

This performance stole the Show for me. It overshadowed the Amiga demonstrations and even distracted my chavvinistic eyes from the inevitable levity of beautiful assistants at the stands.

Overall Impressions

The Show Guide reflected my total impression of the Show itself. It concentrated on the Amiga and the Music System with an old recycled review of the 128. Apart from that and the ads, it had nothing more to say. All in all, it was like an extra edition of a certain magazine.

This time the attendance indicated an upturn in the fortunes of the computer trade but the games field failed to reflect this hope by several noticeable show-appearances. The attitude of the show game was summed up by one youth, obviously suffering the onset of adolescence. He took a long look at the leggy blonde handing out the Show catalogues and was heard to exclaim, 'Can, look at the legs on that'. To this his friend replied, 'Never mind those we came to look at computers!'. Such single-minded dedication should have been rewarded with a better showing from the industry.

Opinions

Although some of the big companies weren't there, PC men seemed to be cheering the bars like gales round a won't bet. Grunting and squeaking about their companies later 'blackwaters' it gave hope for the games market but I felt there was an air of desperation in their cries. There is no doubt that games sales generally are not what they used to be.

One little ray of sunshine in this impending gloom was Mike 'Yes in the look' Easter of Telebit, once described as the most eligible bachelor in PR and still desperately trying to prove it. He is the voice of hope about his taps that the full potential of the games market is not being fully realised because the games market lacks genuine innovation. I would tend to agree with this having seen so many 'cloned' games of late.

And the Sheep

One innovator who has been very quiet of late is the unglorious Jeff Adams. His new game, *Irish Alpha*, is still under development but the demo he had running looks very interesting, demonstrating yet another facet of mirror image lateral screen splitting which he pioneered with *Sheep in Space*.

Keyed Up

With its slight (and unfortunately sound) of glamour was the Commodore Theatre, aforementioned site of the damp squib Amiga launch. During the Show several companies used this as a venue to give full blown demonstrations of products, but none more effectively

Runecaster leads you into
the dark and complex world
of adventures.

THOSE THOUSANDS OF ADVENTURERS who cast their teeth on the Hobbit will probably already have got their copy of 'The Lord of the Rings'.

When it is introduced, 'The Hobbit' set new standards for adventure games. It is this long-awaited sequel from Melbourne House going to shine as brightly!

The suspense of waiting has finally given way to an avid feeling of anticipation at the size of the program and the way the main characters can interact. This is only part one of a three part trilogy, with the second and third parts still a long way off. The original story was published in three books and the computer game version will follow this pattern. The first, based on book one, is entitled The Fellowship of the Ring.

The program comes on two cassettes which contain a cut-down beginner's game in addition to the two separate parts of the main adventure. Also included in the package is the 180-plus page book (the first part of the trilogy) together with an excellent instruction booklet.

The beginner's game is well presented and should prove a good introduction to adventure gaming. Its responses to the input 'HELP' are fairly direct and give the newcomer a good idea of what adventures are all about. The main adventures do not recognize this command!

Although listed in some quarters as a graphics adventure, very few pictures are used in the main game, most appearing in the beginner's version. What graphics there are, are not very inspiring and it is no way close to the atmosphere found in The Hobbit.

When starting the game you will be asked which of the four hobbits — Frodo, Sam, Pippin or Merry — you wish to control. You may choose one or more but whilst playing one character, the others will generally follow the leader unless specifically told to do otherwise.

The screen display resembles a stack of four sheets of paper slightly displaced, so that in addition to the top page, a little of the left hand side of the three other sheets may also be seen. Pictures of characters at your present location are shown at the left on the top sheet. Main characters elsewhere are shown on the three sheets underneath.

The game has many of the ingredients of the original book. Players who have read The Fellowship of the Ring will often have a feeling of déjà-vu. Reading the book is recommended as the game follows the story more closely than The Hobbit game did. Far from spoiling the adventure, this adds to the pleasure for Lord of the Rings fans and



there are still plenty of puzzles to be solved!

There are plenty of locations to explore which contain nothing of special importance in solving the game but which add a lot to the general atmosphere. This greatly increases the feeling of a role playing game.

There is much to commend in Melbourne House's latest epic, really there is a darker side to the coin too. Program operation is desperately slow, there are a number of fatal bugs that will cause the program to crash and some of the responses to input commands are ludicrous to say the least.

Nearly all actions result in a fair amount of text being displayed. This takes some time to appear, no doubt partially due to the program also working out what the various independent characters are doing at that time. More Frodo to a new location and the three other hobbits, together with any other companions, will follow

him in their own good time!

Half a minute between moves is good going, sometimes over a minute is required to regain control of the input cursor to enter your next command! The program will crash if you go into a dark place without matches to light your way and I've heard reports of other situations that give a similar result.

Such is a complexity of the game that it is not possible to QUIT and just start from the beginning — you must reload the program from scratch. This can be onerous to some extent by frequent SAVINGs of your game position on a separate data tape but again this process does tend to slow the game play somewhat.

Complex input commands are accepted, as is talking to other characters (a necessity on occasions). With such a complicated game it is perhaps not surprising that some strange responses are produced but it can be a bit annoying when an item passed from

one hobby to another is lost in the process!

For all its faults *The Lord of the Rings* is a marvellous game for anyone with the blood of Middle Earth in their veins. Newcomers to this wonderful world may well despair but those of us who have waited for further hobby trash from the Shire will sit back and enjoy the experience.

Americana

Although there have been some notable releases of adventure games from UK writers in the last few months, the continuing trickle of American imports is most welcome. Activision's release of the cassette version of *Midnightowls* seems to have made other software houses aware of the gains to be made by having games available on something other than disk.

US Gold has recently launched an updated version of an old favourite on both disk and cassette for the C64/128 — *Aylinn*. This gained popularity some years ago as a crude, but successful, graphics adventure for the TRS 80 as *Aylinn II*. It was followed by a slightly easier version *Aylinn III* but with basically the same plot.

This new version seems to be an improved version of *Aylinn II*, with good graphics and a very device 3-D maze of corridors and rooms that you must map (with difficulty) and explore. Trapping essentially through the maze and only exit available to you.

The theme is that you have been 'put away' after being found wandering the streets entering such phrases as "Take the book and stop the cattle!" and "May the dagger with the sword". Sounds familiar doesn't it!

The door to your room has been inadvertently left unlocked and you must try to find a way to escape. Dressing up as a doctor seems to be the recommended method but first you must find the necessary objects to give your disguise authority.

Down to other rooms will be locked but electronic keys can be found to unlock them. Having opened and examined the contents of those rooms you must remember to close the doors behind you — too many doors left open will set off the alarm!

If my memory serves me correctly the original *Aylinn II* had random alarms connected to some doors but this version has not yet caught on (that way) On entering a room, you may find a box containing something useful — pick it up and the box disappears, put it down and it reappears in its box!

You may also hide things under the furniture but remember where you put them because there will be no indications of their hiding place (once you've set them down). The vocabulary is extensive and may be reviewed at any time by pressing function key F1. Key F2 will present a 'slide show' of some of the

pictures you may find on your travels.

Input commands recognised are fairly comprehensive allowing such as: "DODGE THE BOMB, EXCEPT THE RED COUSIN!", "TRADE COINS FOR BROTHERS ARM" and "GET MAGNET, KNIFE AND SIVER CARD". Several commonly used words are recognised by their initial letter, which saves a great deal of typing. "D D W CARD" is a lot quicker than typing "OPEN DOOR WITH CARD".

The graphics are good films pictures and are at their best when you enter special scenes or meet various characters in the corridors. You may move around the corridors by using the cursor keys (or turning left or right and the up/down key for moving forwards). Examine everything, you never know what or where anything useful may be hidden but never "LOOK UP", true to the original version, something unexpected may fall on your head!

It certainly looks as though this program has been given a new lease of life. US Gold should be congratulated as this 'resurrection program' for marketing greatly improved versions of some of the home computer's classic games: *The Temple of Apokalips* and now *Aylinn*. What next!



Team Play

Fancy a multi-player adventure game? *The Causes of Chaos* from CRL offers the opportunity of a six player game. You can either have together or wage war on each other as the mood takes you. Working in unison seems the way to go, as otherwise someone will have to sit there with their eyes shut!

The game is a fairly basic text only adventure, with the aim being to find six clues, reveal treasures. At the beginning you must enter how many are to play, their names and how many turns each is allowed (one to nine). The input

command is of the type verb/object and the game does not appear to have a very large vocabulary.

If another player is present you may attack him or her. The outcome of each 'round' is determined by who passes a key first and their present status — weapon skill, hit points remaining etc. A reasonable system but not exactly like-to-your-computer's-number key!

The game is a little difficult to get into with only a few locations accessible at the start. Location descriptions are brief and the exits vary slightly if the one player game has been chosen! There are a series of help messages, but generally the text is a little thin.

CRL has a good reputation for software but *The Causes of Chaos* is below normal standard and is certainly not going to get into any top ten.

Last of a Line

Taitex has produced some good arcade games in the past few years and now this company has launched its first adventure look of *Darkon*. It is also the last game as Taitex has gone the way of many promising software houses and no longer exists but this game is still available.

Darkon of the Iron is a text and graphics adventure where players will love or hate. Yes one of those! It has a fairly standard plot, where you, the hero, will hopefully free the world from its evil overlord Darkon. The world is the planet Nirgon, you are 'bionic' and are accompanied by a robot called Komput!

There is a strange mixture of ancient and modern with anti-gravity belts as well as swords and axes. Make the most of what you can find, for there are plenty of things hidden in this game, over 15 possibly useful objects in the first 10 locations!

There is a text panel at the top of the screen that describes your immediate surroundings — but not what may be lying around for you to pick up. Below, the screen is split, with a five-by-two colour picture on the left and on the right a scrolling text window that displays the replies to your input commands.

Multi-word commands of the type "ATTACK THE MAIN BRN+THE MIRROR" are accepted but the vocabulary is limited. "DODGE" or "Y" will display a list of the verbs that are understood and this will often be scanned in the hope of finding the right word.

You are not always told what you might have discovered, frequent use of "LOOK" is to be recommended. HELP is recognised by the game and does not bring any immediate assistance but "LEGEND" will present various useful but cryptic messages.

Each step seems to involve a puzzle and you may feel that some of these are somewhat contrived. There are characters to meet but the vocabulary limits any great interaction! Definitely

not a game for the novice adventurer as progress is restricted to very few locations until a number of puzzles have been solved.

Communicate

Playing adventures may not be the most popular use for a home computer but it certainly has a following that is both large and growing. There are adventure columns in nearly every magazine and a growing number of independent, privately produced, dedicated adventure mags.

The independents are usually photocopied affairs crammed with news, views and reviews. You may think that with so many people all looking at the same source material that they would all be repeating the same things about the same games — not so. Each reviewer has his own ideas as to what makes a game a winner or a loser.

Some games stand out from the pack, while others fall by the wayside completely. Fortunately the latter are getting fewer. But although the appeal of adventures is widespread, not everybody likes to play the same type of game. The trick is to find the reviewer who has a similar taste to yourself.

Adventure columns should be as impartial as possible with a good reviewer having spent a fair time trying to solve the adventures he reviews. We

are not super-heroes, able to solve every game in just a few hours but we do have the experience of dozens of adventures to draw upon. The more you read, the more likely you are to be able to judge which games are for you.

One of the newer independents is 'Gorbarn', edited by Nick Wallford at 84 Kendall Road, Sheffield S8 4QH. A single issue is 50p or a year's subscription, £3.00. Our sample had some 30 pages of info, maps, letters and general furbles — not bad for 50p.

The best known independent is probably that of the Adventurers Club Ltd, 84C, Henevell Road, London NW9 3BH. This is a monthly 30 page dossier, costs £10.95 yearly and is a more professional set up linked with discounted software, a phone-in help line, competitions and various other offers. The Adventurers Club is run by dedicated volunteers, they know what you want and aim to supply it.

The less formal approach of these independent mags, tend to encourage a good response from readers but even here there is a delay between the writing of a question or answer and its publication. Phone-in help lines are one answer but an even more exciting development is becoming more and more popular with computer users — electronic mail, bulletin boards and special interest groups.

All these and more, are the outcome of linking your computer via a modem to many of the free networks set up around the country. Modems are becoming cheaper and often come with a list of phone numbers that will give you access to several of these bulletin boards.

There are many topics covered, ranging from where to next to alternative modems! Gain a few hours with adventure clubs and/or the facility to leave messages requesting help. Another aspect of this form of communication is access to adventure games themselves, where the program can be downloaded directly into your own computer.

For some networks you have to pay a regular subscription but there are usually some features that make this worthwhile. Buy a Commodore modem and you will probably also get a limited free sale to Compuserve. They offer all the usual bulletin board facilities plus much more.

There are even a number of well known games (Level Nine for instance), available for downloading from Compuserve at less than the normal retail price. These have the added advantage of being disk based even if those in the shops were only on cassette. Having once got a modem there may even be the temptation to join in some real-time adventures with other modem users.

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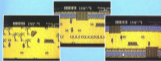
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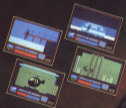
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